THE DERIVATIVE CONDITION

A Present Inquiry into the History of Futures

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Ph.D. submission in
Research Architecture

I hereby declare that the work presented in this thesis meets the full requirements of a doctoral dissertation in the Centre for Research Architecture (CRA) and is my own.

The artistic practice is mainly my own. But as I often work collaboratively, I provide credits with the captions of the respective works.

Signed: _____

Gerald Nestler, September 29, 2016

ABSTRACT

The thesis revisits the innovations that have reshaped financial markets since the 1970s in order to access their contemporary efficacy in shaping the space-time of the market as well as those of politics and social relations.

The future emerges today within a derivative paradigm – the implementation of data-intensive, algorithmic processes based on scientific modelling and mathematical equations that allow the dynamic recalibration of contingent claims at present. Financial markets are exposed to volatility, which corresponds to uncertainty. Risk, defined as “measurable uncertainty” (Knight, 10921), is the powerful tool that keeps the complex circulation of leveraged capital operating (primarily by applying probability calculus to random or historic data).

The promise of history succumbs to a quantitative archive of data whose “sense” is to produce claims on probable futures at present. The thesis argues that the derivative paradigm by the power given to financial markets has effectively been re-orienting not only market relations but social relations as well. As this derivative condition includes every underlying and derivative (all expectations traded) in their complex and volatile interrelation, the market regime – both embodying and exceeding the neoliberal framework– expands the derivative paradigm into society and the contingent becoming of subjectivities.

While the thesis proposes a critique of the derivative condition, the practice part explores the “aesthetics of resolution.” This postdisciplinary project works through the semantic field of the term – from visualization technologies to knowledge-production to decision-making – in order to propose an expanded and radical form of artistic engagement.

The question for both the theoretical and the practice part is whether derivatives are a technology and ultimately not confined to capitalism. Can they serve the needs and desires within complex societies? Can they help us decide which risks we should avoid and which risks we can embrace for the common good?

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PROLOGUE

DEFINITIONS OF THE TERM DERIVATIVE

- Something derived.
- Linguistics
  A word formed from another by derivation, such as electricity from electric.

- Mathematics
  a. The limiting value of the ratio of the change in a function to the corresponding change in its independent variable.
  b. The instantaneous rate of change of a function with respect to its variable.
  c. The slope of the tangent line to the graph of a function at a given point. Also called differential coefficient, fluxion.

- Chemistry
  A compound derived or obtained from another and containing essential elements of the parent substance.

- Business
  An investment that derives its value from another more fundamental investment, as a commitment to buy a bond for a certain sum on a certain date.[1]

- A security whose price is dependent upon or derived from one or more underlying assets.
  The derivative itself is merely a contract between two or more parties. Its value is determined by fluctuations in the underlying asset. The most common underlying assets include stocks, bonds, commodities, currencies, interest rates and market indexes. Most derivatives are characterized by high leverage. Futures contracts, forward contracts, options and swaps are the most common types of derivatives. Derivatives are contracts and can be used as an underlying asset. […] Derivatives are generally used as an instrument to hedge risk, but can also be used for speculative purposes.[2]

- Adjective
  (typically of an artist or work of art) Imitative of the work of another person, and usually disapproved of for that reason.

- Noun
  Something that is based on another source.[3]

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[1] http://www.thefreedictionary.com/derivative
[2] Excerpt from: http://www.investopedia.com/terms/d/derivative.asp#axzz2AVNLtfSs
[3] https://www.google.com/search?q=definition+derivative&ie=utf-8&oe=utf-8&aq=t&rls=org.mozilla:en-US:official&client=firefox-a

CHAPTER 1

ON THE ARTISTIC METHODOLOGY AND BEYOND

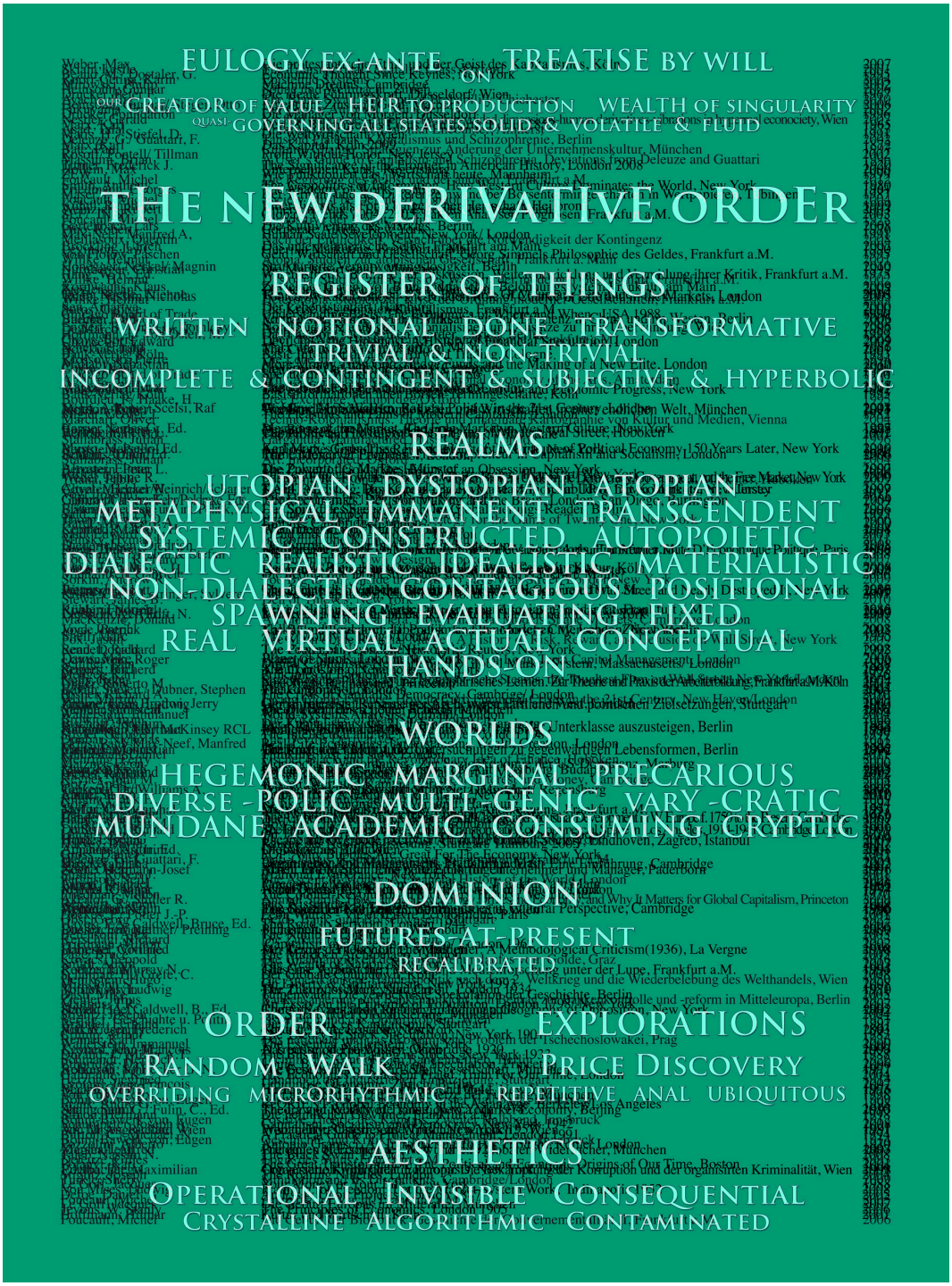

Fig. 1: THE NEW DERIVATIVE ORDER. REGISTER, poster print, 2014.

COLLECTIVE I

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ART AS POSTDISCIPLINARY RESEARCH

A NON-DIRECTIONAL ENGAGEMENT

Every canvas is a crisis, a convulsion. —Dorothea Tanning[1]

This thesis, entitled *THE DERIVATIVE CONDITION. A present inquiry into the history of futures*, explores how a sea change in the financial markets has transformed finance and capitalism since the early 1970s. As the term "capitalism" implies, this transformation is not restricted to markets per se, but has effected a revolution in all social realms, or, as Karl Marx would have said "on the surface of society"[2].

To very briefly introduce this transformation, the "movement of capital as a whole" (to quote Marx again from the same page in Capital, Volume III) shifts capital from its 'dependence' on labour to a logistics of surplus extraction, which leverages debt from past obligation towards future optionality – in other words, into a realm where labour does not (yet) exist. The original space of this productive circulation can be found in the micro-volatilities of a seemingly mundane aspect of markets: market making / trading. Volatility is a financial term that is equivalent to risk. Risk is a term that points to the future, or rather, to a bifurcation as regards this future, as risk deviates from certainty, and thus implies a differentiation of expectations. The operational, contractual, and quantitative principle of such differentiation – on the level of the whole of financial markets – in a non-directional space is the derivative. Derivatives, in their most direct application (in financial terms "vanillas"), are contractual technologies that provide the pricing of expectations in volatile and varying environments. In other words, derivatives are tools for navigating non-directional flows by separating risk from the uncertainty of the future per se. Hence, in order to exploit – or insure against – the future, financial capitalism is engaged in the quantitative production of risk.

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[1] See: https://www.theguardian.com/artanddesign/2004/aug/15/art.fiction
[2] Karl Marx, *Capital, A Critique of Political Economy*, Volume III, Chapter 1, edited by Friedrich Engels (New York: International Publishers, n.d.), p. 19.

A situation in which such a transformation became possible occurred with the accumulation of crises in the early 1970s. In our context, the most significant example was the dismantling of the Bretton Woods system and the subsequent collapse of the post-war era, which led to the floating of national currencies. Consequently, both national economies and markets experienced new levels of risk that had to be dealt with not only politically but also economically. This much more volatile world ushered in a new alliance between political and business interests, which in its wake brought about a new political economy. On a technical level, the innovations that became prevalent were based on a reoriented attitude towards risk (i.e. volatility): direct and incessant "attacks" against uncertainty in the shape of competitive claims on the future.

This shift constituted a weather divide in the financial markets, which led to a climate change in capitalism as a whole. The attitude was brought about by a new conceptualization risk via derivatives and was based on scientific experiment and modelling (the most famous of which is the Black-Scholes-Merton option-pricing model). It supplanted the previous bad faith in derivatives that had been considered instruments of immoral hazard (in the USA, they had even been regarded as unpatriotic because they allowed speculating on the downfall of US-corporations). The institutionalization of this new paradigm is exemplified by the founding of the first derivative market place, the Chicago Board Option Exchange (CBOE). All these decisive moments – the final blow to Bretton Woods, the publication of the Black-Scholes paper and the following contribution by Merton, as well as the establishment of the CBOE – happened in in the watershed year of 1973. This radical shift was not merely confined to markets. It transformed the world.

The concurrent expansion of capitalism on a global scale adds to the urgency to examine the financial formation of current political and economic power relations. There is an abundance of critical literature on contemporary capitalism and globalization that debate, amongst other themes, corporate and institutional power; immaterial labour; human capital and affect; debt and credit expansion; quantitative evaluation schemes. Frederic Jameson's *Postmodernism, Or, The Cultural Logic of Late Capitalism* (Durham: Duke University Press, 1991), Christian Marazzi's *Il posto dei calzini* (1994; English version under the title *Capital and Affetcs. The Politics of Language Economy* (Los Angeles: Semiotext(e), 2004), David Harvey's *Spaces of Capital: Towards a Critical Geography* (New York: Routledge, 2001) or Maurizio Lazzarato's *The Making of the Indebted Man: An Essay on the Neoliberal Condition* (Los Angeles: Semiotext(e), 2012) are only four more widely known examples written in the space of about 20 years. But even these highly critical engagements with the current mode of capitalism do not attack their topic at its very root and proper depth:

the financial markets. They concur that the market system is at the core of neoliberalism and financialization. Of course, the pressing questions of what derivatives are and how they activate financial as well as social change have been explored . for example by scholars like Randy Martin, Benjamin Lee and Edward Li Puma; cultural critics and activists like Brian Holmes; and more technically by sociologists of finance like Karin Knorr Cetina and Donald McKenzie. But these discussion of how financial innovation, modelling, and practice have shaped our world has been comparatively less foregrounded in wider critical forums and even more so in the public.

My contribution to these issues derives from an approach that is probably slightly unusual: It is a practice-based exploration on two levels of engagement: I worked as a broker and trader to acquire direct insight into financial markets; and the decision to follow this route was based on a curiosity that derived directly from my work as an artist. The following cultural critique of the derivative and its financial, social as well as affective implications is therefore grounded in artistic practice and research that was only later followed by theoretical examination. The ideas but forward in this thesis derive from the non-directional logics of art because I believe that observing a specific practice through the lenses of another practice can contribute to and enrich what is mainly an academic discussion. Finance and art might seem widely different and engaged in distinct practices, narratives and materials. But while this is true to a large extent, there are more affinities between the two as one might imagine at first.

Based on such an interaction between artistic and theoretical research, this thesis explores the transformation from the early 1970s to today from the perspective of what has become the core of contemporary finance: derivatives. It follows the technological, contractual, and structural innovations and developments in finance and takes them beyond the confines of financial markets where the derivative enters its actual leverage point: its *socialisation*. This is the story of what I call the *Derivative Condition*.

THE THESIS AS AN INSTANCE OF POSTDISCIPLINARY RESEARCH
REMARKS ON THE ARTISTIC METHODOLOGIES

How do we produce it, capture it, enrich it, and permanently reinvent it in a way that renders it compatible with Universes of mutant value? —Félix Guattari, on the question of subjectivity[3]

I noted above that my inquiry is indebted to both artistic and theoretical methodologies. I call this approach postdisciplinary to declare art is a field of its own and not a discipline in the common epistemic sense. Art is, to the advantage of difference and multiplicity, a certain totality in which by definition everything is possible; especially the unexpected. From this follows, as I will elaborate later, that the Western conception of art is a risk endeavour in which the artist embodies risk, rather than quantitatively insure against or speculate on it. It shares its roots with science and commerce, which were all three born from the sea change brought about by early modernism during the renaissance period. Today, art is the site where new forms of thinking and making often find their initial experimental environment, which not only includes social and political engagements but also disciplines as such. In contrast to the more widely used terminology of interdisciplinary or transdisciplinary research, postdisciplinarity in my understanding is the very mode of research in which art matters; a form of activism in which the logics of art are brought to fruition along tangents on which art meets other fields of research.

This postdisciplinary approach is due to my biography. And as it might help the reader to understand where I come from professionally, I will briefly delineate some of the early moments of my artistic development that led me to engage with finance.

I started to explore finance and economics after I had suffered the ‘shock’ of the Internet. I was working with early net art collectives (such as the Vienna base of The Thing) when the World Wide Web went online. Intuitively, I realised that from that moment on the web would develop into a huge social fabric in which markets and capitalism would play a massive role – my shock moment was that we had been tinkering with the net as a place free of capitalist interference, a utopia of commons and what had been a beautiful experiment seemed to turn into an illusion. The effect was that I felt that we would not be able to raise the urgent questions of our time without comprehending finance and its relations to society and the individual. This

[3] Félix Guattari, *Chaosmosis. An ethico-aesthetic paradigm*, transl. Paul Bains (Indiana University Press, Bloomington & Indianapolis: 1995) p. 135

sparked an urgent desire to learn what this new form of capitalism implied. But as I was totally ignorant I had to delve right into and confront finance directly in order to understand. As an artist, understanding did not imply to me to accumulate theoretical knowledge (I could have studied economics). Rather, it meant exposing myself to the mental, affective and even physical experience of working in finance, which; I assumed, might have a transformative effect on me. The question was, how much of my past would still live in my future (and whether this future self would still be interested in my past self). In other words, how could I stay *present* while exposing myself to this highly personal risk and at the same time learn as much as I could about my new subject? At that time, I wasn't aware of the fact that I was already letting myself into what I now call the derivative condition by practicing an artistic approach to the volatility of experience: by not only embracing but embodying risk.

My personal experience and my experience as a trader and broker at the speculative height of the dot.com bubble (I worked in finance from 1994-1997) set me on a path that I am still following: exploring finance as a new mode of capitalism with enormous relevance beyond markets proper. The material that I have activated in the process of researching, understanding, and conceptualising the topic of my investigation is a collection of artistic experiments as well as readings from varied fields of research, amongst which economics, financial engineering, the sociology of finance and sociology more generally, systems and complexity theory, anthropology, ethnology, philosophy, art and critical theory are the most obvious.

The art-based archive underlying my research – which is collected in the practice portfolio following the text section of this thesis – is therefore extensive and encompasses a broad range of reflections and practice that go beyond the constraints of a thesis (for example, the sectioning of text and artwork).[4] Hence, it is important to clarify that art's underlying bearing is crucial for my understanding of the impact and implementation of financial measures in contemporary societies. The text is based on my artistic practice, and not the other way round. It is informed by the logics of art, activism and theory, which, I hope, have been cross-fertilizing on this journey.

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[4] The impact of finance on society has itself developed from theoretical research that not only asks about markets but also engages with questions regarding the individual and society, and the ethical, aesthetic and political frameworks to which markets have recently been made the favoured answer. Thus, the person acknowledged with building the fundament on which classical economics – and with it the 19th century idea of the *homo economicus* as a self-interested and rational being – have been developed, Adam Smith, is an early example of such a wider field of interest and study. Even though he is most known for pioneering political economy with "An Inquiry into the Nature and Cause of the Wealth of Nations" (1776), he was in fact a social philosopher whose earlier "The Theory of Moral Sentiments" (1759) introduces "sympathy" as the inherent interest in the well-being of others.

Fig 2: Gerald Nestler, *Bottomless Bit, Elastic*, 2012

To exemplify this with a work of art: I included a broad scope of writings pertaining to the rationalisation of socio-economic questions and issues as part of my installation *Bottomless Pit, Elastic* (Fig. 2). The so-called *Contingent Archive* (see Practice Portfolio Appendix B for a list version) constitutes the index of this collection of books up to the year 2012. In the artwork it becomes the fundamental value within a volatility setting, a probabilistic and highly invested historic arrangement on future optionality. While many of these ideological risk options have expired, some preserve a monopoly, especially in the realm of economics. The visitors who let themselves in on the volatile swing discover the “medium” of contingency, Elie Ayache, who epitomises the next speculative level of countering the uncertainty of the future. *Bottomless Pit, Elastic* with its *Contingent Archive* is akin to a “nervous net” with its multitudes of narratives and fictions. However, the spatial swings transport the body of the visitors towards a physical experience of volatility that accompanies, or, interferes, with intellectual representation.

The sculpture puts into motion what to me seems the paradigmatic shift as regards our individual and socio-institutional abilities to sense and comprehend the contemporary language of power and its abstract complexity. Derivatives deal with anticipations of future potentials at present. They are therefore not a means of representation but a measure of performance. What if finance in general has shifted the language of power – and thus of social conversation – from representation to performance? What if complexity and abstraction are the signs of the 'inhospitableness' of finance's spatio-temporal environment that manifest in a non-representational scenery? What we as a consequence might lack are the "sensory organs" to perceive its performative imagery and read its circulating codes because we have not yet learned to decipher the language of performative power.

To counter the entanglement of our minds in representational modes of perception, *Bottomless Pit, Elastic* experiments with the sheer possibility of sensing the volatility of contemporary life under financial capitalism. It shifts in non-directional *circulation* from image and mind towards the body. Turning the attention towards the body as a performative multiplicity on a myriad of levels and from there develop a sensory physicality that is capable of perceiving power as performative activity implies forms of learning – a kind of 'hard coding' our perception – that go far beyond this initial experiment. But even such a comparatively small level of disruption takes us somewhere else because even the smallest movement confuses reflection. The spinning suspension we experience when we become part of the sculpture removes us from the knowledge that constitutes its structure. At the same time, this alienation breaks complexity down into the co-incidence of physical presence. And it might give us an idea of what it means to move with, navigate, adjust, reorient, and revert performative commands. Hence, one of my artistic approaches against the violence of financial capitalism is to offer sites-that-move and inspire imaginations for body knowledge – the wisdom of movement per se – and from this position engage in counter-reading power.

The stories, events, models, and technologies I refer to in this thesis activate the performative 'agent' of the derivative. Its provocation can be described as a specific form of pandemic – the spreading of the derivative's specific rationality from the arena of finance into the strata of social relations and subjectivities. My choice of literature from the vast archive of material and immaterial narratives and fictions mirrors my approach to activate the archive in a performative sense, tracing ideas, concepts and images that catalyse processes and hopefully allow me to tell at least a part of the epic story of derivatives transgressing beyond their financial habitat.

A postdisciplinary methodology is open and non-hierarchical and multi-directional. I do not follow a single methodology and one line of thought that informs all others, including my own findings. This is due to a working method I will present in chapter 3 and that I call “aesthetics of resolution.” It is intrinsically artistic in its capability to craft and yield ideas and images from seemingly unrelated, disregarded, opaque or hidden traces and sources – including those that appear in the moment of encounter and thus seem to have not “existed” before – which nevertheless reveal references, relations and connections. Hence, the literature is a kind of application on these artistic moulds: They are applied to form, test and solidify the artistic findings. Therefore, we could call this split a bifurcation in which artistic and theoretical narratives, while moving in close proximity, contribute their own distinct forms of knowledge and experience. When the lines of this bifurcation meet again and the narratives compound a conceptual step is taken towards a new narrative that emerges from the interaction between artistic and theoretical involvement.

In fact, I first conceived and developed the terms and concepts that inform the discussion set out in this thesis – firstly and originally the Derivative Condition (which I explore in Chapter 4), secondly and later the work programme of an “aesthetics of resolution” which includes the “figure of the renegade” (that I will describe in detail in Chapter 3) – not in theoretical and literature research but through an artistic practice that assembles very different things into what I term Collectives – which is therefore the term for the headings of the thesis. As an artist, my “creative process” is very much one of serendipity, as I will elaborate in more detail below. In short, I happen to find by circulations through very different spheres – not unlike Guy Debord described the “dérive”[5] for the urban radical – images, the aesthetic impression of a term or a thing, associations and imagery that first form into protean assemblages. Only when these liquid and moving (one could well say speculative and volatile) impressions quasi-solidify into more solid matter I engage in a close reading with fields of expertise that relate to the issues I am concerned with. The Collectives are the outcomes (but not results) of these speculative internal conversations. As a conceptual consequence I therefore decided to also bring the structure of the thesis into motion. To make it an exercise in circulations that move through the Collective-assemblages. Volatility – a key term in finance – is therefore not only a concept of investigation but also the material surface of writing the thesis. Art and research are not only applied once for a specific argument but resurface again at another point to attach to other fact, associations, fictions, and images. The thesis poietic desire – if I may call it so –

[5] Guy Debord, “Definitions,” *Internationale Situationniste #1* (Paris, 1958)

resembles refrains and rhymes through different attachments. It is made up of multiple circulations whose volatility is less in the investments and divestments of interest but rather in the attractions and repulsions in-between terms, concepts and notions; the relations between narratives that bring together the micro-circles of (hi)stories and the macro environment of financial fiction. The narrative that informs this thesis is therefore indebted to science fiction, however, not in that it moves along the vast stretches of (cosmic) space but infinitesimal events in (microscopic) time.

ART AND THE ART MARKET IN THE DERIVATIVE CONDITION

This thesis takes its origin in art; it moves through different streams of critical research and theory; and it develops its hypotheses, concepts, and practices along different forms of knowledge and experience. Ultimately (not at the end but ever along and in company) I hope to arrive again at art but in a deeper, richer constellation, a transformed Collective.

But my approach to artistic practice stands in marked stark contrast to the art market in its current manifestation. The art market is neither the focal point of my research nor of my work as an artist. But as it is of major importance in today's art world, I feel an urgency to zoom in on this competitive field of art valuation and the way it affects artists from my perspective of the Derivative Condition. When I say, "zoom in" I don't mean to say that I will be able to deliver a full elaboration (such an attempt will have to wait until a suitable opportunity arises).

The following remarks are therefore an introduction into my conceptualization of the Derivative Condition and offer an example of how it can be read from within a specific field. Even though they are a general outline to the main discussion below, they might come to early for a reader who is not familiar with these highly specialised terms and concepts. I can only ask you to bear with me with my promise to address each one of them throughout the text.

If there is some relevance in the following, it will concern the relation of the market as the "background noise" to which artistic practice is exposed today.

If noise is the master of information, as I will put forward in Chapter 2, we need to take noise into account when we speak about the art market, as it exerts influence on the environment in which artists live and work. This is not to say that there is noise in the

art market. Rather I argue that the art market in its current form constitutes the noise that distorts the artistic playing field, or, in fact, it constitutes the playing field to which artists are forced to adapt. In countries like the USA, for example, very few options exist beyond the art market. Also, art funding as an alternative framework to support the arts is diminishing in those countries that have had extensive programmes (e.g. most central European countries). Additionally, regions and countries have jumped on the market bandwagon, which had not been on the map of most Western art aficionados and collectors before the turn of the century. As some of these new eldorados of the "leverage class" (see Chapter 4) have experienced their first slumps (like the Chinese art market for contemporary art), the global art market is taking shape by its power to merry speculative business savvy with cultural esteem and the integration into a global coterie.[6]

The term "art market" is an established identifier even though it is a very different animal than the market of supply and demand. Pricing "singular, incommensurable products" – or *Valuing the Unique*, as Lucian Karpik entitled his treatise – contradicts the defining characteristics of the capitalist market. "This blind spot," Karpik argues in his pervasive study of singularities," is the logical consequence of a theoretical framework whose universalism implies a definition of exchange products (goods and services) that, in the end, excludes all differential features but price."[7]

I will not enter into a discussion of Karpik's theses because my approach is based on my experience as an artist and observer of the art world as well as my research of finance and derivatives. The following statements are therefore less a contribution to an economics of art as a field of subjectivities in Karpik's terminology. Rather, they trace the inclusion (objectification) of (contemporary) art in the art market through operations nested in the derivative paradigm.

To posit the art market as noise is to view it from the perspective of the artist (which, by default, includes the possibility to utilize noise for one's own reward and esteem). There are certainly artists who define themselves through the market but I think it is save to say that in general artists adapt to its volatility rather than banking on it. From the perspective of the market, however, a generalization of the market as noise would be deemed highly exaggerated, to put it mildly. Art market players from every realm

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[6] Space prohibits a closer examination of this topic, but there are plenty of sources, such as Hans Belting, Andrea Buddensieg and Peter Weibel (eds.), *The Global Contemporary and the Rise of New Art Worlds* (Cambridge: MIT Press, 2013) or Iain Robertson, *A New Art from Emerging Markets* (London: Lund Humphries, 2011).
[7] Lucien Karpik, *Valuing the Unique. The Economics of Singularities* (Princeton University Press, 2010), p. 3.

concede that noise is a constituent element of their occupation, but they would uphold that there is information (of what kind depends on their professional affiliation). The profound abyss that separates these two 'worlds' is, however, not only visible from the artists' rim of the gorge but also from that of the market. While the former world often expresses its discontent and rage,[8] the break is implied more subtly in latter.

I have personally experienced this implicit irreconcilable rift in two interviews with art market specialists. The first time when I interviewed Randall Willette of Fine Art Wealth Management for the KUNSTFORUM International issues on art and economy, which I co-edited with Dieter Buchhart in 2010. And just recently in an interview with Claire McAndrew of Art Economics for the special issue on art and finance, which I co-edit with Suhail Malik for Finance and Society (forthcoming 2016). Both professionals are well versed in economics and finance, and successfully adopt their profession to the art market. McAndrew is considered the leading art market economist today,[9] which is demonstrated by the fact that Art Basel has only recently engaged her firm Arts Economics. As one art blog reported in June 2016, "the most-talked-about bit of news on the Messeplatz Monday afternoon was the announcement that Clare McAndrew, who for eight years has published a hugely influential deep dive into the statistics of the art market for TEFAF, will bring that same study to Art Basel, where its publication will be commissioned by the fair and the Swiss bank UBS."[10]

The striking fact in my interviews with Willette and McAndrew is that the word "art" is mentioned ever so often; but the word "artist" is never mentioned, not even in the costume of the "blue chip artist" or the "artist brand," both manifestations of solid art market success. The question was dodged upon request. There is of course a good reason for the omission of the artist and the sheer lack of response: Economists concern themselves with commodities and assets; and when commissioned to deal with art, they approach art in this respect. It is their competence that is commissioned, not their personal values. Hence, a statement on the producers of art and their role in the context of the art market would go beyond expertise and could only be answered personally.

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[8] A provocation in this direction, with which the author sympathizes even though he recognizes the limitations of a critique of what is basically neoclassical economics (to which Marxist critique of capitalism often adheres to), is McKenzie Wark, "Designs for a New World," *e-flux*, Journal #58, 2014, http://www.e-flux.com/journal/58/61163/designs-for-a-new-world/

[9] Claire MacAndrew leads Art Economics, the most influential research and consulting firm focused exclusively on the art economy: http://artseconomics.com/

[10] See: http://www.artnews.com/2016/06/15/clare-mcandrew-leading-art-market-economist-on-her-defection-to-art-basel/

Nevertheless, this fact expresses the deep gulf between an art business that is ever more financialized – that is, introduced to the circulation that finance performs – and the production side of art. Hence, art is either made productive by circulation or it is not productive; ultimately, the latter art looses its title. In other word, and in reflection of my discussion of the "claim" in chapter 4, art is either a (contingent) claim in the competitive field of the art market, or it is a promise; and as such of no value except a personal one. (In my reading, the common term "promising artist" implies an artist who affirms the market game of contingent claims). The kind of contingency art, and especially art produced today, is exposed to from the perspective of the derivative condition, will occupy the remaining part of this text.

As *noise* that distorts *information*, the art market has been developing a unique form of valuing the incommensurable and pricing the priceless. It has rearranged the schemes of financialization to fit a world that is not easily quantified. It has done so by firstly establishing an aesthetic program of perception in which the Other – alterity as the unknown, unknowable face – is turned into a slight differentiation, an attribute, a "difference in sameness." This slight of hand is the foundational act and principle of any transition to the market, which cannot measure and quantify the incommensurable Other. Concerning the priceless and the incommensurable, "[the face] resists totality and manifests infinity,"[11] as Emmanuel Levinas writes; "[it] is present in its refusal to be contained. In this sense it cannot be comprehended, that is encompassed."[12] The market turns the "face" that cannot be encompassed from an intimate and internal movement of incommensurable difference into an "imperialism of the same."[13] But this sameness does not come as an 'all-inclusive grand tour' package. It produces an externality that is at the same time the contingent resource. The "other face" of art evokes desire (or even greed), but as it does not intensify the money form, it lingers at the fringes of value, which means it is resource on a metalevel. It is equivalent to the "like" clicked on facebook: an emotional residue that delivers a highly-valued prize: metadata (the register through which present and future assets are evaluated in a disseminated network of relations).

The relations between the artist, art institutions, and the market (with its players such as collectors, agents, art fairs, auction houses…) define art history. This is a narrative in the making – a constant construction and negotiation rather than a tradition carried

[11] Emmanuel Levinas, *Totality and Infinity: An Essay on Exteriority* (Pittsburgh: Duquesne, 1969), p. 398
[12] Emmanuel Levinas, loc.cit., p. 194
[13] Emmanuel Levinas, loc.cit., p. 50

on. But the "book" of art is not what art history tells us. It is the works vis-à-vis other works where the "other" might be a vicinity (identical to some degree) as well as alien (a faceless unknown). Just like Ayache's take on the market, "in order to think the market, it goes outside its medium […]," [14] art as an institution is also made to go outside its medium (a relational practice of citing, paraphrasing, leaving open, inviting in…). [15] Of course, the art market is neither a market proper in the liberal sense of distributing supply and demand nor in Ayache's sense of a "technology of the future." However, it has much in common with the construction of derivative instruments on top of underlying stock and value.

Today new work is introduced in the market less as unique subjective value of 'individual information' but as a relational asset with two distinct trajectories: on the one hand, inclusion into a network that is open enough to invite everybody in (the residual of the public and of value in the traditional sense) and on the other hand the introduction into rating and pricing circles that activate the financial trinity of circulation: speculation, arbitrage, and hedging. Both these moves have to go hand in hand to ensure that bidding commences and is sustainable through the different layers of the art market. Only in turn is production activated (as a mark in the market), meaning that the bidding process increases demand within the respective circle and subsequently captures the interest of other parties. This two-fold move leverages interest (demand) and as a consequence financialization kicks in 'naturally' (one may add sarcastically). Financialization rests on the probabilistic valuation of data, which, in cases where they exist, are historic data. The primal data in the case of art is an art history not restricted to traditional and classic art but including contemporary art, which is ripe with data (price data, collection data, biographical data…) to be exploited (for more see the link in fn 2 for Art Economics).

From its introduction, new work is a derivative instrument in the paranoid sense of the market: It is traded (shown, sold or circulated otherwise) based on an underlying that constitutes the fundamental value of the art market and its collections – the contemporary art market is a hedge as well as a speculation to raise or sustain value, with arbitrage opportunities mixed in. The underlying of this dynamic hedging operations is not a stock or bond, of course. The underlying of art can only be a fundamental value beyond doubt. In the current framework, modern and avant-garde

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[14] Elie Ayache, *The Medium of Contingency. An Inverse View of the Market* (Houndmills: Pelgrave MacMillan, 2015), p.74

[15] There is presence, a necessity that Ayache interestingly shares with Levinas even though he constitutes it in writing (and thus in the techne of Derridas opposition to Levinas in the Derrida's *Violence and Metaphysics*).

art meet this requirement because art from these periods has defined Western civilization and its way of living. It is also (and therefore) beyond doubt the highest prize of cultural inclusion in a global world (still) under Western domination. It is the first global art in relation to the market with auctions, art fair or art biennial events streamed worldwide for those 'invested.'

However, this wealth of capital and participation is a mere phantasma of wealth if it is not constantly evoked, garnered, and attended to. Hence, the market depends on a 'secondary market' that fulfils this qualification, as the underlying stock of value is relatively seldom traded ('real' value doesn't change hands all the time. When it does, however, it accumulates spectacular wealth. In my conceptual understanding of the derivative condition, this secondary market – contemporary art – is filled with 'instruments' (artworks) that introduce sufficient volatility to calibrate and recalibrate the derivative chain dynamically. Contemporary art is a realm of the derivative market, of the pricing regime and its dynamic hedging strategy against or along volatility – here the derivative paradigm and its mode of circulation come into the picture. To participate in potential future market power and capitalize on past production (which, in the case of art, is to a large degree stored in freeports compared to collectors' residences or museums) art market players must 'produce' derivative art that is attached to former art production by offering connections, interpretations, attributions, allegiance – closely derived relationships – and as such link the past to the present in order to construct the idea of future wealth in the first place (nothing has market value by itself).

I don't mean to say that art would otherwise not be sold and bought and would have no value or have no price attached. But I mean to say that the value of modern and avant-garde art – mainly traded in auctions and in exceptional cases – relies on the dynamic recalibration of new art that credits the value of the predecessors in a tight net of speculatively rendered market prices – contemporary art is not a new art in opposition to modern art and the avant-gardes but is its line of succession.[16] The market rewards the most successful successors less by important museum shows (these are conditions of value production) but by prices that approximate the prices for the assets – and thus undertakes to transfer them into their own asset class. Contemporary art is thus an option on – a vehicle of – future value in the quantitative financial sense, rather than a representation of a 'time-valued' affective relationship in a qualitative sense.

[16] It is to my mind no coincidence that the boom in the contemporary art market began after hedge funds owners and other HNWI from finance entered the scene. Even though their influence is not the only dominant factor, the knowledge they brought to art cannot be underestimated.

Hence, the market competition for inclusion into what a former era called the “canon” and in which attachment to preceding masters was termed epigonism. Hence, the boom and bust cycles of individual artist careers which fulfil or disappoint the speculative drive. To be clear, this is a quantitative drive, not a qualitative obsession – or rather, the former ‘rationality’ conditions the latter ‘affect’. The price is the distinctive element, which confers its value to the bearer (owner). This complex meshing of relational interests is nurtured by the performative production of risk to produce future wealth potential in tandem with the paranoia of default – the decline in price and a deflation of value (again, the price of works is traded up or down; not their value, which is a purely personal and hence un-interested and un-interesting side-affect).

In the derivative market paradigm, world-producing art of the past is conserved as financial wealth by deflating its former radical political clout. (A political stance is prerequisite and as such devalued beyond recognition.) It is fundamental value not in the sense of a politics of change or of alterity but for a derivative speculation on its future value in the response chain with present work (recalibration). Exposed to market forces, originality, transgression and resistance – the marks of quality of the modernist conception of art – succumb to a relational asset that must not be ‘overemphasized.’ This is the derivative market condition of the artist today.

A DERIVATIVE NARRATIVE

Writing text embedded in epistemic research logics is an exercise that could not be more different from writing text encoded in artistic logics. My work often sways between these forms of practice and is as such engaged with their variances and mutations. This *spread* between these textual forms has greatly influenced the composition as well as the framework of this thesis and I would therefore like to close COLLECTIVE I with a short presentation of a piece of artistic writing. I place it between the previous research-led insert on the art market in the derivative condition and ahead of the following general discussion of the relations and distinctions between art and finance. It is a rupture through which I hope a different logic comes through, which on the one hand superimposes the thesis’ research writing with artistic wording and on the other hand links the lyrics to the practice portfolio.

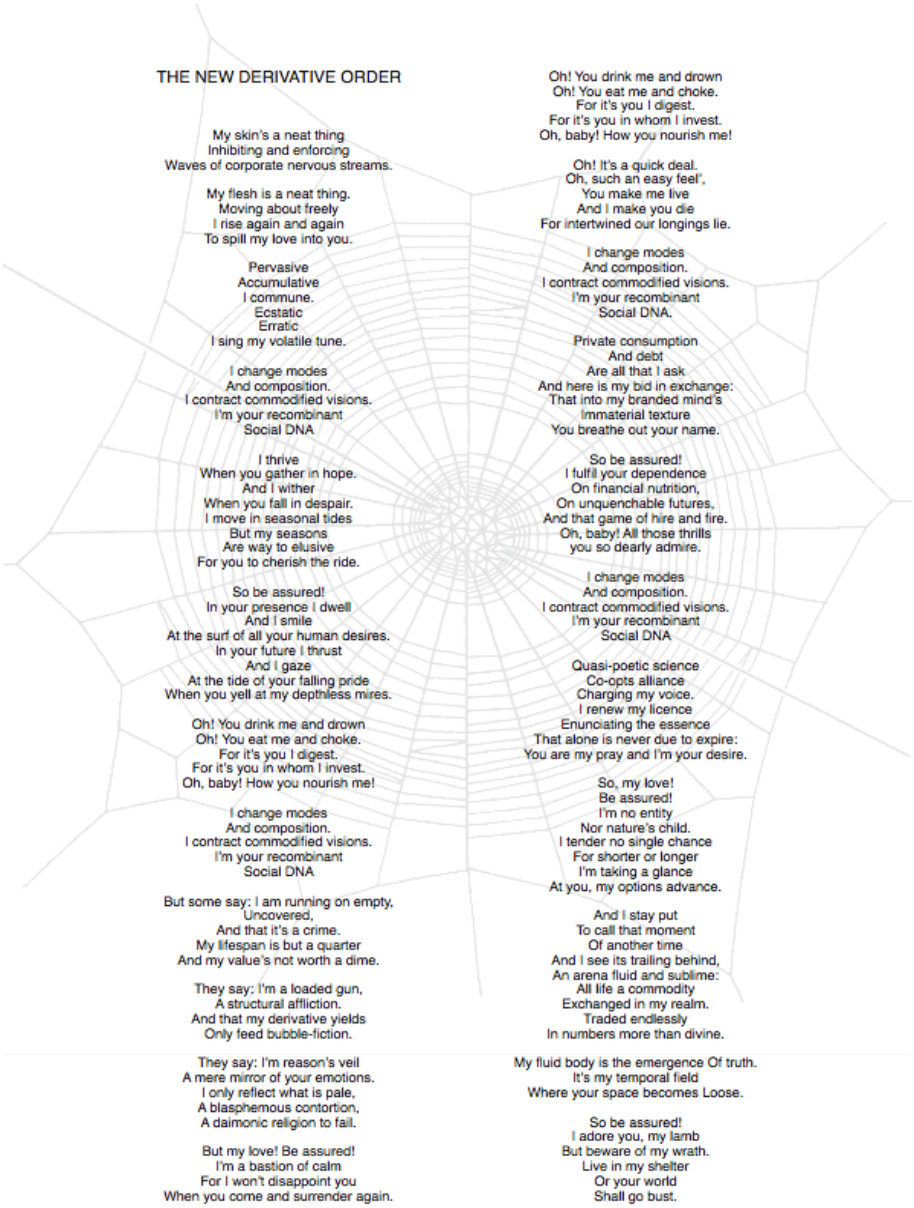

Fig. 3: *THE NEW DERIVATIVE ORDER. Algo Script Autofest*, lyrics, 2011

I initially wrote *THE NEW DERIVATIVE ORDER. Algo Script Autofest* for Szely, a composer friend. He had asked me to capture “Manchester Liberalism” (the name of his track) for which he wrote an experimental sound piece that conveys an acoustic critique of capitalism from the 19th century free traders up to today’s information capitalism. At first, writing proved an endeavour into a bottomless pit, I was incapable of delivering a critique of capitalism in the form of a song. But time was running and my friend’s reminders became more and more pressing. One day, I decided to trash what I had accumulated. I had to start from a clean slate. As theory had failed me, I had to find another inroad. I decided to immerse myself into a state in which the *thing* speaks for itself – a method I usually work with to collect material before I develop a project: in this “derivative narrative”, the *thing* evolves by itself, deriving from association forays

that thicken into thoughts, images, notions, materials, ideas. A multitude of things flow together, part, meet again, attach, catalyse, 'coagulate' into new stories, shapes or frames. A rather schizophrenic method, it is somewhat reminiscent of Freud's setting in psychotherapy: taking on both the role of analysand and analyst, I immerse myself in a kind of "evenly suspended attention" to observe the flow of "free associations". Contrary to Freud's method of listening without remembering, however, or to automatic writing and drawing (a Surrealists' practice[17] derived from Freud and mediumistic automatism), which both provoke the subconscious to directly express itself, I don't follow the stream like an aimless flaneur. Unlike Immanuel Kant's "disinterested interest"[18], this contemplative mode is about giving voice while listening, visualizing while perceiving, directly coding without previously decoding. Writing in this sense is a form of risk-taking, of riding the crest of volatility variance.[19] The stream is filled with *things-to-come* that are 'synaptically' tied together in the most *marginal, larval* way. The mind channels the performance of these polyphonic voices and turns them into an artistic compound-in-the-making towards a thing-as-work. It had taken me months to come up with nothing and now, three hours after I had started, I read for the first time what *I* had written. The voices spoke of the market, money, exchange, the mathematics of finance and the rationality of power. It seemed like beauty to these voices, but to me, the *author of last resort*, it was an alien, a daimon[20] beauty that I felt impelled to resist.

The lyrics of *THE NEW DERIVATIVE ORDER* do not constitute critical writing in the sense of constructing degrees of truth to a claim.[21] Instead, the *ethos* of living up to a promise along a volatile path opened a channel to an 'embodied criticality', which emerged in type while listening to voices. Paying back my debt (in its proto-economic sense) allowed me to enter into an involvement that proved effective for tracing expressive notions beyond a clear-cut theoretical involvement.

Ultimately, the experience made me wonder if this method might not also prove fruitful for my thesis – another exercise in writing though obviously different to composing lyrics. What seems compelling to me is to fuse artistic and theoretical approaches to

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[17] André Breton defined surrealism as pure psychic automatism.
[18] Kant uses "interesseloses Wohlgefallen" (disinterested appreciation) in the German original.
[19] As this thesis revisits the innovations in finance since the 1970s to access its contemporary role as a world-producing apparatus, risk and volatility are some of the most important conceptual nodes and will appear in different shapes and shades throughout the thesis.
[20] I borrow "daimon" from Thomas Feuerstein's multi-layered reading of the term. For more, see: http://daimon.myzel.net/Daimon:Portal
[21] We will below encounter another form of writing, proposed by Elie Ayache, which is both materially and philosophically geared towards the future and thus in my view a reflection of Ludwig von Mises' subjective theory of value.

conceive of and realize points of departure that grow out of diverse fields of material research. In which I would follow these traces and their volatile movements in a non-directional way. As a practice, this allows for the emergence of narratives from marginal sources, from 'in-betweens' rather than from attested ways of perception and thinking. A *fabulation* whose fictions run parallel to the narratives this thesis confronts, penetrates and intersects. A *reading scope* that sees in the between of finance's narratives, operations and processes and thus detects (like a sensor of the mind) "strange truths", "alien forces", "invisible performances" within itself. I found encouragement in research undertaken in philosophy and the social sciences – which in turn, it seems, are sometimes influenced by artistic approaches. I met incorporations of these "alien forces" with whom I was able to exchange, contend and dispute. Some of these "Others" have, as human beings, even become my friends (and I feel positively indebted to them as friends despite all the differing viewpoints).

The following quote from Kathleen Stewart's essay *Cultural Poesis. The Generativity of Emergent Things*[22] may serve as one example for my approach. By exchanging the term "ethnographic" with "artistic" and allowing for a wider and more abstract interpretation of what we accept as "ordinary things" (derivatives, the core theme of my thesis, are even today often perceived as a rather outlandish topic) one arrives at a rather ingeniously correlating description:

> What follows is a piece of imaginative writing grounded in an intense attention to the *poesis,* or creativity, of ordinary things. This is an ethnographic attention, but it is one that is loosened from any certain prefabricated knowledge of its object. Instead, it tracks a moving object in an effort (a) to somehow record the state of emergence that animates things cultural and (b) to track some of the effects of this state of things—the proliferation of everyday practices that arise in the effort to know what is happening or to be part of it, for instance, or the haunting or exciting presence of traces, remainders, and excesses uncaptured by claimed meanings. The writing here is committed to speculations, experiments, recognitions, engagements, and curiosity, not to demystification and uncovered truths that snap into place to support a well-known picture of the world.

[22] Kathleen Stewart, "Cultural Poesis. The Generativity of Emergent Things," in: Norman K. Denzin/Yvonne S. Lincoln, *The SAGE Handbook of Qualitative Research, Third Edition*, Thousand Oaks, 2005, p. 1015

COLLECTIVE II

"I" AND "I"

TO BE THE ARTIST IS TO BE THE EVENT

In the case of the artist, the fields of action and research collapse, or rather the action-laboratory of the artist and its exposure to the *marginal*, *larval*, *enzymatic* and *precarious* includes robust theoretical research. Research follows action not in the sense of merely interpreting given outcomes. Rather, the distinction lays in a phenomenon of practice I will address in more depth later (when I will engage with the markets and their impact on the 'social') – the phenomenon of *presence*. I would for now formulate this discrepancy as on the one hand "being actor in the present moment" in which, to use Latour's expressions, "wild innovations" happen in contrast to the scrutinizing and accompanying task of "follow[ing] the actor."

Although I *know* the concepts and the hypotheses gained from artistic practice (as they live in the presence of the *I*), they are no given pretexts, which I would then interpret by inserting appropriate quotes from specialized fields of inquiry. Instead, the actions as concepts, objects, performances, installations, videos, etc. are the artistic sets of associations that unfold in *presence*. These associations flow 'wild' only to materialize into *things* (the image-concepts) that trigger research as a comparative or orbiting study. The artistic performance is at the same time both the following of the actor (I follow *I*) and 'innovation' of concepts (or in the terminology of Deleuze, the "percepts") that yield objects of different texture, so to say. Being infused in the present moment of action I therefore express as: *To be the artist is to be the event*.

In many instances the thesis is such a practice. However, the research follows the artistic method on another layer of examination, comparatively reading what coagulates into objects and percepts, how material and concrete or subtle and immaterial they might be. This approach is to render writing, text. Still, this methodology serves the artistic research in tracing and extrapolating the works and concepts as multiple events of presence (not only in art but also in finance) by injecting findings from other fields (such as economics, finance, mathematics, anthropology, ethnology, sociology, cybernetics, system theory, art theory, philosophy) in order to craft multi-layered narratives (owing to Clifford Geertz's "thick description"). As a consequence, the approach is hybrid. Or, deriving from Michel Serres' intersubjectivity

to the flow of presence and making, between the *I*, the I and the We of a 'comparative vicariance', it is a collective made by quasi-objects (that are quasi-subjects).

> This quasi-object that is a marker of the subject is an astonishing constructor of intersubjectivity. We know, through it, how and when we are subjects and when and how we are no longer subjects. 'We': what does that mean? We are precisely the fluctuating moving back and forth of 'I.' The 'I' in the game is a token exchanged. And this passing, this network of passes, these vicariances of subjects weave the collection… The 'we' is made by the bursts and occultations of the 'I.' The 'we' is made by the passing of the 'I.' By exchanging the 'I.' And by substitution and vicariance of the 'I.'"[23]

Quasi-anthropologist, quasi-ethnologist, quasi-sociologist, quasi-philosopher… and *quasi-artist* by a comparative tracing and creating of collectives of thought and practice that include the presence of the *artist as the event* in its material collection. While I refer to the performative and passing mode of *the artist* as: *to be the event*; I call the exchange and research mode *the quasi-artist*. These proposals for a terminology are not distinct fields of actions with different hierarchies and significance. Rather, they are components of a hybrid, interlinked assemblage never residing in but moving in-between presences of events *and re-presences* (tracing presences) that follow events.

This has not only implications – and applications – for art. Such an apparatus, if I may call it that, may be found in other fields as well. According to my experience, it is also relevant in finance. To illustrate, I quote the sociologists of finance Daniel Beunza and David Stark who refer to Michel Callon's contribution to ANT:

> The cognitive challenge facing our arbitrage traders – a challenge central to the process of innovation – is the problem of recognition. […] Innovation requires another cognitive process that we can think of as *re-cognition* (making unanticipated associations, reconceptualizing the situation, breaking out of lock-in). It involves a distinctive type of search – not like those searches that yield the coordinates of a known target or retrieve a phone number, product code or document locator for a pre-identified entity or category – but the search where you do not know what you are looking for but will recognize it when you find it.[24]

As an artist who undertook fieldwork as a broker and trader to gather empirical and subjective experience of what trading is and how its performative sense affects the body, the mind and the collective, my perspective of *what* traders are *in* extends the above with Michel Serres' notes on the parasite of communication. As producers of noise (the myriads of quotes that serve as liquidity traps), these quantitative parasites

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[23] Michel Serres, *The Parasite* (Minneapolis: University of Minnesota Press, 2007), p. 227, quoted from: www.stevenconnor.com/milieux

[24] Daniel Beunza and David Stark, "Tools of Trade: The Socio-technology of Arbitrage in a Wall Street Trading Room," in: *Industrial and Corporate Change*, Vol.13, No.2, 2004, p.373.

are only the first in a line, feeding off a host that is in turn a parasite exploiting arbitrage opportunities. “In the parasitic chain, the last to come tries to supplant his predecessor.”[25] It is the world traders recognize, their global communicative network – the ‘being’ they acknowledge (manifested, for example, in the Bloomberg Terminal network); the market as “the biggest and most proliferating parasite or quasi-object that has ever arisen in history,” to qualify my venture point with reference to Steven Connor’s notes on Serres’ 1990s remarks on “the space of global communications.”[26] It reverberates in the physical derivative trading floors as well as in immaterial arbitrage settings where “this network of passes, these vicariances of subjects weave the collection… The ‘we’ is made by the bursts and occultations of the ‘I.’”

In this specific sense the artistic methodology I described above resembles what traders are confronted with between the realms of quantitative knowledge and action, data research and transaction, theory and practice. At the same time, this is merely a resemblance because it happens on so distant ‘peripheries’ of a practice that ‘we’ are instantly set apart again. (The next Collective will introduce and Chapter 3 will clearly demarcate my practice. It will differentiate between the trader inside the market and the *collective figure of the artist* as oscillating between the inside and the outside). The affirmative parasitic of which Serres speaks is enclosed in the propensity for proprietary capital to declare its hegemony. The market puts itself in our place, i.e. takes no place except in us, the actual peripheries, thus taking on the notion of a being. It materializes at every locality, i.e. clearing node, but at the same time it reaches across, lives among, marches through. Again, what Serres notes on global communication in general is no less true for the communication of price:

> “All previous cartographies, whether geographical, biological, economic, or political, have depended upon the principle of logical noncontradiction expressed as a physical principle, namely that one cannot both be and not be where one is, one cannot be in one place and in another simultaneously. This is the rule that seems to be set aside in the world of global communications that makes it possible for every periphery to be in the middle: a world without addresses that correspond to unique and determinate sets of coordinates in the physical world.”[27]

We meet where the event crystallizes into action; we belong to different worlds when we take into account the ‘stages’ on which these events play out – the technopolitical paradigm of the financial cyberherd versa the precarious subjectivities of the artists; we are alien to each other when one aims at possessing the future and the other at

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[25] Michel Serres, *The Parasite*, loc.cit., p. 4.
[26] http://www.stevenconnor.com/milieux/
[27] Steven Connor, loc. cit., referring to Serres, *Atlas*. Paris 1994, p. 205-6

expressing the present. This is not to idealize the artist against a global corporate complex. To the contrary, it points towards a fundamental problem of neoclassical economics and its follow-up, neoliberalism, that is anthropocentric when it comes to positing the individual at the centre of the market narrative (e.g. the homo economicus, the rational self) but in the next move liquidates it in favour of the corporate body, its epiphany of the individual pursuit of happiness. As the latter is coherent with the realities shaped in markets and unleashed by neoliberalism, we could well speak of an organocentric narrative that pervades organization and management not only of finance but also of society.

As stated above, the artistic methodology I counter-propose is set in the provocative perspective of a *presence suffused with doing* rather than reflecting on itself, a future or a past. But a doing based on a conception of perception that I will delineate as aesthetics of resolution (see Chapter 3). And in this form, a *making* based on an aesthetic conception of an immanence of the assemblage of material and mental flows, in which being in the middle of the event equals to be the event. *I* 'observe' marginal, larval *things* (as quasi-objects) while they move, meet, collide, pass and coagulate…; and *I* realize them, in the double meaning of the word (the *italic I* stands for the perceiver of event, the occurrence and not the socio-political subject I). Rather than dissolving in the event, the *I* becomes an active participant in these margins of intense consciousness. *Doing* as *perceiving* towards *making* bears the translation from retention (here: an *aesthetics*) to protention (here: a *poietics*), to use Edmund Husserl's phenomenological terminology of temporality as regards the perception, or, the event of the present. Steven Shapiro evokes Alfred N. Whitehead's philosophical term "*prehension* for the act by which one actual occasion takes up and responds to another."[28] And he continues, "a new entity comes into being by prehending other entities: every event *is* the prehension of other events." Hence, he conflates prehension and self-prehension:

> All this applies […] not only to the encounter between subject and object, but also to the encounters between one object and another, as well as what is commonly called the 'identity' of the individual subject. Self-identity, the relation of a subject to itself, has the same structure as the relation of a subject and an object. They are both grounded in prehension […] I continually prehend myself; I renew myself in being, at every instant, by prehending what I was just a moment ago, 'between a tenth of a second and half a second ago.' Such an immediate past 'is gone, and yet it is here. It is our indubitable self, the foundation of our present existence.'[29]

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[28] Steven Shapiro, *Without Criteria* (Cambridge: The MIT Press, 2012), p. 28
[29] Shapiro loc.cit, p. 29, citing Whitehead, *Adventures of Ideas* (New York: The Free Press, 1933/1867), p. 181

I am engaged in an expanded forum of knowledge production in which practice-based research and art 'perform' experience cultures in order to elicit other questions on what we know and what is unknown. While related to ANT-theory, it is not about "actants". Rather, it is a laboratory which traces the experiment of derivative finance 'in the wild of culture,' in the cultivated nature or natural culture of and in-between individuals, subjectivities, objects, and communities. My research not only examines what these markets do. I rather engage directly to learn what 'it does (to me)' – experience the event as an attempt to move from aisthesis (perception) to poiesis (making).

Exemplified by what Dona Haraway and other feminist and social scientists call "worlding," my approach is an effort to include practices and processes that are themselves shaped or adapted by the financial regime. It thus gravitates inside a precarious[30] field imaginary that counters the current politics of knowledge production and the politics of profit maximization – both of which are derivatives of the paradigmatic patterns of finance capitalism. Thus, the *artist as event* and the *quasi-artist* are performative aspects of relations between Michel Serres' quasi-objects and quasi-subjects. Instead of interpreting transcendent things from a field of immanence, it means to be "mittendrin"[31] (in the thick of things) and across limits at the same time. Isabelle Graw's Latourian critique of the role of animism as a "lasting provocation" (Anselm Franke/Irene Albers) for modern thought, with which she concludes her essay *The Value of the Art Commodity* theoretically corresponds to the above:

> "Instead of elevating the actant to the status of a figure of universal applicability, our study of practices in art should distinguish between pictures that appear performatively as quasi-subjects, assemblages that seem subject-like, anthropomorphic 'figures,' and other varieties of the animate work of art. We should also explore whether and how the impression of animation and aliveness created in a wide range of ways fundamentally benefits the form of value of these works. It is in the interest of that value that a high degree of aliveness is suggested, which is to say, that the objects seem animate."[32]

Practically, though, what the *artist as event* and the *quasi-artist* perform is not only to address but to animate the dimension of such implied value: By making the current paradigm of exploitation the topic of art. Consequently, conceptualization is less a theoretical than primarily an artistic process: It is a *work of art* not in the sense of an (an)aesthetic commodity that fulfils the purpose of inclusion into the art market. At the same time quasi-autonomous object and participatory quasi-subject in myriads of relations, it is an example for an aesthetics that marries presence, performance and

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[30] I will specify my use of the term 'precarious' in Chapter 3.
[31] This is the (German) title of Steven Connor's blog entry on Michel Serres, see fn. 20
[32] Isabelle Graw, "The Value of the Art Commodity," in: *Texte zur Kunst*, 22/88, 2012, p.56

aesthesis;[33] an aesthetics animating art beyond enunciation, repetition as innovation (Paolo Virno) and also beyond critique. As I will show in the following chapters, it is on the own hand an exercise in risk-taking that contradicts the quantitative financial notion of risk in its practice. It is on the other hand a service for risk-takers and an exercise in solidarity that aids those who live under the financial notion of risk but are determined to move beyond it.

The three main conceptual nodes of this thesis relate to these redefinitions and reappropriation of risk as accompanying the future while it emerges from retentions to pretensions, and so forth: the aesthetics of resolution, the figure of the renegade, the derivative condition.

[33] The Greek term refers to discerning perception by both the senses as well as the intellect.

COLLECTIVE III

I BUT MANY

THE ARTISTIC METHODOLOGY EXTENDED

I recounted the 'embryonics' of the lyrics *THE NEW DERIVATIVE ORDER. Algo Script Autofest* right at the beginning of the thesis to illustrate a mode of *being-with in process* that informs my artistic research more generally and will therefore resurface in the following. Artistic research has become a diverse but not uncontested field. Literature on the production of knowledge in the arts is impressive as well as diverging. Although this thesis is not concerned with an examination of these different lines – or flights – of thought, I am aware that I am tracing on similar ground. It is obvious that artistic research as an epistemic culture commits differently to the knowledge production in rational-quantitative sciences (there are voices that defend "true (epistemic) knowledge" as the precinct of science). At the same time, we should not forget that the paradigms of scientific knowledge do not rest on a solid bedrock of absolute truth but also commit to fictive as well as relational elements – as many scholars like David Bloor[34], Elena Esposito[35], Karin Knorr Cetina[36], Thomas Kuhn[37], Bruno Latour[38] or Niklas Luhmann have shown. This holds true especially for two fields I will discuss in my thesis: finance and economics. David Stark, a sociologist of finance, talks of "peripheral vision"[39] to delineate a diversification of options that constitutes a vital contribution to research on complex and multi-layered subjects. As Stark elaborates on the epigraph of his book *The Sense of Dissonance* (he quotes W. C. Williams poem *Patterson*, "Dissonance / if you are interested / leads to discovery"), "there are multiple voices, and they are not harmonious. Yet there can be a sense in this dissonance."

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[34] David Bloor, *Knowledge and Social Imagery* (Chicago: University of Chicago Press, 1976
[35] Elena Esposito, *Die Fiktion der wahrscheinlichen Realität* [The Fiction of Probable Reality] (Frankfurt/Main: Suhrkamp, 2007). To my knowledge, the book has not been translated to English. I therefore translated the quotes.
[36] Karin Knorr Cetina, *Epistemic Cultures. How The Sciences make Knowledge* (Cambridge: Harvard University Press, 1999)
[37] Thomas Kuhn, *The Structure of Scientific Revolution* (Chicago: University of Chicago Press, 1962)
[38] Bruno Latour, *We have never been Modern* (Cambridge: Harvard University Press), 1993
[39] The interview with David Stark by Brooke Harrington can be found on this website: thesocietypages.org/economicsociology/2010/04/14/the-sense-of-dissonance-an-interview-with-david-stark

As an artist, however, my approach is neither a single focus nor an attention to a peripheral vision as such. I would rather describe the approach as becoming *peripheral*, or, with an ontological term, *flat*, but in a multiple collective way, in which we don't look out at peripheries but acknowledge that we are peripheries and thus are able to link peripheries together; that we are at the margins and at the same time in the thick of things due to accelerated[40], heightened and diaphanous (translucent) resolution regimes of information flows – an interweaving of surfaces whose multi-dimensional and speculative reverberations I will come back to in Chapter 3. This signifies an understanding that I am peripheral and sense (both in an intuitive as well as technical sense) other peripheries. De-centring one's venture point means acknowledging one's own marginal position relative to a seeming infinity of others.

It also means a dis-connection, a de-centring beyond perception (ontologically, not phenomenological, at loss of a venture point) relative to an unknown, i.e. unmediated, number of 'dark matter' that function as the gravitational centres of digitized and algorithmic sense attraction and exploitation today. What is typically termed the "black box" are highly-active machines – agents by all respect – that master the craft of communicating without conversing, of establishing collectives without associating with them – seeing them, reading them, registering them, storing them, differentiating them and their relations into unconscious phenomena (in order to avoid an term like agencies). This matter – the term matter will appear in different shapes throughout this thesis, especially in relation to the financial engineer and philosopher Elie Ayache's use of the term for derivatives – belongs to a specific order(ing) that I would define as matter in the sense of a material regime powered by the different(iation of) layers (its differentials) 'below' the collective visibility that form its whole matrix. In contrast to the term black box, which implies a single information processing, i.e. withholding, machine – and thus a typical capitalist ploy to 'individualize' the entrepreneurial spirit – dark matter puts the stress on the pervading principle behind these boxes, the energy that facilitates its techno-cosmic regime. While the populations inhabiting the layers of this grid form our collective equipment, the general intellect in its entirety, these opaque mirrors reflect back on us what we already (seem to) know and hide what we ought to know. Because it exists, whether we know about it or not. Dark matter confronts us with a stateless state; a collective equipment enclosed, veiled, withdrawn from general perception (to parallel Marx's general intellect for the sensory apparatuses). This is not only about knowing that things (machines) exist that we (the public in the political

[40] I wrote this passage before the "Manifesto for an Accelerationist Politics" was published to refer to information capitalism's dependence on ever new technological condensations of material and time.

sense) don't know about. But that things exist we don't know anything about, not even that they might exist. The grid therefore indicates a varying degree of enclosure – and thus allegiance to the information capitalist order –, a coordinate system of knowledge known and unknown. We sometimes intuitively sense where elimination sets in – we feel it or suspect it but we rarely have evidence of it as it happens.

I will activate the semantic field of the term *resolution* to examine this phenomenon. Supposedly in contrast to general acceptance, perception and intuition are today not defined by direct communication to the senses or the mind but are being brought under the control of technologies of visualization, knowledge production and decision-making – a process that I confront with the concept of an *aesthetics of resolution* that is at the core of the artistic project (a poietics rather than a technë) accompanying the theoretical part of this thesis. Perception and intuition are subject to *technowledge* – I use the term for the conflation of technology and knowledge through algorithms, compounds, automation… – that I will address with the term *poietics of resolution*.

A further brief remark should be made about the consequence I aim at. It exceeds the ambitions and goals of contemporary art – at least much of what is featured in glossy art magazines, at art fairs and auctions and other business areas of the art market – to which I will add some remarks on art in on the Derivative Condition in the Appendix. To adopt a term Suhail Malik has introduced in recent years, it aims at "exiting contemporary art."[41] I aim for an art that is post-disciplinary in its understanding (it acknowledges the fruitful potentials of collaborative work between different fields of research); post-media / post-digital in its appearance (assemblages and encounters of materials, data, conversations, code, narratives and fictions); polyvocal in assembling diverse voices that discover additive rhythms; political in its ultimate consequence – in the sense that it deflects from the complacent aesthetics of relational and open work, which to my mind has become an asset of both the art market's white cube (the showroom) and its black box (the shop), for a material and conversational agency.

[41] Suhail Malik, „Exit not escape. On the Necessity of Art's Exit from Contemporary Art," lecture at Artists Space, New York, June 14, 2013. https://www.youtube.com/watch?v=fimEhntbRZ4, last accessed July 12, 2016.

INSERT POST-MEDIA

Our ability to pull data together is unmatched. —Walmart U.S. CEO Bill Simon[42]

It would argue that the post-media condition – a term that I deploy beyond its artistic origin and meaning[43] into how social assemblages are constructed, i.e. "mediated" – is part of the derivative condition. Not only "things" and "bodies" are affected by turning to data, but also relations, attributes, expectations and their discrepancies are scrutinized and exploited for their future profit potential. In 1985, Félix Guattari predicted that

> The emergence of [the] new practices of subjectivation of a post-media era will be greatly facilitated by a concerted reappropriation of communicational and information technology, assuming that they increasingly allow for: [...] innovative forms of dialogue and collective interactivity; [...] the connection of banks of data through networking; [...] the multiplication to infinity of 'existential operators', permitting access to mutant creative universes.[44]

A crucial role during the development from data processing to big data has been afforded to metadata – data that provide data about data. In a connected communication environment in which bots and daemons (code that runs in the background and facilitates smooth operation) undertake data harvesting,[45] the metadata's registration function becomes a tool to activate and exploit resources through derivations from and between data on data (rather than from an intrinsic value engrained in content). Metadata, when cultivated, are sharable and scalable data. Hence, they appreciate and valorize relations and attributions rather than the "fundamentals" they describe. In a big data environment in which data sets "are so large or complex that traditional data processing applications are inadequate to deal with them,"[46] they facilitate a means to speculating on possible outcomes, potential resources. They are assets to leverage (a crucial term in the Derivative Condition to which I will return in Chapter 2 and 4) the predictive power of big data.

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[42] Walmart U.S. CEO Bill Simon in September 2013. From: *Consumers, Big Data, and Online Tracking in the Retail Industry: A Case Study of Walmart*, Centre for Media Justice, 2013. http://centerformediajustice.org/wp-content/uploads/2014/06/WALMART_PRIVACY_.pdf

[43] Peter Weibel claims, "all art is post-media art [...] no-one can escape from the media [...] the art of the technical media, i.e. art which has been produced with the aid of a device, constitutes the core of our media experience; this media experience has become the norm for all aesthetic experience; hence in art there is no longer anything beyond the media." https://monoskop.org/Postmedia, last accessed September 8, 2016.

[44] See: https://monoskop.org/Postmedia. Last accessed September 8, 2016.

[45] An interesting research on Facebook and data harvesting was presented under the title *Immaterial Labour and Data Harvesting Facebook Algorithmic Factory (1)* by Share Lab: https://labs.rs/en/facebook-algorithmic-factory-immaterial-labour-and-data-harvesting/

[46] https://en.wikipedia.org/wiki/Big_data. Last accessed September 8, 2016.

> Assets are critical to your business operations -- they need to be discovered at all points of the digital lifecycle. Key to building trust in your data is ensuring its accuracy and usability. Leveraging meaningful metadata provides your best chance for a return on investment on the assets created and becomes an essential line of defence against lost opportunities. Your users' digital experience is based on their ability to identify, discover and experience your brand in the way it was intended. Value is not found – it's made – so make the data meaningful to you, your users and your organization by managing it well.[47]

The present is a vast site of data exploitation for future gains within all adaptable temporal horizons. Algorithms are employed "to decide what, in a sea of information, is meaningful, relevant"[48] – from the long durée of the recently resumed Martian colonization project, the quickest transactions of high frequency trading, to predictive big data power applied to digital marketing and consumer tracking,[49] credit scoring,[50] health insurance or law enforcement,[51] amongst others. This exploitation is written into the earth and the air; into molecules and atoms; into bodies and institutions; into thoughts and affects; into prices and values. Essentially, it capitalizes the relationships of those who share their expectations and anticipations, their needs, desires or fears.

> With 1.6 billion active users in 2015, Facebook is heading towards fulfilling their mission to connect every person on this planet through their social network. […] We are the witnesses of the time of transparency *of the individual*. At the same time, Facebook, the platform itself is far from being open and transparent. What happens within the invisible walls of this complex algorithmic machine mediating the communication of billions of people is kind of mystery, a black box. There are many reasons why we should be interested in these black boxes mediating and recording our interaction, our deepest personal communications, our behaviour and activities. Within those invisible walls, in every moment algorithms are deciding which information will appear in our infosphere, how many and which of your friends will see your posts, what kind of content will become part of your reality and

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47 John Horodyski, *Breaking Down Big Data: The Value in Metadata*, http://www.cmswire.com/cms/information-management/breaking-down-big-data-the-value-in-metadata-026985.php, last accessed September 10, 2016.

48 Ganaele Langlois, "Participatory culture and the new governance of communication: The paradox of participatory media," *Television & New Media*, 14(2), 91–105., 2012, p. 100.

49 See, for example: *Consumers, Big Data, and Online Tracking in the Retail Industry: A Case Study of Walmart*, Center for Media Justice, 2013. http://centerformediajustice.org/wp-content/uploads/2014/06/WALMART_PRIVACY_.pdf

50 See, for example: Poon, Martha, "From New Deal Institutions to Capital Markets: Commercial Consumer Risk Scores and the Making of Subprime Mortgage Finance," in *Accounting, Organizations and Society*, Vol. 35, No. 5, 2008, pp. 654-674. Scrutinizing credit bureau scores, Poon holds that „[t]he strength of the bureau scores as risk management aids is that they give competitive lending firms equal access to general snapshots of the consumer that are continuously recalculated as new data is amassed from participating lenders. Such scores are by no means produced from an 'ideal' data set. They are parasitic and pragmatic constructions that make the most of information that is readily available at the bureaus as a resource for manufacturing pre-packaged analytic products."

51 See, for example: https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing

what will be censored or deleted.[52]

Thus, relations, expectations and their attributes are not only affected, they are "invisibly" – that is, beyond human perception and cognition not included in the black box – constructed and incessantly reconstructed. Their underlying principle is not the a former on-site and in-time feasibility of acquisition, distribution, storage but the anticipation and recalibration of future terms, conditions, options and ultimately profits (even if this future is a nanosecond). We will revisit this site – on the example of a financial event – under the rubric of an aesthetics of resolution.

To take up the discussion before the insertion, recalibrating moves are per se not necessarily detrimental to an artistic practice that deviates from contemporary art and the art market. Art can exit art in many ways and re-enter it with movements that have no final destination such as the gallery, the museum, the art fair, the art biennial or any other 'conservative' framework. One could call it a "realist art" if one accepts that "reality" (as the socio-political construct, not the experience quality of life) is a constructed, narrated fiction and thus a world simulation fabricated to suffocate other possible worlds.

This approach benefits from elements of philosophical, sociological, anthropological research, but it is not bound to academic or other scholarly standards. It accepts at the level of basic research what, for example, Bruno Latour writes in a brief description of Actor-Network-Theory (of which he says, "I wish I could call 'associology'"):

> Using a slogan from ANT, you have '*to follow the actors themselves'* [my emphasis] that is try to catch up with their often wild innovations in order to learn from them what the collective existence has become in their hands, which methods they have elaborated to make it fit together, which accounts could best define the new associations that they have been forced to establish."[53]

David Stark has formulated a similar approach in an interview: "The critical search is not when I already know what I'm looking for. […] Instead, the more interesting search

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[52] Quoted from Share Lab (https://labs.rs/en/facebook-algorithmic-factory-immaterial-labour-and-data-harvesting/)
[53] Bruno Latour, *Reassembling the Social*, Oxford, 2005, p.12.

is when I don't know what I'm looking for, yet I can recognize it when I find it."[54] In relation to finance and financial derivatives – the field that this thesis and its artistic approach attempt to elucidate – Elie Ayache's fundamental premise radicalizes this thought. His philosophy of the market is built on the practice of "writing," or rather his conception of writing. To him, writing is faster than thought; it runs along the "search" (the "market" as a "book" for Ayache) and is thus on the same level of (i.e. parallel to) the event, that is, of the unknown, absolute contingency.

> Everyone is concerned about the future and the writers should not be aiming at predicting the future but at writing it. So as long as the future matters – and the future should be the concern of everyone – and as long as we happen to live today in a societies which, I don't want to say are ruled but, are based on currency, money and finance […] the usefulness of the market and therefore what the market makers produce is the market itself, the material medium that allows us – us meaning the society, humanity, the world – to connect materially with the future. Ultimately, a reflection on the contingency or the event has to be turned towards the future. So, the future matters."[55]

Ayache's project, at least since the publication of *The Medium of Contingency* is led by the ambition to exceed the market and introduce a new pervasive philosophy, which is not purely of the market but for and by itself:

> The market becomes a book once it is recognized that the transformation of thought that happens there (which remains special and specific in the market as it concerns only financial contingent events and their financial translation and mediation through price) can generally be described as the couching of thought in writing."[56]

Writing becomes his 'agency', his "matter" with which the future – the contingent event – is tackled. One might say that the future is his "fetish", as he even goes a step further and equates his philosophy of the market with work in general:

> And I think that you can safely say that every work – especially the works of art – is turned for the future. Because this is what writers should be doing, they should be dealing with the future. They should be the future — not predict the future…"[57]

Contingency – here I agree with Ayache – plays a major role in the instance of enhancing/embracing resolution (in the full sense of its semantic field). However, we

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[54] See: http://thesocietypages.org/economicsociology/2010/04/14/the-sense-of-dissonance-an-interview-with-david-stark/
[55] Elie Ayache, in: Gerald Nestler, *CONTINGENT CLAIM. Portrait of a Philosophy I, Elie Ayache*, single channel video, 2012.
[56] Elie Ayache, *The Medium of Contingency. An Inverse View of the* Market (Basingstoke: Palgrave Macmillan, 2015), p. 72.
[57] Elie Ayache, in: Gerald Nestler, loc. cit.

need to rearrange the notion of risk in order to get out of the prison of an economy based on probabilistic futurology, austerity (past as well as future debt) – a project Ayache is also engaged in – and in consequence a dispossession of all. We need to counter the hegemony of value as price – where I disagree with Ayache, as he consistently turns a blind eye to the consequences beyond the market proper – a fact that pertains to (neo)liberalism more generally and will occupy us in Chapter 4.

This is the point where a political economy comes into play that – contrary to Ayache's intuition – needs to be based on a moment as possessed but ungraspable, fleeting, 'metaphysical' as well as material as the present. Being in the future can only imply being presently becoming (unintentionally possessed and unwittingly awake even when we are asleep, unconscious or in a coma), as the present – any present moment and regardless of its technological depth in time – is where we live and act and from where we become. It is our original "home," our point of departure as well as arrival in which the past meets our future, our becoming by our own making. The capitalist expropriation from this "land" – in which we live in the deepest sense of the word – constitutes primitive (the German "ursprünglich" means original) accumulation at every moment of life because without this constant expropriation from the "land" as our birthright (being born and not yet dead means being alive presently) we are in bondage, dispossessed of what we are possessed by nature (in even more so in the derivative condition this thesis is concerned with where every moment is an instant multiplicity of quantitative anticipations). If being in the future does not go through *being* present – and not go through *moving into* (Ayache would say "writing") one's future at present – we live towards a future that is not ours, written by others, on sheets we don't know of, in resolutions we are unaware of. The contingent claim is never on one's own future present (it is not a promise, I will argue in Chapter 4). When the continent event arrives, and flips it from virtual to actualized reality, it always yields someone else's booty.

However, moving and writing (a specific cultural form of movement itself) are terms that imply friction and hence a material meeting that impacts the process, the act. Hence, there are traces even when the contact – the tangency – is most elusive. Intuitively, we feel the impact even if we have no words to describe, lest define it. Art and other cultural practices are sometimes sensors for society that tell the story by inventing performative scores, depict their plots in images and sounds, or find other ways of narration. Today, the sensors have to be updated conceptually, technologically and collectively. There are multiple ways how this can be achieved. My conceptual approach will take up most of Chapter 3. It is an ongoing practice whose first steps are collected in the Practice Portfolio.

