Fostering green investments and tackling climate-related financial risks: which role for macroprudential policies?

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Scaling up Green Finance: The Role of Central Banks
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Widespread recognition of climate change: three of nine interlinked planetary boundaries have already been overstepped (Rockström et al., 2009)

There are three broad channels through which climate change can affect financial stability (Carney, 2015):

1. **Transition risks** are those that could arise from a sudden and disorderly transition to a low-carbon economy.
2. **Physical risks** are “those risks that arise from the interaction of climate-related hazards (including hazardous events and trends) with the vulnerability of exposure of human and natural systems”.
3. **Liability risks** stem from “parties who have suffered loss from the effects of climate change seeking compensation from those they hold responsible”.

Climate-related financial risks are highly debated because of the possible effects of these risks for the financial system, and financial stability in general.

Nevertheless, central banks and regulators, with few exceptions, seem to overlook climate objectives in practice.
**Stranded assets**

- Financial portfolios that are highly exposed to carbon-intensive “stranded” assets imply a potential threat for the low-carbon transition and have implications for systemic risk.
  - Asset stranding results when assets have suffered from unanticipated or premature write-downs, devaluations or conversion to liabilities.
- Firms with carbon-intensive financial activities are more exposed to solvency and liquidity problems when servicing their bonds and loans → higher credit risks for the financial & banking sector.
The green finance gap, technological progress, soft landing

The “Green finance gap”, i.e. *the lack of sufficient financial resources to be directed towards green investments*, is particularly relevant for the transition towards a low-carbon economy, because it represents

- a serious hindrance for the **achievement of the climate goals** as discussed during the Conference of the Parties to the United Nations Framework Convention on Climate Change

- and an hindrance for an **adequate technological progress** (*D’Orazio and Valente, 2018*)

- ...Green Finance Gap could prevent a so-called “soft landing” (*Schoenmaker and Van Tilburg, 2016*)
Beyond the Green Finance Gap

- **Considerable investments are required** in the sectors characterized by high capital costs, i.e., the building, industrial, transport and energy sectors.
- **$14 trillion are needed** over the period of 2010-2030 (WEF estimates);
- The **annual average investment** in green technologies in all the sectors considered in the study, should be on **average $0.7 trillion**.
Climate Change and Financial Regulation

The required investments to close the gap are **difficult to be met under the current financial framework**

- Central banks and regulators, with few exceptions, seem to **overlook climate objectives** in practice;

- A possible explanation for this neglect is related to the **models** traditionally used by central banks, which "are not well suited to capturing the effects of climate change or the complexity of the economic transition" (Sevillano and Gonzalez, 2018, p.129). Indeed, only recently a new generation of models has been developed to account for the effects of climate change on financial and economic stability (Balint et al., 2017; Fontana and Sawyer, 2016; Dafermos et al., 2017, 2018; Monasterolo and Raberto, 2018; Bovari et al., 2018; Lamperti et al., 2018);

- Existing financial regulatory framework still overlooks the possibility that **systemic risk arises in case of a “green transition”**;  
⇒ “**Carbon-bias**” and “**short-termism**” in existing regulatory schemes
Research Questions

- Is the current macroprudential regulatory framework “green enough” to enhance a low-carbon transition?
- If not, how policymakers can make it “greener”?
- What are the possible (unintended) consequences the existing regulatory framework can have on the transition?
Our view

- Considering the negative externalities deriving from climate-related financial risks, regulatory authorities can suggest **measures that could allow banks to increase long term “green” lending**, without harming the financial system’s stability.

- Macroprudential policy enriched with the “greened” tools, should be concerned with financial stability and a climate-related finance objective, hence **reaching also the objective of aligning finance with sustainable growth and development**.
Our contribution

- We present a critical review of existing and novel prudential approaches to align finance with sustainable growth and development, as well as incentivizing the “decarbonization” of banks’ balance sheets.
- We provide an up-to-date mapping of green prudential regulations and tools at the OECD and European level.
The 2007 crisis: “stability is destabilizing” (Minsky, 1982)
→ price stability can coincide with the build-up of excessive financial risk

