How Unconventional is Green Monetary Policy?

Melina Papoutsi (ECB), Monika Piazzesi (Stanford & NBER), Martin Schneider (Stanford & NBER)

Discussion: Walker Ray (LSE)

Macro-Finance Workshop, May 2022

Motivation

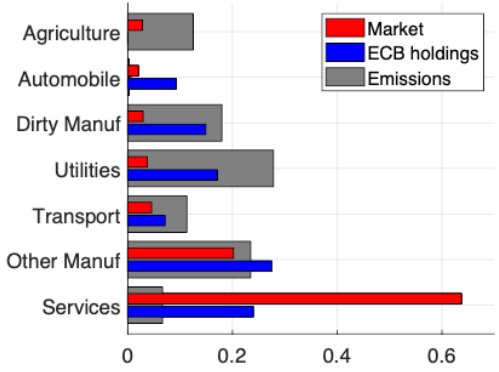
Question:

- New central bank policy of purchasing corporate bonds
- End goal: macroeconomic stabilization
- But how should the central bank determine its portfolio?

This Paper:

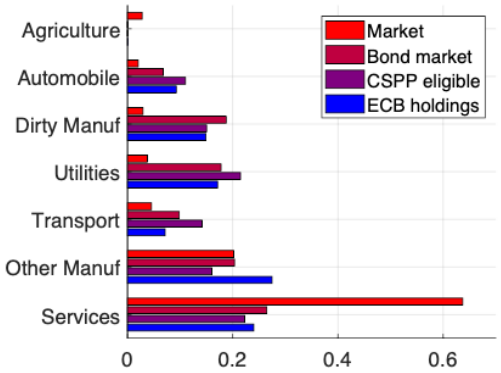
- Empirical:
  - ECB corporate bond purchases end up subsidizing “brown” industries
- Model:
  - Multi-sector, multi-asset class growth model with production (climate) externalities, financial frictions
  - By tilting green, asset purchases can (and sometimes should) alleviate climate externalities

Market Portfolio, ECB Holdings, Emissions



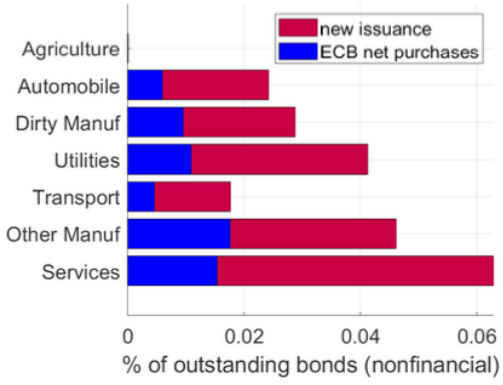
- ECB purchases tilt brown...

Market Portfolio, ECB Holdings, Bond Market, CSPP Eligible



- ...because purchases are proportional to market value of outstanding bonds, and these are disproportionately issued by carbon-intensive sectors

ECB Holdings, New Issuance



- ECB is a big player!

Brief Model Summary

- Combines insights of IAMs and intermediary asset pricing
- Firms produce using labor and capital (funded by financial intermediaries)
- Production externality:

$$y_{t+1,i} = z_{t+1,i}\left(\eta_{t+1}\right) k_{t,i}^{\alpha_n} \ell_{t+1,i}^{1-\alpha_n}, \quad \eta_{t+1} = \eta_t + \int_I \epsilon_{t,i} y_{t,i} \, \mathrm{d}i$$

- Financial frictions in the form of intermediaries' holding costs: $h(\cdot)$
  - For a given asset, $h(\cdot)$ depends on the assets exposure to risk factors: $\omega^i \in \mathbb{R}^F$
  - Small number of factors: $F \ll I$
  - Intermediaries' holding costs matter because they affect the cost of capital

