

Monetary Policy and Climate Change

Monika Piazzesi
Stanford, CEPR & NBER

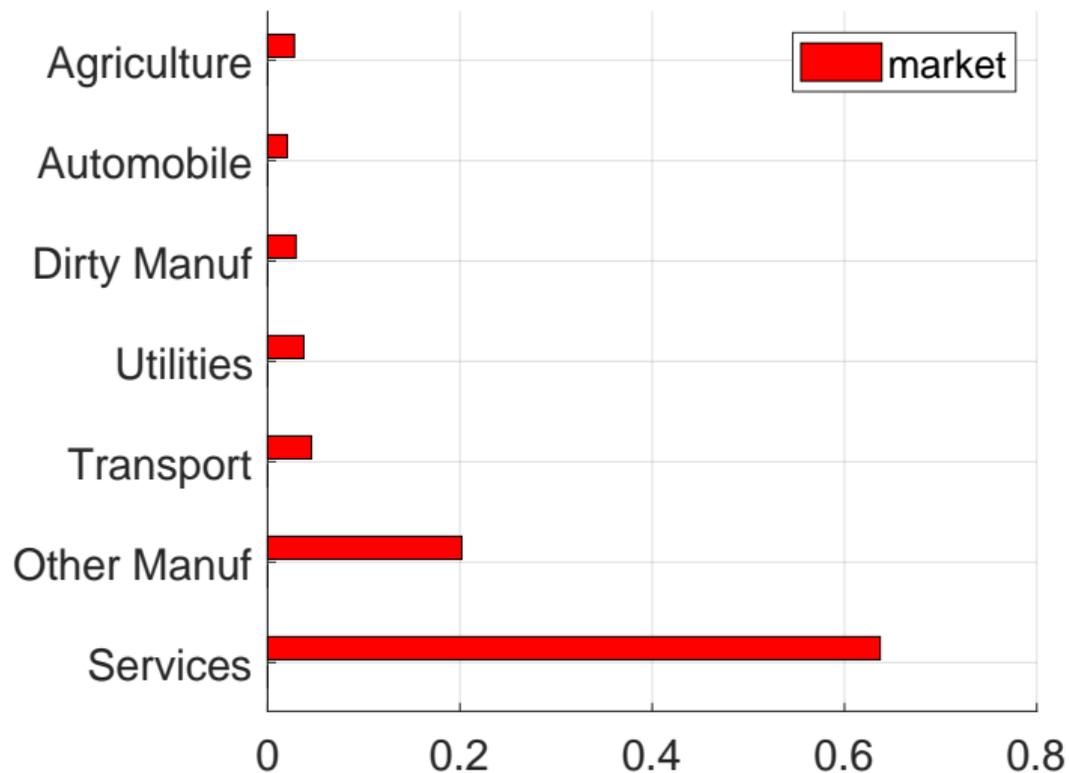
The ECB and Its Watchers XXII, March 2022

Unconventional monetary policy

- Low interest rate environment
 - ▶ main tool for (unconventional) monetary policy: asset purchases
 - ▶ government bonds, MBS,.... most recently **corporate bonds**
 - ▶ goal: lower firms' cost of capital, stimulate investment
 - Which corporate bonds should central banks buy?
- Conventional view:
 - ▶ monetary policy should aim for "**market neutrality**"
 - ▶ no mandate to favor particular firms
 - ▶ in practice: bond purchases proportional to bonds outstanding
- Plan for remarks:
 1. Current **corporate bond** holdings by the ECB (Papoutsis, Piazzesi & Schneider 2021)
 2. How do asset purchases work?
 3. Can asset purchases be **market neutral** ?
 4. Impact on climate and ballpark numbers

