The Short-Run Dynamic Effects of Protectionism

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Moscow, 23 April 2018

Introduction

I will present two recent research papers:

- In "Protectionism and the Business Cycle" (with M. Cacciatore and Fabio Ghironi) we propose a macroeconomic analysis , both empirical and theoretical, of the short run dynamic effects of protectionism.

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- In "Self-Harming Trade Policy? Protectionism and Production Networks" (with M. Cacciatore) we propose an empirical analysis at detailed industry level of the employment effects of protectionism both in protected industries and in downstream industries.

Protectionism and the Business Cycle

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Motivation

- A spectre is haunting the world economy...

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- Debate about costs and benefits of trade policy as a macroeconomic policy tool
  - Boost output, rebalance external accounts, or address distributional effects of trade
  - Influential scholars argued that temporary tariffs may be beneficial in a liquidity trap, thanks to the inflationary effect of higher import costs (e.g., Eichengreen, 2016)
- First study the short run effects of protectionism on macroeconomic fluctuations both empirically and theoretically

Contribution

1. Estimate effects of temporary trade barriers using country-level and panel VARs
   - Quarterly/monthly data on product-level antidumping investigations (which typically lead to the imposition of tariffs)
   - Annual data on applied tariff rates

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   - SOE with key macro/trade ingredients: physical capital, nominal rigidities, endogenous trade structure (firm heterogeneity + sunk/fixed entry costs)
   - Baseline scenario mirrors the empirical analysis: normal times under a flexible exchange rate
   - Model counterfactuals where protectionism advocated as potentially beneficial: (i) liquidity trap and (ii) fixed exchange rate regime

Results

1. Empirical analysis: temporary trade barriers act as a negative supply shock
   - Recessionary, inflationary, with (at best) a small positive effect on the trade balance/GDP

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2. Macro and micro dynamics behind the contractionary effects of tariffs
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   - Micro level: reallocation of market shares towards less efficient domestic producers
3. Protectionism remains contractionary even in a liquidity trap or under a peg

Literature

- Empirical work on the cyclicality of temporary trade barriers
  - Bown (2013) and Bown and Crowley (2013, 2014)
- Earlier theoretical literature on the macro effects of trade policy
  - Mundell's (1961), Krugman (1982), Eichengreen (1981, 1983)
- Border adjustment tax and departures from Lerner's symmetry
  - Farhi, Gopinath, and Itskhoki (2014), Barbiero, Farhi, Gopinath, and Itskhoki (2017), Costinot and Werning (2017), Erceg, Prestipino, and Raffo (2017), Lindé and Pescatori (2017)
- Dynamic consequences of trade integration (permanently lower trade costs)
  - Trefler (2005), Barattieri (2014), Cacciatore (2014) among many others

Outline

1. Empirical Analysis
2. Model
3. Protectionism in Normal Times
4. Conterfactuals
5. Conclusions

Empirical Analysis

Temporary Trade Barriers

- Low applied tariffs but frequently changing temporary trade barriers (TTBs)
  - Antidumping duties, global safeguards, and countervailing duties
- Antidumping (AD) duties are the primary policy exceptions to WTO rules
  - Account for 80%-90% of all TTBs across countries

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- Antidumping (AD) duties are the primary policy exceptions to WTO rules
  - Account for 80%-90% of all TTBs across countries
- Canada: most active user among developed SOE; Turkey and India: largest and most active users among developing SOE;
  - 2% in Canada (0.5% of GDP; higher prior to 2001)
  - Up to 6% of imported products affected by TTBs in Turkey ($\simeq$ 1% of GDP)

Global Antidumping Database

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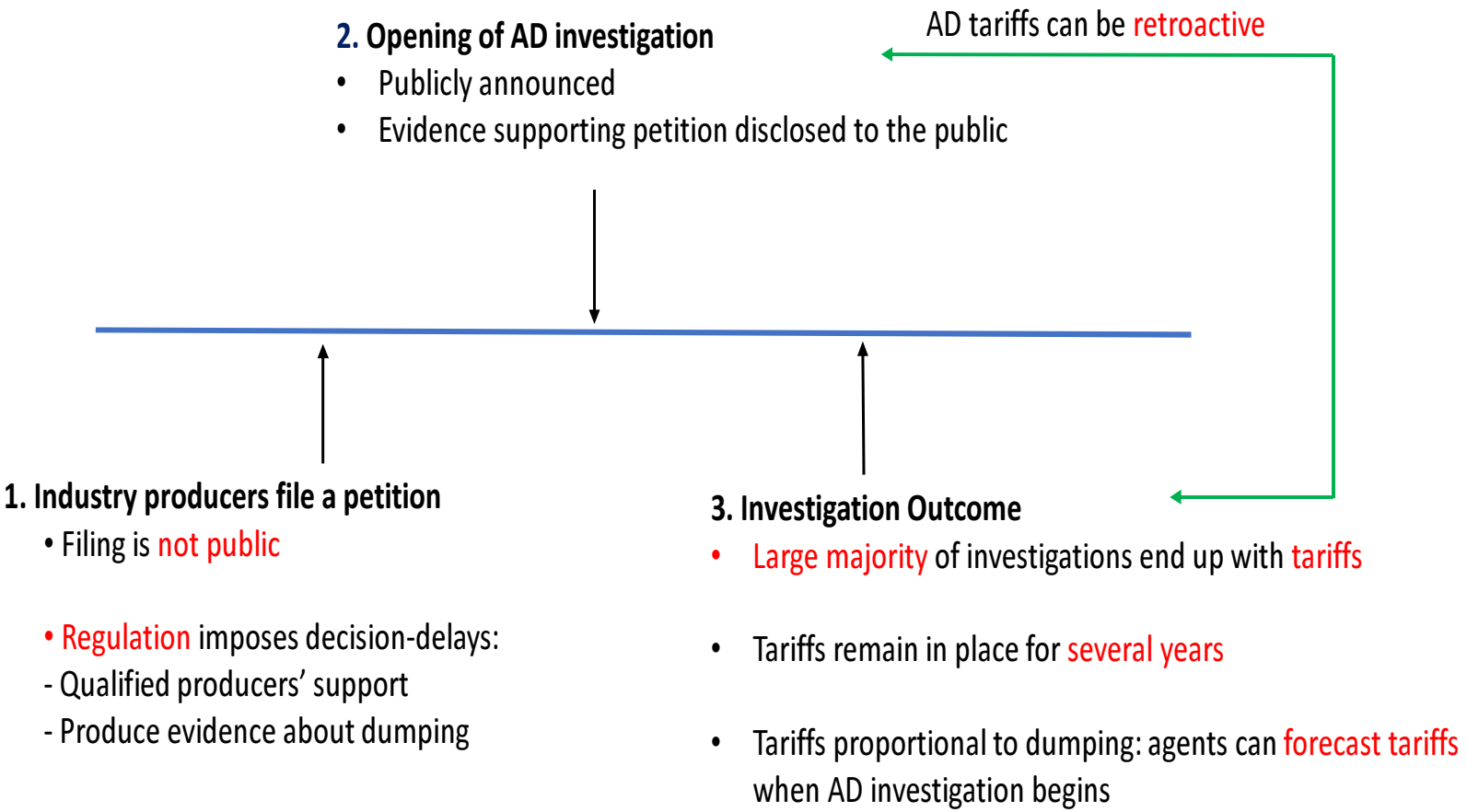
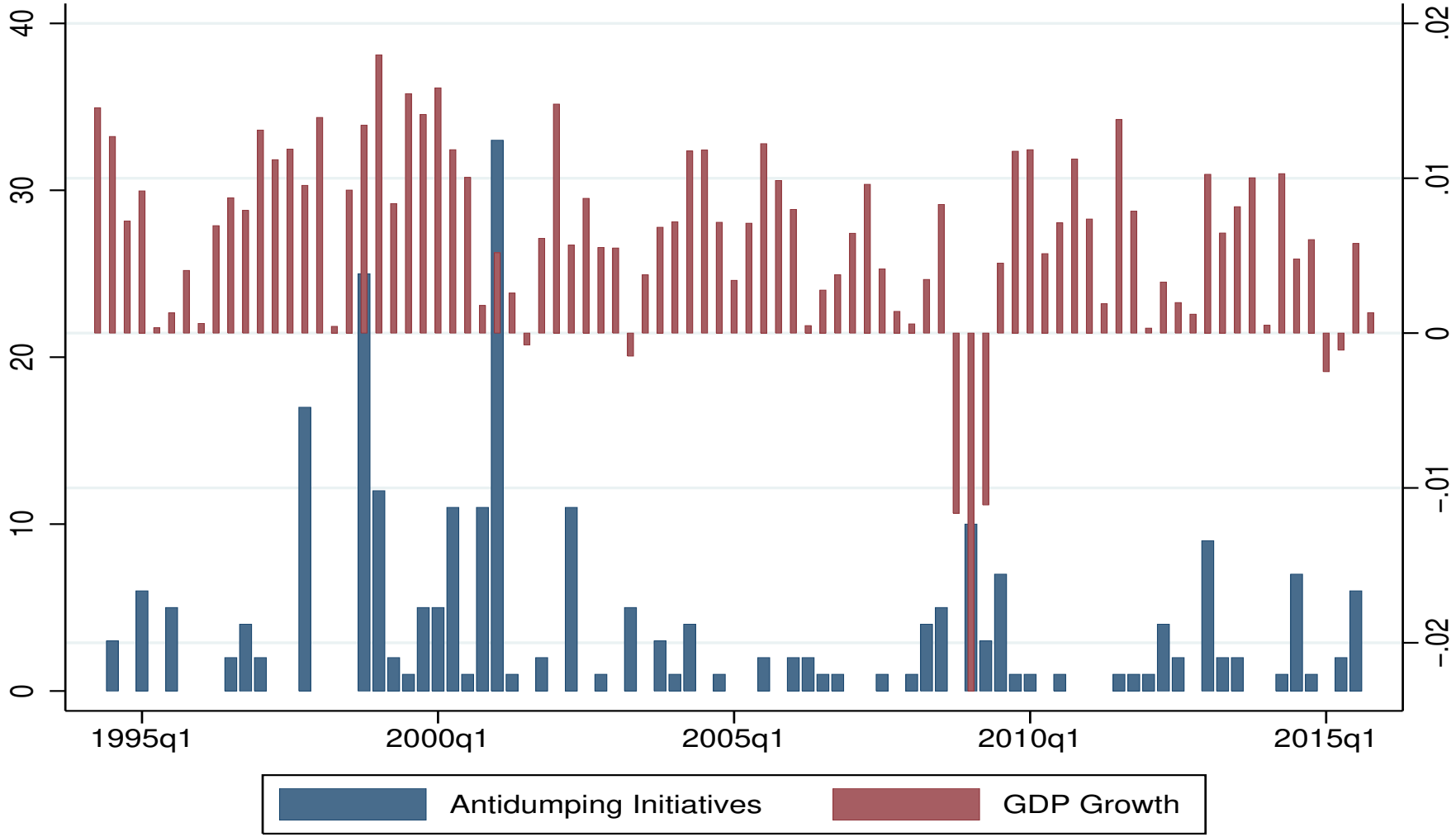