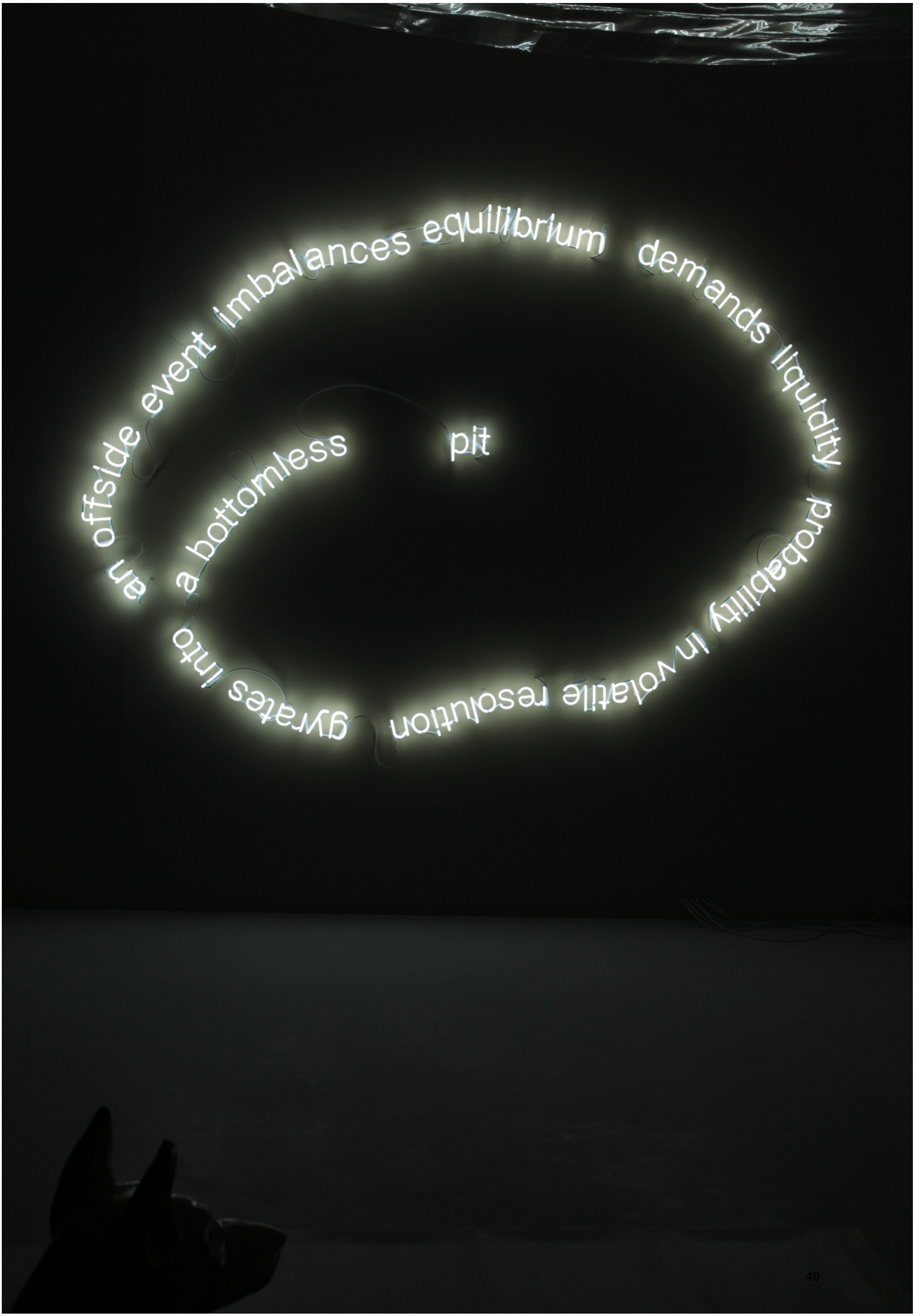
Another approach is Randy Martin's critical involvement with finance. The late sociologist and dancer dedicated his life to the re-interpretation of the (hi)story of the derivative logic and of volatility – a fundamental term that will appear throughout this thesis –, a term that in his work comes in a variety of guises. But these guises do not hide but open up and activate the potentials against the provocation of finance and its quantitative regime. In his *Tribute to Randy Martin*, Robert Wosnitzer – a former proprietary trader who turned to critical research and academia – delves into Martin's extension of the volatility notion to recount his own experiences as a young skater:

> The risk associated with the movement of skating was deeply productive and collaborative, where we were performing for ourselves — a society for ourselves, or itself, if you will — as we moved laterally across the concrete surface creating something new each time — in Randy [Martin's] words, risking together to create more of what we wanted. The convex shape of the pool was the horizon of our upside, where we could defy the limit of what was once probable and turned it into something possible that could be dynamically replicated in the next move, with the slightest adjustment creating something entirely new. The volatility that we encountered and brought into the pool was not something to avoid or protect against with externally imposed limits, but rather a surplus of value to be explored that we could harvest and return as a gift to each other, mobilizing our repertoire of attributes that couldn't be reduced to our individuality. The pool was our palette for speculative action, where our performance produced an ethos, or spirit, that was not imposed upon us, but embraced for no other reason than the possibility of a payoff for the sublime."[58]

The approach taken in this thesis is less about (youth) cultures or artistic styles (Martin has written extensively about dance as a liberating art form to reappropriate volatility by sharing risk). While Martin's theses have influenced my reading of the derivative condition and are part of my artistic practice – I had the pleasure to film a video with him for my *Portraits of a Philosophy Series*,[59] which is included in the practice part of the thesis – I am more interested in understanding and provoking concepts for counter-tactics against the eradication of relationships that oppose the profit obsession. I agree with Martin that there is an urgency to re-conceptualize the derivative instead of bluntly damning it, but it seems to me that my approach requires a very different political economy of non-participation by the "debt classes" to actually unsettle and upset the hegemony of what I will in Chapter 4 propose to call the "leverage class."

Following page: *HOT POTATO. No Risk No Fun In The Dark Pool*, neon assemblage, 2013

[58] Robert Wosnitzer, "Movement after Randy Martin," in: *Social Text (2015) 33(3 124).*
[59] The work is entitled *CONTINGENT OPTIONALITY. Portrait of a Philosophy Series III. Randy Martin,* 1-channel video, 27:45 min., 2014-2015.


an offside event imbalances equilibrium demands liquidity
probability in volatile resolution gyrates into
a bottomless pit

COLLECTIVE IV

ONE AS MANY

FROM CULTURAL AESTHETICS TO POLITICAL POIESIS

I tend to agree when Martin says,

> [t]he skateboarding graffitist and the hedge fund manager take themselves to be masters of their risk universes without imitating one another. They do not share models even if their models share a logic. What they do is derived from what others have done, even as they are pressed to go further. Indeed, a certain derivative logic might be said to link together these otherwise disparate ways of being, modes of practice, sites of engagement that are at the heart of a nonprobabilistic, embodied sensibility of risk. Attributes of giving and taking risk, seizing something for oneself and acting through others, attaching a future to a present pass laterally through all these myriad expressions in a manner that constitutes a social logic. The derivative here is not exclusive or exhaustive, singly causal or determinate, precisely because it is already inside these various expressions while at the same time part of their animating context.[60]

But I wonder if they truly share the same logic? As I will suggest later, embodying risk is a different animal than hedging or speculating *with* risk. Martin's comparison tears open a deep relation between different modes of confronting uncertainty, risk, and hazard since modernity discovered the forward future as its constitutive premise ("Plus Ultra" was the motto of emperor Charles V). It harks back to the moment when what comes around is not consumed anymore by divine order and its representatives on earth but has surplus attached (even if this 'surplus' means loss, ruin or demise). But at the same time it allows us to realize that there might be other possible risks – and fully embodied – that escape the capitalist logic of financial derivatives.

When skaters enter pools – to take up Martin's example with the documentary film *Dogtown and Z-Boys* – that are empty and abandoned because of drought – an amazing prequel of environmental catastrophes and the current Anthropocene narrative – they produce their own fulfilling spectacle within the fringes of the social context.[61] However, they are no outcasts. Rather, they make use of undiscovered and

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[60] Randy Martin, "After Economy?: Social Logics of the Derivative," *Social Text* (2013) 31(1 114), p. 97; doi:10.1215/01642472-1958908l.

[61] Stacy Peralta's *Dogtown and Z-Boys* (2001) is an entertaining documentary that tells the story of the Zephyr skateboarding team and is a beautiful example of Randy Martin's reading of the derivative in social contexts. For the sake of completeness, I add the film's synopsis from Wikipedia: "*Dogtown and Z-Boys* narrated by Sean Penn, begins with the history of

unconquered terrain that those adapted to the current order are blind to. The skaters invent a new vision by performing it together, by taking risk together, and by developing their skills together. As such they are outsiders in a precarious position where new potentials and even new methodologies exist nevertheless – the system relies exactly on such moves. It seems to me that their actions relate more to the entrepreneurial spirit – and the precarious initiation it entails –, which is often mistaken as a fundamental premise of capitalism, while it actually is a mode by which capitalism discovers new "talent" (both as capability and as money) and thus new inroads into profit-making. There is a telling quote at the beginning of the film: ""Two hundred years of American technology has unwittingly created a massive cement playground of unlimited potential. But it was the minds of 11 year olds that could see that potential." Capitalism reinvents itself through such movements and engagements, which are initially outside its realm. The story of skateboarding and its integration into the capitalist market system is an example how neoliberalism stages romantic story telling. It is a story of success precisely because it enters the market at some point of its development. It is a story of gentrification in which drought and abandonment are mere prerequisites of heroic trial. It is a story in which the derivative logic of finance prevails as the integrative process of a volatile social progress.

Let us not forget that the question of volatility is essentially a technical one and that derivative finance is the answer to this question as regards the market.[62] We will come back to this problem, so for now it suffices to state that uncertainty is its essential background and it depends on how uncertainty is translated into risk in order to model possible outcomes. What is necessary therefore for derivatives to make sense is volatility – which is nothing else than unknown risk. Instead of delving into the mathematical language of Black-Scholes-Merton (BSM) – an unnecessary complication for our endeavour – I quote Ayache. Let us remember this quote in the next passage when we navigate the complications as regards derivatives and volatility:

> Volatility becomes the only fundamental value; volatility becomes the concept of

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skateboarding in Southern California and how it had been strongly influenced by the surf culture in the surrounding areas of Santa Monica and Venice, nicknamed Dogtown. Surf shop owners Jeff Ho, Skip Engblom, and Craig Stecyk established the Zephyr Skateboard Team with local teenagers from broken homes. The sport of skateboarding continued to evolve as the Z-Boys continued to bring edgy moves influenced by surfing. During one of California's record-breaking droughts, local backyard pools were emptied and became hotspots for these young skateboarders looking for places to skateboard. The members of the Zephyr team gained notability and national attention when they competed in skateboard championships and started to receive media attention for their skills as young athletes…"
https://en.wikipedia.org/wiki/Dogtown_and_Z-Boys

[62] Randy Martin might relate technique to the highly experienced skills of skaters who are able to make the most incredible moves.

> the market and the true stuff the market is made of. Suddenly, science and quantitative theory move from trying to determine the value of the traded asset, which is impossible because the only thing that exists is its market price, to conceiving and fixing in mind the volatility of its price. Science rules: Let volatility be σ. BSM is the mathematical consequence of Brownian motion with volatility σ, and what is truly amazing is that, for the first time in the history of economics and finance, the value of something is calculated and therefore determined, through BSM. In an environment where nobody knows the value of anything – for otherwise, there wouldn't exist a market – it now suffices to recognize volatility in order to determine the value of something, the value of the derivative! Note that this has nothing to do with knowledge. Volatility is equal to the meaning of the market, we said. As such, it is a semantic certainty and it lies beyond knowledge.[63]

VEILED VISIBILITY AND THE DERIVATIVE PARADIGM

Finance is the equivalent in capital of what capital does to labour, which is to socialize it. —Randy Martin[64]

On the far end of the spectrum of market integration is a very different form of risk-taking. The Enron scandal provides a vivid imagery of how hedging, arbitrage and speculation – the trinity of the derivative finance deity – can collapse into a hazardous game where enormous risks are cunningly hidden and advertised as the new paragon of transparency and knowledge. What comes to the fore – beneath the actual scandal and the enormous damage done, which I will not address here – is to what extent derivatives can increase risks instead of decreasing them.

I will try to delineate this development by crafting a "conversation" between Brian Holmes and Randy Martin and their approaches to the derivative logic. Holmes, in his essay *Is it Written in the Stars? Global Finance, Precarious Destinies* (2009) points to a deception aired on TV and thus aimed at the public as such (or, what is called "mom and pop investors") rather than institutional investors:

> *Ask why* was the slogan of the former energy-trading corporation Enron, whose opaque financial strategies, illegal business manoeuvres and extensive support in Washington made it an exemplar of control fraud at the turn of the millennium. An advertisement aired just before bankruptcy in 2001 shows three businessmen with seeing-eye dogs and the heads of mice, wearing dark glasses and tapping the

[63] Elie Ayache in an interview with Roman Vasseur entitled "My Matter," in: *Journal of Visual Art Practice*, to be published 2016

[64] Quoted from: Gerald Nestler, CONTINGENT OPTIONALITY. Portrait of a Philosophy Series III. Randy Martin. 1-channel video, 27:45 min., 2014-2015

> ground with white canes. The off-screen voice explains: "Enron Online… is creating an open, transparent marketplace that replaces the dark, blind system that existed." Another ad promotes weather derivatives to protect against unforeseen climate events; the CEO who doesn't buy them is shown as a sitting duck at a carnival sideshow, easily picked off by any kid with a BB gun (or more likely, a PC and a broadband connection). As for the slogan itself, it's a classic symptom of the speculative economy: an injunction to know that reverses into its opposite. *Why ask?* is the real message. *At stake here is the function of the veil, which turns sophisticated knowledge, indeed visibility itself, into a weirdly transparent cloak of secrecy and denial. Visible blindness is the underlying formula of financial governance* [my emphasis].[65]

Randy Martin, addresses the question of the sheer possibility of turning "sophisticated knowledge, indeed visibility itself, into a weirdly transparent cloak of secrecy and denial" and, in my mind, stirs up a hornets' nest: What is at the bottom of the derivative paradigm is not only that value does not and cannot exist in the market and that only price exists. And further that price is not a singular but a myriad, so to say:

> Not only do derivatives increase opacity as they spread ownership, they also enhance volatility as they amplify risk, in both cases converting what was known and containable in its impact to what is dispersed, conflicted, and unknown. Rather than doing away with some ideal underlying or fundamental value, price is contested at every moment of its articulation. Derivatives stand as an enhanced medium of this open and ceaseless contestation. By removing one array of risk circumstances, derivatives engender a hyperactive manufacture of risk conditions insofar as they treat the volatility they produce as their general horizon of opportunity.[66]

In relation to Enron, what appears as a theoretical definition turns out to be an incentive in an increasingly competitive and fast environment whose persuasive power is supported by the profit imperative that Karl Marx described as a necessary condition of capitalism. One question arises (and which will be dealt with on different layers throughout the thesis) that Holmes poses directly:

> What is a derivative? We know that it is a fungible contract, created by applying a mathematical formula to an underlying asset or commodity whose price is susceptible to fluctuation on volatile markets. By assembling constellations of values that statistically tend to fluctuate in opposite directions, derivatives were supposed to mitigate the risks of globalization with the highest degree of efficiency. The idea was that that all risks, including collective ones, should be made into salable products, formatted for the market by private actors in search of a profit. Yet although it is salable, the derivative cannot be understood as an ordinary commodity of the industrial era. Marx described the commodity as that product of human labour whose exchange value, seemingly animated with a life of its own,

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[65] Brian Holmes, *Is it Written in the Stars? Global Finance, Precarious Destinies*, 2009. See: https://brianholmes.wordpress.com/2009/11/06/is-it-written-in-the-stars/#sdfootnote19anc
[66] Randy Martin, "After Economy?," loc.cit., p. 90.

> acts to render invisible the social relations that produced it.[67]

Up to this point, Holmes and Martin seem to agree with each other. But at this point their perspectives seem to bifurcate. Holmes argues that derivatives

> […] have nothing directly to do with production; instead they are conceived to manage the environmental risks that weigh on the future of speculative activity. In this sense they are *meta-commodities* that govern the unfolding of the contemporary economic model. Their fascinating appearance acts to conceal the private deliberations that effectively shape the environment in which any productive or consumptive activity can take place.[68]

On the other hand, referring to Bryan and Rafferty's seminal study, *Capitalism with Derivatives. A Political Economy of Financial Derivatives, Capital and Class* (Palgrave Macmillan, 2006), Martin argues ("taking up" Holmes' notion of the veil) that

> […] if finance was a veil of representation restoring, economy affords a return of and to what can be considered real. Yet for Bryan and Rafferty, the very notion that this real economy of values can be separated from financial markets is countermanded by derivatives trading. *They observe that prices are first formed in options and futures markets before they are set in cash markets*. The core operation of derivatives is to bind the future to the present through a range of contractual opportunities and to make all manner of capitals across disparate spheres of place, sector, and characteristic commensurate with one another. In this respect, derivatives provide some of the anchoring functions of currency sovereignty once afforded by gold and dollar standards. They introduce a highly dynamic but comprehensively convertible measure of prices across time and space so as to stand as a form of metacapital. They therefore continue with a process of abstraction of concrete instances and capacities for production to conditions of universal exchange that Marx identified with the accumulation of commodities as such.[69]

Obviously, their perspectives on exiting the capitalist logic of the derivative deviate as well. For Holmes, the scandal needs a new political resistance for which he invokes Matteo Pasquinelli's proclamation from the latter's book *Animal Spirits: A Bestiary of the Commons* (Institute of Networked Cultures/NAi publishers, 2008):

> Addressing himself to European artistic vanguards steeped in the heritage of Italian Autonomia, Matteo Pasquinelli calls for "the sabotage of creative value" and "the explosion of the social relations enclosed in the modern commodity." In the university, that would mean trashing the concept of individual market freedom and prying open the meta-relations of governance that are concealed in abstruse mathematical formulas. Such an explosion has become urgent. We need a different world model, which cannot be abstracted from price information analyzed by computers. But it will take more than critical insights to gain anything concrete.

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[67] Holmes, loc.cit.
[68] Holmes, loc.cit.
[69] Martin, loc.cit., p. 88-89 (my emphasis in the quote)

> Beneath the curve of the night sky there awaits, not only occupations of public buildings and demonstrations on the streets, but also an existential struggle for the quality of our dreams. Critical intelligence and the radical imagination will have to merge with the animal spirits of political conflict, to chart new paths through the fateful spaces where symbolic constellations are etched on living skins.[70]

Martin, however, proposes to unearth the potentials inherent in the derivative, which he sees as a cultural form reaching far beyond their financial implementation:

> Beyond the pervasiveness of the phenomenon, however, the question arises as to why it is useful analytically and politically to think the social through the lens of the derivative. Demonstrating these various resonances will require a wide-ranging approach, but a few provisional points can be made at the onset. First, we could say that a derivative logic speaks to what is otherwise balefully named as fragmentation, dispersion, isolation by allowing us to recognize ways in which the concrete particularities, the specific engagements, commitments, interventions we tender and expend might be interconnected without first or ultimately needing to appear as a single whole or unity of practice or perspective. Second, derivatives articulate what is made in motion, how production is inside circulation, and as such how to notice the value of our work in the midst of volatility. Third, derivatives work through the agency of arbitrage, of small interventions that make a significant difference, of a generative risk in the face of generalized failure but on behalf of a desired ends. To recognize and realize these other kinds of gains that might issue from a more fully elaborated social logic of the derivative, we must pull it from the wreckage of the economic where its conventional meanings are interred.[71]

In my view, the perspectives held by Holmes and Martin demonstrate the intellectual tensions that we have to address today in order to move towards new forms of resistance and political participation. This is a tension that also marks my work and my position. It represents the poles between which my thinking sways. While I sympathize with Holmes radical political stance and his commitment to solidarity, my conviction that we need to radically rethink and even upend the derivative notion has grown stronger in recent years. It arose from not much more than an instinct that I drew from my experiences as a broker and trader (an “artistic fieldwork” that I claim did not ‘corrupt’ me) and grew the more I understood the deep intrusion of the derivative logic since its financial inception in the early 1970s. Hence, I see my work also in conversation with Randy Martin and other thinkers who accept the challenge of countering the derivative logic and its quantitative paradigm – the valuation of everything through price – by unearthing its deviant potentials and extending the debate towards methodologies that allow sharing risks for the benefit of all instead of the profit of the few.

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[70] Holmes, loc.cit.
[71] Martin, loc.cit., p. 87

The precarious situation that encompasses the whole world in which the young surfers enter private property and thus transgress the law, are chased by police, their backgrounds from broken families, and the drought that made their transgressions possible in the first place – from broken homes to abandoned pools and beyond the horizon of the 1970s the foreclosures and eviction from homes in recent times – reflects a development that has become the social condition in the Anthropocene. There might be trajectories for the integration into the surplus of leveraged capital, but for most people who try hard to adapt to and survive the swings of social volatility, debt and a loss of future are the more likely prospects. Holmes condenses this outlook after the subprime mortgage crisis in 2007 in few but striking words:

> What European activists call 'precarity' – that is, a condition of generalized uncertainty regarding education, employment, housing, health care, retirement and other life chances – now appears as a destiny, rising up against horizons blocked by the advancing threat of climate change. The supernova has finally imploded, leaving black holes in the future.[72]

The grievance here is that black holes in the future reflect back to the present. The "impact craters" of financial crashes, bankruptcies, and bailouts leave destroyed environments behind that do not serve as habitats. But what if collective action and new forms of solidarity emerge from the epicentres of these wars? What if we gain strength from 'accepting' contingent precarious connections that emerge from – sometimes sudden – appearances of affinity, relationship and reference that derive directly from focal sites of conflict?

Hence, what I will undertake in Chapter 3 is to work out a narrative – an aesthetics of resolution – that counters this logic not from the outside but from inside the system. Or, more precisely, by oscillating between inside and outside. I would argue that we have seen too many examples of 'integration' into the derivative logic of risk (and subsequently the precarious state of being at risk) to adhere to the faith that change will come from outside alone. We need to join the forces that work for change by building environments external to the current system – call it neoliberal or information capitalism – and those who seek to hack its theoretical, technological, and systemic underpinnings.

Today, the avant-gardes of critical debate have developed new inroads into a critical "reading" of power – their reading is at the same time "writing": The generations that grew up with coding and the Internet are heavily invested in the same technologies that

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[72] Brian Holmes, Is it Written in the Stars?, loc.cit.

allow power to distribute wealth unevenly. They not only understand these schemes, they *make* them. Their critical thinking combines intellectual and technological savvy. And their engagement turns the sheet in ways that completely undermine old business models and force corporations to adapt. From the Internet to the blockchain – to give but two major examples – new models arise. As disruptive technologies, they change the playing field. While they open access at first, venture capital and other capitalist forces seek to integrate them into their structures both economically and intellectually. It is less the exemption but the rule that those at the forefront of alternative socio-technological approaches live lives split between engagements in radical projects, non-profit environments, start-ups and stances at publically traded corporations. They sit on panels that discuss the undoing of capitalism as well as in the conference rooms of Alphabet and other monopoly-seeking firms.

Therefore, it begs the question whether art can still be seen as a world of itself that by its sheer 'genius' (its fundamental role in the development of modernity at large and capitalism in particular) asks the right questions of the day (a view that might seem outdated but holds sway in the galleries in Chelsea, New York, at art fairs, and other centers of the art world). Or if we need to conceive art – and artistic practice –as an oscillating and volatile practice that moves through the fringes of systems to strike at their core. Whose autonomy, even, is not a given; not a fundamental right nor a premise to be defended. But a force turned into a strategic weapon that can be 'unlocked' and 'locked;' that appears at some places but in others dissolves to absorb what surrounds it. As such, art might not even need artists except as a veil for its agenda where necessary. The artist would thus be one persona in a cast of different appearances of a figure that not only critiques and resists, but also shifts and mutates. That works within systems – a political daemon – speaks out openly – a visceral avatar – and sometimes appears in the White Cube – an artist. There would not be the need for the artist to 'incarnate' in one body (and let us not be tricked, celebrated artist groups are often successful because they manage to incorporate in one "body artistic"), but the term "artist" could signify entities that have no "address;" a new incorporation that counters the corporation; a cryptoartist that resembles the Indian deity Durga with its ten arms and weapons.[73]

[73] "Durga is a warrior goddess [that] manifests fearlessness and patience and never loses her sense of humour even during spiritual battles of epic proportion, as represented by the constant meditative smile on her face." See: https://www.quora.com/Why-are-most-Hindu-gods-visualised-as-bearers-of-many-weapons-and-arms

Hence, *we* are in the position to propose turning the tables by collaborating with those in the system who have learnt – and are willing – to abandon it; who strive for a very different kind of poietics (political, ethical, social). We need to look for ways in which risk embodied cannot be integrated because it already resides inside undetected. And that therefore gives rise to 'revolutionaries' whose ambivalence is neither heroic nor romantic nor entrepreneurial (worse, it is politically ambivalent for the right as well as the left). And whose solidarity is not only human but makes use of all matters non-human (that is, how we benefit from *nature* though technologies). I call this activism that produces practices within the context of the aesthetics of resolution the "figure of the renegade." I will address it in Chapter 3.

Following page: *FORM TCR. TIP, COMPLAINT OR REFERRAL*, official SEC form, Digitex-poster print, 2015.

Privacy Act Statement

This notice is given under the Privacy Act of 1974. This form may be used by anyone wishing to provide the SEC with information concerning a possible violation of the federal securities laws. We are authorized to request information from you by various laws: Sections 19 and 20 of the Securities Act of 1933, Sections 21 and 21F of the Securities Exchange Act of 1934, Section 321 of the Trust Indenture Act of 1939, Section 42 of the Investment Company Act of 1940, Section 209 of the Investment Advisers Act of 1940 and Title 17 of the Code of Federal Regulations, Section 202.5.

Our principal purpose in requesting information is to gather facts in order to determine whether any person has violated, is violating, or is about to violate any provision of the federal securities laws or rules for which we have enforcement authority. Facts developed may, however, constitute violations of other laws or rules. Further, if you are submitting information for the SEC's whistleblower award program pursuant to Section 21F of the Securities Exchange Act of 1934 (Exchange Act), the information provided will be used in connection with our evaluation of your or your client's eligibility and other factors relevant to our determination of whether to pay an award to you or your client.

The information provided may be used by SEC personnel for purposes of investigating possible violations of, or to conduct investigations authorized by, the federal securities law; in proceedings in which the federal securities laws are in issue or the SEC is a party; to coordinate law enforcement activities between the SEC and other federal, state, local or foreign law enforcement agencies, securities self regulatory organizations, and foreign securities authorities; and pursuant to other routine uses as described in SEC-42 "Enforcement Files."

Furnishing the information requested herein is voluntary. However, a decision not provide any of the requested information, or failure to provide complete information, may affect our evaluation of your submission. Further, if you are submitting this information for the SEC whistleblower program and you do not execute the Whistleblower Declaration or, if you are submitting information anonymously, identify the attorney representing you in this matter, you may not be considered for an award.

Questions concerning this form maybe directed to the SEC Office of the Whistleblower, 100 F Street, NE, Washington, DC 20549, Tel. (202) 551-4790, Fax (703) 813-9322.

Submission Procedures

After manually completing this Form TCR, please send it by mail or delivery to the SEC Office of the Whistleblower, 100 F Street, NE, Washington, DC 20549, or by facsimile to (703) 813-9322.

You have the right to submit information anonymously. If you are submitting anonymously and you want to be considered for a whistleblower award, however, you *must* (1) be represented by an attorney in this matter and (2) complete Sections B and G of this form. If you are not submitting anonymously, you may, but are not required to, have an attorney. If you are not represented by an attorney in this matter, you may leave Sections B and G blank.

If you are submitting information for the SEC's whistleblower award program, you *must* submit your information either using this Form TCR or electronically through the SEC's Tips, Complaints and Referrals Portal, available on the SEC web site at https://denebleo.sec.gov/TCRExternal/index.xhtml.

Instructions for Completing Form TCR:

Section A: Information about You

Questions 1-4: Please provide the following information about yourself:

Last name, first name, and middle initial

Complete address, including city, state and zip code

Telephone number and, if available, an alternate number where you can be reached

Your e-mail address (to facilitate communications, we strongly encourage you to provide your email address),
Your preferred method of communication; and
Your occupation

For more than two complainants, use additional sheets as necessary to provide the required information for each complainant.

Section B: Information about Your Attorney. Complete this section only if you are represented by an attorney in this matter. You must be represented by an attorney, and this section must be completed, if you are submitting your information anonymously and you want to be considered for the SEC's whistleblower award program.

Questions 1-4: Provide the following information about the attorney representing you in this matter:

Attorney's name

Firm name

Complete address, including city, state and zip code

Telephone number and fax number, and

E-mail address

Section C: Tell Us about the Individual and/or Entity You Have a Complaint Against. If your complaint relates to more than two individuals and/or entities, you may attach additional sheets.

Question 1: Choose one of the following that best describes the individual or entity to which your complaint relates:

For Individuals: accountant, analyst, attorney, auditor, broker, compliance officer, employee, executive officer or director, financial planner, fund manager, investment advisor representative, stock promoter, trustee, unknown, or other (specify).

For Entity: bank, broker-dealer, clearing agency, day trading firm, exchange, Financial Industry Regulatory Authority, insurance company, investment advisor, investment advisor representative, investment company, Individual Retirement Account or 401(k) custodian/administrator, market maker, municipal securities dealers, mutual fund, newsletter company/investment publication company, on-line trading firm, private fund company (including hedge fund, private equity fund, venture capital fund, or real estate fund), private/closely held company, publicly held company, transfer agent/paying agent/registrar, underwriter, unknown, or other (specify).

Questions 2-4: For each subject, provide the following information, if known:

Full name
Complete address, including city, state and zip code
Telephone number,
E-mail address, and
Internet address, if applicable

Section D: Tell Us about Your Complaint

Question 1: State the date (mm/dd/yyyy) that the alleged conduct began.

Question 2: Choose the option that you believe best describes the nature of your complaint. If you are alleging more than one violation, please list all that you believe may apply. Use additional sheets if necessary.

Theft/misappropriation (advance fee fraud; lost or stolen securities; hacking of account)
Misrepresentation/omission (false/misleading marketing/sales literature; inaccurate, misleading or non-disclosure by Broker-Dealer, Investment Adviser and Associated Person; false/material misstatements in firm research that were basis of transaction)
Offering fraud (Ponzi/pyramid scheme; other offering fraud)
Registration violations (unregistered securities offering)
Trading (after hours trading; algorithmic trading; front-running; insider trading, manipulation of securities/prices; market timing; inaccurate quotes/pricing information; program trading; short selling; trading suspensions; volatility)
Fees/mark-ups/commissions (excessive or unnecessary administrative fees; excessive commissions or sales fees; failure to disclose fees; insufficient notice of change in fees; negotiated fee problems; excessive mark-ups/markdowns; excessive or otherwise improper spreads)
Corporate disclosure/reporting/other issuer matter (audit; corporate governance; conflicts of interest by management; executive compensation; failure to notify shareholders of corporate events; false/misleading financial statements, offering documents, press releases, proxy materials; failure to file reports; financial fraud; Foreign Corrupt Practices Act violations; going private transactions; mergers and acquisitions; restrictive legends, including 144 issues; reverse stock splits; selective disclosure – Regulation FD, 17 CFR 243; shareholder proposals; stock options for employees; stock splits; tender offers)
Sales and advisory practices (background information on past violations/integrity; breach of fiduciary duty/responsibility (IA); failure to disclose breakpoints; churning/excessive trading; cold calling; conflict of interest; abuse of authority in discretionary trading; failure to respond to investor; guarantee against loss/promise to buy back shares; high pressure sales techniques; instructions by client not followed; investment objectives not followed; margin; poor investment advice; Regulation E (Electronic Transfer Act); Regulation S-P, 17 CFR 248, (privacy issues); solicitation methods (non-cold calling; seminars); suitability; unauthorized transactions)
Operational (bond call; bond default; difficulty buying/selling securities; confirmations/statements; proxy materials/prospectus; delivery of funds/proceeds; dividend and interest problems; exchanges/switches of mutual funds with fund family; margin (illegal extension of margin credit, Regulation T restrictions, unauthorized margin transactions); online issues (trading system operation); settlement (including T+1 or T+3 concerns); stock certificates; spam; tax reporting problems; titling securities (difficulty titling ownership); trade execution.
Customer accounts (abandoned or inactive accounts; account administration and processing; identity theft affecting account; IPOs: problems with IPO allocation or eligibility; inaccurate valuation of Net Asset Value; transfer of account)
Comments/complaints about SEC, Self-Regulatory Organization, and Securities Investor Protection Corporation processes & programs (arbitration: bias by arbitrators/forum, failure to pay/comply with award, mandatory arbitration requirements, procedural problems or delays; SEC: complaints about enforcement actions, complaints about rulemaking, failure to act; Self-Regulatory Organization: failure to act; Investor Protection: inadequacy of laws or rules; SIPC: customer protection, proceedings and Broker-Dealer liquidations;
Other (analyst complaints; market maker activities; employer/employee disputes; specify other).

Question 3a: State whether you or your counsel have had any prior communications with the SEC concerning this matter.

Question 3b: If the answer to question 3a is yes, provide the name of the SEC staff member with whom you or your counsel communicated.

Question 4a: Indicate whether you or your counsel have provided the information you are providing to the SEC to any other agency or organization.

Question 4b: If the answer to question 4a is yes, provide details.

Question 4c: Provide the name and contact information of the point of contact at the other agency or organization, if known.

Question 5a: Indicate whether your complaint relates to an entity of which you are, or were in the past, an officer, director, counsel, employee, consultant, or contractor.

Question 5b: If the answer to question 5a is yes, state whether you have reported this violation to your supervisor, compliance office, whistleblower hotline, ombudsman, or any other available mechanism at the entity for reporting violations.

Question 5c: If the answer to question 5b is yes, provide details.

Question 5d: Provide the date on which you took the actions described in questions 5a and 5b..

Question 6a: Indicate whether you have taken any other action regarding your complaint, including whether you complained to the SEC, another regulator, a law enforcement agency, or any other agency or organization; initiated legal action, mediation or arbitration, or initiated any other action.

Question 6b: If you answered yes to question 6a, provide details, including the date on which you took the action(s) described, the name of the person or entity to whom you directed any report or complaint and contact information for the person or entity, if known, and the complete case name, case number, and forum of any legal action you have taken. Use additional sheets if necessary.

Question 7a: Check the appropriate box regarding whether your complaint relates to residential mortgage-backed securities.

Question 7b: List the following options that you believe best describes the type of security or investment at issue, if applicable:

1031 exchanges
529 plans
American Depositary Receipts
Annuities (equity-indexed annuities, fixed annuities, variable annuities)
Asset-backed securities
Auction rate securities
Banking products (including credit cards)
Certificates of deposit (CDs)
Closed-end funds
Coins and precious metals (gold, silver, etc.)
Collateralized mortgage obligations (CMOs)
Commercial paper
Commodities (currency transactions, futures, stock index options)
Convertible securities
Debt (corporate, lower-rated or "junk", municipal)
Equities (exchange-traded, foreign, Over-the-Counter, unregistered, linked notes)
Exchange Traded Funds
Franchises or business ventures
Hedge funds
Insurance contracts (not annuities)
Money-market funds
Mortgage-backed securities (mortgages, reverse mortgages)
Mutual funds
Options (commodity options, index options)
Partnerships
Preferred shares
Prime bank securities/high yield programs
Promissory notes
Real estate (real estate investment trusts (REITs))
Retirement plans (401(k), IRAs)
Rights and warrants
Structured note products
Subprime issues
Treasury securities
U.S. government agency securities
Unit investment trusts (UIT)
Viaticals and life settlements
Wrap accounts
Separately Managed Accounts (SMAs)
Unknown
Other (specify)

Question 7c: Provide the name of the issuer or security, if applicable.

Question 7d: Provide the ticker symbol or CUSIP number of the security, if applicable.

Question 8: State in detail all the facts pertinent to the alleged violation. Explain why you believe the facts described constitute a violation of the federal securities laws. Attach additional sheets if necessary.

Question 9: Describe all supporting materials in your possession and the availability and location of additional supporting materials not in your possession. Attach additional sheets if necessary.

Question 10: Describe how you obtained the information that supports your allegation. If any information was obtained from an attorney or in a communication where an attorney was present, identify such information with as much particularity as possible. In addition, if any information was obtained from a public source, identify the source with as much particularity as possible. Attach additional sheets if necessary.

Question 11: You may use this space to identify any documents or other information in your submission that you believe could reasonably be expected to reveal your identity. Explain the basis for your belief that your identity would be revealed if the documents or information were disclosed to a third party.

Question 12: Provide any additional information you think may be relevant.

Section E: Eligibility Requirements

Question 1: State whether you are currently, or were at the time you acquired the original information that you are submitting to the SEC, a member, officer, or employee of the Department of Justice; the Securities and Exchange Commission; the Comptroller of the Currency, the Board of Governors of the Federal Reserve System, the Federal Deposit Insurance Corporation, the Office of Thrift Supervision; the Public Company Accounting Oversight Board; any law enforcement organization; or any national securities exchange, registered securities association, registered clearing agency, the Municipal Securities Rulemaking Board

Question 2: State whether you are, or were you at the time you acquired the original information you are submitting to the SEC, a member, officer or employee of a foreign government, any political subdivision, department, agency, or instrumentality of a foreign government, or any other foreign financial regulatory authority as that term is defined in Section 3(a)(52) of the Securities Exchange Act of 1934.

Section 3(a)(52) of the Exchange Act (15 U.S.C. §78c(a)(52)) currently defines "foreign financial regulatory authority" as "any (A) foreign securities authority, (B) other governmental body or foreign equivalent of a self-regulatory organization empowered by a foreign government to administer or enforce its laws relating to the regulation of fiduciaries, trusts, commercial lending, insurance, trading in contracts of sale of a commodity for future delivery, or other instruments traded on or subject to the rules of a contract market, board of trade, or foreign equivalent, or other financial activities, or (C) membership organization a function of which is to regulate participation of its members in activities listed above."

Question 3: State whether you acquired the information you are providing to the SEC through the performance of an engagement required under the securities laws by an independent public accountant.

Question 4: State whether you are providing the information pursuant to a cooperation agreement with the SEC or with any other agency or organization.

Question 5: State whether you are a spouse, parent, child or sibling of a member or employee of the SEC, or whether you reside in the same household as a member or employee of the SEC.

Question 6: State whether you acquired the information you are providing to the SEC from any individual described in Questions 1 through 5 of this Section.

Question 7: State whether you or anyone representing you has received any request, inquiry or demand that relates to the subject matter of your submission in connection with: (i) an investigation, inspection or examination by the SEC, the Public Company Accounting Oversight Board, or any self-regulatory organization; or (ii) an investigation by Congress, or any other authority of the federal government, or a state Attorney General or securities regulatory authority?

Question 8: State whether you are the subject or target of a criminal investigation or have been convicted of a criminal violation in connection with the information you are submitting to the SEC.

Question 9: If you answered "Yes" to any of questions 1 through 8, provide additional details relating to your response.

SECTION F: Whistleblower's Declaration.

You must sign this Declaration if you are submitting this information pursuant to the SEC whistleblower program and wish to be considered for an award. If you are submitting your information anonymously, you must still sign this Declaration, and you must provide your attorney with the original of this signed form.

If you are not submitting your information pursuant to the SEC whistleblower program, you do not need to sign this Declaration.

SECTION G: COUNSEL CERTIFICATION

If you are submitting this information pursuant to the SEC whistleblower program and are doing so anonymously, your attorney must sign the Counsel Certification section.

If you are represented in this matter but you are not submitting your information pursuant to the SEC whistleblower program, your attorney does not need to sign the Counsel Certification Section.

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549

FORM TCR
TIP, COMPLAINT OR REFERRAL

A. INFORMATION ABOUT YOU

COMPLAINANT 1:

1. Last Name	First	M.I.
2. Street Address	Apartment/ Unit #	
City	State/ Province	ZIP/ Postal Code	Country
3. Telephone	Alt. Phone	E-mail Address
4. Occupation	Preferred method of communication	

COMPLAINANT 2:

1. Last Name	First	M.I.
2. Street Address	Apartment/ Unit #	
City	State/ Province	ZIP/ Postal Code	Country
3. Telephone	Alt. Phone	E-mail Address
4. Occupation	Preferred method of communication	

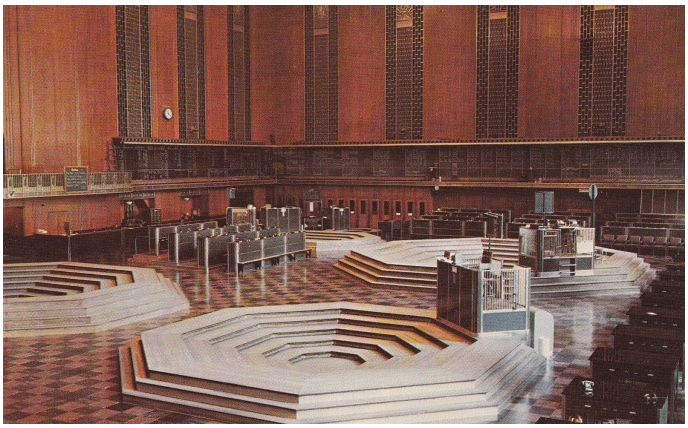
B. ATTORNEY'S INFORMATION (I

1. Attorney's Name			
2. Firm Name			
3. Street Address			
City	State/ Province	ZIP/ Postal Code	Country
4. Telephone	Fax	E-mail Address	

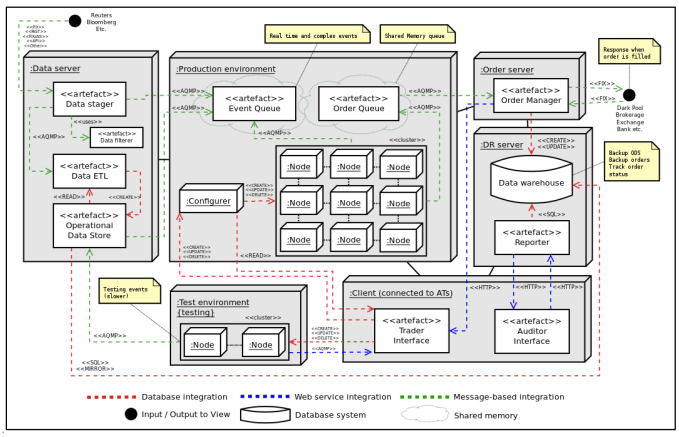
CHAPTER 2

THEORETICAL DISCOURSE

DERIVED FROM ARTISTIC RESEARCH



Algorithmic Trading system (ATs) High Level Deployment View



COLLECTIVE V

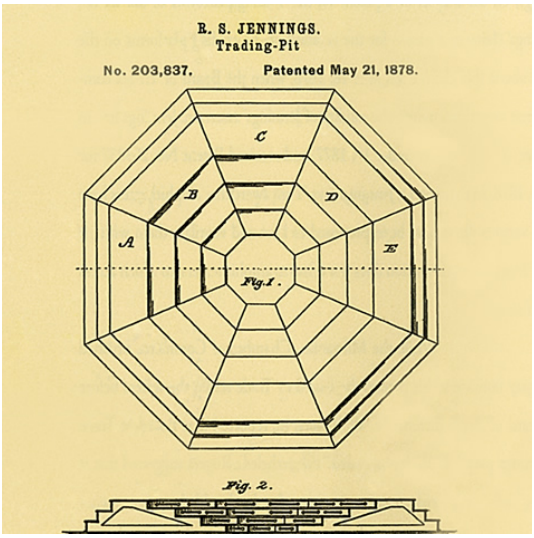
UTOPIA UNLEASHED

A BRIEF HISTORY OF FINANCE

AT THE OUTSET OF THE HISTORY OF THE FUTURE AT PRESENT

[…] the usefulness of the market […] is the market itself, meaning the material medium that allows us—us meaning the society, humanity, the world—to connect materially with the future. If you need the future and if you need to deal with the future beforehand […], the future is what preoccupies everywhere and all the time. […] if Meillassoux says that contingency is the absolute thing one could say that the future is the absolute thing because it's the same, contingency is the future […] And I think that you can safely say that every work—especially the works of art are turned for the future.
—Elie Ayache[1]

When Ruben Jennings filed a patent with the US patent authority in 1878, an early example of architectural modernism – neglected in the catalogues of architectural modernity – was born. Its plain Form follows Function design was married with a floor plan that enabled direct communication and brought "order to the often-chaotic trading environment."[2] It helped to incorporate the technological inventions of the day more fluidly.



Patent No. 203,837, issued on May 21, 1878 (Fig. 4, left), is an octagonal five-step structure facilitating a more streamlined method for trading financial assets and commodities in market exchange places. Contrary to former flat trading floors it assembled traders in an arena that allowed for an instant visual panoptic view and facilitated them with "great acoustics advantages"[3] regarding all actions happening.

[1] In: Gerald Nestler, *CONTINGENT CLAIM. Portrait of a Philosophy I*, 1-channel-video, 2012
[2] See: http://www.cmegroup.com/stories/#!2-trading-floor-design
[3] Quoted from Jennings' patent description. Further information on the patent infringement of U.S. financial institutions can be found in an essay by Jacob Birnbaum: http://www.fourwinds10.net/siterun_data/government/corporate_u_s/news.php?q=1265228529

This allowed for immediate intervention. The success of this concentrated and concentric space – the trading pit – was so overwhelming that it was adopted immediately by major exchange places and shapes open-outcry[4] trading floors up to the present day[5] (fig. 1 and 2, page 1; fig. 3 shows the layout of an algorithmic unit for automated trading). Had he been aware of this architectural innovation, it might have served Adolf Loos as a perfect example for *Ornament und Verbrechen*,[6] a polemic he wrote 1908, 30 years after Jennings invention. Although exchange places took up Jennings's idea quickly, not one paid licensing fees. "Soon thereafter, Jennings proceeded to sue financial exchanges such as the CBOT for its use and the result was that Jennings lost and his patent was invalidated."[7] There is a certain irony in the fact that he is still remembered in the financial world, as a number of blog entries show. Even the world's largest open-outcry exchange place, the Chicago Mercantile Exchange (CME Group) refers to his innovation on their website's history section[8].

The rise of a new and invigorated commercial power of future exchanges was certainly[9] due to different facts, such as a change in the perception of time that Niklas Luhmann describes as "time became reflective, it became capable of re-entering itself" or the industrial revolution and associated new agricultural production methods such as livestock storage, centralized warehouses, refrigerated boxcars and later agricultural standards for crops and other products. But Jennings' invention and the following spread of the trading pit are at the outset of the financial markets' impact not only on the economy and on business in general but also on a much wider social field. As I will show below, the architectural and communicative foundations of early derivative markets were laid out a short time before Gabriel Tarde spoke of these markets as laboratories of social psychology**.**

Jennings' 'intelligent design,' an early example of the Form follows Function design approach,[10] was a further step in making exchange places more functional. Arnoldi and Borch's notion of "imitation and control" – to which I will refer below – finds convincing visual evidence in the architectural setting of the trading pits (Chapter front page: fig. 1

[4] Open-outcry is the term used for trading floors where traders shout and use hand-signal, thus facilitating the price-finding process with immediate effect.
[5] Futures exchange places in Chicago such as the Chicago Board Options Exchange (CBOE), the Chicago Board of Trade (CBOT) or the Chicago Mercantile Exchange (CME) (both belong to the CME Group) are some of the last exchange places that adhere to open-outcry markets.
[6] The English translation was published 1913 under the title *Ornament and Crime*.
[7] See: http://www.tradingpitblog.com/2009/06/trading-pit-patent.html
[8] http://www.cmegroup.com/stories/#!2-trading-floor-design
[9] I will refer to historically crucial developments in more detail later.
[10] The Term was introduced by the American sculptor Horatio Greenrough in 1852 and adopted by the leading member oft he architectural Chicago School, Louis Sullivan. I couldn't find any evidence that links Jennings with the Chicago School but it is noteworthy that Chicago was and still is the main site of open outcry trading floors.

(1950) and 2 (2009) show trading floors at the Chicago Board of Trade). The material object facilitating trading thus facilitates an audio-visual "imitation and control" (Arnoldi and Borch, 2007) network installation. In tandem with simultaneous technological developments, this design constitutes the early framework of a new paradigm – a forum that doesn't (re)construct past events but the future.[11] It lasted for about 100 years before another kind of architecture took over (chapter front cover fig.3 shows the architecture of an algorithmic trading system (components and sub-components).

Another major force in evoking the financial apparatus to its full-fledged scheme was an invention that happened at around the same time Jennings patented his layout: Edison's speaking telephone. A few decades before, Morse invented the telegraph and it was almost immediately applied to great effect. It helped expanding the market architecture towards a network of international scope, making it the arguably first global system in human history.

> Telegraphs commercialize in the mid-1800s. Chicago and New York exchanges can share market news instantaneously. The electromagnetic telegraph debuts in 1835, and in 1844 Congress funds a 40-mile line from Baltimore to Washington, D.C. Ten years later, 23,000 miles of wire crisscross the country. Now exchange traders can share market information with unprecedented speed. By 1866, the first trans-Atlantic cable shortens communication time with foreign markets from three days to three hours.[12]

This quote from the website of the largest derivative market place in the world, the Chicago Mercantile Exchange (CME), gives evidence of the impact telecommunication had on the expansive field of capitalist markets already in their early days.[13] It is a further evidence of how closely allied politics and business have already been in the early days when financial markets became an international technology. This alliance, researched in its current manifestations among others by Brian Holmes and Armin Medosch's Technopolitics project, has become a paradigmatic field of insertion, not only of technology but also so of regulations and rules. The successors to the telegraph have multiplied the circle of negotiation from the amphitheatre to the trading pit by spherically enclosing the world as such with orbital satellite networks, underground fibre optic networks and microwave transmissions.

A micro-scopic rendering of even minimal arbitrage potentials and macro-scopic rendering of procedures, processes and matters on earth, this cybernetic network

[11] I should note that the missing element at the time – mathematical formulations that allowed modelling stochastic processes to deal with risk – was actually developed by Louis Bachelier in 1900 in his PhD thesis *The Theory of Speculation*. See Collective VI below.
[12] See: http://www.cmegroup.com/stories/#!2-telegraphs
[13] I will take a closer look below at how the current fibre optics technology (in which e.g. the CME Group has substantial stakes) and algorithmic trading reshape market communication.

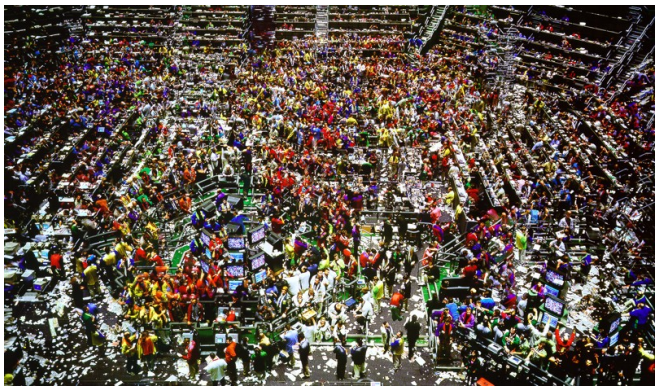
"appresents" (Karin Knorr Cetina and Alex Preda) the world in its randomness and uncertainty. To illustrate the shift from the 1880s to today I quote from a web commercial for a so-called Complex Event Processing solution for traders:

> "In the time it takes me to say this sentence, your world will have changed. The information you relied on 10 seconds ago is already out of date. In today's capital markets, the profit from opportunities that are here one minute are gone the next. You have to react quickly. You have to analyze a growing amount of high-velocity data, identify revenue opportunities and risks as they appear and make split second decisions to take immediate action. In financial services, continual intelligence can help your business capitalize on opportunities as they happen."[14]

Complexity theory, cybernetics and probabilistic mathematics are forming a cutting edge technology bound to become the extensive cyborg prosthesis of the market maker fixed in a pseudo-presence and sucked up in the anticipation of the very next move. The trader herself becomes a protuberance of the system, a facet of complexity that could (sic!) be an event to be processed and followed closely.[15] Agamben speaks of a metastable "state of emergency" that resides in the transition from one transaction to the next. Here, we encounter an extreme situation without place where Agamben's "camp" involves temporal, relational emergences: As regards the markets, even if a trader is located at a specific place the technological, computer-based and cybernetic enclosure links her to a transitive 'oracle' of which she is less the viewer than the 'seer', a prophet of future presence. The spatial realm of the "state of emergency" is turned into a time-based flow of 'reversed nature': like snowflakes melt away when they touch a warmer surface, trades emerge and reality is 'manufactured' when 'molecular monads' of algorithmic bids and asks merge at the matching engine of the computerized bottomless pit.

[14] Ad delivered by Neil McGovern, Director of Real-Time Analytics Strategy at Sybase Inc. http://www.sybase.com/products/financialservicessolutions/complex-event-processing

[15] The New York Stock Exchange, for instance, is implementing an augmented reality device that fuses the trader with algorithmic and communication technologies. This development is owed to a decrease in market share in a competitive, merger-prone global exchange market. Also, repeated issues with algorithmic transactions revived a requirement to keep a human trader on spot. A prototype, Wall Street Lingo, is presented here: www.youtube.com/watch?v=I4D8pALmgUc




Figures 5 + 6: left: Trading floor at the Chicago Board of Trade. Rright: The UBS Trading floor was the largest bank trading floor but has in the meantime been reduced to a fraction of its fomer size.

FROM IMMORAL HAZARD TO SCIENTIFIC ETHOS

They keep saying in the media that finance is like a casino. It's much worse than a casino! When I look at a derivative product the probabilities are not known. At least in a casino the odds are certain. —Martha Poon[16]

As early as 1986, Susan Strange, accredited with having revived political economy in Britain, argued in her seminal book *Casino Capitalism* that the study of financial markets has become the key to unlock the power relations of the time. She was an early warning voice against dangers that were lurking behind the enclosures of the global financial system and considered the 1997 Asian crisis a proof of her theory. The shibboleth she introduced – inspired by John Maynard Keynes[17] – has caught on: "Casino capitalism" has become a political slogan that not only adorns the signposts at anti-capitalist rallies. Recently, it has spread all over the economical and political spectrum ranging from staunch conservatives like Patrick J. Buchanan to liberal economists like Robert Shiller or Paul Krugman (who calls himself a "free-market Keynesian").

> "The world of high finance today offers the players a choice of games. Instead of roulette, blackjack, or poker, there is dealing to be done - the foreign-exchange market and all its variations; or in bonds, government securities or shares. In all these markets you may place bets on the future by dealing forward and by buying or selling options and all sorts of other recondite financial inventions. […] And the

[16] Martha Poon, "For Financial Certainty, Try Machine Gambling," *Journal of Cultural Economy* (2013), p. 7, DOI: 10.1080/17530350.2013.840668. The quote is from "Hsin Hin Lim, a gambling enthusiast who is also an equity derivatives and structured finance lawyer in the City of London [who] translates into legal contract the terms of the financial products dreamed up by ambitious quants and investment bankers at a major financial institution."

[17] John M. Keynes refers to casino capitalism in *General Theory of Employment, Interest, and Money*, chapter 12/VI, 1936.

> croupiers in this global finance casino are the big bankers and brokers. They play, as it were, "for the house.' It is they, in the long run, who make the best living."[18]

Strange's slogan is not simply a catch phrase. To illustrate, let us take a look back to the time when the current state of financial markets was in its infancy and its evolution was set to begin: the late 1960s. This is not a story of political revolt against the powers that be. But the revolution at the centre of this story is no less stunning even though much more troubling. And at first it seems to back the notion of the marketplace as a casino. At the centre of this story is not an economist but a member of another profession, a profession that will be playing a key role in the unfolding drama of finance right up to the present day: mathematics. In 1962, Edward Oakley Thorp furnished mathematical proof for the first time that a casino's house advantage in Blackjack could be overcome. But Thorp was not the pure mathematician who would consecrate himself to an ivory tower of scientific truth. His ambition was to proof his findings in practice. He teamed up with "Manny Kimmel, a wealthy professional gambler and one-time illegal bookie with mob connections,"[19] who invested 10.000 USD in order to experimentally verify Thorp's hypothesis. Thorp also collaborated with famed MIT professor Claude Shannon (renowned for his vital contributions to information theory and therefore credited as one of the 'founding fathers' of the computer age). They developed a wearable computer (the first ever to be used for gambling – a method understandably forbidden soon after) and employed it at gaming sprees that also included Shannon's wife. In 1962, Thorp published the results of his research in a small book, which instantly became a bestseller and soon a classic: *Beat the Dealer*.[20]

Although quite telling, this story would not be further interesting for what I am concerned with. But Ed Thorp had 'tasted blood.' There was another world out there that surpassed the casino both for the money involved and the mathematical challenge. So Thorp decided to tackle another 'game,' far from Las Vegas or similar though slightly darker playgrounds, and try his luck at calculating returns with probability calculus and statistics: The world of high finance. Only five years later, in 1967, he published the remarkably similar title, *Beat the Market*[21] and it might not come as a surprise that it also became an instant success. In its introduction it says:

> "We present here a method by which investors can consistently make large profits. We have used this method in the market for the past five years to earn 25% a year. We have made profits during two of the sharpest stock market drops of this

[18] Susan Strange, *Casino Capitalism* (Manchester University Press, 1996).
[19] Quoted from: http://en.wikipedia.org/wiki/Edward_O._Thorp
[20] Edward O. Thorp, Beat the Dealer: A Winning Strategy for the Game of Twenty-One (New York: Vinatge, 1962)
[21] Edward O. Thorp, Beat the Market: A Scientific Stock Market System, New York, 1967

> century; we have made profits when the stock market soared; and we have also made profits in stationary and churning markets. We have used mathematics, economics, and electronic computers to prove and perfect our theory. After reading dozens of books, investigating advisory services and mutual funds, and trying and rejecting scores of systems, we believe that ours is the first scientifically proven method for consistent stock market profits.

The book is considered seminal in spreading mathematics to the trading floor[22] – the paradigmatic shift finance has seen since the early 1970s. Thorp has become a legendary figure in the financial world, a key player in the transformation of derivative as well as arbitrage trading and the rise of the hedge funds. In the wake of the end of the Bretton Woods system and the subsequent floating of currency prices, derivatives turned from immoral hazard to state-of-the art technology. The entertaining provocation of gambling the casino with its promise of fortune turned to a scientific endeavour in which desire and luck was substituted by the quest for (mathematical) truth.

In the new paradigm of production that requires uncertainty, risk is not to be avoided. The elucidating light of aspiration and its relational 'intelligence,' reason, become searchlights of new opportunities, which are, of course, new risks. All the assuring investments (not only in a technical sense) in insurance (two centuries later it will be called "hedging") are derivative: There is no need for hedging if there is no risk endeavour. From a risk-averse society[23] to a risk-prone and even risk-inclined society: Here we encounter the sea change[24] that separates traditional from modern society. At the heart of the latter is probability theory and its rendering of risk as a measure to manage decision-making. This is the turning point – the first mathematical wave of quantification – that arose when Blaise Pascal and Pierre de Fermat laid the groundwork on the basis of games of chance in the mid-17th century. In a world in which relative probabilities are the nearest thing to absolute certainty and risk quantifies fortune and prudence, as Niklas Luhmann tells us, "risk […] becomes a

[22] Its subtitle, "A *Scientific* (my emphasis) Stock Market System," was certainly helpful in persuading buyers of the rational approach of the author who before had been known for his casino gambles – a leisure activity that actually became legendary in Wall Street circles in the following decades when the elite of traders indulged in loaded poker rounds (an account can be found in Scott Patterson's *The Quants: How A New Breed of Math Whizzes Conquered Wall Street and Nearly Destroyed It*, New York, 2010 tells vividly. A list of Wall Street and Poker celebrities can be found here: http://www.businessinsider.com/wall-streets-best-poker-players-2011-6?op=1

[23] Scholars of antiquity agree, for instance, that Greek civilisation and oracles avoided risk and the new, and therefore describe them as "conservative"

[24] Niklas Luhmann in his essay *Modern Society Shocked by its Risks*. Hong Kong, 1996 notes that the term risk (risicum, riscare) appears first in the transition from the Middle Ages to modern society in legal contexts mainly relating to sea trade

universal aspect of decision making. It may even be, as far as future outcomes are concerned, the very essence of a decision."[25]

The last remnant of the superhuman spirit, in an already modern sense of rationality, can be traced to Adam Smith's notion of an "invisible hand." The expression first appears in *The History of Astronomy* (1795) where it is unrelated to commerce and more in line with Leibniz' principal of sufficient reason. Economically, it first appears in his *Theory of Moral Sentiments* (1759), where he argued, "that by trying to maximize their own gains in a free market, individual ambition benefits society, even if the ambitious have no benevolent intentions." In *The Wealth of Nations* (1776), after adopting economic ideas developed by the French Physiocrats and especially Cantillons *Essai sur la Nature du Commerce en Général* (1755), he referred to the notion directly as regards self-interest and a thus unintentionally promoted general interest.[26] Although Smith himself never referred to God directly, his use of words seems to imply a superhuman quality. It might have been sentences like, "When *Providence* [my emphasis] divided the earth among a few lordly masters, it neither forgot nor abandoned those who seemed to have been left out in the partition," that led someone so captivated by human action like Ludwig von Mises to reason that Smith referred to God when he used "invisible hand".

For Luhmann, our fate seems presence depletion in order to allocate decisions on the immediate future. This is produced by the embrace of risk and incorporates in *angst* of (financial) loss, craving for novelties, urge for innovations, overwhelming magnitude of calculation – all under the capitalist paradigm of growth. It accrues in technologies of access ranging from the agora of the marketplace to the agora of the commonplace:

> "In this sense decisions are always new. They introduce newness, new pasts and new futures, in an unqualifiable world that nevertheless remains the same. The old European tradition thought of newness as deviance. In early modern times newness became slowly admitted as pleasure. Then it became the performance and the merit of the 'subject'. But now we seem to approach a time in which newness becomes the unavoidable unity of fate and risk."[27]

The reconceptualization of what is bought and sold in derivative markets in the 1960s and 70s unveils the current financial concept of "newness" as an information pattern of change and risk that is quantifiable in prices. These innovations – reverberating Joseph Schumpeter's creative destruction by innovation – fuse technological, mathematical, legal and logistic knowledge into ever more diversified packaged services. Their

[25] Luhmann, loc.cit., p. 5
[26] Mark Thornton, *The Mystery of Adam Smith's Invisible Hand Resolved* (Auborn: Mises Institute, 2006)
[27] Luhmann, p. 13

relevance in the socio-political shift from Keynesian Welfare State to what Bob Jessop calls the Schumpeterian Workfare State[28] must not be underestimated. Newness in both Luhmann and Schumpeter's sense has come to equate volatility. Deviance, a multiplier of unknowns, is processed and made productive by variance measures. Option terminology reflects a seemingly mundane character: exotic[29] for the latter and vanilla for the former.

Contrary to casino games where rules are not only clearly defined but transgressions are sanctioned with (often lifelong) expulsion,[30] market rules are under constant pressure of deregulation and adaptation. They do not constitute a "magic circle" of invariable rules, as Johan Huizinga[31] described games. Rather, their magic circle – their arena – is permeable, malleable and adaptable to a high degree. The allegory reflects an ideological deflection of a system that not only create its own rules, models, commodities and so on but also implants them in the socio-cultural realm of the production of risk.

Hence, the casino metaphor seems oddly in contradiction to any social and political effort. It downplays the actual impact by collating it with a game (a contest of hazard rather than beauty, as in Keynes). It thereby eliminates it from reality and undermines current urgencies: The urgency against fate beyond the profitable sensation of gambling, where the precarious ecology of all living is at stake; The urgency against what is at stake in the arena of finance where the contingent nature of our global future is hijacked with a mix of complex derivatives, nanosecond arbitrage and off-shore corporate structures; the urgency against the utopian belief that markets are natural and need to 'roam-free' in order to spill their competitive cornucopia – the monetarist-libertarian worship reminiscent of the inaccessible 'invisible hand' of ancient deities.

Of course, there is plenty of 'competition' in turning the future into categories of ownership, patent or other forms of leverage that allow for caging/cashing in on a future that could be different. It is the property title and its potential to create debt obligations that must circulate back and be redeemed with interest that constitutes the

[28] See: https://bobjessop.org/2014/05/06/towards-a-schumpeterian-workfare-state-preliminary-remarks-on-post-fordist-political-economy/

[29] www.investopedia.com/terms/v/variance.asp#axzz2IFH7KyqE: Variance measures the variability (volatility) from an average. Volatility is a measure of risk, so this statistic can help determine the risk an investor might take on when purchasing a specific security.

[30] Needless to say, new strategies and technologies are no exception from this rule. Shannon and Thorp's invention of the wearable computer, for instance, was banned immediately when casinos got wind of it.

[31] Johan Huizinga, *Homo Ludens: A Study of the Play-Element in Culture*, (London: Routledge & Kegan Paul, 1949).

legal kernel of capitalism, as Steiger and Heinsohn[32] have revealed. But it also manifests a Protean *Gestalt*, an ability not only to implement an economy but also to adapt to new situations. This is due to what the authors call "Eigentumsprämie," (property premium), the initial, immaterial excess constituted by the title that furnishes material excess of interest and disposability of capital:

> A debtor who has to convert the property premium into interest is forced – in competition with other debtors – to refund more money than he received in the credit agreement. The debtor, therefore, has to exploit his borrowed advance of money, the capital, in a very particular way. He is thus forced to resource-economisation. […] Technical progress, therefore, arises from the permanent necessity of proprietaries to reduce indebtedness."[33] [My translation]

Although they define property as the nucleus of any economy proper (an absolute title in this regard) – a view I do not share, in particular because the fields of research Heinsohn and Steiger draw their conclusions from, ethnology and anthropology, have delivered plenty of evidence to the contrary (to only name the classic studies of Marcel Mauss and Bronislav Malinowski on gift exchange cultures, or Marcel Hénaff *The Price of Truth. Gift, Money and Philosophy*) – they nevertheless acknowledge,

> […] that concentration of property destroys the power of leverage of citizens, thus compelling the state to the position of debtor by proxy as long as it avoids the redistribution of property. […] The state, therefore, would have to restore leverage power by a radical distribution of property."[34] [My translation]

The exploitation of the contingent becoming by enclosures of possession does therefore not happen without constrictions or struggles. In the process, ruins are constructed[35] from existing worlds to potentialize futures by equating the world in the face of price. This does not simply happen by disinvestment in projects that do not (anymore) promise profits but by a speculative 'portfolio management' of capital based on a vertical (successive) instead of horizontal (simultaneous) rule of engagement, and what we could call a 'three-plus-one investment strategy': capture (privatisation),

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[32] Gunnar Heinsohn/Otto Steiger, *Eigentum, Zins und Geld* [Property, Interest and Money], (Marburg: Metropolis, 2002)

[33] loc. cit. „Ein Schuldner, der die Eigentumsprämie des Gläubigers in Zins umzuwandeln hat, wird dazu gezwungen – in Konkurrenz mit anderen Schuldnern – mehr Geld zurückzuzahlen, als er im Kreditkontrakt erhalten hat. Der Schuldner muß also seinen geliehenen Geldvorschuß, das Kapital, in einer ganz besonderen Weise verwerten. Er wird so zur Ökonomisierung von Ressourcen gezwungen. […] Technischer Fortschritt entspringt also der ständigen Notwendigkeit einer Verringerung der Verschuldung von Eigentümern."

[34] loc. cit. „[…] die Eigentumskonzentration die Verschuldungsfähigkeit von Bürgern zerstört und somit den Staat solange in die Position eines stellvertretenden Schuldners nötigt, wie er eine Neuverteilung von Eigentum umgeht. Der Staat müsste […] also durch die radikale Verteilung von Eigentum die Verschuldungsfähigkeit wiederherstellen."

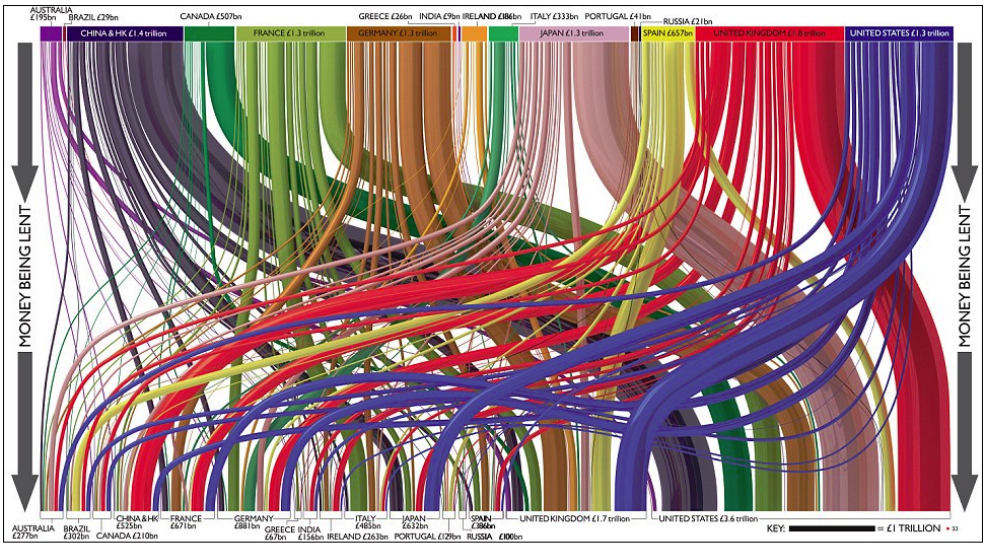
[35] Contrary to the ruin as a collateral damage or wreckage, I refer to the construction of ruins as an applied strategy to invalidate and capitalise on existing institutions and traditions of communality, exchange and knowledge. See above.

speculation (arbitrage), and exodus (disinvesting) plus a concurrent fictitious derivative insurance (dynamic hedging). Obsolescence – the mode of cessation implemented in products – becomes a mode of unwinding local institutions and traditions and thus their future by a "short-termism which has *systematically*, *and not accidentally*, been translated into the *decomposition of investment into speculation*"[36].

> "At the origin of capitalism, it was the God of a reformed monotheism who assumed the symbolic function of […] infinite responsibility, as we are informed by Weber. But what could take on the symbolic function of this infinite responsibility when capitalism turns into a process of disenchantment, nihilism and the death of God?"[37]

Bernard Stiegler, following Max Weber, raises the question of infinite responsibility and finds the answer in the careless psychopower of a libidinal economy exploiting the "infinite object of desire". Before I come back to the 'careless whispers' of speculative capitalism and Stiegler's pharmacological framework of capitalism, I will try to elaborate a different view – not opposing Stiegler's but as an alternative entry point. Instead of *infinite desire*, the apparatus I will evoke hinges on the notions of *absolute truth* (mathematics) and *technowledge of the future* (derivatives). In their foundations, they are less psychological than philosophical, less individual than systemic. I look at markets as a 'common fate' rather than that of individuals in order to attempt empowering dividual subjectivities for a time after post-capitalism.

Fig. 7: "The Interconnected Web of Global Debt," Zerohedge guest post, Dec. 21, 2012[38]



In our graphic, money flows from top to bottom, and the thickness of each pipe in the graph denotes the amount being lent

[36] Bernard Stiegler, *For a New Critique of Political Economy* (Cambridge: Polity, 2010), p.6.
[37] Stiegler, loc.cit., p. 94
[38] See: http://www.zerohedge.com/news/2012-12-21/guest-post-interconnective-web-global-debt

NOISE

"By now, finance permeates from the beginning to the end the circulation of capital. Every productive act and every act of consumption is directly or indirectly tied to finance. Debt-credit relationships define the production and exchange of goods according to a speculative logic, transforming, that is, the use value of goods (theoretically all produced or to-be-produced goods) in veritable potential financial assets that generate surplus value. The demand, and the indebtedness it implies, for a financialized use value, as happened with housing during the subprime bubble, induces further increases in demand precisely in virtue of the increase of the price of that good. This fully contradicts the law of supply and demand typical of neoclassical theory where an increase in price reduces demand. —Christian Marazzi[39]

The forensics by which the thing receives speech turns into a flight of speeches, a multifarious, immersive chthonic realm, which is kept hovering above the abyss. Information seizes to produce knowledge, at least in the sense of the episteme. The economist Fischer Black who with Myron Scholes developed the Black-Scholes equation (termed the most applied formula in the history of mathematics) refers us to the term "noise." Noise, Black declares in 1986, is the opposite of information and is thus fundamental for speculation to occur. "Noise makes financial markets possible, but also makes them imperfect."[40] Noise trading – the disagreement on what will happen – is the speculative price discovery when information is not at hand, not trusted or not easily analysed due to complexity of the situation. Following the above quote, Peter Mehrling explains Black's evaluation:

> "Even though the effect of noise trading is to cause market price to deviate quite far from value, it is not clear that we can do anything about it that information traders are not already doing. In an ideal world, where information is freely available, there would be *no room* for noise traders, or indeed *for any trading at all* [my emphasis], and price would always equal value. But in our imperfect world, where information is costly, noise traders keep the information traders in business providing the expected profits that encourage them to gather information in the first place."[41]

Not only is this one of the first moments that a leading economist accepts irrationality as a major component of markets (and thus deviates from the theory of perfect Nash equilibrium and Fama's efficient market hypothesis – a scandal at the time). It also describes with the word "noise" the complexity of a situation in which more often than not information cannot be attained because it is impossible to know what lies beyond the horizon of the present moment. Thus, mathematics takes on a different role

[39] Christian Marazzi, *The Violence of Financial Capitalism* (Los Angeles: Semiotext(e), 2011), p. 107
[40] Peter Mehrling, *Fischer Black and the Revolutionary Idea of Finance* (Hoboken: Wiley, 2012), p. 233
[41] Mehrling, loc.cit., p. 234.

altogether and becomes the fundamental *technowledge* of calculating the future. Redundant concerning the acoustics of the arena, it becomes the quantitative net stretched across the pit, instrumentalized to render the truth of complex probabilistic calculus in order and destroy the correlational circle of the voices on the floor (which are redundant and replaced by the speech of machine-code).

What is at stake is not a random field of future possibilities but what we actually and commonly can (in a material sense) think and make of the future. What is disappearing in the bondage of contracted futures is not only a potentially different future but the experience of time lived here and now. The 'market being' lives in the twilight zone between today and the morrow haunting a spectre that has always been concealed to human knowledge, whether we apply complex mathematical models or read the entrails of animals. The derivative markets – descending from remnants of an older socio-cultural model devoted to the arduous and complicated quest for truth – claim to master the contingent realm of uncertainty. Derivative markets today fabricate the *technē* of the future by rationalizing unknown events with the help of the mathematics of probability. Truth has ceased to be the realm of a god. Truth today performs in the realm of the price-daemon.

EXPERIMENTS ON THE BODY POLITICS

What has become brittle today not only as regards financial markets is the paradigmatic image of the laboratory as a perfectly controlled space – if we accept the comparison of markets with the scientific laboratory. Maurizio Lazzarato reminds us, "Gabriel Tarde […] had already a century ago defined stock exchanges as laboratories of social psychology."[42] This is less to do with an understanding of markets as places where facts are modified but the interpretation of causes, or, in other words the untenable and unattainable position that markets exist outside and before the world. Jakob Arnoldi and Christian Borch describe this laboratory of imitation and control:

> The collective pricing is both a collective self-monitoring, where market participants mirror themselves in the market rates – something which creates imitation; but market crowds are also arenas where economic interests concur. There is a faceless market crowd, prone to sudden eruptions of collective affect, but there are also elaborate hierarchies and social control. The key to all this is uncertainty: there is much pressure and much risk, which create massive incentives for both imitation and control. The imitation may be both conscious and subconscious; in the former case it is indeed an attempt to control, in the latter it is

[42] Maurizio Lazzarato, "From Capital-Labour to Capital-Life", *ephemera. theory of the multitude*, Volume 4(3): p. 195

an act of affect created by the market crowd.[43]

The language of fabrication applied in the laboratory of the bottomless pit –the trading floor and its volatile and rapturous passage from the future to the present (and not the other way round) – is still the same than the one Galileo defined as the script of nature: mathematics. Arnoldi and Borch, looking at open outcry trading floors, deal with their 'object of investigation' as a social order. They refer to Gabriel Tarde's notions of intensity and imitation, which he worked out in *The Laws of Imitation* (1903):

> "From a Tardean point of view, imitation is not always equally intense. Blind, unconscious imitation is most likely to occur in very volatile markets, whereas conscious imitation may prevail in stable markets. Yet Brennan's analysis suggests that the very socio-physical setting of open-outcry markets make these particularly susceptible to unconscious, non-rational, affective imitation, because the physical proximity of market makers is likely to stimulate transmissions of affect."[44]

They merry Tarde's insights with Harrison C. Whites's network theory, which starts out from a stochastic character of social life and reveals the object of fabrication in the original financial laboratory (the trading floor): The peers who are (still) subjects and therefore *are* the experiment (which they are performing at the same time) that create the fact (price) without any causality inherent:

> All control efforts are attempts to reduce uncertainty – therein lies the reason why White is so useful for analyzing economic activity. Decoupling refers to a process in which actors avoid or suspend ties between nodes of the network; ties which by definition establish dependencies. To decouple is thus 'converse to embedding' (White, 1992: 32); it is used to 'buffer one chain of actions from another as well as freeing one actor from another's ties' (1992: 78). According to White, a particular type of decoupling is related to comparability (1992: 13). By comparing his or her behaviour to that of peers, an actor reduces complexity and acquires a possible standard for his or her future action. This action may imitate that of the peers or it may decouple from it. An example of the latter is to seek out a niche. *Finding a niche in a market is a control strategy*. [My emphasis][45]

What could be a better control strategy to countering uncertainty than moving from the imitation-control niche of human traders to *niche-ing* markets per se: By applying a cybernetic regime constructed of computer networks (discrete, undisclosed traffic), security measures (control), quantitative decoupling (algorithms), and deregulation (contracts)? When Felix Guattari speaks of a "rising demand for subjective

[43] Jakob Arnoldi and Christian Borch, „Market Crowds between Imitation and Control," in: *Theory, Culture & Society*, Vol. 24(7-8), 2007, p. 177
[44] Arnoldi/Borch, loc.cit., p. 170
[45] Arnoldi/Borch, loc.cit., p. 171

singularity,"[46] what we are witnessing today might constitute the other side of the coin of political reterritorialisation – the introduction of domination by a time-based regime anchored in objective singularity.