QE Transmission and Spillovers

- In an integrated market, for all assets i: $\mu_i - r = \mathbf{A}_i^\top \mathbf{\Lambda}$
- QE changes the portfolio of intermediaries, but in a frictionless world: $\frac{\partial \mathbf{\Lambda}}{\partial QE} = \mathbf{0}$
- When facing frictions, portfolio reallocation implies: $\frac{\partial \mathbf{\Lambda}}{\partial QE} \neq \mathbf{0}$
- If the price of risk affects real decisions, QE will have real effects
- Therefore, QE can also be used to partially offset externalities
- Major theme in other work:
  - QE spillovers across maturities
    [Vayanos and Vila (2009, 2021)]
  - QE spillovers in FX markets, foreign bond markets
    [Gourinchas, Ray, Vayanos (2022), Greenwood, Hanson, Stein, Sunderam (2020)]
  - Macroeconomic spillovers of QE
    [Ray (2019)]

Policy Takeaways

- QE purchases replace intermediaries' risky assets with safe CB debt
  - $\Longrightarrow$ reduction in exposure to risk factors
    - (depends on the portfolio of securities purchased, and associated holding costs)
  - $\Longrightarrow$ reduction in excess returns for any asset exposed to same risk factors
    - (occurs regardless of whether the asset was directly purchased)
  - $\Longrightarrow$ changes in production for firms issuing any asset exposed to same risk factors
    - (works through firms equating cost with marginal product of capital)

- QE is a blunt instrument (since $|\mathbf{\Lambda}| = F \ll I$), but may be effective. Optimal policy:
  - With carbon tax: target financial frictions only
  - Without carbon tax: tilt green
  - Optimal policy is not neutral (and market neutrality is a tricky concept)

State-Dependence of QE Transmission?

- Spillovers depend on how integrated or segmented markets are (and the risk-bearing capacity of intermediaries)
  - Fed's QE purchases had local effects
    [D'Amico and King (2013)]
  - Treasury demand shocks have more localized effects during periods of financial distress
    [Droste, Gorodnichenko, Ray (2022)]

- Spillovers larger when markets are more integrated (but the overall effect may be smaller?)

- CB needs a lot of information about the shape of holding costs?

Transmission of Conventional Policy?

- Insights from this paper (and broader QE literature): anything that moves quantities held by intermediaries will also affect market price of risk

- Corporate vs. "Conventional" QE:
  - Are there fundamental differences between purchases of corporate bonds and (long-term) sovereign bonds?
  - If sovereign bonds load sufficiently on risk factors, then perhaps conventional QE can achieve similar outcomes

- Conventional (short-rate) policy:
  - Movements in policy rate can also affect risk premia
  - Can conventional policy relax financial frictions and/or climate externalities?

Modeling Climate Externalities?

- Energy: emissions with energy input and production?

$$y = z(\eta)\, k^{\alpha} \ell^{1-\alpha-\nu} E^{\nu}$$

$$E = g\left(E^{\text{fossil}}, E^{\text{clean}}\right), \quad \Delta\eta = \int E^{\text{fossil}}$$

- Would be interesting to compare two policies:
  - A subsidy for firms producing green energy
  - QE purchases of bonds issued by firms producing green energy
  - Prediction based on the insights of the paper
    - Green energy QE only partially as effective as direct subsidy
    - Only effective to the extent that green energy bonds differ in their risk exposure
- Discounting: role of discounting with permanent emissions? $\eta_{t+1} > \eta_t$
  - Social discount factors

    [Bauer and Rudebusch (2021)]

The Political Economy of Green Monetary Policy?

- Will tilting bond purchases green effect central bank independence?
- Tilting green can be justified purely from the central bank's "usual" mandate
- However, there is clearly political disagreement about the role of carbon in production!
- Although these political considerations are beyond the scope of the paper, the model can help us think about these questions in a reduced-form way
  - Allows for differential CB holding costs: $\tilde{h}(\cdot) \neq h(\cdot)$

Concluding Remarks

- Extremely insightful paper. Helps clarify our thinking about:
- The role of unconventional monetary policy in shaping firm investment decisions
- The scope of monetary policy in partially offsetting climate risk externalities
- Opens up the door for a much broader debate about the purview of unconventional monetary policy