Data: New Antidumping Initiatives in Canada



Understanding Magnitudes

- Three peaks of AD initiatives in Canada (1997:Q4, 1999:Q3, 2001:Q1)
- Consider 2001:Q1
  - AD initiatives in the steel sector worth $\simeq 30\%$ of sectoral imports
  - Steel sector output was 1.1% of GDP (including IO linkages)
- All AD initiatives led to the imposition of tariffs
- Median imposed tariff equal to 56%

Empirical Strategy

- Quarterly and monthly VARs for Canada and Turkey (India for robustness)

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- Baseline trade-policy measure : # of HS-6 digits products for which an AD investigation begins in a given month or quarter
- Standard macro variables :
  - **Quarterly data**: real GDP growth, inflation, and trade balance/GDP
  - **Monthly data**: also include nominal interest rate and nominal exchange rate growth (IP rather than GDP)

Empirical Strategy

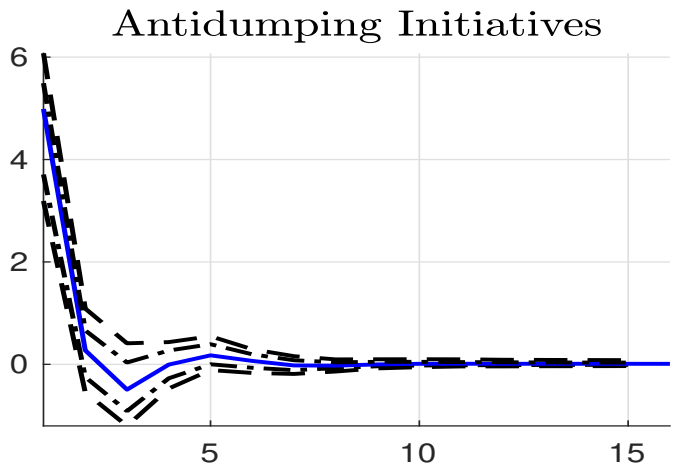
- Structural VAR

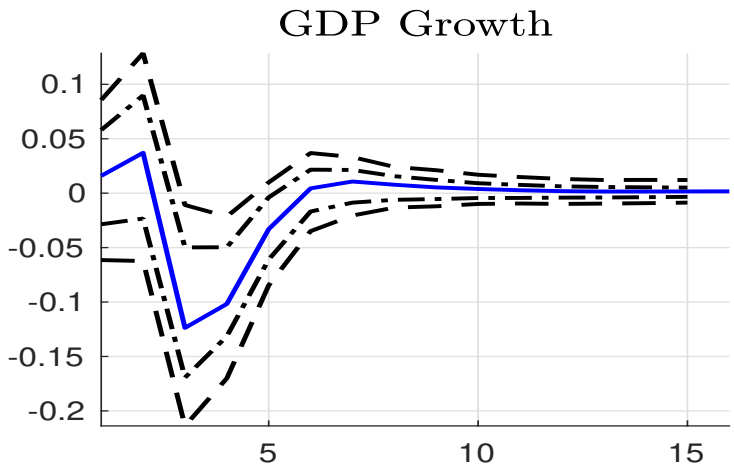
$$Y_t = \Theta + \sum_{i=1}^{p} \Phi_i Y_{t-i} + A u_t$$

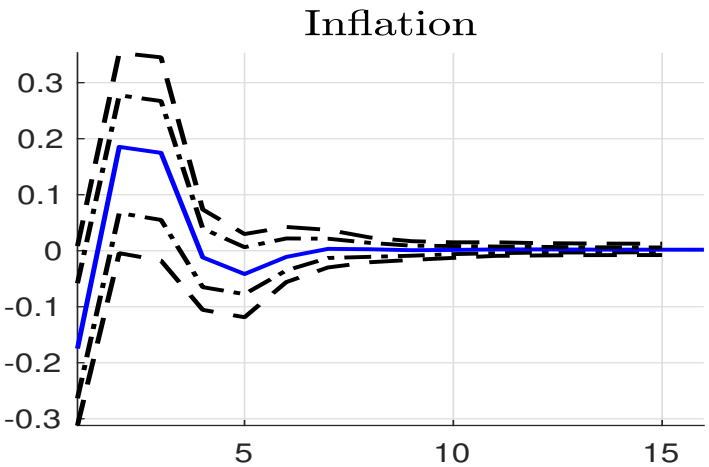
- p determined with standard information criteria