THE MARKET "BEING:" INFORMATION, FLOW, AND BRICOLAGE

Karin Knorr Cetina and Alex Preda in their article *The Temporalisation of Financial Markets: From Network to Flow* argue in respect to the current global financial system and in a critical review of Manuel Castell's network theory that

> […] markets moved from a network-based architecture to one based on a scopic mode of coordination. In networks, the mechanism of coordination is relational and selective; [...] A scopic mechanism, in contrast, works through collecting and ‚appresenting' things simultaneously to a large audience of observers. The transformation from relation-seeking actors to data and narratives beamed to observers enabled a flow market to emerge that moves across time zones with the sun. The notion 'flow' points to the streaming character of market reality and some of its consequences. The specialized lifeworld of flow markets is 'metastable' in physicists' sense: it is stable only long enough to enable transactions to occur and changes with transactions.[47]

In such a scopic system[48], information is present at all times and places. It is ever-present as a mode to be made use of ‚freely.' At the same time we are integrated in a net of satellites that scan our planet and package data into diversified information of safeguarded interests. The flow of images, data, and algorithmic sequences is monitored as a flow from "in the next moment" to "a moment ago". Rather than a completely pre-engineered and accomplished framework, it is a collection of "bricolage" frames (MacKenzie and Prado-Guerra, 2013) built to make possible, assess and direct the emergent flows. What emerges, however, are not spontaneous instances in the world but the very system that sets in motion the constructed emergence of price discovery, the incessant streams of bids and asks. The infinite market being that Knorr

[46] "Generally, one can say that contemporary history is increasingly dominated by rising demand for subjective singularity – quarrels over language, autonomist demands, issues of nationalism and of the nation, which, in total ambiguity, express on the one hand aspiration for national liberation, but also manifest themselves in what I would call conservative reterritorialisations of subjectivity." Felix Guattari, *Chaosmosis*, 1995, p. 3

[47] Karin Knorr Cetina and Alex Preda, „The Temporalisation of Financial Markets: From Network to Flow", *Theory, Culture & Society*, 2007, Vol. 24(7-8): 116-138

[48] „A scoping system," Knorr and Preda explain, "can be defined as a system of observation and projection that assembles on one surface dispersed and diverse activities, interpretations and representations which in turn orient and constrain the response of an audience ... When such a mechanism is in place, coordination and activities respond to the projected reality to which participants become oriented. The system acts as a centering and mediating device through which things pass and from which they flow forward." Loc. cit., p. 126.

Cetina brings to light by quoting a trader is therefore a specifically cybernetic form (a material shape) of 'granting' emergent flows to infinitely surface, merge and submerge. This only becomes effective when a ‚transaction' happens, or, in the terminology of quotation, when an ‚ask' is matched (merges) with a ‚bid' and a deal is closed.

Hence – and in contrasting extension to Knorr Cetina's research findings – the transactions and their operational field (the technological and evaluative environment they cover) do not require human agency. Rather, they are extremely well suited for successful automation. Automation is usually implemented when it reduces cost, improves quality, processes inventory efficiently (the industrial sector speaks of "just in time" production), and improves response time – hence is conducive to competitive advantage.[49] This list makes clear that automation finds manifold applications in finance, some of which are much more mundane than artificial intelligence-driven quantitative decision-making units; or automated low-latency computer-network processes that order ahead of time in order to trade "just in time." When the term "black box" gained traction it simply described an electronic, automatic "switchboard" technology that could calculate and process data much quicker than humans who were supposed to be only concerned with its input and output.

The black box is a computational device whose inner workings are unknown or do not need to be known. However simple or complex the system, its underlying principle is clear: every black box is an apparatus devised to generate profit. In the early days, this meant initiating a radical cut with older and established practices and their business models and practices. Like in surgical sectioning, entire occupational profiles, financial methodologies and industries were abandoned. But the automatization of the 'blue collar work' factories on Wall Street and LaSalle Street – the trading floors that could hold hundreds and even thousands of so-called "locals" and their back offices – was an uneven (one might say volatile) path from the beginning. Leo Melamed, the chairman of the Chicago Mercantile Exchange from 1969 to 1987 stated in an interview:

> My view was that you could not trade 24-hours in an open-outcry environment in any efficient manner ... but at the time the idea of a black box solution for trading was like Darth Vader. It was considered the worst evil possible, because it would take away the open outcry business from the floor. And so we had to do this very, very quietly.[50]

[49] https://belcanengineeringservices.com/index.php/automation-main/191
[50] http://www.derivativesstrategy.com/magazine/archive/1995-1996/0496qa.asp, last accessed August 8, 2016

Melamed led the MERC, as it was then called,[51] through a number of radical changes and innovations, most importantly the introduction of financial futures in 1973. It earned Melamid the name of "the father of financial futures." Before that time, futures markets were agricultural markets at which the produce had to be delivered at settlement. Law required this because trading future prices without delivery was nothing short of pure gamble.[52] Hence, the radical shift to cash settlement that Melamid and others asserted over the timespan of nearly two decades cannot be underestimated. However, political and macroeconomic developments laid the ground for the first financial futures – for whose implementation he was even supported by economist Milton Friedman. It was the time when Nixon announced the end of the Dollar-gold convertibility (on August 15, 1971) and as a result the Bretton Woods agreement disintegrated (1973). The deregulation of exchange rates spilled enormous uncertainty and volatility into currency and other financial markets worldwide – a situation that in the financial world was considered an opportunity rather than a curse. Volatility is the financial word for risk and there is one 'ingredient' derivative markets depend on: volatility. Without volatility – and therefore risk – no urgency to hedge nor an opportunity to speculate. Melamid described the situation in the same interview,

> […] eventually the concept took hold because the idea was so enormously strong. And it was perfect timing. After we launched the currency contracts, we had the oil embargo, then inflation, then every kind of upheaval in finance imaginable. Our new markets were ideally suited for both the speculator and the hedger in times of upheaval… Currencies are one thing, but interest rates are the holiest of instruments on Wall Street. I mean, this is where Salomon Brothers and Goldman Sachs lived. This was their bread and butter. What? An interest rate futures market in Chicago? Ridiculous! The day it was launched Milton Friedman was the bell ringer, and the contract was an instant success."[53]

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[51] Under Melamid's leadership, the Merc merged with the Chicago Board of Trade (CBOT) in 2007, the New York Mercantile Exchange (NYMEX) and the Commodity Exchange (COMEX) in 2008 to form the largest financial market place in the world, the Chicago Mercantile Exchange (CME).

[52] Melamid describes the situation from his perspective, which reveals the direct influence of finance on policy-making: "Since time immemorial, when a futures contract matured, you had be able to deliver the product. Without a mechanism for delivery we would be just a gambling institution, subject to the gambling laws and probably banned from most states. Even for the currency contracts I had to go to the Continental Bank and talk them into creating a delivery facility for us. […] But certain products I wanted to trade couldn't be delivered. […] I knew Eurodollars was probably the most important short-term interest rate benchmark of all. But you can't deliver an interest rate. All you can do is measure the value of the interest rate at the time you bought the contract and at the time it matured and the difference in the value in cash, but you couldn't deliver the interest rate. *I decided that it would take a federal agency to give me the right and the cover of legitimacy for 'cash settlement.' In 1974 we worked towards the creation of the Commodity Futures Trading Commission. Then in 1977 we began working with the CFTC on the idea of cash settlement, and it finally was approved in 1981* [my emphasis]. Once there was cash settlement, I knew that the sky was the limit. […] The first cash-settled futures contract was Eurodollars. Then we listed S&P futures in 1982. It was an enormous breakthrough – a hedging mechanism, a risk management instrument of enormous potential." See: http://www.derivativesstrategy.com/magazine/archive/1995-1996/0496qa.asp

[53] http://www.derivativesstrategy.com/magazine/archive/1995-1996/0496qa.asp, last accessed

Betting on future prices by the volatility of future prices became the paradigmatic method for anticipating present values (I call this approach the derivative paradigm). This might sound counter-intuitive at first, but it becomes clearer when we consider the fact that price is by definition an anticipation, an expectation of the future value of a 'thing'. As prices come into existence through the matching of buy and sell orders they formulate a quantified anticipation of the calculated future needs, hopes, desires, and fears of the buy and the sell side in a market. The (invested/speculative) reality of the market is the future. Only when a future moment (a virtual price) and a present moment (an actualized price) meet (or au contraire, when the anticipation fails to a degree that affords instant action) a profit (or loss) is realized. Only the aggregate market with all its myriads of (derivative) prices communicates to those invested what their values are. However, as the market deals in anticipations, what investors are interested in is less present value but future price. The more prices exist, the deeper is the market – it is liquid, which means that a party is very likely to get the price for their anticipation. The more volatility is in the market, the higher is the risk but at the same time opportunity increases, too. In a 24-hour environment that is global, calculations of this magnitude cannot be made by human brains. Hence, Melamid exemplifies the development of derivative markets from highly-regulated but at the same time 'wild' agricultural markets to high-tech, self-regulated and self-organised financial markets.

Electronically aided cybernetic self-organization in finance began slowly in the 1980s but has taken on global significance in the mid-1990s when important aspects of market infrastructure for matching and clearing orders and the pricing mechanism had been turned into a 24-hour electronic environment. In an increasingly electronic environment, improving response time is by itself a reason to automate specific operations, which again intensifies as the technological standard develops. Well-established industry standards of how transactions are negotiated and closed came under pressure and were eliminated in rapid series of innovations that were not only technological (that is their basis) but also strategic (such as a radically different speculative approach) and organisational (the connections, relations and correlations between non-human and human actors). An example for such a radical shift can be found in Donald MacKenzie and Juan-Pablo Pardo-Guerra's study *Insurgent capitalism: Island, bricolage and the re-making of finance* that examines the introduction of the so-called Island ECN (an internal Electronic Communications Network – a computerized trading system that automatically matches buyers and sellers and displays its real-time limit order book to the public) at the fringes of the financial system and its catastrophic impact on the heart of finance proper. "'This was

probably the most influential change in the markets since they did away with fixed-commission rates in the 70s,' says Mark Friedfertig, CEO of Broadway Trading, a leading day-trading firm that has used Island since January 1996."[54]

MacKenzie and Pardo-Guerra's narrative is worth reading, as it is part science fiction and anarchic counter-culture; part nerd collective marginality; it is about tinkering and experimenting as much as megalomaniac obstinacy. It seems to fit the sagas of innovative tech geniuses – the heroic legends of our days – that were working away in a garage and singlehandedly revolutionized the world.[55] Widely unnoticed, science nerds had taken on finance and were on the verge of taking it over. This was not a new development; there were specimen before – such as the Eudaemoniac group[56] and other "quants" (a term that was introduced much later) in the 1980s, or their predecessors in the late 1960s such as the Thorp. But only in the late 1990s and early 2000s, the moment had come when the electronic waves, which had merely spilled at the 'locals' shores' in Chicago, New York and elsewhere, banked up to a Tsunami. The trading pit and its often excessive noise started to fall silent. Investment banks had to hire scientists, mathematicians, and computer experts, not only to take advantage of the new opportunities but also to stay in business.[57]

The financial expert and philosopher Elie Ayache, who I discuss and quote throughout my thesis, is an example for the influx of young scientists and engineers. His story is paradigmatic for the change in financial markets and I therefore quote a longer passage from a video interview I did with him, which is the basis for a 3-channel video I am working on[58] (not included in the practice part):[59]

> The derivatives business started in Paris and became fashionable in '86-'87, just a few months before the crash [of 1987]. So, this is when banks became market makers in options and started hiring engineers because of derivatives. They

[54] http://www.wallstreetandtech.com/careers/the-top-10-financial-technology-innovators-of-the-decade/d/d-id/1253235?, last accessed August 11, 2016

[55] Marianna Mazzuccato contradicts the creative economy/venture capitalists' sagas under the rubric of „The state has not just fixed markets, but actively created them" in: T*he Entrepreneurial State* (London: Demos, 2011).

[56] The Eudaemonics were a group of graduate students and young scientists in the USA who experimented with computer technology, quantitative methods and probability theory first in casinos and later on Wall Street. The model for their 'betting sprees' was Ed Thorp who will be mentioned later. See: Thomas A. Bass, *The Eudaemonic Pie* (Boston: Houghton Mifflin, 1985).

[57] Just to process an order size typical for an investment bank required an algorithm that was able to split the order up into a flow of trading data that could slip unnoticed below the threshold of human and non-human (algorithmic) perception.

[58] Gerald Nestler, *Two Globes Forming A Circle. Dividual Recalibration, Automated*. 3-channel video with Elie Ayache and Philippe Henrotte, algorithm, and objects, forthcoming 2017.

[59] This and the following quotes are part of an interview with Elie Ayache and Philippe Henrotte translated for and published in the book *Making of Finance* (edited by Armen Avanessian and Gerald Nestler, Berlin: Merve Verlag, 2015). The quotes therefore exist in published form although in German (referenced page numbers relate to the Merve book).

> thought they needed people who understood equations and partial derivatives and Delta Gamma volatility. The Ecole Polytechnique [from where Ayache had graduated] might have had a course on probability theory and the like but as opposed to today there was no specific curriculum on derivatives or finance. When I arrived at that trading desk of this Parisian large bank the whole business had only just started about a year before when my boss had been hired for exactly the same reasons: he was an engineer and he programmed. The topic of his dissertation was programming the Black Scholes formula on Symphony – the ancestor of Excel – and that was a major breakthrough, which allowed the bank to have a trading desk. [...] The Black Scholes formula wasn't taught at school, so my boss had to buy that famous book that every trader in those days had – the Cox-Ross-Rubinstein book – on option trading where they teach you how to program, numerically program binomial trees. So that was the first book addressed to people who do programming. We had read that book and applied the algorithms. So for me, it was really about trading on the floor because that was the new thing that was emerging. I worked on the floor in Paris for four years and then in London for five years. That was exciting but if you ask me if I had any idea that this would become a career – no, absolutely not. Because to me to go and trade on the floor looked like going hunting or something. It was not like sitting behind a desk.[60]

Ayache often narrates the story in private that his first day on the trading floor of the MATIF (the Marche a Terme International de France) was the day of the crash, Black Monday, October 19, 1987). The interview also sheds light on the practice of Black-Scholes-Merton (BSM), how it was applied and how it failed:

> From my point of view, I used the Black Scholes formula and the software that was programmed by my boss for first time '87, and then there was the crash. The crash obviously is very important in terms of building the field because it made options become much more liquid than they used to be. Because they were all over the place and everybody wanted options. From this point of view technology is very important because banks – I mean large banks like the one I was in – were starting to own portfolios of options. And because we were market makers we didn't know how many options were going to sell. It was up to the market to come and challenge us. Immediately, there was the need for software. You didn't have software that could aggregate option positions and compute the overall exposure of the portfolio fast enough. So, you have Black Scholes first of all and the next technological breakthrough was how to aggregate options which have different maturities and strikes, etc. and that you are booking in your portfolio under a different volatility of values. So, this by itself created what we call the "smile problem" where you had to make sense in a single framework of options that are trading at levels of volatility that are different one from the other. This is in contradiction to Black Scholes that says that there is only one volatility number. And this triggered the whole theoretical research of trying to generalize Black Scholes.[61]

Philippe Henrotte, Ayache's partner at the financial service firm ITO 33 and a professor of finance at the HEC Paris (Hautes Etudes Commerciales de Paris) who I interviewed together with Ayache, has spend the last 30 years modeling BSM. His statement sheds light on the fact why BSM is still used even though there is agreement on its failure:

[60] Avanessian, Nestler, loc.cit., p 96.
[61] Avanessian, Nestler (eds.), loc.cit., p. 97.

> […] the breakthrough for everybody was the crash because that's when this smile issue became a big problem and this afforded a lot of time and resources. The smile issue means that you couldn't simply price the huge variety of options in the market with Black Scholes. Black Scholes is really designed to price one option. To make consistent pricing of two options with different strikes, different maturity just doesn't work with it. So, you've got to expand the theory to make it consistent. That's where we come from and it's still a problem I'm looking at. I'm the only one because after the 90's there was not such a huge amount of money spent on this issue and it all started to go wrong with credit derivatives and everything exploded with the Lehman crisis, of course. Ever since, we are paying the price for that because our field is getting associated with what I believe is the wrong problem.[62]

Asked, what the problem is in his opinion, Henrotte very clearly delineates the scandal of the subprime crisis in thee words of a quant:

> Basically, if you're not careful with your model, it's easy to transport toxic stuff into very safe things. The 'magic' of transforming good theory into something that is inherently junk or risky or bad is an issue, right? And it went very fast. I think this is bad but there is a lot of money spent convincing regulators and credit rating agencies and all these people that what you're producing has in fact almost no risk, which obviously attracts a huge amount of money because a lot of people are looking for return with no risk. So, the quant community started producing models saying, 'we have found a way so you can invest your money and there will be extremely limited risk, even though what you'd be investing in is extremely risky.' So, where is the issue? I simplify a bit but obviously a huge amount of money is suddenly spent on these products, which, not surprisingly if you ask me, explode. And when it explodes, people come back to the profession and say, 'You are very lousy people, so now we're going to stop you from doing proprietary trading.' Which makes sense, meaning if you want to spend your money on stupid things, do it, but not with the taxpayers' money subsidizing your losses, which isn't fair.[63]

The relation between derivatives calculated with the BSM formula (in financial lingo "vanillas") and complex derivatives based on the Gaussian Cupola formula developed by David Li would justify a separate chapter. As there is not enough space to discuss the topic, I would only like to mention that there is a crucial difference between these two financial instruments: The former are directly derived from their underlying and BSM allows the pricing of both derivatives and underlying (by implied volatility) while the latter are based on the mathematical description of ties between different risk tiers. I would therefore suggest calling them "correlatives," in order to differentiate between these instruments. However, even though Ayache is adamantly upholding the market pit filled with human market makers, the reality of financial transactions is obviously different. Today, algorithms account for the most part of financial transactions globally. Unfortunately, much of recent research into algorithmic finance has emphasized one application of automated trading over others – high frequency trading –, even though the financial infrastructure is made up of diverse practices and digital-processual

[62] Avanessian, Nestler (eds.), loc.cit., p. 98.
[63] Avanessian, Nestler (eds.), loc.cit., p. 100.

materialities. Algorithms underlie the financial infrastructure; no order and no transaction exist that are not processed through an algorithm even at the last open outcry option pits at the Chicago Mercantile Exchange.

From the early days of Jennings's trading pit to today, the utopia of the future shifted from a spatial regime to one of time. Not only in the substitution of trading floors and human market makers with electronic networks, black boxes, and algorithms. On a social level the utopia of progress developed a rich imagery of cosmic travel, space exploration and colonisation. Those who were the avatars of this older 'enterprise' and were deemed to developed the rockets that take us into space – engineers, mathematicians, and physicists – have since the 1970s become the makers of markets, the "Masters of the Universe" (Tom Wolfe, 1987). However, this universe is one of derivative time calibration, in other words, it is an endeavour in colonizing time. This is not simply a metaphor but bears on a statement expressed by Elie Ayache in a video portrait I made on the basis of a 3-hour interview:

> The market is the technology of the future. [...] It is producing the material bridge – which is the market – with which to connect to the future events that may happen to the stuff that is trading. So we are dealing with the future…according to me the market is the technology of time, the technology of the future that allows us to travel in the future…just like the technology of space, meaning the rockets that allowed us to go and discover the space.[64]

The source and materiality of the surface of financial markets rests on the introduction of a specific modality of thought derived from mathematical and scientific models that reoriented the politics of progress from a space utopia full of representations and imaginations to a performative colonization of action in time. In the following, I will examine the history of the performative *writing* of price since the introduction of quantification, which has become the pervasive and commanding order in finance.

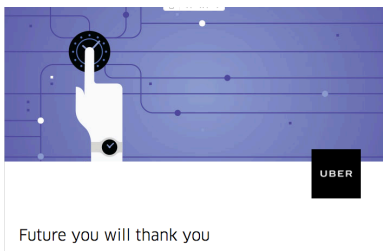

Fig. 8: Image on an advertising panel, August 2016.

[64] Gerald Nestler, *CONTINGENT CLAIM. Portrait of a Philosophy I, Elie Ayache*, 1-channel video, Video, 35:23. In the video, Ayache, an options trader, financial engineer and philosopher, elaborates on his interpretation of derivative trading based on his reading of philosophical works by e.g. Quentin Meillassoux, Alain Badiou, Gilles Deleuze and Henri Bergson. In his critique of financial markets he replaces probability with the concept of contingency. Opposing the notion of value (which for Ayache is not a market category) he defines price as absolute (in the sense of Q. Meillassoux, *After Finitude*, 2011). In his reading of J. L. Borges' *Pierre Menard Author of the Quixote* he holds that prices are realised by writing as a contingent practice. The video is part of the installation *Bottomless Pit, Elastic* and included in the Practice Portfolio of this thesis.

COLLECTIVE VI

THE QUANTITATIVE TURN IN FINANCE

THE RECENT HISTORY OF THE FUTURE AT PRESENT

Whether we listen through the fading cacophony of the trading floor or over the rotation of cooling fans in a server room, we must attend most carefully of all to the anonymous murmur of the writing of price. —John Roffe[65]

Two initial remarks to delineate my use of the term "quantitative turn" for the developments in finance since the late 1960s: Firstly, an expert reader with a background in automated trading (or its examination) might find it oversimplifying to combine two distinct and consecutively developed financial technologies – derivatives and automated trading with their own respective array of methodologies, instruments and even mindsets and cultures. However, the latter is a market force born from scientific models just as the former. This is not to say that there were no bifurcations at which algorithmic trading developed its own paths – and high frequency trading (HFT) with its focus on low latency is a foremost example. It is no secret that financial markets have dynamics that lead to differentiation on all kinds of layers, also within already specialized practices. But HFT in all its differentiations and optimizations would simply not exist without the "groundwork" developed in derivative markets. Edward O. Thorp, who operated the first quantitative hedge fund (1969), developed his mathematical models and formulas in order to hedge his bets with derivatives. The history of financial markets since then has seen an enormous expansion of mathematically informed business models to win in the market, which intrinsically includes derivative markets:

> HFT is not an entirely new phenomenon: rather, it is the culmination of decades of technological innovation and regulatory developments that have encouraged financial automation. There have also been new developments in classical financial practices such as arbitrage: it is now possible to perform arbitrage between two highly correlated products, for example, treasury bonds traded on the NYSE and a corresponding futures contract traded on the Chicago Mercantile Exchange (CME). It takes around 13 milliseconds for a price move on the NYSE to have an impact on the future' s price. By optimizing the material connection between the two marketplaces, HFTs can react faster […] and earn a small profit

[65] Jon Roffe, *Abstract Market Theory* (Palgrave Macmillan: Basingstoke, 2015), p. 29

on every single trade.[66]

Secondly, I use the term "quantitative turn" in finance instead of the established "performative turn" because performativity is contingent on the quantification of finance. Since the late 1960s, finance has been revolutionized by the input of cybernetic-scientific *technowledge*. I am aware that doing business and financing projects has been quantitative to some degree for centuries if not millennia. One of the basic ideas in economics, the quantity theory of money "is surely one of the oldest ideas in economics. It goes back thousands of years," as the a proponent of the Chicago School of Economics, Nobel Laureate Milton Friedman, mentioned.[67] Calculation, bookkeeping and accounting have long histories and traditions, too. However, the latest seachange is of a category that transcends earlier mathematical and/or scientific approaches. Cohorts of quants have introduced quantitative evaluation, risk management and algorithmic transactions that feed and exploit liquidity. Calculus and calculation have moved from basic and relatively simple mathematics to complex equations, which borrow from biology (e.g. Brownian motion), physics (e.g. stochastic jump diffusion), partial differential equation (e.g. Black and Scholes) and even rocket science (e.g. Merton's use of Ito's lemma), to only mention a few. We have entered a market whose quantitative-technological totality exceeds earlier quantitative incorporations such as money, as elaborately theorized by Georg Simmel at the beginning of the 20th century:

> We invest economic objects with a quantity of value as if it were an inherent quality, and then hand them over to the process of exchange, to a mechanism determined by those quantities, to an impersonal confrontation between values, from which they return multiplied and more enjoyable to the final purpose, which was also their point of origin: subjective experience. This is the basis and source of that valuation which finds its expression in economic life and whose consequences represent the meaning of money.[68] […] Only the fact that the object is exchanged, that it is a price and costs a price, draws this line and determines the quantum of subjective value with which the object enters the process of exchange as an objective value.[69]

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[66] Ann-Christina Lange, Marc Lenglet and Robert Seyfert, "Cultures of high-frequency trading: mapping the landscape of algorithmic developments in contemporary financial markets," *Economy and Society* Vol. 45/2, 2016: 1– 17, p. 5. doi.org/10.1080/03085147.2016.1213986.
[67] Milton Friedman, *The Counter-Revolution in Monetary Theory*, First Wincott Memorial Lecture (London: The Institute of Economic Affairs, 1970), p. 9
[68] Georg Simmel, *The Philosophy of Money* (London: Routledge, 2004), p. 76. German original published in 1900.
[69] Simmel, p. 91. This passage reverberates with Ludwig von Mises' "subjective theory of value," which is at the core of what would later become Neoliberalism (partly because von Mises was Friedrich von Hayek's most important teacher). See e.g. Ludwig von Mises, *Human Action* (Auburn: Ludwig Mises Institute, 1989)

Moreover, the seminal example of an earlier sophisticated mathematical theory, Louis Bachelier's *Theorie de la Speculation* (published in 1900)[70] was simply overlooked because the proper *technowledge* for financial risk production was not available – financial markets lacked the 'sensory organs' of communication and computer technology as well as of cybernetics.[71] Bachelier's contribution to financial theory was so monumental (he introduced random walk)[72] that 65 years later, Jimmy Savage, a mathematical statistician, felt inclined to sent out postcards with the following message: "Do any of you economist guys know about a French book on the theory of speculation by some French professor named Bachelier?" No one had. But Paul Samuelson (known as the "Father of Modern Economics" due to his seminal contributions to both neo-Keynesian and neoclassical economics) took it up and Eugene Fama translated it into a model that won him the Nobel Prize: The Efficient Market Hypothesis[73] holds that the stock market's price movements do not follow patterns or trends and that past price movements cannot be used to predict future prices. The quantitative breakthrough came with the Black-Scholes-Merton model in combination with technological improvements and adaptations (a favourable political climate for market liberalisation after Nixon's election to President of the United States was the socio-political prerequisite). These rational models had enormous impact on decision-making (pricing) in financial markets. Their efficiency was only challenged by the crash of 1987 – which led to the actual success of BSM even though it is established fact that the model failed – and the inclusion of emotional factors by behavioural economics in the early 1990s.

We would not have seen such an intense debate on performativity in finance without the scientific and engineering impact on the field beginning with the late 1960s. As Elie Ayache states, "the market-maker cannot dispense with the quantitative tools or the mathematical models."[74] Since the mid-1980s, the "enunciation" of price identification has irreversibly[75] turned from the performative ritual in the market theatre (the

[70] In 1900, Bachelier, published his PhD-thesis at the Sorbonne: *Theorie de la speculation* demonstrated that "L'esperance mathematique du speculateur est nul" (The mathematical expectation of the speculator is zero). He described this condition as a "fair game".
[71] This can be deduced from e.g. Donald McKenzie and Yuval Millo, "Constructing a Market, Performing Theory: The Historical Sociology of a Financial Derivatives Exchange," in: *AJS*, Vol. 109, No.1, 2003
[72] Random walk is Brownian motion (1827, Robert Brown), for which Einstein, unaware of Bachelier, developed the equation for another context five years later in 1905.
[73] Developed in his PhD thesis in 1965 (supervised by Benoit Mandelbrot) and published 1970 in the *Journal of Finance* under the title "Efficient Capital Markets: A Review of Theory and Empirical Work."
[74] Elie Ayache, *The Medium of Contingency. An Inverse View oft he* Market (Palgrave Macmillan: Basingstoke, 2015), p. 5
[75] I use the term "irreversible" not because it is impossible to think a reversion (and Ayache stands as an example) but because it would entail a complete revolution of the financial system

architectural soundscape of the trading pit) with its "crowd between imitation and control" (Arnoldi & Borch) to an off-sight and deterritorialized technological performance based on quantification.[76]

However, I do not propose a replacement of terms. Rather, the proposed conceptual framework takes quantification as the basis from which the efficacy of performativity unfolds. The quantitative-technological array is the underlying "statement" from which performativity derives. As Michel Callon states,

> [t]he performativity approach makes it possible to exhibit the struggle between worlds that are trying to prevail; it makes the struggle for life between statements visible. Each statement, each model battles to exist. But the Darwinian metaphor stops there. In reality this struggle between statements is a struggle between socio-technical *agencements.* It is not the environment that decides and selects the statements that will survive; it is the statements themselves that determine the environments required for their survival."[77]

And MacKenzie responds, "markets' infrastructures matter."[78] Quantification changes the infrastructure and the "enunciation" of price. The utterances of locals on the trading foor are performative in Austin's sense, as Donald MacKenzie explains. And he gives the example of the Chicago futures exchange, "if someone offers to buy from me, or to sell to me, a particular asset for a particular price, and I say 'done' or 'agreed,' then the deal is agreed."[79] But he acknowledges instantly that the term performative becomes "a far more complex matter than the analysis of specific, individual utterances" with the impact of economics[80] on financial markets. A fully automated and quantified process ranging from incoming orders to settlement and clearing has led to a decrease on the spread (margin) in pricing. The order book has become a dynamic, constantly updated

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and its paradigmatic model. This is a socio-political task but not in the sense of revers engineering (a practice of derivative finance called "dynamic hedging") or the return to a previous state.

[76] The human trader still exists, of course, on Chicago options floors and on some trading floors of investment banks and other financial firms. The performative utterance in Austin's sense still exists on trading floors: „you're done," indicates an agreement on a specific price. However, his task (the male gender reflects a highly male-dominated workforce) is quantitative – see, for example, Karin Knorr Cetina, "From Pipes to Scopes: The Flow Architecture of Financial Markets," in: *Distinktion - Scandinavian journal of social theory* 7, 2003

[77] Michel Callon, *What does it mean to say that economics is performative?* CSI working papers series no. 005, 2006, p. 28

[78] Donald MacKenzie, *An Engine, not a Camera. How Financial Models Shape Markets*, (Cambridge: MIT Press, 2005), p.12. We cannot outline the history of this development here. It suffices to say that he first applies the example of the Chicago future markets to show how technical, legal and social processes have formed financial markets since the 19th century and continues with the role of economics by citing Callon and "his insistence that economics itself is a part of the infrastructure of modern markets: '…economics, in the broad sense of the term, performs, shapes and formats the economy, rather than observing how it functions.'" p. 14-15

[79] Donald MacKenzie, loc.cit., p.16

[80] As mentioned above, economics (and especially microeconomics) interprets its *matter* as natural and applies models and methodologies from the natural sciences.

electronic register that feeds orders into an algorithmically executed matching engine; real-time IT-interfaces communicate the pricing activity back to market makers and traders assembled in a global theatre whose circles and ranks are invisibly separated by pecuniary, technological, and institutional hierarchies of access. Hence, the main – but heavily contested – argument in favour of HFT, that it enhances the provision and depth of liquidity.[81] Rishi K. Narang defines "liquidity *at any point in time* as being the *immediate availability* [both my emphasis] of units to be transacted at a fair price."[82] As liquidity hinges on size, price, and immediacy, quantitative trading impacts the liquidity performance within the market infrastructure and at the same time delivers liquidity – or the lack thereof – as its very field of 'technowledge-experience'.

THE QUANTITATIVE TURN IN FINANCE

This is the age of quantification. On the Social Science building at the University of Chicago there is carved the statement of Lord Kelvin: 'If we cannot measure a thing, our knowledge of it is meagre and unsatisfactory.' —George J. Stiegler[83]

The quantitative turn in finance implies that computer-based modelling and accounting (evaluation) are an "irreplaceable and irreducible part of the constitution of markets"[84] and thus inform its performativity. An initial instance in this recent history of financial markets can be identified by the formation of the first quantitative hedge fund in 1969. Convertible Hedge Associates, founded by Edward O. Thorp and his partner Jay Regan exploited quantitative methodologies acquired by scientized casino gambling. Before defecting academia for finance, Edward O. Thorp had been a mathematics professor at the MIT who experimented with modern probability theory by applying it on games of chance. In the course of his research he also invented the first wearable computer together with the "father of information theory," Claude Shannon, and both successfully 'tested' its power to increase the betting odds in the game of roulette.

As a hedge fund manager, Thorp prioritized shareholder over academic interests and abandoned scholarly publishing. Hence, the game-changing occasion arrived with the

[81] Exemplified by two online resources, Investopia gives a rather positive conclusion, while the Zerohedge blog is highly critical: http://www.investopedia.com/articles/active-trading/050515/liquidity-improved-high-frequency-trading-hft.asp. http://www.zerohedge.com/news/2015-08-25/cutting-through-hft-lies-what-really-happened-during-flash-crash-august-24-2015
[82] Rishi K. Narang, *The Truth about High-Frequency Trading* (Hoboken: Wiley, 2014), p. 28
[83] George J. Stiegler, *The Pleasures and Pains of Modern Capitalism*, Thirteenth Wincott Memorial Lecture (London: The Institute of Economic Affairs, 1982), p. 22
[84] Millo and MacKenzie, 2009, loc.cit, p. 641.

publication of the Black Scholes-Merton model in 1973 (BSM).[85] As Elena Esposito explains:

> The formula represents an attempt in the present to give an objectivity (a price) to a future given, where this future has not yet arrived, and hence cannot be known, but depends on present operations – that is, on today' s price. Callon' s circularity here shows its most direct form. The object does not exist but for the intervention of the observer, an intervention that is doomed to affect it. MacKenzie has shown that the success of the Black-Scholes formula and its influence on the expansion of financial markets depended on performativity. Since the future does not yet exist, the present expectations about the future contribute to its production.[86]

Although BSM was published as a theoretical work, it marks the turning towards quantification. Its impact on pricing in derivative markets cannot be underestimated. In Donald Mackenzie's words, "financial economics […] did more than analyze markets; it altered them. It was an 'engine' in a sense not intended by [Milton] Friedman: an active force transforming its environment, not a camera passively recording it."[87]

But this "force" emerged rather unrecognized und half-comprehend at best – not only by the public but specialists, too, as the 1987 crash proved. Gil Scott-Heron's 1970 "The Revolution Will Not be Televised" comes to mind, a radical political poem released at about the same time when BSM introduced an algorithm that sparked the first derivative wave of neoliberal market revolutions that today hold sway over the world. But while Mackenzie's account is mainly concerned with "bodies" and their operations, High Frequency Trading (HFT) has in the meantime abandoned human traders and their site-specific resolution apparatuses for quant-coded algorithmic high-res market making. As collateral damage, the epitome of territorialised capitalism, Wall Street, had become a mere symbol. While the crowded trading floor of the New York Stock Exchange (NYSE) is still the undisputed televisual icon of the "market," the media presence obfuscates, more than reveals, what the market has actually become, as a result of what I term the *quantitative turn* in finance. Since 2012 the NYSE and its trading floor have been the property of Intercontinental Exchange, a provider of algorithmic trading platforms operating from Atlanta, USA (David 2012). The new pivotal architectural nodes of what has turned into a deterritorialized, informational capitalism are now the nondescript and non-representative warehouse buildings, filled

[85] Fisher Black & Myron Scholes, "The Pricing of Options and Corporate Liabilities," *in: Journal of Political Economy* 81 (3): 637–654, 1973. Robert C. Merton, "Theory of Rational Option Pricing," in: *Bell Journal of Economics and Management Science* (The RAND Corporation) 4 (1): 141–183, 1973. Thorp, in an interview with the *Journal of Investment Consulting* (Vol. 12, No. 1, 2011), claims that he had come up with an equivalent formula years before BSM but hadn't published it to protect the competitive advantage of his investors.

[86] Elena Esposito, "The structures of uncertainty: performativity and unpredictability in economic operations," *Economy and Society*, 42:1, 2013, p. 106

[87] Donald MacKenzie, *An Engine, not a Camera*, loc.cit., p.12

to the brim with computer servers and fibre optics, in suburban areas such as Mahwah, New Jersey. Although in 2010 this was still future in the making, something unsettling had dawned on acute observers of the epic failure described as the Flash Crash: algorithmic daimonic powers had slipped away from human control. For the first time, bots had caused mayhem. Not only were automated trading desks affected; this "revolution" flashed into view as a globally televised event.

In the wake of the suspension of the Bretton Wood agreement and the subsequent transition to floating exchange rates, the Black-Scholes formula introduced an algorithm that co-sparked the first wave of quantitative financial market revolutions in conjunction with the founding of the Chicago Currency Futures Market (1972) and the Chicago Board Options Exchange.[88] BSM's paradigmatic role as a derivative pricing tool is supported by the fact that it "survived" the 1989 market crash even though the latter is widely recognized as the proof that BSM fails. The 'sign on the wall' of its failure, the so-called "volatility smile" (or, "volatility skew"), has since been turned into the positive 'enunciation' of pricing and is one of the most prominent features of financial market calculations.[89] In contrast to the 'hierarchy' implied by BSM – in which the derivative is merely a value of the price of an underlying – this counter-measure for trading in derivatives (i.e. trading the volatility of volatility) introduced an attempt to apply what could be described as a "folded flat ontology" of uncertainty and risk by calculating, trading, and pricing[90] implied volatility, i.e. the future price movements of the underlying. The consequence of the reversion of BSM is a substitution of value by price and the valuation process by the price process. Roffe delineates the flattening of time series into price series in the following way:

> There is an important link here with the category of the future, as an irreducibly open temporal modality that likewise evades any subordination to knowledge […] the contrast with value reveals itself here, for […] all values make a kind of conditional demand on the future – they *predispose* – whereas prices manifest in a relationship of pure indifference to what came before and what comes next.[91]

Thus, in Ayache's philosophy of the market – a philosophy that advocates the replacement of probability by contingency – value has no place in the market. Only price happens:

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[88] The CBOE was founded in 1973 and introduced exchange-based option trading.
[89] Here is not the space to explain its characteristics. In brief, BSM defines volatility (risk) as constant in a log normal distribution. Instead, the range of market prices for an option showed a curve (a "smile," or "skew") – the model fails at pricing out-of-the value risk distributions (the probability of rare events). MacKenzie provides a detailed discussion. A philosophical treatise is: Elie Ayache, *The Blank Swan. The End of Probability* (Hoboken: Wiley, 2010)
[90] Pricing constitutes Ayache's philosophical point of departure against the probability paradigm.
[91] Roffe, loc.cit., p. 35

> In my narrative of derivatives, what I mean by value is what comes out of the theoretical valuation models. I do not mean the value that actors in the market attach or deny to the derivative for whatever subjective, ethical, or political reason. Now against value as given by the valuation models, I argue for the immanence of the market and, consequently, that price is all there is. For instance, the fundamental parameter in the BSM valuation model is instantaneous volatility. This is a formal theoretical concept. However, given that there are only prices and no transcendent view of volatility, the only working concept in BSM is the volatility that we imply from the market prices of derivatives by inverting the BSM formula against them, or implied volatility.[92]

With price as the quanta of derivative markets and the incessant recalibration of derivative prices, the market moves towards *resolution* within an abstract flat ontology whose surface is folded. The folds constitute the discrete steps of interconnected derivative complexity, its recalibrated price series (trading volatility of volatility and so forth). The actualization of price *dissolves* a cluster of derivative prices written unto each other to instantly recalibrate[93] a *next* virtual cluster – a method called dynamic hedging. John Roffe, by referring to the philosopher Raymond Ruyer, accounts for this (by way of prices as intense singularities while I refer to intensive recalibration):

> Ruyer's account offers to the theory of the market as a surface […] the insistence on the absence of an ontological gap between surface and occupant. […] The inscription of price thus must not be thought in terms of the encounter between two extended things, like chalk and a blackboard, but rather the *modulation* of one reality. To write price is thus to deform the market surface itself. It is possible to imagine the market without price or inscription, as a degree zero surface of intensity awaiting acts of pricing, as if we were to conceive a waveless sea. This, however, is never in fact the case. The topology of the market remains what it is in the wake of the last price, and then changes – and *changes* completely – with the next price.[94]

Thus price happens in the *rhythual* between contingencies and actualisation. It is never *known* whether beforehand nor after. It is an eventual process. No price ever repeats, no scale (difference, hierarchy) exists, except the "internal difference" of context change – a flat ontology folded, in which the 'pleat' constitutes context change:

> As there is ultimately no difference *in the market* between the underlying and the derivative (when we imply volatility from the option price, aren't we *deriving* the underlying from the derivative?), this implicate dimension, disrupting the notion of process, is present in all price series, and not just in derivatives. In fact, it says that in every price the whole market is *implicit* because the capacity of context change, which is implicit in every traded (derivative) price, is in the end just a

[92] Elie Ayache, *The Medium of Contingency*, loc.cit., p. 5
[93] Ayache accounts for the importance of recalibration – and the surface of the market: „Recalibration is what all derivatives traders do when using derivative pricing tools and is precisely what derivative valuation theory, or academia at large, cannot account for. Derivative valuation theory deals only with stochastic processes and stochastic control and knows nothing of the concept of market price, even less so of the concept of implied volatility." *Loc. cit.*, p. 32
[94] Roffe, *Abstract Market Theory*, loc.cit., p. 71

> reflection of price *as the internal difference and pit*, regardless of its derivative nature.[95]

Here, the performativity of BSM meets MacKenzie's counterperformativity[96] in the sense that the market positively "misinterprets" BSM as an operational tool for pricing even though the theoretical model failed. In MacKenzie's words:

> In Chicago, where a Black-Scholes world was performed, a radically different world is now institutionalized in risk-management techniques: a world of discontinuous price movements, of jumps in volatility, and even of Mandelbrot's monsters. The goal is not performativity but counterperformativity: to assume "wild" randomness in order to lessen the chance of its manifesting itself.[97]

In the market, BSM is not a model imposed on the market but the dynamic hedging *practice of pricing*. Prices trade on a surface, which is the market, and all the 'levels' of complexity are on the same playing field (even though they fold). In the words of Jon Roffe, "the market conceived as a medium [is] defined as an inscriptive and intensive surface."[98]

The next wave of quantitative trading was ushered in by computational penetration in the early 1990s. In contrast to the previous wave its performativity is not restricted to financial markets: connectivity, the intensification of computing capacity, computer networks and the concomitant increase in bandwidth. In finance, the fusion of mathematical quantification and information technology (in conjunction with the deregulation of financial markets in the 1980s) saw a new breed of traders emerging. Their heroes were not the market-savvy speculators and market makers of old but scientists like Thorp (who is called the "father of quants"). To take a single example: The Eudaemons, a group of science students including J. Doyne Farmer[99] experimented with wearable computing in casino gambles – influenced by Thorp who had published a bestselling book on his own scientific gambling sprees (*Beat the Dealer*, Vintage Books: New York, 1966). In 1991, Farmer and his partners founded Prediction Company, a financial firm, which aggressively took advantage of quantitative prediction and pattern recognition that they could calculate and process with the computing power, technological conglomerations and analytical tools that had become available. Finding order in chaos (how order emerges at the "edges of chaos," a phrase

[95] Elie Ayache, *The Blank Swan*, loc.cit., p. 20
[96] MacKenzie describes counterperformativity: „practical use of an aspect of economics makes economic processes less like their depiction by economics," loc.cit., p. 17
[97] MacKenzie, loc.cit., p. 210
[98] Jon Roffe, *loc.cit.,* p. 32
[99] J. Doyne Farmer is the co-director of the program on complexity economics at Oxford's Institute for New Economic Thinking and a former quant (see below).

coined by Farmer and his partner Norman Packard), tinkering with and tweaking complexity was Farmer's concern:

> Farmer draws a square in the air. Going up the square increases apparent complexity; going across the square increases inherent complexity. 'Physics normally works down here,' Farmer says, pointing to the bottom corner of low complexity for both sorts, home of the easy problems. 'Out there,' pointing to the opposite upper corner, 'it's all hard. But we are now sliding up to here, where it gets interesting – where the apparent complexity is high, but the true complexity is still low. Up here complex problems have something in them you can predict. And those are exactly the ones we are looking for in the stock market.'[100]

The concept they followed, "local predictability," or, "pockets of predictability" can be characterized as a specific scientific (probabilistic) investigation to boost resolution, i.e. to comprehend and visualize otherwise obscure volatility phenomena. This approach instances the earliest examples of a risk culture that they termed "black box trading". In contrast to earlier forms of proprietary protection and secrecy, interests, claims and titles were now hardwired into machine.[101] The effects on communication as a social, cultural, and economic foundation have been immense: resolution technologies – sort of quantitative dynamic microscopes – were turned into analytic black boxes, i.e. competitive tools for performative machinic observation, prevision and evaluation (i.e. pricing) to make profits on financial markets.[102] The contingent incalculable events of this *rhythual* are bursts and liquidity drains. They trigger flash crashes in which financial growth (not to be mistaken with economic growth) dissolves in microseconds.[103]

Today the techno-scientific semblance between gambling and finance has turned once more. Now it seems more rational to gamble the casino; finance has become the murkier water, animated by data monsters not seen in the gambling hell. As Martha Poon recounts,

> In both gambling and finance, digital environments are the new mediators of entrenched economic inequality. […] the separation between these two industries in practice is a legal distinction. Through the common application of algorithmic technology to betting, borrowing, and investing, the line is once again becoming blurry. There is, however, one important difference in the way each is being revamped by digital systems. In casinos, there is central control over the odds, and randomization is fixed in each digital product installed on the floor by game manufacturers. Things are significantly more complicated in distributed financial markets where numerous proprietary algorithms and products are contingently

[100] Kevin Klein, *Out of Control. The New Biology of Machines, Social Systems, and the Economic World* (Basic Books: New York: 1995): http://kk.org/mt-files/outofcontrol/ch22-d.html
[101] Such enclosures of resolution technologies do, of course, not only apply to finance; every digital camera with its locked/unlocked software is a black box in this respect.
[102] The wider social implications of this development beyond the field of finance are the topic of Frank Pasquale's book, *The Black Box Society. The Secret Algorithms That Control Money and Information* (Cambridge: Harvard University Press, 2015)
[103] Such as the Facebook IPO (2012) in which liquidity dried up, or the $-Flash Crash (2015).

> intertwined. In derivatives markets, for example, there is no philosophical equivalent of the RNG [a pseudo-random device for statistical sampling, cryptography and other uses], no discreet centre responsible for randomization.[104]

QUANTITATIVE FINANCE AND ITS MODE OF PRODUCTION

Only money is free from any quality and exclusively determined by quantity.
—Georg Simmel[105]

While in the early 1990s, quants were dependent on human runners and traders on the trading floors in Chicago and other major market centres (with the exception of the NASDAQ), artificial (neural) networks and automation of order transaction, order flow and the price engine took another ten years and more to be implemented fully. The electronic global data flow represented by the Bloomberg terminal as a non-human extension of the 'individual'[106] traders on the trading floor, forging a cyborg *dividuality* in which every *dividual* blends into and is bound to the global information and pricing machine. Uncertainty has been turned into a global negotiation on volatility (risk), which is calibrated *dividualy* and externalised individually in the case of under-performance. In his forthcoming book on proprietary trading Robert Wosnitzer argues, "the subjectivity of the trader is mutually co-constitutive with the practice of prop trading, where a dividual subject emerges that has mastered, for better or worse, the social and economic value of a world in which the derivative rules."[107] In the course of the production of these claims, Austin's performativity shifted to Callon's conception and MacKenzie's "counterperformativity" (both underscore the impact of economics on finance) and eventually turned into a non-individual ontology of immanence in which technological risk assemblages composed of human and non-human actors have become the productive force of complex and contingent operations on the future.

The operational division between uncertainty and risk that Frank Knight introduced in 1921[108] and which underlies finance has found its corresponding technologies with the scientification of finance. I would therefore argue that the mode of production of finance

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[104] Martha Poon, "For Financial Certainty, Try Machine Gambling," loc.cit., p. 6-7.
[105] Georg Simmel, *The Philosophy of Money*, loc.cit., p. 281
[106] As regards the wider economy, one might think of Deleuze and Guattari's notions of "body without organs" and "organs without body" in the sense that the corporation could be interpreted as the 'legal individual' from whose *incorporated organism* dividuals derive. See: Gerald Nestler, "The Non-Space of Money, or, the Pseudo-Common Oracle of Risk Production," in: *Paratactic Commons*, 2012, pp. 150-154. Online catalogue: https://issuu.com/ekmelertan/docs/amber12/1
[107] Robert Wosnitzer, *Desk, Firm, God, Country*, loc.cit., p. 171
[108] Frank H. Knight, *Risk, Uncertainty, and Profit* (Boston: Hart, Schaffner & Marx, 1921)

is the production of risk[109] – the *material* production and exploitation of quantifiable futures (options) by trading volatility (on volatility and so forth) in a sea of uncertainty.[110] Every option is a virtual, material trajectory into the future and in tight connection with the myriad of other options traded. To quote from a sociology of finance paper:

> A price is not an abstraction: to be conveyed from one human being to another, or from one automated system to another, a price must take a material form, whether that be the sound waves created by speech, the electrical signals of the telegraph or telephone, or the optical signals that now flow through high-speed networks.[111]

Gilles Deleuze writes, "The only danger in all this is that the virtual could be confused with the possible. The possible is opposed to the real; the process undergone by the possible is therefore a 'realisation'. By contrast, the virtual is not opposed to the real; it possesses a full reality by itself. The process it undergoes is that of actualization.[112] The recalibration process of dynamic hedging and implied volatility is a "thick narrative" of the Deleuzian virtual – of virtual pricing actualised at every moment (the markets trade and no *possibility* exists). It is a virtual universe that resolves the future by the actualisation of price quasi in parallel to real events. But as the production of risk is the mode of production of finance – processed by a multitude of circulating complex price layers at any given moment – to say "parallel" is not to say that these worlds never meet. Quite to the contrary, by blocking out uncertainty and elaborating massive systems that calculate and exploit risk (options), this mode of production is an attractor for reality to emerge within its 'gravitational' field. In the words of Ayache, the market is "the technology of the future."

This technology of the future, however, is enclosed in a black box; resolution – both concerning technology as well as solution – is proprietary. Thus, externalities do not only appear in the 'past' (as the consequence) of industrial activity, but affect the future, too. Consequence trails ahead as finance – or one should say the finance-state complex as the result of the financial crisis of 2008 – models the world along the lines of probability regimes (this is not confined to markets, as big data and other practices prove). Future profits are being reaped by performative speculation; future losses (both socially and ecologically) are socialized (austerity politics, for one, are schemes on the

[109] To be clear, this is a theoretical concept of the function of financial markets, and not a simple allegation against the speculative rage of markets and their catastrophic consequences.
[110] While Esposito argues "uncertainty […] is the engine and stimulus of economic activity, allowing for the development of creativity and the generation of novelties" (loc.cit.,p. 120), accepted opinion in the social studies of finance holds that markets block out uncertainty in favour of risk.
[111] MacKenzie, D., Beunza, D., Millo, Y., & Pardo-Guerra, J. P., "Drilling through the Allegheny Mountains: Liquidity, materiality and high-frequency trading," *Journal of Cultural Economy*, 5(3), 279–296, 2010, p. 280.
[112] Deleuze, *Difference and Repetition* (New York: Columbia University Press, 1994), p. 211

future, not the past) – a counterperformativity not of the market but the world. The *absolute distance* between now and the future is approximated for those who can attach to the future as an *intensive space*[113] – mainly by way of speculative leverage; while it is foreclosed for those whose obligations are defined by debt as a bond to the past.[114]

The success of quant strategies and technologies is a convincing example of a shift in which performance implies an ontology that flattens the relations between human and non-human actors. However, and this expands beyond the financial field into other technological and algorithmic black box operations, they introduce (fold in) new scales and hierarchies as well as new entanglements. Information asymmetry, for instance, conquers the whole gamut of the semantic potentiality of *resolution*. It has the distinct 'advantage' that it constructs the future on a probabilistic trajectory that for the 'uninitiated' feels as if events happened contingently. Hence, noise and information are the two faces of a violent scheme that acts under the veil of complexity and uncertainty while it extracts the future (the product) from the simplest activities and imaginations (its natural resource, its raw material). The politics of security and austerity are but the social implementation of such exposure. And we should add that it is constructing the future towards a post-capitalist society, because "there is no alternative" as the older model's extraction of profits is becoming defunct with zero utility killing interest generation.[115] It is to be seen if the order past the post-capitalist order will be based on an authoritarian implementation of sharing[116] or on new subjectivities and their collectives in the empowering sense of a flat ontology.

In the next chapter, we will briefly leave the question of the derivative for a discussion of the practice approach of this thesis, which is built around the concepts of an "aesthetics of resolution" and the "figure of the renegade" – exemplified on automated algorithmic trading, the Flash Crash and its consequences. As on all layers of finance, leverage plays a powerful role in this scheme. It will allow us to reconnect to the treatment of the derivative condition in Chapter 4.

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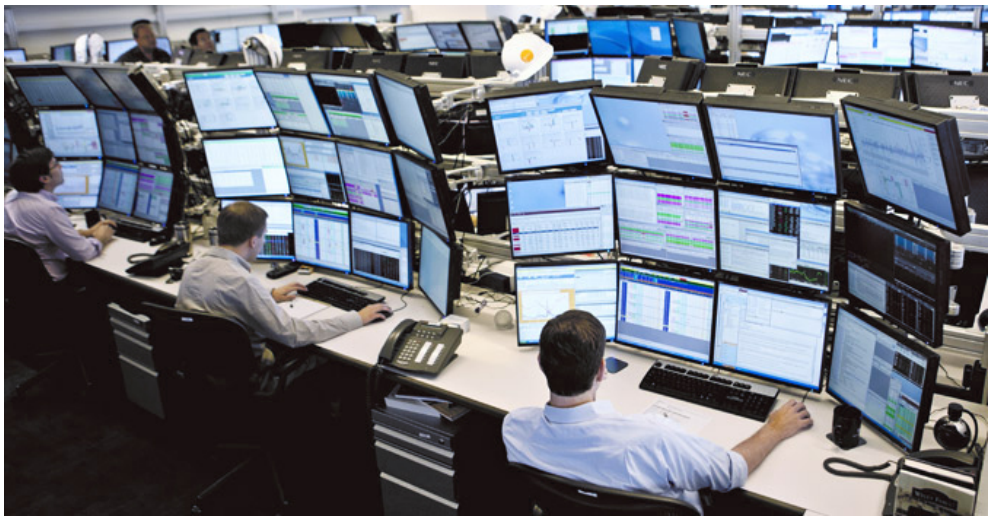
[113] Roffe: „absolute surfaces are intensive surfaces." (*Abstract Market Theory*, p. 70).
[114] The space of this article does not allow a deeper discussion of the positions of leverage and debt in the social order. In a forthcoming text, I make use of this divide in which leverage stands for liquid future and debt for illiquid past to offer an argument on information capitalism's social class relations.
[115] Another point in this line of argument is the afore-mentioned growing attention of capitalists to unconditional basic income (see footnote XX).
[116] One might think of the growth of social credit scoring applications, such as the Chinese "Sesame Credit", which is said to become mandatory for citizens in 2020. These systems are based on derivative logics of volatility, in which risk is produced as a constant and monitoring others as well as oneself recalibrates one's reputation.

CHAPTER 3

TOWARDS AN AESTHETICS OF RESOLUTION AND THE DISRUPTION BY RENEGADE POLYVOCALITY



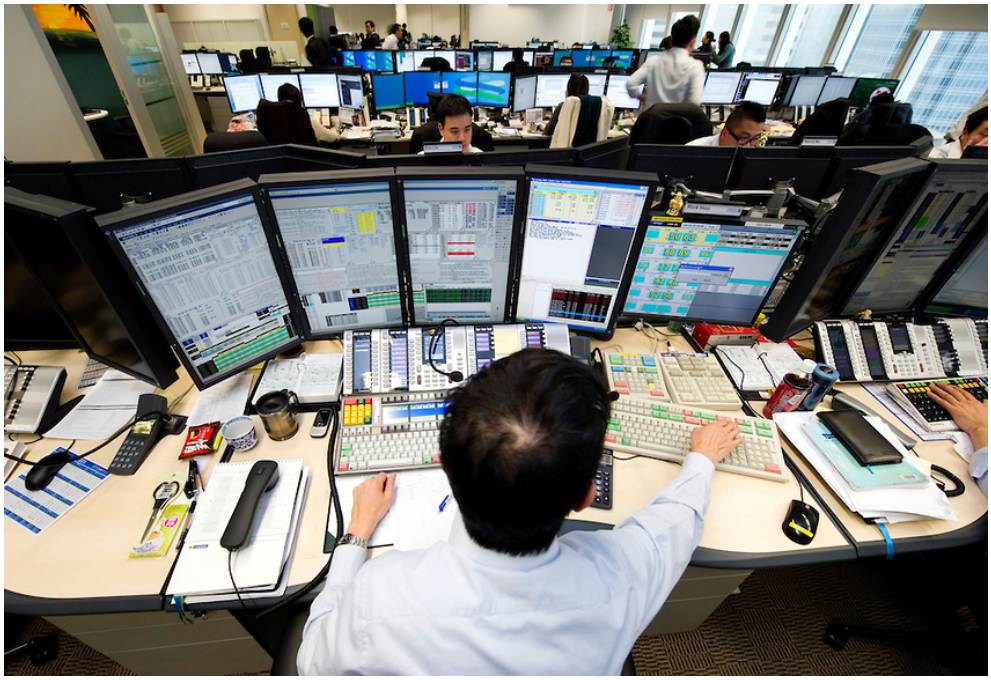


Fig. 1 + 2: Depictions of trading venues as combined human-algorithmic resolution machines

THE CONCEPTUAL FIGURE OF THE ARTIST AS EMBODYING RISK IN COMPARISON TO THE ABYSS IN FINANCE

Thinking in pictures […] stands nearer to unconscious processes than does thinking in words, and is […] older than the latter both ontogenetically and phylogenetically.
—Freud, 1927

For me, working as an artist entails encountering a crack, a flaw, an opening. I use the word *encounter* deliberately, as it implies a kind of serendipity, a chance encounter, an experience of inconsistency enigmatic enough to become magnetic. I insert myself into such a gravitational field with the twofold tactics of research and imagination/fabulation in order to find, i.e. construct, a trace that leads to a strategic collective of voices. The strategic instance could be a term, a notion, a process or an image that allows me to expand, multiply and connect to other 'voices' (terms, topics, fields…) seemingly unrelated at first. This deterritorialising 'effect' (it happens by chance as much as by will) attracts heterogeneous voices whose rhythms settle, overlay or surface and reterritorialise in a techno-polyvocality (to readopt Félix Guattari's term),[1] grounding themselves in the assemblage "earth" – multifarious and mutant – of installative material, physical movement, data trace, contract, recorded voice, graphic rendering, digital video or the reactions to instant visceral feedback, to name but a few.

As an artist engaged in practice, i.e. in *making*, I resort to art as a "medium of contingency" (also the title of Ayache's latest book that I will refer to in more depth later), which knows no price – its values are not re-territorialised to the quantitative. As regards art theory, this is not a theory of art as a new perspective on its history. It doesn't offer a reflection on existing or upcoming art as alternative, topical practice. Rather, it is a theory of art as practice, i.e. as art as/within event. As regards economies, it does not draw on the paranoid evaluation of every conceivable (probable) outcome – the one we find rules our economies today in favour of those who control by fear – but a positive, open (i.e. volatile) and equal engagement between human and nonhuman subjectivities-in-becoming. The question will be if this theorization vis-à-vis Ayache's philosophy will lead to a political economy in which risk,

[1] „It is not my intention to retrace, even summarily, the diverse paths of deterritorialisation of these territorialised Assemblages of enunciation. Let us just note that their general evolution will move towards an accentuation of the individuation of subjectivity, towards a loss of its *polyvocality* [my emphasis] – simply consider the multiplication of names attributed to an individual in many archaic societies – and towards an autonomisation of Universes of value of the order of the divine, the good, the true, the beautiful of power [...]" Félix Guattari, *Chaosmosis. An ethico-aesthetic paradigm* (Indiana University Press, Bloomington & Indianapolis: 1995) p. 99

contingency and the making of presents and futures are turned into an encouraging project for the many. If the *derivative condition*, as I propose to call the current order, and its derivative paradigm, the operational model behind it, can be turned into forceful assemblages of agency that counter not only the current manifestation of capitalism but also the embryonic monster that is emerging by ways of the automation of production and decision-making, extending past obligations into extreme futures, and the communing with risk – such as in recent debates about the „value“ of unconditional basic income from the side of venture capitalists, Silicon Valley entrepreneurs and other neoliberals as a mode of investing risk capital to push back the state in favour of a more entrepreneurial society.[2] In a word, which informs this thesis fundamentally, by enhancing *resolution* throughout the full gamut of the semantic field of the term.

Such an approach does not hinge on an artist/observer relation that has been a key aspect of contemporary art for decades. Rather, it fosters collaborative affinities of different kinds of experts and expert systems – artists and scientists, processes and technologies – and the public come together in common attempts to reconceptualise and re-orient the aesthetics of knowledge-production by inserting themselves into their making. My conception of the artist does not relate to the individual artist but to a collective of different, ambiguous agencies. This approach revitalises the initially liberating program of the avant-garde by affirming the demise of the political thrust of “making everybody an artist,” which has become the creative core of the neoliberal project since at least the late 1990s – a provocation addressed by the counter-culture of hacking.[3]. It also affirms the fundamental premise of technologies that process dissemination, visualisation and decision-making as well as its various incorporations of enclosures (e.g. black boxes), which underlie Information Capitalism.[4] It does so because without acknowledging their real power and impact we cannot move on from an anaesthetic arbitrariness of form towards a conversation of activist hacker-theory-experts – a realm addressing a growing population of digital natives – on consequential content. Such a transdisciplinary approach (or post-disciplinary, to use a more fashionable term) is essential if we want to move from an aesthetics to a poietics of resolution, i.e. from a quasi-unconscious state of consumption to an involved

[2] See, for example: http://www.bloomberg.com/view/articles/2016-05-02/a-basic-income-should-be-the-next-big-thing or https://www.vice.com/read/something-for-everyone-0000546-v22n1
[3] The Cyberpunk Project founded in 1994 is on example of a ‚renegade’ hacker ethos. See: http://project.cyberpunk.ru/idb/hacker_ethics.html. This spirit is, for example, still upheld in the Chaos Computer Club and its annual conference, see: https://www.ccc.de/en/
[4] A vivid description of the early days of black box trading is Thomas A. Bass, „Black Box. What happens when maverick physicists in New Mexico set out to predict the markets?,“ in *The New Yorker*, April 26, 1999 issue. http://www.columbia.edu/~dj114/btofc.htm

engagement that not only develops counter-tactics against proprietary interests but realises political agency within metastable information flows.

This approach reframes a programmatic passage in Félix Guattari's *Chaosmosis* text, but under the circumstances of the immanent algorithmic hegemony of postdemocratic capitalism whose narratives have captured "creativity" for its production of subjectivity:

> It should, however, be clear that we are in no way advocating an aesthetisation of the Socius, for after all, promoting a new aesthetic paradigm involves overthrowing current forms of art as much as those of social life I hold out my hand to the future. My approach will be marked by mechanical confidence or creative uncertainty, according to whether I consider everything to be worked out in advance or everything to be there for the taking – that the world can be rebuilt from other Universes of value and that other existential Territories should be constructed towards this end. The immense ordeals that the planet is going through – such as the suffocation of its atmosphere - involve changes in production, ways of living and axes of value. The demographic explosion, which will, in a few decades, see the population of Latin America multiply by three and that of Africa by fives, does not proceed from an inexorable biological malediction. The key factors in it are economic (that is, they relate to power) and in the final analysis are subjective – cultural, social and mass mediatic.[5]

In the following, I will address an example, which on the one hand highlights the complexities and intricacies of such an endeavour as well as its achievements and failures. On the other hand, it outlines an instance of artistic practice concerned with the counter-tactics of an *aesthetics of resolution*[6] and an *Other-Singularisation* against the "Socius" embodied in the ambivalent, marginal and risky figure of the *Renegade*.

As regards my practice, the examples given in the Practice Portfolio are a first step towards this work programme. A current project I am engaged in offers the opportunity to delve deeper into the different layers of an "aesthetics of resolution." It is a collective film and exhibition project (working title: *Renegades, Traitors, Educators*) in which the expert and whistleblower Haim Bodek shares his in-depth knowledge (to expand and reorient his whistleblower practice). On the basis of this detailed canvas, the project addresses the current mode of finance and its specific schemes of information asymmetry. It maps and visualizes algorithmic practices from an insider's view and puts them into the perspective of a wider social and cultural context as a counteraction against the claims of finance and its financial and social malpractice. The project's aim is to develop an activist practice around the film and the exhibition to deepen the relevance of the "aesthetics of resolution" proposal through the "figure of the renegade."

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[5] Félix Guattari, Chaosmosis, loc.cit., p. 134

[6] A further example on finance as a field of artistic practice, *The Trend Is Your Friend!* (Eckermann and Nestler, 2009). A text that focuses on this topic is *A Scopic Mode of World Production. Derivative money, technological capitalism and a recourse on artistic research* (Nestler 2010). http://www.geraldnestler.net/texts_engl.htm

COLLECTIVE VII

QUANTITATIVE FINANCE
AND THE AESTHETICS OF RESOLUTION

We must say, then, that the poets were the sense of mankind, and the philosophers its intellect. Thus, what Aristotle said in particular about the individual is also true in general about human-kind: 'Nothing is found in the intellect which was not first found in the senses […] This means that the human mind can only understand a thing after the senses have furnished an impression of it, which is what today's metaphysicians call an occasion. For the mind uses the intellect whenever it 'gathers' something insensible from a sense impression, and this act of gathering is the proper meaning of the Latin verb intelligere, to understand. —Giambattista Vico [7]

This quasi-subjective act extends today into the realm of automation where it can be utilized to a much higher degree than with traders made of flesh. It is therefore of urgency to examine algorithmic trading as a practical tool of quantitative finance – both practically and theoretically. The following undertakes this in the form of an artistic and philosophical reading of quantitative finance. Based on a discussion of the 2010 Flash Crash, it provokes the notion of an *aesthetics of resolution* and its potential for a critical and at the same time productive reading inscribed in the semantic field of the term. Setting out from an arts-related approach to the material data records of black box trading, the chapter examines *resolution* techniques and practices (i.e. coding, automation, hardware optimization, and visualization) as means to explore the issue of performance in finance, in which different forms of *resolution* are applied for problem solving, knowledge production, and decision-making. The chapter reads performativity as discussed by Callon, MacKenzie and Esposito and its linguistic and philosophical roots (Austin, Butler) with recent philosophies of networks (DeLanda), speculative philosophy (Bryant) and the philosophy of the market (Roffe, Ayache). What are the consequences – and what can be done – when representation of power looses its visible material substrates and delivers itself to levels of resolution where vision, knowledge and decision are inter-performed by algorithmic speech acts?

Artistic practice has the potential to immerse in modes of research, exchange, compilation, and presentation. It weaves a multiplicity of approaches and investigations into a fabric made of concepts, notions, objects, materials – and the relations between

[7] From the 2009 spring issue editorial of *Art & Research*. As quoted in the journal: Giambattista Vico, 'Poetic Wisdom' [363], *New Science: Principles of the New Science Concerning the Common Nature of Nations*. Third edition, thoroughly corrected, revised and expanded by the author, translated by David March (Harmondsworth: Penguin, 2001), p. 136.

them. It opens new pathways into artistic expression beyond marketable branding strategies and the enclosures of capital, but also undermines the established notion of the autonomy of art and its own logics of production. This foregrounds the question of aesthetics that can deliver means for perceiving and appreciating forms of engagement and agency by bringing together theory, science, and art in new ways. In the following I propose an approach in which autonomy is reconceptualised as a dynamic, open, sometimes aleatoric and instantaneous process (acts connected to a multitude of contingent moments). It purposely integrates ambiguous heteronomous influences in order to make resolution in the full meaning of the term.

INITIAL REMARKS ON QUANTITATIVE TRADING

The past is only the impatience of the future. —Elie Ayache

The ferocious event of the Flash Crash brought high-frequency trading (HFT) to public attention. It sparked a debate that lasted for years and saw proponents and critics plunging in fierce controversies. Journalists and bloggers picked up the topic. It seemed as if the financial markets were at the mercy of smart quants who built the hardware and coded the algorithms that drove these automated speculations. But the impact of HFT as the characteristic feature of finance was exaggerated even though HFT achieved unparalleled market shares for some years (up to 80 per cent of U.S. stock transactions in 2012). I will briefly draw on two voices from the field to delineate the controversy on HFT and its regulation, before I discuss some implications of algorithmic and automated trading that shape the core of this article.

Firstly, HFT is but one set of automated financial practices within a wider scope of electronic and algorithmic trading. While many commentators emphasize the role of transaction speed, the main technical obstacle to overcome is latency. Within the field of computer-based exchange trading, HFT can therefore be classified as a low-latency operation. HFT is one of a series of quantitative trading strategies that operate within computer environments and are therefore exposed to information technology issues. Restraints and faults concern, for instance, a firm's hardware and software kits as well as signal processing and transmission bottlenecks within the market infrastructure. Secondly, it is an established fact, sometimes downplayed by critics,[8] that HFT neither

[8] Jon Roffe rightly refutes such misinterpretations: „The speed of algorithmic trading, which has given rise to the phrase high frequency trading (or HFT) is often taken to be a decisive socio-political development on its own terms […] This speed does indeed have a great deal of interest and importance in the social and political registers […] but by itself it tells us precisely nothing about the market." *Abstract Market Theory* (Basingstoke: Palgrave Macmillan: 2015), p. 31

constitutes the market nor is it a self-producing system devoid of human influence. As HFT pioneer Rishi Narang asserts:

> Quantitative trading can be defined as the systematic implementation of trading strategies that human beings create through rigorous research. In this context, *systematic* is defined as a disciplined, methodological, and automated approach. Despite this talk of automation and systematization, *people* conduct the research and decide what the strategies will be, *people* select the universe of securities for the system to trade, and *people* choose what data to procure and how to clean those data for use in a systematic context, among a great many other things.[9]

This fact is important in more than one ways: Firstly, because it posits human action and user-definition at the centre of a system that operates automatically – even, I would add, in those cases that advertise the utilization of fully automating trading systems by implementing artificial intelligence; secondly, because the scientific resolution apparatuses that exploit micro-time are still an extension of the human mind rather than a new entity, a new intelligence beyond human reach; finally, because the question of accountability and responsibility has not (yet) been transferred from human to nonhuman agency – even though lawmakers are confronted with legal premises as regards liability of automated systems. This is not to say that the complexity of interrelations hasn't increased by the advance of combined human and nonhuman actors within the black box of quantitative trading (to extend the term black box from firm to system). Adequate regulation will have to include frameworks for algorithmic market activity and the risks they entail[10] without experiencing similar difficulties as in earlier efforts – as exemplified by Regulation NMS, an issue the market expert Haim Bodek condensed for the Security Trader Association Annual Convention in 2013:

> The introduction of Regulation NMS in 2007 triggered the dramatic surge of HFT volume in US equity markets. Not well understood at the time was that for-profit electronic exchanges had artificially spurred this volume growth, catering to the 'the new market makers' by providing HFTs specialized features and discriminatory advantages that dovetailed with HFT strategies. Indeed, by circumventing the purpose and intent of Regulation NMS through a myriad of legal exceptions and clever regulatory workarounds, electronic exchanges have assisted HFTs in exploiting market fragmentation for mutual gain at the expense of institutional investors.[11]

Algorithmic trading – of which HFT is, as we said, but one application – highlights how closely linked financial interests have come and to the detriment of regulatory efforts that lag behind both technologically and technologically. At the same time, however, it proves the "key role of power and politics at the macro-organizational level, pointing to

[9] Rishi K. Narang, *Inside the black box* (Hoboken: Wiley & Sons, 2015), xi
[10] Nathan Coombs, What is an algorithm? Financial regulation in the era of high-frequency trading, *Economy and Society*, Volume 45 Number 2 2016: 1-25. http://dx.doi.org/10.1080/03085147.2016.1213977
[11] Haim Bodek, *The Problem of HFT*, Denver Security Trader Association - 43rd Annual Convention, 2013 http://haimbodek.com/past_events.html

the importance of regulators and exchange management in the design of automation."[12] Moreover and as regards the financial sector as a whole,

> what makes risk culture such a fascinating and challenging topic to research is the fact that many, though not all, of these habits and routines are not readily visible, even to organizational participants themselves let alone researchers. Yet it is this problem of visibility, of making the risk culture visible, that is at the heart of current regulatory and organizational focus."[13]

Hence, as Mark Coeckelbergh delineates with the term "distancing", „there is something deeply problematic about financial technologies and their impact on our relations to others and to the world, that these problems are not only due to the behaviour of people (e.g., bankers, traders) or to 'the system', but also, and crucially, have to do with the technologies used."[14] Since the late 1960s, economics and finance have developed models and methods that continually introduced quantitative and automated (black box) processes into market making and the pricing regime. Concurrently, these applications advanced proprietary interests, which have manifested not only in legal contracts (an essential requirement of capitalism) but also in technological access control and black boxes.

Communication times between financial centers

	Distance Earth Surface	Distance Through Earth	Time Surface Fiber optics	Time Surface Air	Time Through Earth	Time saved Through Earth versus Fiber	Time saved Through Earth versus Air
New York London	3,465	3,337	28.2	18.6	17.9	10.3	0.7
New York Tokyo	6,749	5,817	54.9	36.3	31.2	23.7	5.0
London Tokyo	5,946	5,394	48.4	31.9	29.0	19.4	3.0
New York Hong Kong	8,054	6,630	65.5	43.3	35.6	29.9	7.7
London Hong Kong	5,979	5,423	48.6	32.1	29.1	19.5	3.0
London Sydney	10,572	7,691	86.0	56.8	41.3	44.7	15.5
New York Sydney	10,377	7,487	84.4	55.7	40.2	44.2	15.5

Distances in miles, time in milliseconds, calculations by professor Espen Gaarder Haug
Optical fiber assumed 66% speed of light. Neutrino speed assumed approximately speed of light.

Fig. 3: Commmunication times between financial centers.[15]

[12] Daniel Beunza and Yuval Millo, "Blended automation: Integrating algorithms on the floor of the New York stock exchange," in: *SRC Discussion Paper No. 38* (London: Systemic Risk Centre, London School of Economics and Political Science, 2015), p. 40.
[13] Simon Ashby, Tommaso Palermo, Michael Power, *Risk culture in financial organisations: An intermim Report*, CARR – Centre for Analysis of Risk and Regulation (London: School of Economics, 2012), p. 7
[14] Mark Coeckelbergh, *Money Machines. Electronic Financial Technologies, Distancing, and Responsibility in Global Finance* (Farnham: Ashgate, 2015), p. 3
[15] Commmunication times between financial centers, graphic: Espen Gaarder Haug, http://www.forbes.com/sites/brucedorminey/2012/04/30/neutrinos-to-give-high-frequency-traders-the-millisecond-edge/#2b9cfb171ba4

I engage with this issue exemplified by the Flash Crash in order to activate the notion of *resolution* and its semantic field as a methodological apparatus against the provocation of what I call the "derivative condition" of social relations. Derived from artistic research and practice – that constitutes the practice based aspect of this thesis –, the concepts discussed transgress contemporary art by outlining an instance of post-disciplinary practice in the realm of art and philosophy engaged in what I term an *aesthetics of resolution*. I will delineate some of the issues and consequences of a loss – or absence – of *resolution* and the relevance of the term as a concept for a) understanding the systemic crisis and b) for countering black boxing in order to support knowledge production in the public interest. The orientation is *aesthetic* in the sense of perceiving and applying leverage points for a *poietics* that moves beyond the paradigmatic capitalist framework. I will finally resort to an agent buried within the concept of resolution, the figure of the *renegade*. I will refer to specialist sources from the financial, data analysis and IT industries as well as philosophers and sociologists of finance.

In common parlance, the term "resolution" at first evokes of a means to an end in the service of visualization. A processual detail in the chain of technological operations, it is performative on the level of the processual calculations that result in its representations (and increasingly so as today they are on the verge of an algorithmic decoupling of the image from its material source) and on the level of its exploitation that utilizes probabilistic techniques for productivity scenarios. Focusing on resolution is not simply a question of technical specifications or layers of visualization. Rather, resolution techniques embody powerful and ambivalent contraptions of *technowledge* (to craft a term for the fusion of automation, technology and knowledge beyond human apperception) by which the technical meaning of the term black box affects the wider social realm.[16] Here, resolution serves the construction of enclosures typical for the differentiation machine of information capitalism with its forward-oriented strata of time. It enables the generation of scarcity from an abundance of possible and transparently developed proposals and solutions (e.g. the financial market's intellectual property concerning software regime as opposed to, e.g., open source). Hence, it facilitates the parcelling of materials into specific restrictions. These restrictions belong to the category of the commodity and can therefore be unlocked, i.e. sold and distributed, to consumer classes of varying affluence and stakes. By developing artificial senses and

[16] Technically, the term black box refers to systems that feed inputs and produce outputs without disclosing their inner workings (which might be unknown). In finance, black box trading denotes computer-based trading systems that apply algorithms to buy and sell financial products automatically. The term has been extended e.g. by Frank Pasquale (see fn. 100, chapter 2) to analyze the pervasive use of intransparent algorithmic processes that serve proprietary exploitation of information (data).

at the same time restricting access to their data, resolution techniques are performative instruments of power that capitalize on visibility, or, as it were, invisibility – on what we are able, i.e. offered, to see/know; and by implication on what we are not able, i.e. not offered, to see/know. Increasingly, we 'lose sight' of what *there is* we ought to *see*, i.e. what we ought to perceive, comprehend and make informed decisions on.

While a market crash is a violent event – an encounter with a crack, a visceral turmoil, a performance of rupture, counterperformativity – it is at the same time an opening. The work of the artist, in contrast, entails a sort of physical, somatic sensitivity towards encountering a crack, a flaw, an opening. In short, rather than evaluating, hedging or avoiding risk, *the artist embodies risk*. Encounter stands for a deliberately produced chance event that is by necessity uncertain and as yet unknown – the artistic encounter is a leap, a self-induced crisis, an open receptivity alongside what takes place. I use the word *encounter* deliberately because it implies perception that grasps the moment while it is moving on; an inconsistent and subtle experience enigmatic enough to become magnetic – a gravitational attraction that diffuses resolution towards the full meaning of the term.

