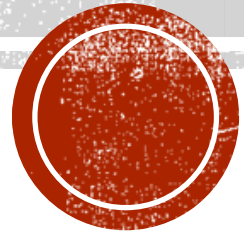
MONETARY POLICY FOR THE GREEN TRANSITION

Luca Fornaro, Veronica Guerrieri, Lucrezia Reichlin



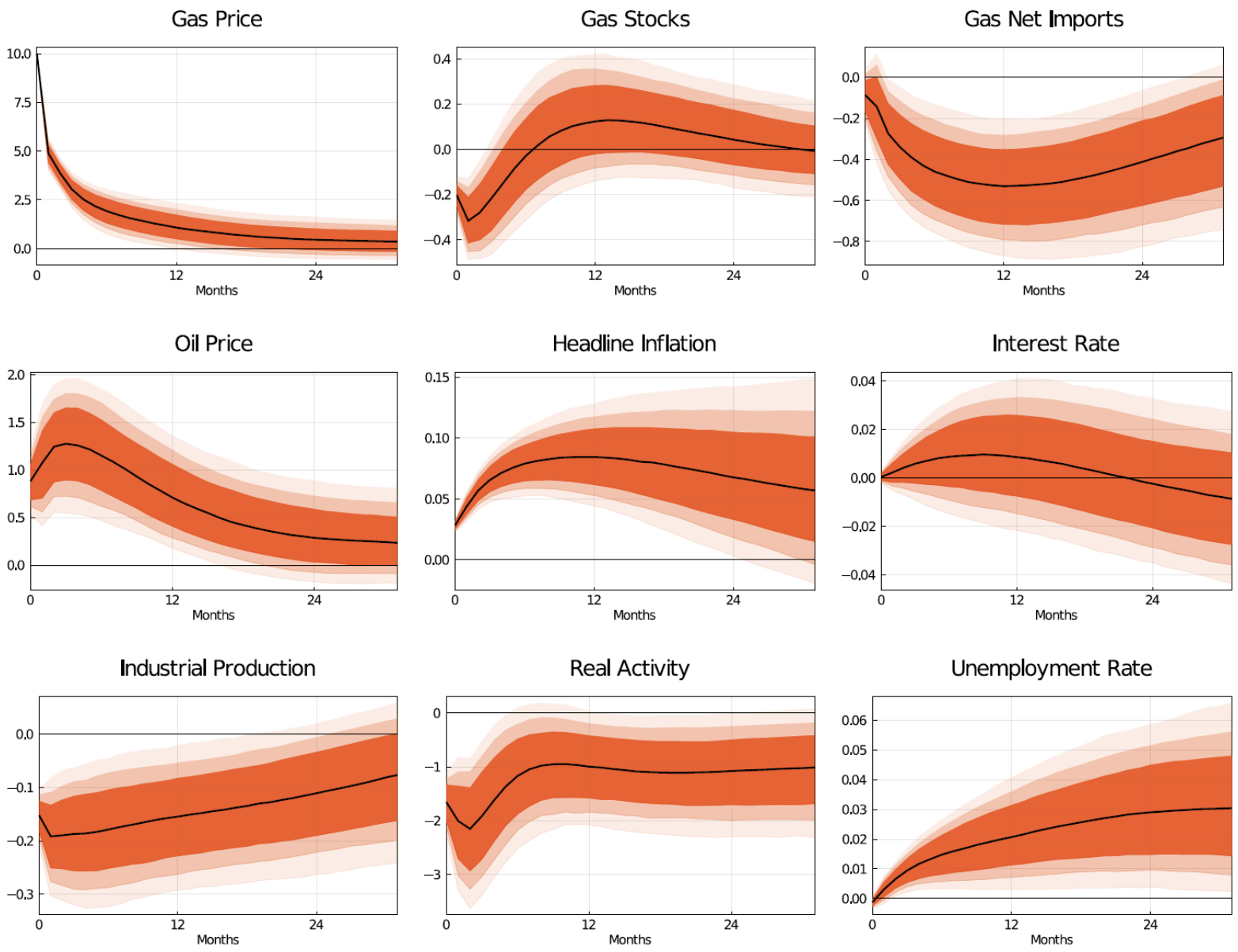
QUESTION

- To promote the green transition many countries introduced carbon taxes or regulatory constraints to reduce carbon emissions
- Long-term benefits are clear, but there might be sizeable **transition costs**
- This report: how does the green transition affect monetary policy and vice-versa?

