

GREEN BONDS AND THE ENERGY TRANSITION: EFFICIENCY AND SOCIAL INEQUALITIES

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Overview

The empirical evidences of the macroeconomic costs of climate change are nowadays undeniable as it has been showed that climate change affects workers productivity, economic growth or even inter-personal conflicts (Nordhaus (1994), Hsiang et al. (2017), Dell et al. (2014), Carleton & Hsiang (2016)). However, despite this consensus, the actions to be carried in order to deal with climate change or at least the maintenance of global warming under the 2°C at the 2100 horizon, a measure adapted by the COP 21 members and more recently by the members of the COP 26, prone to be insufficient to achieve the fixed aim. In that respect, the IPCC 6th assessment report in 2021 established that a drastic reduction in the emissions of greenhouse gases is necessary if the objective is to keep global warming under the 2°C, a reduction that has not been achieved according to World Bank data that shows an increase of 3% of greenhouse gases between 2015 and 2021.

Then, if our society wants to properly address the challenge of the energy transition, governments should facilitate private green investments in the following years, with the purpose of increasing green production while reducing brown production.

Governments have several ways to incentivize a particular type of investments, either through a fiscal policy or a monetary one. The literature is nowadays extensive concerning the use of fiscal policy in order to achieve an energy transition (e.g., Bhattarai & Trzeciakiewicz (2017), Drygalla et al. (2017)). However, to the best of our knowledge, there exist a transmission channel that has not been profoundly exploited, namely government loans or “green bonds”. The One Planet Summit held in Paris in 2017, highlighted the increase interest over a green financial system. In this conference, 8 Central Banks have established a network for the green transformation of the financial system (Greening the Financial System (NGFS)) and more recently, they have published a report stressing the role of Central Banks in the mitigation of climate change.

In this paper, we analyze the efficiency of different macroeconomic policies that can be used to incentivize the energy transition from different angles: (a) the increase or not of the so-called green production; (b) the effects of these measures on macroeconomic aggregates (GDP, consumption, inflation, interest rates, etc.) and; (c) the impact of these policies over social inequalities.

Our approach is twofold. Firstly, we analyze the efficiency of green bonds. These bonds should be considered as government loans to green producers, issued by the Central Bank. More precisely, we analyze if a quantitative easing policy, like those applied after the financial crisis of 2008 or the Covid19 crisis in 2021, could be useful to achieve the energy transition without indirect effects over economic growth or financial stability.

Secondly, latest events as the « Yellow Jackets » movement in France in 2019, the strikes in Ecuador in 2019 or in Kazakhstan in 2021, have shown that the implementation and increase of carbon taxes, although imposed in order to reduce CO2 emissions and fight climate change, are no longer accepted by the populations as they constitute a heavy burden to households who see their purchasing power being reduced, especially for the poorest ones. In this paper, we compare the efficiency of classic economic policies, mainly fiscal (carbon taxes, subsidies to green consumption, other social transfers) against the use of green bonds. The comparison takes into account the effects of different measures over GDP, inflation and financial stability, but we look as well at their impact over the increase or decrease of social inequalities.

Methods

To this aim, we develop a theoretical analysis based on a Dynamic Stochastic General Equilibrium (DSGE) model as those models have proven to be useful to study business cycles and welfare consequences of macroeconomic policies following exogenous shocks. Our model follows those developed by Smets and Wouters (2007) but with a financial sector as in Gertler et Karadi (2010). We extend these frameworks by integrating the co-existence of brown firms, which are taxed and green firms, that the public government want to support. Both firms produce their goods

using labor supplied by households and capital supplied by capital producers. In this model, capital is acquired by purchasing claims to private and public institutions. Capital producers produce their capital by investing in green and brown goods. We assume that Central Banks have the possibility to create money by issuing claims and that they follow an exogenous rule that governs the fraction of green and brown claims it issues.

Finally, in order to evaluate the impact of the different measures over social inequalities, we consider two types of consumers as in Galí et al. (2007): Ricardian households with an access to financial markets and “rule of thumb” households that consume all their revenue at each period.

Results

Preliminary results show that the use of *green bonds* allows for an increase of green production and an increase of GDP. The increase in GDP however depends on the calibration of the output elasticity with respect to each type of good.

Regarding inequality, on the one hand, and as expected, simulations shows that the use of carbon taxes affects harder those households without access to financial markets, which increases social inequalities. On the other hand, our simulations show that the use of *green bonds* increases as well social inequalities but via another channel: the more the Central Bank finances green firms, the more they became productive, and as a consequence the rentability of those firms increases. This translates in an increase of banks profitability. Households who have access to financial markets and that are, by hypothesis, owners of private banks, will see their profits increase as well, which will provoke an increase on the gap between the two types of households assumed to exist in this model.

Conclusions

This paper studies and compares the efficiency of the use of several energy policies applied to achieve the energy transition. We tackle a particular transmission channel that has not been profoundly exploited until now, the use of green bonds used to finance green producers.

Our results, although preliminary, show that the transmission channels of different policies are considerable different, each affecting differently social inequalities.

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