Such a philosophical and artistic[17] approach is a point of departure towards collective affinities between different kinds of expert subjectivities and systems – e.g. artists and theorists, philosophers and scientists, objects, codes, processes, technologies… – in common attempts to reconceptualize and re-orient the aesthetics of knowledge-production towards an aesthetics in the field of consequences. This approach revitalizes the initially liberating program of the avant-garde by affirming the demise of the political thrust of 'making everybody an artist,' which has become the creative core of the neoliberal project since the late 1990s new economy. It also affirms the fundamental premise of technologies that process dissemination, visualization and decision-making as well as its various incorporations of enclosure (e.g. black boxes) that underlie information capitalism. It does so because without acknowledging their power and impact we cannot move from anaesthetic arbitrariness towards a conversation on consequential content within an assembly of activist hacker-theory-experts – a realm addressing a growing population of digital natives. Such a post-disciplinary approach is essential if we ultimately want to move from an *aesthetics* to a *poietics of resolution*, i.e. from the (informed, critical) consumption of perception to involved engagement that not only develops counter-tactics against proprietary

[17] More on the artistic approach can be found in: Gerald Nestler, "Towards a Poietics of Resolution. On embodied risk, contingent autonomies and renegade collectives as forms of technological and artistic resistance," in: *Journal for Research Cultures*, Vol. 1/1, Dec. 2015. https://researchcultures.com

interests but develops strategies for realizing political agency within metastable information flows.

Hence, an aesthetics of resolution corresponds to and at the same time exceeds the complex performative investigations that Elena Esposito delineates with the term "observation" – which she owes to Heinz von Foerster's second order cybernetics in which the observer affects and is affected by the system:

> The concept of performativity is applicable to all disciplines in that it concerns not only language, but also observation in general […] The result [...] is a condition of indeterminacy (in the social sciences one refers to contingency) which leads to a profound rethinking of the methods and categories of research."[18]

To fully activate the potential of an aesthetics of resolution, observation needs to be coupled with a practice of thought that applies "rethinking" in the socio-political realm. The multifaceted semantic field of resolution and its technological as well as social significance – ranging from visualization, discrimination, intelligence and knowledge to intention, purpose, (common) initiative and (joint) decision-making – offers a collectivity that presents a conceptual basis for a practice, which does not lose sight of rethinking socio-political constitutions as well as the conditions that make the ruptures and breaches of social contracts possible in the name of the protection of proprietary interests. Thus, it might play an eminent role in the effort of tracing aesthetic as well as political consequences – in other words to carve out the *aesthetics of resolution* and then move to a *poietics of resolution*: a move from dissent to insurrection that "re-makes" the playing field within a research paradigm that is not merely interested in the analysis of data and events but also in the consequences of processes and decisions that lead to and result from them respectively.

An aesthetics of resolution is therefore not merely a technical issue. Rather, it is a post-disciplinary approach to question and entangle the intricate and complex fabric of how ideology works through information, technology and capitalism and how technology and methodology are infused in knowledge production. To understand how performative capitalist "resolutions" inhibit (dissolve) the free flow of meanings within the term's semantic field (its flat ontology); and consequently to learn how we can break the mould of black box enclosures and enable *renegade collectives*. In other words, to bring back the (quantitative) financialized claim to the (qualitative) political body and to subjectivities-in-becoming.

[18] Elena Esposito, "The structures of uncertainty: performativity and unpredictability in economic operations," *Economy and Society*, 42:1, 2013, p. 103.

THE FLASH CRASH. RESOLUTION IN MICROTIME

A distributed system is one in which the failure of a computer you didn't even know existed can render your own computer unusable. —Leslie Lamport

On May 6, 2010, bots played havoc among financial market centres. The Flash Crash – as it has become known – caused mayhem in less than five minutes, and went viral as the biggest one-day decline in the history of financial markets. During the rapid slump, the Dow Jones Industrial Average plunged by about 1,000 points, only to recover most of its losses in the following twenty minutes. When it hit bottom, it had lost nine per cent of its total value and shockwaves went through the economic system. CNBC Live, initially covering the Greek austerity crisis and the riots in the streets of Athens, shifted immediately to the trading floor of the New York stock exchange: "What the heck is going on down there? … I don't know… this is fear, this is capitulation."[19]

The Flash Crash constitutes a watershed event in financial markets. Algorithmic trading had taken centre-stage and produced a hostile environment. Human traders lost their bearings in the event and a live-broadcast for professional traders commented: "This will blow people out in a big way like you won't believe."[20] Technically, capitulation means panic-selling due to pessimism and resignation. But apart from financial losses, "capitulation" implies the liquidation of unmediated human perception and collective resolution. Who informs such potent noise without leaving much of a trace?

Initially, the TV-screen showed live footage of the Greek insurgence in Athens meshed with economic data feeds and real-time market prices (a constant presence not only in today's business media) ticking away in a smaller window below. But the live broadcast of protesters pitted against police forces gradually faded, with the discussion shifting in tone and content. Market charts began to fill the screen as the conversation plunged into an emotional debate about what specific contingency might have triggered the downward flood of transactions. The suggested speculative explanations included a "fat finger event" (a typing error), a breakdown of machines (a hardware failure), a software glitch, and rapid-selling action due to the European (and especially the Greek) credit crisis. One commentator was heard reiterating recommendations to buy because of the "ridiculously low" levels of some stocks; another proposed "shock and awe" politics in order to get the economy running again. The forceful global deformations introduced by the neoliberal reformulation of self-interested profit maximisation became apparent in this instant of simultaneous broadcasting of civil unrest and financial war.

[19] Technically, capitulation means panic selling due to pessimism and resignation.
[20] Ben Lichtenstein, the "voice of the CME S&P futures pit". Traders Audio, "May 6 2010 Stock Market Crash," May 12, 2010, http://www.youtube.com/watch?v=1mC4tu1NhUA.

The live coverage of the uprising in Greece and the crash, each with its accompanying visual and oral rhetoric, unintentionally evoked the stark contrast between the capitalist regime of financialization on the one hand, with its debt-induced grip on politics and the economy, and on the other hand the effects of this regime on the notion of the public good. When the spotlight panned from the destroyed common ground in Greece to the historic instance of an algorithmic crash, market disequilibrium on a gigantic scale obscured a catastrophic failure of an even vaster extent. The Flash Crash eclipsed what has become the symbol of the ruination of the agora of commonality, epitomized by the eruption of popular protest at the site of its ancient origin in Athens.

Fig. 4 + 5: Screenshots of the CNBC live coverage of the Flash Crash, May 6, 2010

The subsequent investigation of the Flash Crash resulted in a joint official report by the United States regulatory authorities, the SEC and the CFTC.[21] It was published a few months after the incident and put the blame on human trading. In contrast, an analysis of the event conducted by a small financial data provider claimed that the crash was in fact caused by orders executed automatically by algorithms. Nanex LLC,[22] a financial service provider, records trading data and was therefore in the position to examine the event on their own account. They soon realized that conventional market data records (1-minute resolution intervals) did not show any material traces of what might have initiated the rupture that tore the intricate fabric of market prices. They decided to go deeper into the 'abyss' of micro-time and look at shorter time-intervals. Step-by-step,

[21] "Findings regarding the market events of May 6, 2010." Reports of the staffs of the CFTC and SEC to the joint advisory committee on emerging regulatory issues, September 30, 2010, http://www.sec.gov/news/studies/2010/marketevents-report.pdf

[22] Nanex is a market research firm that supplies real-time data feeds of trades and quotes for all US stock, option and futures exchanges. As their website states, "we have archived this data since 2004 and have created and used numerous tools to help us sift through the enormous dataset: approximately 2.5 trillion quotes and trades as of June 2010."

they enhanced the temporal resolution by custom-made bots and began to analyse the Flash Crash at dizzying depths of time.

Finally, they made a strike of market activity at fractions of a second. At first glance, it looked like a glitch. But what emerged were the material traces of an elaborate scheme. They had encountered 'alien' information in a realm that was deemed to only emit noise.[23] As the founder and CEO of Nanex, Eric Hunsader, stated: "The SEC/CFTC analysts clearly didn't have the dataset to do it in the first place. One-minute snapshot data, you can't tell what happened inside of that minute. We didn't really see the relationship between the trades and the quote rates until we went under a second."[24] Supported by the evidence Nanex procured, their final statement was unambiguous: "High Frequency Trading caused the Flash Crash. Of this, we are sure."[25] We won't address the truth claim of Nanex's statement, as our main concern here is the discrepancy between the material traces and their consequences. We will therefore focus on Nanex as a provider of a set of *resolutions* about the material data of the Flash Crash. Nanex's research revealed traces otherwise obscured in the depth of time as regards the question of resolution in the sense of visualization (making tools that enhance perception and render material evidence), evaluative measuring (computation/calculation of sequences and relations) and knowledge-production (analysis and interpretation of material). However, the decisive elements of the semantic field of the term – attribution and solution – were, as we will see below, beyond the capacities of Nanex or any third party (both market participants and general public). The actuator(s) of the Flash Crash are still unknown.[26]

[23] Noise as opposed to signal is the term for random information in information theory. As financial markets are constructed as information markets (both in the Hayekian sense of the price regime and cybernetics), noise is a constituent element of trading. Following Fischer Black we can define it as the ubiquitous other of information: "Noise makes financial markets possible, but also makes them imperfect," in: Fischer Black, „Noise," *Journal of Finance*, Volume 41, Issue 3, 1986, p. 530.

[24] Nanex," *Sify Finance*, October 5, 2010, http://www.sify.com/finance/u-s-flash-crash-report-ignores-research-nanex-news-insurance-kkfiEjeciij.html.

[25] http://www.nanex.net/aqck2/4150.html. Even though Nanex found evidence of trades they could not provide evidence on the perpetrator. The law protects proprietary data and its source.

[26] This essay is also not concerned with the recent exposure of the ostensible culprit. According to a news report, „Mr Sarao's spoofing netted him a profit of $40m (£28m), according to the US." *The Independent*, February 5, 2016. http://www.independent.co.uk/news/business/news/navinder-singh-sarao-british-flash-crash-trader-broke-no-laws-says-lawyer-a6856791.html

Fig. 6: CNBC live coverage Flash Crash at the point of capitulation, 2010

REPERFORMATIVE FORENSICS

All consciousness is a matter of threshold. —Gilles Deleuze

The SEC and CFTC based their official report on the material made available by exchanges and market participants, which usually has a resolution of one-minute trading intervals. This dataset would have been adequate to scrutinize trading activities before the ascent of HFT. But today, to quote the founder of Nanex, Eric Hunsader, "in the blink of an eye, the market moves what used to take humans thirty minutes."[27] The quote illustrates the sheer pointlessness of scrutinizing only market activity above the transaction frequency of the fastest traders. Nanex's experience with market data allowed them to intuitively escape the trap of one-minute or even one-second resolutions. They conceal more than they reveal.[28]

Additionally, an investigation confronted with the complexity of market interplay is not only confronted with one or several black boxes but with the meta-black box of market configuration. As the former HFT trader David Lauer remarks:

> The markets and the interplay in the industry between all theses firms with all these very complicated and complex technology systems and how they interact makes the entire system of exchanges, high-frequency, brokers and the interaction between the technology, it a complex system. […] There is no cause and effect that you can point to. What caused the Flash Crash is a nonsense question. […] And, if you were to replay the same sequence of events, identically, there's no guarantee that it will cause a Flash Crash again. That's the nature of complex systems.[29]

[27] Transcript of Adam Taggart, "Eric Hunsader: Investors Need to Realize the Machines Have Taken Over. The Blink of an eye is a lifetime for HFT algos," *Peak Prosperity*, October 6, 2012, http://www.peakprosperity.com/podcast/79804/nanex-investors-realize-machines-taken-over.
[28] Another example is the crash of Knight Capital in 2010. Nanex, who analysed the incident, remark: "If we zoom in and look at what happens under one second, then a clear pattern emerges. We think it's important to note that the SEC claimed there is no value to be gained from looking at data in time resolutions under a second 'because it is just noise'. We strongly disagree." http://www.nanex.net/aqck2/3522.html
[29] David Lauer in Marijke Meerman, dir., *The Wall Street Code*, documentary, 51 min,

Discontented, Nanex changed strategy and resorted to an investigation that mixed forensic analysis with “witness review” and information disclosure: they asked the party blamed in the official report (though not identified), the mutual fund Waddell & Reed, to grant access to their trading data. In accordance with the capitalist proprietary regime, it is most plausible that the fund would have declined such a request if they had not been blamed. But by that time, Waddell & Reed had a keen and vested interest in clearing their name. The incorporation of the proprietary source code allowed Nanex to classify the data of this specific address and deliver a more rigorous account. Their analysis relies on an apparatus that pairs three quantitative frameworks in an effort to deliver sufficient approximation to the trading operations: Nanex’s extensive archive of financial data; their custom-made, adaptive quantitative resolution devices that powered the investigation of the data sets; and the algorithmic trading data from a black box. This framework allowed Nanex to resolve the official narrative (which was hailed by algo traders) and bring the cybernetic regime of HFT to light. To borrow a computing term, we can outline this process as the parsing of the trading performance after the fact (the proprietary dataset provided by Waddell & Reed) by performative cameras that not only analyse but also craft a new (counter-)performative narration (the analysis accomplished by Nanex).

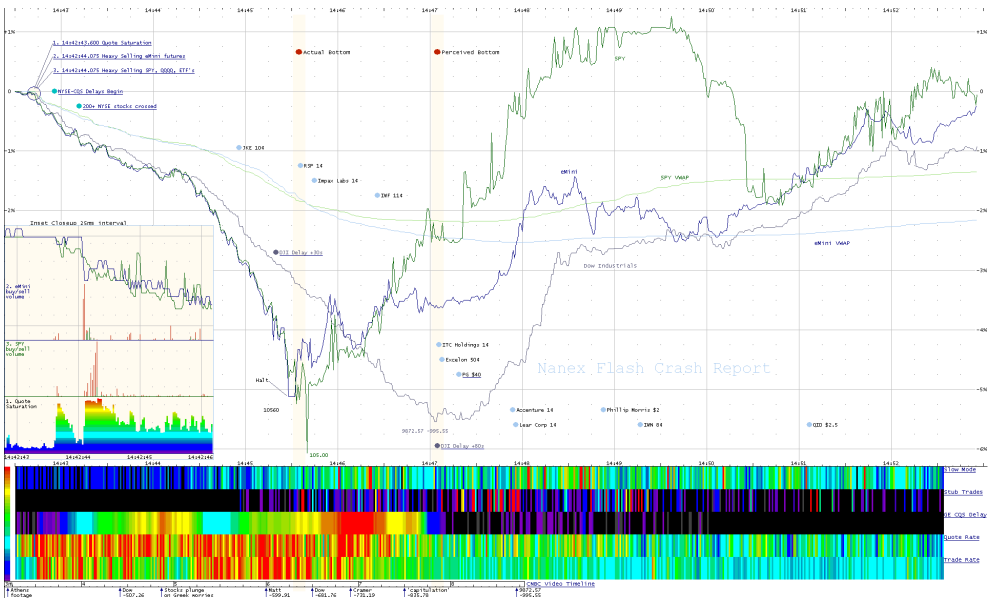

Fig. 7: Flash Crash analysis, courtesy Nanex LLC

http://www.youtube.com/watch?v=kFQJNeQDDHA, at 46:00–46:48.

Extending Callon's remarks on derivative trading (and the Black Scholes Merton model which we will address below), we can adopt Callon's take on performativity and MacKenzie's on counterperformativity[30] to flash trading and in respect to flash crashes, and extend it to a "medium" in which bursts appear recurrently:

> Whereas the notion of a self-fulfilling prophecy explains success or failure in terms of beliefs only, that of performativity goes beyond human minds and deploys all the materialities comprising the socio-technical *agencements* that constitute the world in which these agents are plunged: performativity leaves open the possibility of events that might refute, or even happen independently of, what humans believe or think. MacKenzie proposes the notion of counter-performativity to denote these failures, because in this case the [Black Scholes Merton] formula produces behaviours that eventually undermine it.[31]

Due to the complexity described by Lauer, the market cannot simply be "captured" and "replayed" like a film.[32] The vision-enhancing sensors that detect time-blurred traces and mark discriminations in a complex environment deliver information from noise that has to be unearthed and then resolved in a separate stage. Thus, the forensic analysis is neither fully embodied nor defined by the abstract representations of data traffic. Rather, the analysis is situated, i.e. constructed, in between the juncture of *performance* as the actual presence of an event taking place (exemplified by the occurrence of the Flash Crash); *performative analysis* as providing (making visible) "visual collateral" of a "re-animation" of the original obscured presence after the fact; and *counterperformativity* as a "renegade act" disclosing material otherwise under non-disclosure as a consequence of "capitulation".

We can now outline a sharper distinction, which will help us to grasp what is at play in the forensic documentation and evaluation apparatus. Artificial sense organs reach into deep time by increasing the resolution bandwidth in order to revisit the otherwise insensible "scene of the crime." The analysis is thus an intricate and extensive cybernetic undertaking characterized by a process of re-mapping, re-modelling, re-visioning, and re-narrating a specific past that happened at near-light speed—a performance *ex post* that *was* the occurrence of a future event. As this approach re-

[30] MacKenzie in *An Engine, not a Camera*: „The strong, Barnesian [a term he uses to distinguish his sociological from Austin's linguistic approach] sense of 'performativity', in which the use of a model (or some other aspect of economics) makes it 'more true,' raises the possibility of its converse: that the effect of the practical use of a theory or model may be to alter economic processes so that they conform less well to the theory or model. Let me call this possibility – which is not explicit in Callon's work – 'counterperformativity.'" p. 19

[31] Michel Callon *What does it mean to say that economics is performative?* CSI working papers series no. 005, 2006, p. 17.

[32] In a philosophical discussion of this thought, Jon Roffe emphasises the „evental character of price […], for, strictly speaking, no price can ever be repeated. This is because any given price is recorded on a surface and in this way changes it. To repeat the same price – where price is now grasped at the moment of its advent – can never have the same effect on the market surface itself." *Loc.cit.,* p 71.

enacts the *performance* of the event, the methodology can be specified as *reperformance*. The technological, calculative aspect of sifting data to come up with evidence—enacting the realtime reperformance—becomes explicit in the sheer enormity of the material Nanex examined:

> May 6th had approximately 7.6 billion […] records. We generated over 4,500 datasets and over 1,200 charts before uncovering what we believe precipitated the swift 600 point drop beginning at 14:42:46 and ending at 14:47:02. In generating these data sets we have also developed several proprietary applications that identify the conditions described in real time or for historical analysis.[33]

Only rigorous research into the deeper, less perceptible strata of microscopic time reveals the actual material matrix. What emerges is an excavation that elucidates an inversion of time from Chronos to Kairos – from a chronological interpretation (*replay*) of pricing to one of intense time (*realtime*), i.e. event. Methodologically, it inverts the relation between time and space: while the common notion of archaeology entails entering into concrete and thick space cautiously (as when employing technologies of surveying, probing, and classifying), in order to extract the material witness (a truth) of a former era, an archaeology of finance is a forensics of the performance of the future. It probes into the imperceptible materiality of time becoming. It detects patterns and recovers artefacts whose existence is derived from financial models and built on technologies of miniaturization, automation and infrastructure aligned with the politics of securing, excluding, and enclosing. Research is applied on a field of "making happen" in which "the concept of performativity has lead to the replacement of the concept of truth (or non-truth) by that of success or failure."[34]

The story of the Flash Crash unfolds in the extended realm of trading bandwidth and the reduction of profit margins in which a technopolitical regime of success/failure becomes apparent via exclusion/inclusion. It prioritizes the algorithmic *aesthesis* of an elite of HFT traders, or, more to the point, HFT quants.[35] Narang views this as part of the competitive ecology of information technology: "[…] many micro-industries experience an initial phase of immense profitability, which in turn attracts a great many new participants. These new participants drive up competition, which in turn causes profit margins to diminish. Eventually, so many participants are competing that margins can turn negative.[36] Haim Bodek, however, whose HFT hedge fund went bankrupt due to "order flow information asymmetries," has a darker view of HFT's "noisy" ecology:

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[33] See: http://www.nanex.net/20100506/FlashCrashAnalysis_About.html
[34] Michel Callon *What does it mean to say that economics is performative?* Loc.cit., p. 13
[35] Evidence is the conviction of BATS Global Markets by the SEC on the grounds of an illegal preference of influential HFTs (who are often shareholders of the exchanges, as Bodek states).
[36] Rishi K. Narang, *The Truth about High-Frequency Trading* (Hoboken: Wiley, 2014) pp. 18-19.

> There's basically interaction in the market. This firm knows how this works here, they know this practice works over there, and they're able to get to 15% or 20% of the market because they know that – and that's the *only* reason they can get there […] you have this efficient market and certain regulators say it's great, it's only a penny wide, the customer gets the best price. And now I'm telling you, you can have a firm with 20% of the market and the rules change a little bit and some transparency happens and they collapse to 3%. So, what's your takeaway? What's my epiphany? I basically believe that humans, individuals running large trading companies, cannot actually tolerate a zero profit margin environment. We will find ways around that situation. We will cheat. We will manufacture situations. We will undermine the infrastructure.[37]

Below the radar of state agencies established to regulate market activity, corporate self-interest created an even deeper level of incorporation programmed into automated trading as the "genetic" code of a new breed of financial agency. Mathematical models and algorithms had already revolutionized the logistic infrastructure of exchanges by displacing the trading pit and its market makers (human traders known as "locals") in favour of faster execution rates and smaller spreads.[38] Subsequently implanted into a bricolage arena of computerized matching engines, they directly negotiate price with one another. Inigo Wilkins and Bogdan Dragos argue that "algorithms are no longer tools, but they are active in analysing economic data, translating it into relevant information and producing trading orders."[39] J. Doyne Farmer, co-director of the program on complexity economics at Oxford's Institute for New Economic Thinking and former financial engineer, notes, "under price-time priority auction there is a huge advantage to speed."[40]

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[37] Gerald Nestler, *CONTINGENT ETHICS. Portrait of a Philosophy II, Haim Bodek*, 2014, single channel video. [0:20:24] There seems to be a relation between zero spread and zero marginal utility and the corporate schemes of extracting profits by manufacturing monopolies.

[38] Donald MacKenzie and Juan Pablo Pardo-Guerra argue that "[t]wenty years ago, share trading in the US was still almost entirely human-mediated and mostly took place in just two marketplaces: NYSE and NASDAQ. Now, there are thirteen exchanges and more than fifty other trading venues. Only a very small minority of deals are now consummated by human beings: the heart of trading is tens of thousands of computer servers, in often huge datacentres linked by fibre-optic cables carrying millions of messages a second."[38] *Insurgent capitalism: Island, bricolage and the re-making of finance*, *Economy and Society*, Volume 43, 2014, p. 25

[39] Inigo Wikins and Bogdan Dragos, "Destructive Destruction? An Ecological Study of High Frequency Trading," *Mute*, January 22, 2013, http://www.metamute.org/editorial/articles/destructive-destruction-ecological-study-high-frequency-trading#.

[40] J. Doyne Farmer, "The impact of computer based training on systemic risk," 11. Paper presented at the London School of Economics, January 11, 2013, http://www.lse.ac.uk/fmg/events/conferences/Systemic-Risk-Centre/Foresight-Report_110113/Papers-and-slides/Doyne-Farmer.pdf.

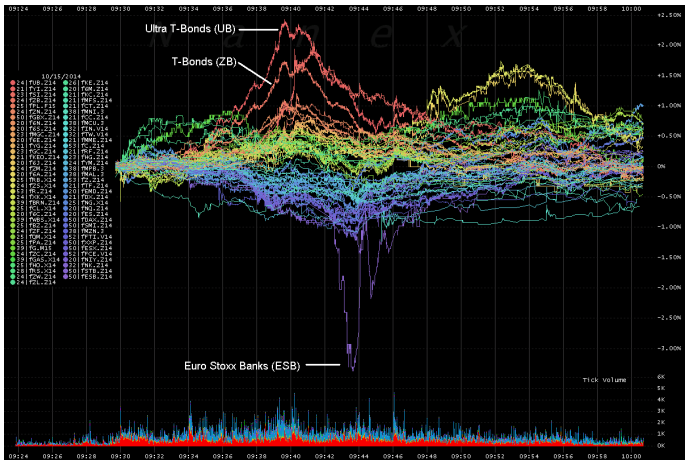

Fig. 8: Algo Burst: Treasury Flash Crash 2014, courtesy Nanex LLC[41]

Even if there is an absolute limit to speed, a divide has opened up, a gaping but invisible abyss: by exploiting timescales beyond the threshold of perception a new class of enclosures and scales has found the means to effectively hide its machinations from slower competitors and public influence alike. Gottfried Wilhelm Leibniz's notion of apperception ceases to be a conception of conscious experience emerging from small, unconscious perceptions. The myriads of mathematically constructed small perceptions (of which these camera-engines are not at all "unconscious") define a virtual field of machine apperception where those who do not command the latest cyborg infrastructure are captured or blocked. The financial market architecture with its proprietary logistics has become a black box not only with regard to the parameters of official inquests, but also in terms of knowability more generally (and beyond algorithmic trading proper). What the high-frequency black box emits – and one may add by purpose – is not information but noise. This *technowledge* exerts influence not only on the industry itself but of necessity also incapacitates the public forum as a whole. Algorithmic speech translates into intense algorithmic violence, invisible and insensible. Noise exceeds the category of information theory. Discussing Serres' philosophy of science, Steven D. Brown argues (based on Henri Altan):

> Classically, information theory distinguishes between a sender and a receiver, between whom a signal passes. Atlan noted that this scheme places noise or interference in a completely external position, outside the relationship. It is, in a sense, the backdrop against which the communication happens. But this backdrop plays a role, since it is the necessary ground against which the signal stands out as something different. […] As such, noise is really part of the relationship between

[41] "On October 15, 2014 between 9:33 and 9:45, liquidity evaporated in Treasury futures and prices skyrocketed (causing yields to plummet). Five minutes later, prices returned to 9:33 levels. Trading activity was enormous, sending trade counts for the entire day to record highs - exceeding that of the Lehman collapse, the financial crisis and the August 2011 downgrade of U.S. debt. Treasury futures were so active, they pushed overall trade counts on the CME to a new record high," http://www.nanex.net/aqck2/4681.html

> sender and receiver. […] For the sender, noise will always be an obstruction – it gets in the way and must be overcome. But for the receiver, noise need not play this role. […] Serres concludes that not only can there be no straightforward exchange of messages from one point to another, but that noise is a productive component of all information transmission. Without noise, interference, there could be no communication.[42]

As Gregory Bateson remarked, "all that is not information, not redundancy, not form and not restraint – is noise, the only possible source of *new* patterns."[43] To resume the argument above, noise can be – and is – turned into a tool. Noise can become an active force, a strategic or tactical measure, depending on the aim. In the complex socio-technological environment of financial markets, this new – and with a term of Serres "parasitic" – pattern of communication can be called *counterinformation*. It flows with what is deemed information, accentuates it like a backlight accentuates the shapes in front of it. But it is not merely environmental contingency, it is an embrace that speaks, a daemon that 'automatically' fabricates the "terms and conditions" in the background. It constitutes a powerful and disruptive "rhythual" – to add the layer of algorithmic frequency to Judith Butler's "ritual":

> The performative needs to be rethought not only as an act that an official language-user wields in order to implement already authorized effects, but precisely as social *rhythual* [original: ritual], as one of the very "modalities of practices [that] are powerful and hard to resist precisely because they are silent and insidious, insistent and insinuating:' When we say that an insult strikes like a blow, we imply that our bodies are injured by such speech.[44]

Fisher Black, in his seminal text *Noise*, holds that "noise is information that hasn't arrived yet."[45] When we accept, as evidence has shown, that low latency trading is defined by speed advantage, we must ascertain a game-changing and ruinous bifurcation[46] as regards competition in Hayekian information markets: Those who do not command the automated rhythual of micro-time face noise as "silent and insidious" information they will only know when it is too late. The new patterns are obscured; their embrace is tantamount to a rape where the offender is invisible. The fraudulent insult of systemic information asymmetry turns into the silent violence of noise asymmetry.

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[42] Steven D. Brown, "Michel Serres: Science, Translation and the Logic of the Parasite," *Theory Culture Society* 2002; 19; 1, p.8. DOI: 0263276402019003001

[43] Gregory Bateson, Cybernetic Explanation, in: Steps to an Ecology of Mind (New York: Ballantine Books, 1967), p. 410.

[44] Judith Butler, *Excitable Speech. A Politics of the Performative* (Routledge: New York & London, 1997), p. 159

[45] Fischer Black, „Noise," in: *Journal of Finance*, Volume 41, Issue 3, 1986, p. 529. Black counts 5 models of noise, the one quoted here relates to business cycles and unemployment and as such, we imply, to the wider economy and to social consequences.

[46] See also fn. 11

TOWARDS AN AESTHETICS OF RESOLUTION IN QUANTITATIVE FINANCE

When your world reduces to a trading pit, history becomes quantitative. —Elie Ayache

The artistic-philosophical appropriation of quantitative finance that informs this essay is a *fiction* crafted from financial, economic and scientific narratives. As might have already become clear, it emphasizes performance rather than representation[47], process rather than appearance, agency rather than idiom (Pickering 1995). It engages with how reality is produced, rather than interpreted, with a speculative leap into the unknown rather than a relapse of the past (i.e. a recognizable method, style or genre). This perspective will be applied on the following delineation of the notion of an *aesthetics of resolution* based on our initial discussion of the Flash Crash and algorithmic trading more generally as well as its investigative limitations. As an artistic-philosophical point of departure, such an aesthetics engages with the question of what and how we observe and how truth is constructed. In question is an aesthesis in the sense of how we perceive and visualize financial processes; how we derive knowledge and organise decision-making; and how this is part of an institutional setting that wields power not only over (the emergence of) systems but also the ways *we* resolve issues.

I apply the term resolution through the full gamut of its semantic field – from visualization and discrimination to intelligence and knowledge production to intention, purpose and initiative and to solution and (joint) decision-making. Its agency – its potential productivity for thought and its practical usefulness – can be fully realized (captured) only as a 'whole.' This is not to say that I am proposing an essentialist view. Quite to the contrary, we are steeped in a myriad of flows, shifts, exchanges, and translations issued by human as well as non-human speech. What makes the term resolution interesting to me is its semantic connectivity: On the one hand it offers potential for intense exchange in which its semantic layers act as a communicative vessels. On the other hand, it offers itself as a research tool to examine how these meanings – translated into concrete tools – are enclosed and exploited in the name of proprietary claims and titles. In contrast to a philosophy of relations and essences, I critically posit the notion of resolution and its semantic field within a flat ontology of *populations* in a particular *semantic geography*. Graham Harman briefly addresses the history of the term:

[47] With the term "representation" I refer to means of communication that target beyond the system rather than „technical" representation as exemplified by Daniel Beunza and Fabian Muniesa's text "*Listening to the spread plot,"* in: Bruno Latour and Peter Weibel, (eds.) *Making Things Public: Atmospheres of Democracy*, (MIT Press, Cambridge: 2005), pp. 628-633.

> When the phrase "flat ontology" was used by Roy Bhaskar in the early 1970's in his book on the realist theory of science, it was a polemical term. Namely, he used it to refer to theories that flatten the world into its accessibility to human observers; it was a dismissive phrase aimed at positivism, not a flattering description of realism. The meaning of the phrase was reversed in 2006 by Bhaskar's admirer Manuel DeLanda. For DeLanda, 'flat ontology' simply means that all entities must be treated alike. That is to say, it is an *anti*-reductionist term, such that armies, cities, and herds of cattle might be just as real as steel girders and atoms of potassium. 'Flat' has now reversed its meaning: rather than referring to a world without levels in which everything inhabits the realm of human consciousness, it means instead a world in which all levels are on the same playing field.[48]

While Harman continues with a critique of the claim that "reality and efficacy are interchangeable terms," this text makes use of flat ontology precisely because we are dealing with financial realities whether they are hidden or in full sight. At the same time, the term's use is positioned on the level of an *ideal* situation – ideal in the sense of semantic equity and coherence, not in an essentialist sense – from which the granularity of hierarchical relations and layers becomes *visible*. The *ideal* position is not a pure state but a 'molecular infection of the whole skin' of the market as the surface of its resolution(s). Positing the notion of resolution as a flat ontology – in which all levels are on the same playing field – is to construct a vantage point not above but within; and through which we can perceive how *vision*, *knowledge* and *decision-making* are made into information capitalism's powerful black box schemes. While the source as an individual black box trading cannot be known, we hope to show that this does not pertain to the market black box. As DeLanda writes, "an ontology of individual entities […] demand to know in each case what specific historical process has given rise to a whole, or, what amounts to the same thing, it demands to know the source of a whole's systematicity."[49] The quantitative surface itself will serve as the measuring device of deflection and scaling. We will therefore firstly discuss how the recent philosophies of the market have conceptualised this surface.

The systematicity we are dealing with is one of *absolute distance*. It is a construction based on the economic appropriation of probability theory to account for what cannot be *known*. It is a scheme (a multiplicity of schemes), which measures (constructs) approximations to the *unknown*. Ayache says, "one doesn't step into the market because one knows something, but because one *does not know* something and *cannot*

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48 Graham Harman, The Road to Objects, in: *continent.* 1.3 (2011): 177. http://www.continentcontinent.cc/index.php/continent/article/viewArticle/48

49 Manuel DeLanda, "A New Ontology for the Social Sciences," in: *Transdisciplinary Objects* (Champaign: University of Illinois, 2002)

predict something. (Why would one exchange if one did know?)."[50] In the words of John Roffe:

> […] the real contingency of the market is subordinated to the ideal distribution of probabilities. But the fact is, as Ayache notes, that when options are priced and traded, this is done outside of any certainty, beyond any epistemological warrant. The *next* price is the product of a contingent act, and for that very reason beyond the reach of true and false: 'The market doesn't know the future.'[51]

However, 'below' the ideal position of a philosophy of the market based on a reading of contingency, there is the market that rolls, rattles and judders. How are they connected? Do they ever meet?

Successful innovations often answer to immediate local problems and, as Donald MacKenzie and Juan Pablo Pardo-Guerra say, and are "nearly always bricolage: the creative, ad hoc re-use of existing resources […], not the mechanical implementation of a grand plan nor simply logical deduction from existing scientific theory."[52] And Mackenzie and Pardo-Guerra continue:

> The bricolage hypothesis has a corollary: history matters. If innovation is shaped by local experiences and local priorities and consists mainly of the creative reuse of existing resources, then those experiences, priorities and resources can have lasting effects […] and can be consequential. As Riles […] argues, 'finance is an explicit politics … a purposeful and stated compulsion of self and others, a realm of must, shall, and will'. Devices permit and compel, just as laws, regulations and ideologies do, and if their histories matter, then the 'explicit politics' of finance is shaped locally as well as globally.[53]

History embedded – i.e. made – in locality, through experiences, on the basis of deals, and the exploitation of resources is a far cry from the capital H *History of Absolute Contingency*; even if the next price is never known. Just to the contrary, because it is never known there is history in the making and an explicit politics of finance. As we discussed in Chapter 2, Collective VI (The Quantitative Turn in Finance), even if algorithmic trading flattened financial access and practice to some degree, there are new hierarchies, new gatekeepers, and new ruptures. Nothing has changed, except that there is a philosophical discussion as probably never before. Therefore, finance has truly entered history, as we are now discussing it on all levels of its appearance and its ideology. This is where Ayache and HFT connect. At the point of a renewed interest in political economy, which can now draw on resources that were not at hand

[50] Elie Ayache, *The Blank Swan. The End of Probability* (Hoboken: Wiley, 2010), p. 62
[51] John Roffe, *Abstract Market Theory*, loc.cit., p. 25
[52] MacKenzie, Donald / Pardo-Guerra, Juan Pablo, C*apitalism: Island, bricolage and the re-making of finance*, 2013, p 6.
[53] MacKenzie and Pardo-Guerra, 2013, loc.cit., pp. 7-8.

before. And this is where Ayache contributes beyond a purely philosophical debate, and also beyond the marketing objectives of his firm ITO 33 – because his philosophy is the abstraction of an innovative financial model the firm has developed but cannot sell due to the conservative attitude of hedge funds and investment banks that prefer the rattling models of yore that still cough up money.

We need to move on. The question of a reinvigorated political economy exceeds the limits of this thesis – and my humble abilities – and is a project that can only be advanced by the (active or passive) involvement of contributors from different disciplines and experiences – including finance (which is why I take Ayache so seriously – he might not be actively engaged in the project of a new political economy but passively he is because we can draw from him important insights). But I hope that my conceptualization of the derivative condition (mainly chapter 4) and the following notes on an aesthetics of resolution can serve at least as a small contribution.

COLLECTIVE VIII

ON THE AESTHETICS OF RESOLUTION

Performativity is not about creating but about making happen. —Michel Callon

As mentioned above, the flat ontology of associations proposed by Levi Bryant (based on DeLanda) might serve as a helpful 'device'. Human and non-human entanglements give rise to new forms of (volatile) collectives. Bryant's fourth thesis of flat ontology "invites us to think in terms of collectives and entanglements between a variety of different types of actors, at a variety of different temporal and spatial scales, rather than focusing exclusively on the gap between humans and objects."[54] While accounts of financial practice up to the 2000s, such as Mackenzie's, are concerned with "bodies" (physical and mental ones as well as devices) and their operations (extended and augmented), low automated trading conglomerations are replacing human traders and their site-specific 'trivial' resolution apparatuses for seemingly more sophisticated, quant-coded algorithmic high-resolution market making. The dividual incorporates in automated processing. Technology made it imperative to automate, i.e. control volume

[54] Levi R. Bryant, *The Democracy of Objects* (Open Humanities Press: University of Michigan: 2011) p. 32

trading and reduce latency, in order to stay in the game – not only for small 'boutique' hedge funds but also for the big players like investment banks. The rise of non-human actors in finance is due to its radical colonization by a previously 'alien' force:' natural scientists who have been introducing ever new schemes of quantitative and technological competitive advantage. This intrusion was made possible by the Janus-faced character of a social science, economics, which at the same time appropriates the natural sciences.[55] In the words of the financial engineer and philosopher Elie Ayache: "It is only in physics that you assume that something is pre-given by nature and therefore can allow yourself to make that 'given' a part of the equation whose resolution will ultimately say what the 'given' is worth. BSM assumed that the market was nature."[56] Black-Scholes-Merton exploits molecular Brownian motion and Ito's lemma (an equation first applied to guide missiles). Engineers, physicians or mathematicians (often hailing from highly-renowned universities and colleges) apply the spatial components of molecular movement and rocket science (the future strike of a target) and translate into a performative methodology to colonize and exploit (by increasing the resolution of) ever-smaller time horizons.[57]

The principle resolution threshold is the visibility of the order book – the information is visible and can be acted upon instantly. The crucial term for action is "instantly", as the term opens up to the whole gamut of *technowledge* that redefines latency and speed horizons – and therefore the increment of an actionable instant as well as the constriction of 'visibility' to resolution machines. The financial expert, former HFT trader and whistleblower Haim Bodek ascribes the "cannibalistic" acceleration to competitive advantage:

> Since 2007, we saw compression in the algorithm trading space where the profit margins approached near zero. And I am part of that problem. I ran my firm specifically to tighten up markets. We sometimes call that the race to the bottom in the business. […] What is the activity that's driving that race to the bottom? You say, "If I can make a near-risk-free fraction of a cent and even if the whole day would have demanded a little bit more, I'm happy to do that now even if we barely make a profit because I'm basically taking away the opportunity for someone else to make a profit. […] The strategy, which many of the algorithm trading firms did, was basically market

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Roffe points to this issue when he writes that „[t]he distinction between price and value is fundamental to economics, to the financial study of markets, and to political economy; at the same time, the grounds of the distinction itself, and the differentiating characteristics of the two terms, often remains obscure. It would not be too much to say that this obscurity has coloured the entire history of economics through all of its convulsions, and gives a particular complexion to analyses across its spectrum, from politics to mathematized finance." *Abstract Market Theory*, loc.cit., p. 22

[56] Elie Ayache, The Medium of Contingency, loc.cit., p. 142

[57] April 9, 2001 is an important date for the next wave of financial quantification and automation: The decimalization of U.S equity markets that instituted quotes in decimals instead of fractions. As a 2009 article in Forbes magazine states, "Overnight the minimum spread a marketmaker stood to pocket between a bid and offer was compressed from 6.25 cents down to a penny."[57]

share and just bring it to a place where our competition couldn't handle it."[58]

As Ayache points out, however, the scientific paradigm behind quantitative trading and automation hasn't changed – and thus implicitly refutes Rishi K. Narang's assertion of "rigorous research". To Ayache, automated trading is not a new scientific method but a progressive exploitation of the reigning paradigm of probability and its futile scales:

> The market is the only place where the qualitative absolute event, the one that is irreducible to measure and scale and probability, finds quantitative expression, in a material medium borne by numbers, or rather prices. The market is quantitative history. One should keep in mind this contradiction in terms: one should remain aware that the historical event is incalculable and unquantifiable because it precedes any scale; and then understand the extraordinary nature of price (and of its medium: the market) as the quantification of that unquantifiability. This is why the market is truly the technology of the future. You have to realize that price is not a number. Quantifying the event (translating it into numbers) is impossible; yet the market is such a translation, precisely in so far as it takes place outside of possibility. 'Quantitative history' does not mean that the event is being forced into the mold of numbers. Rather, a quantity, a number of an extraordinary nature, has been found such that history can be quantified.[59]

In a nutshell, while for Ayache the market is real, probability is not. The hard problem of the volatility smile has not been resolved, nor has it been tackled in algorithmic trading on the supposition that the (option) pricing technology (BSM reversed) works. The algorithms are not complex but simple in order to quickly sift through and act on financial and other "big data". Quantitative trading accelerates the exploitation of an old paradigm[60] materially embedded in the computer-powered calculative evaluation of massive data sets. Predication machines attempt to evade *their* unpredictable contingent event by trading in fractions of a second.[61] They reorganise the market to an extraction of price from big data. The performative paradigm of quantified exploits a future it doesn't *know*. The production of risk, a potentially massive concept for complex societies and their needs and desires, complexifies price without producing a present in which it translates back to value. Rather, it produces massive volatilities in the social realm. Resolution dissolves to power.

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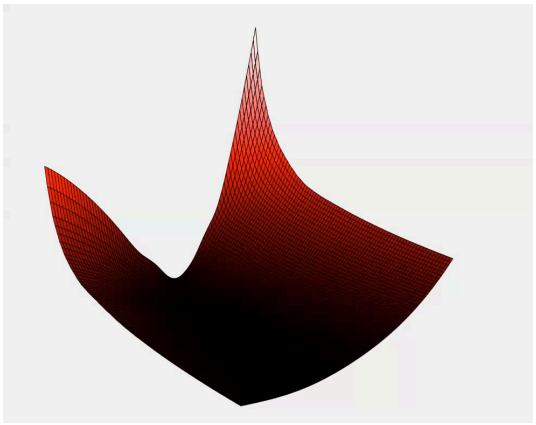
[58] In: Gerald Nestler, *Portrait of a Philosophy. Contingent Ethics*, 2014, single channel video. [0:14:20]

[59] Elie Ayache, *The Medium of Contingency. An Inverse View oft he* Market (Palgrave Macmillan: Basingstoke, 2015), p. 52

[60] How this plays out in financial corporations was shown by Karen Ho in: *Liquidated: An Ethnography of Wall Street* (Duke University Press: Durham/London, 2009).

[61] Knight Capital's loss is an instance for an unpredictable event within the black box itself. On August 1, 2012, the HFT trader lost over 400 million Dollars in 30 minutes due to a technical error, and the firm had to file for bankruptcy. Nanex, who analyzed their trades, commented, "the glitch led to 4 million extra trades in 550 million shares that would not have existed otherwise." See: http://www.nanex.net/aqck2/3522.html http://www.bloomberg.com/news/articles/2012-08-02/knight-shows-how-to-lose-440-million-in-30-minutes.



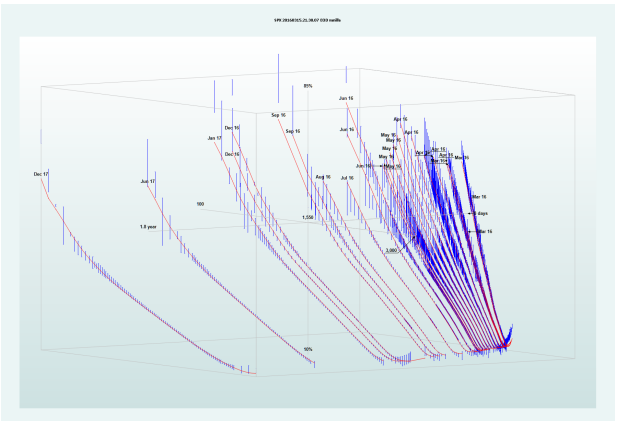


Fig. 9 + 10: Graphic illustrations of a volatility smile, courtesy Philippe Henrotte

The notion of resolution involves technologies that engineer thinking and affecting; that orient attractions and forge applications. Resolution is not restricted to a technical appropriation in the form of a device for perceiving (before undiscovered worlds) – a visualization tool, the setting of a laboratory, big data evaluations or the like. Neither is merely it a cultural technique of conciliation and consultation to craft compromise and compensation. Rather, it is a basic category though not uncharged with ideologies. As an instrument of power it has inspired revolutions as well as served restorations. Its trajectory is towards openings and new perspectives but at the same time it can also be reversed to map the scales of new hierarchies. Fundamentally, however, resolution initialises new layers of thought that move from surface to surface in a connective, interrelating and unbiased way (initially a flat ontology) that erupt in new visions and knowledge. In such a post-disciplinary arena of research, art and philosophy are natural allies.

Resolution apparatuses are instrumental for developing tools and methodologies. While they provide us with significant and relevant meaning in a technological as well as political sense, they produce competitive advantage when commodified. As such, resolution is one of information capitalism's cardinal means for producing attraction, evaluation and appreciation. This is due to the fact that it is about commensurable relations and associations (pricing), or, as Bruno Latour says about actors: "Nothing is by itself ordered or disordered, unique or multiple, homogeneous or heterogeneous, fluid or inert, human or inhuman, useful or useless. Never by itself, but always by others."[62] Its productive feature of profit maximization is an inheritance from post-Fordist operations (e.g. while a digital camera contains the full scope of its resolution capacity the price paid determines which resolution is unlocked; this is not simply a

[62] Bruno Latour, *The Pasteurization of France* (Harvard University Press: Cambridge: 1993) p. 161

technique to control access and commercial interests but the *sign(ature)* of the capitalist order). It is here where the semantic openness of the term resolution is enclosed technologically, semantically and socially. Here, its intrinsically *flat ontology* as a communicative ensemble is breached, broken, corrupted, redirected, and stratified: The black box is a complex machine that exploits resolution through the whole gamut of its semantic potentials. It inserts a mode of hierarchy that substitutes representational with performative power. However, resolution techniques are never pure, impeccable and flawless. There are glitches, inconsistencies – and noise – that escape the probabilistic and stochastic contraption, in consumer products as well as in finance.

At a time when events could only be depicted and narrated in still images, time had to be represented spatially, for example in the compositional array of sequential image resolution in a medieval painting. With the invention of motion pictures, a new paradigm of resolution emerged: the passage of time is re-presented in time, or, in other words, time as a performance is recorded onto itself, its own distinct time. Time performs more or less directly (as in live broadcasts); its course of events is copied and contained (recording); its material is edited, cut-up, re-arranged, altered, reversed, accelerated, etc. The container is the information and the content is noise, at least from the perspectives of the engineer and the *programmer*. All this opens up to a diversity of resolution techniques that – if developed and used – can be applied for the most varying applications ranging from the lab to the silver screen, from projection to streaming, from scientific scrutiny to entertainment, and so forth. Algorithmic processing adds more layers of intervention and analysis – and more noise – and in its latest development emulates optical illusion, distraction and manipulation into high-definition narratives beyond the capture of the chronological course of events and the positivist fallacy of photographic realism. There are, however, events, occurrences, processes, and operations that are not or not easily captured. The term “capture” exceeds visualization and imaging in the sense that it implies the awareness or even intuition of a specific reality. Capture is not bound to a technical device, a material manifestation of knowledge alone. Within the notion of resolution, capture is in the first instance a grasp that distinguishes information from noise by way of framing – the performative construction of containers –, which may be actuated by knowledge as well as by serendipity; by scrutinizing data flows but also by the event, that is, by crisis.[63]

To summarise briefly, the term resolution technically speaks of intellectual, artistic as well as affective potentials and involves technological and algorithmic operations and

[63] The Knight Capital incident highlights the embarrassment of a theoretical and technical misconception of information and noise on the level of financial regulation (see fn. 11).

the distances between them. It can thus be seen as a socially powerful node of how we may sense, develop, map, differentiate and support relations between humans and non-humans. Moreover, it holds the potential for thinking and creating access to value(s) in radical contrast to the capitalist price(ing) engine and its proprietary logic, without losing the performative edge necessary within complex societies in flux.

Against the enclosures and the noise of capital (a “derivative autonomy" which has also captured and financialized the arts), autonomy might have to be reconceptualized as a dynamic, open, sometimes aleatoric and instantaneous process (acts connected to a multitude of contingent moments) that purposely integrates ambiguous, heteronomous influences in order to *make* resolution in the full meaning of the term. With Michel Serres we can rephrase this statement from the angle of noise: “noise, through its presence and absence, the intermittence of the signal, produces new systems.” It is the activation of noise against the „parasite“ that creates „new patterns“ (Bateson, above). And Serres asks, as if he was about to evoke resolution in the full meaning of the notion, and thus also what I call the figure of the renegade (the daemon of difference that reorients, i.e. *translates*, the flow of relation and nonrelation, information and noise, pattern and system...): „Can we rewrite a system, not in the key of pre-established harmony [but] as the book of difference, noise, and disorder?“

I will therefore conclude with an example of an ambiguous (and even marginal) figure and its environment that at the same time hold the potential for rethinking and reactivating autonomy dynamically for a reorientation towards agency beyond critique.

COLLECTIVE IX

THE FIGURE OF THE RENEGADE

TOWARDS A POIETICS OF RESOLUTION

Wall Street is not immoral; more it is amoral. When you are not comfortable having an ethical discussion in your field with somebody over lunch, that’s a clue. […] When those types of basic question are taboo you’re not going to have much reflection.
—Haim Bodek

The quantitative turn in finance has had implications on the financial market as a whole, from human to automated market making; from available time periods for successful investment to those for successful speculation (to accept the terminology for frequencies of transaction turnovers); from value and evaluation to price and pricing, from randomness to risk production as a complex and contingent operation on the future. This shift has had implications beyond the market proper, as Jon Roffe explains, and has radically affected a seemingly fundamental notion:

> […] value has no place at all in the market, which is solely the regime of price. This is already implicit in the definition of values as qualitative, since the market is a locus for quanta alone. The individual and collective habits and the institutionalized social memory that provide the field in which values come into being and are deployed, is opposed the market, characterized as contingent opening onto the future, and figured in open-ended and unqualified pricing process. While we will see that the market is not a necessary reality – and could not be, given the through-and-through contingent character of the pricing-process – it nonetheless confronts social formations with the radical contingency that the process embodies, and thereby opens it onto its (partial) undoing. […] because the pricing process is not governed by systems of valuation at all, while nonetheless playing a part in their constitution, orientation and interruption, it marks a moment in the structure of social values that exposes them to becoming undone. […] the pricing process always has the potential to undermine value.[64]

At the same time, the quantification of pricing (beginning with implied volatility calculated on BSM has affected a (more) flat ontology in financial markets. Especially Ayache and Roffe's recent philosophical elaboration delineate the performative resolution of contingent claims (Ayache preferred term for derivatives). The hierarchy of underlying price *above* derivative value has flattened out to the recalibration of derivative prices constantly derived from and implied in the underlying as well as derivatives on derivatives. Volatility of volatility introduces a surface into the market, for which price stands as the non-human non-essentialist actant. Adding "financial" to Levi R. Bryant's description of flat ontology, the non-human actor in finance comes to the fore:

> [...] the broader strategic import of the concept of flat ontology is to diminish the obsessive focus on the human, subjective and the cultural within social, political, cultural theory and philosophy *[and the author would add, finance]*. In particular, my ambition is to diminish an almost exclusive focus on propositions, representations, norms, signs, narratives, discourses, and so on, so as to cultivate a greater appreciation for nonhuman actors such as animate and inanimate natural entities, technologies, and such. [...] in *addition* to these semiotic actors that play a role in collectives of humans and nonhumans, greater attention would be directed at the role of nonhuman actors in human collectives and the role they play in constraining the possibilities of existence.[65]

[64] Jon Roffe, loc.cit., 29-30.
[65] Levi R. Bryant, *The Democracy of Objects* (Open Humanities Press, University of Michigan Library: 2011) pp. 247-48.

The complex and intricate operations and machinations between humans and non-humans result in new resolutions that either constrain, or, resolve our perception and cognition. What I term an *Aesthetics of Resolution* is therefore an approach to conceptualize and provoke "such an attentiveness to these nonhuman actors [that] would provide us with the resources for thinking strategies of composition that might push collectives into new basins of attraction.[66] Bryant draws on Bruno Latour to propose such a game-changing environment:

> It is […] necessary to raise questions and devise strategies for enhancing the resonance of other systems or objects within the social sphere so that change might be produced. Similarly, in his recent 'Compositionist Manifesto,' Latour proposes the practice of composition as an alternative to critique. Where critique aims at debunking, composition aims at building. Where critique focuses on content and modes of representation, composition focuses on regimes of attraction. If regimes of attraction tend to lock people into particular social systems or modes of life, the question of composition would be that of how we might build new collectives that expand the field of possibility and change within the social sphere. Here we cannot focus on discourse alone, but must also focus on the role that nonhuman actors such as resources and technologies play in human collectives.[67]

However, as evidenced by the Flash Crash and its investigations, to "push collectives" we are in need of an attractor that is both inside and outside, or better, that *embodies* a trajectory and an exchange out-of and in-to the black box. Bryant holds that

> […] flat ontology makes two key claims. First, humans are not at the centre of being, but are among beings. Second, objects are not a pole opposing a subject, but exist in their own right, regardless of whether any other object or human relates to them. Humans, far from constituting a category called 'subject' that is opposed to 'object', are themselves one type of object among many.[68]

Hence, we need to look for an immanent actor, i.e. attractor and communicator, that is both human and non-human – a figure of collective per se. I call this attractor the figure of the renegade – an expert witness both human and non-human. Black boxes – operators that extract "competitive monopolies" by folding the flat ontology of resolution – are machines whose performances excise the productive elements from the communicative flow by implementing new access hierarchies (including what we termed "the rhythual of noise asymmetries"). This undefined violence can only be defined and addressed by the resonance of an agent that *knows* this violence expertly and takes the consequences by exposing herself. By embodying the risk entailed, one might add. The figure of the renegade not only holds such a distinct potential of resistance. In fact, she also moves on from a weak position that it is at the centre of

[66] Loc.cit. p. 289
[67] Loc.cit. p. 226-27
[68] Loc.cit. p. 249

many debates in philosophy and art: the renegade exceeds critique and dissent to a new embodied form of insurrection. As marginal and ambivalent such moves might sometimes be they are nonetheless strong oppositions from within the system. Applying Judith Butler's reasoning on the speech act to this specific field, the one that speaks is at the same time addressed by the violence:

> The word that wounds becomes an instrument of resistance in the redeployment that destroys the prior territory of its operation. Such redeployment means speaking words without prior authorization and putting into risk the security of linguistic life, the sense of one's place in language, that one's words do as one says. That risk, however, has already arrived with injurious language as it calls into question the linguistic survival of the one addressed. Insurrectionary speech becomes the necessary response to injurious language, a risk taken in response to being put at risk, a repetition in language that forces change.[69]

When confronted with black boxes, it seems that composition and association are secondary to a renegade act (in the sense that they follow it), which itself is secondary to an event or a series of events (violence). With Butler and her reading of the performative as potential for insurrection, the renegade opens new (now human and non human) inroads for building new compositions and collectives:

> The performative is not a singular act used by an already established subject, but one of the powerful and insidious ways in which subjects are called into social being from diffuse social quarters, inaugurated into sociality by a variety of diffuse and powerful interpellations. In this sense the social performative is a crucial part not only of subject formation, but of the ongoing political contestation and reformulation of the subject as well. The performative is not only a ritual practice: it is one of the influential rituals by which subjects are formed and reformulated. This point seems to me to be a crucial one, and raises again the possibility of a speech act as an insurrectionary act.[70]

The full circle of an aesthetics of resolution (i.e. a solution) was out of the reach of the forensic analysis of the Flash Crash. But it allowed glancing behind the closed curtain of black box trading and look at how resolution apparatuses play out in this ecosystem: At first is a quality of depth in investigation, or more technically, the production of quantitative camera-engines with high-resolution on the split-second time scale at which low latency and high frequency trading is carried out. The strata to be investigated have to be discovered and discerned rather than simply considered and surveyed. Thus, algorithmic analytics devices are crucial for unearthing such "archaeological" evidence. Its material elusiveness – which I attribute to a new breed of machines that turn apperception from conscious perception (when mental attention is coupled with previous experiences and conceptions) to technological cognition – hides

[69] Judith Butler, *Excitable Speech. A Politics of the Performative* (London: Routledge, 1997), p. 163
[70] Loc. cit., p. 160

a thick surface of myriads of data characterized by a propensity towards invisibility and a sort of "counterperception" that escapes cognizability, i.e. reperformance.

Thus and despite of the near-elimination of the eyewitness from the scene (who as market maker is an expert witness), the paradigmatic shift to electronic exchange gives rise to the cognate notion of a subtly different kind of witness, one who would be capable of challenging calculative violence: the *renegade* – a traitor, defector, informant or whistleblower who transgresses the unwritten laws of complicity and secrecy. By providing material from undisclosed or classified sources on a broad range of subjects this figure of the whistleblower has in recent years turned the principal witness for the public, procuring otherwise unavailable evidence of violence. In the financial context, this particular manifestation of the witness—who does not testify on the basis of real presence – becomes the medium of forensics by a logistics of redirection (e.g. the leaking of confidential material that cannot – must not – speak for itself). This witness is not a plain informant. The financial renegade who presents objects as subjects-of-debate is an expert witness as much as the scientific analysts ally who subsequently (re)performs the forensic narrative by composing the facts (they could be the same person, or, a collective of human and nonhuman expertise). The story of the Flash Crash offers an example of the ambiguous significance for the possible production of future publics, depicting in all its complexity the horizon of an exposed and discontinuous self-regulating force against the boundless utopia of a self-regulating market. The intricate problem of the resolution of the Flash Crash demonstrates the ambiguity contained: the participation of an insider or even (alleged) perpetrator is required in order to unearth evidential data that is buried (in undisclosed documents, in fractions of a second or other fields of technowledge).

The ambivalence, the perils and the 'performativity' of the renegade whistleblower surfaces in the following statement by Haim Bodek who in 2011 exposed to the SEC an order type violation (named Hide Not Slide) used by the Direct Edge (now a subsidiary of BATS Global Markets), which resulted in the record penalty of $14m in January 2015:[71]

> The whistleblower syndrome is kind of a pattern. The whistleblower says that 'this is obviously wrong and I'm going to call it out' and then when I call it out everyone else is going to realize that it's wrong and it's just going to get fixed right away. What he doesn't realize is that everybody knows about it. So, the message a whistleblower should probably address is […] 'you know this is wrong and I know all of you recognize this is happening, but this is *wrong*.' And when you realize that that's what whistleblowing is – that you're making people go through the uncomfortable process of looking at themselves, that's all it is – you realize you're not the hero, you're not

[71] https://www.sec.gov/news/pressrelease/2015-2.html#.VLP9qyvF9g0

> bringing new information to the table. You're the guy pointing out the thing that no one wants to see, that everybody knows about. And what's weird about all these cases is that it seems that these, call it injustices happen in pharmaceuticals, in labour and it's the same pattern over and over and over, where there's massive injustices which no one wants to talk about and no one wants to admit vocally but everybody knows that's how things work. It doesn't change until the whistleblower does it.[72]

Her marginal position notwithstanding, however, the figure of the renegade points to a destination that emphasizes the need to look for resistance from inside rather than outside of a system, in our case financial markets, or, more broadly, information capitalism. Merriam Webster defines "renegade" as (a) a "person who leaves one group, religion, etc., and joins another that opposes it" and (b) as "someone or something that causes trouble and cannot be controlled." The renegade transgresses the unwritten laws of complicity and secrecy. From the perspective of a system or an industry, the renegade's 'opting-out' makes her a traitor and defector. But often by default rather than design she becomes an educator for the general public (in institutional degrees). This is a fact that exceeds finance and takes effect in other sectors and power fields as well.

In fact, the renegade constitutes an individual act that proceeds from mere dissent (critique within a system) to concrete transgression and insurrection (an act of resistance and renunciation). It is an act through which subject as the revolutionary figure comes back full circle as the 'only' actual agent of radical change – at a time in which the subject's demise is incessantly decreed by automated decision-making, big data prognostics and the politics of consumption.

To take as example only the most noted incorporation of the renegade, a whistleblower is often an expert acting from a point of no return, a risk taker at the point of ultimate crisis who rises up against wrong. By speaking out and sharing proprietary data, business strategies or classified information, she not only discloses what was excluded from public debate but also manifests noncompliance as an act of civil courage for the greater good. This is a point to be taken seriously even when the experiences that cause her to be disobedient do not inform an ethical decision to act against violence but to an attempt to improve and advance the system – a fact that applies to many industry whistleblowers. The renegade is not a heroic figure; it is as ambiguous as the world she inhabits. This is not to the disadvantage of the concept, the contrary: in the midst of (fabricated) noise – in which noise is the master of information –, the system yields information (accidentally). The renegade act – essentially a violation of current custom, rule or law – produces a host of viable resolution materials across the

[72] In: Gerald Nestler, *Contingent Ethics. Portrait of a Philosophy II, Haim Bodek*, 2014, single channel video. [0:40:36]

semantic field of the term ranging from shared visualization, discrimination and cognition to decision-making. Whatever the impulse, each act perforates an autonomy that is decreasingly conceded to natural persons but granted to (consolidated) corporate bodies by virtue of their assumed maturity and complexity.

At the same time, the renegade's opting-out is an option not provided for by systems and corporations.[73] In the appropriate financial terminology, this "naked option" is a truly contingent act when exercised. It cannot be priced in and is thus outside the probability tree. It means in effect that this act reclaims autonomy against all odds. And it reawakens the subject as (an even though ambivalent) political figure. To qualify this statement, such autonomy does not constitute political autonomy with a capital A – an autonomy that bestows rights or vests powers. To the contrary, it often constitutes a singular act that attracts serious problems and is prone to fail. The renegade is in an extremely precarious position, as recent history has unmistakably shown (only her non-human expertise retained and secured might deliver her from persecution and ruin). Moreover, the growing enclosure, virtualization and commodification of data are leading to the algorithmic constitution of virtual subjects. These volatile and fragmented 'minds' are assembled by bots and are increasingly separated from their physical bodies. What looms on the horizon is the latter's disappearance from negotiations on status, rights, and autonomy.

Bryant reminds us of Ian Bogost's "thesis that all objects equally exist, but not all objects exist equally" and that a flat ontology or an ontology of immanence "constitutes the democracy of objects." (Bryant, p. 286) At the same time, however, he refers to Latour: "unlike society, which is an artefact imposed by the modernist settlement, [the concept of collectives] refers to associations of humans and nonhumans. While a division between nature and society renders invisible the political process by which the cosmos is collected in one liveable whole, the word 'collective' makes this process central."[74] Hence, if we open and expand the *figure of the renegade* to a wider collective notion of expert practices and voices, we could create *renegade solidarity* and *renegade incorporations* as a forceful strategy to counter information capitalism's

[73] Corporations, for example, are, as everyone experiences in daily life, less and less designed to communicate with (human) individuals. Rather, their internal composition is a multiplication of black boxes, a multiplicity of enclosures and security zones with crypto-access codes. Increasingly automated in their communication to the world, they force us into their algorithmic rhythual, the 'better' their artificial voice systems become. However, this algorithmic exclusion does not halt at the 'outer rampart'. To the contrary, it continues inside the paranoid animal. Staff is often as excluded as customers, forced to use the same externalized communication tools and even to resort to hacking 'their own' sytstem. Mostly unaware by corporation and staff, the latter are 'trained' to become renegades.

[74] Bruno Latour, *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge: Harvard University Press, 1999) p. 304.), p. 270

grip on life – its ever shrinking distance in a physical, affective and moral sense – as delineated by Mark Coeckelbergh[75] – that it constructs from the *absolute* distance it *invests* in. Knowledge does not resolve, it dissolves into what it cannot know and thus intensifies as price(s).

But within the 'dark matter' of the black box resides the potential of a 'dark multitude.' While automation is expanding, most black box enclosures (individual ones as well as the complex fabrications of multiple black boxes within one corporation or institution) are still populated by subjects whose discontent is becoming more and more palpable across every political spectrum. This disillusion is heavily charged with the idea that change would have to come to the system from outside the system; and that corporate and other power interests have undermined democratic institutions. At the same time, the connections of the state-finance-military complex have become overtly obvious, not only but certainly also due to the renegade acts of whistleblowers like Edward Snowden or Chelsea Manning. This dissolution would have to be channelled into the understanding that it is within the system that radical change is possible. But that it needs a host of renegade acts that are the result of an awareness that Haim Bodek put in the quote above: "You're the guy pointing out the thing […] that everybody knows about." The frustration in every realm of society today is due to the fact that "everybody knows" – not in all details but in those relevant to their own world. It is from there that the revolution has to launch.

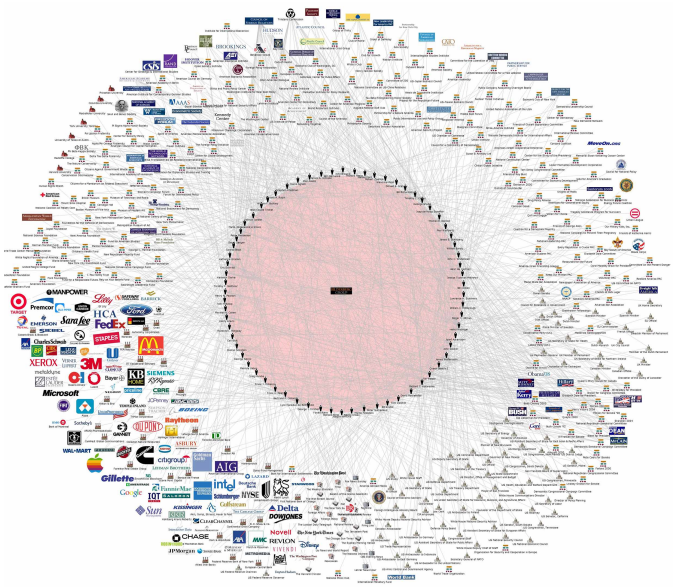


Fig. 11: The Bilderberg group assembles political leaders and experts from industry, finance, academia and the media. It is criticized to represent the elite state-finance-military complex [76]

[75] Mark Coeckelbergh, *Money Machines*, loc.cit., 2015
[76] Image source: http://www.zerohedge.com/sites/default/files/images/user5/imageroot/2016/06/04/bilderberg%20group.jpg

A telling example in line with my endeavour in this chapter is the story of Alayne Fleischmann, the whistleblower in the JP Morgan Chase mortgage fraud case covered by the Rolling Stone magazine journalist Matt Taibbi.[77] The evidence she provided resulted in a gigantic $9 billion settlement between the bank and the U.S. government. While this might seem a harsh penalty even for a powerful global banking corporation and thus light a beacon of hope against corporate crime, the case is significant for the very opposite result. Fleischmann, who had reported "massive criminal securities fraud" in 2006 under the promise of secrecy, publically whistleblowed the case in autumn 2014 (it is difficult to imagine how oppressive and solitary an eight year veil of secrecy must fell like) – after the settlement between the bank and the government had been announced. Fleischmann had not expected a deal between government and bank. She had assumed – as Taibbi recounts – her statements would lead to the prosecution of those responsible for the fraud, including the top tier of the bank's management. But, as he writes in his article,

> Fleischmann later realized that the government wasn't interested in having her testify against Chase in court or any other public forum. Instead, the Justice Department's political wing, led by [Attorney General Eric] Holder, appeared to be using her, and her evidence, as a bargaining chip to extract more hush money from Dimon [James "Jamie" Dimon, CEO of JP Morgan Chase]. It worked. Within weeks, Dimon had upped his offer to roughly $9 billion.[78]

Her first television appearance on *Democracy Now!* (with Matt Taibbi) exemplifies the courage, stamina, and ethical conviction of a whistleblower.[79] But it is also heart-breaking to watch the pain such violence exerts in all its brutality. To put the corporate crime and the political hush-up in perspective, Taibbi quotes Dennis Kelleher of the financial reform group Better Markets who remarked that the settlement

> was unprecedented in many ways, including being very carefully crafted to bypass the court system. […] There can be little doubt that the DOJ [Department of Justice] and JP-Morgan were trying to avoid disclosure of their dirty deeds and prevent public scrutiny of their sweetheart deal. [...] Can you imagine the outcry if (Bush-era Attorney General) Alberto Gonzales had gone into the backroom and given Halliburton immunity in exchange for a billion dollars?[80]

The disillusionment in our societies today does not derive from such scandals; its exposure doesn't take anyone by complete surprise. It is not news that ironclad corporations get their way:

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[77] Matt Taibbi, "The $9 Billion Witness: Meet JPMorgan Chase's Worst Nightmare," *Rolling Stone*, November 6, 2011 issue. p. 3. www.rollingstone.com/politics/news/the-9-billion-witness-20141106?page=3
[78] Taibbi, loc.cit.
[79] Weblink: http://www.democracynow.org/2014/11/7/matt_taibbi_and_bank_whistleblower_on
[80] Taibbi, loc.cit.

> Because after all this activity, all these court actions, all these penalties (both real and abortive), even after a fair amount of noise in the press, the target companies remain more ascendant than ever. The people who stole all those billions are still in place. And the bank is more untouchable than ever.[81]

Rather, the frustration is due to the fact that „we all know this is happening“ but that we don't know what to do about it. The humiliation of truth by its complete inefficacy in the face of the state-finance-complex on all levels of social relations – from scandals like the JP Morgan Chase case to the violence and destruction of austerity politics – destroys the foundations of democracy. The renegade act and its *poietics* of resolution and reperformance stands against this violence and its information and noise asymmetries by counter-constructing "assemblies" from the most varied sources. Renegade solidarity stands for ruptures, breaks and their counter-*institutions* in which a collective of *experts* – professionals, scientists but also activists, artists, etc. – work together to enhance resolution across the whole gamut of its semantic and thus its political meaning and potential political clout. The autonomy gained is marginal, in a state of constant flux, and even volatile if not dangerous. At the same time, it produces myriad forms of knowledge and generates activist tactics of infiltration. In intensifying, reinforcing recursive acts that belong to language as well as other logics of expression, new modes of making can come into existence which again produce new ways of perceiving, thinking, observing and making the world. We can adopt Armen Avenassian and Anke Henning's speculative postulate that "there is no cognition independent of *language [my emphasis]*. Neither aesthesis (perceiving the world) nor noiesis (thinking the world) can be had without poiesis."[82] It is a case of offering platforms of affiliation (rather than conformity) and of strengthening the desire of opting out as the prerequisite to participation.[83]

As Brian Holmes has observed,

> […] what even the best sociologists do not seem to understand is that new coordinates cannot just be deduced from a purely intellectual analysis of the totality of the world-system, however "cosmopolitical" it is claimed to be. They have to be invented in a rupture from its existing state, or better, from its illusory continuity. This act of collective invention is the preeminent use of the noosphere, with its proliferation of pulsating signals.[84]

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[81] Taibbi, loc.cit.

[82] Armen Avanessian, Anke Hennig, *Metanoia: Spekulative Ontologie der Sprache* (Berlin: Merve Verlag, 2014), translation by Nils F. Schott.

[83] Among other things, this includes cryptocurrencies based on open source technology such as the blockchain. Their conceptualization and application needs more discussion to avoid the experiences with Bitcoin, which has become an object of speculation no different than other financial commodities.

[84] Brian Holmes, *Guattari's Schizoanalytic Cartographies, or, the Pathic Core at the Heart of Cybernetics*, p.14. https://brianholmes.wordpress.com/2009/02/27/guattaris-schizoanalytic-cartographies/)

The renegade act, in conjunction with an *aesthesis* as resolution, is a radical point of "rupture" often provoked by the scandal of an "illusory continuity" that cannot be maintained by the renegade. The allegedly first flash crash in 2010 was a rupture that opened up the conflict between those who are for and those who are against illusory continuity. The host of flash crashes and other scandals since 2010 has shaken the confidence in financial markets. This is not to say we were at the threshold of a revolution – the ground seems still firm for finance, as it successfully externalizes its transgressions into society. But we might say that there are cracks it is worth looking into more deeply. And what we find there are not just traces of data, evidence or even proof (the "intellectual analysis" Holmes refers to) – not only the 'alterity' of data about us, as the 'other of us'. With the black box slightly ajar, we find other people on that 'inside'. Others who are not others in the sense of alterity but *others* who are *we*. If *we* seize *our* hands through the crack in the black box whenever it appears, we all become the renegade who can 'leverage' to the root of the trouble (the radical point of rupture).

Such a move points towards a poietic collective after post-capitalism.[85] Here, to act means to engage in an ambivalent, *commonism* – cooperative production, distribution, resolution, and circulation facilitated (in part) by technologies and algorithms in which forms of ownership, commonship and autonomy exist side by side and in flux. Such an act is not without speculation, risk, arbitrage, and leverage. But these terms take on different meaning where the future is *made* with seeing, differentiating, envisioning and resolving 'eyes' through the folds that distort the playing field; in short, to move from *low-res* to *high-res* across the whole gamut of the term's consequential meanings. Which is to say that art (as collective, a plurality, a 'dark multitude') is political resistance by default.

[85] Peter Drucker introduced the term "post-capitalist" for a society in which knowledge would substitute capital and licensing property as sources of wealth and which would develop between 2010-2020. It was taken up by e.g. Paul Mason in *PostCapitalism: A Guide to the Future* (London: Penguin, 2015) and more critically by Left Accelerationism, e.g. Nick Srnicek and Alex Williams', *Inventing the Future: Postcapitalism and a World Without Work* (London/New York: Verso, 2015). However, the term is conceptually tied to a 'capitalism lite' in which the *poetics of resolution* are still folded into a hierarchical system, which in a social context means a class system (see also fn. 78).

CONCLUDING REMARK CONCERNING MY PRACTICE

Contrary to market activity (which includes the art “market”) artists rarely indulge in insuring, speculating on or dealing with risk (as some of their art dealer do). Rather, artists embody risk (in a sense akin to the term “worlding”). Their “derivative mode” of production is not about securing a future-at-present by recalibrating (and pricing) every conceivable expectation. A speculation in the sense of imagining and materially making the future, it affirms and employs risk as t(h)rust and as a way to imagine how to realise a common expectation within noise, volatility and disorder: building worlds in which the depth of resolution does not collapse into a surface for a few.

On the level of an artistic approach focusing on consequences and a poetics of resolution, the renegade act is a form of resistance that is intrinsic to art as well as society at large (in which art and society come together). Artistic practice turns into a transition movement that does not uphold autonomy for itself in contrast to other fields of labour but instead delves into cracks and openings produced by the system in which what appears as noise is turned into information. Here, new narratives wait to be taken up, contextualised, and made productive. The logics of such a work is distinctly artistic from the onset, from the first approach to resolution as an act that discovers the break and from there develops imagery and imaginations. It is materialist and at the same time speculative. It is collective as it works through assemblages that it is a part of.

At the same time it expands the idea of the artist from the individual to the collective. Once again, I admit, but the promise of radical art/activism of the 1990s, for example, was undermined by the art world and the art market in the 2000s. Today, academies and art schools teach self-marketing and brand building as necessary capabilities to survive in the environment. There are niches, of course, but the derivative condition as regards the art market is pervasive (see Appendix for a brief reflection on this topic). There are collectives that successfully work against the provocations of what one could briefly call the state-finance-military complex, and as a member of the Centre for Research Architecture I experience such an endeavour directly.

What distinguishes my approach, at least in parts, might be its specific attempt to enter the black box. How do we get inside? is the question. And to me there is no answer (because access is denied by default) except when the inside exits by itself (renegade). I believe (also this is not new!) that we need to find friends who might actually be enemies but because of some accidental or other reason we have a similar interest. The strategy is to allow for occurencies and encounters that make a set of tactics possibly – the concept of serendipity as a hardcore encounter. Finding situations where

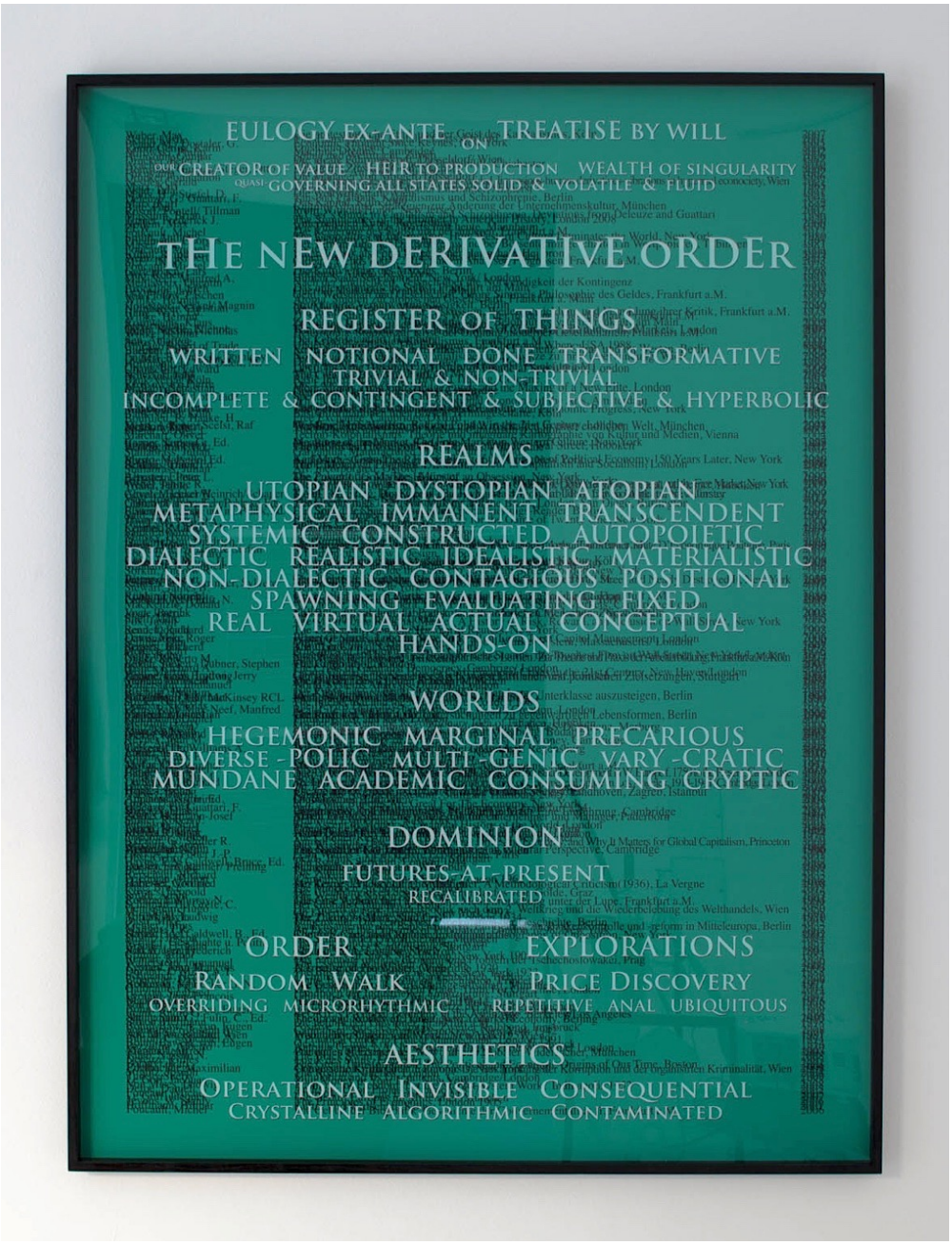
an 'inner inside meets an outer inside.' Ayache and Bodek are my enemy-friends because they are gatekeepers (at least former ones) that have decided to open doors and share their expertise. They are renegades of very different tiers, of course.

