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Can Green Quantitative Easing (QE) Reduce Global Warming?

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The idea of a green QE (quantitative easing) programme has gained a lot of traction over the last years. Our recent research shows that a green QE programme that involves the purchase of green corporate bonds can indeed reduce global warming. Nevertheless the programme will be more effective if green investment responds strongly to changes in the interest rates. This policy brief complements our joint seminar on Climate Change and Finance held on 23rd May 2018 at the University of Greenwich, London.

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CAN GREEN QE REDUCE GLOBAL WARMING?

Summary

The idea of a green QE (quantitative easing) programme has gained a lot of traction over the last years. It has been argued that by implementing such a programme central banks could contribute to the fight against climate change. Our recent research shows that a green QE programme that involves the purchase of green corporate bonds can indeed reduce global warming. The programme will be more effective if green investment responds strongly to changes in the interest rates. Yet, green QE cannot by itself prevent severe climate change: even with optimistic assumptions about the role of interest rates, the path of global atmospheric temperature is not very likely to change substantially by such a programme. Many other types of environmental policies and strategies are necessary to keep global warming close to 2°C.

What is green QE?

Since the onset of the crisis, QE programmes have been implemented by many central banks around the globe. Via these programmes, central banks have issued money in order to buy sovereign and corporate bonds. Although these purchases have reduced the bond interest rates, there is still a lively debate on how much effective they have been in stimulating economic activity, which has been their main aim.

The idea behind a green QE programme is different: instead of buying any type of bonds, central banks should buy bonds that have been issued by firms or governments that intend to fund projects on energy efficiency, renewables and any other type of environmentally friendly investment.[1] Why would that be useful? These purchases can reduce the cost of borrowing for green projects. And this can induce firms and governments to undertake green investment that will reduce carbon emissions. So, the primary aim of green QE would not be to enhance economic growth, as the conventional QE programmes, but to contribute to the fight against climate change. That said, green QE can have positive effects on employment since it can boost economic activity in the green sector which tends to be more labour intensive.

Could green QE be a central bank tool in practice?

Currently, most central banks, especially in high-income countries, do not have sustainability targets. Their main target is price stability, while a lot of emphasis is also placed on financial stability.[2] So, it could be argued that central banks could include green QE in their toolkit only if their mandate is modified in order to incorporate some environmental targets.

[1] Anderson, V. (2015). Green Money: Reclaiming Quantitative Easing Money Creation for the Common Good, Green/EFA group in the European Parliament.
[2] Campiglio, E., Dafermos, Y., Monnin, P., Ryan-Collins, J., Schotten, G., Tanaka, M. (2018). 'Climate change challenges for central banks and financial regulators', *Nature Climate Change*, 8 (6), 462-468.

But this might not be essential. Central banks could consider the possibility of implementing a green QE programme based on their financial stability target. If it is true that climate change can destabilise the financial system, central banks could use green QE to reduce climate-related financial risks. This would be in line with their current mandate, in particular if their financial stability targets are interpreted based on a long-run perspective.

Can climate change lead to financial instability?

So, a key question is whether climate change could destabilise the financial system. It is widely accepted that severe global warming could harm our economies substantially. High temperatures might make people less productive in their work, health problems might reduce the number of people who are able to work and natural disasters might destroy infrastructure and agricultural production in many areas around the globe.[3] On top of that, climate damages could make people less willing to consume since they might wish to accumulate savings for an uncertain world; and firms might postpone their investment plans because of their adverse expectations about future profitability.

Would these developments also harm the financial system? Our recent research[4] has shown that this is very likely. Using an innovative ecological macroeconomic model[5], we have conducted a simulation analysis which illustrates that, if the transition to a low carbon economy is very slow in the next decades, climate-related events might reduce the profitability of firms and might make them unable to repay their debts, leading to systemic bank losses. This could initiate a financial vicious cycle whereby financially impaired banks provide less credit to the economy and less credit leads to further defaults and bank losses. We also show that in a world of climate-related financial uncertainty, financial investors might be less willing to invest in financial instruments issued by private companies which will be affected by climate change. This might set-off a fire-sale of private bonds that would cause financial instability.