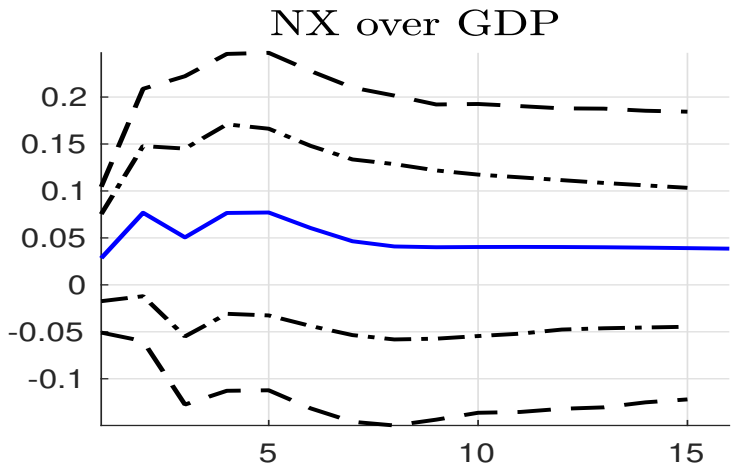
- Identification (matrix A): # of AD investigations is predetermined within a month/quarter
  - Decision lags: coordination issues among producers and regulation
  - AD investigations reflect unfair foreign competition