The post-crisis “new normal”: Basel III explicitly tackles systemic risks

Under the existing Basel III accord:
- **climate-related financial risks are narrowly defined**, regulatory capital and liquidity regulations (under Pillar 1) **do not explicitly require banks to assess the impact of climate-related risks on bank’s exposures**
- **reinforces short-termism in financial markets**, hence creating obstacles for capital mobilization aimed at green investment projects which require long-term “patient” financial capitals that are, by definition, riskier than short-term assets (Dore, 2008; Mazzucato, 2013).
**“Greened” Basel III**

1. **Pillar 1**: we focus mostly on lender-based measures
2. **Pillar 2**: it should be extended to include climate-related risks (climate-related stress tests)
3. **Pillar 3**: disclosure requirements, both quantitative and qualitative, should be included so that investors can fully learn the risks to which specific banking institutions are exposed

<table>
<thead>
<tr>
<th>GREEN BASEL III</th>
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<tr>
<td><strong>Pillar I</strong></td>
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<tr>
<td>Enhanced capital &amp; liquidity requirements</td>
</tr>
<tr>
<td>- Liquidity coverage ratio (LCR)</td>
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<tr>
<td>- Net Stable Funding Ratio (NSFR)</td>
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<tr>
<td>- Leverage ratio</td>
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<tr>
<td>- Capital conservation buffers</td>
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<tr>
<td>- Countercyclical capital buffers</td>
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| - Enhanced loss absorption clause | | *
| - Securitization | | (quantitative disclosure) |
| - Trading risk | | |
| - Counterparty credit risk | | |

**Table:** The enhanced Basel III framework considering climate-related financial risk concerns. Instruments discussed in the paper are in italics.
Green Macroprudential Policy

"Greened" Basel III

<table>
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<tr>
<th>Intermediate Objective</th>
<th>Category</th>
<th>Instrument</th>
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<tbody>
<tr>
<td>Limit misaligned incentives, canalize credit to green sectors</td>
<td>Reserves</td>
<td>Differentiated reserve requirement</td>
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<tr>
<td></td>
<td>Reserves of exposure</td>
<td></td>
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<tr>
<td>Mitigate and prevent excessive credit growth and leverage</td>
<td>Capital</td>
<td>CAR with GSF</td>
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<td></td>
<td>Capital</td>
<td>Countercyclical capital buffer</td>
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<tr>
<td></td>
<td>Capital</td>
<td>Sectoral leverage ratio</td>
</tr>
<tr>
<td>Limit the concentration of certain exposures</td>
<td>Lending limits</td>
<td>Max(min) credit ceiling(floor)</td>
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<tr>
<td></td>
<td>Lending limits</td>
<td>Large exposures limit</td>
</tr>
<tr>
<td>Mitigate and prevent market illiquidity and maturity mismatch</td>
<td>Liquidity</td>
<td>Liquidity coverage ratio</td>
</tr>
<tr>
<td></td>
<td>Liquidity</td>
<td>Net stable funding ratio</td>
</tr>
</tbody>
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Table: *Classification of “green” macroprudential tools.*
A clearly defined cluster of emerging economies located in the **East Asia region** (namely; China, India, Pakistan, Bangladesh, Vietnam, Indonesia) appears as the **leader** of the adopters of mandatory regulations → the most engaged in pursuing policies aimed at greening the banking sector.

High-income countries emerge instead as the **“laggards”**, because the adoption of a climate-related perspective in the financial regulation is still a topic of **discussion** at the policy level.

**EU:**
- Creation of HLEG in Sustainable Finance to explore opportunities for implementation of GSF and possible green taxonomy.
- The European Commission supports the adjustment of banks capital requirements with sustainable finance goals by proposing the introduction of a “Green Supporting Factor” - GSF.
The Diffusion of “Green” Macroprudential Requirements

Figure: Source: our elaboration on data collected from official documents of national central banks, financial and international institutions.
“Green” macroprudential instruments
**Diffusion of green prudential instruments**

- **Pillar I**: no capital instruments implemented, mostly lending limits (mandatory in Bangladesh, India, Nigeria, Brazil, Laos, South Korea, Vietnam; under discussion in Denmark, Ecuador, Japan, Kenya)

- **Pillar II**: climate-related stress tests so far implemented only in China, under discussion in France, Netherlands