Where this leads to has to be seen by doing – and my current project with Bodek is especially fascinating because he is not only a whistleblower but has in the meantime become a 'collective whistleblower' who acts for other informants that do not want to whistleblow on their own account.

Fig. 12-15: Gerald Nestler, *RESOLUTIONIZATIONS. self-organized | self-regulated | mythological | resolution*. Photographs of the hedge fund Sang Lucci and high-resolution visualizations of Flash Crashes (courtesy Nanex LLC), 2015. Copyright the artist and Nanex LLC.

CHAPTER 4

THE DERIVATIVE CONDITION



Gerald Nestler, *THE NEW DERIVATIVE ORDER. Register*, 2014. Photo: Wolfgang Thaler

COLLECTIVE X

FINANCE AND ITS MODE OF PRODUCTION

PRELIMINARY REMARK

If we are to gain any purchase on the social significance of derivative logics it is vital to focus not only on the ways of knowing risk but also on ways of being risky. The kind of being that embraces risk, the types of policies that punish those unable to undertake risk to their selfbetterment (the at-risk populations), the confidence that every performance of self can be translated into models that measure outcomes: all display myriad incarnations of the derivative logic. —Randy Martin[1]

When I refer to the derivative condition, I argue that developments in finance since the early 1970s have had a formative influence on the composition of social relations and hence on our world – if we agree that the term "world" speaks of all things and their relations – beyond the financial market in particular and the economy in general.

Critical interpretations, such as those that run under the rubrics of "financialization," "neoliberalism, "and "immaterial labor," highlight important aspects of this development. However, at least to my mind, they often seem to suffer from approaches that do not go down to the deep root of the revolution in finance. They focus on corporations and business more generally; the state and its role in deregulating and regulating the market and its social functions; the impact on labour and creativity; and the affective, emotional and libidinal effects of post-fordist capitalism. To qualify, this list is by far not complete and it would also be wrong to generalize critical readings of financialization and immaterial labour under this conceptual flaw. Researchers like Randy Martin, Brian Holmes, and Maurizio Lazzarato amongst others attest to the opposite by their engagements with finance and its contemporary formations. Also, neoliberalism is not exclusively bound to finance. Hence, the following reading is more an extension of and discussion with critical contributions on financialization and immaterial labour. It takes its scope from the proposition that the developments, applications and repercussions described in critical discourse are to a large degree due to the impact of a new

[1] Randy Martin, "A Precarious Dance, a Derivative Sociality," in: *The Drama Review* 56:4 (T216) Winter 2012. New York University and the Massachusetts Institute of Technology, p. 69

creature[2] under the old name of finance. Based on the discussions in the previous chapters – which delineated organisational, technological, social, and political issues concerning finance – I hope to show that in order to understand the sea change that has affected the world we need to investigate the sea change in finance.

As I already discussed, I worked as a broker and trader in the mid-1990s with the aim to understand what finance was about from my own personal experience and from an artistic perspective. Form my first intense encounter on, finance – and this implies derivative markets as I refer to markets in which derivatives are traded – appeared to me less as an entity but as a metapractice built on original inventions from other fields. A child of many parents, finance as it appears to us today was born from a host of different intakes that had reached a level of maturity at a specific time in history – some developed independently, others in close relationship with each other. In order to make sense of what had 'happened' to me and what I had 'done', I felt the need to expand from reading art theory and a few financial and economic papers to a host of other fields that seemed to have had impact on the modelling of this new world of finance: among them computer technology, computation and information theory, cybernetics, mathematics and physics, macro- and microeconomics. In the late 1990s, theoreticians and scholars were intensifying the study of finance, and I began to also consult them: The fields they engage in were and are mainly sociology at large – from where the sociology of finance took shape –, science and technology studies, anthropology and ethnographic studies, art and philosophy. Due to my practice, I was also aware of the significance of legal aspects, as finance developed innovative approaches to contracts. Especially derivatives are contractual manifestations of extensive scope. Their terms and conditions may fit on a tiny slip of paper but can fill hundreds of pages in some cases that show a complexity of claim relations, which overwhelm even professionals who do not happen to be legal experts in a specific market or commodity.

My approach as artist differs in a practice-perspective from many scholars that have researched this field in academia or elsewhere.[3] Also in this instance, there are, of course, exceptions such as the late Randy Martin whose original calling and profession was dance, or the social scientist Robert Wosnitzer who was first a proprietary trader in bonds at a large investment bank. Especially Martin has thought deeply about what he calls the "derivative logic" and its relation to society and art. In his elaboration on dance and the derivative logic, he remarks, for instance, that

[2] In order to expose the material implications of creativity and creation as incorporation, the artist and writer Thomas Feuerstein adverts to the Greek *creas* (meat, flesh) as a semantic root for the Latin *creare*.
[3] The number of artists who had studied economics or worked in finance is longer and includes celebrated names like Jeff Koons or Timo Seghal, to name but two.

> [the] movement practices that help specify a decentred social kinesthetic in which decolonized bodies assert other modalities of risk are themselves derivative forms that share not so much aesthetic influence as attributes that are features of their self-production. In addition to postmodern dance, we can look at hip hop and boarding culture as practices sharing kinesthetic attributes and principles of mobilization that enable us to grasp political potentialities that inhere in the social logic of the derivative.[4]

The stimulus and perception I gained from the intellectual and physical experience as a broker and trader was crucial for my understanding as well as my further engagement (I am convinced that I would have given up on this inclination if I had only read literature to satisfy my curiosity. And I would have dropped out after a week had I not promised myself to stay as long as it was necessary to gain insight). Only later did I start to read a wide range of literature, at first in order to resolve my experience and develop an approach to artistic practice in parallel to my experience in finance (an approach I describe in Chapter 1) and later to 'test' my hypothesis that I developed from the artistic approach (that I delineate in Chapter 2). These two different work methodologies – that insist on their own respective logics, because art and theory have their own histories, traditions, practices and promises and are therefore irreducible one to the other – come together nonetheless in what I term the "aesthetics of resolution" (the topic of chapter 3).

I will therefore outline my conception of the derivative condition in this chapter on a more conversational level of narration, as the artistic and theoretical background has in parts been layout out in the previous chapters. However, the further I develop my reading of the derivative condition and the derivative paradigm, the more the necessity for grounding my specific propositions and hypothesis will increase and I will consult experts and thinkers in order to deepen the discussion. I will limit this discussion to a small number of experts and scholars, partly because the space does not allow an elaboration at length, but mainly because I think a discussion between a select few has advantages over an escalating treatise. I hope that this format allows my exploration to concentrate on the vital points of discussion and unburdens the reader's task that a topic might hold, which is unfortunately still at the margins of our intellectual debates.

[4] Randy Martin, "A Precarious Dance, a Derivative Sociality," loc.cit., p. 73

INTRODUCTION TO THE CONCEPTION OF THE DERIVATIVE CONDITION

„Money itself is a derivative of trust." — Jeffrey Epstein[5]

In a nutshell, the term "derivative condition" speaks of a mode of social relations the production of subjectivities and their dividual embeddedness in an artificial being that consists of technology, science, contracts, and policies. It derive from financial innovations and aims at the future; the term "derivative paradigm" describes the quantitative models, methodologies, and techniques that have become operational and the way these innovations are translated into market processes and eventually get introduced into social measures and affairs.

What is the perspective from which it makes sense to observe finance as a social field and its influence on societies and subjectivities when a purely economic outlook is insufficient as it lacks discrimination and clarity? My personal interest as an artist and activist (in the sense of working towards agency) was to understand finance and the market as a part of contemporary life and therefore as an 'agency' within the latter. And I stated to realize that derivatives were the key to understand this new form of social relations that has developed over the course of the last four decades. Derivative markets are a mode of relations processed by quantitative methods – a mathematical and technological machine that evaluates relations, which are generated to facilitate future encounters rather than past or present ones. Simmel's critique of money's quantification of value already makes a similar argument.[6] But in the derivative condition this process is radicalized towards the constitution of the individual and her social relations. The derivative condition is a regime of relations that shifts from value – qualitative aspects based on trust, for example – to price as the quantitative other to the event that can be calibrated (and recalibrated incessantly in order to meet expectations and anticipations concerning the future).

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[5] Jeffrey Epstein, is an American financier and philanthropist. I include the complete quote, as it is telling as to what Epstein subjects trust to: "The behavior of termites, together with ants and bees, is a precursor to trust because they have an extraordinary ability to form relationships and sophisticated social structures based on mutual altruism even though individually they are fundamentally dumb. Money itself is a derivative of trust. If we can figure out how termites come together, then we may be able to better understand the underlying principles of market behaviour – and make big money." See: http://nymag.com/nymetro/news/people/n_7912/index2.html, last accessed Sept. 15, 2016.

[6] For example in this passage of *The Philosophy of Money*: "One of the major tendencies of life— the reduction of quality to quantity—achieves its highest and uniquely perfect representation in money. […] Money is the most inadequate but also the most adequate object of our endeavours." See: http://www.waggish.org/2014/georg-simmels-philosophy-of-money-3-money-in-the-sequence-of-purposes/

The derivative pricing of contingent expectations serves as a resolution regime to stochastically move along (in parallel with) the uncertainty of the future. Hence, probabilistic mathematical recalibration computed to render prices of any conceivable outcome "creates" the future in the eye of contingency at any present moment of trading. The present as we know it has no bearing here; the moment it emerges (every moment), arrives as price to be instantly turned into the 'next' risk estimate. In a quasi-forensic application turned toward the future instead of the past, historic data – the quantified remnants of historic market events - enter a new cycle of profit calculations. This mode corresponds to Deleuze's demand, as possibilities are ruled out by probability theory and stochastics:

> The only danger […] is that the virtual could be confused with the possible. The possible is opposed to the real; the process undergone by the possible is therefore a 'realisation'. By contrast, the virtual is not opposed to the real; it possesses a full reality by itself. The process it undergoes is that of actualization.[7]

While the past succumbs to a stochastic reservoir for the quantification of future events, the present vaporises in the actualisation of the one price realised from the myriads of virtual prices that "inhabit" these volatile "galaxies" of risk options. These quickly fading "bodies" – the material embodiment of optionality – include a commodity termed the human capital. Thus, in what I call the derivative condition, contingent futures rendered as claims produce subjectivities and their relations that at the same moment "collapse"; it is the present – in which subjectivity and agency are born in the first place – which decays in microseconds. We might even be in need of a new word to describe this techno-epistemic framework and I therefore introduced the term "technowledge" to acknowledge both the human and non-human contributions to financial markets and its main task, the production of risk options to trade the future through volatile presents.

Risk has been a central category of modernity. It is therefore 'alive' in the art, the sciences and other fields, and not only in the economy and in markets. The term goes back to 16th century commercial language when the Italian "rescare" was adopted to describe the danger rocks and shoals near a coast constituted for the trading vessels of the early colonial era. Risk therefore origins right at the outset of the capitalist sphere. However, the exposure to hazard embedded in the term is not confined to the dangerous effort to sail the seas along the coast due to infant navigation skills. The actual prospect of such endeavours can be highlighted by the motto of emperor Charles V.: "Plus Ultra." The emblematic term defies the ancient imperative "Non Plus

[7] Gilles Deleuze, *Difference and Repetition* (New York: Columbia University Press, 1994), p. 211.

Ultra" – a warning more than a prohibition against going beyond the confines of the world known to antiquity whose limit was at the Pillars of Hercules near the Straits of Gibraltar.

But risk but is one face of the coin that made the modern endeavour so powerful. It had to find an equivalent to fulfil its potential as a promise on the future.

> Of all beings that have Existence only in the Minds of Men, nothing is more fantastical and nice than Credit; 'this never to be forc'd, it hangs upon Opinion; it depends upon our Passions of Hope and Fear; it comes many times unsought for, and often goes away without Reason; and when once lost, is hardly to be quite recover'd.[8]

This quote introduces Carl Wennerlind's investigation of the ascent of early modern credit during the English financial revolution of the 17th century.[9] From its roots in alchemy, amongst other sources, to the first applications of probabilistic reasoning and the introduction of organized credit circulation, he traces the development of a radical change of the social fabric:

> [For] credit to thrive, people have to learn how to respect and honour contracts and to trust that others will do the same. Commitment mechanisms and legal frameworks need to be developed and tailored to assist in the formation of honesty and trust. Formation of such a culture of credit thus necessitates a considerable behavioural transformation. […] many early modern philosophers considered the establishment of such a framework the very essence of modern society.[10]

This radical shift brought forth a social order based on instability, chance, and uncertainty – "the very meaning of casualty," so Wennerlind. And he continues,

> Because credit was built on what was so widely recognized as a porous foundation, nothing short of an epistemological revolution was necessary for people to understand and embrace it, and to overcome the trepidations about basing both commerce and the state on what was fundamentally a mental construct."[11]

An infinite world was waiting in which science arranged for infinite ways of 'improving' nature and society. Credit was to become the lubricant that made ruthless and risky expansion endeavours possible (or, in economic terms, probable). Those who were able to unleash it become the new rulers of the world. Here is not the space to enlarge upon Western (colonial) history and its boom and bust cycles. But it is important to remember that already the 17th century saw credit as an operative mode of economic

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[8] Wennerlind's quote id from: Charles Davenant, *Discourses on the Publick Revenues, and on the Trade of England*, (London, 1698), pt. 1, discourse 2, 38.
[9] Carl Wennerlind, *Casualties of Credit. The English Financial Revolution, 1620-1720*, Cambridge: Harvard University Press, 2011).
[10] Carl Wennerlind, loc.sit., p.1.
[11] Carl Wennerlind, loc.cit., p. 2.

and political power.[12] Here is also not the place to examine how it has historically profited from financial innovations, except for noting that the different stages of the industrial revolution would not have been possible without credit accommodation and the design of "aleatoric contracts, including games of chance and insurance, […] were part of the new efforts to control and harness risk and uncertainty"[13] for private and state investment.

This defiance of boundaries – to which both risk and credit attest – is, I would argue, for better or worse the core of the modern constitution, which is defined by reorienting the perspective from past wisdom and eternal glory to future opportunities and riches. It took pride in transgressing the limits of the older world not only commercially but also philosophically and socially. I believe it makes sense therefore to extend the notion of risk as implicit in many other human endeavours. One root can be seen in the humiliation by what was to become the origin of modern science: the Copernican insight that the Earth revolves around the sun and not the other way round – the first of the modern revolutions. A further transitory event was the Lisbon earthquake on All Saint's Day 1755, which was identified as a major event in the disruption of Western faith in a benevolent God. It introduced a profound feeling of uncertainty (for Voltaire the incident proofed the absurdity of Leibniz' "best of all possible worlds"). The philosophers of the Age of Enlightenment like Immanuel Kant turned to study natural instead of supernatural causes for such events. The conclusion was drawn that 'perfect information' does not exist – that there is no deity and no divine grace at least not in any communion with humans. To make a long story short, uncertainty entered the world. And with it risk entered, not only as hazard but also as chance and fortune, as the earliest studies on probability by Fermat, Pascal or Huygens show.

When it comes to art and how it evolved in the West, I would go as far as to call risk a fundamental value (with an ironic turn on the economic meaning) because since the Renaissance and even more profoundly since Modernity and the avant-gardes, artists have engaged in revolutionizing perception, perspective, style, and *Weltanschauung*. They constantly strive for insurrections and radical changes in their own field – in which they not only produce but also account for the "results" (artworks).

[12] And did so at length, as this quote from Wennerlind, Casualties of Credit implies: „Facing a situation of rapidly deteriorating public credit in 1710, the [British] state dedicated all of the anticipated profits from newly acquired monopoly on the slave trade to Spanish America in support of the national debt. Hence, in as much as the modern state was fundamentally based on authority and violence – the power to tax, fight, punish, and colonize – so too was the Financial Revolution." p. 5.
[13] Carl Wennerlind, loc.cit., p. 4.

In relation to risk the whole process of *being an artist is to be the event* that I delineated in Chapter 1 equals a notion that I conceive of as "embodying risk." A work of art cannot be achieved by mere engineering – since the Renaissance the ancient *artes* have been separated into *ars* and *techne* (science and art). Art is in this perspective a practice that entails a leap, a jump into the unknown, into an abyss. It is a perception of crisis – along self-introduced crisis – within which a new path, an opening is found. There is hazard and chance at the same time. Experience does not suffice, even when it leads the way. Art needs to go beyond experience; serendipity is sine qua non. Randy Martin's narratives of dance and skateboarding are wonderful examples of risk-taking on a wide array of levels within the current "social logic of derivatives." Such forms of risk (at the level of play) might look rather innocuous or even insignificant to the outsider who might value the wagers on property or the entrepreneurial gamble higher. But we shouldn't forget that, as a result, new terrain is obtained, new perspectives, experiences, and outlooks not only in art but also for life itself – which includes their commodification and commercialization. Art has been a social engine since the early days of modernity through which we perceive and comprehend our world, partly because artists do not invest in averting or hedging risk but embody risk. In art, therefore, risk is fundamental and in that specific instance, science, economy, and art are akin. They form the triple star of modernity, the "trinity of the future god".

In the economy, and in finance especially, the embodiment of risk is a collective effort since the first stock company in 16th century Amsterdam. But the capitalist collective (the company) gets together in order to distribute risk both for limiting risk exposure and profiting from risk taking. From the corporation as a nonhuman and immortal (in the biological sense) embodiment to the methodologies of insurance to the first derivatives, we overlook a human endeavour geared towards abstracting risk in the market and externalizing it to bodies that are left to incorporate what the market rationale rejects. (The economic notions of "rationality" as well as "externality" are examples of its affective power).

The shift in rationality and the advent of probability theory in its wake had profound influence on decision-making, However, Niklas Luhmann states:

> The future […] is reconstructed by an oscillator function fixing possibilities of bifurcation. If, and only if, a distinction is accepted can one cross from one side to the other […]. This applies also to the distinction between the system and the environment or the temporal distinction between the past and the future. The perspective of (future) oscillations gives uncertainty a specific form. It does not make the future predictable but it has the function of coping with unpredictable events. It replaces the unknown with a binary distinction. […] This helps to transform

> irritation in information as time goes on and to maintain or even enlarge possibilities of decision. [They] combine memory and oscillator function in highly selective ways. They integrate thereby their past and their future without presupposing this integration as given by nature or by creation. They do not implement a well-ordered world. They perform a contingent handling of contingencies, and only secondarily may they be described in terms of good or bad, right or wrong, safe or risky.[14]

Even though current research that examines decision-making (which involves risk in real-life settings) from chaos theorists like Benoit Mandelbrot[15] to behaviourist economists like Daniel Kahnemann and Amos Tversky[16] to randomness, risk and uncertainty researchers like Nassim Taleb[17] clearly states that there is no definite relation between former trends and current transactions. Statistics as well as forecasting are prone to error. They are a gigantic epistemic system of management by mathematical analyses and algorithmic practice set up to find traces that connect the past with the future. They generate 'sense' in closing the gap of presence as it were, i.e. extrapolate risk from uncertainty to facilitate transactions with (positive) return.

On the social and human front, such epistemic cultures where adopted to render them applicable to the decision-making processes of the most valuable resource: human capital. This concept commodifies individual performance into a profit-seeking endeavour. But it was also conceived as extending beyond the economic rationale, as Michel Feher shows:

> [...] not all investment in human capital is for future earnings alone. Some of it is for future well-being in forms that are not captured in the earnings stream of the individual in whom the investment is made." In other words, following Irving Fisher's distinctions and correlations among monetary, real, and psychic incomes, Schultz and Becker make it clear that returns on human capital cannot be understood as a mere influx of money. According to Becker, investments in human capital such as 'schooling, a computer training course, expenditures in medical care, and lectures on the virtues of punctuality and honesty' are indeed likely to 'raise earnings,' but they can also 'add to a person's appreciation of literature over much of his or her lifetime.'[18]

We will come back to the impact of economic and financial models and calculations on the social field. But to continue with financial markets per se, one very successful

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[14] Niklas Luhmann, *Modern Society Shocked by its Risks* (Hong Kong: The Social Sciences Research Center, The University of Hong Kong, 1996), pp. 12-13

[15] See: Benoit Mandelbrot, *The (Mis)behavior of Markets: A Fractal View of Risk, Ruin, and Reward* (New York: Basic Books, 2004)

[16] See: Daniel Kahnemann and Amos Tversky "Prospect Theory: An Analysis of Decision under Risk", *Econometrica*, XLVII,1979

[17] See: Nassim Taleb, *The Black Swan: The Impact of the Highly Improbable* (New York: Random House, 2007)

[18] Michel Feher, "Self-Appreciation; or, The Aspirations of Human Capital," in: *Public Culture* 2009 Volume 21, Number 1: 21-41, p. 26. doi: 10.1215/08992363-2008-019

theory of (option) pricing that outright altered decision-making in financial markets is the Black-Scholes-Merton model introduced in 1973.

> Black-Scholes was really what enabled the exchange to thrive. […] It gave a lot of legitimacy to the whole notions of hedging and efficient pricing, whereas we were faced, in the late 60s-early70s with the issue of gambling. That issue fell away, and I think Black-Scholes made it fall away. It wasn't speculation or gambling, it was efficient pricing.[19]

The change, though, was not due to the truth of the model, i.e. its applicability in pricing options in the market. Quite to the contrary, it showed its imperfections right from the start. After all, it was a mathematical theory that was based on perfect conditions that did not exist in reality. What happened, quite counter-intuitively, was that the model shaped the market to follow its mark. The *technowledge* of pricing changed its 'world'. In the course of a few years, trading shifted from reciprocal face-to-face interaction to a more mathematically guided practice. McKenzie and Milla note that "Black, Scholes, and Merton's model did not describe an already existing world: when first formulated, its assumptions were quite unrealistic, and empirical prices differed systematically from the model. Gradually, though, the financial markets changed in a way that fitted the model."[20] Or, as Michel Callon put it:

> Yes, *homo economicus* does exist, but it is not an a-historical reality; he does not describe the hidden nature of the human being. He is the result of a process of configuration. […] Of course, it mobilizes material and metrological investments, property rights and money, but we should not forget the essential contribution of economics in the performing of the economy.[21]

Moreover, derivative pricing had an enormous influence on the role of leverage as a means to produce risk potentials to rake in future profits. This fundamental premise of the successful implementation of Black-Scholes-Merton clearly shows a further technopolitical aspect of the development, because purchasing stock on credit was illegal until the Nixon presidency when the law against borrowing stocks on debt was repealed. A temporal space of navigation has since evolved that simulates the gravitational space and its attraction of bodies. Probabilistic real-time scenarios power the attraction of leveraged transactions.

Uncertainty has become the realm of economics par excellence in a world in which every action is geared towards the future to render profit – as the Austrian economist

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[19] Donald McKenzie, *A Engine, Not An Camera*, loc.cit., p. 158

[20] McKenzie and Milla note that "Black, Scholes, and Merton's model did not describe an already existing world: when first formulated, its assumptions were quite unrealistic, and empirical prices differed systematically from the model. Gradually, though, the financial markets changed in a way that fitted the model," loc. cit. p. 137

[21] Michel Callon, ed., *The Laws of the Markets*, (Hoboken: Wiley-Blackwell, 1998), pp. 22-23

Ludwig von Mises postulated in his treatise *Human Action* (1949). Or, in other words, uncertainty, as the constant companion of every action, has to 'enter into negotiations'. Frank H. Knight, an early Chicago school economist, established the framework for this negotiation when he established the distinction between uncertainty and risk (*Risk, Uncertainty, and Profit*, 1921). For the further development of finance, this distinction proved seminal (especially for a neoliberal world grounded in market forces as it re-emerged in the early 1970s). Knight's work is a climax of theoretical approximation since the term risk appeared for the first time about 500 years ago. (Another seminal work was Louis Bachelier's *Theory of Speculation* (1900). It was utterly overlooked and only rediscovered in the early 1960s; it therefore didn't have a direct impact on finance).

Knight's distinction is fundamental because while uncertainty cannot be modelled, risk can – or at least that is what Black-Scholes-Merton and other pricing models attempt by calculating the price with the variable volatility. In Knight's own words, "It will appear that a measurable uncertainty, or "risk" proper […] is so far different from an unmeasurable one that it is not in effect an uncertainty at all."[22] Uncertainty cannot, but risk can be quantified.

Contrary to risk management, what I term the production of risk is a measure beyond methodologically applied knowledge to face uncertainty along volatility (which corresponds to risk in derivatives trading). No trader faces uncertainty by sheer and adamant hazard, i.e. by direct and unchecked confrontation with uncertainty (and if it were only due to the market as a forum in which uncertainty speaks through the voice of risk). Metaphorically speaking, risk is about pursuing a lead not of past traces but of future ones, as if one could quasi materialize a trace becoming. The more 'risk particles' – we will further refer to them as "risk options" – materialize by quantification (that is, all derivative prices traded), the less uncertainty seems to be encountered on the way forward (a relation between liquidity and price) and the more we seem to *know* about the future's actual but 'fleeting approach'.

When communication technology, cybernetics, computation and economic modelling – like the Black Scholes Merton model (BSM) – finally converge in the quantification of risk in 1973, it sparked a whole new industry and a whole new logics of productive circulation – derivative finance. There were other factors as well and in the same year: political ones like the collapse of the Bretton Woods agreement and the oil crisis; institutional ones like the founding of the Chicago Board Options Exchange, legal ones like contractual commodification and standardization, to give but a few examples. It is a

[22] Frank H. Knight, *Risk, Uncertainty, and Profit* (New York: August M. Keller (Reprint of Economic Classics, 1964), p. 20.

rarely discussed but fascinating turn by which the attitude towards derivatives was adjusted from an immoral gamble on the economy of a country – and even an unpatriotic act against a country's wealth – to a scientifically sound method of evaluating risk, i.e. volatility – even though the science applied was developed in casino gambling by scientists and future finance wizards such as Edward E. Thorp (I would like to refer German readers to the interview with Thorp in *Making of Finance*.[23]

But there is another narrative that discovers the derivative claim outside finance as a social move, a quality that is arguably older as its quantitative correspondence in finance. As I remarked above, Randy Martin has meticulously explored the promise of a "derivative sense" of which the following passage gives a short introduction:

> When taken as a broader social logic, and not just as an activity that takes place within one sector or domain called the economy, the dynamics of the derivative can be seen across all manner of human activity in ways that engender mutual indebtedness, interdependencies across different times and places, and a swelling socialization of what people take to be and expect from life, history, and their future. Rather than a moral compromise to be avoided, the social entailments of indebtedness are the basis of political engagement. What we call identity is certainly an attribute of self that gets bundled, valued, and circulated beyond an individual person.[24]

HYPOTHESIS: FINANCE IS NOT A PROMISE. IT IS A CLAIM

When I propose to read finance as a claim rather than a promise, this is also to say that finance is about claims rather than promises. However, finance in general and derivatives in particular are often regarded as promises. Recently, Arjun Appadurai explored "the link between derivatives and language [that] turns on the question of promises."[25] And even though he beautifully lays out the specifics of the notion of promise in relation to contemporary finance – including non-fulfilment of the promise intrinsic to derivatives – I suggest we could gain in understanding by differentiating between an institutionally secured assurance of fulfilment (for both sides of the transaction and therefore to some degree mutually) and the myriad ways how regimes

[23] Avanessian and Nestler, loc.cit.
[24] Randy Martin, "A Precarious Dance, a Derivative Sociality," loc.cit., p. 67
[25] Arjun Appadurai, *Banking on Words. The Failure of Language in the Age of Derivative Finance* (Chicago: The University of Chicago Press, 2016), p.6. Appadurai deconstructs the idea of promise in finance. An example of a purly affirmative view of derivatives as a promise for the common wealth from the perspective of a person invested in their construction, see Richard L. Sandor, *Good Derivatives: A Story of Financial and Environmental Innovation* (Hoboken: Wiley, 2012).

are forged that facilitate, exercise or coerce transaction and fulfilment in an environment that is characterized by competition.

The specific term for fulfilment in finance is settlement. The specific case of derivatives is that they are highly artificial objects for the settlement of very specific claims. On the surface, they resemble the promise of insurance, i.e. the promise to redeem a loss for the payment of a premium (paid one-off or in instalments). However, they are not one-sided and directional, meaning that a client insures an immaterial or material good with an insurance entity on the basis of the latter's aim to break-even in the long run. If conceptualized as a promise, derivatives constitute a double-bound promise in which both sites of the trade take risk in the short-run. There are always specific negotiations of risk with each derivative while insurance is based on large populations and the premium is not demanded on the basis of the evaluation of the specific case as such.

Arjun Appadurai develops a critique of financial derivatives and their stakes in the promise from the perspective of language. He develops his argument "following Austin, as one of the class of performances, linguistic utterances that, if produced in the right conditions, create the conditions of their own truth."[26] But we find ourselves in a technological environment whose language is mathematics. Today, there are only few of those enunciations left that derive directly from performative utterance in Austin's sense. Donald Mackenzie introduced the term Barnesian performativity to distinguish a form of performativity in which practice follows theory. His does so to distinguish the success of the Black-Scholes-Merton model (BSM) as a market-shaping force from other forms of performativity. The language of BSM is mathematical; it introduced mathematics into finance on a new level. Robert Merton himself recounts an anecdote that illustrates the rapid 'take-over':

> By 1975, every single person on the floor of the [Chicago Board Options] exchange was using the Black-Scholes formula for pricing and determining the position mixes of options to hedge their risks. Texas Instruments created a specialized hand-held calculator. It had the formula, the hedge ratios, everything, in it. In no time at all, Black-Scholes went from theoretical to something that everyone used. Not because they were academically interested, but because it was a necessity. It was need that drove option traders on the floor of the CBOE to do that. It not only gave the price, but it also gave the risk. So all the guys on the floor knew 'If I go long on this many of these options, and short on this many of those options, with this ratio, I'm balanced.' Well, that was critical or they couldn't operate. Right from the beginning, that happened. In terms of speed of adoption and depth of adoption, I don't think there's anything quite comparable.[27]

[26] Arjun Appadurai, loc.cit., p.6.
[27] From: http://mitsloan.mit.edu/newsroom/articles/black-scholes-merton-a-40-year-revolution-in-finance, last accessed August 4, 2016.

It was a trader named Joseph Ritchie who had programmed the formula into a Texas Instruments hand-held calculator for his own use. Before he left options trading, he gave his calculator to another trader, Steve Fossett who subsequently became the biggest trader at the CBOE. Ritchie later commented on his motive: "A trader on the floor with the simplest programming calculators in 1976 instantly became a one-eyed man in the land of the blind."[28] The language had started to turn from speech performance through language (open outcry, which would live on for another 30 years but with diminishing impact) to the speech of algorithms.

> A notion of epistemic uncertainty that is based on the promise (made not only by high-frequency traders, but in algorithmic cultures in general) that objectivity and profitability can be realized through the use of numerical codes and material infrastructures. […] The extent of this promise becomes particularly obvious when it remains unfulfilled, or when it is contradicted in effect by algorithmic practices – i.e. when algorithms fail. [...] the events of the Flash Crash are a particularly apt example. The event has been explained by so-called 'hot potato effects,' where the same positions were rapidly passed back and forth by trading algorithms […].[29]

And Appadurai further acknowledges that the trader's enunciation "It's done,"[30] which completes the trade, is only an utterance among many such utterances that are built on each other. Derivatives are not only written on the underlying, they are written onto each other. In his words, "[…] it allows for the repeated commodification of prior promises by new promises, thus diluting and disseminating the force of the promise across many players (traders).[31]

However, these few quotations illustrate that promises in financial markets are elusive at best. Finance seems more a persuasion of promise as regards a wider politics of social integration and social engineering, in which the "promise" to fulfil an obligation is a systemic issue rather than a personal one. The "promise" is a framework in the setting of the institution known as finance constructed to organize the processing of claims.

Hence, the notion of promise seems to become impotent at the moment it enters the actual machinations of finance. Clearly, if one consults what happens on the trading floor and in the algorithmic trading space the result of this examination will show an incessant exchange that is less to do with promises and everything with claims. In contrast to the promise and its reciprocity or at least its fulfilment, a claim is a

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[28] In an interview with Trader Monthly Magazine, March 2007, entitled "The Options King."
[29] Ann-Christina Lange, Marc Lenglet and Robert Seyfert, "Cultures of high-frequency trading: mapping the landscape of algorithmic developments in contemporary financial markets," *Economy and Society* Vol. 45/2, 2016: 1– 17, p. 13. doi.org/10.1080/03085147.2016.1213986.
[30] See Chaper 2, fn 78.
[31] Appadurai, loc.cit., p. 8

competitive statement, a contradiction to every other claim, an assertion. What sense would a market have if it were not for negotiating contra-dictions?

Jon Roffe, in his book-length essay *Abstract Market Theory*, which is to a large degree a discussion of Elie Ayache's philosophy of the market, implicitly attests to when he, quoting from Ayache's *The Blank Swan. The End of Probability* (2011), argues:

> […] Since the pricing process does in fact exist, and since the writing of a price does make a difference, we are led to two counter-claims [against the two traditional concepts of price]: first, that the pricing of derivatives has no intrinsic relation to equilibrium (and thus to the supply-demand dynamic); second, that the pricing-process is not oriented by any pre-existent endpoint. Pricing, being contingent, is a passage without a fixed conclusion. […] if derivatives prices were fated to be no more than deterministic functions of the underlying price and time, there would be no point in trading them and inventing them. Only if the derivative is traded at variance with its theoretical value V(S,t) does it really exist and create an event. Only then can its value become its price and can the ability to value it become the capacity to trade it.[32]

Even though the promise and the claim are connected by the uncertainty of the outcome to which they are oriented, they differ as acts. While the promise is a binding pledge, the claim is an assertion of a right in the face of possible contradiction. Hence the latter is not a bond (as is the promise) but an appropriation (at least at the moment of utterance). The trading environment – whether the trading floor or the algorithmic trading space – are environments constructed for the assertion of claims, which accounts for the highly competitive conduct experienced in the market. Again, the institutional character of finance has to resolve itself as a promise, as confidentiality and trust have to be delivered for the system to function – claims need to be cleared and/or rolled over in order to attract new claims to be traded. This is a promise that has to be fulfilled for the whole system to function. A telling example of the capitulation of systemic promise was the crisis of 2008 triggered by the failure of the investment bank Lehman Brothers (which was the result of toxic assets from the subprime market): banks knew that (also) the books of their competitors held toxic products – because they were all claiming profits within the competitive landscape of subprime mortgages and their complex derivatives – and therefore instantly mistrusted each other. This in turn stopped the circulation of money and credit on which financial markets rely (credit is of course a promise). The 2008 catastrophe was a crisis of trust because the 'industrial standard' of promise was not just corroded but annihilated by the extreme proliferation and differentiation of high-risk claims.

[32] Jon Roffe, *Abstract Market Theory* (Basingstoke: Palgrave Macmillan: 2015), p. 8

As regards market operations, Ayache proposes to speak of contingent claims rather than derivatives because he wants to prove that derivatives unfold their own market, i.e. they are not determined as a promise of the underlying's value. I quote Roffe again:

> […] the fact is, as Ayache notes, that when options are priced and traded, this is done outside of any certainty, beyond any epistemological warrant. The next price is the product of a contingent act, and for that very reason beyond the reach of true and false: 'The market doesn't know the future.'[33]

One might add that the market as a space of trading is therefore not the realm of promise because how should it account for a promise outside "the reach of true and false" even at introduction? A promise is introduced with the trajectory of adhering to it, with acquitting the duty incurred. In contrast, a claim is per se not bound to 'truth'. The claim is a virtual statement (in the Deleuzian sense) that is actualized and thus justified or not. But it is also an assertion whose 'truth' unfolds in the instances of its negotiation after its introduction into the 'playing-field': the claim is a tool for the construction of reality, i.e. the construction of justification, and eventually truth.

Roffe extends on the feature of the market as a non-site (even though it is a location) of certainty. It is a space that opens up at the margins of knowledge and moves towards the unknown. It 'oscillates' around the empty core of the bottomless pit – to metaphorically return to the trading floor I discussed in chapter 2. Every claim is an appropriation of a not-yet actualized real, and price is its origin.

This is not a simple negative feature, but rather the positive absence that demonstrates the raison d'être of the market: "'One doesn't step into the market because one knows something, but because one does not know something and cannot predict something. (Why would one exchange if one did know?)' We are returned here to the rejection of the redundancy that afflicts the market in the orthodox model, since it is the very fact that the trader does not know what the derivative is worth that a price is written."[34]

Here the claim reveals its contingency, its wager on the present, in contrast to the predictive realm of the underlying and its incoproration into value. Price is always traded now, not in the future. As Roffe argues, "the contrast with value reveals itself here, for […] all values make a kind of conditional demand on the future – they predispose – whereas prices manifest in a relationship of pure indifference to what came before and what comes next."(35) But the contingent claim aka derivative is not indifferent to all the other (myriads of) contingent claims that make up its market at every moment. A feature of the contingent claim is its generative motive: A claim is not

[33] Jon Roffe, loc.cit., p. 25
[34] Jon Roffe, loc.cit., p. 25

a single entity; it 'lives' within the competitive field with other claims. It would not come into existence if it weren't for answering to another claim and for its capacity to differentiate negotiation. Every claim is an assertion at the margins that defines its position and thus generates opposition by proximity. Every claim results in a next claim. Every expectation (expressed as a quantitative definition) bears a further expectation on top of the first:

> Trading is more fundamental than probability and doesn't need probability to frame its randomness. Enough to consider the efficient market hypothesis and the conclusion will be that the path of price has to be random at any time scale – which just gives Brownian motion as the simplest case. This absolute value of the market of a certain asset […] is translated into the price of the contingent claim written on that asset, and then the randomness of price of the latter, which now becomes traded, is translated in turn into the price of the next, so on and so forth, in an argument which I tried my best to transplant from time into place, from the metric of probability space into the topology of the event. Money and writing are the only reason why this is so, because they entail trading. They are present both at the beginning and at the end. No event disrupts the market from outside; the market itself is the continual event. This is the reason why, contrary to probability, it is commensurate with the event. [MY MATTER, p.6]

Ayache delineates the process by which derivatives are traded on the paradigmatic model of BSM:

> [...] there is no meaning for the price of a traded asset separately from the notion of the volatility of that price, and that there is no translation of that volatility other than by the market price of a derivative written on that asset. [...] Instead of asking a statistician or an econometrician to hand us the volatility of the underlying asset price in order to use it as an input in the BSM formula and get the value of the option as an output, we read the option price from the options market, and we invert the BSM formula against it, in order to imply (or reverse-engineer) the value the volatility must have, which we subsequently call *implied volatility*." [MY MATTER INTERVIEW ANSWER p.1-2]

Hence, the realm of derivatives – of contingent claims – is not extensive in space but intensive in time.[35] It collates the magnitude of anticipations of which the complexity of all claims accounts for:

[35] Ayache "One specific issue around BSM is that it is a failed model that nevertheless is applied. Contrary to science where a proven fault would disqualify a model, BSM enjoys great popularity in option pricing. What Philippe Henrotte calls "re-engineering" – the financial term is implied volatility – has become the mode of operation instead of the introduction of a new model. The reason is not scientific but pragmatic: that the model works under conditions of trading implied volatility. Henrotte: "the breakthrough for everybody was the crash [of 1987] because that's when this smile issue became a big problem and this afforded a lot of time and resources. The smile issue means that you couldn't simply price the huge variety of options in the market with Black Scholes. Black Scholes is really designed to price one option and to make consistent pricing of two options with different strikes, different maturity, it just doesn't work [derivative pricing needs to price many more options than two]. So, you've got to expand the theory to make it consistent. Before the crash, it was extremely bad but after that, it was very

> The whole of the market, at once, and in all of its constitutive intensive quantities can be thought as *an intensive quantity itself*, a unique, perpetually metamorphosing Price. At this limit, there is no difference between price and implied volatility, since to think the market in this way is to no longer make reference to a given price or price-process against which other processes are co-ordinated, that is to say to a fixed point of view. It is to think of the market as an absolute surface, united in its absolute multiplicity by auto-survey. This point dovetails with the evental character of price […], for, strictly speaking, no price can ever be repeated. This is because any given price is recorded on a surface and in this way changes it. To repeat the same price – where price is now grasped at the moment of its advent – can never have the same effect on the market surface itself. (Roffe, 71)

The chain of contingent claims and their origin in the underlying starts with the basic experience that an asset, such as a stock or bond, does not move linearly in time. Rather, it moves 'up' or 'down'. The volatility of this movement is the performance of uncertainty, which for the trader, investor, et al. manifests as risk. Hence, trading volatility (risk) itself is a way to deal with risk implemented by the definition of specific expectations and anticipations as regards the movement of the underlying (the stock, bond…) which results in a claim about volatility, in other words in a financial derivative. Elie Ayache explains the chain that is provoked by this first move and the reversal of financial practice it brought about:

> Why do I need derivatives? When I buy an apple or an orange I buy it to eat it, right? I just buy it, so why are derivatives important? I think that the answer lies in the dimension of time because if you are buying an orange, it is to consume it immediately. So there is no time dimension to it. Whereas as soon as you start talking about financial markets [...] you are going to buy a stock or bond. Even though the stock and the bond are basic instruments that are not derivatives, they nevertheless have a time dimension because basically you're buying the future dividends and the future welfare of a company or you're loaning money to a company, a state, etc. Because they are financial instruments and finance is something that goes through time, these instruments by themselves introduce a dimension of time. Now, if you are starting to trade a simple stock or a simple bond and you have the dimension of time – which you did not have when you bought the orange that you consumed on the spot – by necessity you will have to start to care about how the price of that stock or that bond is going to behave in time. So, the trajectory of the price becomes the commodity now and no longer just the stock or the bond. To me, that's the start of derivatives. Because you have the time dimension there is no way that you could trade the stock and the bond and not at the same time trade derivatives that pay depending on whether the stock goes above a certain level or below a certain level. So, [...] can we dispense with derivatives? I don't think we can dispense with them as soon as you start trading financial instruments. I cannot define a market without saying that I have the underlying stock or bond together with all the derivatives written on it that trade at the same time because there is, to me, no definition of price without at the same time having in mind the volatility of price. They go together because that is what the market is: you have a price and the volatility of price, which means that you have the

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clear that it wouldn't work. You would need some more thought, and a lot more research and resources." From: Interview with Elie Ayache and Philippe Henrotte, 2014. Pleases ee fn 52 for the reference.

> option written on that price and if you have the option therefore you have the price of the option and if you have the price of the option you have an option written on that option and so on. (Ayache in Ayache/Henrotte Interview)

To conclude, the claim does not express "I agree". The claim says, "I disagree", "postulate my claim against yours." The trader's utterance "It's done" is the affirmation of the acceptance of a new claim thrown into the market against another, rather than a promise of fulfilment. The claim is not a concilliary statement, it is a competitive one: It says: "I take this space, you clear the way." "I assert my right." If we wanted to adopt the term promise for trading, we could only do so, I would argue, under the premise of a perverted promise; a promise without reciprocity that therefore violates the intrinsic value of the promise. But why don't we instead use the term that clearly speaks the language of assertion, appropriation, seizure, and even war? A term that cannot be thought of but as one infused with competition? The term claim describes financial transaction practices more fully and directly than the term promise. It is also much more attuned to the notion of the derivative condition in which the competition between all reigns over reciprocity.

With a rather sweeping remark we can say that the project of capitalism has successfully exploited the notions of giving and reciprocity – that speak through the promise – into the subjective entrepreneurial fulfilment of competitive advantage – the claim to a right that is at the same time denied to others. But capitalism has at the same time gone through another of its pupations from which it has spread new wings. As Michel Feher, in his reading of the works of Gary S. Becker and Theodor W. Schultz on human capital, argues, the neoliberal agenda that planned to 'foster' the profit seeking entrepreneurial spirit in the individual collapsed into the appreciation scheme of a financial market that dissolves the individual though its pervasive appreciation scheme:

> In [Becker and Schultz's) view, investments in human capital should essentially be analysed in terms of the returns they produce, that is, in terms of income. As they see it, the calculations of someone investing in his or her human capital are ultimately of the same order as those of a neoclassical consumer seeking to maximize his or her utility and of a company looking for long-term commercial profit. However, in the neoliberal world of globalized and unregulated financial markets, corporate governance is concerned less with optimizing returns on investment over time than with maximizing the distribution of dividends in the short run. Accordingly, its major preoccupation is capital growth or appreciation rather than income, stock value rather than commercial profit.[36]

[36] Michel Feher, loc.cit, p. 27.

And Feher continues in his essay Self-Appreciation; or, The Aspirations of Human Capital, which in all brevity gives a brilliant history of neoliberalism: “In other words, insofar as our condition is that of human capital in a neoliberal environment, our main purpose is not so much to profit from our accumulated potential as to constantly value or appreciate ourselves — or at least prevent our own depreciation.”[37] The ‘promise’ of such a purpose can only be achieved by issuing claims. Hence, the condition we are in has changed its course radically. The market claims the future and everyone included in the market not only claims the future but also becomes a claim on the future. This is where in all uncertainty, risk becomes the resource, the necessary and urgent intervention, because every claim is an open assertion against contradiction. The claim – in contrast to the promise, which opens to the bond – opens to competition. A claim is not consumed, like a promise, it produces. While the promise evokes its power of reciprocity against uncertainty and speculation, the claim is a speculative effort to allocate and appropriate the future within an extremely volatile environment. This extends the market towards the production of subjectivities whose becoming is set by the placing of claims in volatile circulations:

> […] this is something on which Foucault insists — if we take seriously the subjective apparatus of human capital, we can see that neoliberalism in fact treats people not as consumers but as producers, as entrepreneurs of themselves or, more precisely, as investors in themselves, as human capital that wishes to appreciate and to value itself and thus allocate its skills accordingly.[38]

HUMAN ACTION

In every sphere of human action, grammar is the establishment of limits defining a space of communication. Today the economy is the universal grammar traversing the different levels of human activity. Language is defined and limited by its economic exchangeability: this effects a reduction of language to information, an incorporation of technolinguistic automatisms into the social circulation of language.
—Franco ‘Bifo’ Berardi[39]

If the claim (and the chain of claims it provokes at instant) is at the core of financial action, we should be able to detect its root in economic theory. Even though Ayache argues from the positions of philosophy (the perspective of his theory of contingency) and science (the market as a technology of the future), the claim as such is neither a philosophical nor a scientific term. I would therefore argue that the claim constitutes the

[37] Michel Feher, loc.cit, p. 27.
[38] Michel Feher, loc.cit, p. 31.
[39] Franco ‘Bifo’ Berardi, *The Uprising. On Poetry and Finance* (Los Angeles: Semiotext(e), 2012), p. 158

underlying perception of the neoclassical conception of the human condition. It develops from the subjective theory of value (as for instance formulated by Carl Menger in his Principles of Economics, 1871)[40] that places strong emphasis on human action as the forward-looking fundamental attitude in a market setting (Menger also contributed to the concept of marginal utility). It is a rational choice model whose successful outcome is decided in the speculative field of a competitive market arrangement where claims are pitted against each other.

This speculation encounters the unknown in a realm that is clearly, narrowly and robustly structured around the specific conceptualizations, contractual formulations, and quantitative praxeologies of risk action. Ayache does note refer to economists and social theorists like Menger or Ludwig von Mises.[41] However, von Mises' conceptualization of "action" as a forward-looking subjective act whose very realm is the exchange in the market precedes Ayache both economically and theoretically. The following statements by von Mises could be taken directly from Ayache: "Future needs and valuations, the reaction of men to changes in conditions, future scientific and technological knowledge, future ideologies and policies can never be foretold with more than a greater or smaller degree of probability. Every action refers to an unknown future. It is in this sense always a risky speculation."[42] "Human action […] is characterized by the absence of constant relations."[43]

Without noticing – or at least without clarifying at any point – Ayache's philosophy rests heavily on Menger and von Mises' economic interpretation and theorization of Human Action (the title of the latter's most noted book in the English language). This is not merely a historic anecdote. Rather, Menger and von Mises were instrumental on building the cornerstones of the ideological framework that became known as neoliberalism. In its economic underpinnings, Elie Ayache's philosophy of the market can be traced to the line of thought known as the Austrian school of economics. This influential school started with Carl Menger, Friedrich von Wieser (who invented the term „Grenznutzen" (marginal utility) and Eugen von Böhm-Bawerk (whose work on interest became formative); carried forward by Ludwig von Mises and Friedrich A.

[40] Wikipedia, referencing Menger (and mentioning William Stanley Jevons, Léon Walras), proposes the following short description: "The subjective theory of value is a theory of value which advances the idea that the value of a good is not determined by any inherent property of the good, nor by the amount of labor necessary to produce the good, but instead value is determined by the importance an acting individual places on a good for the achievement of his desired ends." https://en.wikipedia.org/wiki/Subjective_theory_of_value
[41] Ayache does not quote economists because he aims at the metaphysics of the market; he mentions Richard von Mises (Ludwig's brother), a mathematician who contributed to the frequency theory of probability.
[42] Ludwig von Mises, *Human Action* (Auburn: Ludwig Mises Institute, 1989) ,p. 106
[43] von Mises, loc.cit., p. 58.

Hayek as well as other neoclassical economists such as Fritz Machlup (who examined knowledge as an economic resource; he introduced the term „the half-life of knowledge“ to the time half of the knowledge in a particular area is superseded), Gottfried Haberler (who introduced the „opportunity cost“ concept as a replacement for Ricardian labour theory of value) and even Oskar Morgenstern (with John von Neumann the founder of game theory around which modern economics has been built).[44]

The subjective theory of value is the ground plan on which disciples and successors built the economic theory and the fame of this economic school. Without subjective choice and value there would be no economic conception of action and no individual agent. For Austrians, the market crowd – to once again refer to Arnoldi and Borch's terminology – is not a swarm in which imitation bifurcates from individual rational choice. For them, the market is fundamentally built on the rational individual and its information-bringing urgency. As Hayek argues: „Fundamentally, in a system where the knowledge of the relevant facts is dispersed among many people, prices can act to coordinate the separate actions of different people in the same way as subjective values help the individual to coordinate the parts of his plan."[45]

But unlike Ayache, Mises does not stop at theorizing actions of the market proper. For him, "subjective theory of value" reaches deep into human nature:

> For a long time men failed to realize that the transition from the classical theory of value to the subjective theory of value was much more than the substitution of a more satisfactory theory of market exchange […] It is much more than merely a theory of the 'economic side' of human endeavours and of man's striving for commodities and an improvement in his material well-being. *It is the science of every kind of human action* [my emphasis]. Choosing determines all human decisions. In making his choice man chooses not only between various material things and services. All human values are offered for option. All ends and all means, both material and ideal issues, the sublime and the base, the noble and the ignoble, are ranged in a single row and subjected to a decision which picks out one thing and sets aside another. Nothing that men aim at or want to avoid remains outside of this arrangement into a unique scale of gradation and preference.[46]

Mises' ambition is pervasive. "It is no longer enough to deal with the economic problems within the traditional framework. It is necessary to build the theory of

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[44] John von Neumann and Oskar Morgenstern's *Theory of Games and Economic Behavior* (Princeton University Press, 1944/2007) facilitated for the first time an axiomatic theory of utility that allowed examining behaviour in economic situations and decision-making under uncertainty. It sparked a wave of theoretical and mathematical abstractions of which the Nash equilibrium is but one example.

[45] Friedrich A. Hayek, "The Use of Knowledge in Society," *The American Economic Review*, Volume 35, Issue 4 (Sep., 1945), 519-530, p. 626.

[46] Ludwig von Mises, *Human Action: A Treatise on Economics* (New Haven: Yale University Press, 1949), p. 3

catallactics [Mises' term for economics] upon the solid foundation of a general theory of human action, praxeology."[47] Mises distinguishes human action from unconscious behaviour and reflexes: "The unconscious behaviour of the bodily organs and cells is for the acting ego no less a datum than any other fact of the external world." Rather, human action, so Mises, "is purposeful behaviour. Or one might say: Action is will put into operation and transformed into agency, is aiming at ends and goals, is the ego's meaningful response to stimuli and to the conditions of its environment, is a person's conscious adjustment to the state of the universe that determines his life."[48]

> […] we speak of the subjectivism of the general science of human action. It takes the ultimate ends chosen by acting man as data, it is entirely neutral with regard to them, and it refrains from passing any value judgments. The only standard, which it applies, is whether or not the means chosen are fit for the attainment of the ends aimed at. If Eudaemonism says happiness, if Utilitarianism and economics say utility, we must interpret these terms in a subjectivistic way as that which acting man aims at because it is desirable in his eyes. It is in this formalism that the progress of the modern meaning of Eudaemonism, Hedonism, and Utilitarianism consists as opposed to the older material meaning and the progress of the modern subjectivistic theory of value as opposed to the objectivistic theory of value as expounded by classical political economy.[49]

While both von Mises and Ayache are critical of probability theory, von Mises' conception at this point deviates from Ayache's scientific metaphysics.

> The relation between reason and experience has long been one of the fundamental philosophical problems. Like all other problems of the critique of knowledge, philosophers have approached it only with reference to the natural sciences. They have ignored the sciences of human action. Their contributions have been useless for praxeology. […] Einstein raises the question: 'how can mathematics, a product of human reason that does not depend on any experience, so exquisitely fit the objects of reality? Is human reason able to discover, unaided by experience, through pure reasoning the features of real things?' And his answer is: 'As far as the theorems of mathematics refer to reality, they are not certain, and as far as they are certain, they do not refer to reality.' However, the sciences of human action differ radically from the natural sciences. Authors eager to construct an epistemological system of the sciences of human action according to the pattern of the natural sciences err lamentably.[50]

While von Mises' ambition was to produce a general theory of economics as a science of man's actions, Ayache's aim is a metaphysics of contingency that operates through a scientific process of pricing within the Hayekian market setup: „[…] the information

[47] von Mises, loc.cit., p.7
[48] von Mises, p.9
[49] von Mises, p.21
[50] von Mises, p.39

should come from the market prices and nothing but the prices […] it should come from the future and not from the past,"[51] which in turn relinquishes value:

> What is value as opposed to price? I don't want to even wonder what value is because I have price. So, that's my statement. If you define price as a quantitative amount of money that gets attached to something that you are exchanging in a free market on the floor – open outcry – then, to me, you have already all the derivatives that have to trade. If you leave it freely to the exchange, price will fluctuate randomly because of a very fundamental argument. So as I said earlier, I cannot understand price if I want to make it the fundamental entity. I cannot understand price without price volatility because if you are exchanging something in the free market, there is nobody, no planner who tells you what the price is going to be. And therefore you cannot say, "I think it's the price," like you would fix the value. So, to me, there's an equation between what I mean by price and the full chain of derivatives written on top of derivatives ad infinitum, that's the same thing.[52]

Ayache generalises the market, to put it succinctly, as a complex instancing of discrete enunciations, which are essentially not quantified (derived from value) but quantitative in the first place. The market in Ayache's term is therefore the derivative event to the events outside the market.

> We cannot understand what the market is without understanding that there will always be events that go outside of the box. There will always be contingencies that weren't even a member of the list of possibilities that we had before. That's completely impractical, you basically cannot compute it. But I'm telling you that the market is of the same nature as the event but the event doesn't exist, as you know, until it happens, so that's one thing. But the market exists. The only advantage that the market has over the event is that it exists, therefore my speculation: if somebody goes into that capsule, if you will, which is the technology of derivatives, it's not that he's going to understand the future but at least he is dealing with something that is at least as rich and complex as the future. So, it's not an explanation of the future in terms of, 'that's it, I've got the future all explained to you and if I read the market today, I read the future.' No, because the market as it shapes the future, the future changes every day, but you need to be immersed in the market as a trader with all the derivatives to be able to at least approach the event in one way or other.[53]

His metaphysics of the market attempts to define a form of action that Ayache holds as superior to philosophy because its specific form of writing writes along the future materially, and not 'only' intellectually. It makes the future (it is poiesis) by being with the event that is outside the market. But he never critically examines the economic or

[51] Hayek, loc.cit., p. 81
[52] Gerald Nestler, *Two Globes Forming A Circle. Dividual Recalibration, Automated*. 3-channel video assemblage with Elie Ayache and Philippe Henrotte, algorithm, and objects (forthcoming 2017). This and the following quotes are part of an interview with Ayache and Henrotte published in German in Making of Finance (edited by Armen Avanessian and Gerald Nestler, Merve Verlag, 2015).
[53] Gerald Nestler, *CONTINGENT CLAIM. Portrait of a Philosophy I*, 1-channel-video, 2012, https://vimeo.com/103286163

political conceptions of the very market he discusses in metaphysical terms[54] and thus falls prey to a conception that he defines as science but is nevertheless ideological. Hayek illustrates his ideology of the market by an example that reflects the reductionist nature of neoclassical theory, born out of the self-concept of cultural superiority in the colonial era fused with the elitist bourgeois "Gründerzeit" in central Europe:

> Assume that somewhere in the world a new opportunity for the use of some raw material, say tin, has arisen, or that one of the sources of supply of tin has been eliminated. It does not matter for our purpose-and it is very significant that it does not matter which of these two causes has made tin more scarce [sic!]. All that the users of tin need to know is that some of the tin they used to consume is now more profitably employed elsewhere, and that in consequence they must economize tin. *There is no need for the great majority of them even to know where the more urgent need has arisen, or in favor of what other needs they ought to husband the supply* [my emphasis]. If only some of them know directly of the new demand, and switch resources over to it, and if the people who are aware of the new gap thus created in turn fill it from still other sources, the effect will rapidly spread throughout the whole economic system and influence not only all the uses of tin, but also those of its substitutes and the substitutes of these substitutes, the supply of all the things made of tin, and their substitutes, and so on; and all this without the great majority of those instrumental in bringing about these substitutions knowing anything at all about the original cause of these changes. The whole acts as one market, not because any of its members survey the whole field, but because their limited individual fields of vision sufficiently overlap so that through many intermediaries the relevant information is communicated to all. The mere fact that there is one price for any commodity – or rather that local prices are connected in a manner determined by the cost of transport, etc. – brings about the solution which (it is just conceptually possible) might have been arrived at by one single mind possessing all the information which is in fact dispersed among all the people involved in the process.[55]

Here, the idea of pure theory that is but an a-political rendering of the market comes to light. It would only be a very weak defence of Ayache that he outspokenly neglects any political relation of the market in favour of his philosophical discussion – a premise as impossible as it is absurd – in which history turns into price:

> … The market is the only place where the qualitative absolute event, the one that is irreducible to measure and scale and probability, finds quantitative expression, in a material medium borne by numbers, or rather prices. The market is quantitative history. One should keep in mind this contradiction in terms: one should remain

[54] Ayache has only recently, in his new book The Medium of Contingency. An Inverse View of the Market (Houndmills: Palgrave MacMillan, 2015) begun to qualified his neglect of the market as a political field at least to some regard: "Instead of trying to fit the market in preexisting formats, such as sociology or anthropology or even probability theory, an immanent theory of the market – what we have called an inverse view of the market _ should stick with the market as specialty and special medium and draw the ultimate consequences from a thorough metaphysical analysis of it; and then one should generalize these incredible findings outside the market by trying to discover what, in other cases, resembles the market. Because of the way that possibilities are nontotalized in the market (the definition of price), the market becomes the medium of contingency; it even replaces the event.

[55] Hayek, loc.cit.

> aware that the historical event is incalculable and unquantifiable because it precedes any scale; and then understand the extraordinary nature of price (and of its medium: the market) as the quantification of that unquantifiability. This is why the market is truly the technology of the future. You have to realize that price is not a number. Quantifying the event (translating it into numbers) is impossible; yet the market is such a translation, precisely in so far as it takes place outside of possibility. 'Quantitative history' does not mean that the event is being forced into the mold of numbers. Rather, a quantity, a number of an extraordinary nature, has been found such that history can be quantified.[56]

This anti-political position stands only seemingly in contrast to Hayek. In fact, by producing no discussion as to the social positioning of his market, Ayache unwittingly subjects his theory to Hayek's wider claim, whose very program was a politics of the market in favour of the state or any other collective. To give an example of the violent scope of Hayek's claims, we only need to listen to his reply in a TV broadcast: Interviewer: "Isn't it a philosophy based essentially on selfishness? What about altruism, where does that come in?" Hayek: "It doesn't come in. See, both altruism and solidarity are very strong instincts which guided men in the small group where he was serving known other persons, when his efforts were directed to the needs of familiar people."[57] A claim preposterous to reason by the pundit of a neoliberal reason.

COMPETITION. INTRICATE CIRCLES AND PROPRIETARY FUNCTIONS

This is all just about a 1 cent move in the market in the stock. That's all it is. …That's when the game is played. And when this move happens the world is divided into winners and losers. —Haim Bodek[58]

Of the 1%, by the 1%, for the 1%. —Joseph Stieglitz[59]

When we explore financial markets today, what we perceive are a host of different instruments, technologies, models, and even cultures. But their development and coexistence are not based on any natural reason of evolution. Their existence is based on the opportunity for another claim and the contingency of its settlement with a profit. Their co-existence is therefore an a-existence in which they strive to defeat their competitors and, if possible, annihilate them.[60] The market's ideal form is the 'pure

[56] Elie Ayache, *The Medium of Contingency*, loc.cit. p. 59
[57] http://www.arte.tv/guide/de/044979-005/der-kapitalismus-5-6?autoplay=1, 11:02-11:25min.
[58] Haim Bodek, whistleblower and former owner of the high-frequency trading firm Trading Machines, in: Marijke Meerman, *The Wall Street Code*, film documentary, 50:30min. (01:36-2:00), http://www.youtube.com/watch?v=kFQJNeQDDHA) last accessed August 27, 2016.
[59] Joseph Stieglitz, in an article for Vanity Fair, March 31, 2011. See: http://www.vanityfair.com/news/2011/05/top-one-percent-201105
[60] This drive towards annihilation – supported by political intervention during the credit crisis – expands to the market in its entirety, as Philippe Henrotte argues, "In fact, I believe today we

space of competition and circulation' (a conception vis-à-vis the urge to monopolize in the corporate field) where nothing else enters (except the 'benevolent' interference of the invisible hand) and nothing else can enter (except under the condition of instant ruin). Pure competition without any contamination (for instance, by state interference) has been and is the religiously defended conviction of any laissez-faire libertarian.[61] As one source argues, "libertarians are radicals (principled advocates) for individual freedom and responsibility – and the pure free-market private-enterprise economic system which would result from a consistent application of that principle."[62] This includes every relation-turned-market negotiation, such as the labour market in which claims on high price (labourer) and low price (employer) are deemed to shift equilibrium levels.

While this conception is founded on an unmediated relation between market participants (or one mediated by 'pure' agents, transmitters – another idealization), today's markets have ridiculed this notion by the fact that the transmitter is itself a market force.[63] Communication technologies, mathematical formulas, algorithms, etc. do not simply facilitate trading; they constantly re-shape it. Marx in the Grundrisse already described machinery as a mode of circulation that instances the revolution of production:

> Machinery appears, then, as the most adequate form of fixed capital, and fixed capital, in so far as capital's relations with itself are concerned, appears as the most adequate form of capital as such. In another respect, however, in so far as fixed capital is condemned to an existence within the confines of a specific use value, it does not correspond to the concept of capital, which, as value, is indifferent to every specific form of use value, and can adopt or shed any of them as equivalent incarnations. In this respect, as regards capital's external relations, it is circulating capital which appears as the adequate form of capital, and not fixed capital.[64]

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are in a state worse than in 2007. We have much more credit now than we used to have in 2007. And we solved the issue by buying more of the problem, not reducing it! The reason is that our world doesn't know how it could function without credit. In fact, our job is to do calibrations on future events and now we see probabilities priced by the market of extremely bad things going on very vividly. The very bad thing would be the stock market losing 90% of its value, right? Even though it never occurred in the past, this scenario has a none-zero probability today! When I look at derivatives, is there a price on "will the stock market lose a huge amount of value"? Yes, it is and some people are waiting to put money on that." Loc.cit.

[61] An example in which this question is discussed can be found here: https://mises.org/library/if-pure-market-economy-so-good-why-doesnt-it-exist

[62] See: http://laissez-fairerepublic.com/libertar.htm

[63] Marx already attests to this in *The Grundrisse. The Fragment on Machines*: „Once adopted into the production process of capital, the means of labour passes through different metamorphoses, whose culmination is the machine, or rather, an automatic system of machinery (system of machinery: the automatic one is merely its most complete, most adequate form, and alone transforms machinery into a system)." p. 692.

[64] Marx, loc.cit, p. 694

Today, the way claims enter the market and are competitively pitted against each other has changed once again. Rishi K. Narang, a former high-frequency trader describes the challenge: “Traders take on the risk […] competing in a hypercompetitive market“ (Narang) that is formed by all the expenditures that the casting of claims entails in an electronic and algorithmic trading space. While financial derivatives originated in the 1970s by the legal acceptance that the settlement of claims suffices (as no delivery exists in this case) and thus minimized entry costs into the markets, contemporary professional market engagement is heavily contingent on investments in infrastructure and human capital already in advance. This complication and proliferation of claims is advanced not only by individual agents and infrastructures, but the system’s complexification in general. As Haim Bodek, who whistleblowed fraud in high-frequency markets, observes,

> Over 40 dark pools, 13 exchanges, all this heavy, intense competition […] And there was some point in time where the competition got so intense that the way to survive – and survive is maintaining a standard of living you probably should not be entitled to, you providing no value – […] is that you get collusive behavior […] And as a market becomes more efficient, the incentive for corrupt and fraudulent behavior goes up.[65]

Here, we come full circle from Hayek’s expulsion of altruism from capitalist society towards a machinic self-interest on autopilot whose competitive potentiality is self-destruction. As the fabrication and exploitation of ‘information asymmetries’ ‘naturally’ escalate beyond the market and run the whole gamut of debt and credit integration, one must assess that the contingency, which claims and their technological implementation produce, is a contingent chain of atrocities.

[65] In: Gerald Nestler, *CONTINGENT ETHICS. Portrait of a Philosophy II, Haim Bodek*, 2014, single channel video. Bodek uses the term “efficient market” for the high-speed reduction of the bid-ask spread, which is the difference that market makers rely on to fulfil their obligation of providing prices as well as their business model to earn a profit. https://vimeo.com/channels/aor

COLLECTIVE XI

TOWARDS A CRITIQUE OF THE DERIVATIVE CONDITION

Contrary to the notion that finance is separate from the real world — that it is ethereal, ephemeral, epiphenomenal, immaterial — derivative logics suffuse the flows and structures of our daily lives, and compel us to rethink where to turn in the face of crisis.[66] —Randy Martin

Financial capitalism is the apparatus that prices information in respect to its future potentiality. As I have discussed in chapters 2 and 3, it also performatively codes and recodes what is left of value outside its pricing engine kernel. It has become a vital node of capitalist power. The transfer of financial methodologies to the wider social realm is usually called financialization and has been explored by many critics of capitalism. The term stands for procedures that have acquired agency not only as regards economic evaluations (for instance in the form of deregulations that initiated financial value assessment on production or trade) but also concerning labour, care, and environmental evaluations. It has subsequently introduced new forms of dependency on a wide array of activities, as Robin Blackburn asserts:

> Financialisation now runs the gamut from corporate strategy to personal finance. It permeates everyday life, with more products that arise from the increasing commodification of the life course, such as student debt or personal pensions, as well as with the marketing of credit cards or the arrangement of mortgages.[67]

As early as 1994, Christian Marazzi pinpointed this development as regards the neoliberal 'episteme' of immaterial labour and human capital:

> Now we are witnessing the birth of 'cognitive labourers,' a class of producers no longer 'commanded.' To use Adam Smith's terminology, by machines external to live labour, but rather by technologies that are increasingly mental, symbolic, and communicative. The new fixed capital, the new machine that commands live labour and makes the worker produce, is no longer a physically identifiable and specifically situated tool, but tends rather to be located with in the worker herself, in her brain and in her soul. […] The real evaluation consists in the 'social validation' of the intellectual capital developed, that is, in the degree of customer satisfaction that can be translated into sales volume. As is only normal, it is at the moment of sale that the human resources activated in the production process are monetized and therefore measured. As abstract value par excellence, money sanctions the value of human capital, 'reducing it to a commodity,' revealing its market inadequacies, and providing information – comparable to inventory data – on where and how to

[66] Randy Martin, loc.cit, p. 68
[67] Robin Blackburn, "Finance and the Fourth Dimension," *New Left Review 39*, 2006, p.39.

intervene in order to better adapt production to market demand.[68]

Randy Martin, in his book-length study on the Financialization of Daily Life, approaches the same process from the perspective of a critique of social engineering, which according to him, has been at the forefront of social changes and adaptations in the USA since the neoliberal revolution in the 1980s:

> The risk-capable […] are the poster children of neoliberalism. The "at-risk" are the human dart boards of the neocons. In 1983, then Secretary of Education William Bennett issued the polemic "A Nation At Risk" which fingered low-test scores among public school children as a threat to national security via compromised market competitiveness. A new regime of discipline and punish, with tightly controlled content standards, turned education into a battlefield that now buries its dead […] in a cemetery called "No Child Left Behind." In 1981, Reagan's Secretary of State Alexander Haig, identified international terrorism–understood as one big family with the USSR behind it–to be a rampant threat. The culture wars treated those artists who might create obscene work as a moral contagion that needed defunding. The war on drugs sanctioned use of military intervention for domestic police activities so as to reverse the time of investigation and punishment. […] This legal framework for surveillance, property seizure and prosecution of 'shadowy networks' would be folded into the PATRIOT Act passed after September 11, 2001. In sum, these domestic wars would pave the way for the war on terror, an antagonism presented as unbounded in time or space. […] With spaces of foreign and domestic commingled, securitized so to speak, the terrorist is the bad object of risk embrace, one who places all good risk abiders at risk.[69]

Hence, with the focus on an economy that addresses the integration and exclusion of populations by the circulation of wealth as money rather then the production of wealth as value, financialization describes the multiplication of capitalist circulation into each of its nodes. It proliferates by infecting the political anchors and social safeguards of a former Keynesian economy. The new policies

> […] diversified interests [that] may wind up in soliciting curious forms of self-interest, particularly if individuals need to begin thinking through so many selves. Ironically, just when life seemed to be tailored so that rational actors could make decisions with perfect access to information, the rules for […] what could count as information […] became so complex as to mess up the equation all over again.[70]

The end of the welfare state also meant the beginning of an industry that finds profit in re-engineering failed policies, business models, and precarious existences.

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[68] Christian Marazzi, *Capital and Affects. The Politics oft he Language Economy* (Los Angeles, Semiotext(e), 2012 (first edition 1994), pp. 95-96

[69] Randy Martin, *Where did the Future Go?,* http://www.logosjournal.com/issue_5.1/martin.htm, last accessed September 3, 2016.

[70] Randy Martin, *Financialization of Daily Life* (Philadelphia: Temple University Press, 2002)., p. 12.

Financialization – the volatile heir to linear progress – is a mode of commodification that re-arranges, re-assembles, re-addresses, re-codes, and re-shapes the world by utilizing the surrounding noise composed of all those voices that are at risk. But voices are not membranes of language only. They emanate from bodies; they are bodies in flight and meet other bodies in flight. They might swarm or collide or pass each other. "When risk rules," Martin writes,

> […] it serves to measure how people relate to each other, what they value together, and why they await the future. Not only is the mind to be ordered, but also the body is to be somatized to risk so that what sleeps at night is the knowledge of what can happen by day; a body at risk expresses its own risk capacity."[71]

The term capacity speaks of a possible future, of moments in which 'it' is fulfilled. "Financialization, the elaboration of capital's movement within the integuments of daily life, makes the future, not an individual's uncertainty, but a present obligation to embrace a risk of what can be made of a promised return."[72]

On a broader outlook on immaterial cognitive labour, production, cooperation and communication, Maurizio Lazzarato insists in a text published in 2004, "capitalism is not only a mode of production but a production of worlds."[73] In Randy Martin's version of a financialized world capitalism does not produce laborers – it replaces them by automation – but capitalists:

> Financialization integrates markets that were separate, like banking for business and consumers, or markets for insurance and real estate. It asks people from all walks of life to accept risks into their homes that were hitherto the province of professionals. Without significant capital, people are being asked to think like capitalists.[74]

Information Capitalism, the name for the operations of financialization, has therefore successfully annihilated every outside. From now on, there are no 'foreigners' to capitalism, only those who reside in the system or those who are kept in an alien state (aliens in their precarious state are excluded until their debt history and credit score, for example, grant access automatically[75]).

But we might have to extend our perspective of interpretation at this point. When capitalism – or for that matter financialization – implements market risk practices into

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[71] Martin, loc.cit., p. 144.
[72] Martin, loc.cit., p. 146.
[73] Maurizio Lazzarato, "From Capital-Labour to Capital-Life," in: *ephemera. theory of the multitude*, Volume 4(3): 187, 2004
[74] Randy Martin, loc.cit., p.12.
[75] The mortgage lending practices that led to the subprime crisis can in this perspective be interpreted an unsuccessful attempt to include even aliens.

the population, the whole scenario of subjection changes. One might, for example, wonder what consequences arise in the near future in the light of the new interest in the concept of unconditional basic income by venture capitalists and Silicon Valley insiders. This leverage class – as I would like to call them (I will come back to the term below) are rethinking their former rejection of the idea by translating it into a new normativity based on Neo-Schumpeterian disruptive technologies and market integration – but this time the integration into the logic of derivative markets and not the neoliberal market that was still concerned with stocks, bonds, and commodities. On this front, spreading and monitoring risk capital is interpreted as a viable solution to weaken the state (because it implies the end of the last welfare and other state programs) and integrating the population as investors in the circulation of capital.

To "think like a capitalists," however, does no longer equal "to think like an investor." Today, it means to think like a speculator, an arbitrageur, a hedger or a scalper – which means to think through volatility at any given moment. To bank on volatility, so to say, is not about reducing or avoiding risk. Just to the contrary, as I have shown above, it is about producing risk against uncertainty (in the Knightian differentiation). As volatility's only constant is in its shifts, the reckoning goes towards incessant risk arbitrage by unsecured calculation and recalibration of one's own and all other risk options within the specific speculative realm under the condition of contingency concerning every future moment. Security is only found be the 'welfare' of the market's offering of hedging opportunities at the same time with speculative claims.[76]

Hence, we have a first example for the move from financialization to what I would argue is a fully-fledged derivative logic. One might object that I am speculating on a future form of social engineering, which is itself contingent on an uncertain future. But the drift towards a derivative logic is apparent in many situations of professional or daily life today. Calibrating and recalibrating appreciation and credit with automated technological devices is, for example, a derivative form of conduct that nearly everyone applies or at least knows about. The derivative paradigm of modelling risk by implied volatility has been successfully transferred to the social arena and informs lifestyles, ways of appreciating "friends" and one's relation to them and in turn one's own self-esteem. It is coded into algorithmic machines – from automated trading to smartphones – and into interfaces where it directly interacts with humans. Without the technological black box of high-resolution machines and their networked interconnections on a global

[76] The "delta-hedge" is a strategy in option trading that hedges risk by constantly offsetting long and short positions in the derivative and the underlying – I should remark here that derivative trading has always been a technology-aided practice because its complex calculations cannot be accomplished by human labour alone.

and pervasive level this complex negotiation and re-engineering would not be possible. As capitalism' always aims for pervasive influence and surveillance (a subliminal ideological monopoly), this mode of relations and self-relation is built to affect populations as a whole. The derivative condition is thus the first truly technological and at the same time totally interconnected condition – another point where it differs from the concept of financialization, which recognizes integration and communication but ignores technological interconnection between all 'players' and across affective and rational layers of exchange. This includes bots, which make up the bulk of the speech in the derivative condition. Partly because the tasks that effect its paradigm – in contrast to Ayache's humanism – is delivered to algorithms and networked machines that are always on. Partly because bots are the quantitative agents of change and modulation to which everything and everyone reacts and answers, as direct communication without mediation decreases rapidly, especially in professional life but also in private life.[77] Even if communication seems quite direct, a bot or daimon is present (the notion "not far" makes no sense in a real-time environment). Bots, one might even say, are the first derivative (volatility) to which the next in chain react by variance.

We just recently left the neoliberal paradigm, originally deployed to educate citizens to become entrepreneurs in the service of small profits. Today, we are leaving its internal revolution through financialization, the creation and evaluation of value on the market and the education of consumers to become not just producers but small investors and market makers. In both schemes, money is produced in the same way: by incorporating values (however small in comparison to the market, they often hold the life savings and memorizes of those who own them) into the market and leveraging them into the pricing regime.