Quarterly VAR: Canada

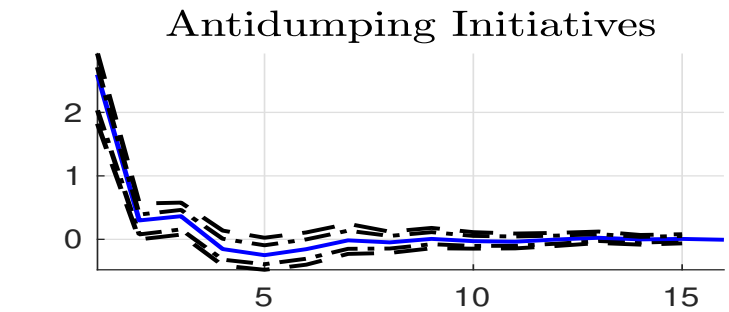


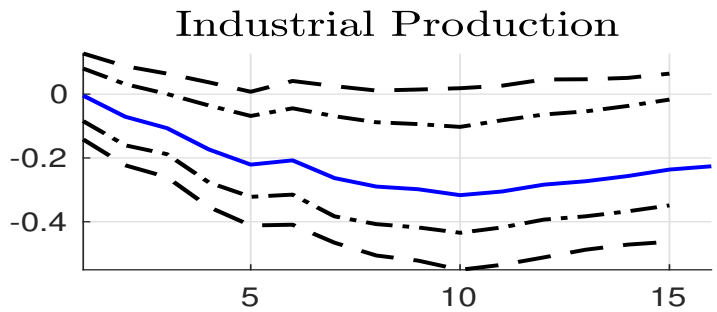


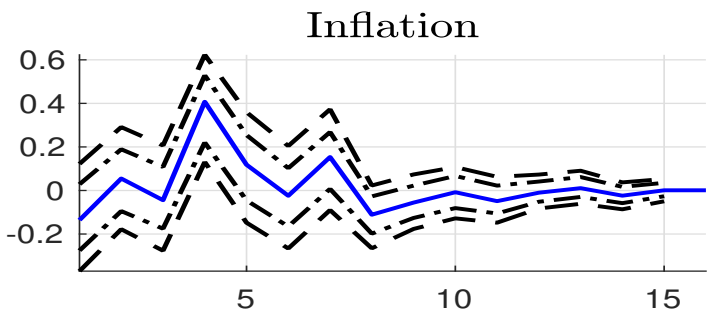


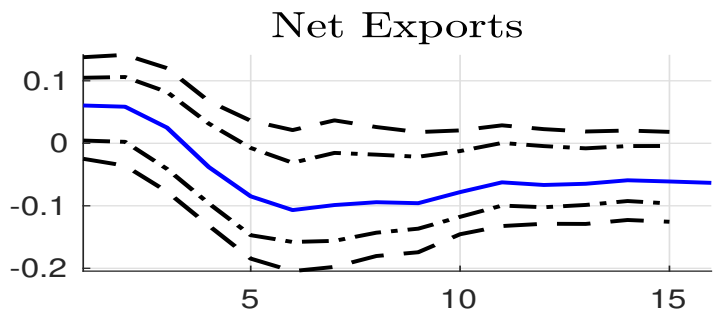


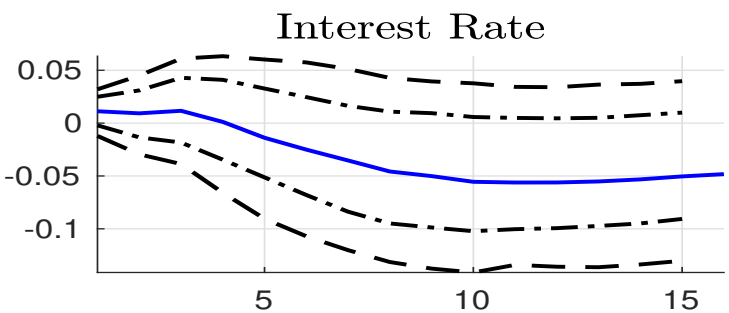
Monthly VAR: Canada

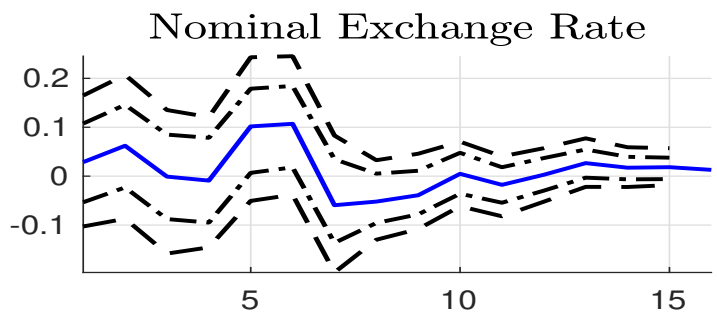








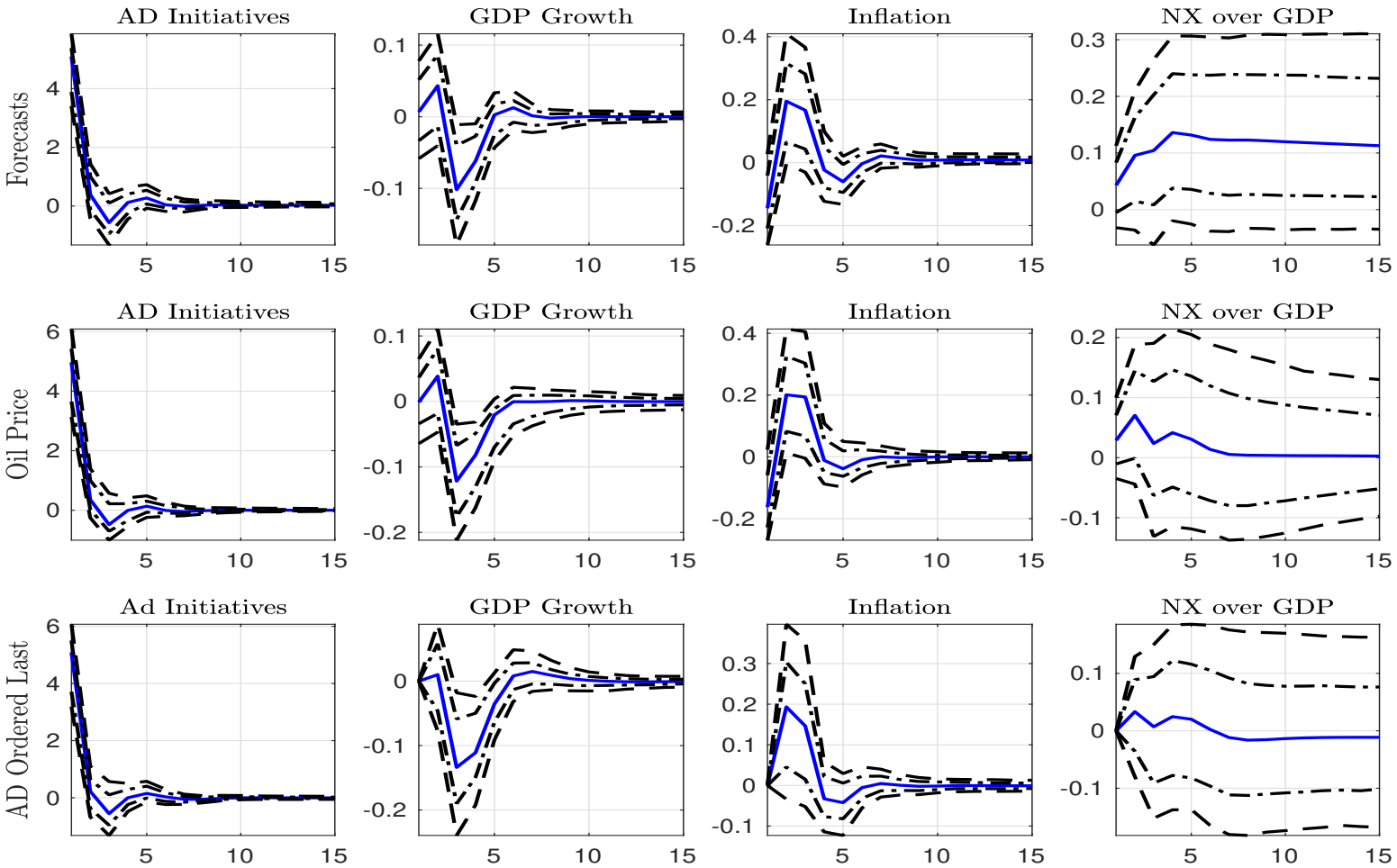




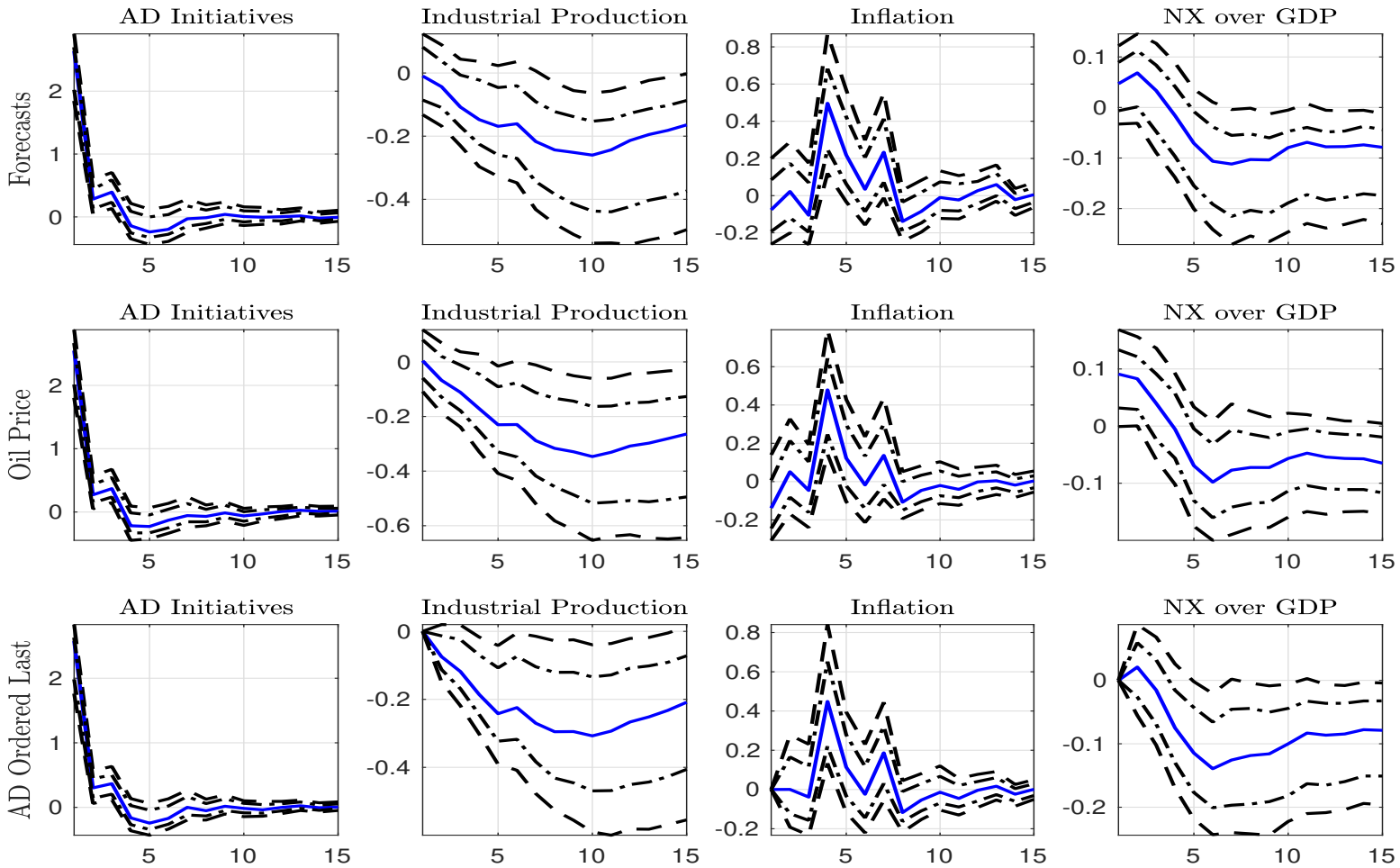
Robustness

- Variety of robustness checks:
  - Adding Forecasts for Imports and Expectations
  - Controlling for Oil Prices
  - Different recursive ordering: AD initiatives respond to all macro shocks contemporaneously,
  - Considering also Countervailing Duties and Global Safeguards.
- Results are also similar when considering Turkey and India.