1. We think of the green transition as a **negative supply shock** → worse inflation/unemployment menu for monetary policy
2. In particular, it is an **asymmetric supply shock** → even worse menu because some inflation is the symptom of relative price changes for efficient reallocation
3. If we consider that **innovation is endogenous** → fighting inflation has the additional cost of slowing down investment in green technology more relative to dirty technology

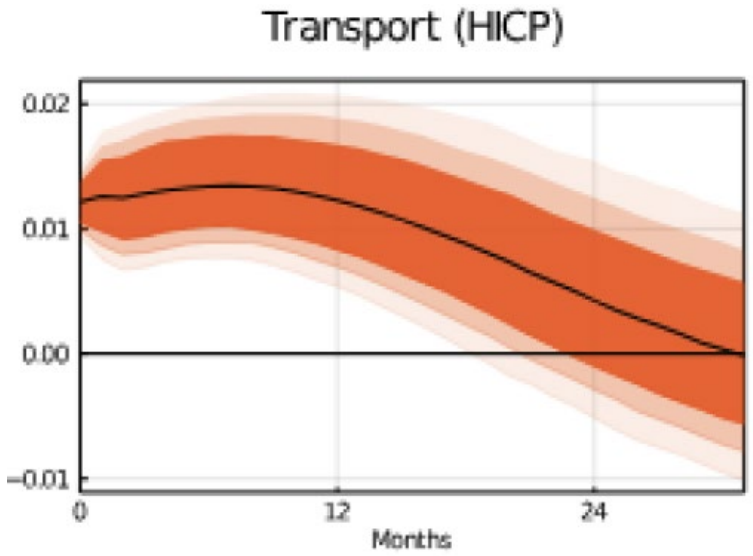
→ subsidies to green investment or targeted credit policies can help reconcile low inflation with a successful green transition

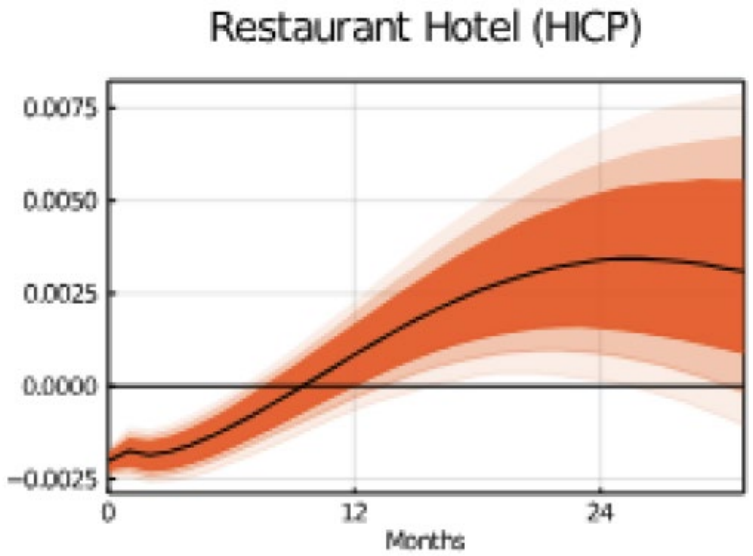
GREEN TRANSITION = NEGATIVE SUPPLY SHOCK



AN UNEXPECTED INCREASE IN GAS PRICES (EURO AREA)