But why is that important? As the global financial crisis of 2007-8 showed rather dramatically, an impaired financial system has significant implications for the real economy. Our analysis illustrates that climate-related disruptions to the financial institutions and financial markets will reduce the ability of firms to obtain access to finance in order to meet their commitments and undertake investment. As a result, the impact of climate change on economic activity will be exacerbated. This is in line with empirical research that has shown that the economic effects of natural disasters are higher when the access to the financial system is limited.[6]

Moreover, our simulations show that in a business-as-usual scenario governments might decide to bailout the climate-impaired financial institutions, increasing public debts. This is important because if governments respond to higher levels of public debt by implementing austerity programmes, economic

[3] See, for example, Dell, M., Jones, B.F. and Olken, B.A. (2014). 'What do we learn from the weather? The new climate-economy literature', *Journal of Economic Literature*, 52 (3), 740-798.
[4] Dafermos, Y., Nikolaidi, M. and Galanis, G. (2018). 'Climate change, financial stability and monetary policy', *Ecological Economics*, 152, 219-234.
[5] See www.define-model.org. See also Dafermos, Y., Nikolaidi, M. and Galanis, G. (2017). 'A stock-flow-fund ecological macroeconomic model', *Ecological Economics*, 131, 191-207.
[6] McDermott, T.K.J., Barry, F. and Tol, R.S.J., (2014). 'Disasters and development: natural disasters, credit constraints, and economic growth', *Oxford Economic Papers*, 66 (3), 750-773.

growth might decline even further. Perhaps more importantly, soaring public debt might make governments less willing to provide financial support to the people that will be affected by climate damages. And this would significantly magnify the social unrest generated by global warming.

But things might be even worse: physical damages are not the only potential cause of climate-related financial instability. If at some point in time climate policies are implemented abruptly or technology leads to a sudden shift to renewables, financial investors' confidence in the future profitability of carbon-related sectors might be undermined. This could lead to a substantial revaluation of the financial assets of these sectors, making them more vulnerable to defaults. Actually, recent research has shown that the exposure of the financial system to carbon-related sectors is substantial.[7] So, climate-induced financial instability might arise much before the rate of climate change becomes unprecedented.

Effects of a green QE programme

Would the implementation of a green QE programme help central banks reduce the financial risks of climate change described above? In our research we have explore this issue.[8] We have simulated a scenario in which a green QE programme is started being implemented at the global level in 2020. According to this programme, central banks buy a specific proportion of green bonds and they commit themselves that they will keep the same share of the green bond market in the next decades.

Such a programme should not be viewed as a simple extension of the current corporate QE programmes, which are of temporary nature and have as an aim to help central banks achieve price stability. On the contrary, the green corporate QE programme analysed in our paper is a kind of industrial policy with a much longer-term commitment and is assumed to run independently of any other type of conventional QE. As pointed out above, even without a change in their mandates, central banks could consider implementing such a programme if they decide to broaden their interpretation of their financial stability targets.

How does such a green corporate QE affect green investment in our model? The purchase of corporate green bonds by central banks reduces the interest rate on these bonds compared to the interest rate on conventional bonds. As a result, firms become more willing to invest in projects related to renewables and energy efficiency. On top of that, the lower cost of borrowing on the bond market makes them more willing to issue bonds instead of relying on bank loans.

Our simulation analysis shows that the programme boosts investment in renewables and energy efficiency and reduces global warming compared to a business-as-usual scenario. The reduction is higher the more firms increase their green investment as a response to a reduction of the interest rate on green bonds. Importantly, the reduction of global warming results in lower financial instability: the restriction of climate damages has beneficial effects on firms' and banks' financial health.

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[7] Battiston, S., Mandel, A., Monasterolo, I., Schütze, F. and Visentin, G. (2017). 'A climate stress-test of the financial system', *Nature Climate Change*, 7 (4), 283-288.

[8] Dafermos, Y., Nikolaidi, M. and Galanis, G. (2018). 'Climate change, financial stability and monetary policy', *Ecological Economics*, 152, 219-234.

However, the effects of a green corporate QE programme are not very substantial in quantitative terms: even if we adopt very optimistic assumptions about the responsiveness of green investment to changes in the interest rates, the difference in 2100 temperature compared to a scenario without a green QE is not higher than 0.5°C. This implies that many other policies and strategies need to be implemented in conjunction with a green programme in order to keep global warming close to 2°C and avoid climate-induced financial instability. Examples of such policies include green public investment, carbon taxes, green differentiated capital requirements and regulatory interventions that promote environmentally friendly consumption norms and methods of production. So, although a green QE is definitely a useful policy that central banks should consider including in their toolkit, it should not be viewed as a substitute for other climate policies.

About the authors

Dr. **Yannis Dafermos** is a Senior Lecturer in Economics at the University of the West of England. His research focuses on financial macroeconomics, climate change and finance, ecological macroeconomics and inequality. His work has appeared in various academic journals, such as the Cambridge Journal of Economics, Ecological Economics, Nature Climate Change, the Journal of Post Keynesian Economics and the Review of Political Economy.

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