- **Pillar III**: risk disclosure and risk assessment are gathering a lot of interest (Colombia, Indonesia, Pakistan, Peru, South Africa, Switzerland, Turkey)
Focus on Europe
Focus on Asia
Policy implications and alternative measures
Differentiated Reserve Requirements

Pros
- Canalizes exposures to green sectors
- Aligns the banks’ profitability with the sustainability policy target

Cons
- In LICs, suboptimal for liquidity management
- In HICs, inefficient, both as liquidity and macroprudential instrument, due to liquidity abundance

Alternative measures (our proposal based on existing literature)
Activation of DDR according to country-specific policy features, policy stance and goals
Capital Adequacy Requirement

**Pros**
- Favours green investments by incentivizing the presence of green loans in banks’ portfolios

**Cons**
- Underestimates the risks possibly related to green loans
- Undermines the resilience of the financial system

**Alternative measures**
- Increase the risk weights for brown loans (*Schoenmaker and Van Tilburg, 2016*)
- Set up a Brown Penalizing Factor (a higher CAR for banks with brown assets) (*2DII, 2018*)
Countercyclical Capital Buffer

Pros

- Favors financial stability
- Mitigates excessive “brown” credit growth
- Signalling power in the financial market

Cons

- Depends on the adopted measure/indicator of the climate-related systemic risk
- Requires adequate calibration
- Requires early activation
- Depends on capital ratios adopted by banks

Alternative measures (our proposal based on existing literature)

- Set up of a Negative Capital Buffer
- Construction of a buffer during the “carbon-intensive” credit cycle
Sectional Leverage Requirement

**Pros**
- Limits exposure of a bank to brown assets
- Limits over-leveraging

**Cons**
- Difficult to rely on appropriate disclosure of banks’ exposures; also, no standards available (our proposal based on existing literature)
- Difficult to calibrate the ratio (our proposal based on existing literature)

**Complementary measures** (our proposal based on existing literature)
Improve disclosure mechanism
Liquidity measures

**Net Stable Fund Ratio**

**Pros**
- Reduces the maturity mismatch between assets and funding
- Favors financial stability

**Cons**
- Favors short term (brown) assets

**Alternative measures**
- Set a lower Stable Fund ratio (EBF, 2018)

**Liquidity Coverage Ratio**

**Pros**
- Protects banks against liquidity crises

**Cons**
- Limits bank capital available for green (long-term) assets (our analysis based on existing literature)
Lending limits I

**Minimum Credit Floors**

**Pros**
- Allocates a defined fraction of loans to the green sector

**Cons**
- Possible market distortions *(Volz, 2017)*
- Low incentives for green lending (our analysis based on existing literature)

**Maximum Credit Ceilings**

**Pros**
- Limits lending to non-sustainable sectors

**Cons**
- Possible market distortions (our analysis based on existing literature)
Lending limits II

**Large Exposure Limits**

**Pros**

- Limits exposure to non-sustainable sectors
- Guarantees banks’ solvency
- Safeguards banks against transition risk and systemic risk

**Cons**

- Depends on disclosure (our analysis based on existing literature)

**Complementary measures** (our proposal based on existing literature)

Improve disclosure mechanism
Conclusions

- Despite the rising awareness of the adverse impact of climate-related risk on financial stability, there are no internationally agreed-upon regulatory schemes to withstand the potential losses they can cause to the financial sector.

- Reported evidence suggests that low/medium income counties are pioneers in adopting green prudential instruments while high income countries are rather characterized by “all talk, no walk” strategy.
Our view:

- Prudential authorities can play a potential important role in leading the transition to a low-carbon economy & align financial stability objectives with climate-related objectives.

- The existing green instruments - as well as those that are currently debated - go in the “right direction”, but their design is often prone to destabilizing effects for the financial sector.

- Their efficiency and implementation has to be carefully analyzed.

- Most promising instruments are related to (bank) capital management: CCyB, SLR, CAR/BPF.
Open issues and challenges

1. It is urgent to set up an agreed-upon green taxonomy.
2. (Pillar I) How to measure the effectiveness of the instruments?
3. (Pillar II) Climate-related stress tests: for financial institutions but also for countries (systemic). At the moment there exists no standard.
5. Governance: risk of overstretching central banks’ mandates?
Thank you for your attention!

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References II