ASYMMETRIC SHOCK: RELATIVE PRICES

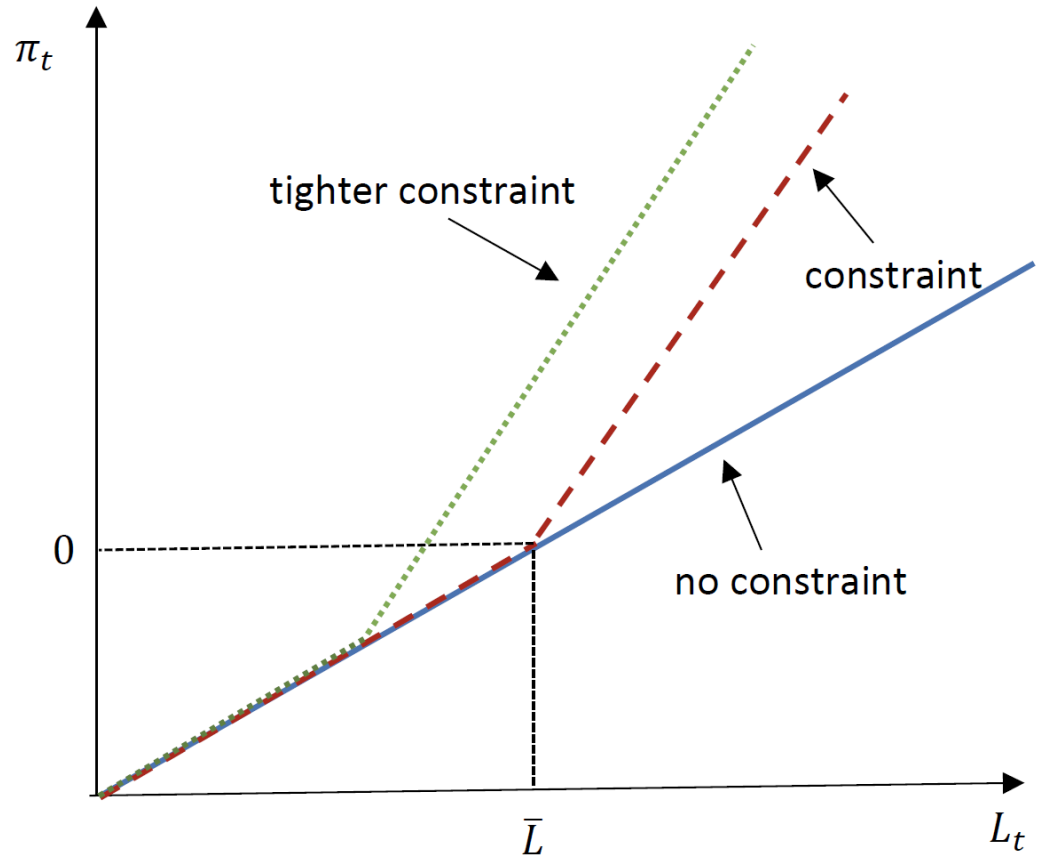




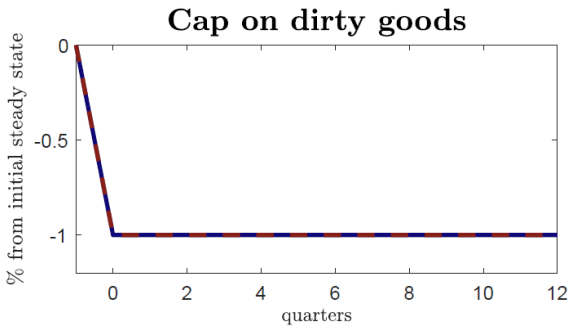
A SIMPLE MODEL

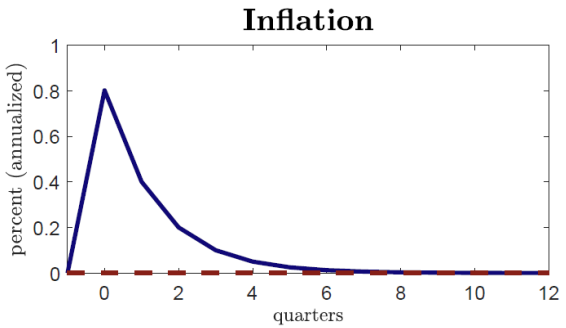
- Final goods are produced with labor and two types of intermediate goods: "green" and "dirty"
- Green regulation = cap on production of dirty goods (implemented with tax)
- → non-linear Phillips curve: as employment increases above a certain level, the constraint becomes binding and inflation increases not only because of wage growth but also because rise in relative price of dirty goods
- Green transition = gradual tightening of that cap
- → up-ward shift of the Phillips curve: worse inflation/employment menu available to central bankers and more inflationary environment

