Carbon Taxes and Tariffs, Financial Frictions, and International Spillovers

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Why shall we account for climate change in the short run?

Transition risk (*versus* physical risk):

- Keynesian shock (investment)

- Inflation

- Inputs substitutions

- Stranded assets / labor adjustments (sectoral heterogeneity)

- Technological change

- Shock on competitivity

- Sufficiency/sobriety

- Critical Raw Materials

- Acceptability

- Financial contagion

→ Pisani-Ferry commission (2022-2023, France Strategie)

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Environmental Dynamic Stochastic General Equilibrium models

- DSGE Model
  - Representative agent
  - Savings, consumption, production function, capital stock
  - Stochastic shocks, e.g. TFP
  - Rigidities and frictions (New Keynesian), monetary policy,...

- Add environmental components
  - E.g. pollution as byproduct of production or energy input

- Main illustrations:
  - Benchmark (RBC): Fischer and Springborn (2011) and Heutel (2012),
  - Monetary policy: Annicchiarico and Di Dio (2015),
  - Labor market frictions: Shapiro and Metcalf (2021)
  - Risk attitude: Cai and Lontzek (2019)

What the paper does

- Analyse how does ambitious climate policy transmit across borders
  $\rightarrow$ emission tax and BCA

- Appraise the role for financial frictions and international financial
  linkages in this transmission? $\rightarrow$ how do financial frictions and BCA
  interact

- Highlight the role of macroprudential policies that imposes a tax on
  banks' brown loans and a subsidy to green loans.

For this presentation

- Analyse how does ambitious climate policy transmit across borders → emission tax and BCA

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This paper

- Two-country E-DSGE model:
  - Green and brown sector (emissions as by-product)
  - Trade and financial spillovers across countries
  - Implicit carbon budget $\rightarrow$ rationale for climate policy
  - Financial frictions between banks and households (Gertler and Kiyotaki 2010), so that credit supply is limited by banks' net worth
- Different policy scenarios. For this presentation:
  - Unilateral carbon tax in the domestic economy
  - $+$ carbon border adjustment mechanism in the domestic economy
  - $+$ financial frictions

Outline

1. Introduction

2. Setup

3. Results

4. Conclusions

Model overview

Two countries – Home and Foreign – populated by

- Households
  - Consume, save (deposits), supply labor
- Financial intermediaries
  - Collect deposits, lend to Home and Foreign non-financial firms
- Non-financial firms
  - Polluting (tradable) T; 'Green' (non-tradable) N
- Government
  - Implements policies

Calibration

- Countries: European Union and United States for the main calibrations

- Standard international RBC parameters

- Financial sector parameters (target banks' leverage ratio, sectoral and cross-border exposures, credit spreads)

- Environmental parameters (to match sectoral emissions intensities in the data)
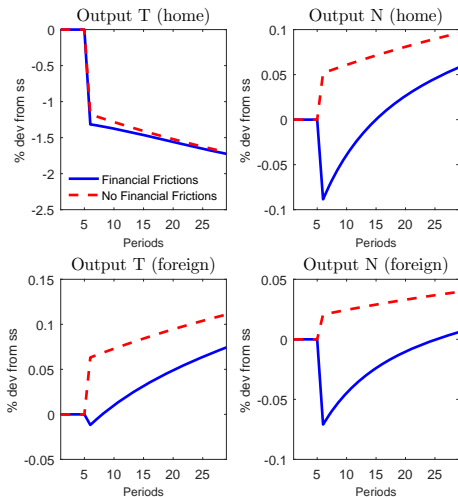
Results

- Results from two sets of simulations:

  1. Unilateral (exogenous) carbon tax shock at Home
  2. Unilateral (exogenous) carbon tax shock and carbon border adjustment mechanism at Home

- Some focus on the role of banks for international spillovers

Domestic (Home) carbon tax

- Unexpected introduction of a \$80 per ton tax on CO_2 in the Home country
  - In line with recommendations from Stiglitz et al. (2017), IMF (2019); lower bound for recent estimates of the social cost of carbon
- Start in baseline (no tax) steady state, hitting the Home economy with a carbon tax in period 5
- Compare models with and without financial frictions (and with and without macroprudential policy)