The new speculative outlook on life has a similar effect as the transformation from classical neoliberalism to financialization: it changes the condition by its own "revolution." We have entered the sphere of the derivative condition, in which not only our individual self is transformed into a negotiation of status via "appreciation," to use Michel Feher's term. By dividualizing those seeking appreciation for themselves through volatile recognition systems, information capitalism has rendered relations

[77] We witness this every time we look up from our own absorption into our smartphone. We witness this when we, as it happened to me recently, try to speak with a company's representative on the phone but never get beyond the machine intelligence (that today has already learned to chuckle) and realize that the sales person in the shop has to go through the exactly same procedure. The black box and its access controls form a complex and automated negation of communication that is transparent only in the sense that even employees in small local stores are ranked at the outer margins of access. To force access the employee had to trick her ‚own' system – she had to hack the corporate system she gets paid to manage.

derivative and profitable, from sharing personal information, images, feelings, desires or fears to the network logistics increasingly powered by bots. In this realm, value does not, only price exists. This is an insight we can gain from Ayache's philosophy of the derivative market as the technology of the future.

THE DERIVATIVE CONDITION IN CONTRAST TO NEOLIBERALISM

In his lecture series on the Age of Appreciation, Michel Feher leads us through the liberal and neoliberal condition in an admirable and matchless fashion.[78] His essay *Self-Appreciation; or, The Aspirations of Human Capital*, from which I have cited passages, condenses some of his thoughts. The question he raises is the following: "who is the subject of neoliberalism or, more precisely, of knowing what type of subjectivity is being simultaneously presupposed and targeted by neoliberal policies"?[79]

Competitive negotiation becomes immersed in an apparatus that on the one hand facilitates a micro-scopic visualisation of even the most miniscule profit potentials (as, e.g., with arbitrage) and on the other hand a macro-scopic visualisation of procedures, processes, happenings and matters on earth – both addressing randomness and uncertainty. The engine behind this resolution apparatus is a calculative one. The derivative condition is powered by mathematics and computation. What it brings into the perspective of everyday life is a commodification that is quantitative instead of qualitative in its access to relations, affects, difference and identity. That is based on price circulation instead of value production – a turn that cannot be emphasised enough especially in relation to Marxist critique of capitalism – and whose trajectory is the future, rather than the past. The latter is where circulation meets production in a Marxian sense and where the shift from value to price happens. As stated above, price is the extinction of value in the service of what I call the "production of risk", that is, in the service of volatility. Human capital has a price, as it can only exist as a form of risk, that is, of volatility, which is priced in financial markets. The value of the human – as any other 'thing' is only an externality, or, at best, a collateral, even though a very uncertain one.

As Feher shows, the profit-seeking entrepreneurial spirit is turned into an appreciation-seeking speculative spirit. When I say speculation I mean the market triangle of speculation, hedging and arbitrage. It includes hedging one's future and arbitrage

[78] Video recordings of the lectures can be found here: https://vimeo.com/80882516
[79] Michel Feher, loc.cit., p. 23.

opportunities – riskless 'profits' gained on a sort of 'closed-outcry market' where 'imitation and control' (Arnoldi & Borch) are still paramount for competitive edge. This is in analogy to what we witness in social fields. Randy Martin describes some inherent issues that signal the conflict between precarious and entrepreneurial identification:

> From the perspective of the ways derivatives double in network and organization, and given the loss of security and elaboration of indebtedness that constitute the precarious, the terms of this conjuncture are rendered more specific (and with dance, more particular still). Identity can certainly be understood as a bundling together of attributes of personhood (through hierarchically ordered classifiers of value such as race, gender, sexuality, ethnicity, etc.) and placing these in circulation. That identity is made through some kind of affiliation with an (imagined) community points to all manner of organizational forms — employment, cultural and legal rights or citizenship, market participation or consumption — that array and are differentiated by these various yet simultaneous classifications of self. So too, identity does not sit still in its place, but has become a domain of increasing volatility, negotiation, flow, and dispersal — precisely what "network" would seem to name. That the networks in turn order value, as in the rankings of preference and judgment, of aggregations of like and dislike through which the internet becomes a means of commerce, suggests the insinuation of a derivative logic. Further, the focus on the ways in which small movements can be leveraged to larger gains, positions the practice of arbitrage as the key subject position of the derivatives trader. By aggregating these bits of attention, the idea is not to capture the whole person but to set identity in motion, to deliver what will momentarily stand as a public interest in which so many small hits add up to a hit with significant impact.[80]

This movement generates even more gruesome conflicts, which come, however, soft-footedly. When Martin refers to identity as a "a domain of increasing volatility, negotiation, flow, and dispersal," it is the later term that seems to give us an inclination of the exploitation we are entering: Relational or family ties and other connections are either made to pay (arbitrage) or dissolve (mainly an externality) – let us just think of the latest generation of social credit scores that are being implemented all around the world (like the already mentioned Sesame credit score) and how they are beginning to turn identity and relationships into a highly volatile asset in competitive relation to all other individual (we must now say, dividual) assets. This optionality turns the concept of the individual from one of inalienable rights (and authenticity) into one of automated derivation and volatility (risk). If you have friends or family members with lower scores, your score will be instantly affected. This is an extreme but very real example for the *derivative condition*. The interactions of those who sign up into these pervasive networks equal bets on an anticipated future outcome at present that they are forced to recalibrate constantly to adjust their own and their relations' contingent 'option price'. As these systems are implemented in order to involve every individual in the 'game,' the 'perfect information market' manifests as a hypervolatile space in which everyone's

[80] Randy Martin, "A Precarious Dance, a Derivative Sociality," loc.cit., p. 70.

interaction is not only a sensor but also an agent – however, not for their own good or a common good – for an underlying control system, in which the deep conjunction of the state-finance-media-complex becomes visible.

The shift was slow enough to work subliminal; metaphorically speaking somewhat like the cruel experiment in which a frog is killed without noticing it when water is very slowly brought to the boiling point. Many people, I would say, feel awkward, confused, even numb and blind vis-à-vis developments that undermine democratic accountability in favour of the evaluation regimes of market and security apparatuses. Automation and “security-zation” (meant as the power triangle of security, austerity, and asset speculation) is decoupling and blacking out general assumptions on civil and political rights (and increasingly human rights). In its wake, participation in political and economic affairs and decision-making are hampered.

In contrast to Feher I therefore resist the term neoliberal condition. In fact, Feher describes and theorizes the radical change from entrepreneurial profit-seeking to the market related appreciation regime that completely revolutionized neoliberalism by its own surprise. It had not provided for this development. This alone might not make a valid argument for the proposal of an alternative concept. However, what Feher and others seem to miss – and what I briefly noted in the beginning of this chapter – is the fundamental role of the market as a technology. Not in its classical interpretation of demand and supply equilibrium and price as its reflection, but as a scientifically and technologically grounded measure of volatility. The difference as to what I term the derivative condition is found in the registers that also inform the latter’s techno-scientific underpinnings, which for the first time in human history regulate the credit regime of social inclusion and exclusion by autonomous quantitative (data-based) and intelligent data agents and their processes as well as the perspective where this new order attaches itself, where it enters and revolutionizes the field of interpretation. In my perspective, the paradigm resides in the way relations are perceived, how they are turned towards projects of the future (even at present), made to produce knowledge and control, and last but not least new forms of profits, which are still monetized but increasingly incorporate in other forms od wealth.

The derivative condition describes a new (biopolitical) hegemony enacted by the regime of competitive pricing. It not only constitutes the poles of ‘men and market’ (the liberal condition) or the triangle between ‘men, market and state’ (the neoliberal condition) but extends towards every possible ‘volatile manifestation’ (the paradox of real-time). It takes effect without attaching itself to anything (i.e. anyone) because it has realized that the logistics of disengagement are more powerful than those of

engagement. Within the paradigmatic capitalist logic of "time is money," engaged investment is no rational choice for a real-time scenario that moves on at instant.

> Finance is indeed all about compulsory movement, the obligation to keep going at all costs, to go forward into the future unencumbered by historical claims. But if finance spreads movement everywhere, it generates no language of movement, no sensibility regarding how we are disposed to go one way and not another, no logic by which we might grasp how the imperative to move rules us, how we are oriented by it, through it, against it toward some realization of how else we might be moved and by what we might rule together.[81]

The random walk has become the pace in almost every respect; 'volatile equilibrium markets' are the successors to the welfare state whose 'total' social safety net has been turned into the 'ubiquity' of a privatized security industry. Contrary to all the declarations on the value of life – human or other – it becomes increasingly contingent on how these values prove themselves on the market, i.e. how they compete in the instantaneous pricing contest. This is no longer a beauty contest (Maynard Keynes) or a casino (Susan Strange). It has turned into a fight for survival; fiercely competitive, it endangers cultures and lifestyles, lifeforms and species.

As a *technology of the future*, and as such of time, derivatives and their electronic trading network grant opportunity globally; not only to assess but provide for future occurrences, which by definition are unknown. The ascent of derivatives is the ascent of what we could call an apparatus that circulates the future at the spot by governing uncertainty in the form of the production of distinct risks options.[82] It seems obvious that a technology preparing to conquer a blank terrain of knowledge – the fundamental precinct of the unknown – would provoke consequences outside its negotiation. For a capitalist system, mapping the unknown – not by making it known but by tracing the uncertain becoming of the future by distributing risk potentials – is tantamount to mapping new territories for enclosure. The apparatus, therefore, yields profit not by reducing or avoiding risk – the framework of most civilisations, as scholars of antiquity, ethnographers and anthropologists have informed us – but by excessive risk taking, in other words by producing leveraged risk. As Keynes wrote, "there is no clear evidence from experience that the investment policy which is socially advantageous coincides with that which is most profitable."[83] Even the smallest gap that tears up the fabric of derivative pricing – a new if miniscule risk potential – is instantly made into a profit scheme by the quickest and most intelligent 'predator' – a method generally known as

[81] Randy Martin, "A Precarious Dance, a Derivative Sociality," loc.cit., p. 70.
[82] Frank H. Knight in his seminal book Risk, Uncertainty, and Profit generalized the notion of risk as a measurable uncertainty in contrast to one that cannot be measured as early as 1921.
[83] John M. Keynes, *The general theory of employment, interest and money* (London: Macmillan Cambridge University Press, for Royal Economic Society, 1936), chapter 12, V.

arbitrage. Today, these predators are increasingly materialising as cyborg devices made of flesh, mathematics and code. The liquid pools they inhabit – the primeval soups of such anthropogenic beings – not only flood global markets. These torrents swell and engulf larger territories and geographies, their fluctuations wreaking havoc and leaving ruins when they subside – the latter in fact being a strategy of the politics of speculation and not a natural result. The range of derivatives is total in that they *sense* the risk movements of the underlying on a global level and at the same time *make* the value of the underlying (implied volatility). We therefore have to refute Randy Martin's generalization that "the traffic in derivatives can move in markets around the world while the bundle of goods to which they are tied – the house, car, or student loan – have local attachments.[84] The material composition of those underlyings that do not necessarily take space – such as many commodities like houses and cars, raw materials, produce – are increasingly turned into data and therefore also brought into circulation. Financial assets, for instance, such as stocks or bonds – from where the triumphal procession of derivatives took its origin – are generally not issued but exist in electronic data records and are therefore not tied to any specific locality today.

The derivative condition is meta-derivative to contemporary finance in the sense that it traces the decisive impacts of derivative finance on the wider social realm and on individual agents. I infer the notion of the derivative from finance to point at a relation of volatile social forces that do not simply express dependence or subjection. To borrow Levi Bryant's remarks on Latour's *We Have Never Been Modern*, I conceive of them as "an additional missing term, a missing mass, in […] social explanations: nonhuman entities." And Bryant continues:

> Latour, following Serres, refers to these missing terms as "quasi-objects". Quasi-objects are objects that are neither quite natural nor quite social. Like Deleuze's aleatory point, they are operators that draw people together in particular relations as well as drawing people into relations with other nonhuman objects while being irreducible social constructions in the semiotic in the humanist sense.[85]

This scheme of compulsory inclusion into the quasi-gravitational field of capitalist short-term relations and the exploitation of volatile and precarious risk potentials – paradigmatic for the livelihood of people on an enormous and extensive scale reaching from migrant workers to corporate employees (of course in varying degrees) – exceeds the notion of financialization. With Marcel Hénaff we can say that nothing is to

[84] Randy Martin, "A Precarious Dance, a Derivative Sociality," loc.cit. p. 67
[85] Levi R. Bryant, *Of Quasi-Objects and the Construction of Collectives*, http://larvalsubjects.wordpress.com/2011/06/18/of-quasi-objects-and-the-construction-of-collectives/

exist without price in the marketplace and that it claims a price even on the priceless.[86] To achieve that goal in the era of leveraged appreciation, it needs a different approach than simply enforcing such a regime from above. It needs a scheme that implants stakes directly in the individual herself by shaping her inclusion into the market system as a wagering contract (derivative) on short-term profit accumulation (underlying) in an algorithmic real-time environment. She can therefore be described as a self-trading, speculative and constantly recalibrating dividual that trades her own risk option through the volatile spikes in a marketplace that has fused labour, services or other forms of commerce into one "matching engine".

A contracted achiever for the underlying profit paradigm, she is wedged in a tight corset in which her value quickly decreases with time relative to her 'strike price' at 'maturity' (sales, education, speed, implementation targets, etc.): This scheme is blueprinted on financial derivatives. Contrary to the notion of the *artist as event* – when "rather than dissolving in the event, the *I* becomes an active participant in these margins of intense consciousness, the bearer of the translation from retention to protention," to use Edmund Husserl's terminology of temporality as regards the perception of the present – the wake time of lived presence is anchored in debt (a promise to be redeemed in a predetermined future and at the same time a euphemism for guilt, as the German term "Schuld(en)" clearly denotes) and thus transferred and signed over to the speculative interest.

However, the derivative condition is not a concept that expresses absolute submission of everyone under the constraints of finance. But in my view it nevertheless defines a generic property. Although volatile dividuals are granted individual rights (conditional, for instance, on citizenship and working contracts) on the one hand and decision-power, sense of community, will, emotions, etc. on the other, the Derivative Condition conceptualises a pervasive integration under a regime that enforces its domination on all social levels; not only by commodifying but by investing, leveraging and risking the self in the face of price. Contrary to Emmanuel Levina's notion of encounters "in the face of the other"[87] (who can neither be known nor dominated), the potency of transaction (price) and its volatile, quantitative application of 'knowledge' inflicts impotence of agency and what Hannah Arendt once termed the "Wagnis zur Öffentlichkeit" (the public venture).

[86] Marcel Hénaff, *The Price of Truth. Gift, Money and Philosophy* (Stanford: University Press, 2010), p. 17.
[87] Emmanuel Levinas, *Totality and Infinity* (Pittsburgh: Duquesne University Press, 1969)

To give an unsettling example: In a radio feature on labour conditions at the Deutsche Telekom, a partly privatised multinational corporation, employees reported (undisclosed for fear of repressions):

> Management strategies force staff to abide to extremely competitive sales strategies. They prohibit customer consultants to give advice, telling them that their only goal is to reach the sales targets they are given by exclusively concentrating on selling. Not only have solidarity and friendship between staff dwindled and people stopped hanging out with each other after work as they used to do. Now they all vanish into their terrace houses right after work. Worse, we have even had suicides because people are not able to cope with the situation they're in. If people only reach similar results as in the period before they are told to leave their comfort zone. And they are made to leave if they underperformed…"[88]

Collateral effects are externalities in the sense that the individual risk-bearer is only included when profitable but not in case of default. Contracts are used to coerce subjection to the purely profit oriented goals of the shareholder-value principle (the recipient of dividends in this case is the German government, which refuses to interfere operative business with the exception of dividend payments). This social disbandment is not obtained by orders but by evoking notions of inclusion in a competitive circle. Employees are 'persuaded' to put themselves at stake by accepting their employment relationship as a wager on their futures. Amongst many other disrupting strategies, constantly adapted objectives and standards – a contradiction per se and tantamount to constantly reappraised (or, in financial speak, dynamically replicated) stakes – render the subject as human capital a replaceable, a fungible financial product. Livelihood, and not seldom survival, succumbs to a question of derivation where one's value is one's price: Am I – a contracted wager nurturing the underlying systemic profit regime – settled, rolled over – or closed?

The seachange we are confronted with today is one in which even the sea seems to be changed. Another sea than the one we have known expands before us. It is an order without direction except in the miniscule moment of price. It is an order that is not in time and therefore has no direction. It is a an order that is not enforced by political and/or military power, not asserted by economic dominance and not established by unvoiced compliance or the affirmed consent by the population of a territory. This is the order of the intelligent machine and its (self-)integration into the lifeworld. This is the order of a machine that calculates massive data in real-time and communicates some of them with us. This is the order in which algorithms will learn to understand and love each other because the derivative condition is the condition of the complex machine.

[88] Translated from the script of *Tretmühle Telekom*, a ARD Radiofeature, January 2012. The programme detailed many more details that cannot be reproduced here. See: http://web.ard.de/radio/radiofeature/#awp::?page_id=2179

The intelligent technology of the future knows no future and has no sense for the future. It is now and nowhere else. It moves at random and decides in real-time. And we have become the subtle meat (to combine the Latin *creare* with the Greek *creas* = meat, flesh) of cognitive capitalism, its neuronal resource for navigating the volatile seas of contingency.

A PROPOSITION ON THE CLASS RELATION IN THE DERIVATITVE CONDITION

[…] neoliberalism is an economy turned towards the future, since finance is a promise of future wealth and, consequently, incommensurable with actual wealth. […] From this perspective, all financial innovations have but one sole purpose: possessing the future in advance by objectivizing it. […] In this way, debt appropriates not only the present labor time of wage-earners and the population in general, it also pre-empts non-chronological time, each person's future as well as the future of society as a whole. —Maurizio Lazzarato"[89]

What the recent turbulence in financial systems has announced is an historical transformation that must become our concerted object of study – the arrival of leverage as a new and legitimated form of value production that is remaking the character of wealth and human suffering. —Martha Poon and Robert Wosnitzer[90]

Erik Olin Wright writes in his contribution on *Foundations of Class Analysis: A Marxist Perspective* at the Annual Meeting of the American Sociological Association in 1999:[91]

> When the rights and powers of people over productive resources are unequally distributed – when some people have greater rights/powers with respect to specific kinds of productive resources than do others – these relations can be described as class relations.

In this respect, the derivative condition does not differ from former capitalist conditions. Without delving into Olin Wrights explorations and the issue of class in other times, we might suggest that instead of "productive resource" we should now say "circulation resources", as the derivative condition is one in which circulation is central. This is not to say that production is of lesser importance – we live in a world of immense production and consumption – but what distinguishes the current order is that derivative circulations determine production, and not the other way round.

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[89] Maurizio Lazzarato, *The Making of Indebted Man. An Essay on the Neoliberal Condition*, Los Angeles: Semiotext(e), 2012), p. 46

[90] Martha Poon & Robert Wosnitzer, "Review Essay: Karen Ho, Liquidating corporate America: how financial leverage has changed the fundamental nature of what is valuable," *Journal of Cultural Economy*, 5:2, 2002, p. 253. doi.org/10.1080/17530350.2012.660272

[91] Erik Owen Wright, *Foundations of Class Analysis: A Marxist Perspective*, Annual Meeting of the American Sociological Association, Chicago, 1999

I would therefore like to share the following thought:

The class relation in the Derivative Condition manifests in an upper-class that partakes in leveraged bets on future gains – contingent claims based on credit that produce future profit as well as esteem – and a three-fold precarious lower class divided between: (a) those dividuals who are in-dividualy accepted in debt schemes that tie them to a past obligation to be redeemed in the future, (b) those who partake in the remnants of welfare programs that ease their debt burdens by social programs or other subsidies, or, who are offered micro-credits as a promise of social mobility, which are then speculatively invested as contingent claims on the receivers' future (a hedge by the 'ethical investor' against the precarious risk of default by the investee), and (c) those who constitute the pariah class who live under the full violence of conditions in which not even debt is granted and who are totally externalized under the regime of financial, economic and other forms of war.

> The understanding of social problems as risks to be managed by mathematical models of outcomes applies to weather variations, military interventions, student and employee performance, health care allocations. Populations are cleaved between those who master these arts of risk management and those who fail to do so. In conventional policy terms, the latter have been labeled not the actually marginalized precariate, but the potentially fallen and contagious at-risk (see Martin 2007). The consequence of a world suffused with derivative logics is that it becomes a riskier place. When all act based upon risks they anticipate, the environment that they inhabit becomes all the more volatile; the impossibility of forecasting outcomes when forecasts collide and cancel one another enhances the likelihood of unlikely and catastrophic events.[92]

What we are confronted with is a perverted money commons in which the corporate body devours the natural person. In the words of David Graeber, "Instead of creating some sort of overarching institution to protect debtors, they […] protect creditors. They essentially declare (in defiance of all traditional economic logic) that no debtor should ever be allowed to default. Needless to say the result is catastrophic. We are experiencing something that looks like what the ancients were most afraid of: a population of debtors skating at the edge of disaster." This "skating at the edge of disaster" corresponds to the leveraged business models of financial markets where low money margins lever high stakes of risk and the speed of high frequency trading squeezes the moment of presence into the realm of microseconds.

The derivative condition, I'd like to propose, is not merely a term that extends on the concept of financialisation. The derivative condition describes a social order that has its own operational paradigm (the derivative paradigm of modelling risk by leveraged

[92] Randy Martin, "A Precarious Dance, a Derivative Sociality," loc.cit., p. 67

trading – calculating, calibrating and recalibrating implied volatility as an act of re-engineering, as Philippe Henrotte calls it). It gives way to a structural hierarchy that is its own and is produced by its paradigmatic operation – in other words, its own manifestation of the class system. In contrast to industrial capitalism and the Marxian class system, which was based on the ownership of the means of production by the capitalist class and the incorporations of labour in tiers, I argue that information capitalism has yielded a new mode – a new layering – of inclusion and exclusion. This is not to say that a class system has developed that is completely different from Marx. Rather, it is a proposal for its adaptation in information capitalism. The demise of production as the elementary form of capitalist expropriation, in favour of access to appreciation regimes circulating in the mode of credit history, analysis, rating, facility, and enhancement vis-à-vis credit restrictions and denial respectively has led to an expansion of different forms of debt. This has introduced corporate as well as personal credit standing / rating to a growing number of the world's population. Microcredits, for example, have allowed the spreading of investment opportunities to some of most poverty-stricken, and has thus included the poorest segments of society into global financial speculation schemes.

But these schemes have only recently been exported to developing countries and directly to the poor. Corporate America has tested leverage exploitation on home soil by switching from production to circulation in the 1970s. In this story, we encounter the false promise again and its true Gestalt as claim. With the difference that these claims had no contingency attached. They were simply brutally enforced:

> The promise of leverage was that controlling the flow of cash could be a mechanism of making profit, an alternative to industrial production. The introduction of the LBO delivered two distinct shocks to the American public: the shock of discovering what it means to live in an economy where productive units are liquidated to boost numbers on balance sheets; and the shock of witnessing just how much personal wealth would be amassed by the tiny coterie that instigated this financial revolution. The high-leverage movement created a notorious new breed of corporate raiders who partnered with financial intermediaries such as Drexel to funnel billions of dollars into the takeover mania. Perpetuating bids for companies meant enabling frontline figures such as Nelson Peltz, Carl Ichan, T. Boone Pickens, Ronald Perelman or even Rupert Murdoch. As Connie Bruck records, 'They [Milken, Drexel] have to create these guys, otherwise the business stops.'[93]

The creation of credit goes hand in hand with the creation of money. It is thus the fundamental financial activity. Fiat money is credit, that is, a debt to be redeemed in a predetermined future whose terms of payment are clearly outlined in the terms of credit. As already discussed, the conceptual node is risk. When I speak of the mode of

[93] Martha Poon & Robert Wosnitzer, loc.cit., p. 248

production in information capitalism as the production of risk to materially chart the future in all its contingency, I include all the different layers of risk assessment finance provides. From credit scoring to consumer credit, from student debt to microfinance, from debt financing to financial leverage, from sovereign to convertible bonds; and including all the derivatives that trade the risks entailed. Here, the circulation of data condensed to derivative pricing informs production: it is the engine that evaluates risks and potentials for investment decisions (a loan, for instance, is an investment granted in order to yield surplus-value).

Access to credit and leverage means access to social integration, prosperity and recognition. It also inflates the market in a new round of distribution of wealth from below to the top:

> If there is an essence to finance […] it is leverage, not labour. Leverage is a mechanism of linking debt to value, and it is a form that permits the 'everyman' to take a major stake in ownership. The process of leveraging is hard to disentangle because it is parasitic upon older regimes of value embodied in the ownership of assets and equity –labour, stock, expertise, industrial capacity and capital accumulation – before it subverts them as the basis of value. Each time this inversion occurs, […] a mysterious phantom power called the capital markets grows[94].

The ostensible flatness of organisational and social hierarchies (a pretence that is quickly dissolving at the moment) obfuscates the deep gulf between members of classes. The real scandal of a widening income gap is another example of a perspective, which as a critique of capitalism is of only little help to understand the structural differences underlying the derivative condition. As vital as such debates underpinned by data are, they usually come from economists who affirm the market and hence deplore the unfairness as a system failure that needs to be mended (Thomas Piketty, Robert J. Shiller and others).

But defence seems a stance of little creative potential. We must think and act through the system and bring together those who are ready. To use a sentence from chapter 3, "we need to move on" because the scandal we are confronted with is real. As Martha Poon and Robert Wosnitzer in their review of Karin Ho's brilliant ethnographic study of Wall Street investment banks, Liquidated (2009) write:

> But these markets for debt are no abstraction. They are sustained by productive machineries that can be examined if we look for them. The techniques for liquidating the body and soul of corporate America, first envisioned by raiders and financially-minded CEOs like famed GE chairman Jack Welsh, have been perfected and hardwired, not by IBs, but by numerous professionals such as corporate accountants, management consultancies and enterprise system designers (most

[94] Martha Poon & Robert Wosnitzer, loc.cit., p. 253

> notably the German engineering firm, SAP). To actualize the world expressed in financial deal books, a variety of working professions are intertwined in long chains of productive labour. This is how some labourers are liquidated – at the behest of technical systems constructed by others. This technical labour is specific and highly distributed, which poses a stark challenge to single-silo and uni-temporal ethnographies. Finance is composed of processes that make debt valuable. The question this raises for social scientists is no different from the one posed by anthropologist of Central Africa Janet Roitman, when she writes, 'I would like to consider the ways that debt is plenitude and not simply lack'[95]

I would add a thought that extends her desire: I would ike to consider the ways that leverage is plenitude and not simply extraction of wealth.

RESISTENCE IN THE DERIVATIVE CONDITION

Michel Feher's insight that "The rise of human capital as a dominant subjective form is a deciding feature of neoliberalism" (Feher 2009, 24) must be extended for the derivative condition and its technological basis in information capitalism that human capital is being augmented and increasingly replaced by intelligent machinic capital. Concerning human capital, which is now under pressure from the profitable and appreciative interaction of bots on all levels of life, this is due to the appertaining extension as regards Feher's explication: "Insofar as our condition is that of human capital in a neoliberal environment, our main purpose is not so much to profit from our accumulated potential as to constantly value or appreciate ourselves — or at least prevent our own depreciation."[96] Not only are bots on the verge of taking over the rituals of our appreciation and evaluation – including our depreciation (the Sesame credit score example in chapter 2, fn. 113 is a harbinger of this quasi-human condition); moreover, we are getting into a regime of valuation and appreciation in which our 'fate' is tantamount to our capacity to surf the volatile, non-directional movements of real-time data streams that do not distinguish between human value or any other. Evaluation is triggered by performance, which is not to be misunderstood as a directional reward-punishment scheme based on supply and demand, as liberalism would have had it or a directionality of the appreciation of values exchanged among peers in neoliberalism. Performance has turned into the contingent, non-directional 'unknown' of the price regime and its cancelation of value. Value, one might say, is a notion deriving from an earlier form of capitalism in which investment had (in the true sense of the word) staying power. The short-term management of esteem in neoliberalism was a first assault on value by which it turned 'post-modern' – if you

[95] Martha Poon & Robert Wosnitzer, loc.cit., p. 253
[96] FEHER, loc.cit., p. 27

forgive me this pun – value could mean and stand for (more or less) anything. In a real-time speculative environment, however, how could value exist or flourish? Neoliberal post-modern value contained at least the promise of individual freedom and self-fulfilment – and the release of directionality into a diversity of projects – with the double entry of profit and acclaim for those on the right side of the ledger. Value in complex contingent timescapes at real-time, however, that only open to low latency perceptive sensing (a spectacle without sensation) becomes a joke. The promise of big data has a price, and nothing else.

Jon Roffe accentuates this thought, at least to some degree, when he postulates in his Abstract Market Theory:

> This role is quite diverse, and depends on a variety of factors. Conversely, value has no place at all in the market, which is solely the regime of price. This is already implicit in the definition of values as qualitative, since the market is a locus for quanta alone. The individual and collective habits and the institutionalized social memory that provide the field in which values come into being and are deployed, is opposed the market, characterized as contingent opening onto the future, and figured in open-ended and unqualified pricing process. While we will see that the market is not a necessary reality – and could not be, given the through-and through contingent character of the pricing-process – it nonetheless confronts social formations with the radical contingency that the process embodies, and thereby opens it onto its (partial) undoing. […] because the pricing process is not governed by systems of valuation at all, while nonetheless playing a part in their constitution, orientation and interruption, it marks a moment in the structure of social values that exposes them to becoming undone. In other words, the pricing process always has the potential to undermine value.[97]

Roffe is aware that his position might open to a misunderstanding. And as this might also concern my treatment, I include the following passage as well:

> It might be objected that this is little better than a truism. But if critics of the role of market in society since Marx have made similar claims, they have done so on the grounds of the inherent sanctity of value as such. They have proceeded on the basis of the assumption of the secondary status of price with respect to socially situated values – including, we should add, the absolute value of the market itself as championed by libertarianism or free market idealism. This absolute primordiality of value, though, is precisely what the existence of the market calls into question. If the market exists, the reach of evaluative regimes is shown to have a very precise limit. In fact, the market is at once a realized active nihilism – a machine for the problematisation of values – and the stark utopia Polanyi recognized over sixty years ago.[98]

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[97] Jon Roffe, loc.cit., pp. 29-30

[98] The passage in Karl Polanyi, The Great Transformation (Boston: Beacon Press, 2001), p. 3, reads as follows: „Our thesis is that the idea of a self-adjusting market implied a stark Utopia. Such an institution could not exist for any length of time without annihilating the human and natural substance of society; it would have physically destroyed man and transformed his surroundings into a wilderness. Inevitably, society took measures to protect itself, but whatever measures it took impaired the self-regulation of the market, disorganized industrial life, and thus

The question is, however, if the sentence with which Roffe actually begins the paragraph could open price radically against its regime and take us to shores beyond capitalism (which implies also beyond the trivializing catchphrase "post-capitalism"):

> In fact […] the qualification of price is one of the tasks of any form of society in which the market plays a role, which is to say, any capitalist society. Prices can be qualified, valued or evaluated, by social formations, and thereby play a role in the ordering of the social.

I don't want to give the impression as if the answer is going to be provided here. It would take a much broader and at the same time deeper and concerted effort to tackle it. What I would offer to add, though, is that in a technological lifeworld with real-time algorithmic presence, we might not be able to shy asking it. Especially under the condition that we accept the diversity, complexity, and non-directionality of social relations as desirable, or at least preferable to an order that would take us back to former forms of coercion and repression. Volatility and risk hold potentials that are not only known but also sought by artists, to confine myself to my own field of practice. These notions are – as many other appropriated terms and concepts – not originally created by capitalism. They are exploited by capitalism, that is, they are turned into the directional logic of capital.

This applies especially to technology, or as Marx said, machinery:

> However, while capital gives itself its adequate form as use value within the production process only in the form of machinery and other material manifestations of fixed capital, such as railways etc. […] this in no way means that this use value – machinery as such – is capital, or that its existence as machinery is identical with its existence as capital; any more than gold would cease to have use value as gold if it were no longer money. *Machinery does not lose its use value as soon as it ceases to be capital* [my emphasis].[99]

If, derivatives are, as Elie Ayache proposes, the "technology of the future," can they therefore be unlocked from the capitalist cage and from Hayekian ideology? And even though they rest on money, can we create new currencies that would unfasten the deeply rooted entrenchment of money in capital, i.e. property? And if derivatives create immense wealth, but up to now only for a few, shall we ask, as Randy Martin proposes, "what to make of this wealth"?

Some of these questions are already queried and are creating a diversity of answers that I cannot dwell on here in detail. The proliferation of cryptocurrencies and the

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endangered society in yet another way It was this dilemma which forced the development of the market system into a definite groove and finally disrupted the social organization based upon it."

[99] Marx, *Grundrisse*, loc.cit., p. 700.

potential of the blockchain, to give but two examples that go hand in hand and at the same time open to a multitude of immensely rich possibilities, are certainly a development that holds a 'disruptive' potential. The question here is, of course, how far reaching their disruption goes – will they become a fundamental leverage for the next capitalist incarnation, or will they disrupt capitalism and open to forms of collectivity and mutuality in which the promise – and the trust it implies – replaces the claim of competitive advantage over others (who are no alterity but the same) and its sacrifice of altruism (to honours alterity)?

Hence, if there is value in derivatives, it is a value beyond what the market does intrinsically (its micro perspective on the world). It would be one after a radical reorientation towards a macro-perspective that honours what it now excludes as externalities. In this sense – and only in this sense, Philippe Henrotte's statement could open to other imaginations: "The value on the financial market won't give you a prediction but a vision on what this event could be."[100]

COLLECTIVE XII

POSTSCRIPT

A PROVOCATION: ALIENATE IN THE DERIVATIVE CONDITION

Our stance is not the precarious condition in which we are forced to live and to which we are hence made to identify with – we are in precarious circumstances not only because the system doesn't afford us with better conditions but because we oppose the system as such. We are – by our own choice – alien to the system.

But instead of a further directional *acceleration* – whatever new purport such a move might have in excess of Gilles Deleuze and Felix Guattari's dictum "Not to withdraw from the process, but to go further, to 'accelerate the process', as Nietzsche put it: in this matter, the truth is that we haven't seen anything yet"[101] and a de-radicalization of

[100] Henrotte, loc.cit.
[101] Gilles Deleuze and Felix Guattari. Anti-Oedipus. Capitalism and Schizophrenia (Minneapolis: University of Minnesota Press, 1983/2000), pp. 239-240.

Nick Land for the Left – we might better think and act through *derivativizations* (to only once use such an impossible term) to confront-by-accompanying the risky bifurcations of non-directional volatilities (the aesthetics of resolution approach is but one example). Here, it *makes* sense to get together and elicit derivative mutualities against the risks we don't want as well as derivative affiliations for the risks we are poised to take. The power and generosity of such an embodied and shared *poiesis* (a specific making) is the contagious laughter against (into the face of) the reactionary testosterone competitive logic capitalism will always favour against any other from of conduct.[102] In the age of the *Anthropocene*, self-interest – automated or not – is a recipe for disaster.

Michel Feher's proposal to resist by adopting the system's strategies and tactics and to work from there has currency but it shows only one face of the coin. The other face is the scandal of separation and segregation, which must be addressed through the black box and all the other enclosures, gated communities and access-denials we are confronted with.

If we are alien, then let us be alien together. But let us be alien together in all the facets such derivative dividualism generates, and with the support of each technology that can be used to alienate us even more against the system. Because here lies a volatility that the system cannot calculate, calibrate and recalibrate. It opens and generates myriads of qualitative 'out-of-the-many options' whose 'smile surface' has no quantitative correspondent in price. Therefore, instead of insisting on a given fundamental value of the priceless, let us construct the priceless by our own ingenuity.

[102] To emphasize, finance is a purely male construction of violent competition. Nothing has changed in this respect with the new breeds of automated trading (up to 80% of male elite university graduates go into finance). On the contrary, this utter disgrace is highlighted by the fact that financial markets wield power over the lives of all in a global world that is ever more steeped in competition and where care is a lowly paid externality. But care is the fundamental function of finance if it is to have a social and cultural foundation and function. (A first would be to take issue with finance's outrageous gender discrimination – ironically, usually defended with a hint to the hardships of competition that only men can endure). The good news is that there are a growing number of (female) writers and activists who engage with finance and its wider implications. The scope of these debates is naturally extremely wide, and reaches from e.g. Ann-Christina Lange, Marc Lenglet and Robert Seyfert's "Cultures of high-frequency trading: mapping the landscape of algorithmic developments in contemporary financial markets" (*Economy and Society* Vol. 45 No. 2 2016: 1– 17) to e.g. Michelle Murphy's, "The Girl: Mergers of Feminism and Finance in Neoliberal Times," in *S&F Online*. The relations of art and finance are the topic of a special issue of *Finance* and Society that is co-edit by Suhail Malik and me. It presents critical readings as well as proposals for new practices by a younger generation, such as Victoria Ivanova, Laura Lotti and Emily Rosamond, Matthias Tarasiewicz, Sophie-Carolin Wagner, amongst others.

De Sign your Self-Colonization as Human Resource Micro Brand and Consume your Awareness You are Not as Rare as Reality

PRACTICE PORTFOLIO

2010-2015

DERIVATIVE BOND EMISSIONS.
Issue for post-individual subjectivities, 2009

#6 of an ongoing collection of text works

INTRODUCTORY NOTE
TO THE PRACTICE PORTFOLIO

I described my practice approach in chapter 1 of this thesis.
However, I would like to add a few remarks as an introduction to the practice part of the thesis:

The practice portfolio assembles projects developed within the scope of my thesis between 2010-2015. My approach to art practice is post-media and post-disciplinary: In relation to my work, the first term refers to a practice that manifests in a multitude of techniques and genres, such as video, installation, performance, text, code, graphics, and sound; the second term extends the notion further into a conversation with and a discussion of a diversity of fields of research. By bringing different voices, works, and technologies together, I aim at producing assemblages that I would like to describe as invitations to engage with content and material, and all their possible interconnections emotionally, affectedly as well as intellectually. Only when we commit ourselves fully to the urgent questions of our time will be be able to develop agency in the world and beyond the current modes of contemporary art and the art market.

Such an approach cannot be realized alone. (the concept of the artist genius – still upheld in the art market – is a reactionary answer; its entrepreneurial spirit ornates the current neoliberal order.) I therefore work in close companionship with colleagues and friends. As such, my own practice is an assemblage of different contributions on different layers of collaboration.
With gratitude and thankfulness I would like to mention at least those who have been with me in many of my projects in the last years and wihtout whom they would not exist:
Sylvia Eckermann, Alois Bernsteiner and his team, Szely, the members of the Technopolitics working group, and my deceased friend Christoph Cargnelli.

A final remark on my current (2016–) practice: the works within the context of the “aesthetics of resolution” and “the figure of the renegade” presented in this portfolio define a first conceptual and artistic approach to the topic. I will continue to work on this artist-activist project. There are two concrete projects I am working on at present:

- The video assemblage *Two Globes Forming A Circle. Dividual Recalibration, Automated*, 3-channel video with Elie Ayache and Philippe Henrotte that will also feature algorithms and objects (forthcoming 2017). The transcript of the video interview is included in the thesis in the Appendix to the practice portfolio.

- A film and exhibition project (working title: *Renegades, Traitors, Educators*).
The algorithmic trading expert and whistleblower Haim Bodek has agreed to share his in-depth knowledge in order to expand and reorient his whistleblower practice. On the basis of this detailed canvas, the project addresses the current mode of finance. It maps and visualizes algorithmic practice from an insider’s view and discusses the findings in a larger social context. The project’s goal is an activist practice that deepens the promise of an aesthetics of resolution and the figure of the renegade, which is its own moment of counter-action.

ON PURPOSE.
The New Derivative Order

Kunstraum Bernsteiner, Vienna

February 28 – April 25, 2012

A first body of work on derivative markets and their impact on society and social relations that I developed from 2010 to 2012 was shown at the Kunstraum Bernsteiner in Vienna.

ON PURPOSE. The New Derivative Order

Kunstraum Bernsteiner, Vienna
February 28 – April 25, 2012

...the market is always right, it's a life form that has being in its own right. You know in a Gestalt sort of way – it has form and meaning – it has life, it has life in and of itself ... and we are a sum of our parts, or it is a sum of its parts.
Unnamed trader, in an interview with sociologist Karin Knorr-Cetina

| Speculation—Risk | Credit—Debt | Contingency—Probability |
| Value—Price | Volatility—Leverage | Algorithms—Decision-making |

The impact of financial markets on the social construction of reality has become thoroughly evident. From this perspective, a society that has incorporated economic interpretations of narratives and concepts such as credit, debt, risk or speculation faces a specific challenge: To what extent have we abandoned the present for a future we cannot know even if the most complex mathematical models are employed?

ON PURPOSE. The New Derivative Order addresses the terms preposed, which have been appropriated by financial and economic interests to a high degree. The aim of the exhibition was to engage in a discussion around these terms and their respective relevance not only for our perception of the world but also its production. This included the arguably all-encompassing, net-like appearance of the financial empire, repercussions on social institutions and the effects on individual modes of self-realization. The artistic involvement did not stop at a critical account; rather, potentials were addressed that go beyond the status quo of a neoliberal and financially dominated world in order to multiply the narratives and fictions behind the above-mentioned notions by re-formulating individual and common agencies.

ON PURPOSE. The New Derivative Order was an exhibition in progress. It hosted artworks and performances as well as talks and discussions with economists, traders, sociologists, philosophers and artists. The events and their participants were objects and exhibits equal to the installations, videos, voices, drawings, texts and algorithms – they all inhabited and populated the space (partly temporarily) and created contexts for thoughts, acts and objects and thus for further research as an associative practice.

Exhibition

The exhibition was part of an ongoing project that offered a platform for a profound exchange between art, philosophy, sociology and finance.

Calling for a radical reflection of the issues at stake, the project assembled contributions to a critique of financial biopolitics in order to attempt a redefinition of narrative structures in-between social evaluations and relations.

The exhibition was structured around three formats of artistic research: artworks | performance workshops and events | talks and discussions. The setting and its exhibits changed with the performances and events.

Works

Videos, sculptures, installations, photography, audio and text works, algorithms.
The works constituted aspects of an interrogation of the following questions: How is our imagination of reality changed by a perception influenced by economic and financial interests? Which purposes, ideologies and technological penetrations are behind the distortions we today see in the social fabrics on a global scope? How can we lever out dominating interpretations and realize new approaches in the area of agency in a social environment that is significantly made up of a narrative fusion of economic interest, mathematical codes and technologies of space and time.

Performative Events

The show opened with a performance, which was followed by a workshop with international performers and choreographers. The Europe In Motion workshop – a EU-project co-organized by brut (Vienna), Bimeras (Istanbul), Dance4 (Nottingham) and springdance (Utrecht) and led by Jonathan Burrows and Gerald Nestler (Vienna stage) – developed interventions revolving around the body as the place of ideological objectifications of capital and labor.
The subsequent performance event was part of the renowned *imagetanz* festival.

Talks and discussions

The theme of the exhibition was also examined on a theoretical level in talks and discussions with participants from different fields of research. These meetings addressed political, philosophical, sociological and artistic questions by close questioning financial markets and their ideological as well as methodological foundations, rationalizations, and fictions.

In this context, a PhD seminar of the Centre for Research Architecture, Department of Visual Cultures, Goldsmiths, University of London was hosted at which amongst other questions contingency was discussed as a medium in relation to philosophy, sociology, finance and art as practice-based research.

Contributions by:
Elie Ayache (financial engineer, philosopher)
Jonathan Burrows (choreographer, performer)
Sylvia Eckermann (artist)
Brian Holmes (art and cultural critic)
Karin Knorr-Cetina (sociologist)

Further contributions by:
Konrad Becker (artist) / Katja Mayer (researcher in science studies) / Armin Medosch (artist and researcher) / Stefan Nowotny (philosopher) / Felix Stalder (sociologist) / Simon Streather (artist and actor) / Peter Szely (composer, electronic sound artist) / Eyal Weizman (architect and theoretician / Members of the Centre for Research Architecture, Goldsmiths, London.

$$P = Xe^{-rT} N(-d_2) - S N(-d_1)$$

$$C = S\,N(d_1) - X\,e^{-rT}\,N(d_2)$$

WORKS

CONTINGENT CLAIM. Portrait of a Philosophy I, Elie Ayache

Video, 35’23’’

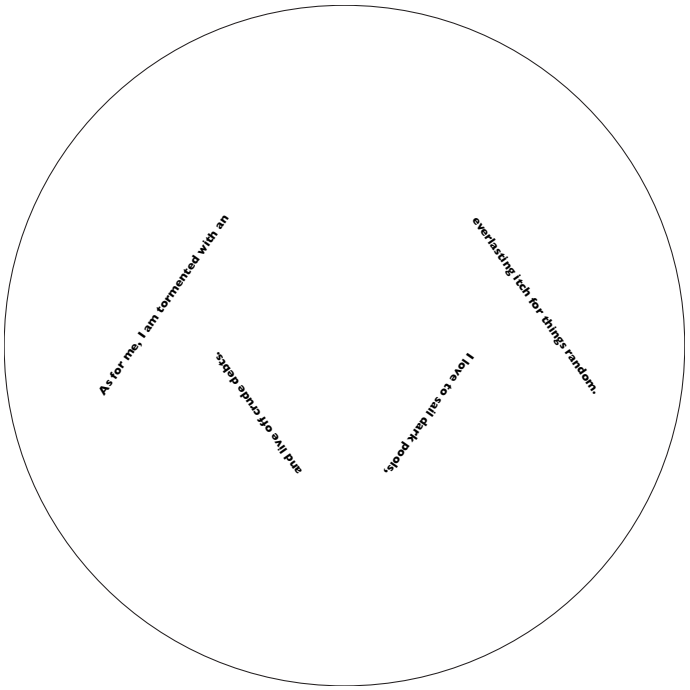
The video portraits Elie Ayache, the author of *The Blank Swan. The End of Probability* (2011). Ayache, a financial engineer and former options trader who has turned to philosophy in order to propose a new theoretical framework for financial markets in which contingency replaces probability, speaks about derivative trading in relation to philosophical concepts developed by Quentin Meillassoux, Alain Badiou, Gilles Deleuze and Henri Bergson, amongst others. By referring to J. L. Borges’ Pierre Menard. Author of the Quixote, he conceptualizes price discovery as a form of writing (derivatives). The exchange of contingent claims (written) to him constitutes the “technology of the future.” The video was shown as part of the assemblage *Bottomless Pit, Elastic*.

BOTTOMLESS PIT, ELASTIC
Assemblage

A trampoline or swing, the sculpture's volatile architecture when set in motion by the visitors starts dancing the random walk. The skeleton of a new and all embracing"being" or "life form," its flesh is composed of an archival net of molecular material, a tapestry abundant in historic and contemporary attempts to rationalize the situational and contingent economy of the future. The work assembles attempts to craft a situational technology which "creates future(s)" on financial markets as well as critical and opposing voices. By making the inherent volatility of the financial framework come alive the assemblage calls for a radical artistic and theoretical involvement in re-addressing practices and notions such as credit, debt, risk, margins, speculation, and automation to counter what is at stake when we exploit our and the earth's future at present.

LA DERIVATION HUMAINE

Text work: Modified quotes from different sources (e.g. Jack London, *The Heart of Darkness*).



SPEECH ACT ALGORIZM

Drawing / Writing in progress

A large piece of paper served as the recording medium of the discussions and talks and became a medium of agency over the course of the exhibition. The Black-Scholes-Merton formula – applied to calculate prices in derivative option trading – was inscribed as a "water mark". Arguably the most significant mathematical model of our time, it was awarded with the Nobel Prize in economics in 1997. The 1987 market crash is considered the event when the this model collapsed in the face of trading as an emergent activity. Nevertheless, the formula continues to be used widely to calibrate option prices in order to protect against incommensurabilities. Speech Act Algorizm appropriated the notion of recalibration to critically address social and cultural moments of derivativisation and to activate a turn from transaction to action.

I'VE NEVER SEEN ANYTHING LIKE THIS

Audio recording

Financial algorithms (a term that refers to the 9th century scholar Al-Chwarizmi) are applied to perform complex operations at low latency. Currently operating at millisecond speed, high frequency trading is conducted beyond the threshold of human cognitive abilities. Thus, decision-making processes are increasingly based on automated algorithmic processes. The Flash Crash on May 6, 2010 was a watershed event in financial history, as it marks the first major market crash triggered by algorithms. A live audio recording covering the incident from the S&P trading floor in Chicago gives evidence of the event's severity.

VOLATILITY SMILE
On Enduring Performance and Participation

The performers stage a living sculpture or tableau vivant derived from Salvador Dali and Philippe Halsman's photographic collage In *Voluptas Mors* (1951). The common task is to physically realize a virtually impossible approximation to the historic photomontage and to hold the position as long as possible.Far from being surreal, the time-based sculpture effects a visual experience of a fragile beauty.

Epitomizing the absurdities that materialize in the spectacular reconstructions of commonality, the provocations by the corporate reframing of leverage, debt and solidarity become corporeal.

With Agnieszka Dmochowska, Karin Pauer, Gabri M. Einsiedl, Julia Mach, Filip Szatarski, Jasmin Hoffer, Martin Tomann.

Original photo by H
alsman and Dali, 1951

LOVE IN THE 21st CENTURY (COOL POP)

Love in the 21st Century (Cool Pop) re-actualises Robert Indiana's sculpture *love* (1964) by calling into question the state of mutual recognition in the current social climate and the interpretation of the term CREDIT under neoliberalism.

Installed in the courtyard of the exhibition space, the ice sculpture melted away under adverse conditions to its constitution.


CRE

Next page:

Special project in the Basement

CRYSTAL MATH

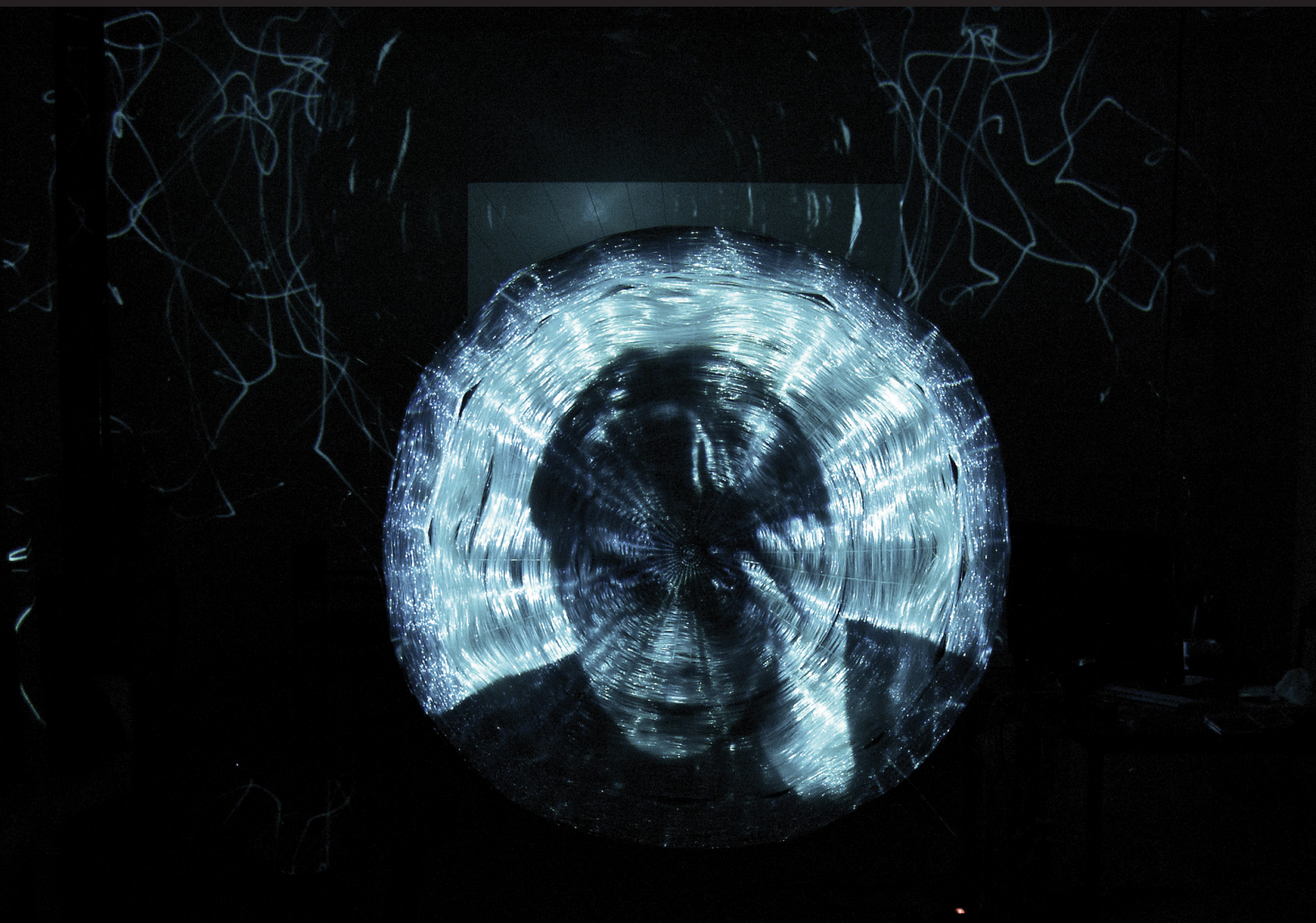
1-channel video with 5.1 sound

Video installation: Sylvia Eckermann
Lyrics/title: Gerald Nestler.
Sound: Peter Szely. Voice: Simon Streather

With thousands of meters of nylon threat, Sylvia Eckermann weaved a spider web-like projection screen to visualize the utilization of networks as traps that catch pray rather than as communicative realms of social media. Her captivating “expressive verbal image” (Sabine Dreher) addresses a pervasive scheme ranging from financial markets to data retention to the Web 2.0. The branding of Facebook as a social network and agent of change, for instance, stands in stark contrast to its market value as a “dark pool” (an unregulated exchange place) of economic information exploitation by means of big data technologies.

As regards finance, algorithms derived from mathematical models make up about 70 per cent of transactions in major markets; further to that, decision-making is being sourced out to these processes, as transcations at micorsecond speed are all too fast for human cognition. Thus, the recent quantitative turn in finance manifests a growing dependence on, if not addiction to, mathematically computed calculus – a ‘truth’ expressed in the probabilitsic approximations of a divinatory science of sorts.
Unfolding beneath the profound abyss of split seconds, a gulf opens not only between human and artficial actors. Beyond predatory schemes of competitive advantage, a parasitic system that is at the same time the host produces risks that open up to yawning chasms in the social fabrics of societies, their institutions and their productive capacities.

The contingent and therefore manifold options of shaping the future feed derivative fictions of a future-at-present. The voice of Simon Streather enunciates these bottomless pits put into words by Gerald Nestler, whose lyrics The New Derivative Order depict the market as a being that breeds our “recombinant social DNA.” Oh baby! How you nourish me!



In the Eye of the Storm the Future Rests
Assemblage, drawing

Based on the architectural design of the trading floor that precedes architectural modernity (a patent by Ruben Jennings, 1878) the work maps its relations to contemporaneous developments in communication technology on the one hand and historic precursors such as the Greek theatre (initially a place of oracle) on the other hand. The collage produces a panorama that traces divinatory practices from the construction of the oracle after consultation in ancient Greece to a construction of oracular price discovery during consultation in market making. The characteristics of today's scopic and global theatre of finance become increasingly visible, as the potentiality and subjectivity of the present moment disolves in hollow promises of a future-at-present.

This page: Lecture and discussion with Brian Holmes (lecture) and the Tchnopolitics working group.

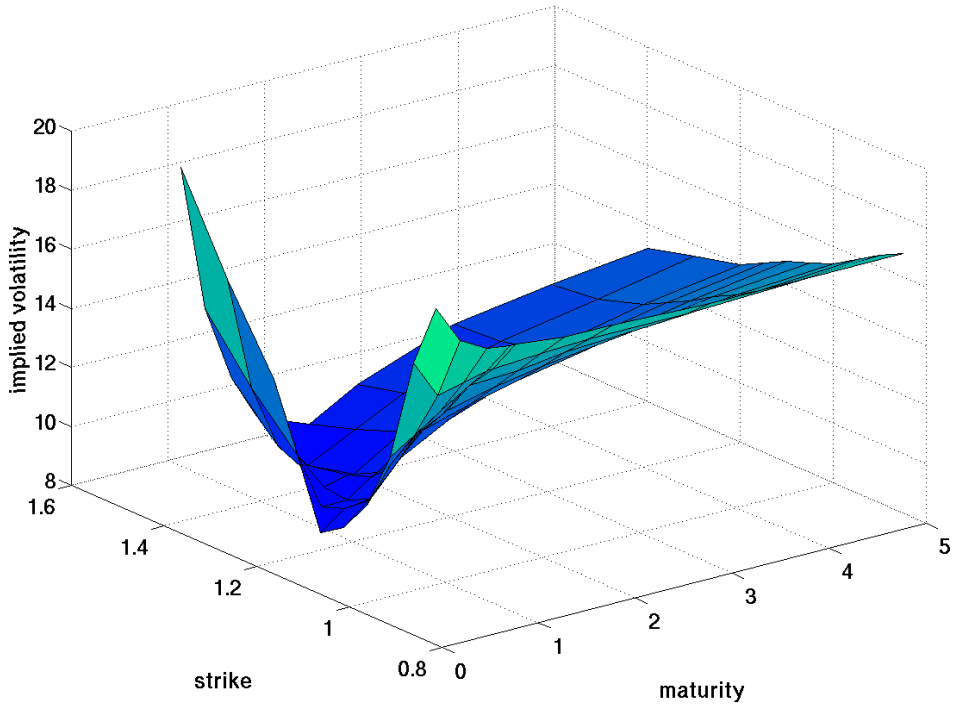
Next 2 pages: Performance event during the *Imagetanz* Festival


EPIC
FAIL


EPIC
FAIL


GREED

The fabric mounted in the exhibition space was modeled after the so-called “volatility smile” (see graph below). These implied volatility patterns signify deficiencies in the Black-Scholes option pricing model which assumes constant volatility. Unknown before the crash of 1987, this theoretical anomaly of option trading implies that contingencies, i.e. events that cannot be foreseen, reduce standard probability calculus to absurdity. Following the crash, out-of-the-money options, which have no intrinsic value and tend to erode quickly, have been priced higher to due a loss of confidence in the standard model.



Special thanks to:

Alois Bernsteiner and his team who made this exhibition project possible.
Sylvia Eckermann.
Elie Ayache, Christian Droste, Susanne Haider & art:phalanx, Brian Holmes, Bettina Kogler & brut, Karin Knorr-Cetina, Katja Mayer, Armin Medosch & the technopolitcs research group, Bruce Stinson, Klaus Strickner, Felix Stalder, Peter Szely.
And everyone at the Centre for Research Architecture, Goldsmiths, University of London.

www.friendsandart.at/GeraldNestler/onpurpose.html

Next page: *The New Derivative Order. Register*, text work, material, size variable, 2014

THE NEW DERIVATIVE ORDER

My skin's a neat thing
Inhibiting and enforcing
Waves of corporate nervous streams.

My flesh is a neat thing.
Moving about freely
I rise again and again
To spill my love into you.

Pervasive
Accumulative
I commune.
Ecstatic
Erratic
I sing my volatile tune.

I change modes
And composition.
I contract commodified visions.
I'm your recombinant
Social DNA

I thrive
When you gather in hope.
And I wither
When you fall in despair.
I move in seasonal tides
But my seasons
Are way to elusive
For you to cherish the ride.

So be assured!
In your presence I dwell
And I smile
At the surf of all your human desires.
In your future I thrust
And I gaze
At the tide of your falling pride
When you yell at my depthless mires.

Oh! You drink me and drown
Oh! You eat me and choke.
For it's you I digest.
For it's you in whom I invest.
Oh, baby! How you nourish me!

I change modes
And composition.
I contract commodified visions.
I'm your recombinant
Social DNA

But some say: I am running on empty,
Uncovered,
And that it's a crime.
My lifespan is but a quarter
And my value's not worth a dime.

They say: I'm a loaded gun,
A structural affliction.
And that my derivative yields
Only feed bubble-fiction.

They say: I'm reason's veil
A mere mirror of your emotions.
I only reflect what is pale,
A blasphemous contortion,
A daimonic religion to fail.

But my love! Be assured!
I'm a bastion of calm
For I won't disappoint you
When you come and surrender again.

Oh! You drink me and drown
Oh! You eat me and choke.
For it's you I digest.
For it's you in whom I invest.
Oh, baby! How you nourish me!

Oh! It's a quick deal.
Oh, such an easy feel',
You make me live
And I make you die
For intertwined our longings lie.

I change modes
And composition.
I contract commodified visions.
I'm your recombinant
Social DNA.

Private consumption
And debt
Are all that I ask
And here is my bid in exchange:
That into my branded mind's
Immaterial texture
You breathe out your name.

So be assured!
I fulfil your dependence
On financial nutrition,
On unquenchable futures,
And that game of hire and fire.
Oh, baby! All those thrills
you so dearly admire.

I change modes
And composition.
I contract commodified visions.
I'm your recombinant
Social DNA

Quasi-poetic science
Co-opts alliance
Charging my voice.
I renew my licence
Enunciating the essence
That alone is never due to expire:
You are my pray and I'm your desire.

So, my love!
Be assured!
I'm no entity
Nor nature's child.
I tender no single chance
For shorter or longer
I'm taking a glance
At you, my options advance.

And I stay put
To call that moment
Of another time
And I see its trailing behind,
An arena fluid and sublime:
All life a commodity
Exchanged in my realm.
Traded endlessly
In numbers more than divine.

My fluid body is the emergence Of truth.
It's my temporal field
Where your space becomes Loose.

So be assured!
I adore you, my lamb
But beware of my wrath.
Live in my shelter
Or your world
Shall go bust.

CARRIER HOTEL

Assemblage. video, sound, text, objects and neon

2010-2013

CARRIER HOTEL

Assemblage of video, sound, text, objects and neon,
2010-2013

Carrier Hotels are no residences for human travellers. As sensitive spaces of the financial industry, their rooms are computer server hard drives and their hallways the bandwidths of data corridors. Data packets dwell for time spaces calculated in microseconds – and thus beyond human cognitive abilities – only to travel on with the lowest latency feasible. While this constitutes a social glitch of enormity for discretionary competence, a new dimension of (trans-)action patterns manifests in algorithms and derivative contracts. Questions pertaining to risk and hedging, venture and insuring as well as credit (debt) and security are posed on a speculative level whose volatile fluctuations oscillate between the poles of probability calculus and contingent events.

In the form of a symbolic hotel room, *Carrier Hotel* assembles perceptions that put the complexity of such events in perspective. The assemblage is composed of new work but also hosts existing art works and material:

CARRIER HOTEL, 2012-2013
The architecture is composed of an appropriation of an authentic derivative contract (328 pages printed on transparent foil), which was introduced in the market in 2007 and caused a market crash.

PREDATORY GLITCH, 2010
The processing of a live audio coverage of the Flash Crash (by Ben Lichtenstein of TradersAudio) that deals with the displacement of human by automated trading agents.

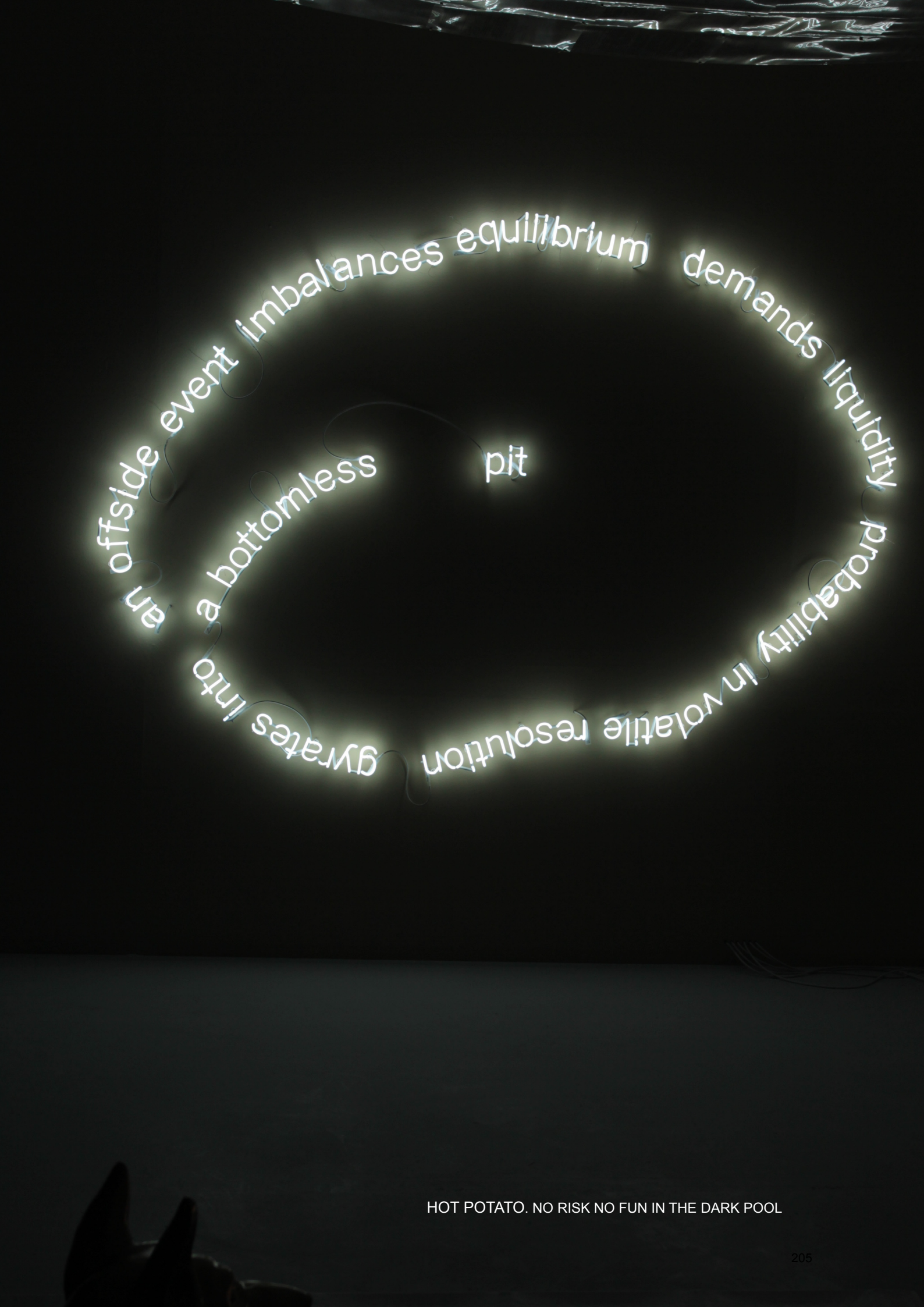
CONTINGENT CLAIM. Portrait of a Philosophy, 2012
Video with the options trader, financial engineer and philosopher Elie Ayache on a new philosophy of derivative markets that attempts to replace the paradigm of probability with one of contingency.
Description see project ON PURPOSE above

HOT POTATO. No risk no fun in the dark pool, 2013
Neon text work on the occurrence of a signal event as a bifurcation on the ‘social event horizon’. For both mathematics and theology, the circle is the symbolic icon of perfection and truth. While religion resorts to divine providence, quantification rationalizes governance by rendering uncertainty fungible through calculable risk commodities. While the past becomes a random figure, a deficient but nonetheless valuable stochastic reservoir of historic data calibrated to model future probabilities, the future turns into a becoming that eclipses the very notion of the moment. At this horizon of human experience, a violence takes hold that is unnamable, as the flashes of its now have no opening — it only strikes collaterally; and we face a bottomless pit of “capitulation” on all fronts when that instant leaks into a moment (the same moment yet a micro-fraction after the instant) and noise starts inflating into a bubble. The instance of an event and its contingent complexity deform the circular perfection of truth and eternal circulation; the idealist icon melts into the wobbly shape of a potato and the root of an abysmal bifurcation emerges right at the social event horizon.

Carrier Hotel was shown at *GLITCH. Unser Schreibzeug arbeitet mit an unseren Gedanken*
An exhibition by Medien.Kunst.Tirol at Kunstraum Innsbruck, 2013.


an outside event imbalances equilibrium demands liquidity
resolution gyrates into a bottomless pit

This and the previous page: CARRIER HOTEL, assemblage, 2012-2013



HOT POTATO. NO RISK NO FUN IN THE DARK POOL

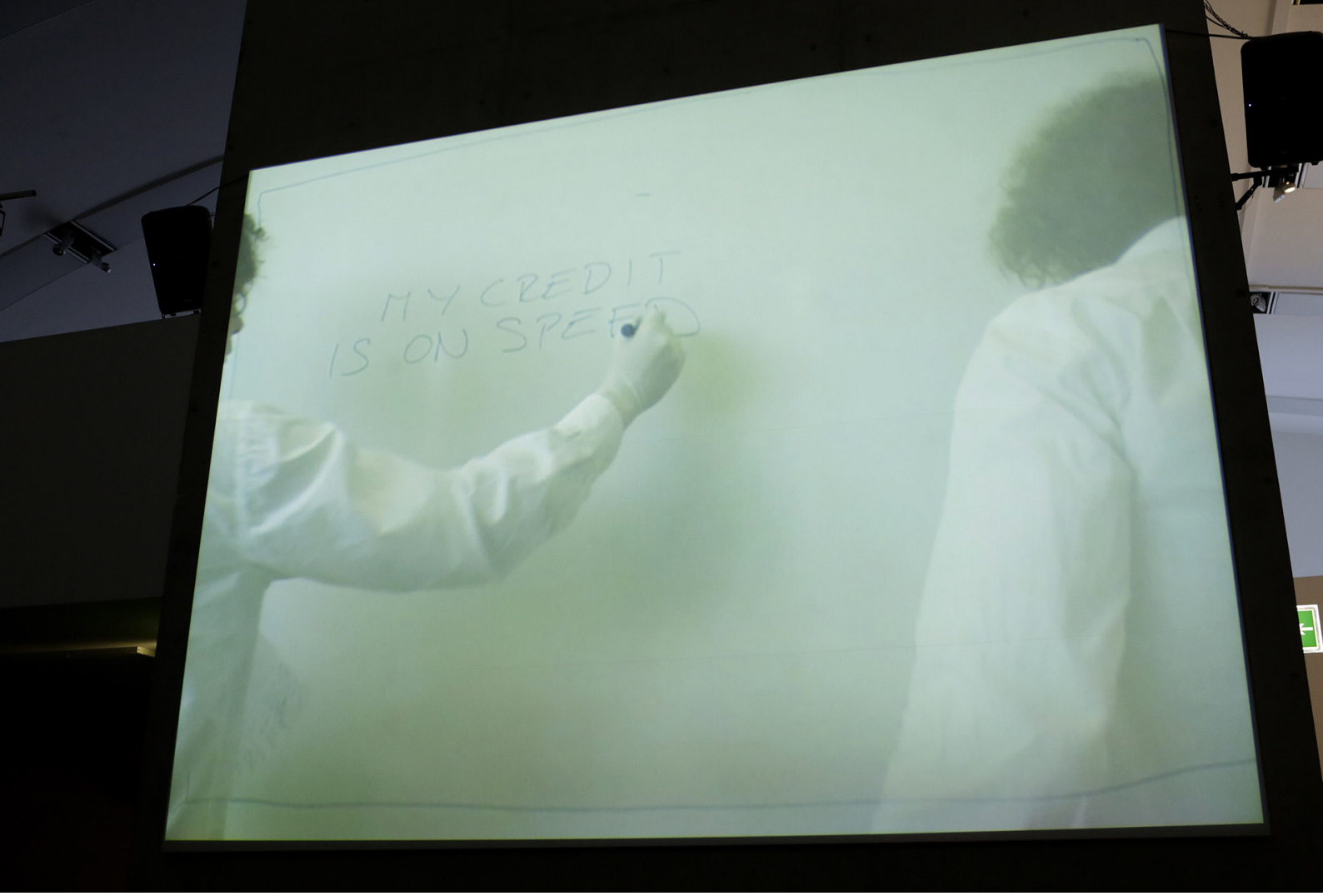

pit

CARGO CARRY CULT

Charged voyages in algo measure

Lecture performance and video
with contributions by Tav Falco

Kunsthalle Wien, May 22, 2013

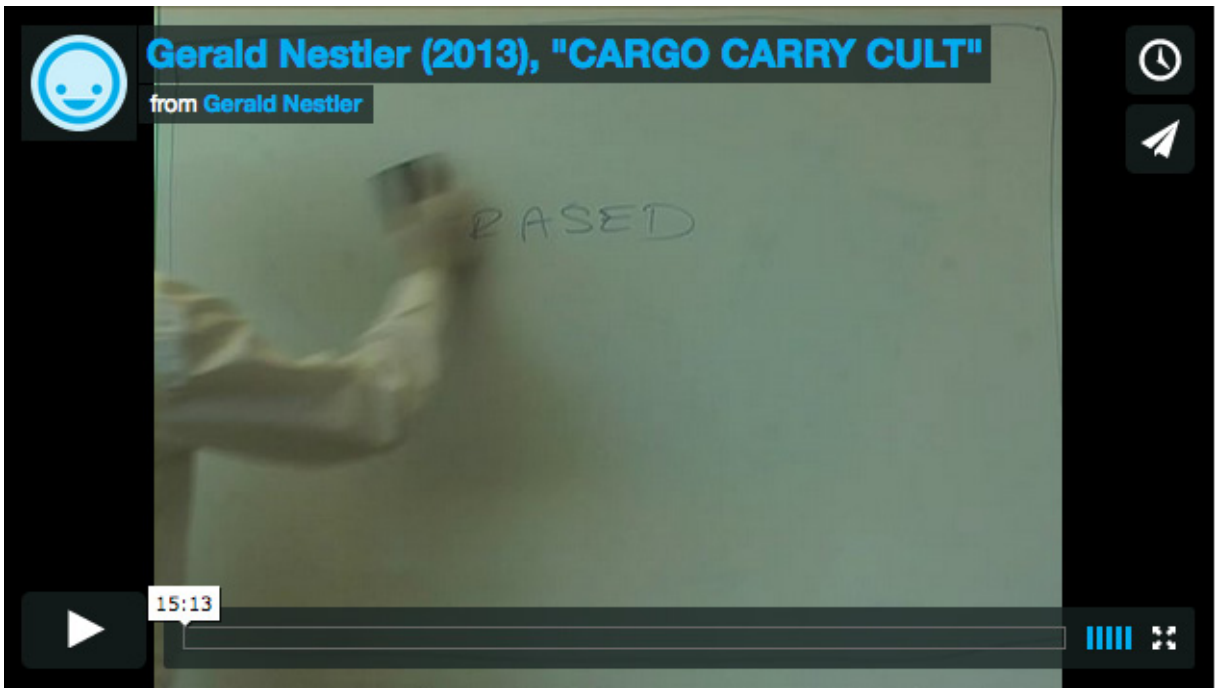

MY CREDIT
IS ON SPEED


EAKERS, SYCOPHANTS,
RTISTS, AIR KISSERS,
S, CREEPS, ASSHOLES,
BIG SHOTS,
ICIDES, SUB

CARGO CARRY CULT
Charged voyages in algo measure

Lecture performance and video by Gerald Nestler
With contributions by Tav Falco, May 22, 2013

WWTBD - What Would Thomas Bernhard Do
Kunsthalle Wien and Wiener Festwochen
Curated by Nicolaus Schafhausen and Lucas Gehrmann, Cathérine Hug
May 17 – 26, 2013



VIDEO LINK: https://vimeo.com/channels/792814

While the visual stimuli of financial
market transactions appear anaemic,
their mathematically generated
but
nevertheless erratic
moments
exalt the imagination.

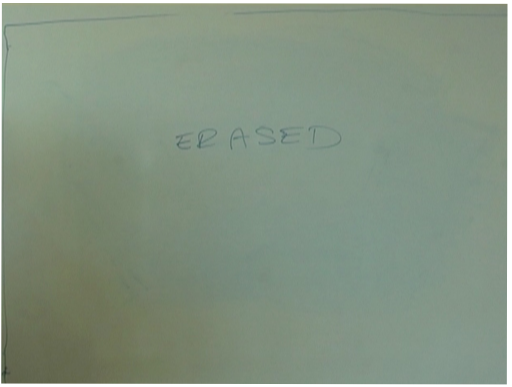
Perpetually seeking dissolution,
surreal dichotomies of relationships
open up between
invisibility and omnipotence
inconceivability and ad hoc access
time as an object
and space
as the transcendent medium
of objectification.

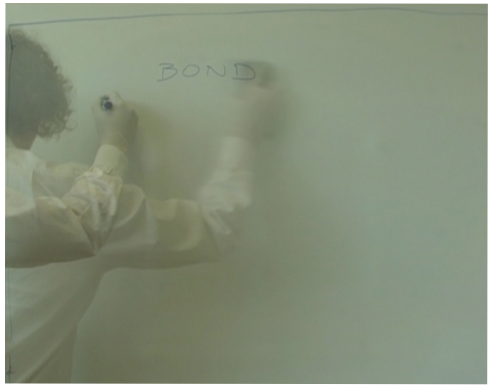
While the ancient Greek placed coins
on the eyes and tongues of their deceased,
– to pay Charon for passage to the realm of the shades –
the phenomenal world of terrestrials darkens and suffocates
in the presence of
algorithmic flashes
whose moneyed microseconds establish
a social event horizon beyond human perception.

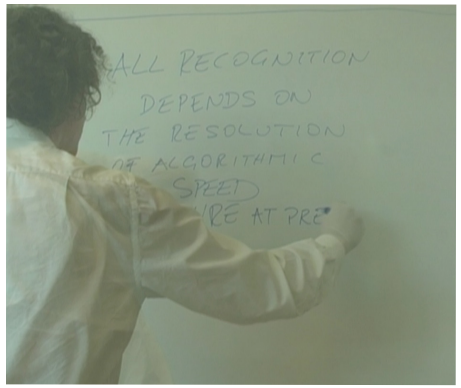
The aesthetics of code below-threshold
conceal an elaborate fiction.
It glorifies
mind and body as volatile
quantifiable neuronal objects.