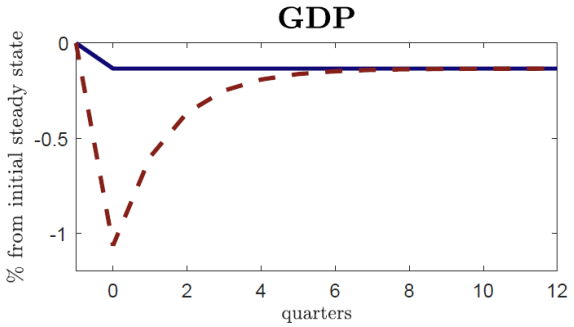
UP-WARD SHIFT OF PHILLIPS CURVE

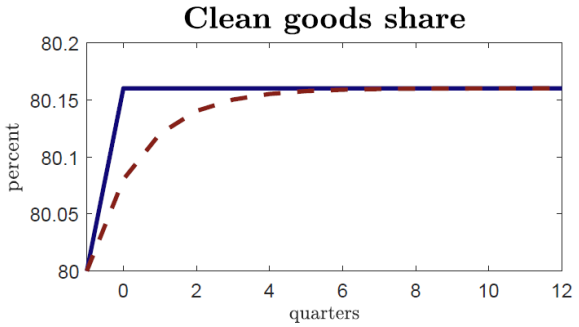


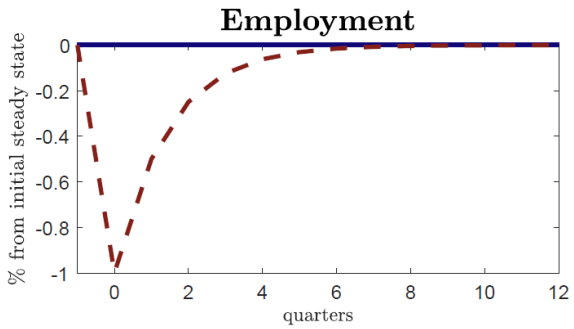
PERMANENT TIGHTENING OF DIRTY GOODS CAP