Main results for the domestic (Home) carbon tax (1)

Main results for the domestic (Home) carbon tax (2)
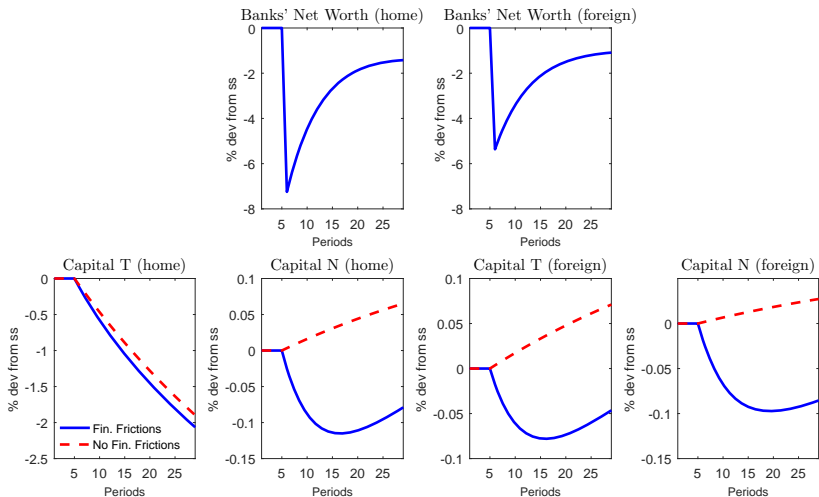
Interpretation

- Without financial frictions, capital flows into green sectors and into Foreign country

- With financial frictions, domestic transition risk transmits to the foreign country through cross-border bank lending

- With financial frictions, there is still carbon leakage (albeit smaller)

Carbon border adjustment mechanisms

- Carbon border adjustment mechanisms are modeled as an import tariff on Foreign polluting tradable good

- Home household's budget constraint thus becomes:

$$P_{H,t} C_{H,t} + P_{N,t} C_{N,t} + \left(P_{F,t} + \tau_{cbam,t} \right) C_{F,t} + D_t$$
$$= W_{T,t} L_{T,t} + W_{N,t} L_{N,t} + R_{t+1} D_{t+1} + \Pi_t + div_t + \Xi_t$$

Results for the domestic (Home) carbon tax coupled with a carbon border adjustment mechanism
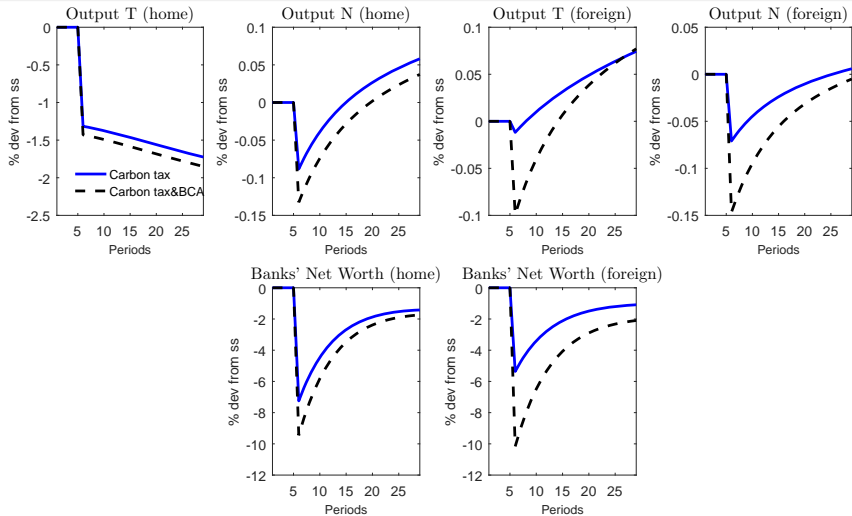
Interpretation

- The carbon border adjustment mechanism reduces leakage, even if it makes recession more severe at Home
  - Foreign country's banks affected negatively cut back on credit supply to Home firms

Conclusions

- Non-trivial effects of BCA
- Cross-border financial linkages important for understanding international spillovers of domestic climate policies
- Macroprudential policy to mitigate financial instability risks due to ambitious climate action $+$ insulate the economy from transition risk originated abroad