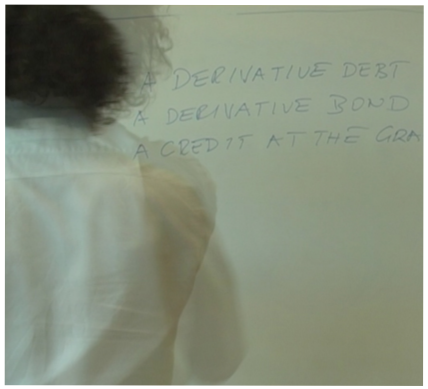
Neither of us is present at such dizzying heights
but as potential resource.
The automated crest they call the future
consumes the present before the moment emerges.

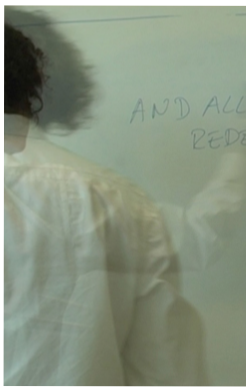
And all image erased.

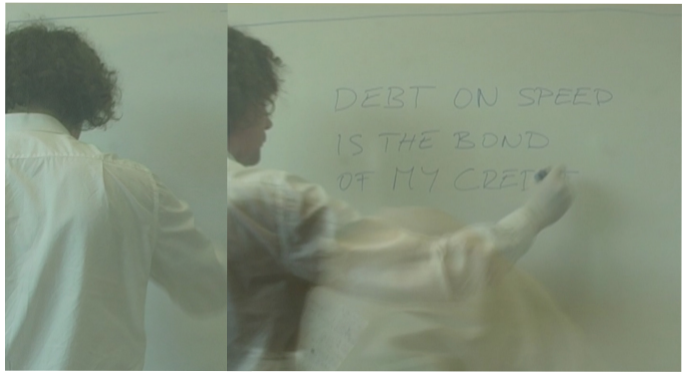

ERASED

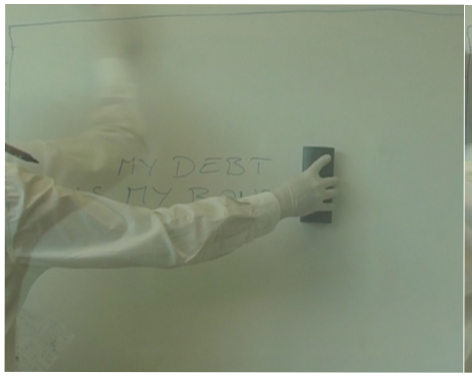

BOND

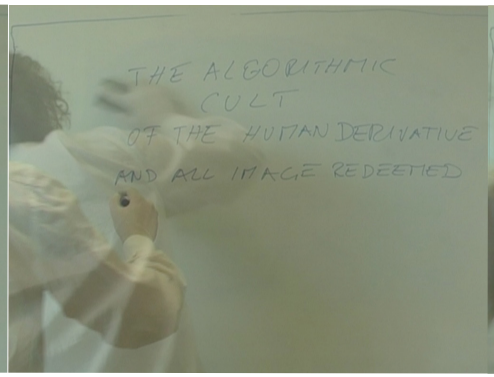

ALL RECOGNITION
DEPENDS ON
THE RESOLUTION
OF ALGORITHMIC
SPEED

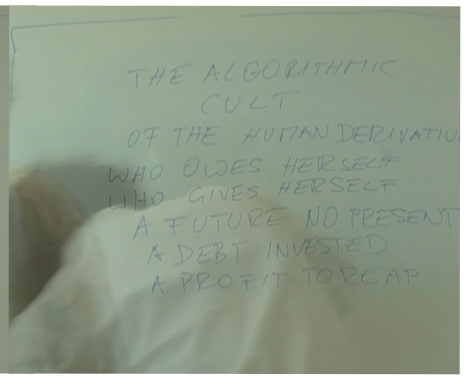

A DERIVATIVE DEBT
A DERIVATIVE BOND

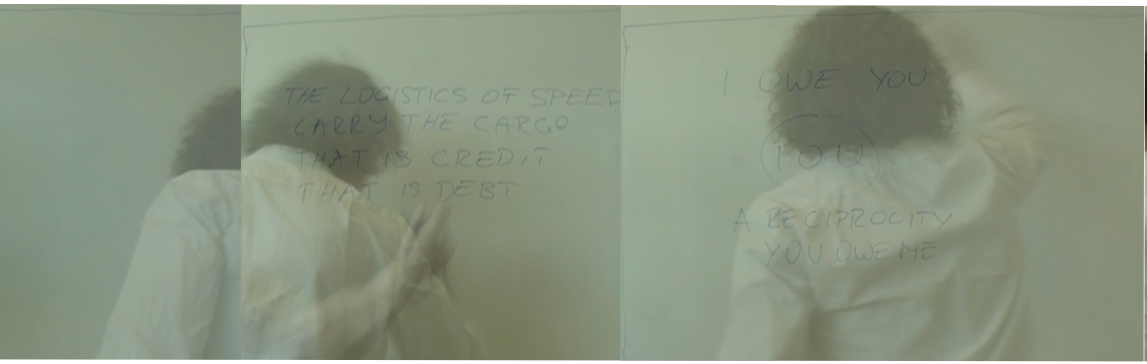

AND ALL

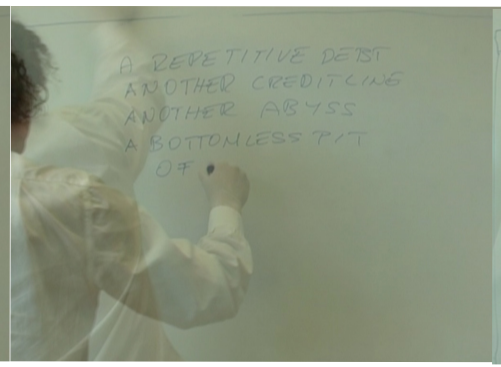

DEBT ON SPEED
IS THE BOND
OF MY CREDIT

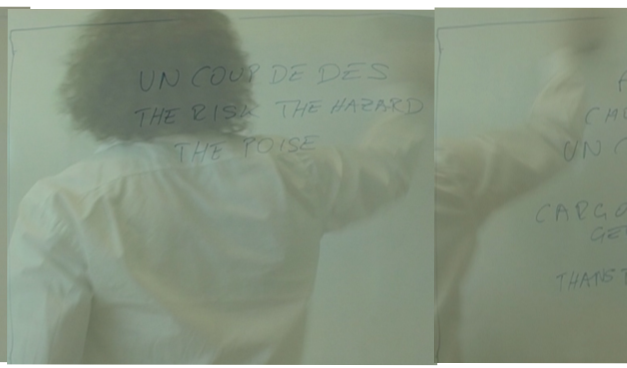

MY DEBT

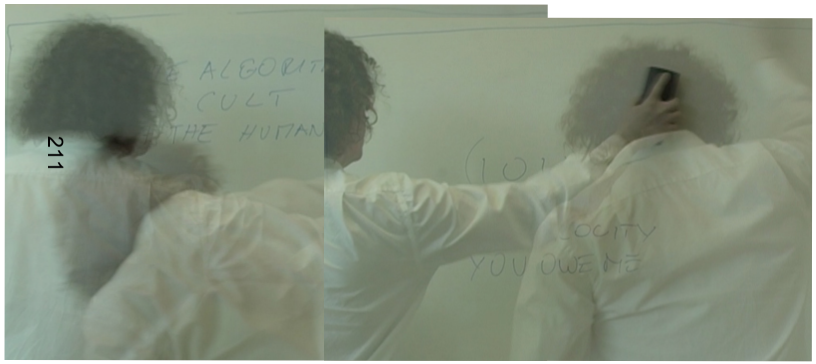

THE ALGORITHMIC
CULT
OF THE HUMAN DERIVATIVE
AND ALL IMAGE REDEEMED

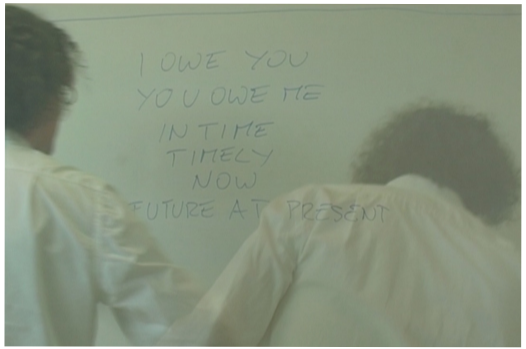

THE ALGORITHMIC
CULT
OF THE HUMAN DERIVATIVE
WHO OWES HERSELF
WHO GIVES HERSELF
A FUTURE NO PRESENT
A DEBT INVESTED
A PROFIT FOR CAP

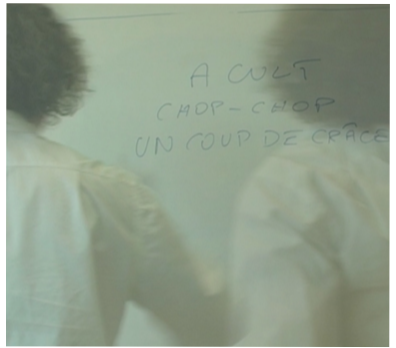

THE LOGISTICS OF SPEED
CARRY THE CARGO
THAT IS CREDIT
I OWE YOU
(IOU)
A RECIPROCITY
YOU OWE ME

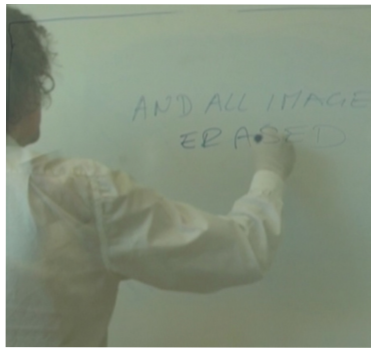

A REPETITIVE DEBT
ANOTHER CREDITING
ANOTHER ABYSS
A BOTTOMLESS PIT
OF


UN COUP DE DES
THE HAZARD


(IOU)
YOU OWE ME


I OWE YOU
YOU OWE ME
IN TIME
TIMELY
NOW
FUTURE AT PRESENT


A CULT
CHOP-CHOP
UN COUP DE GRACE


AND ALL IMAGE
ERASED

Special thanks to:
Tav Falco and
Lucas Gehrmann

Aesthetics of Resolution

and

Portraits of a Philosophy series

Research project and video series

2013 - ongoing

Aesthetics of Resolution + Portraits of a Philosophy Series

AESTHETICS OF RESOLUTION

Initially outlined with a critical reading of an analysis of the Flash Crash 2010, the concept was further developed for a conference at the Serralves Museum, Porto (Nov. 2014) and an exhibition entitled “HEGDE AVANTGARDE. renegades, traitors, educators.”

Video footage, images, graphics, voice, performance, objects and texts provide the material for an artistic as well as theoretical inquiry that resonates around the issue as to whether the conditions of perception and agency in the era of black boxes are being modified – if not disintegrated – into myriad derivative devices that are custom-built to exclude (capitalize) and at the same time internalize (socialize) underlying human capital/assets.

This begs the question whether an “aesthetics of resolution” could serve as a poietic toolbox to counter proprietary schemes by employing the full purport of the term from technical to social and political agencies of resolution.

The arbitrary, marginal but at the same time insurgent figure of the renegade – a traitor inside systems and an educator beyond their confines – is introduced as potential pharmakon against the ruptures that transform knowledge into proprietary capital and vision into social blindness.

PORTRAITS OF A PHILOSOPHY video series

Portraits of a Philosophy is a video series on the derivative condition of the relations between natural, social and corporate bodies and minds in our time and the contingent nature of the future, the present, and the past. So far three videos were produced.

Portraits of a Philosophy Series (to date):
CONTINGENT CLAIM, Portraits of a Philosophy Series I. Elie Ayache
CONTINGENT ETHICS. Portraits of a Philosophy Series II. Haim Bodek
CONTINGENT OPTIONALITY. Portraits of a Philosophy Series III. Randy Martin

https://vimeo.com/channels/aor

geraldnestler.net
geraldnestler.net/texts_engl.htm
friendsandart.at/GeraldNestler/hedgeavantgarde/e.html

hkw.de/en/programm/projekte/2014/forensis/start_forensis.php
sternberg-press.com/?pageId=1488

COUNTERING CAPITULATION

From Automated Participation to Renegade Solidarity
High-frequency trading and the forensic analysis of the
Flash Crash, May 6, 2010

Artistic research project and single channel video, 2013-14,
produced with the support of the Haus der Kulturen der Welt, Berlin.

Financial forensics and the double figure of the expert witness

The Flash Crash of May 6, 2010 was the biggest one-day market decline in history. The Dow Jones Industrial Average plunged about 1000 points, 9 per cent of its value only to recover those losses within minutes.

A forensic investigation of this financial event, performed by the data analyst Nanex, revealed that, in contrast to claims by US authorities, which put the blame on human trading, it were in fact trade orders executed automatically by algorithms that caused the crash.

Nanex noticed evidence of market activity at fractions of milliseconds by analyzing the Flash Crash at a resolution far below conventional data records, which usually show one-minute trading intervals.

Computer-based high-frequency trading is beyond the capacity of human experience or action. In order to support their claim, Nanex used otherwise secret trading data provided by Waddell & Reed, the mutual fund blamed for the crash.

Here the traditional role of the expert witness combines the forensic analyst and the renegade company providing information by transgressing the industry's unwritten law of secrecy.

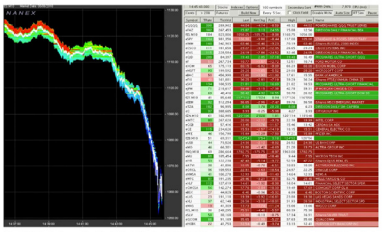
VIDEO LINK: https://vimeo.com/channels/aor

Screenshots on the following pages:

COUNTERING CAPITULATION
Single-channel video, 11:20 min., 2014

"Ninety percent of finance
doesn't know how the U.S. stock market works."

Haim Bodek,
expert in electronic trading and whistleblower



The left chart shows the Flash Crash in the S&P 500 Index Futures covered live by Ben Lichtenstein. Market liquidity is indicated by color scheme, ranging from red (highest) to violet (least). Nanex LLC

This animation shows traffic and interrelation between regulated U.S. exchanges during the Flash Crash. Nanex LLC

0.00000074 seconds

11.8 inch or 30 cm
the distance that light travels through vacuum
in one nanosecond

The computer scientist and US rear admiral,
"Amazing Grace" Hopper (1906-1992),
explains latency.

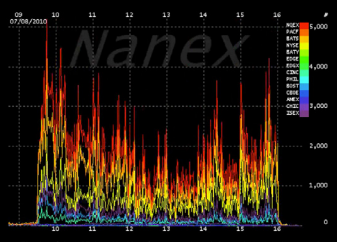
The term describes the amount of time
a message takes to traverse a system.

"You know for a fact
that there are people out there
that know what actually happened.

So in fact, this entire paper could be science fiction
or it could be dead on, we have no idea.

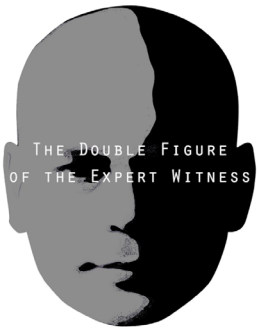
To this day we don't know because nobody is talking.
They are not allowed to talk because that would disadvantage their shareholders."

MIT finance professor Andrew Lo on a quant meltdown study in 2007



The rise of the HFT Algo Machines from 2007 through September 2013. Nanex LLC

THE FORENSIC ANALYST



THE RENEGADE WHISTLEBLOWER

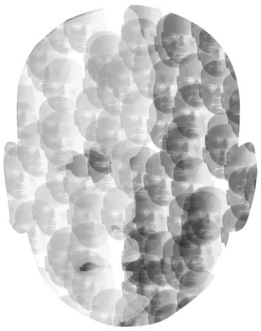
THE DOUBLE FIGURE OF THE EXPERT WITNESS

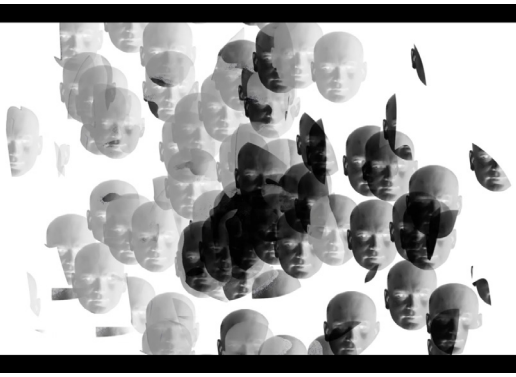
With artificial sense organs that reach into deep time,
Nanex examined quotes at the level of microseconds.

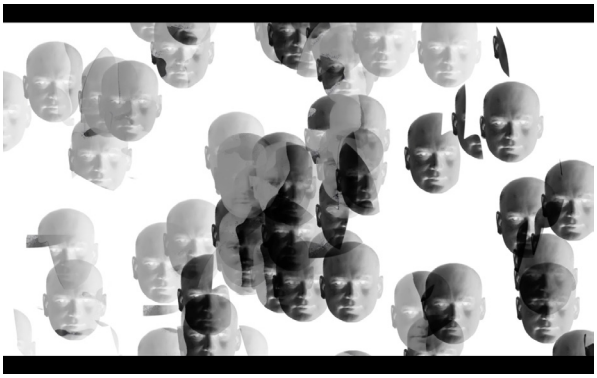
They re-performed the otherwise inextricable "scene of the crime"
by increasing the resolution bandwidth to far below a second
with tools that chart and visualize every quote and trade.

Nanex archived approximately 7.6 billion data records on the Flash Crash.

They generated over 4500 datasets and over 1200 charts
before they uncovered what in their view
precipitated a 600-point drop in just over 4 minutes.

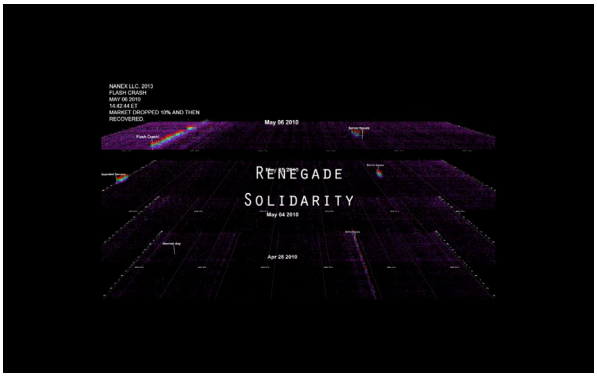


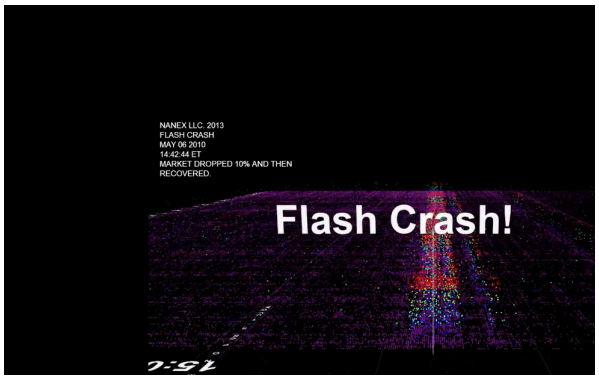


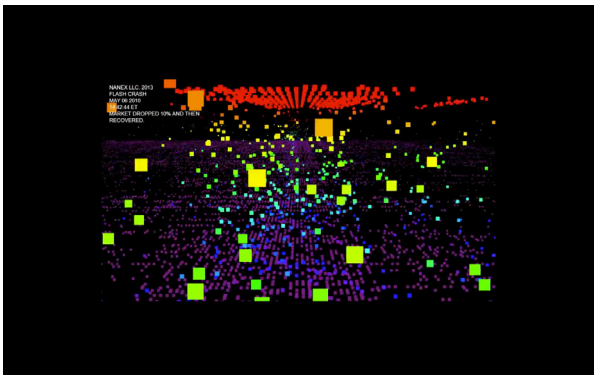


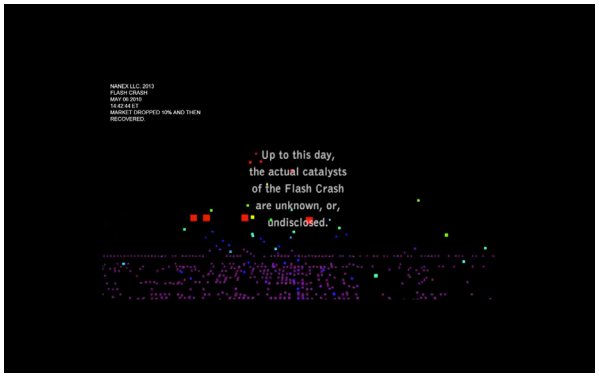
"If you see fraud and don't shout fraud, you are a fraud."

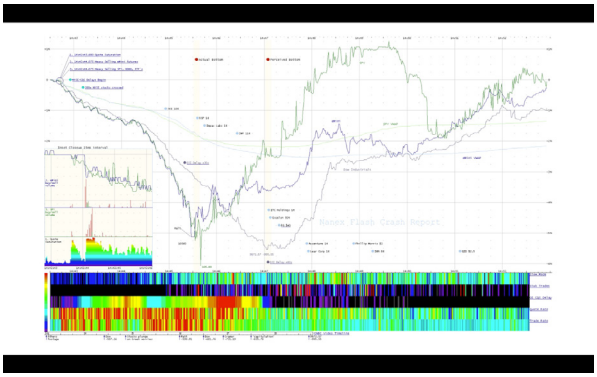
Nassim Taleb, essayist and former derivatives trader

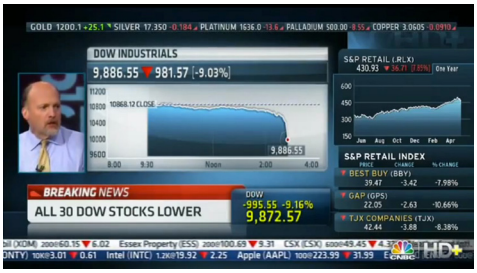




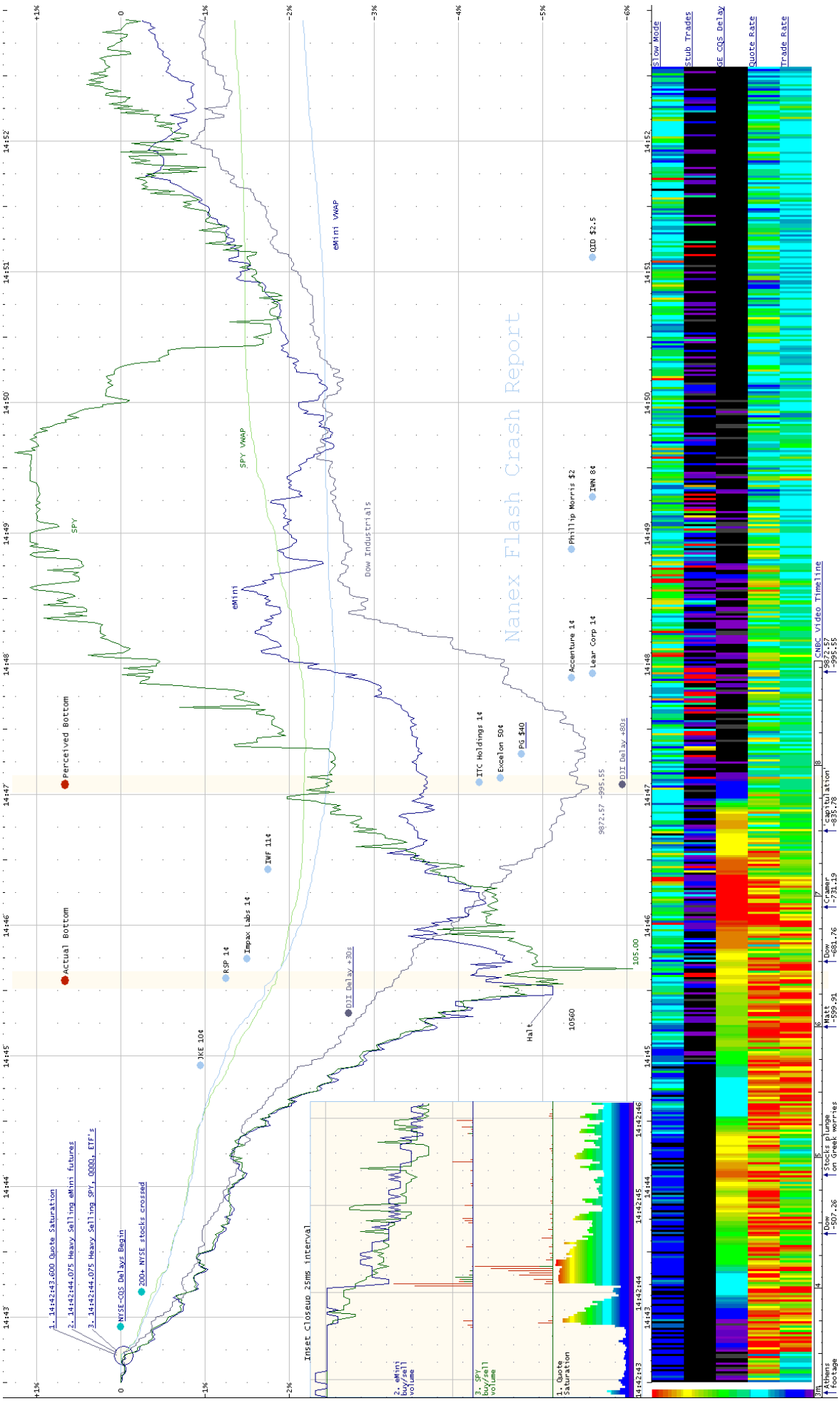






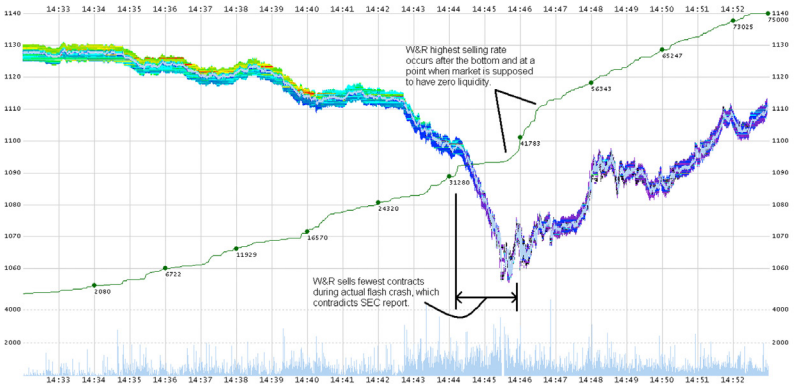


Stills from CNBC News, May 6, 2010 during the Wall Street “capitulation.” Images © CNBC

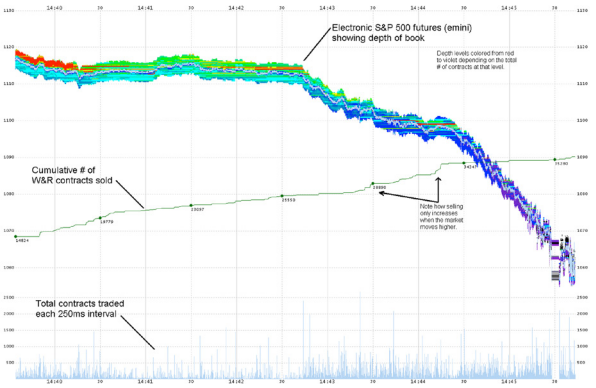


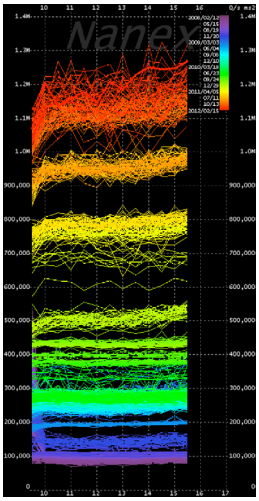
"We present this Flash Crash Summary Report using a time-line graph to distinguish the events that caused the crash from those that were effects of the crash. The main chart covers from 14:42:30 to 14:52:00 in 1 second intervals, " Nanex Flash Crash report. ©Nanex

Below: 250 millisecond interval chart. and a second interval chart.

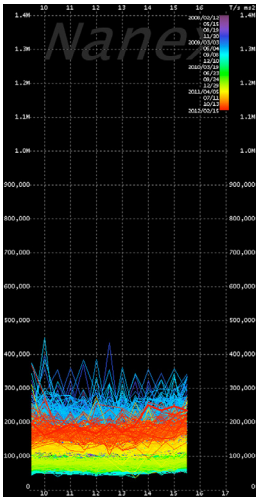


Both charts show eMini S&P 500 index depth and cumulative Waddell & Reed contracts sold.
Nanex's findings contradict the official report as regards the catalyst of the Flash Crash by showing that the bulk of the mutual fund Waddell & Reed's trades "occurred after the market bottomed and was rocketing higher—a point in time that the SEC report tells us the market was out of liquidity."
"May 6th 2010 Flash Crash Analyses: Continuing Developments: Sell Algo Trades," Nanex, October 8, 2010.





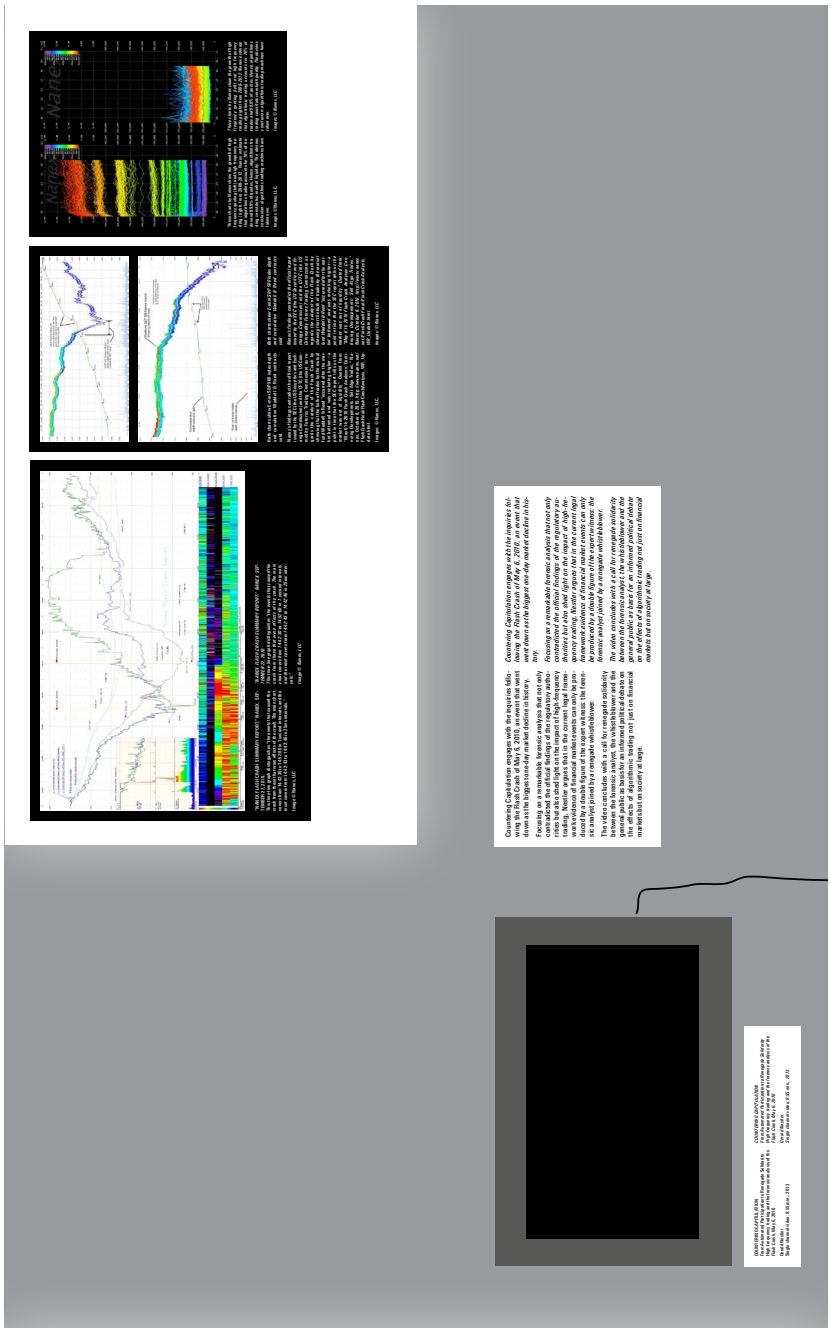
The left chart shows growth of high frequency quoting.



The right chart shows (lack of) growth of high frequency trading.

images ©Nanex, LLC.

"We present this Flash Crash Summary Report using a time-line graph to distinguish the events that caused the crash from those that were effects of the crash. The main chart covers from 14:42:30 to 14:52:00 in 1 second intervals, and the inset covers from 14:42:43 to 14:42:46 in 25ms intervals."
Nanex Flash Crash Summary Report, September 27, 2010. Images courtesy Nanex, © Nanex, LLC.



FINANCIAL FORENSICS AND THE DOUBLE FIGURE OF THE EXPERT WITNESS
Gerald Nestler

The Flash Crash of May 6, 2010 was the biggest one-day market decline in history. It saw the Dow Jones Industrial Average plunge by about 1,000 points—9 percent of its total value—only to recover those losses within minutes. A forensic investigation of this financial event conducted by the data analyst Nanex revealed that, in contrast to claims by US authorities, which put the blame on human trading, it was in fact trade orders executed automatically by algorithms that caused the crash. Nanex noticed evidence of market activity at fractions of milliseconds by analyzing the Flash Crash at a time resolution far quicker than conventional data records, which usually show one-minute trading intervals. Computer-based high-frequency trading is beyond the capacity of human experience or action. In order to support their claim, Nanex used otherwise secret trading data provided by Waddell & Reed, the mutual fund blamed for the crash. Here the traditional role of the expert witness is taken by a collaboration between the forensic analyst and the renegade company, which joined forces to provide information in contravention of the industry's unwritten law of secrecy.

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Display table layout,
FORENSIS exhibition,
Haus der Kulturen
der Welt, Berlin 2014


CASE 'LEFT-TO-DIE BOAT'
FILE KIVALINA
CASE GUATEMALA
FILE FINANCIAL FORENSICS

COUNTERING CAPITULATION, installation views (this and the previous page)
FORENSIS, Haus der Kulturen der Welt, Berlin, 15.3. – 5.5.2014
© Laura Fiorio / Haus der Kulturen der Welt

COUNTERING CAPITULATION
FROM AUTOMATED PARTICIPATION TO RENEGADE SOLIDARITY.

High-frequency trading and the forensic analysis of the Flash Crash, May 6, 2010.
Iron frame, light boxes, prints, headphones, AV-player, single channel video, 11:20 min.,
90 x 90 x 105 cm, 2013-14

In terms of what can be called an aesthetics in the field of consequences, COUNTERING CAPITULATION engages with inquiries following the Flash Crash of May 6, 2010, an event that went down as the biggest one-day market decline in history. By focusing on a remarkable forensic analysis — which not only contradicted official findings of the regulatory authorities but also shed light on the impact of high-frequency trading — the artist argues that it is impossible to produce evidence of financial market events in the current legal and regulatory frameworks except by a coincidence that Nestler describes as the emergence of a “double figure of the expert witness:” a situation that arises when a renegade speaks out as a whistleblower and joins a (forensic) analyst in a concerted effort to prove typically undisclosed facts. The video concludes with a call for strengthening renegade solidarity between the general public, (forensic) experts and whistleblowers as a basis for an informed political debate on the effects of algorithmic procedures not on financial markets alone but on society at large.

Credits:
Research, concept, text and editing: Gerald Nestler
Animation: Sylvia Eckermann
Flash Crash charts and animations courtesy of Nanex LLC
Sound editing: szely
Synthetic algo voice over: Alva & Tom
Special thanks to:
Eric Hunsader, Sylvia Eckermann, Brian Holmes, Eyal Weizmann

Produced with the support of the Haus der Kulturen der Welt, Berlin for the exhibition FORENSIS, curated by Anselm Franke and Eyal Weizman, March 15 - May 5, 2014.

COUNTERING CAPITULATION was presented at:

FORENSIS

FORENSIS was a co-production by Haus der Kulturen der Welt,
funded by the Capital Cultural Fund, and by Forensic Architecture,
ERC-funded research project based at Goldsmiths, University of London.

Haus der Kulturen der Welt, Berlin
Curated by Anselm Franke and Eyal Weizman.
March 15 2014 - May 5, 2014

The exhibition included contributions by:
Lawrencence Abu Hamdan, Nabil Ahmed, Maayan Amir, Gabriel Cuéllar, Daar (Decolonizing Architecture Art Residency, Sandi Hilal, Alessandro Petti, And Eyal Weizman), Grupa Spomenik / The Monument Group (Damir Arsenijevic, Ana Bezic, Pavle Levi, Jelena Petrovic, Branimir Stojanovic, Milica Tomic), Ayesha Hameed, Charles Heller, Helene Kazan, Thomas Keenan, Steffen Kraemer, Adrian Lahoud, Armin Linke, Modelling Kivalina, Model Court (Lawrence Abu Hamdan, Sidsel Meineche Hansen, Lorenzo Pezzani, Oliver Rees), Gerald Nestler, Godofredo Pereira, Nicola Perugini, Alessandro Petti, Lorenzo Pezzani, Cesare P. R. Romano, Susan Schuppli, Francesco Sebregondi, Situ Research, Caroline Sturdy Colls, Territorial Agency (John Palmesino, Ann-Sofi Rönnskog), Paulo Tavares, Srdjan Jovanovic Weiss, Eyal Weizman, Ines Weizman.

PORTRAITS OF A PHILOSOPHY

Video series

Portraits of a Philosophy is a video series on the derivative condition of the relations between natural, social and corporate bodies and minds in our time and the contingent nature of the future, the present, and the past.

Portraits of a Philosophy Series (to date):
CONTINGENT CLAIM, Portraits of a Philosophy Series I. Elie Ayache
CONTINGENT ETHICS. Portraits of a Philosophy Series II. Haim Bodek
CONTINGENT OPTIONALITY. Portraits of a Philosophy Series III. Randy Martin

VIDEO LINK: https://vimeo.com/channels/aor

Next Page: Vimeo screenshots of *Portrait of a Philosophy* video


CONTINGENT CLAIM. Portrait of a Philosophy
Series I. Elie Ayache. 2012
from Gerald Nestler
35:23
HD


CONTINGENT ETHICS. Portrait of a Philosophy
Series II. Haim Bodek.
from Gerald Nestler
44:56
HD

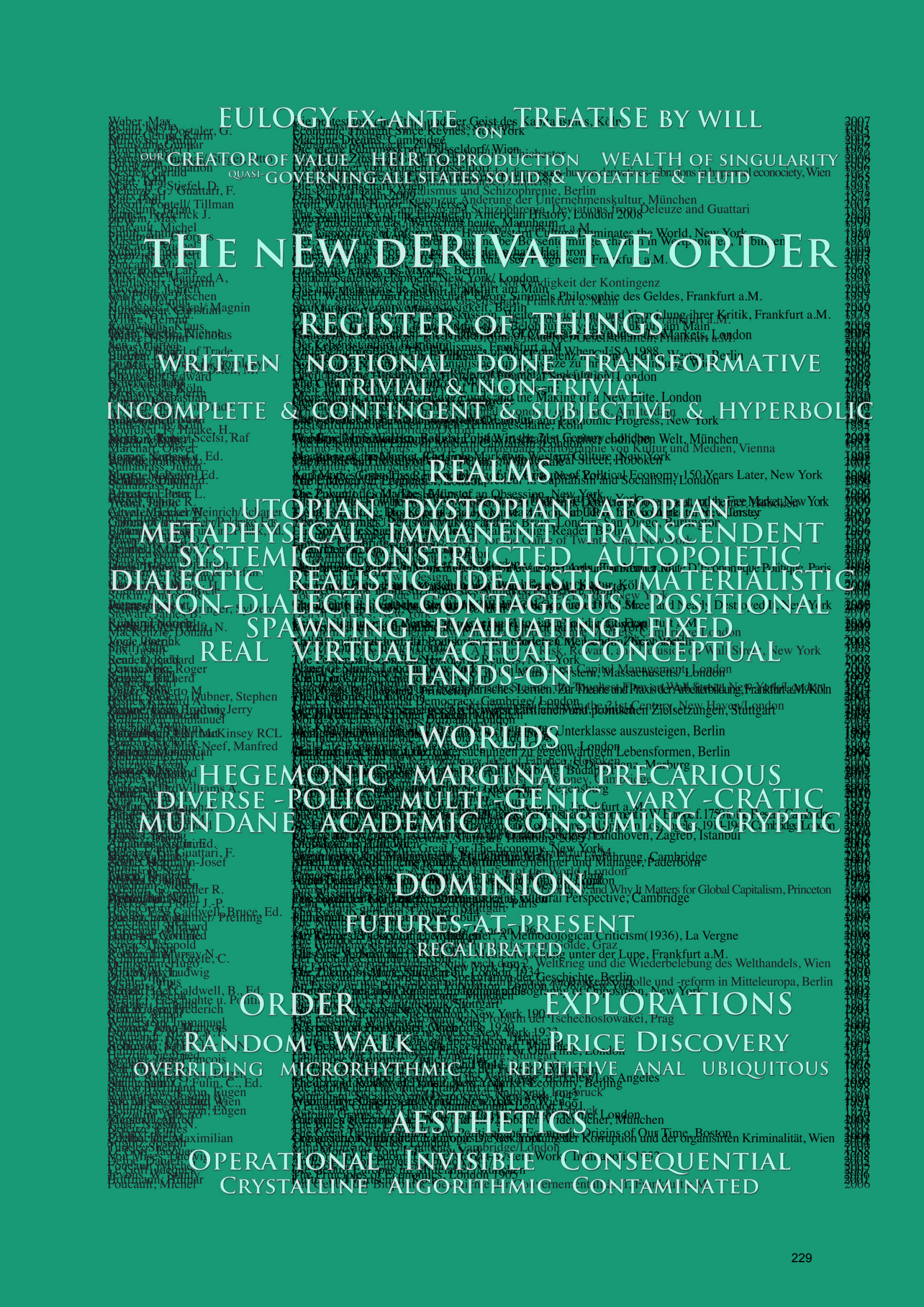

CONTINGENT OPTIONALITY. Portrait of a
Philosophy Series III. Randy Martin
from Gerald Nestler
27:50
HD

HEDGE AVANTGARDE

Renegades, Traitors, Educators
Inquiries into an Aesthetics of Resolution

Kunstraum Bernsteiner
Schiffamtsgasse 11, Vienna

May 6 – June 13, 2015


EULOGY EX-ANTE TREATISE BY WILL
ON
CREATOR OF VALUE HEIR TO PRODUCTION WEALTH OF SINGULARITY
GOVERNING ALL STATES SOLID & VOLATILE & FLUID
THE NEW DERIVATIVE ORDER
REGISTER OF THINGS
WRITTEN NOTIONAL DONE TRANSFORMATIVE
TRIVIAL & NON-TRIVIAL
INCOMPLETE & CONTINGENT & SUBJECTIVE & HYPERBOLIC
REALMS
UTOPIAN DYSTOPIAN ATOPIAN
METAPHYSICAL IMMANENT TRANSCENDENT
SYSTEMIC CONSTRUCTED AUTOPOIETIC
DIALECTIC REALISTIC IDEALISTIC MATERIALISTIC
NON-DIALECTIC CONTAGIOUS POSITIONAL
SPAWNING EVALUATING FIXED
REAL VIRTUAL ACTUAL CONCEPTUAL
HANDS-ON
WORLDS
HEGEMONIC MARGINAL PRECARIOUS
DIVERSE -POLIC MULTI-GENIC VARY -CRATIC
MUNDANE ACADEMIC CONSUMING CRYPTIC
DOMINION
FUTURES-AT-PRESENT
RECALIBRATED
ORDER EXPLORATIONS
Random Walk Price Discovery
overriding microrhythmic repetitive anal ubiquitous
AESTHETICS
Operational Invisible Consequential
Crystalline Algorithmic Contaminated

HEDGE AVANTGARDE

Renegades, Traitors, Educators
Inquiries into an Aesthetics of Resolution

Kunstraum Bernsteiner
Schiffamtsgasse 11, Vienna

May 6 – June 13, 2015

Opening: Tue, May 5, 2015, 7-10 pm
Lecture-Performance: we take you everywhere, but get you nowhere
Lecture by Paul Wilmott, moves by Andrea Gunnlaugsdottir, Nizan Kalina and Evandro Pedroni

June 8, 2105, 7-10 pm:
Making of finance, MERVE publishers, Berlin, edited by Armen Avanessian & Gerald Nestler. Book launch with Elie Ayache, Armin Medosch and Gerald Nestler. Moderation: Ina Zwerger (Ö1 Radiokolleg).

Previous page:

THE NEW DERIVATIVE ORDER. REGISTER
ALGO SCRIPT AUTOFEST

Print, size variable, 2014

The work delineates the socio-genetic register of a new and all-embracing “being”. Originally a native of the market, this “lifeform” leads a nomadic existence roaming and colonizing other habitat. Underlying its math-lingual chemistry is the archival net of its molecular material, a tapestry assembling historic and contemporary attempts to rationalize the situational and contingent economy of the future. The algorithmic parasite embraces an aesthetics of code beyond human perception, yearning to bear the avatar of singularity bred from financial “technowledge.” A volatile oracle of automated instantaneous constructions, it feeds on the present and blots out the past. Yet, with a host of ineradicable particles of recollection, critique and resistance inscribed at its core, the new order contains the buried potentials for radical engagement against the depletion of common notions and interests and thus against the exploitative biopolitics of a derivative future-at-present.

HEGDE AVANTGARDE disperses the time-based flow of cinematic documentary into a spatial arrangement of material artifacts through which visitors move in time and space. Video footage, images, graphics, voice, performance, objects and texts provide the material for a query that resonates around the issue as to whether the conditions of perception and agency in the era of black boxes are being modified – if not disintegrated – into myriad derivative devices that are custom-built to exclude (capitalize) and at the same time internalize (socialize) underlying human assets. This begs the question whether an aesthetics of “resolution” could serve as a toolbox to counter proprietary schemes by employing the full purport of the term. The arbitrary, marginal but at the same time insurgent figure of the renegade – a traitor inside systems and an educator beyond their confines – is introduced as potential pharmakon against the ruptures which transform knowledge into capital and vision into social blindness.

Among other materials, the exhibition features video interviews with Haim Bodek (financial expert and whistleblower) and Randy Martin (dancer and theoretician); a mathematically-derived performance by Paul Wilmott (mathematician and expert in quantitative finance) and dancers, including financialized sport equipment; educational footage by Sang Lucci about a financial transaction generating $600K profit; as well as contracts drawn up for the 1% and the 99% respectively.

Following pages: Exhibition views. Photos: Wofgang Thaler


artists tutors educators


negates traitors educators


HFT.
Genetic
Contact Improv.
PAUL WILLMOTT.COM

Right: *600K TRADE*. video, New York-based hedge fund Sang Lucci, 2015.

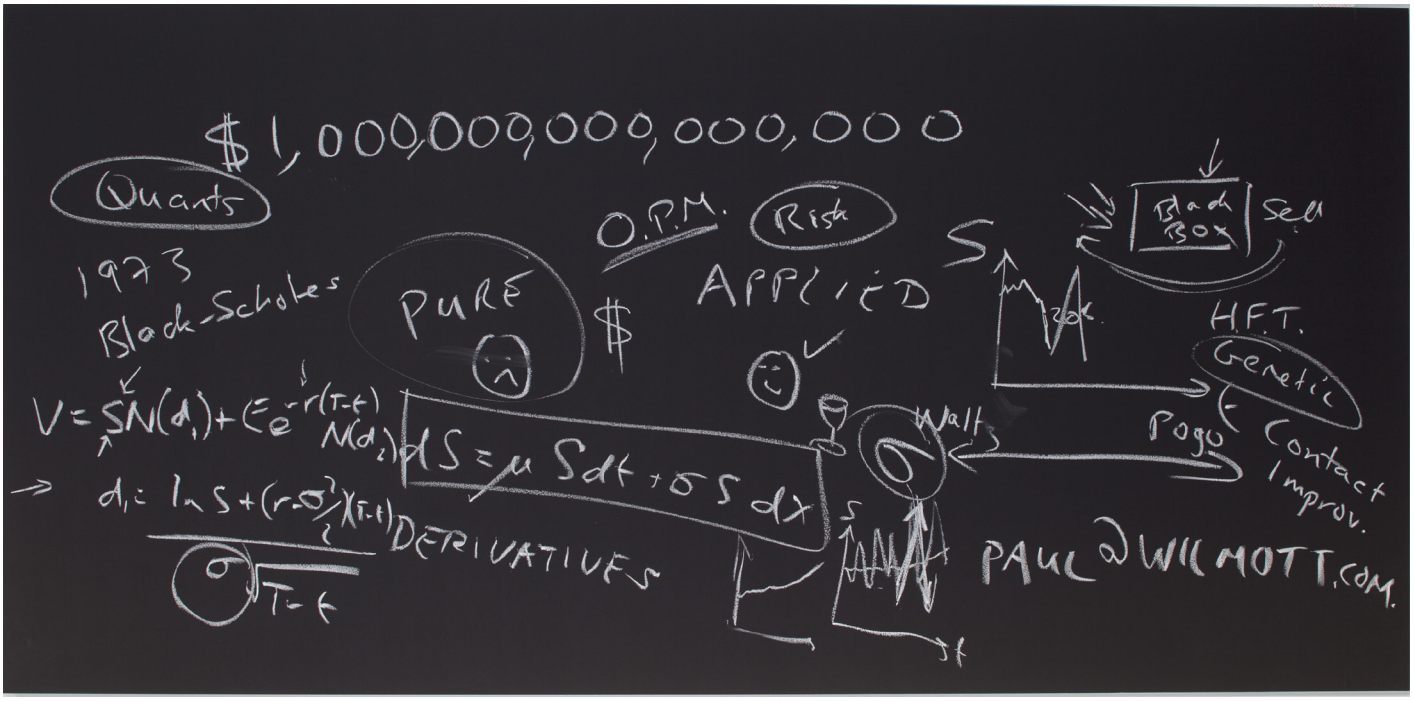
RESOLUTIONIZATIONS. self-organized | self-regulated | mythological. Photos of the hedge fund Sang Lucci and high-res visualizations of flash crashes. 4 prints, 30 x 50 cm, 2015


Maker's Mark

LA POVERA NELLA SUA CASA
Futurismo Nuovo
(contracts for the 1% and the 99% respectively).
Igloo-enclosure, original contingent claim / derivatives contract, McDonald's application form; transparent foil, adhesive strip, FRP-rods, aluminum tubes, rope, Corian, copies, rack, 2015.

THE VOLATILITY PARADIGM
financialized sport equipment for volatile swings in every direction including archetype reminiscences.
Skateboard, laser-engraved, partly varnished, 2015.
Volatility smile: "There was no promise in it, there was nothing in it".
Volatility skew: "We were not looking at this as some kind of future".

WE WERE NOT LOOKING AT THIS
AS SOME KIND OF FUTURE



WE TAKE YOU EVERYWHERE, BUT GET YOU NOWHERE

Blackboard, chalk, mathematical formulations, 2015
Residual outcome of opening lecture performance.
Gerald Nestler with Paul Wilmott, Andrea Gunnlaugsdottir, Nizan Kalina, Evandro Pedroni.

Quantitative derivations of volatile and risky movement sequences in a crowed space.

Audience: underlying, fundamental value.
Performers: derivative moves, volatile price.

Next page: Photos of opening performance


$1,000,000,000,
Quants
1973
Black-Scholes
PURE
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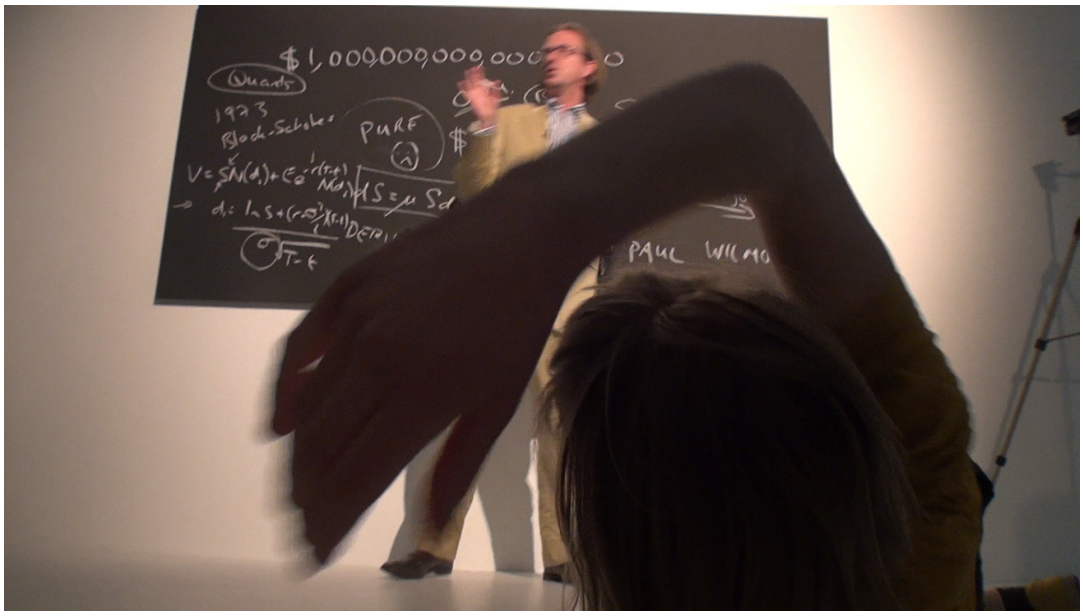
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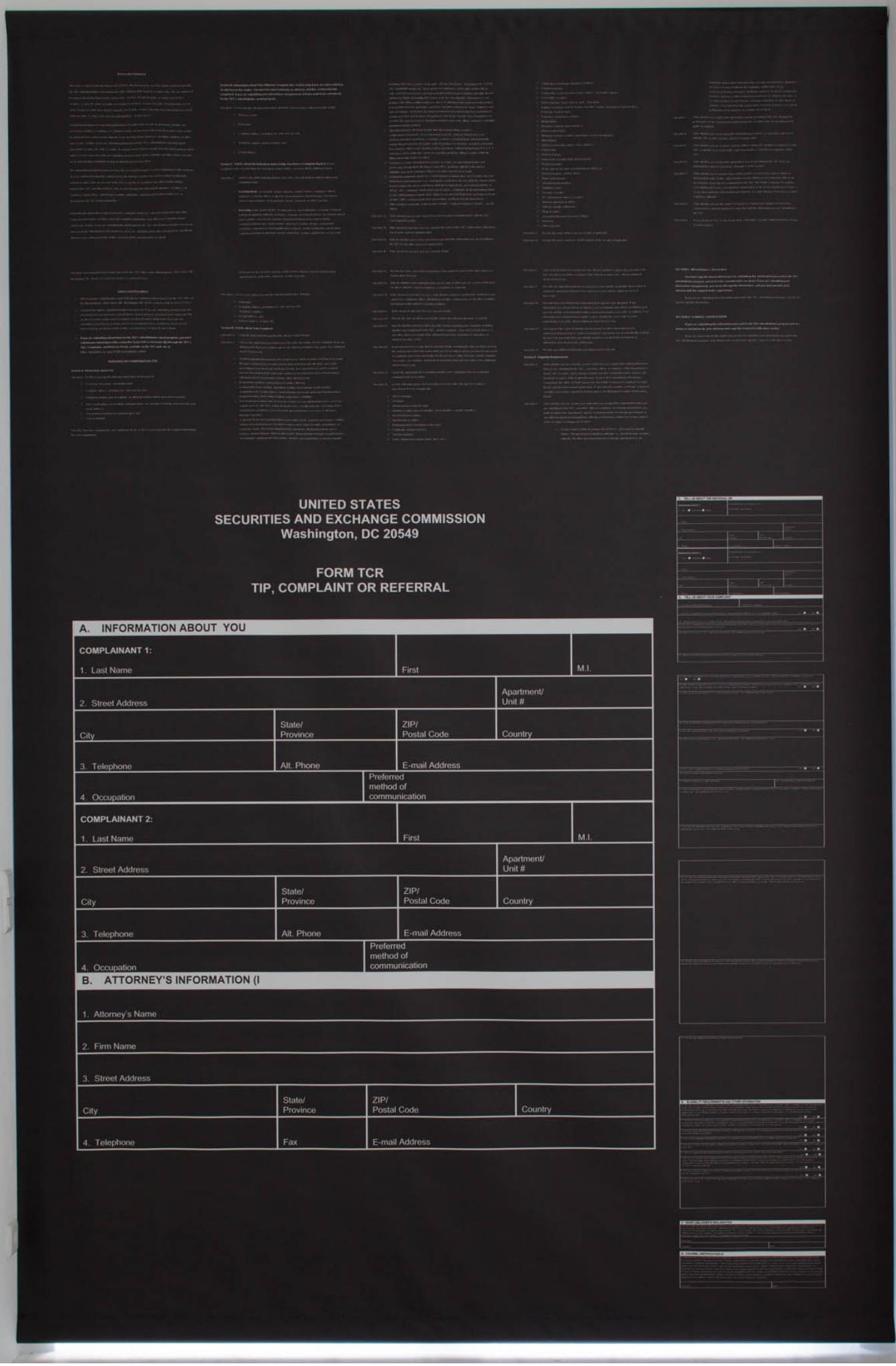

FORM TCR. TIP, COMPLAINT OR REFERRAL
Rework of the official whistleblower form of the US Securities Exchange Commission
Digitex print, 216 x 330 cm, 2015.

LIST of WORKS AND ASSEMBLAGES

left wall:
CONTINGENT ETHICS. Portrait of a Philosophy II
The Aesthetics of Resolution: A poiesis of turning technology into ethics.
1-channel video with Haim Bodek. Sound: Szely, 2nd cam: Mathias Kessler, 44:46 min., 2014-15.

pedestal left:
ICONIC HEDGE. food and Beverage, Risk and Reward.
books, transparent foil, 22 x 30 cm, 2015.

window side left:
600K TRADE. educational video by the New York-based Hedgefund Sang Lucci, 2015.

center:
LA POVERA NELLA SUA CASA. Futurismo Nuovo
(contracts for the 1% and the 99% respectively).
Igloo-enclosure, original contingent claim derivatives contract, application form; transparent foil, adhesive strip, FRP-rods, aluminum tubes, rope, Corian, copies, rack, 2015.
+
THE VOLATILITY PARADIGM.
financialized sport equipment for volatile swings in every direction including archetype reminiscences. Skateboard, laser-engraved, partly varnished, 2015.
Volatility smile: “There was no promise in it, there was nothing in it”.
Volatility skew: “We were not looking at this as some kind of future”.

wall center:
WE TAKE YOU EVERYWHERE, BUT GET YOU NOWHERE
blackboard, chalk, mathematical formulations, 2015.
with Paul Wilmott, Andrea Gunnlaugsdottir, Nizan Kalina, Evandro Pedroni.
quantitative derivations of volatile und risky movement sequences in crowed space.

wall left:
THE NEW DERIVATIVE ORDER. Register.
pigment print, frame, 125 x 269 cm, 2014.

wall aloft:
RENEGADES TRAITORS EDUCATORS.
wall text, 50 x 900 cm, 2015.

window side right:
RESOLUTIONIZATIONS. self-organized | self-regulated | mythological.
photographs of the Hedgefund Sang Lucci and high-res visualizations of flash crashes.
4 prints, ca. 30 x 50 cm, 2015

window side right:
FORM TCR. TIP, COMPLAINT OR REFERRAL
official whistleblower form of the SEC (US-securities exchange commission).
Digitex print, 216 x 330 cm, 2015.

wall right:
CONTINGENT OPTIONALITY. Portrait of a Philosophy III
The Aesthetics of Resolution: Thinking the derivative as shared risk potentiality.
1-channel video with Randy Martin. Sound: Szely, 27:45 min., 2014-15.

ENLITEMENT, Derivative Bond Emissions #1, 2003
Neon sign. Text works in neon, LED or Gobo projection.

I conclude my practice portfolio with a work produced when I began my research into finance and derivatice.

APPENDIX A

PRACTICE PART EXTRA MATERIAL

INTERVIEW WITH ELIE AYACHE AND PHILIPPE HENROTTE

INTRODUCTORY NOTE

The following transcript of a video-interview with Elie Ayache and Philippe Henrotte was conducted in March 2015 to collect material for my 3-channel video installation *Two Globes Forming A Circle. Dividual Recalibration, Automated* (forthcoming 2017).

As I was invited by Armen Avenassian at that time to edit a volume on contemporary financial practices for the *Spekulationen*-series of Merve Verlag, Berlin, I decided to invite Armen to conduct the interview with me and to use the material for the book.

The interview was published in German under the title "DIE ZUKUNFT HANDELN. EIN GESPRÄCH MIT ELIE AYACHE UND PHILIPPE HENROTTE" (trading the future – acting on the future. A conversation with Elie Ayache and Philippe Henrotte) in *MAKING OF FINANCE* (Berlin: Merve Verlag, 2015)

I encose the interview because I firstly quote from it in chapter 4 of the thesis and secondly because the material is part of my artistic practice that informs the thesis (the Aesthetics of Resolution), even though the video has not been completed yet.[1]

INTERVIEW WITH ELIE AYACHE AND PHILIPPE HENROTTE

Interviewers: *Armen Ayanessian (A)* and *Gerald Nestler (G)*

Respondents: Elie Ayache (E) and Philippe Henrotte (P)

Armen Avenassian (A): What's your professional or scientific background?

Philippe Henrotte (P): I met Elie in Paris in 1982, I would say, around that time, when we were students in science at the Ecole Polytechnique. So, I've known Elie for a long time and we've remained close friends ever since. Elie was just coming from Lebanon. There were events in Lebanon at the time, as you can imagine, and he was coming to study in Paris. the Ecole Polytechnique I went to Stanford to study science and sort of mathematical finance, and I got a PhD. I went back to Paris in '87 or '88 to teach at the HTC Paris, where I'm still teaching. Elie was working as a market maker in London and at some point decided to start a company offering

[1] Completed video works in the context of the aesthetics of resolution exist under the title *Portrait of a Philosophy.* Links can be found in the respective section of the practice part of this thesis.

software services to clients in finance. I joined him as the researcher, more or less, and it's a position I've held since. So, I'm the guy responsible for the modeling, the equations, if you want, knowing that most of the people in our company don't do that and I am probably the only one doing it. You just need one guy to write down the equation and then you need a lot of people to just do it, which is a challenge.

A: But when you first met, did you both know that you were going to use mathematics for finance or did that interest come later?

Elie Ayache (E):No, no. There was no finance of derivatives the way it became later. The derivatives business started in Paris and became fashionable in '86-'87, just a few months before the crash, really. So, this is when banks became market makers in options and started hiring engineers because of derivatives. They thought they needed people who understood equations and partial derivatives and Delta Gamma volatility. But the curriculum at the Ecole Polytechnique had a course on probability theory and the like but as opposed to today there was no specific curriculum on derivatives or finance or something like that. When I arrived at that trading desk of this Parisian large bank the whole business had only just started about a year before. And my boss had been hired for exactly the same reasons: he was an engineer and he programmed. The topic of his dissertation was programming the Black Scholes formula on Symphony – the ancestor of Excel – and that was a major breakthrough, which allowed the bank to have a trading desk.

P: At the time, there was a huge demand for people like us because it was at the same time that the deregulation of financial markets started also in Europe and in Paris and also the development of computers, small computers. There was a need for people to code and understand these things. And there was huge intellectual investment by a lot of people in derivatives. Much more in fact, at the time than it is now. It's slowly dying compared to the way it was at the time.

Gerald Nestler (G): And that was already proprietary, a black box, or kind of "open source", something that everyone could use?

E: That's an interesting question. You know, we had no idea what proprietary meant. The Black Scholes formula wasn't taught at school, so my boss then had to buy that famous book that every trader in those days had – the Cox-Ross-Rubinstein book – on option trading where they teach you how to program, numerically program binomial trees. So that was the first book addressed to people who do programming. We had read that book and applied the algorithms. So for me, it was really about trading on the floor because that was the new thing that was emerging. I worked on the floor in Paris for four years and then in London for five years. That was exciting but if you ask me if I had any idea that this would become a career – no, absolutely not. Because to me to go and trade on the floor looked like going hunting or something. It looked nothing like sitting behind a desk.

G: So, would you compare what happened in your field in the '80s to what happened in the 90's with the Internet and communication technology?

P: Sure, in a sense, yes. There was a clear demand for a new industry and it's always both intriguing and exciting to be part of something totally new, you could see the field developing as you did it, which is nice, as opposed to going into physics where things come from 200 years ago. You can add something and make a difference by entering a field where things are totally new.

E: So, literally, derivatives were being standardized at that time and we contributed, me, my boss, Philippe and the team. We even standardized the wording of what call option meant at the exchange in Paris. Not to mention software, which of course was being built from the ground up.

G: But option trading started in '73, right? The CBOE (Chicago Board Options Exchange) was founded in '73, Black Scholes came out the same year. And you say it started '88 in Paris. Isn't that a huge delay?

E: I was trading options and futures on government bonds on the MATIF – the Marche a Terme International de France. Options on equity or stock were already trading. But it's true that in the States from '73, there was not only the Black Scholes formula but they also lifted the ban on trading options, especially put options, a ban that I understand was going back to 1929. And the CBOE was also key.

P: And deregulation was '83 or '84, I would say.

A: From both of your perspectives, what changed in these eight or nine years when this new industry was being constructed or built? Was there also a shift in theoretical understanding?

P: Yes, there was huge innovation at the time, in the period of the 90's up to…

E: [14:33] From my point of view, '87 was the first time that I used the Black Scholes formula and the software that was programmed by my boss, and then there was the crash. The crash obviously is very important in terms of building the field because it made options become much more liquid than they used to be. Because they were all over the place and everybody wanted options. From the point of view technology is very important because banks – I mean large banks like the one I was in – were starting to own portfolios of options. And because we were market makers we didn't know how many options were going to sell. It was up to the market to come and challenge us. Immediately, there was the need for software. You didn't have software that could aggregate option positions and compute the overall exposure of the portfolio fast enough.

So, you have Black Scholes first of all and the next technological breakthrough was how to aggregate options which have different maturities and strikes, etc. and that you are booking in your portfolio under a different volatility of values. So, this by itself created what we call the "smile problem" where you had to make sense in a single framework of options that are trading at levels of volatility that are different one from the other. This is in contradiction to Black Scholes that says that

there is only one volatility number. And this triggered in parallel the whole theoretical research of trying to generalize Black Scholes. And this happened in the early 90's. Philippe was major in that field in terms of his own research – exactly how to make sense of not just the price of the single option but the whole bunch of options written on some underlying.

G: If I understand correctly, there was this exchange, and the mutual need, between theory and practice and at the time you were investigating these possibilities of generalizing the applicability of Black Scholes? Could you also describe what the "smile problem" is?

P: As Elie said, the breakthrough for everybody was the crash because that's when this smile issue became a big problem and this afforded a lot of time and resources. The smile issue means that you couldn't simply price the huge variety of options in the market with Black Scholes. Black Scholes is really designed to price one option and to make consistent pricing of two options with different strikes, different maturity, it just doesn't work. So, you've got to expand the theory to make it consistent. Before the crash, it was extremely bad but after that, it was very clear that it wouldn't work. You would need some more thought, and a lot more research and resources. That's where we come from, that's where I come from, and it's still a problem I'm looking at. I'm the only one because after the 90's there was not such a huge amount of money spent on the issue and it all started to go wrong with credit derivatives and everything exploded with the Lehman crisis, of course. Ever since, we are paying the price for that because our field is getting associated with what I believe is the wrong problem.

A: Namely?

P: Namely credit derivatives.

G: Why?

P: Basically, if you're not careful with your model, it's easy to transport toxic stuff into very safe things. This is an issue, right? By what magic can you transform good theory unto something, which inherently is junk or risky or bad? And it went very fast. I think this is bad. But there is a lot of money spent convincing regulators and credit rating agencies and all these people that what you're producing has in fact almost no risk. If you can do that you can obviously attract a huge amount of money because a lot of people are looking for return with no risk. So, the quant community started producing models saying, "we have found a way so you can invest your money and there will be extremely limited risk, even though what you'd be investing in is extremely risky." So, where is the issue? I simplify a bit but obviously a huge amount of money is suddenly spent on these products, which, not surprisingly if you ask me, explode. And when it explodes, people come back to the profession and say, "You are very lousy people, so now we're going to stop you from doing proprietary trading." Which makes sense, meaning if you want to spend your money on stupid things, do it, but not with the taxpayers' money subsidizing your losses, which isn't fair.

E: To me, that's important because the derivatives – the toxic derivatives that were the result of this black magic – were very complex derivatives as opposed to this very interesting problem how to reconcile Black Scholes to option trading on a large scale, meaning pricing more than one option – the smile problem. Developing something sophisticated and deep about simple derivatives that generalize Black Scholes is the most interesting problem and we are still researching it.

P: So, we are stuck in time, in a sense. We are still looking at the smile problem and consider it as very central and important: But since that time people don't even look at it but try to untangle other problems, which exploded in their face.

A: Was that also the time when you started working together?

E: There's a third person, Serge, and the three of us created the company in '98. Yes, this is exactly where it all comes together because I had, at that time, actually stopped being a trader. I had left the trading firm and for three years I was actually doing something else completely. By the way, this is also when I started doing philosophy part time, and the rest of the time I started thinking about developing algorithms and software. Because I was a trader I had no idea how the software I was using worked and I had even no idea how Black Scholes theory worked because as a trader, you don't need to understand what is written in the book, you just use it. So, for three years I started thinking about how the whole theory worked and about how to do a pricing algorithm that was more efficient than what we had in the bank. So, this is how the idea kind of started to emerge to create a company where we would specialize in doing very efficient tools to price options in terms of software and numerical algorithms. This is how I re-established contact with Philippe, who I had never really lost sight of anyway, to not only do that for numerical software purposes but also tackle the very hard and interesting problem of how to generalize Black Scholes. So, these are the two ideas that we put together in order to create the company in '98.

P: From my point of view, the reason I followed Elie is that I was convinced that the solution was not just pure theory. It's a big challenge and to solve the problem I need engineers to do a lot of software. It's a tremendously hard computer job if you start doing it seriously. Whereas most of the quants are looking for formulas because they don't want to do the computer job. What quants are doing is finding a closed-form solution, a formula that will solve the problem, and then you can publish it and put your name on the formula. The name of the game for quants is finding formulas that you can sell easily. Once you have the formula, any computer can do it in a sense. And it's fast. But at some point it started to affect the way people think because instead of thinking about models that are natural they were thinking of a model, which could be solved. Modeling means what? Getting a representation of how an underlying would move through time. It's a stochastic vision of how it moves. You could do it for many reasons and people did it with a view of getting a closed-form solution, which could then be solved easily and fast.

A: You're insisting that the questions, which need to be asked, are the same as 20 years ago. How is that related to, one could say, a epistemological problem that most people working in this

field do not have the capacities or the interest of really dealing with software because they're just using it in a way. So, is there a relation between a scientific, methodological problem and a kind of political one, or ethical one?

E: I think that one important factor is that here we are basically talking about a science or a formula or software or what not to solve derivatives and to price derivatives. So, banks think this is strategic because if they have them and their opponent doesn't have them, they will make money. So that's why there is already politics in the game because they're trying to keep it in-house. So, what has happened in big banks in France, and the French banks were very strong in that field, was that somebody would come and all of a sudden by authority decide to start a group of quants trying to tackle, for instance, the smile problem. They would hire quants and engineers, etc. but all of those individuals would seek either to please the boss or to find the formula on which to write their name. We haven't seen a case where software was developed by that team and maintained over the years. Because if you start doing computer calculations - and there is no way around solving this by computer - it's not something that you can find in like a week and maintain it and then stop maintaining it. It takes time and it takes duration to have such a thing. That's why all the quants, the big names who are publishing papers, won't stay more than one year in the bank because if they find the formula they will be looking for the next job and a higher paying bank that would hire them. Therefore, their work wouldn't be maintained in the bank they left. To me, all of this is political.

P: Why I joined Elie's company is important because as I departed from most of my colleagues in developing models I knew from the start that this model would not be easily solved. But it would have merits, of course, huge merits. And then if you do that you open gates and a realm of thinking because you're not constrained by the thought "will I be able to produce a closed formula at the end?" But still you'd need a computer to do it efficiently. You have limited resources, it's not something that one guy can do. It was nice for me to join a team of applied mathematicians, Elie's company ITO33, where we've got ten people solving these equations numerically.

A: Can you elaborate why you need an applied mathematician to solve your equations?

P: A closed-form is basically a formula, right, so it can be a long formula but on the computer any formula has to be fast. So, it's a bit tough. But we are looking at an inverse problem in finance. What do I mean by inverse problem? You say, "some stock's price will move in a certain way." We're talking about contingency, we're talking about the probability of something happening. So, we design a model. The model says, "This price can go up or down with these probabilities." That's a model. Now, the inverse problem is knowing that you've developed this model and then look at the actual prices of all these contingent claims of derivative products, can you infer the parameter of them all? Which makes sense, as it leads to prices that are those that we see in the market. The direct problems would be: I design this, I put these parameters, I computed the value of the price of these derivatives. The inverse problem is to go from the results and try to infer the parameter.

G: Ex-post?

P: Yes, inverse means you go back, you go in the other direction. You reverse-engineer. Now, what we do, whenever we want to solve a direct problem - direct problem meaning from parameters to prices - the computer has to solve it for an entire grid with a solution that is not a closed-form. If this is not fast, the inverse problem can take a whole night, a whole week of computer intense computations. In practice, it's possible but in reality it's totally infeasible. Therefore people stop doing and researching that. But I say, if you design a model – even if you don't have a closed-form but the direct problem is fast – then there is hope that you can solve the reverse problem in a decent amount of time. So basically, what we do is to move the time from a whole night at a bank with supercomputer to ten minutes on my laptop. That's the challenge. It's still not a fraction of a second, mind you. It still needs some time, so we're still investigating means of getting faster, but ten minutes as opposed to a full night, it's totally different. I clearly would not be able to do it on my own. If I were on my own in my office at the university, I would be stuck. I would say, potentially it would be feasible but I can't do it. Joining Elie was great for me because then I had all those people who would do it for me. It took us ten years but we finally did it.

E: This thing that Philippe was saying could take a night to compute at the bank and takes us today ten minutes, what is it? It's inferring the parameters of some model to make sense at once of the 3,000 sale prices of Vanilla options - calls and puts written on a certain underlying. So, that's a very complex problem and it requires applied mathematics and partial differential equations and grids on which we discretize the equations and optimize routines, etc. It's a very computer intensive job and today it may take a few minutes. However, this is completely different than going fast. It isn't high-frequency trading, which is something else entirely. I really insist on this because this is not an algorithm that is designed to trade in the market as fast as the market goes. This is an algorithm that tries to make sense of a snapshot of prices of a very rich and complex structure of prices of derivatives.

P: So, why does this matter, or in a sense, what are all these derivatives? Why should we care? What's attracted us and what makes it interesting is that it's the first time that human activity is entirely devoted to trying to understand the future. There is prediction, of course, there are people doing predictions. That's not new, right. But this is different; it's a market. It's a market where people exchange rights on the return in the future and on very elaborate things like what are future events – any kind of event. So, imagine: when you buy or sell IBM, you basically buy future dividends. So, in a sense, you buy the future but it's stuck to what would be a dividend of IBM and that's it. When you move to the derivative, you will buy an event such as: what if IBM does this in two years and not this in three years? And the amount of stuff you can imagine that could happen in the future is boundless, of course. It's enormous compared to just buying and selling IBM. So, the realm of derivatives is really expanding all what the future could be. That's why Elie and me got interested in a philosophical way because it it the first time that human activity is devoted to really understand what the future means and people buy and sell the future in a sense.

G: So, Philippe just started to talk about derivatives as a technology of the future. Well, you didn't say technology of the future but what is the future in this respect?

E: Why do I need derivatives? When I buy an apple or an orange I buy it to eat it, right? I just buy it, so why are derivatives important? I think that the answer lies in the dimension of time because if you are buying an orange, it is to consume it immediately. So there is no time dimension to it. Whereas as soon as you start talking about financial markets, as Philippe was saying, you are going to buy a stock or bond by themselves, even though the stock and the bond are basic instruments that are not derivatives. Nevertheless, they have a time dimension because basically you're buying the future dividends and the future welfare of a company or because you are loaning money to a company, a state, etc. Because they are financial instruments and finance is something that goes through time, these instruments by themselves introduce a dimension of time. Now, if you look at time and you are starting to trade a simple stock or a simple bond and you have the dimension of time – which you did not have when you bought the orange that you consumed on the spot – by necessity you will have to start to care about how the price of that stock or that bond is going to behave in time. So, the trajectory of the price becomes the commodity now and no longer just the stock or the bond. To me, that's the start of derivatives. Because you have the time dimension there is no way that you could trade the stock and the bond but not at the same time trade derivatives that pay depending on whether the stock goes above a certain level or below a certain level. So, when you said can we dispense with derivatives? I don't think we can dispense with them as soon as you start to trade financial instruments like stocks and bonds. I cannot define a market without saying that I have the underlying stock or bond together with all the derivatives written on it that trade at the same time because there is, to me, no definition of price without at the same time having in mind the volatility of price. They go together because that is what the market is: you have a price and the volatility of price, which means that you have the option written on that price and if you have the option therefore you have the price of the option and if you have the price of the option you have an option written on the option and so on. So, you have everything at once.