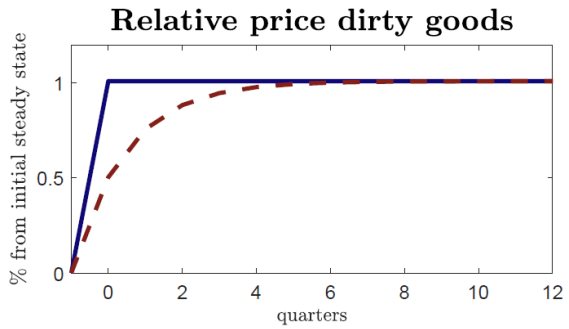






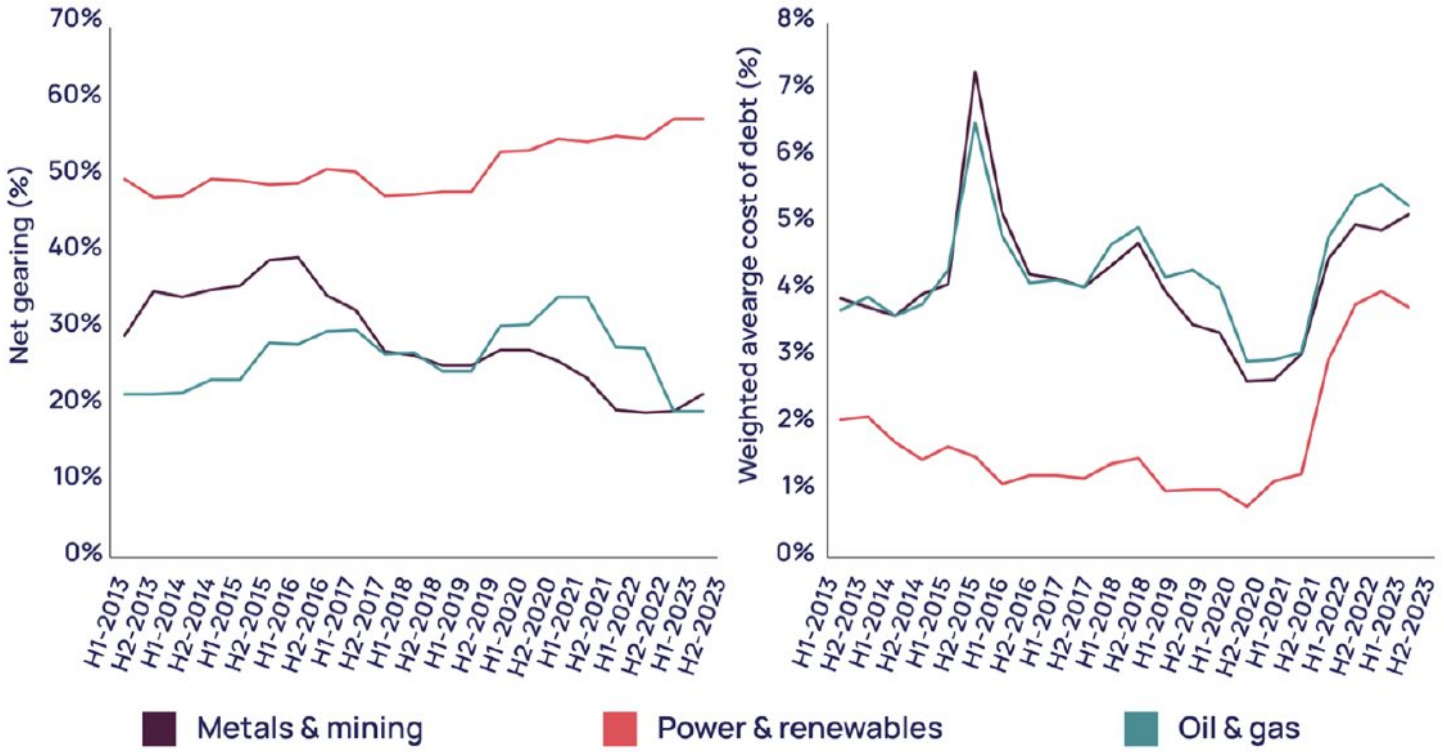






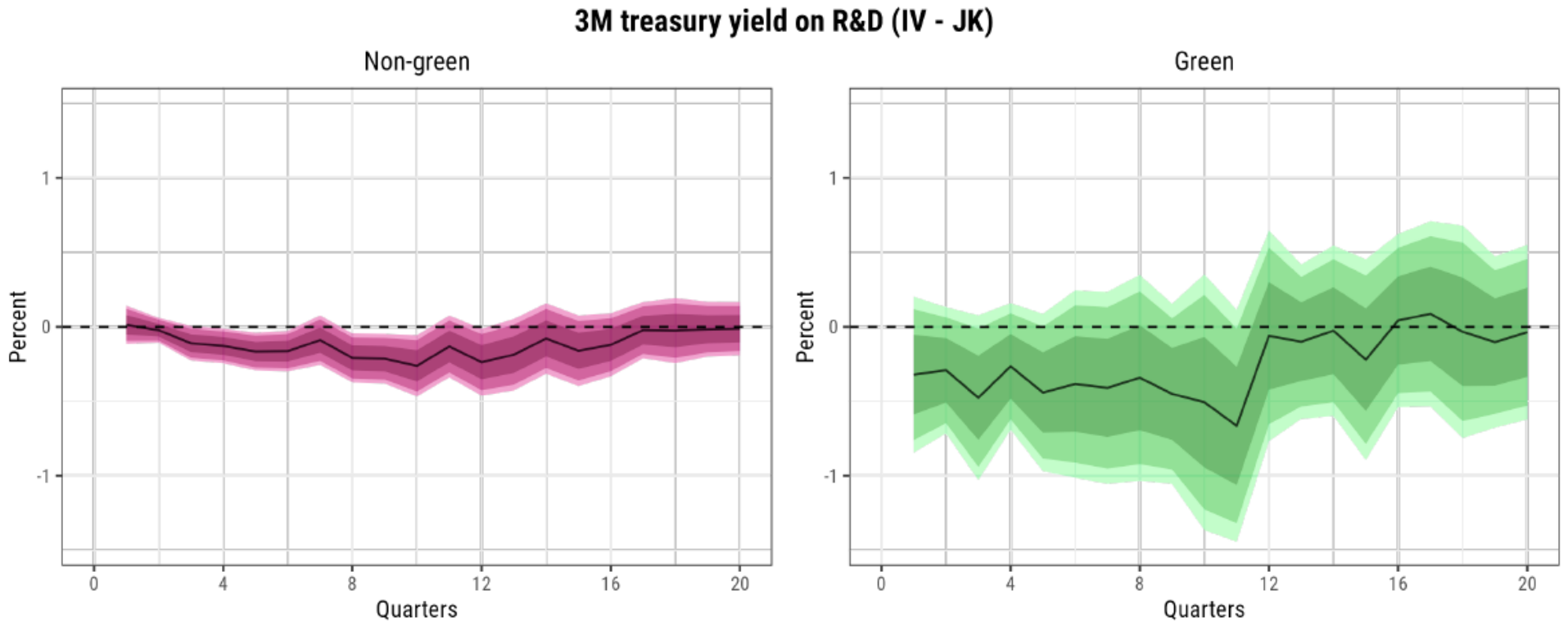
ENDOGENOUS INNOVATION: GREEN VS BROWN TECHNOLOGY