Quarterly VAR Robustness: Canada



Monthly VAR Robustness: Canada



Panel VAR

- AD investigations only apply to a subset of imports
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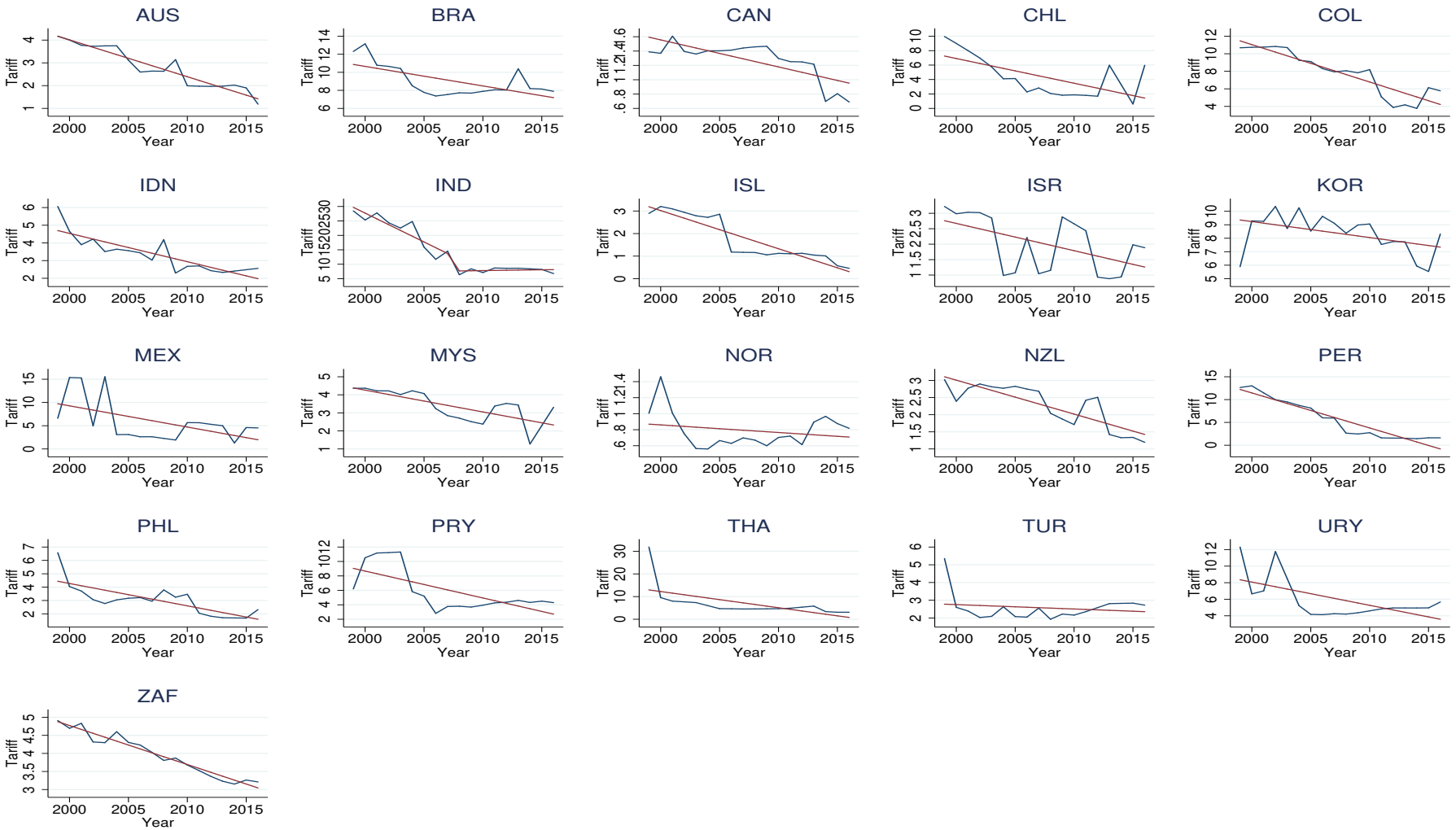
- Panel VAR using harmonized data for 21 small open economies over the period 1999-2016
  - All the countries had flexible exchange rates and did not hit the ZLB
- Continue to assume that trade policy responds with a one-period delay to macroeconomic shocks

Data: Applied Tariff Rates



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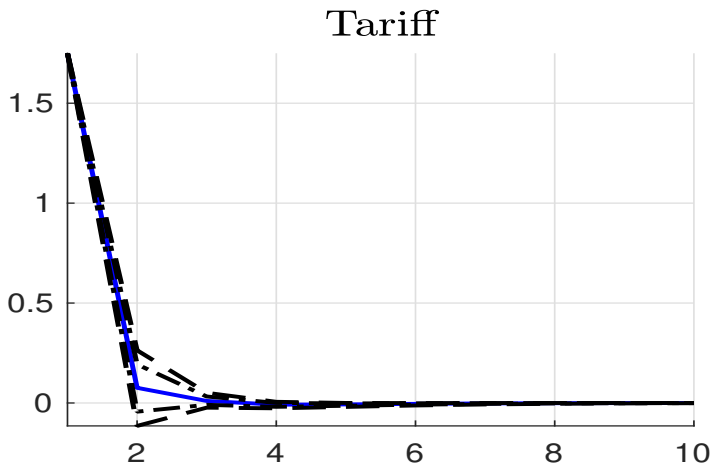
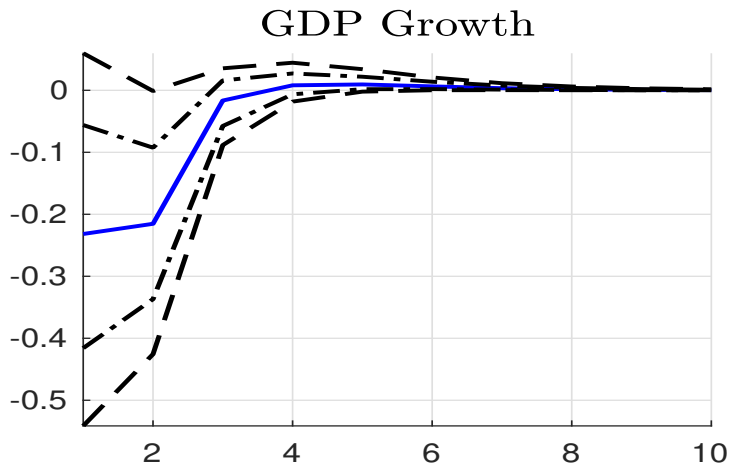
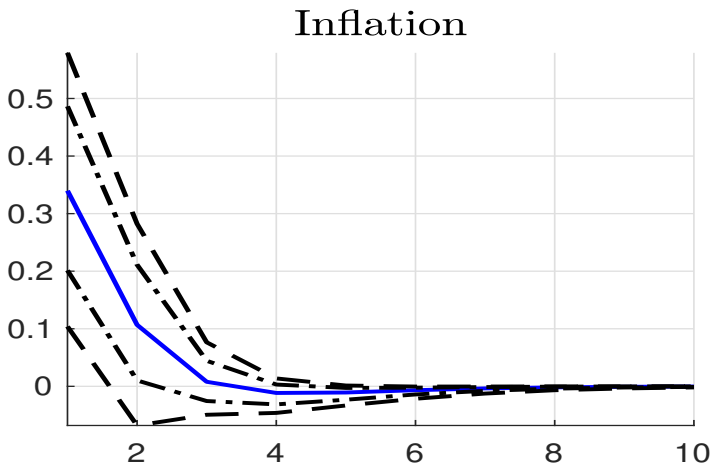
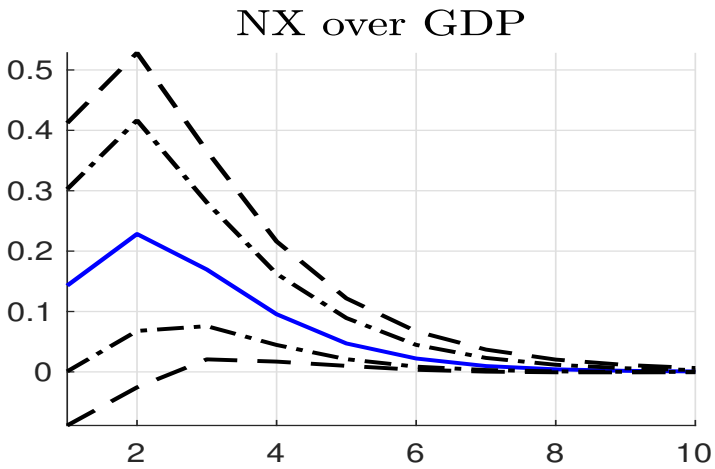

