Climate Transition Risk and the Role of Bank Capital Requirements

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As climate change and the transition to net-zero carbon emissions evolve, the financial sector is expected to face spillovers from fast and intense climate policy action. This concerns policymakers since a healthy banking system is fundamental to finance the carbon transition. Garcia-Villegas and Martorell (2024) aim to understand the macro-financial effects of carbon emission reduction policies and the trade-offs macroprudential policy faces when addressing risk spillovers into the banking sector. Their work investigates three key questions: (i) How may bank capital regulation —specifically capital requirements— address the financial risks derived from implementing carbon taxes? (ii) In the absence of climate policy action, how far can this type of capital-based macroprudential policies go as a sole climate policy tool? (iii) How do bank capital requirements interact with carbon tax policies along the equilibrium transition path to achieve climate goals?

To investigate these questions, the authors embed climate transition risk in a standard dynamic stochastic general equilibrium (DSGE) model with financial frictions and bank failure risk (Mendicino et al (2018), Mendicino et al (2020)), calibrated to match salient features of macroeconomic aggregates in the Euro Area during the last two decades. The model features two distinct production sectors: a non-energy sector and an energy sector that bundles low-carbon and fossil energy —that emits carbon due to the use of fossil resources. Importantly, each economic sector requires unique capital intermediated by sector-specific banks. Banks' portfolio returns are subject to two sources of risk: exogenous idiosyncratic risk and endogenous aggregate volatility risk linked to changes in energy prices. These sources of risk, together with limited liability, may lead to costly bank failures and credit disruption.

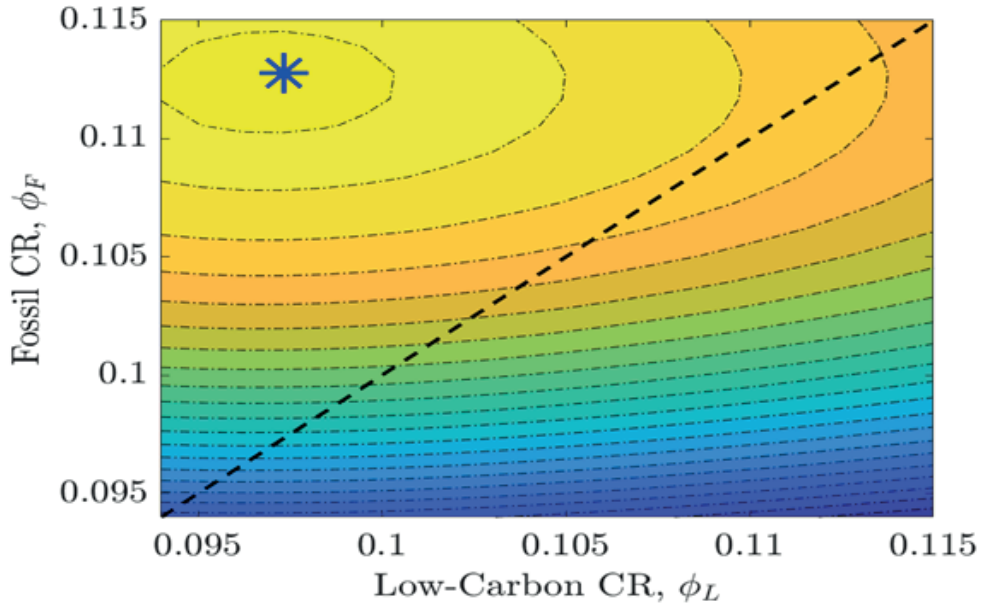
As in the real world, in the model, carbon mitigation policies affect energy prices and have implications for households, firms, and the financial sector. Introducing a carbon tax on fossil fuels increases energy prices and sparks a reallocation of capital across economic sectors. Real sector dynamics propagate to the financial system through the effect of energy prices on the return volatility of banks' energy-linked assets —i.e. an energy price risk channel. In this scenario, the macroprudential authority finds it optimal to increase sectoral capital requirements (asymmetrically) in proportion to the risk borne by each sectoral exposure as opposed to applying the same capital surcharge to all bank exposures. Such policy increases households' welfare as it contains financial risks arising from banks' exposures to energy production. Figure 1, shows the combination of capital requirements for exposures in the fossil-energy, clean- energy, and non-energy sectors that maximizes household's welfare.

Although not within its primary objective, this optimal policy indirectly supports a green credit transition —credit flowing out of the fossil energy sector and into the low-carbon energy sector. Importantly, the authors show that the level of optimal capital requirements and the implied effects on the magnitude of the green credit transition depend on the structural characteristics of an economy's production and energy sectors. This result could have relevant implications for the conduct of macroprudential policy, as it should consider the global dimension of the climate change risks and also the specific circumstances of each bank.

What if macroprudential policies could not only address climate-related financial risks —a goal within their macroprudential mandate, but also actively promote a transition to a green economy through the credit market? The authors find that under the latter policy goal and absent carbon taxes, fossil penalizing capital requirements have a limited impact in generating an investment transition from the fossil to the low-carbon energy sector. While a carbon tax lowers the return on fossil assets, fossil penalizing capital requirements can only reduce the return on equity for banks' fossil assets— which induces a disintermediation towards the non-banking sector, with low impact on the capital accumulation across the low-carbon and fossil energy sectors. Moreover, the associated effects on output and financial stability —due to higher non-bank financial intermediation (NBFI)— are unambiguously adverse.

Figure 1

Household's welfare with Optimal Capital Requirements



NOTE: Household welfare levels for different combinations of capital requirements on fossil (F) and clean energy sectors (L). Yellow regions represent high levels of welfare. Blue regions represent low levels of welfare. The blue asterisk corresponds to the optimum combination of CR when carbon taxes are set to reduce emissions by 35% in the medium run, consistent with the European Commission's emission reduction target for 2030.

Garcia-Villegas and Martorell (2024) also investigate the complementarities between macroprudential policies and carbon taxes along a plausible carbon transition aligned with European emission reduction targets. Their findings reveal that increasing sectoral capital requirements to their optimal level —as a precautionary tool to mitigate the impacts of carbon taxes— delivers lower bank failure rates and long-run welfare gains at the expense of lower investment and credit supply in the short-run.

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