GEARING IN THE ENERGY SECTOR



Source: Martin et al. (2024)

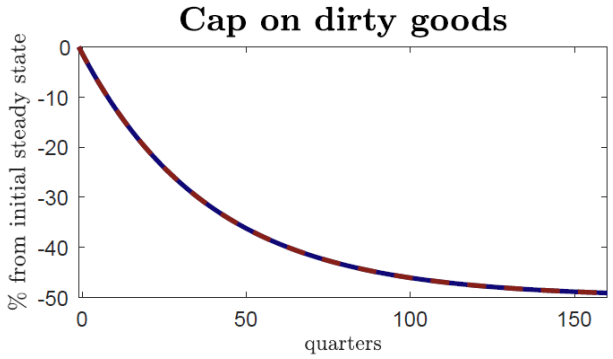
EFFECT OF A 25BPS NEGATIVE MONETARY SHOCK ON R&D INVESTMENT

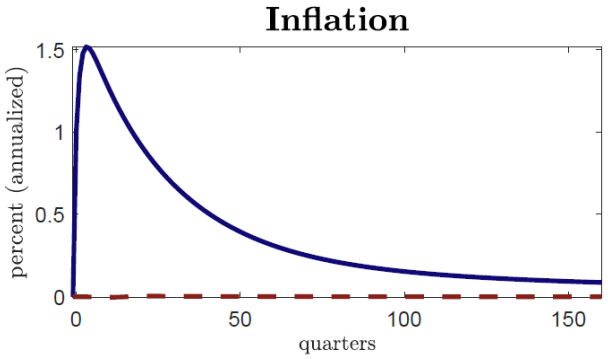


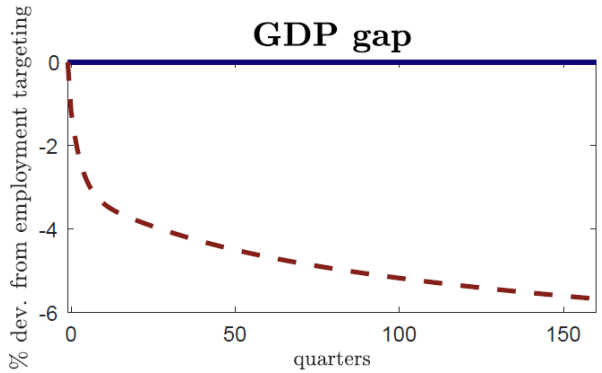
ENDOGENOUS INNOVATION IN THE MODEL

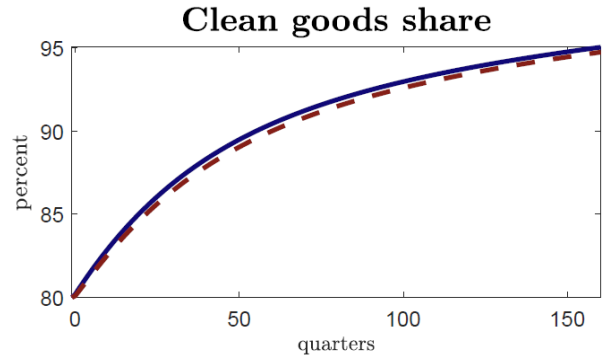
- A tightening of dirty goods cap would reduce productivity because of complementarity between dirty goods and employment
- However, productivity is endogenous!
- Consider endogenous investment in technological progress in both green and dirty sector
- During the green transition, investment in green technology relative to dirty:
  1. Is more sensitive to monetary policy because of longer horizon
  2. Is more responsive to increases in demand because is not constrained
- → tight monetary policy has additional cost of slow down the productivity growth in the green sector