Tariff
1.5
1
0.5
0
2
4
6
8
10


GDP Growth
0
-0.1
-0.2
-0.3
-0.4
-0.5
2
4
6
8
10


Inflation
0.5
0.4
0.3
0.2
0.1
0
2
4
6
8
10


NX over GDP
0.5
0.4
0.3
0.2
0.1
0
2
4
6
8
10

The Model

Key Features

- Small open economy model (two-country model in which Home is of measure zero relative to Foreign)

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- Two vertically integrated production stages
  - Non-tradable intermediate input (Y_t^I) produced with capital (K_t) and labor (L_t)
  - Tradable and non-tradable final consumption sectors (use Y_t^I)

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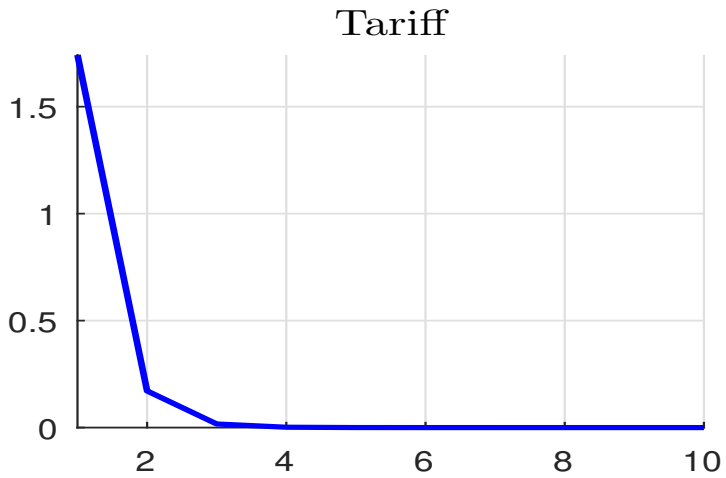
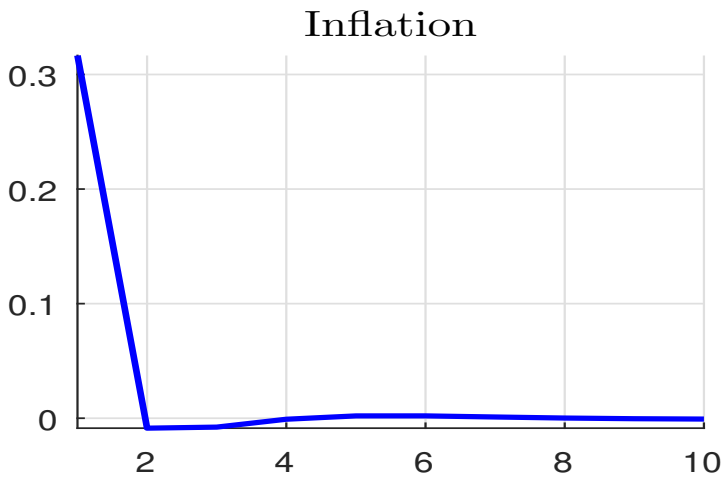
  - Tradable and non-tradable final consumption sectors (use Y_t^I)
- Firm heterogeneity and endogenous producer entry in the tradable sector (Ghironi and Melitz, 2005)
- Trade policy captured by an ad-valorem import tariff
- Incomplete international asset markets and nominal rigidities

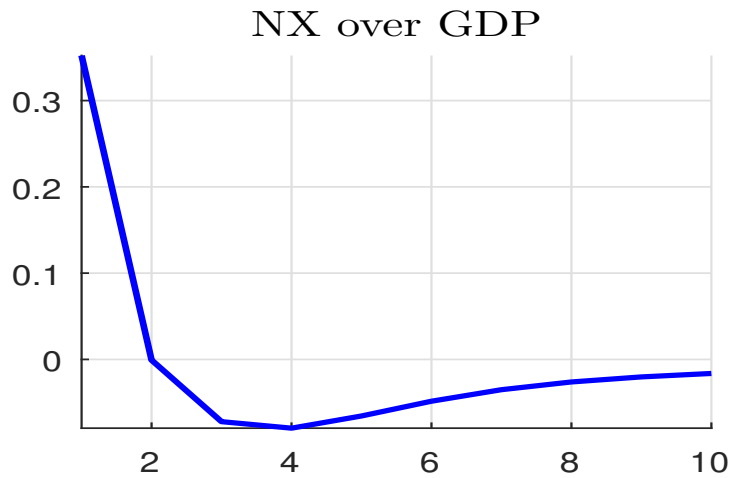
Protectionism in Normal Times

Protectionism in Normal Times (1)

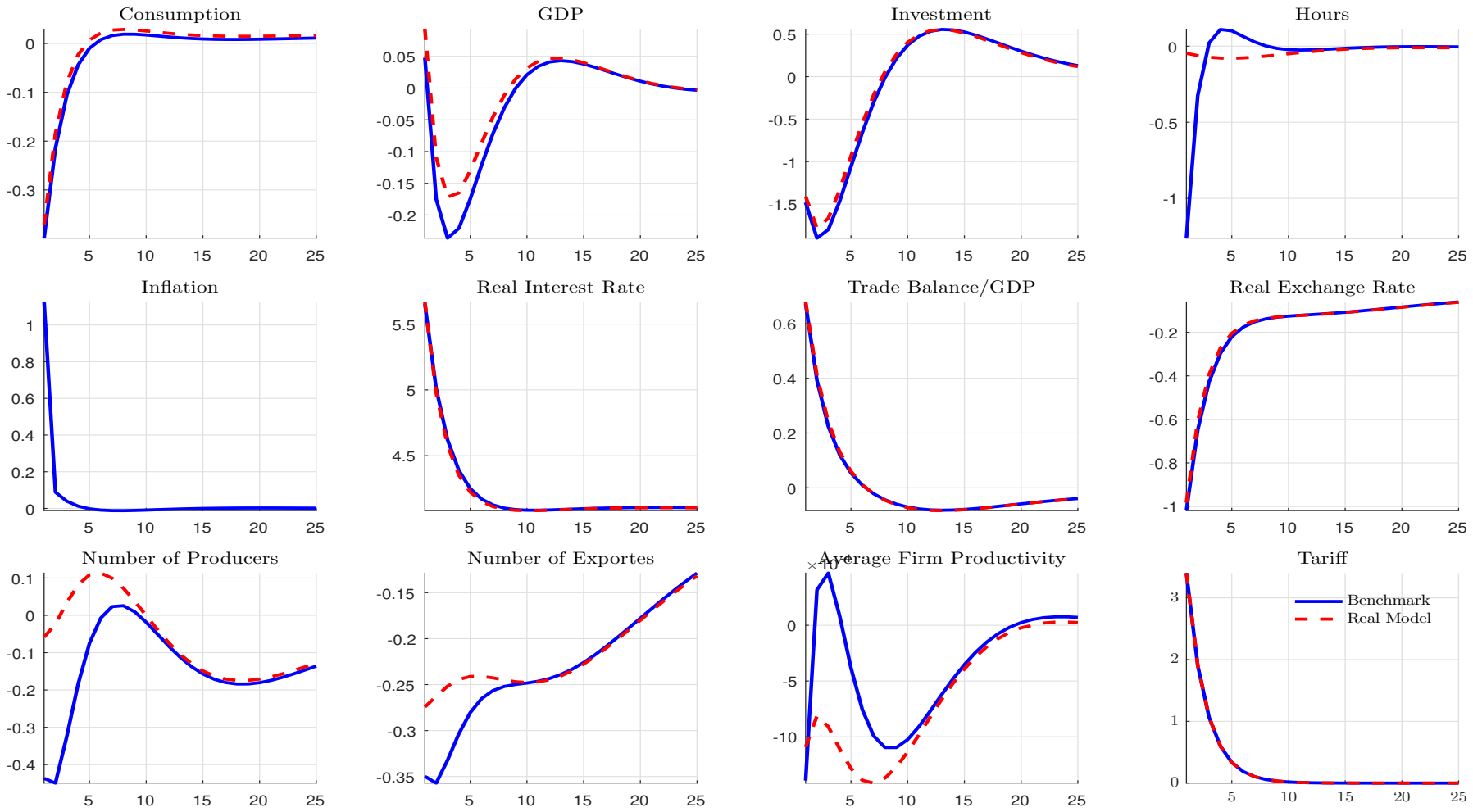
- Temporary increase in τ_t^{IM} to match panel-VAR estimates.