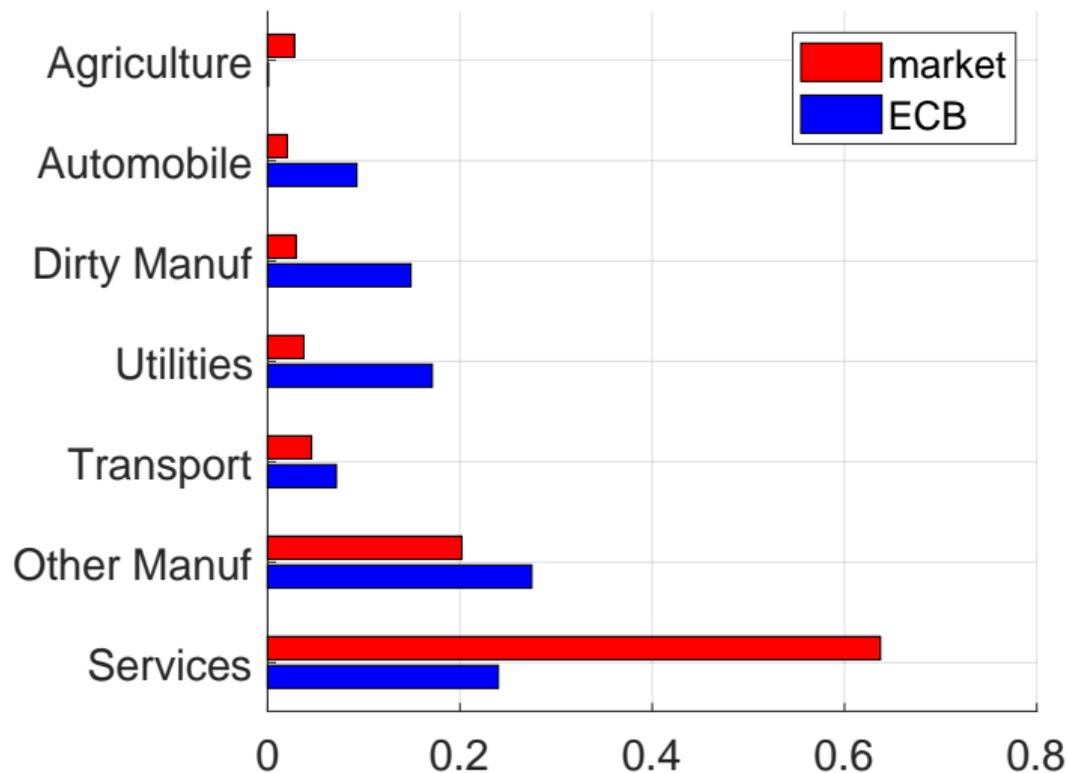
Market shares by sector

Dirty Manuf = oil & coke, chemicals, basic metals, nonmetallic minerals



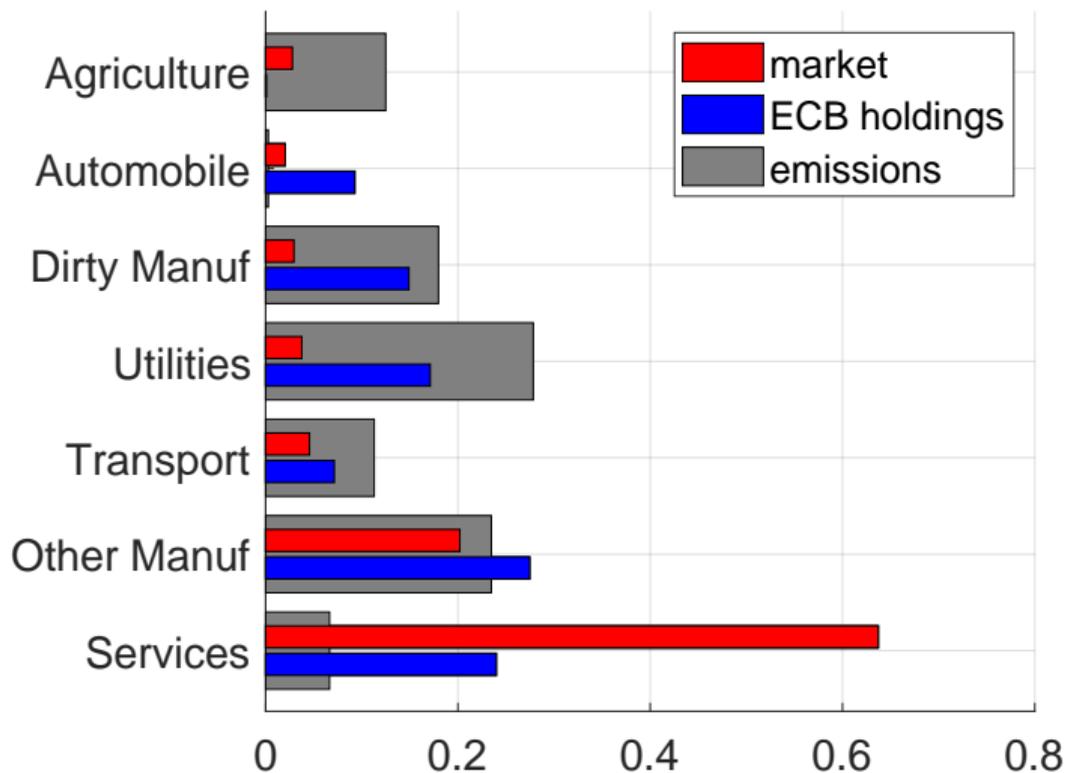
Market portfolio vs ECB portfolio

Dirty Manuf = oil & coke, chemicals, basic metals, nonmetallic minerals



ECB portfolio overweighs sectors with high emissions

Dirty Manuf = oil & coke, chemicals, basic metals, nonmetallic minerals



2. How do asset purchases work?

- Conventional view: asset purchases work by reducing **risk premia** on assets
 - ▶ Gertler & Karadi (2011), Curdia & Woodford (2011), Bernanke (2020)
- From finance, average return on an asset = (low) riskfree rate + **risk premium**
 - ▶ risk premium compensates investors for taking risk
 - ▶ business cycle is the main risk factor
 - ▶ each asset has its own exposure to this risk factor ('beta of the asset')
 - ▶ **risk premium** = asset's risk exposure × **market price of risk**
- Asset purchases lower the **market price of risk**
 - ▶ By purchasing assets, central banks take risk off financial intermediaries' balance sheets
 - ▶ Intermediaries are more willing to take risk
- Lower risk premia on corporate bonds & stocks → more investment

3. Can asset purchases be market neutral ?

- Our definition: Market neutral policy leaves firms' *relative* costs of capital unchanged
 - only macro effects, does not distort market shares of firms in the economy
 - Asset purchases lower market price of risk
 - reduces risk premia for firms with higher risk exposure ('higher beta' firms) more