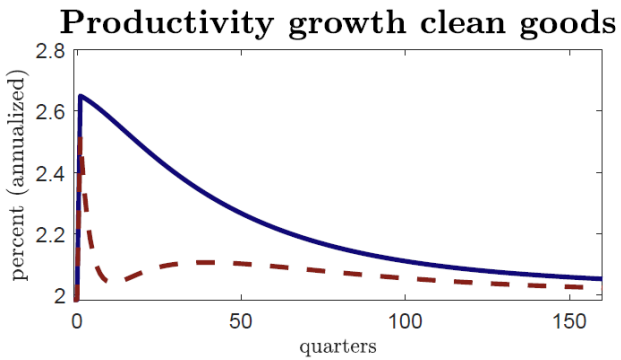
GREEN TRANSITION WITH ENDOGENOUS INNOVATION IN GREEN AND DIRTY TECHNOLOGY

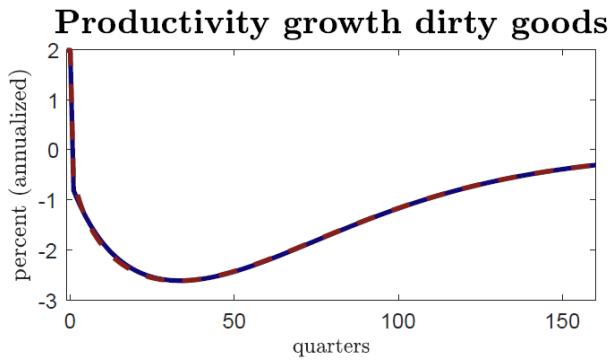




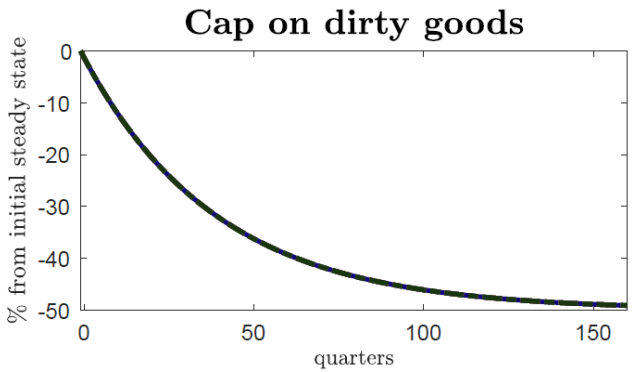


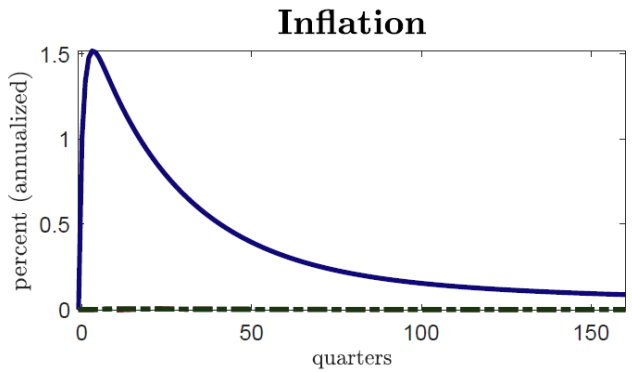


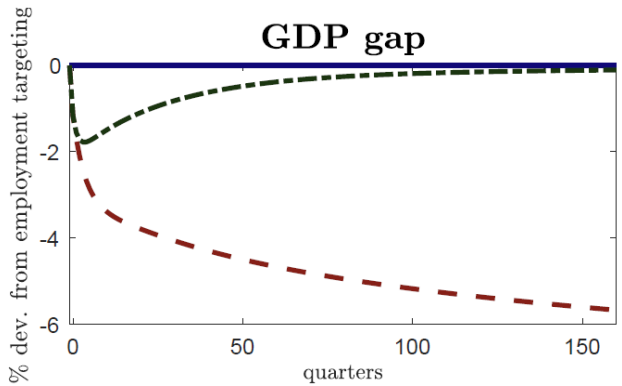


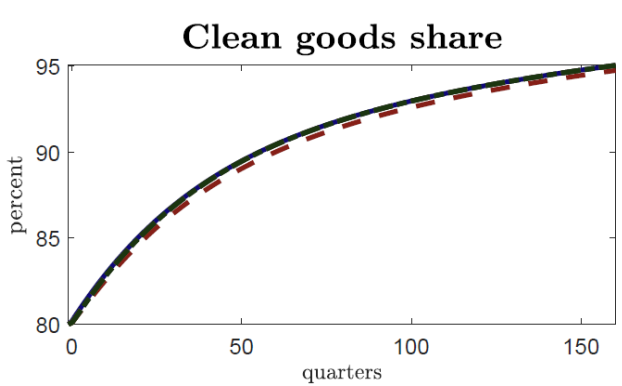


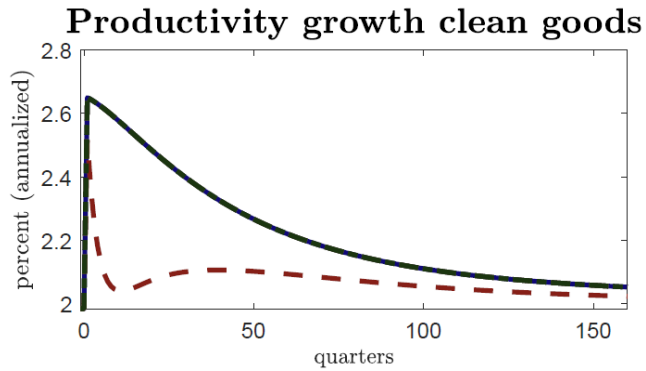
GREEN TRANSITION: MONETARY POLICY AND TARGETED CREDIT POLICY

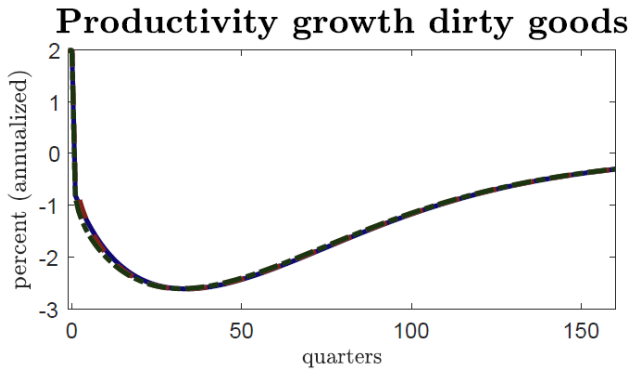












FINAL REMARKS

- The long-term benefits of the green transition are evident to everybody
- However, reducing carbon emission necessarily implies a loss in productivity in the short run and a costly transition to reallocate of production
- During the transition, the central bank will face a worse inflation/unemployment menu and an environment with higher inflation volatility
- A higher level of inflation might be a necessary cost to obtain relative price changes that incentivize the reallocation of production towards the green sector
- Tight monetary policy may also have the additional cost of slowing down innovation in the green sector
- Additional policy tools (e.g. targeted credit policies, subsidies) might be necessary to incentivize investment in green technologies and allow the central bank to keep inflation under control while achieving a successful green transition