Protectionism in Normal Times (2)



Micro and Macro Forces: Intuition

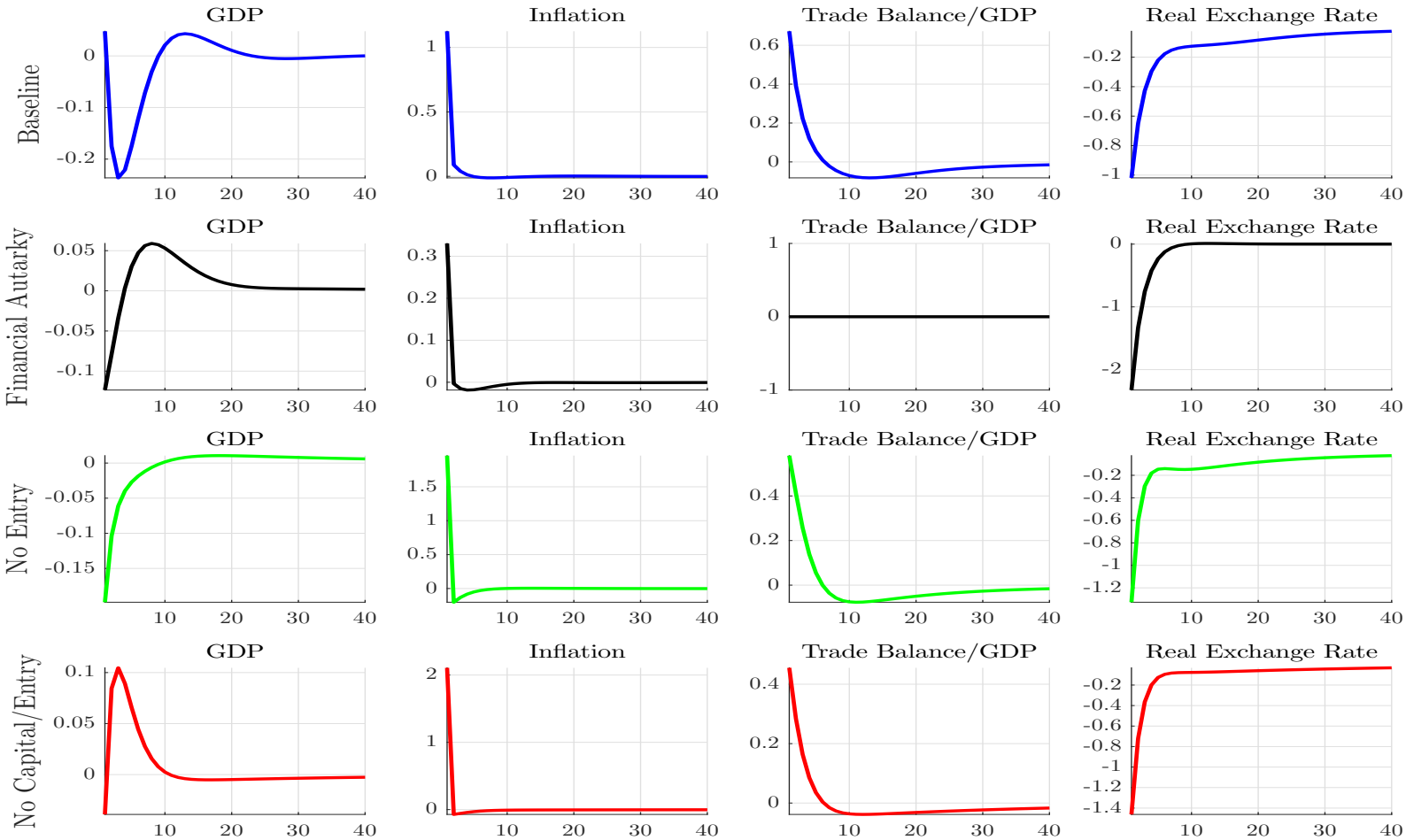
- For a given nominal exchange rate ε_t
  1. Expenditure switching toward Home goods and trade surplus
  2. P_t increases: directly through τ_t^{IM} + reallocation of market shares

$$P_t^T = \left[\varpi_{D,t}^T \left(\tilde{P}_{D,t}^T \right)^{1-\phi_T} + \varpi_{X,t}^{T^*} \left(\varepsilon_t \frac{\tilde{P}_D^{T^*}}{\tilde{z}_{X,t}^*} \left(1 + \tau_t^{IM} \right) \right)^{1-\phi_T} \right]^{\frac{1-\phi_N}{1-\phi_T}}$$

- ε_t appreciates but not enough to offset τ_t^{IM}
- Higher P_t:
  - Reduces real income: lower investment and decline in firm entry
  - Contractionary monetary policy response