 - riskier firms benefit more from the policy
- Asset purchases are not market neutral , except under special conditions

4. Impact on climate and ballpark numbers

- Recent research in empirical finance
 - investors are becoming more and more aware of climate risk (ESG investing)
 - climate risk is a new risk factor
 - firms with higher exposures to climate risk pay substantially higher risk premia
Bolton & Kacperczyk (2021, 2022)
- Suppose asset purchases focus on green investments
 - financial intermediaries less willing to hold assets that are more exposed to climate risk
 - higher market price of climate risk
 - higher cost of capital for firms with higher climate risk exposure
- Requires a shift in ECB portfolio towards green investment

4. Impact on climate and ballpark numbers

- Suppose want to implement \$100/tonne carbon tax
- Emission intensity of dirty sectors (energy) about 1 kg/\$ revenue, clean sectors (services) about 0 kg/\$ revenue
- How large would a change in cost of capital have to be? Result by Papoutsis et al (2021)

$$\begin{aligned}\text{change in cost of capital} &= \text{carbon tax} \times \text{emission intensity} \times \text{capital depreciation rate} \\ &= 100 \times 0.001 \times \text{depreciation rate} \\ &= 0.10 \times \text{depreciation rate}\end{aligned}$$

typical depreciation rate between 0.10 and 0.30, so 3 percentage points

- Cost of financing other inputs like labor: higher "depreciation rate"
→ capital charges for bank loans to pay for workers in high emission firms