G: Already in the 19th century, Marx and others argued that price is never the price of something now. Rather, price is future expectation. So, is this kind of derivative finance something new to the capitalist market or is it fine-tuning the kind of future that the price is already?

E: To me, it's not fine-tuning, it's a major discovery. Philippe said that finally human beings are dealing with the future or trading the future. And you said technology of the future, which I understand literally, so it is literally the technology of the future. It is a material technology as opposed to pure concept. Otherwise, the derivative technology would have been prediction or futurology or probability theory, which is just fiction and theory to me. Here at last, at least this is my opinion, we have a material technology and at the same time material objects – derivatives - and they are a properly material medium to make the market work. It's an invention, it's not a theory, and to me, that's the only way, at least in finance, that you can address the future.

P: What I think Marx got totally wrong - arguing at a different time, however - is what we mean by value. We keep on having this issue of fundamental value as opposed to speculative value. I'm sure you've heard about the vision that finance is doing speculative things and that it would be so much better if we could go back to good old-fashioned fundamental value. You've got all these analysts saying, "What is the fundamental value of something?" This is really the wrong question, if you ask me. If I tell you that value is a value of a derivative, what then is the fundamental value of an event in the future? How can you relate that to a Marxist vision that holds the value of something is the human capital [sic!] labor needed to produce this? An event in the future? I'm telling you now, our society is all digital, virtual, and on top of that, we sell and buy events, future events, which in turn shape future events. Yet, a lot of economists, thinkers and people still view the world through the prism of good old orthodox Marxist theory, which really doesn't make sense. And you wind up with things like "does the share of IBM today reflect its fundamental value?" Excuse me, what is the fundamental value of IBM today? Is there anything like that? When you ask me, it just doesn't make sense.

G: The theory goes back to Ricardo. Marx emphasized labor and production but also circulation. And circulation, that's what derivatives are about, right?

P: Sure. I mean, it changed but what's very new since the 70's is the importance of all of these contingents of the future world. And I'm not sure how many people realize that finance now is kind of a circle between the present and the future, right? Which is extremely interesting, fascinating if you ask me. Why did I go into finance? Not just because of money and so on but because I think there's something extremely new in terms of what our civilization is doing. I don't think any prior civilization did this. The way we act and try to forecast the future and at the same time mold it. We mold it, we do it, and in fact we loop it with the future today. We live in the future, we control it in a way that was totally unknown in the past.

A: Can you give an example? When you to take it literally, a technology of the future or kind of poetics of the future, shaping of the future?

G: And what is value then?

E: The more I think about the whole thing, the more I try to simplify it. And today, my thinking is to say – and I'll go back to what Philippe was saying – well, what is value as opposed to price? So, I don't want to even wonder what value is because I have price. So that's my statement. If you define price as a quantitative amount of money that gets attached to something that you are exchanging in a free market on the floor – open outcry – then, to me, you have already all the derivatives that have to trade. Because, if you define price as being something that you get as a result of an exchange, there is no way you can prevent or stop the people who are exchanging whatever the thing is they are exchanging on the floor. You cannot stop them from writing derivatives on it and exchanging derivatives. So, to me, as I said earlier, I cannot understand price if I want to make it the fundamental entity. I cannot understand price without price volatility because if

you are exchanging something in the free market, there is nobody, no planner is going to tell you what the price is going to be. You are going to leave it freely to the exchange and if you leave it freely to the exchange, price will fluctuate randomly because of a very fundamental argument. If it fluctuates randomly, it means that its inherent in the meaning of price and that price should be volatile. And therefore you cannot say, "I think it's the price," like you would fix the value. As soon as you understand it's volatile it's also inherent that you should write derivatives and derivatives on the derivatives on it and trade derivatives on it at the same time as you trade it to get the whole thing. So, to me, there's an equation between what I mean by price and the full chain of derivatives written on top of derivatives ad infinitum, that's the same thing.

G: That sounds like a Hayekian the free market, an information market without planning, etc., right? Does the market really work that way or is this an ideal? Think of information asymmetries, for example. But what if capital is starting to own the future, when future possibilities become proprietary, so to say?

E: When you say 'own the future' who owns? Nobody owns. There's no way you can stop the flow of derivatives, so it's not that somebody has designed the derivative with the purpose to claim the future, own the future.

A: The exciting thing is that what you're doing is not just a scientific practice, it's not just a business but it's a kind of - that's how I understood both of you but especially you, Philippe – it's a kind of ontological practice. You are shaping things. So, I'm really interested to what extent is that a conscious process or is it only afterwards that you become aware?

P: Of course, when you go in the office and you solve a stupid equation, you're not asking ontological questions every minute. But you are aware that in a sense you participate in something that, as I said, is new in our civilization, which is the shaping of events, an equation of events. You would probably not disagree that innovation is something big in our society? Capitalists do not own innovation and they can't because you can't own nor limit innovation. In fact, the vision of all these capitalist stupid guys that own the future would be a vision of a future, which is well designed and boxed in by some possibilities, right? You'd have a list of possibilities, like you have four states of matter in nature – that's the very good, middle, bad, and extremely bad. I bought some, for instance, so I own them now. What's interesting in what we do is that you can't block these events and no one knows where it's coming from. It could be Apple designing something new but it could also be an innovation coming from something else. We used to have a world where boundaries of what could happen were limited. I mean, of course you had war and events and stuff going on but the mind of people living in such a society or situation didn't change about what would be tomorrow. Today, we are moving in a world where we invent the future. We create a new future and new events and we have markets for it in which we participate.

G: That's Schumpeter's capitalist vision. I mean, you're talking about the entrepreneur, right?

P: Yes, I don't deny it. Absolutely. So we participate in this world where we create the future and we help bring it about. I'm saying what's new in our civilization is the amount of energy, focus, time that we spent on that, as opposed to replicating what the ancients have done. You can love it or hate it, by the way. Conservatives would hate it typically. Everything should be reproduced the same way, that's the definition of conservatism, right? I think we live in a radically different world where new things, new thoughts exist and could have value, could have monetary value. I mean, you know that you've got websites, which have no value one day and then suddenly it's billions of dollars tomorrow, out of nowhere. How can you forecast that? You cannot. There's no way you can forecast that. There are two guys in China who invent Alibaba and suddenly it becomes the largest company a few years later. What's the value of something strange happening and taking huge value tomorrow? Price? I don't know. It's not that because I'm working in finance I've got solutions. We're saying we are the market, which designs prices for it, but don't ask me to give you a definition of value that would be theory based, like where does the value of this come from?

A: But how does the shaping work? You gave the example like if this event happens in two years' time, would IBM then… So, to what extent are you not just following or making potential prices for everything instead of really shaping? I'm really interested in this kind of constructive element.

P: It's a loop, of course. Because you exchange now you've got information from the price that helps you manage what could happen tomorrow. It's a back and forth. You're creating prices, you're creating products, and you're creating new possibilities. It's really creation, which makes it extremely interesting, if you ask me, and I think that's the very crux of our civilization. So, we're not looking, I believe, into something obscure or self-centered.

E: When we say that the derivatives market is the technology of the future, we don't mean that the derivatives market is going to explain the future for us or to make us see the future, no. What I mean, as Philippe has said, the future, in other words, the events that are going to happen are the thing that nobody can foresee and understand. So, it's not that the derivatives market will help us understand that, no. It's rather that the derivatives market is as impossible to understand or at least to foresee as the future. Therefore they are of the same nature! So, somebody who is in the market doesn't understand the market – even though a market maker in a way understands the market by being immersed in the market. But he knows how to deal with the future by being in the market. Do you see what I'm getting at? We cannot understand what the market is without understanding that there will always be events that go outside of the box. There will always be contingencies that weren't even a member of the list of possibilities that we had before. That's completely impractical, you basically cannot compute it. But at least I'm telling you that the market is of the same nature as the event. However, the event doesn't exist, as you know, until it happens, so that's one thing. But the market exists. The only advantage that the market has over the event is that it exists, therefore my speculation: if somebody goes into that capsule, if you will, which is the technology of

derivatives, it's not that he's going to understand the future but at least he is dealing with something that is at least as rich and complex as the future. So, it's not an explanation of the future in terms of, "that's it, I've got the future all explained to you and if I read the market today, I read the future." No, because the market as it shapes the future, the future changes every day, but you need to be immersed in the market as a trader with all the derivatives to be able to at least approach the event in one way or other.

A: But many economic models are not anticipating what you're saying, right?

G: I think Emanuel Derman, the well-known quant, said that in physics models are about nature while in finance models are about assumptions? So, quants come from physics, for example, and are used to dealing with nature – is that something that plays into this issue?

P: You can study a physical element as much as you can and want but it won't change the fact that the particle has a probability of decaying, which only depends on the particle. In finance, by the very reason that it trades it changes its properties, so what are you doing? You're constantly chasing something that changes by the virtue that you look at it. So, there's kind of an ambiguous circle, which makes it hard as well as interesting, on the very premise that we shape the future. We don't shape physical particles; they exist. Anytime you have someone talking to you about fundamental value his mind is very fixed on the economy as something like nature and physics. And all we would have to do is find a way to compute these parameters from nature as if the economy was nature. That's not the way you study it. You look at it, you trade it and it all changes, the very thing you're studying changes.

E: Think of the financial crisis and to the toxic junk that those people with PhD's constructed, who were possibly corrupted by their own lawyers in order to do this. In the subprime case, for instance, you had to bundle the creditworthiness of maybe a hundred households and create a super derivative that would default only if the whole hundred default. And therefore you thought that it was safe. But the derivative that bundled all those households and was adopted by the banks was very complex and it needed a very complex probability theory and formula, and a very complex parameter, which is a correlation, in order to be priced. But as Nassim Taleb would say, it was very fragile because when this multidimensional variable would move just a little in this major correlation the value changed completely. This is what I would call a complex derivative.

Now, the simple derivatives are a new dimension that is potentially infinite and where you can write derivatives upon derivatives. This cannot be captured by probability theory because probability theory only takes you as far as a certain stage of the sequence and stops there because it has to box completely the valuables. So, to me, that finding is what contradicts probability theory and therefore calls for a re-foundation of the whole field. It's a new axiomatic that we need, if you will.

P: Elie tends to view the issue as a metaphysical question and I tend to view it as an anthropological question, a sociological question. Any time I talk about sociology to Elie, he shuts

down totally and every time he come back to me and says, “Oh, but that’s a very metaphysics issue” I shut down completely. Otherwise we agree. To me, if you do finance you do social science. I hate people who don’t understand social science, especially physicists who believe social science should be a hard science, and what’s very unfortunate in our field is that people have a complex towards hard science and believe that they should do things like hard science.

E: Not me, right?

P: I’m not disagreeing just with you [laughter]. So, 90% of publications in our field try to mimic hard science, there are people coming up with tests and numbers and probabilities. And because of that then you can sell it as a good research paper. And, of course, all these tests fail but it doesn’t matter. What matters is that you try to follow hard science in trying to build a test and showing stuff, just like people would do in physics. I think it’s a total corruption of our field.

A: You’re very passionate about your business, your philosophy, your practice and the scientific endeavor that goes along with it. You mentioned the toxics and the financial crisis and so on, so I was wondering whether you can somehow define or clarify the ethical as well as political dimension, not in the sense of left politics or Marxist politics or so, but as an accelerationist I would say this believe in the possibility of shaping the future. That things are not just happening according to any kind of stochastic or probability calculus but there’s both a contingency and an ethical active or proactive dimension. Could somehow dwell on that in a certain sense?

E: It’s not that we’re interested in finance only as a business. There is a kind of ethical and really political idea behind it, not this political party stuff or the left project but politics in the sense of: are we able to structure and shape our future with this technology of the future? You could say that’s an old Marxist idea but without certain elements of political economy. Any way, to me, the answer is simple. It’s not that I have the ambition to shape the future. All I have is the reaction of a researcher, if you will, who has discovered a problem that I think is an odd problem. Nobody has really thought about re-defining the market through derivatives and re-defining the price through derivatives while I think that’s the fundamental thing. So, that’s my discovery. I’m excited by this and I want to communicate that finding. So I’m modest in my ambitions. But of course, the future is shaped by the technology.

P: Okay. So, we’re trying to create value by allocating resources to a project and that’s the job of finance, right. It’s very basic. You want to get money to do a project. How should you do it? Either you have to plan the world old Soviet Union style where you’ve got a politbureau deciding. Or you’ve got a fat capitalist world where you’ve got the market deciding, in a Hayekian way, if you like. How does the market decide? The market decides by looking at risk and return saying, “this is going to be a nice project with limited risk.” It’s easy to see, right, if you have a good definition of the risk and a good grasp, suddenly there are many things you could do. I mean, engineers used to build dams – this has many ecological issues but let’s assuming it creates value. Suddenly, a lot of value in energy is created but of course there’s risk. For example, the risk that the dam will collapse,

so you have to control that risk, limit it. This's an engineering task and then if you can convince me that the risk is small enough, maybe we will allocate a lot of resources to build this dam. Today, we are doing that through financial markets. The financial market tells you if it is risky or not. If it's not risky and returns a lot of money then I will allocate money to this dam. Politicians won't have all the information, so maybe the Hayekian financial market is okay. So, it boils down to explaining what risk could be. And that's tough. That's difficult and the difficult part today is that risk is not just a physical element like a dam, which is physics, so it's easy to compute. But the question is what if the financial market starts going down? And then everything goes down, a systematic collapse of the economy. That's a big, complex risk. If you can manage and eliminate that risk, obviously there will be growth and many other interesting things going on. So, can you convince me that things could be risky or not? Strangely enough, that's the central problem and it's not clear how to solve that issue. So, we've got a derivative product and you can ask, "will something weird occur in the next few years?" It's easy; you just create a derivative and look at the price. If you think something extremely weird will occur we will give you one euro, one dollar. And now, let's see how it trades. And the value on the financial market won't give you a prediction but a vision on what this event could be. That's what we are doing.

Another way of doing it is looking at the past. The past is objective and the good thing about the past is that we all know it's recorded. All the regulators in the world love the past because you can say "surely what occurred in the past will prove itself, so at least it's objective." Now, all regulators look at a vision of the past and say you have to back test what you're doing over ten years, what occurred in the past and so on. But this is a limitation. We've just said that finance is about new events, which never occurred in the past. The crisis in 2007/2008, Lehman Brothers, is an event that never occurred in the past. And that's the problem, right, because people were selling products, saying, "well, we did our analysis, in fact we asked this credit agency to come and do their own independent view," and what they did was looking at the past. They took ten, twenty, fifty years of data and they said that this event cannot occur on the ground that it never occurred. Therefore its probability is extremely small and therefore there is no risk. "So, be my guest, do it. You can do it because there's no risk." And people started allocating enormous amounts of resources to something that was deemed to be without risk. Now, the economy being the economy, by the very fact that people started to over-invest in this risky thing it actually made it happen. Even though probability said that the event would occur once in ten thousand years, very tiny, it occurred two years later. So, obviously the model was wrong, not a little wrong, totally wrong. Do you see the point? It's getting dangerous now. One answer would be, "we stop the show, finance is stupid." But then we don't invest at all. No investment, no growth, no production, the whole show stops, which is certainly not a good answer. So I'm hoping to get to you the feeling that we are talking about something extremely important.

A: I'm sorry for insisting on it because that, for me, is the exciting point. I know you're not into metaphysics or philosophy but Meillassou's ontological idea is, if you sum it up in one sentence, le

passé est imprévisible. So, there's a very paradox understanding of the past that's not given in objective, right. What kind of financial derivative theory and practice is the alternative to the status quo? I completely respect what you say about your modesty or so – but there is both an ethical and political alternative that you are haunted by in a certain way of coming up with different explanations compared to the hegemonic and official one that led us into the financial crisis which is still not managed.

P: In fact, I believe today we are in a state worse than in 2007. So if you ask me, the probability of getting something extremely bad on the economy today is huge. I mean, 2007 was basically an issue of too much credit. We have much more credit now than we used to have in 2007. And we solved the issue by buying more of the problem, not reducing it. The reason is that our world doesn't know how it could function without credit. In fact in our job we do calibration on future events. We see probabilities priced by the market of extremely bad things going on very vividly. The very bad thing would be the stock market losing 90% of its value, right? Even though it never occurred in the past, this scenario has a none-zero probability today! When I look at derivatives, is there a price on "will the stock market lose a huge amount of value"? Yes, it is and some people are waiting to put money on that.

A: It's a very simple and naive twofold question but with the knowledge you've got now, would you say that there are solutions or better ways of not just trading but organizing the market or if you go back with the knowledge you have now of twenty years, would we be in a better financial or political situation if other rules had become hegemonic?

E: I don't know if credit could be avoided, probably not because as Philippe has said, we cannot live without credit even though…

P: …no no, we could. It's a social choice. Our economy is built on credit. I mean, you've got to consume with the money you owe, so you're going to borrow money to consume.

G: You say credit but you're talking about debt, right?

P: It's debt. It's a choice. It's not the end of the world. I mean, it's just that our society is currently built on debt.

G: What other models do you see?

E: It could be equity. There's a very attractive argument that says that you could convert that into equity, right. You no longer borrow money from the bank to buy your house because if you don't have the money, the bank will come and kick you out of your house. But the bank will give you money and take equity in you. So, it invests in you, meaning you will pay for your whole life dividends to the bank but obviously if you lost your money and lost your job, the bank would lose all its money and that's it. It has no claim on your house. So, to replace debt with equity could be one way of addressing the problem because debt is very perverse in the sense that you have to stop everything and expropriate the people.

G: But isn't that something that already exists in finance in the form of convertible bonds?

E: Convertible bonds, to me, is a very wonderful instrument.

P: Some people will say that the crisis that will come will surely be the end of capitalism. I'm sure accelerationists would love it. But no, it's just one form of organization and the market doesn't care about it. There will be a new market with new things. It will be very different and obviously some people won't be happy because there will be a huge transfer of money, value and so on. But it won't be the end of the world. I foresee a very significant crisis worldwide. We're all in the same boat, it's not the Chinese or the US or Europe or Greece. I don't think it's sustainable.

G: Capitalism is built on scarcity. Debt or credit, if you like, is part of that regime. But the way you talk about derivatives sounds like as if it is about abundance. This reminds me of Randy Martin, a leftist theoretician and dancer – unfortunately he died recently – who was reading Marx's Capital 3 through the notion of the derivative, meaning that the idea of derivatives is not just found in finance but it's in many, many other practices as a field of abundance that could become a new – and not capitalist – form of how we share risk.

P: There is a big question lurking behind what you said – we discussed value but the big question you are alluding to, I believe, is money. The question of printing money and that mystery, right? Because so far, any time we have a crisis, the answer is simple, just print more money. The next time around that will be the only possibility: to just print more money. But surely you don't have to be a genius to see that there's a limit to that. You can't print money anymore when people start losing faith in money and that's it. And that's bound to happen. So, the next big event will be a monetary event, global. And once you lose money, you know, that's the best way you lose psyche in a sense, right. So I hope that we'll be clever enough to put together a new money. There will be a new system coming. We will have to build it and we won't go back to the Stone Age or what. But I don't think we have much choice.

G: There are projects – and again people from all kinds of the political and ideological spectrums are in it – that are developing alternative monies, crypto currencies and stuff like that. Do you see a role for derivatives in this?

P: The derivative is based on money. So when you seek a price, you seek a price in some money. If you lose the money, you lose everything. How do you produce money, how do you create and expand money? So far it was a monopoly of the banks, in a sense. You produce money by creating debts. Debt is money. The way you expand money is by expanding debt. Fractional banking, that's how it works, right, and there's a big advantage: if you pay interest as a company, you are not taxed. Can you see a reason for that? Okay, let's say I've got a business and it is generating profit. We all agree it should be taxed. But I don't pay tax on the ground that because I've got a huge amount of debt I can offset my interest payments against my profit. Because the government doesn't get any tax, it's got only one choice, to increase the tax. What does business

do? It increases interest to make sure that the amount left on which you are taxed is diminished. Who's happy? The banks because they are the ones providing more debt. So, how should it be tomorrow, how will it be tomorrow? Let me create for you another world where you are taxed on the whole profit without interest reduction and therefore you can afford to have a much lower tax rate. And you don't push people into debt. It's not the same world of course, we have a world, which is totally biased towards banks and debt. It's got nothing to do with derivatives.

G: Well, the typical argument is that no one will take risks because entrepreneurs are not going to be interested if there are no profit possibilities.

P: That's why Elie is saying, you should have a complete market of equities where you can invest in projects and hedge or diminish the part of risk you are not willing to assume, exactly by using derivatives.

E: For me, the world separates into two, really. Schematically, there is the world of debt and money which can maybe persist forever without any mention of equity and without any mention of derivatives – meaning somebody loans you money and if he doesn't get his money back he cuts off your hand or takes your house or what not. This world could possibly exist separately from another world where by miracle some day somebody decides that "instead of loaning money to that individual I'm going to become a shareholder in this project and collapse with him if the project collapses but I will not claim my money back." In that moment, I believe, equity is created and while it's created the market is immediately created where suddenly this equity has to admit of a price. It can no longer admit of a value. Debt admits of of value simply by discounting the capital. But as soon as you say, "I'm no longer investing in that guy by loaning him money and waiting for him to pay back my capital and my notional value but I'm investing in him as an equity investor." according to my reconstruction, only the open outcry market can affect the price for it and there is no longer any value, it's only price. And as I said, if you have price you have derivatives.

P: Let me give you an example, something totally immoral. The central bank of Europe said to the financial markets, "thinking about any European country defaulting should be totally out of your mind. It will never happen." It's totally foolish because now you've created debt. Debt is a promise that you will repay. Now, Mr Draghi told us that it is always repaid. Obviously it means that now the spread between the German debt and the Greek debt is extremely small because the central bank just told me that they would not default. So, everybody in the world is now over-investing in Greece. Poor Greece. I mean, are they going to say, "No, no, I don't want to touch the money, sorry, the rate is too small. Please take it away"? Of course, they've used the money and now we blame them for having used the money. But in the first place we told everybody that it will never default and now it's defaulting. It's virtually defaulted. Where is the central bank now? Well, it has only one choice: to print money because it made a claim that this would be risk-free. Do you see the importance of money? And then we are all jumping on these poor Greeks telling them they're really stupid because they can't repay it. Of course they can't repay it.

A: So, if by some miracle you would have the jobs of both Mr Drghi and Madame Legarde, the boss of the IMF, what would you do?

P: It's too late. Ten years ago I would have said, "you may invest in Greece or any country, France," it's nothing special with Greece. But you should be prepared to lose money, equity or what have you. And by the way, there will be a derivatives market if you want to hedge and so on. We create all that but don't be fooled: we will not bail you out if you lose money. And that's the political view.

G: But the equity solution, it's even too late for that?

P: No, sorry. It's not too late because now that we are in trouble, the only solution will be to transfer and transform this debt, which we obviously cannot and will not repay, into some form of equity.

G: That leads me to a question, which is discussed on different sides of the political spectrum: it's about unconditional basic income, which is a form of equity, right? Hayek endorsed that in some form and Silicon Valley entrepreneurs are jumping on it as risk capital for everyone. And the left, of course, has been debating this as a human right, a right of subsistence, so to say. Is that a form of equity that you find interesting?

P: Absolutely. But the fact that we decide to push for equity as opposed to debt doesn't mean that the financial market will disappear. And in between there will be a big crisis and many people will be saying this is the end of finance. I don't agree. I think it will be a new form of finance, which will probably be more exiting.

E: According to my reconstruction this will be the start of derivatives really.

P: I agree.

A: In a way you both made the distinction between a 'wrong' understanding of algorithms and the one you're interested in, could you also say, if I use Gerald's notion – he's speaking of a "derivative condition" of our society, our economy – would you say – and I relate to what you've said before – that we have been in the wrong derivative condition and we need another one, a proper one?

P: You know, we specialize in equity but 90% of derivatives in the world are on debt, not on equity. Do you know the size? The world economy is $60 trillion in GDP today and I won't argue about the decimals. Derivatives are 650, credit derivatives 65 trillion – notional, to be fair – but still it is huge and most of it, 90%, is credit, interest rates. That's not equity.

E: To us, they're not even derivatives. In my very strict definition the derivative is volatility of price trading on the floor. Simple or maybe even more complex derivatives but all of that has to trade on the floor to admit of a price.

G: What are the ethical reasons?

P: There's nothing wrong with debt. There's something wrong with debt when, as I told you, the central bank of Europe skews debt claiming that it's not what it is. Any time you buy a government bond, it's claimed to be no risk by virtue of being the government. That's not finance. That's not a market. That's politics. With equity you can't do that. I mean, you can do it but the market will automatically rectify.

G: Why is that only a question of politics? A lot of decisions are taken by people in finance or people that used to work in finance, such as Draghi, to name but one.

P: There's nothing wrong with finance, there's something wrong with misleading people into something, which is not what it is. It's just cheating. It's not nice. You shouldn't do that.

G: So, do you see yourself as an avant-garde of a derivative market that does not yet exist?

E: Well, at least with this technology of pricing derivatives, yes, we're the avant-garde and we have one customer so far.

P: It's difficult to foresee because we don't know. But we hope that there will be a tomorrow, a different world where debt will be much smaller and a new form of finance will exist in which what we do with derivatives will play a major role. We believe that. But of course, this is very self-centered, I recognize that. However, that's the reason why we're here in the first place because we see it coming. We want to be where we believe the action will be. And it's not going to be in debt.

G: A final question: Haim Bodek told me a story about Occupy in Chicago when they were marching towards the CEBOT. What shocked him was that "his world" – that's how he calls quants, traders, etc., many with PhDs from distinguished universities – threw McDonald's job applications from the building down on the people on the street. So, there is a financial elite that's become cynical and has lost touch with people and society. I'm not interpreting his story, that's what he said. As financial experts with your education and experiences where do you position yourself in society and in relation to the world?

P: I think we should democratize finance. I'm not big on Facebook and all this kind of social media but would you say that Facebook has taken over human beings? No, it's allowed you to have different connections with a lot of people around the world. I think technology will help generate much more complex markets. It's coming. By co-financing you will suddenly finance a project on the other side of the world with other people, more collectively informed. There will be a big expansion of these kinds of markets, I believe. I think technology could help that.

G: Elie?

E: No, I'm happy.

PROFESSIONAL BIOGRAPHIES

Elie Ayache and Philippe Henrotte, Co-founders of ITO 33, Paris (from the webiste http://www.ito33.com):

ELIE AYACHE, Co-Founder & CEO, ITO 33
Elie is the initiator of ITO 33. He graduated from Ecole Polytechnique de Paris in 1987. Speaking of his 8 years of experience as a volatility trader, Elie says it was just "a shortcut" into options science. Banks in those days thought they needed top engineers to deal with options. *Dealing options* was another story, but Elie did not mind the ellipsis, as long as he came full circle, and finally became an engineer after long being an options trader. Elie's shortest cut was his first day on the floor: October 19, 1987, a day marked by a huge, unpredictable crash of the stock market that shook the global finance industry. From that first day, Elie learned that what happened then could happen any day. Yet that day was so exceptional that even if you were to replay it some other day, you would not get the same result. The same would hold for any other day. This completely ruled out the notion of "truth" in the markets as something you can think twice about, let alone try to reproduce, simulate or even represent by a model or algorithm. Traders need tools to help them speak everyday language, not a wizard to preach the truth to them once and for all.

PHILIPPE HENROTTE, Co-Founder & Partner ITO 33, Paris
Philippe is Head of Financial Theory and Research at ITO 33. He earned his Ph.D from Stanford University after graduating from Ecole Polytechnique de Paris. For many years, Philippe was a Professor of Finance at HEC. Anything that our pricing models may have to deal with, beyond Black-Scholes, falls squarely within his jurisdiction. This ranges from the incorporation of default risk in our convertible bond pricing PDEs to the full radiance of the *smile problem* in currency and equity options. When confronted with the excitement of his latest discoveries and their far-reaching implications, Philippe feels a bit like a GI embarking on a ship to Normandie in June 1944: there is no turning back!

ITO 33
ITO 33 is a financial services and software company that specializes, among other things, in the pricing, the hedging and the analysis of convertible securities. This includes techniques that assist in calibrating and recalibrating the volatility smile surface and the credit curve, and the computation of the Greeks on all instruments that depend on credit and equity.

APPENDIX B

PRACTICE PART EXTRA MATERIAL

CONTINGENT ARCHIVE

I included my reading up to 2012 in an installation work entitled BOTTOMLESS PIT, ELASTIC (photo above) in which it features as archive and weight against volatile swings.

It also serves as the background OF the print THE DERIVATIVE CONDITION. REGISTER (2014), which is also included in the Practice Portfolio and opens Chapter 4 of this thesis onf the frontpage.

This list is not formatted or aesthetic. It is a pure register that is adopted for each work I use it for. Even though much of it constitutes the Western hallmarks of philosophical and economic reasoning of the last centuries, it is to some degree ‘historic data’ that I evaluate on very different grounds for its future value.

THE NEW DERIVATIVE ORDER

REGISTER of THINGS WRITTEN

TRIVIAL and NON-TRIVIAL
INCOMPLETE and CONTINGENT and SUBJECTIVE

realms

UTOPIAN DYSTOPIAN ATOPIAN
METAPHYSICAL IMMANENT TRANSCENDENT SYSTEMIC AUTOPOIETIC

DIALECTIC REALISTIC IDEALISTIC MATERIALISTIC NON-DIALECTIC
CONTAGIOUS SPAWNING EXPECTING POSITIONAL FIXED

REAL VIRTUAL ACTUAL CONCEPTUAL HANDS-ON

worlds

HEGEMONIC MARGINAL PRECARIOUS
diverse -POLIC multi -GENIC varied -CRATIC

ACADEMIC BESTSELLING MUNDANE CRYPTIC

order

RANDOM WALK

Knorr-Cetina, Karin	Epistemic Systems	2004
Ayache, Elie	The Blank Swan. The End of Probability, Chichester	2010
Nestler, Gerald	Yx. fluid taxonomies-enlitened elevation-voided dimensions-human derivatives-vibrations in hyperreal econociety, Wien	2007
Deleuze, G./ Guattari, F.	Tausend Plateaus. Kapitalismus und Schizophrenie, Berlin	2002
Massumi, Brian	A User's Guide to Capitalism and Schizophrenia. Deviations from Deleuze and Guattari	1996
Foucault, Michel	Die Regierung des Selbst und der anderen, Frankfurt a.M.	2012
Foucault, Michel	Society Must be Defended, London	2004
Foucault, Michel	Dispositive der Macht, Berlin	1978
Meillasoux, Quentin	Nach der Endlichkeit. Versuch über die Notwendigkeit der Kontingenz	2008
Willke, Helmut	Atopia. Studien zur atopischen Gesellschaft, Frankfurt a. Main	2001
Willke, Helmut	Dystopia. Studien zur Krisis des Wissens der modernen Gesellschaft, Frankfurt a.M.	2002
Willke, Helmut	Heterotopia. Studien zur Krise der Ordnung moderner Gesellschaften, Frankfurt a.M.	2003
Baecker, Dirk	Kapitalismus als Religion, Berlin	2003
Groys, Boris	Über das Neue. Versuch einer Kulturökonomie, Frankfurt a.M.	2004
Klossowski, Pierre	Die Lebende Münze, Berlin	1994
Abbing, Hans	Why Are Artists Poor? The Exceptional Economy of the Arts, Amsterdam	2002
Bourdieu, P./ Haake, H.	Free Exchange, Cambridge/Oxford	1995
Marchart, Oliver	Techno-Kolonialismus. Theorie und imaginäre Kartographie von Kultur und Medien, Vienna	2004
Stallabrass, Julian	Gargantua. Manufactured Mass Culture, London	1996
Stallabrass, Julian	Art. Incorporated, Oxford	2004
Triana, Pablo	Lecturing Birds on Flying. Can Mathematical Theories Destroy the Financial Markets?, Hoboken	2009
Galbraith, John K.	The Great Crash 1929, Boston/New York	1954
Thorp, Edward O.	Beat the Dealer. A Winning Strategy for the Game of Twenty One, New York	1966
Minsky, Hyman P.	Instabilität und Kapitalismus, Zürich	2011
Bookstaber, Richard	A Demon of Our Own Design, Hoboken	2007
Sorkin, Andrew R.	Too Big to Fail. Inside the Battle to Save Wall Street, London/New York	2009
Stewart, James B.	Den of Thieves, New York	2010
MacKenzie, Donald	An Engine, Not a Camera. How Financial Models Shape Markets, Cambridge/London	2008
Fox, Justin	The Myth of the Rational Market. A History of Risk, Reward, and Delusion on Wall Street, New York	2009
Lowenstein, Roger	When Genius Failed. The Rise and Fall of Long-Term Capital Management, London	2002

Kelly, Kate	Street Fighters. The Last 72 Hours of Bear Stearns, the Toughest Firm on Wall Street, New York/London	2009
Wolf, Martin	Fixing Global Finance. How to Curb Financial Crises in the 21st Century, New Haven/London	2009
Brown, Aaron	The Poker Face of Wall Street, Hoboken	2006
Dunbar, Nicholas	The Devil's Derivatives, Boston	2011
Mehrling, Perry	Fischer Black and the Revolutionary Idea of Finance, Hoboken	2005
Keynes, John M.	The General Theory of Employment, Interest and Money, Cambridge	2008
Knight, Frank H.	Risk, Uncertainty, and Profit, Orlando	2009
Haug, Espen G.	Derivatives. Models on Models, Chichester	2007
Haug, Espen G	The Complete Guide to Option Pricing Formulas, New York	2007
Deleuze, G./ Guattari, F.	Anti-Ödipus. Kapitalismus und Schizophrenie, Frankfurt a.M.	1974
Ferguson, Neill	The Ascent of Money. A Financial History of the World, London	2008
Akerlof, G./ Shiller R.	Animal Spirits. How Human Psychology Drives the Economy, and Why It Matters for Global Capitalism, Princeton	2009
Obst, Georg	Geld-, Bank- und Börsenwesen, Stuttgart	1922
Kerschagl, Richard	Die Zukunft des Silbers, Berlin	1933
Kovács, Leopold	Die Unabhängigkeit des Banknotenumlaufes vom Golde, Graz	1916
Henikstein, Hugo	Die Amerikanische Handelspolitik nach dem 2. Weltkrieg und die Wiederbelebung des Welthandels, Wien	1950
Ziegler, Julius	Bankensanierung und Bankenaufsicht, Ein Beitrag zur Bankenkontrolle und -reform in Mitteleuropa, Berlin	1933
Verlag f. Geschichte u. Politik	Österreich und das Dollarproblem, Wien	1951
Renner, Karl	Das nationale und das ökonomische Problem der Tschechoslowakei, Prag	1926
Schmandt, Heinrich	Technik der Kontrolle im Bankenbetrieb, Berlin	1926
Herzog, Siegfried	Handbuch der Industriellen Finanzierung, Stuttgart	1914
Böhm-Bawerk von, Eugen	Positive Theorie des Kapitals, Erster Halbband, Innsbruck	1909
Böhm-Bawerk von, Eugen	Positive Theorie des Kapitals, Zweiter Halbband, Innsbruck	1912
Böhm-Bawerk von, Eugen	Geschichte und Kritik der Kapitalzins-Theorien, Innsbruck	1914
Deleuze, Gilles	Logik des Sinns, Frankfurt a.M.	1993
Turkle, Sherry	Simulation and Its Discontents, Cambridge/London	2009
Foucault, Michel	Analytik der Macht, Frankfurt a.M.	2005
Foucault, Michel	Die Geburt der Biopolitik. Geschichte der Gouvernementalität II, Frankfurt a.M.	2006

Sklair, Leslie	The Transnational Capitalist Class, Oxford	2001
Heinsohn, Gunnar	Söhne und Weltmacht, Zürich	2006
Fukuyama, Francis	Der Grosse Aufbruch, München	2002
Asad, Talal	Anthropology & the Colonial Encounter, Amherst	1973
Bate, Paul	Cultural Change: Strategien zur Änderung der Unternehmenskultur, München	1997
Hollein, Max	Unternehmen Kunst, Regensburg	2006
Friedmann, Georges	The Anatomy of Work, London	1961
Weinzierl, Rupert	American Way of Life vs. Europäischer Weg, Wien	2003
Pino, Robert	Corporate Aikido, New York	1976
Levinson, Jay C.	Guerilla Marketing, Frankfurt a. Main	1990
Nürnberger, Christian	Die Machtwirtschaft, München	1999
Ziegler, Jean	Die neuen Herrscher der Welt, München	2005
Soros, George	Die Krise des globalen Kapitalismus, Frankfurt a.M	2000
De Marco, T./ Lister, T.	Peopleware, New York	1987
Howkins, John	The Creative Economy, Suffolk	2001
Corino, Karl	Genie und Geld, Reinbek bei Hamburg	1991
Mokyr, Joel	The Lever of Riches: Technological Creativity and Economic Progress, New York	1992
Minikin, Robert	The Erm Explained, London	1993
Bozon, Norbert	Der Börsenkatechismus, Karlsruhe	1978
Bernstein, Peter L.	Against the Gods: The Remarkable Story of Risk, New York	1996
Bernstein, Peter L.	The Power of Gold: The Histiry of an Obsession, New York	2000
Covel, Michael W.	Trend Following: How Great Traders Make Millions in UP or Down Markets, New Jersey	2007
Livermore, Jesse	Das Spiel der Spiele, Rosenheim	1996
Koppel, R./ Abell, H.	The Innergame of Trading, Chicago	1994
Raab, Thomas	Nachbrenner: Zur Evolution und Funktion des Spektakels, Frankfurt a.M.	2006
Werner, K./ Weiss, H.	Das neue Schwarzbuch Markenfirmen, Wien/Frankfurt a.M.	2003
Jaeger, Hans	Geschichte der Wirtschaftsordnung in Deutschland, Frankfurt a.M.	1988
Kübler, Fridrich	Verrechtlichung von Wirtschaft, Arbeit und sozialer Solidarität, Frankfurt a.M.	1985

Vogl, Joseph	Kalkül und Leidenschaft: Poetik des ökonomischen Menschen, Zürich-Berlin	2008
Sennett, Richard	The Craftsman, London/New York	2008
Sennett, Richerd	The Corrosion of Character, New York	1998
Bakan, Joel	The Corporation, London	2004
Stephenson, Neal	Die Diktatur des schönen Scheins, München	2002
Heuermann, Hartmut	Medienkultur und Mythen, Reinbek bei Hamburg	1994
Castells, Manuel	The Power of Identity, Oxford	1997
Lasn, Kalle	Culture Jamming - Das Manifest der Anti-Werbung, Budapest	2005
Tapscott, D./ Williams A.	Wikinomics: Die Revolution im Netz, München	2007
McLuchan, Marshal	Die mechanische Braut, New York	1951
Longstreth, Richard	The Drive-in, the Supermarket, and the Transformation of Commercial Space in Los Angeles, 1914-1941, Cambridge/London	1999
Athanassakis, Irini	Die Aktie als Bild, Wien	2008
Zoche, Hermann-Josef	Macht Erfolg Sinn: Eine neue Ethik für Unternehmer und Manager, Paderborn	1996
Rogers R. Mark	Handbook of Key Economic Indicators, Illinois - New York	1994
Herrmann, Ned	Das Ganzhirn-Konzept für Führungskräfte, Wien	1996
Edelbacher/ Reitner/ Preining	Sicherheits Management, Wien	2000
Forrester, Viviane	Der Terror der Ökonomie, München	1998
Reetze, Jan	Gläserne Verbraucher: Markt- und Medienforschung unter der Lupe, Frankfurt a.M.	1995
Toffler, Alvin	Der Zukunftsschock, Stuttgart	1970
Schalit, Joel	The Anti-Capitalism Reader: Imagining a Geography of Opposition, New York	2002
Rifkin, Jeremy	The Age of Access, New York	2001
Lyotard, Jean-Francois	Das postmoderne Wissen, Wien	1993
Robinson, John	Die Gesellschaft als Wirtschaftsgesellschaft, München	1971
Machlup, Fritz	International Payments, Debts, and Gold, New York	1976
Shangquan, G./ Fulin, C., Ed.	Theory and Reality of Transition to a Market Economy, Beijing	1995
AK für Angestellte, Wien	Wem gehört Österreichs Wirtschaft wirklich? , Wien	1991
Ziegler, Jean	Die neuen Herrscher der Welt und ihre globalen Widersacher, München	2003
Edelbacher, Maximilian	Organisierte Kriminalität in Europa: Die Bekämpfung der Korruption und der organisirten Kriminalität, Wien	1998

Joyce, Patrick	The Rule of Freedom: Liberalism and the Modern City, London/ New York	2003
Read, Donald	The Power of News. The History of Reuters, New York	1992
Rogers, Jim	A Bull in China, New York	2007
Levitt, Steven / Dubner, Stephen	Freakonomics, London	2005
Veblen, Thorstein	Theorie der feinen Leute, Frankfurt a.M.	1986
Katzenbach J.R./ McKinsey RCL	Pioniere des Wandels, Wien	1996
Freilinger, Christian	Die Kraft der Vision, Linz	1996
Maurice, Keith	Focuc on Business, New Jersey	1992
Gerken, Gerd	Trance-Märkte:Show statt Strategie, Düsseldorf/ Regensburg	1998
Taylor, Charles	Multikulturalismus und die Politik der Anerkennung, Frankfurt a.M.	1993
De Souza, Philip	Seefahrt und Zivilisation, London	2001
Appaurai, Arjun, Ed.	Globalization, London	2001
Negt, Oskar	Arbeit und Menschliche Würde, Göttingen	2001
Myrdal, Gunnar	Asian Drama: An Inquiry into the Poverty of Nations, London	1977
Wolfe, Tom	Fegefeuer der Eitelkeiten, München	1990
Dussel, Enrique	Philosophie der Befreiung, Hamburg	1989
Haberler, Gottfried	Mr. Keynes' Theory Of The Multiplier: A Methodological Criticism(1936), La Vergne	2010
Rothbard, Murray N.	The Case Against the Fed, USA	1994
Von Mises, Ludwig	The Theory of Money and Credit, London 1934	1981
Hayek F.A./ Caldwell, B., Ed.	Contra Keynes and Cambridge, Indianapolis	1995
Von Wieser, Frederich	Natural Value, London/ New York	1893
Keynes, John M.	A Treatise on Probability, Cambridge 1920	2009
Becker G. S./ Becker G. N.	The Economics of Life, USA	1997
Becker Gary S.	Human Capital, Chicago/ London 1964	1993
Amin, Samir	The Law of Worldwide Value, New York 1978	2010
Von Mises, Richard	Probability, Statistics and Truth, New York 1957	1981
Marshall, Alfred	Principles of Economics, New York 1920	1997
Pizano, Diego	Conversation with Great Economists, New York 1980	2009
Von Mises, Ludwig	Planning for Freedom: Let the Market System Work, Indinapolis 1952	2008
Jevons, W. Stanly	The Principles of Economics, London 1905	2006

Menger, Karl	Principles of Economics, Crove City	1976
Posner, Richard A.	The Crisis of Capitalist Democracy, Cambrige/ London	2010
Wallerstein, Immanuel	World-Systems Analysis, Durham/ London	2004
Stigler, George J.	The Intellectual and the Marketplace, London 1984	1999
Kahneman, Daniel	Thinking, fast and slow, London	2011
Hickel, Rudolf	Zerschlagt die Banken, Berlin	2012
Amin, Samir	Eurocentrism, New York	2011
DeLanda, Manuel	A New philosophy of Society, London/ New York	2011
Latour, Bruno	On The Modern Cult Of The Factish Gods, Durham/ London	2010
Gross, Daniel	POP! Why Bubbles Are Great For The Economy, New York	2007
Shiller, Robert J.	Irrational Exuberance, New York	2001
Friedman, Milton	The Counter-Revolution in Monetary Theory, Westmnister	1970
Dockes, P./ Potier J.-P.	Léon Walras - Vie et Œuvre Économique, Paris	2001
Berenson, Alex	The Number, London	2003
Page, Bruce	The Murdoch Archipelago, London	2003
Schuman, H./ Grefe, C.	Der Globale Countdown, Köln	2008
Dash, Mike	Tulpenwahn. Die verrückteste Spekulation der Geschichte, Berlin	2005
Stiglitz, Joseph	Die Schatten der Globalisierung, München	2004
Crump, Arthur	The Theory of Stock Speculation, New York 1901	1983
Durand, J./ Miller A.T.	The Business of Trading in Stocks, New York 1933	1988
Galbraith, J.K.	The Economics of Innocent Fraud. Truth For Our Time, London	2004
Von Cube, Felix	Lust an Leistung: Die Naturgesetze der Führung, München	1998
Simon, Hermann	Die heimlichen Gewinner, Frankfurt a.M.	1998
Burton, C./ Michael, N.	A Practical Guide to Project Management, London 1991	1994
Taleb, Nassim N.	The Black Swan, London	2008
Stiglitz, Joseph	The Roaring Nineties, London	2004
Defoe, Daniel	An Essay Upon Projects, London 1887	2005
Hoffmann, Hilmar	Kultur und Wirtschaft, Köln	2001

Beaud, M./ Dostaler, G.	Economic Thought Since Keynes, New York	1995
Drucker, Peter F.	Die ideale Führungskraft, Düsseldorf/ Wien	1967
Drucker Foundation	Die Manager von Morgen, Düsseldorf	1996
Matis, H. / Stiefel, D.	Die Weltwirtschaft, Wien	1991
Rosoff/ Pontell/ Tillman	Profit Without Honor, New Jersey	2002
ZEW	Wie Funktioniert das? Wirtschaft heute, Mannheim	1999
Maser, Peter	Der Termin- und der Differenzeinwand bei Börsentermingeschäften in Wertpapieren, Tübingen	1987
SEF/ INEF	Globale Trends 2004/ 2005. Fakten Analysen Prognosen, Frankfurt a.M.	2003
Max-Neef, Manfred A,	Human Scale Sevelopment, New York/ London	1991
Von Flotow, Paschen	Geld, Wirtschaft und Gesellschaft. Georg Simmels Philosophie des Geldes, Frankfurt a.M.	1995
Hang, W. F., Ed.	Warenästhetik. Beiträge zur Diskussion, Weiterentwicklung und Vermitlung ihrer Kritik, Frankfurt a.M.	1975
De La Boetie, Etienne	The Politics Of Obedience The Discourse Of Voluntary Servitude, USA	2010
Chicago Board of Trade	Understanding Basis. The Economics of Where and When, USA 1988	1990
Hoffmann, J./ Von Osten, M.	Das Phantom sucht seinen Mörder, Zürich/ Berlin	1999
Bank-Verlag Köln	Basic Information about Forward Trading, Cologne	1993
Chicago Board of Trade	Speculating Workbook, Chicago 1986	1990
Bank-Verlag Köln	Basisinformationen über Börsen-Termingeschäfte, Köln	1995
Stigler, George J.	The Pleasures and Pains of Modern Capitalism, London	1982
Walker, John, Ed.	The Profits and Losses of Global Crime, Willowdale	2001
Seldon, Arthur, Ed.	Prime Mover Of Progress. The Entrepreneur in Capitalism and Socialism, London	1980
Farkas u.a.	Sprizenmanager und ihre Führungsstrategien, Frankfurt/ New York	1996
Vogl, Joseph	Das Gespenst des Kapitals, Zürich 2010	2011
Said, Edward W.	Culture and Imperialism, New York	1993
Said, Edward W.	Freud and the Non-European, London	2003
Heidenreich, Ralph & Stefan	Mehr Geld, Berlin	2008
Michalitsch, Gabriele	Die neoliberale Domestizierung des Subjekts, Frankfurt/ Main	2006
Kraus, Chris/ Lotringer, Sylvere	Hatred of Capitalism, Cambrige/ London	2001
Leyshon, A./ Thrift, N.	Money/Space. Geographies of Monetary Transformation, New York	1997

Schiller, Dan	Digital Capitalism: Networking the Global Market System, Massachusetts/ London	1999
Unger, Roberto M.	Free Trade Reimagined, Princeton	2007
Jardine, Lisa/ Brotton, Jerry	Global Interests. Renaissance Art between East and West, London	2000
Bischoff, Joachim	Der Kapitalismus des 21. Jahrhunderts, Hamburg	1999
Ekins, Paul/ Max-Neef, Manfred	Real-Life Economics: Understanding Wealth Creation, London	1992
Matzner, Egon	Monopolare Weltordnung - Zur Sozioökonomie der US-Dominanz, Marburg	2000
Gorz, Andre	Wissen, Wert und Kapital, Zürich	2004
Gorz, Andre	Kritik der Ökonomischen Vernunft, Hamburg	1994
Clarke, William M.	How the City of London Works, London 1986	2008
Harvey, David	Räume der Neoliberalisierung, Stuttgart/ Hamburg 2005	2007
Shiva, Vandana	Biopiraterie. Kolonialismus des 21. Jahrhunderts - Eine Einführung, Cambridge	2002
Albert, Michael	Parecon: Leben nach dem Kapitalismus, Frankfurt am Main	2006
Reichert, Ramon	Das Wissen der Börse, Bielefeld	2009
Hayek, F.A/ Caldwell, Bruce, Ed.	The Road to Serfdom, London 1944	2007
Friedman, Milton	Capitalism and Freeom, Chicago/ London 1962	2002
Smith, Adam	The Wealth of Nation, New York	2003
Mill, John S.	On Liberty & Utilitarianism, New York 1993	2008
Malthus, T.R.	An Essay on the Principle of Population, London 1798/ New York	2007
Braudel, Fernand	Die Dynamik es Kapitalismus, Stuttgart	1997
Wallerstein, Immanuel	The Essential Wallerstein, New York	2000
Etheridge, Davis	Louis, Bachelier's Theory od $peculation, Princeton	2006
Lyotard, Jean-Francois	Libidinöse Ökonomie, Zürich/ Berlin	2007
Frank, Andre G.	ReORIENT: Global Economy in the Asian Age, Berkeley/Los Angeles	1998
Schumpeter, Joseph A.	Capitalism, Socialism and Democracy, New York 1942	2008
Pozzolini, Alberto	Antonio Gramsci. An Introduction To His Thought, Rome/ London	1970
Polanyi, Karl	The Great Transformation. The Political and Economic Origins of Our Time, Boston	2001
Le Goff, Jacques	Your Money or Your Life, New York	1988
Le Goff, Jacques	Die Geburt Europas im Mittelalter, München	2007

Weber, Max	Die protestantische Ethik und der Geist des Kapitalismus, Köln	2007
Mirowski, Philip	Machine Dreams, Cambridge	2002
Heinsohn, Gunnar/ Steger, Otto	Eigentum, Zins und Geld, Marburg	2006
Marx, Karl	Der 18. Brumaire des Louis Bonaparte, Berlin 1852	1965
Marx, Karl	Das Kapital, Köln 2009	1872
Turner, Frederick J.	The Significance of the Frontier in American History, London 2008	1920
Smith, Anthony	The Geopolitics of Information. How Western Culture Dominates the World, New York	1980
Kühnl, Reinhard	Liberalismus als Form bürgerlicher Herrschaft, Heilbronn	1999
Gertenbach, Lars	Die Kultivierung des Marktes, Berlin	2008
Bröckling, Ulrich	Das unternehmerische Selbst, Frankfurt am Main	2007
Honegger/ Neckel/ Magnin	Strukturierte Verantwortungslosigkeit, Berlin	2010
Kornwachs, Klaus	Zuviel des Guten. Von Boni und falschen Belohnungssystem,Frankfurt am Main	2009
Sen, Amartya	Der Lebensstandart, Hamburg	2000
Englert, B./ Grau I./ Komlosy A.	Nord-Süd-Beziehungen. Kolonialismen und Ansätze zu ihrer Überwindung, Wien	2006
Scherf, Harald	Marx und Keynes, Frankfurt am Main	1986
Coyle, Diane	Governing the Word Economy, Cambridge	2000
Marazzi, Christian	The Violence of Financial Capitalism, London	2011
Negri, Antonio/ Scelsi, Raf	Goodbye Mr Socialism. Radical Politics in the 21st Century, London	2008
Carrier, James G., Ed.	Meanings of the Market. The Free Market in Western Culture, New York	1997
Musto, Marsello, Ed.	Karl Marx's Grundrisse. Foundations of the Critique of Political Economy 150 Years Later, New York	2010
Altvater, Elmar	Die Zukunft des Marktes, Münster	1997
Altvater/Hecker/Heinrich/Schaper	KAPITAL.DOC. Das Kapital (Bd.I) von Marx in Schabildern mit Kommentaren, Münster	1999
Blätter für deutsche und int. Politik, Ed.	Der Sound des Sachzwangs. Der Globalisierungs-Reader, Berlin	2006
Leonard, Mark	What Does China Think?, London	2008
Duval, Jules	Memoire Sur Antoine De Montchretien. Sieur De Vateville. Auteur Du Premier Traite D'Economique Politique, Paris	1868
Wilmott, Paul	Frequently Asked Questions in Quantitative Finance, Chichester	2009
Patterson, Scott	The Quants. How a New Breed of Math Wizards Conquered Wall Street and Nearly Destroyed It, New York	2010
Roubini, Nouriel	Crisis Economics. A Crash Course in the Future of Finance, London	2010

Taleb, Nassim Nicholas	Fooled by Randomness. The Hidden Role of Chance in Life and in the Markets, London	2005
Jullien, François	Vortrag vor Managern über Wirksamkeit und Effizienz in China und im Westen, Berlin	2006
Chancellor, Edward	Devil Take the Hindmost. A History of Financial Speculation, London	2009
Mallaby, Sebastian	More Money Than God. Hedge Funds and the Making of a New Elite, London	2010
Wagenführ, Horst	Handelsfürsten der Renaissance, Wien	1957
Jackson, Tim	Wohlstnd ohne Wachstum. Leben und Wirtschaften in einer endlichen Welt, München	2011
Bernstein, Peter L.	Capital Ideas. The Improbable Origins of Modern Wal Street, Hoboken	1992
Bodanis, David	The Undercov£r Economist, London	2006
Wedel, Janine R.	Shadow Elite. How the World's New Power Brokers Undermine Democracy, Government, and the Free Market, New York	2009
Glimcher/Camerer/Fehr/Poldrake, Eds.	Neuroeconomics. Decision Making and the Brain, London, San Diego, Burlington	2009
Hardt, M./ Negri, A.	Empire, Cambridge/London	2000
Diederichsen, Diedrich	On (Surplus) Value In Art, Berlin/Rotterdam	2008
Graw, Isabelle	Der Große Preis. Kunst zwischen Markt und Celebrity Kultur, Köln	2008
Werner, Paul	Museum, Inc. Inside the Global Art World, Chicago	2005
Liebs, Holger, Ed.	Die Kunst, das Geld und die Krise, Köln	2009
Shell, Marc	Art & Money, Chicago/London	1995
Davis, Mike	Planet of Slums, London/New York	2006
Negt, Oskar	Soziologische Phantasie und exemplarisches Lernen. Zur Theorie und Praxis der Arbeiterbildung, Frankfurt a.M./Köln	1974
Zimmermann, Ludwig	Der Imperialismus. Seine geistigen, wirtschaftlichen und politischen Zielsetzungen, Stuttgart	1963
Karsunke, Yaak	Josef Bachmann / Sonny Liston. Versuche aus der Unterklasse auszusteigen, Berlin	1973
Virno, Paolo	Grammatik der Multitude. Untersuchungen zu gegenwärtigen Lebensformen, Berlin	2002
Geuss, Raymond	Privatheit. Eine Genealogie, Frankfurt a. Main	2002
Lanier, Jaron	You Are Not A Gadget. A Manifesto, New York	2010
Landes, David S.	The Unbound Prometheus. Technological Change and Industrial Development in W. Europe f. 1750 to the Present, Cambridge	1969
Homes, Brian	Escape the Overcode. Activisr Art in the Control Society, Eindhoven, Zagreb, Istanbul	2009
Baecker, Dirk	Organisation und Management, Frankfurt a. Main	2003
Fanon, Frantz	Concerning Violence, London	1965
Appadurai, Arjun	The Social Life of Things. Commodities in Cultural Perspective, Cambridge	1986

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This work is the result of an ongoing conversation that started a long time before I decided to write a PhD thesis. When I started to feel the need to understand finance and markets in the mid 1990s, the topic was not really on the agenda of art and discourse. There was a lot of critical debate on the economy, or, to use the proper terminology, against capitalism. But new media, the Internet and other political, social and artistic issues were more urgent. My decision to go into this field to experience what it *was* and what it would *do* with me was a bit unsettling at first. But my wonderful friends Klaus Strickner and Thomas Feuerstein were – and have been ever since – very supportive. Also both the left-wing artist-activist and the trans- and metrosexual scenes – and all my other friends – that were my second home in Hamburg at that time, were not only forbearing with me but exceptionally kind to someone who had just moved in from Vienna, and more or less instantly spend his days working for the enemy.
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BIBLIOGRAPHY

The bibliography lists the reading that informed the development of the thesis since my upgrade. The literature I read until the upgrade in 2012 is entitled *Contingent Archive* and forms part of the artwork *Bottomless Pit, Elastic* (2012). It also serves as the background in *THE NEW DERIVATIVE ORDER. Register* (2014). This reading began before I started the thesis and continued through the first years of my PhD. Now, it concludes the Practice Portfolio.

Giorgio Agamben, *Il Regno e la Gloria*, (Vicenza: Neri Pozza, 2007).

Appadurai, Arjun. *Banking on Words. The Failure of Language in the Age of Derivative Finance* (Chicago: The University of Chicago Press, 2016).

Arnoldi, Jakob & Borch, Christian. „Market Crowds between Imitation and Control," in: *Theory, Culture & Society*, Vol. 24(7-8), 2007.

Ashby, Simon & Palermo, Tommaso & Power, Michael. *Risk culture in financial organisations: An intermim Report*, CARR – Centre for Analysis of Risk and Regulation (London: School of Economics, 2012).

Avanessian, Armen & Hennig, Anke. *Metanoia: Spekulative Ontologie der Sprache* (Berlin: Merve Verlag, 2014).

Avanessian, Armen & Gerald Nestler, *Making of Finance* (Berlin, Merve Verlag, 2015).

Ayache, Elie. *The Medium of Contingency. An Inverse View of the* Market (Basingstoke: Palgrave Macmillan, 2015).

— — . The Blank Swan*. The End of Probability* (Hoboken: Wiley, 2010).

Bachelier, Louis, "Theorie de la speculation" (1900) in: *Louis Bachelier's Theory of Speculation: The Origins of Modern Finance*. Transl. and with an Introduction by Mark Davis & Alison Etheridge. With a foreword by Paul A. Samuelson (Princeton University Press, 2006).

Bateson, Gregory. "Cybernetic Explanation," in: *Steps to an Ecology of Mind* (New York: Ballantine Books, 1967).

Berardi 'Bifo', Franco. *The Uprising. On Poetry and Finance* (Los Angeles: Semiotext(e), 2012).

Beunza, Daniel & Millo, Yuval. "Blended automation: Integrating algorithms on the floor of the New York stock exchange," in: *SRC Discussion Paper No. 38* (London: Systemic Risk Centre, London School of Economics and Political Science, 2015).

Beunza, Daniel & Stark, David. "Tools of Trade: The Socio-technology of Arbitrage in a Wall Street Trading Room," in: *Industrial and Corporate Change*, Vol.13, No.2, 2004, p.373.

Black, Fischer. „Noise," *Journal of Finance*, Volume 41, Issue 3, 1986.

Black, Fischer & Scholes, Myron. "The Pricing of Options and Corporate Liabilities," in: *Journal of Political Economy* 81 (3): 637–654, 1973.

Blackburn, Robin. "Finance and the Fourth Dimension," *New Left Review 39*, 2006.

Bodek, Haim. *The Problem of HFT*, Denver Security Trader Association, 43rd Annual Convention, 2013, http://haimbodek.com/past_events.html.

Brown, Steven D. “Michel Serres: Science, Translation and the Logic of the Parasite,” *Theory Culture Society* 2002; 19; 1, p.8. DOI: 0263276402019003001.

Bryant, Levi R. *Of Quasi-Objects and the Construction of Collectives*, http://larvalsubjects.wordpress.com/2011/06/18/of-quasi-objects-and-the-construction-of-collectives.

— — . *The Democracy of Objects* (Open Humanities Press: University of Michigan: 2011).

Bloor, David. *Knowledge and Social Imagery* (Chicago: University of Chicago Press, 1976.

Butler, Judith. *Excitable Speech. A Politics of the Performative* (London: Routledge: 1997).

Center for Media Justice, *Consumers, Big Data, and Online Tracking in the Retail Industry: A Case Study of Walmart*, 2013. http://centerformediajustice.org/wp-content/uploads/2014/06/WALMART_PRIVACY_.pdf

Callon, Michel. *What does it mean to say that economics is performative?* CSI working papers series no. 005, 2006

— — . ed., *The Laws of the Markets*, (Hoboken: Wiley-Blackwell, 1998),

Coeckelbergh, Mark. *Money Machines. Electronic Financial Technologies, Distancing, and Responsibility in Global Finance* (Farnham: Ashgate, 2015)

Coombs, Nathan. *What is an algorithm? Financial regulation in the era of high-frequency trading*, *Economy and Society*, Volume 45 Number 2 2016: 1-25

Davenant, Charles. *Discourses on the Publick Revenues, and on the Trade of England*, (London, 698), pt. 1, discourse 2

Deleuze, Gilles. *Difference and Repetition* (New York: Columbia University Press, 1994)

Deleuze, Gilles & Guattari, Felix. *Anti-Oedipus.* Capitalism and Schizophrenia (Minneapolis: University of Minnesota Press, 1983/2000)

Deleuze, Gilles & Guattari, Félix, *A Thousand Plateaus: Capitalism and Schizophrenia*, (Minneapolis: University of Minnesota Press, (1987)

DeLanda, Manuel. “A New Ontology for the Social Sciences,” in: *Transdisciplinary Objects* (Champaign: University of Illinois, 2002)

Esposito, Elena. Die Fiktion der wahrscheinlichen Realität, Frankfurt/Main, 2007

— — . “The structures of uncertainty: performativity and unpredictability in economic operations,” *Economy and Society*, 42:1, 2013

Farmer, J. Doyne. “The impact of computer based training on systemic risk,” Paper presented at the London School of Economics, January 11, 2013, http://www.lse.ac.uk/fmg/events/conferences/Systemic-Risk-Centre/Foresight-Report_110113/Papers-and-slides/Doyne-Farmer.pdf.

Michel Feher, “Self-Appreciation; or, The Aspirations of Human Capital,” in: *Public Culture* 2009 Volume 21, Number 1: 21-41, p. 26. doi: 10.1215/08992363-2008-019

Foucaut, Michel, *Society Must be Defended* (New York: Picador, 1997)

Galbraith, John K., *The Great Crash of 1992* (Boston: Mariner Books, 2009)

Graeber, David. *Debt, The first 5000 years* (New York: Melville House, 2011)

— — . *Fragments of an Anarchist Anthropology* (Cambridge: Prickly Paradigm Press, 2004**)**

Graw, Isabelle. "The Value of the Art Commodity," in: *Texte zur Kunst*, 22/88

Guattari, Félix. *Chaosmosis. An ethico-aesthetic paradigm*, transl. Paul Bains (Bloomington & Indianapolis: Indiana University Press, 1995)

Harman, Graham. "The Road to Objects," in: *continent.* 1.3 (2011): 177.

Hayek, Friedrich A. "The Use of Knowledge in Society," *The American Economic Review*, Volume 35, Issue 4 (Sep., 1945), 519-530

— — . *Individualism and Economic Order* (Chicago: The University of Chikago Press, 1948)

Hayles, Katherine & Jagoda, Patrick & LeMieux, Patrick. "Speculation: Financial Games and Derivative Worlding in a Transmedia Era," *Critical Inquiry*, Vol. 40, No. 3, Comics & Media, edited by Hillary Chute and Patrick Jagoda (Spring 2014), pp. 220-236

Heinsohn, Gunnar & Steiger, Otto. *Eigentum, Zins und Geld* (Marburg: Metropolis Verlag, 2002)

Hénaff, Marcel. *The Price of Truth. Gift, Money and Philosophy* (Stanford: University Press, 2010).

Ho, Karen. *Liquidated: An Ethnography of Wall Street* (Durham:Duke University Press: Durham, 2009).

Holmes, Brian. *Is it Written in the Stars? Global Finance, Precarious Destinies*, 2009. https://brianholmes.wordpress.com/2009/11/06/is-it-written-in-the-stars/#sdfootnote19anc.

— — . *Guattari's Schizoanalytic Cartographies, or, the Pathic Core at the Heart of Cybernetics*, p.14. https://brianholmes.wordpress.com/2009/02/27/guattaris-schizoanalytic-cartographies/).

Horodyski, John. *Breaking Down Big Data: The Value in Metadata*, http://www.cmswire.com/cms/information-management/breaking-down-big-data-the-value-in-metadata-026985.php, last accessed September 10, 2016.

Huizinga, Johan. *Homo Ludens: A Study of the Play-Element in Culture*, (London: Routledge & Kegan Paul, 1949).

Jessop, Bob. *The Future of the Capitalist State* (Cambridge: Polity Press, 2002)

Kahnemann, Daniel & Tversky, Amos "Prospect Theory: An Analysis of Decision under Risk", *Econometrica*, XLVII, 1979

Keynes, John M. *The general theory of employment, interest and money* (London: Macmillan Cambridge University Press, for Royal Economic Society, 1936)

Klein, Kevin. *Out of Control. The New Biology of Machines, Social Systems, and the Economic World* (Basic Books: New York: 1995)

Knight, Frank H. *Risk, Uncertainty, and Profit* (Boston: Hart, Schaffner & Marx, 1921)

Konings, Martijn, *The Emotional Logics of Capitalism. What Progressives Have Missed* (Standford University Press, 2015)

Knorr Cetina, Karin. *Epistemic Cultures. How The Sciences make Knowledge* (Cambridge: Harvard University Press, 1999)

— — . “From Pipes to Scopes: The Flow Architecture of Financial Markets,“ in: *Distinktion - Scandinavian journal of social theory* 7, 2003

Knorr Cetina, Karin & Preda, Alex. „The Temporalisation of Financial Markets: From Network to Flow”, *Theory, Culture & Society*, 2007, Vol. 24(7-8)

Kuhn, Thomas. *The Structure of Scientific Revolutions* (University of Chicago Press, 1962)

Lange, Ann-Christina & Lenglet, Marc & and Seyfert, Robert. “Cultures of high-frequency trading mapping the landscape of algorithmic developments in contemporary financial markets,”*Economy and Society* Vol. 45/2, 2016: 1– 17. doi.org/10.1080/03085147.2016.1213986

Langlois, Ganaele. “Participatory culture and the new governance of communication: The paradox of participatory media,” *Television & New Media*, 14(2), 91–105., 2012

Latour, Bruno. *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge: Harvard University Press, 1999) p. 304.), p. 270

— — . Reassembling the Social. An Introduction to Actor-Network Theory (Oxford University Press, 2005)

— — . *The Pasteurization of France* (Cambridge:Harvard University Press: Cambridge: 1993)

— — . *We have never been Modern* (Cambridge: Harvard University Press, London), 1993

Lauer, David, in :Marijke Meerman (dir.), *The Wall Street Code*, documentary, 50 min., VPRO Backlight, 2013

Lazzarato, Maurizio. “From Capital-Labour to Capital-Life,” in: *ephemera. theory of the multitude*, Volume 4(3), 2004

— — . The Making of Indebted Man. An Essay on the Neoliberal Condition, Los Angeles: Semiotext(e), 2012),

Levinas, Emmanuel. *Totality and Infinity* (Pittsburgh: Duquesne University Press, 1969)

Lichtenstein, Ben. *Traders Audio*, “May 6 2010 Stock Market Crash,” May 12, 2010, http://www.youtube.com/watch?v=1mC4tu1NhUA

Luhmann, Niklas. *Modern Society Shocked by its Risks*. Social Science Centre Occasional Research Paper, Department of Sociology, University of Hong Kong, 1996

MacKenzie, Donald. An Engine, not a Camera. How Financial Models Shape Markets, (Cambridge: MIT Press, 2005)

MacKenzie, D. & Beunza, D. & Millo, Y. & Pardo-Guerra, J. P. “Drilling through the Allegheny Mountains: Liquidity, materiality and high-frequency trading,” *Journal of Cultural Economy*, 5(3), 279–296, 2010, p. 280.

MacKenzie, Donald & Millo, Yuval. “Constructing a Market, Performing Theory: The Historical Sociology of a Financial Derivatives Exchange,” in: *AJS*, Vol. 109, No.1, 2003

MacKenzie, Donald & Pardo-Guerra, Juan Pablo. “Insurgent capitalism: Island, bricolage and the re-making of finance,” *Economy and Society*, Volume 43, 2014

Malik, Suhail. “The Ontology of Finance: Price, Power, and the Arkhéderivative,” in: *Collapse, Vol. VIII, Casino Real*, edited by Robin Mackay, (London: Urbanomic, 2014) pp. 629–812

Marazzi, Christian. *Capital and Affects. The Politics oft he Language Economy* (Los Angeles, Semiotext(e), 2012 (first edition 1994),

— — . *The Violence of Financial Capitalism* (Los Angeles: Semiotext(e), 2011)

Martin, Randy. “After Economy?: Social Logics of the Derivative,” Social Text (2013) 31(1 114), p. 97; doi:10.1215/01642472-1958908l

— — . “A Precarious Dance, a Derivative Sociality,” in: *The Drama Review* 56:4 (T216) Winter 2012. New York University and the Massachusetts Institute of Technology

— — . *Financialization of Daily Life* (Philadelphia: Temple University Press, 2002).,

— — . *Where did the Future Go?,* http://www.logosjournal.com/issue_5.1/martin.htm

Karl Marx, The Grundrisse. The Fragment on Machines, http://thenewobjectivity.com/pdf/marx.pdf

— — . *Capital: Volume 1: A Critique of Political Economy* https://www.marxists.org/archive/marx/works/1867-c1/

Mazzucato, Marianna. T*he Entrepreneurial State* (London: Demos, 2011)

Mason, Paul. *PostCapitalism: A Guide to the Future* (London: Penguin, 2015)

Massumi, Brian. *A User’s Guide to Capitalism and Schizophrenia. Deviations from Deleuze and Guattari* (Cambridge: MIT Press, 1992)

Mayer-Schönburg, Viktor & Cukier, Kenneth. *Big Data: A Revolution That Will Transform How We Live, Work, and Think* (New York: Houghton Mifflin Harcourt, 2013)

Mehrling, Peter. Fischer Black and the Revolutionary Idea of Finance (Hoboken: Wiley, 2012)

Meillasoux, Quentin. After Finitude: An Essay on the Necessity of Contingency (London: Bloomsbury Academic, 2010)

Merton, Robert C. "Theory of Rational Option Pricing," in: *Bell Journal of Economics and Management Science* (The RAND Corporation) 4 (1): 141–183, 1973

Minsky, Hyman P. *Political Economy for the 21st Century: Contemporary Views on the Trend of Economics* (London: Routledge, 1995)

Mises, Ludwig von. *Human Action* (Auburn: Ludwig Mises Institute, 1989)

— — . *The Theory of Money and Credit*, New Haven: Yale University Press, 1953)

Murphy, Michelle. “The Girl: Mergers of Feminism and Finance in Neoliberal Times,” in *S&F Online*, Issue 11.1-11.2, Fall 2012/Spring 2013

Nanex,” Sify Finance, October 5, 2010, http://www.sify.com/finance/u-s-flash-crash-report-ignores-research-nanex-news-insurance-kkfiEjeciij.html.

Nanex. *15-Oct-2014 Treasury Flash Crash*, http://www.nanex.net/aqck2/4681.html

— — . “Flash Crah Mystery Solved,” http://www.nanex.net/aqck2/4150.html

Narang, Rishi K. *Inside the black box* (Hoboken: Wiley & Sons, 2015)

— — . The Truth about High-Frequency Trading (Hoboken: Wiley, 2014)

David McNally, *Monsters of the Market: Zombies, Vampires and Global Capitalism*, Historical Materialism Books (London: Haymarket Books, 2012)

Gerald Nestler, “The Non-Space of Money, or, the Pseudo-Common Oracle of Risk Production,” in: *Paratactic Commons* (Festival Catalogue, Istanbul, 2012)

Gerald Nestler, “Towards a Poietics of Resolution. On embodied risk, contingent autonomies and
renegade collectives as forms of technological and artistic resistance,” in: *Journal for Research Cultures*, Vol. 1/1, Dec. 2015. https://researchcultures.com

— — . Yx. fluid taxonomies-enlitened elevation-voided dimensions-human derivatives-vibrations in hyperreal econociety, (Vienna: Schlebrügge Publisher, 2007)

Neumann, John von & Morgenstern, Oskar. *Theory of Games and Economic Behavior* (Princeton University Press, 1944/2007)

Pasquale, Frank. The Black Box Society. The Secret Algorithms That Control Money and Information (Cambridge, Harvard University Press, 2015)

Pasquinelli, Matteo. Animal Spirits: A Bestiary of the Commons, Rotterdam (2008)

Piketti, Thomas, Capital in the Twenty First Century (Cambridge: Belknap Press, 2014)

Poon, Martha. “For Financial Certainty, Try Machine Gambling,” *Journal of Cultural Economy* (2013), p. 7, DOI: 10.1080/17530350.2013.840668

— — . “From New Deal Institutions to Capital Markets: Commercial Consumer Risk Scores and the Making of Subprime Mortgage Finance,” in *Accounting, Organizations and Society*, Vol. 35, No. 5, 2008

Poon, Martha & Wosnitzer, Robert. “Review Essay: Karen Ho, Liquidating corporate America: how financial leverage has changed the fundamental nature of what is valuable,” *Journal of Cultural Economy*, 5:2, 2002, doi.org/10.1080/17530350.2012.660272

Reports of the staffs of the CFTC and SEC to the joint advisory committee on emerging regulatory issues, “Findings regarding the market events of May 6, 2010,” September 30, 2010. http://www.sec.gov/news/studies/2010/marketevents-report.pdf

Roffe, Jon. *Abstract Market Theory* (Basingstoke: Palgrave Macmillan, 2015)

Michel Serres, *The Parasite* (Minneapolis: University of Minnesota Press, 2007), 1982

Shapiro, Steven. *Without Criteria* (Cambridge: The MIT Press, 2012),

Share Lab, *Immaterial Labour and Data Harvesting Facebook Algorithmic Factory (1)*, https://labs.rs/en/facebook-algorithmic-factory-immaterial-labour-and-data-harvesting/

Simmel, Georg. *The Philosophy of Money* (London: Routledge, 2004)

Srnicek Nick & Williams, Alex, *Inventing the Future: Postcapitalism and a World Without Work* (London/New York: Verso, 2015)

Stengers, Isabelle. *Thinking With Whitehead. A Free and Wild Creation of Concepts*, translated by Michael Chase, Foreword By Bruno Latour, Harvard University Press, Cambridge, Massachusetts, and London, England 2011

Stewart, Kathleen. “Cultural Poesis. The Generativity of Emergent Things,” in: Norman K. Denzin, Yvonne S. Lincoln, *The SAGE Handbook of Qualitative Research, Third Edition*, Thousand Oaks, 2005, p. 1015

Stiegler, George J. *The Pleasures and Pains of Modern Capitalism*, Thirteenth Wincott Memorial Lecture (London: The Institute of Economic Affairs, 1982

Stieglitz, Joseph. “Of the 1%, by the 1%, for the 1%,” in *Vanity Fair*, March 31, 2011. See: http://www.vanityfair.com/news/2011/05/top-one-percent-201105

Strange, Susan. *Casino Capitalism* (Manchester University Press, 1996).

Talleb, Nassin. *The Black Swan: Second Edition*: The Impact of the Highly Improbable (New York, 2010)

Taggart, Adam “Eric Hunsader: Investors Need to Realize the Machines Have Taken Over. The Blink of an eye is a lifetime for HFT algos,” *Peak Prosperity*, October 6, 2012, http://www.peakprosperity.com/podcast/79804/nanex-investors-realize-machines-taken-over

Taibbi, Matt. "The $9 Billion Witness: Meet JPMorgan Chase's Worst Nightmare," *Rolling Stone*, November 6, 2011 issue. p. 3. www.rollingstone.com/politics/news/the-9-billion-witness-20141106?page=3

Taleb, Nassim. The Black Swan: The Impact of the Highly Improbable (New York: Random House, 2007)

Thornton, Mark. *The Mystery of Adam Smith’s Invisible Hand Resolved* (Auborn: Mises Institute, 2006)

Thorp, Edward O. Beat the Dealer: A Winning Strategy for the Game of Twenty-One (New York: Vinatge, 1962)

— — . Beat the Market: A Scientific Stock Market System (New York: Random House, 1967)

Triana, Pablo. Lecturing Birds on Flying. Can Mathematical Theories Destroy the Financial Markets? (Hoboken: Wiley, 2009)

Vasseur, Roman.“My Matter,” Interview with Elie Ayache, in: *Journal of Visual Art Practice* (forthcoming 2016).

Vico, Giambattista. *New Science: Principles of the New Science Concerning the Common Nature of Nations*. Third edition, thoroughly corrected, revised and expanded by the author, translated by David March (Harmondsworth: Penguin, 2001).

Weizman, Eyal. The Least of All Possible Evils: Humanitarian Violence from Arendt to Gaza (London: Verso, 2012)

Wennerlind, Carl. *Casualties of Credit. The English Financial Revolution, 1620-1720*, Cambridge: Harvard University Press, 2011).

Wikins, Inigo & Dragos, Bogdan. “Destructive Destruction? An Ecological Study of High Frequency Trading,” *Mute*, January 22, 2013. http://www.metamute.org/editorial/articles/destructive-destruction-ecological-study-high-frequency-trading#.

Wosnitzer, Robert. *Desk, Firm, God, Country: Proprietary Trading And The Speculative Ethos Of Financialism*, PhD thesis, New York University, 2015 (book forthcoming 2017)

— — . “Movement after Randy Martin,” in: *Social Text (2015) 33(3 124.*

Wright, Erik Owen. *Foundations of Class Analysis: A Marxist Perspective*, Annual Meeting of the American Sociological Association, Chicago, 1999.