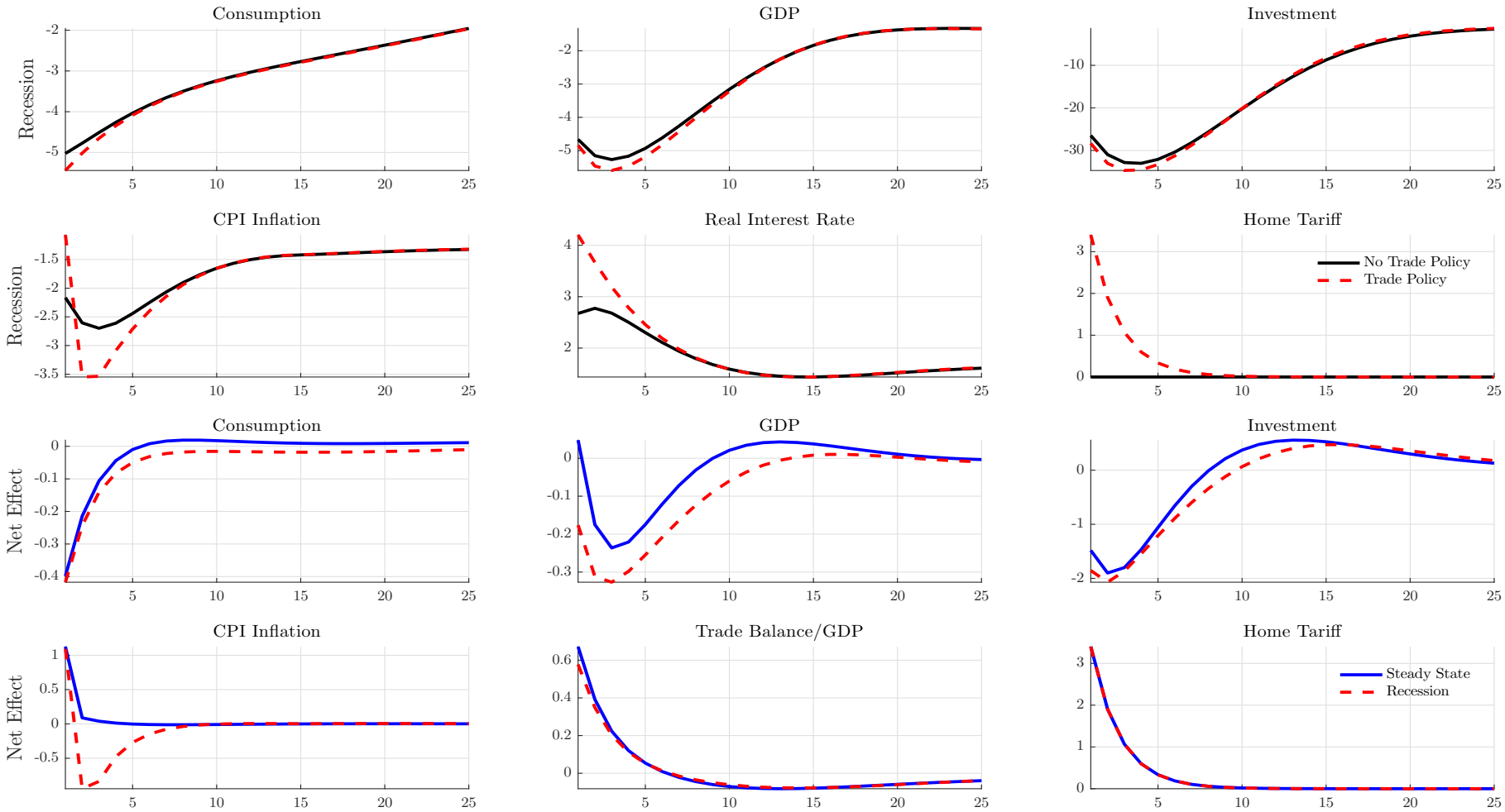
Micro and Macro Forces

- **Alternative models**: (i) financial autarky; (ii) no firm dynamics; (iii) no capital/no firm dynamics



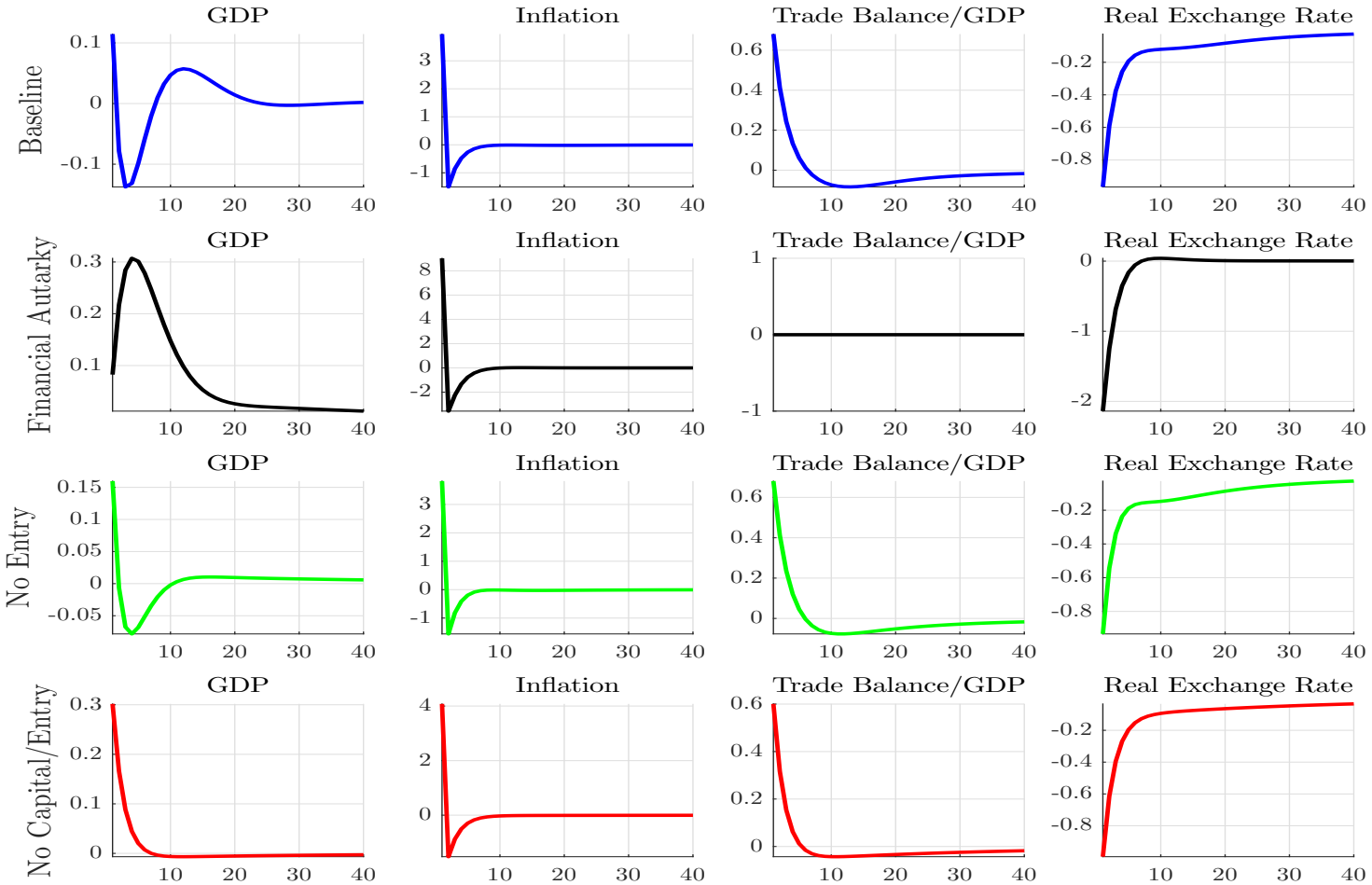
Counterfactual Scenarios

Protectionism in a Liquidity Trap



Protectionism under a Fixed Exchange Rate

- **Baseline** vs **no capital/no firm dynamics**



Conclusions

1. Structural VARs using trade-policy and macro data at different frequency
   - Temporary trade barriers act as a negative supply shock
   - At best a small positive effect on the trade balance
2. Small-open economy model with key macro/trade ingredients reproduces VAR evidence
   - Both macro and micro dynamics behind the contractionary effects of tariffs
3. Policy takeaway: protectionism remains a bad idea—at least for small open economies
   - Even when in a liquidity trap and regardless of exchange rate arrangements
   - Detrimental economic effects even when abstracting from retaliation from trade partners

Self-Harming Trade Policy? Protectionism and Production Networks

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- Particular focus on the access to global supply chains (nearly 50 US Billions of Steel and Aluminium imports affected)...implying a potential trade-off between gains in protected industries and negative effects on downstream domestic producers.
- Existing evidence on the consequences of protectionism through vertical linkages is scant.

What We Do

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  1. We identify trade policy shocks that are free of endogenous and anticipatory movements.
  2. We construct exogenous measures of upstream protectionism faced by 70 narrowly defined NAICS-4 industries.
  3. We estimate panel local projections using the identified trade-policy shocks to determine the dynamic effects of protectionism on employment within and across industries.

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   - A uniform 2 p.p. increase in the share of imports subject to TTBs in upstream industries, leads to an average employment decline between 0.29 p.p. and 0.65 p.p. after two years.

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   - A uniform 2 p.p. increase in the share of imports subject to TTBs in upstream industries, leads to an average employment decline between 0.29 p.p. and 0.65 p.p. after two years.

3. The negative effects of upstream protectionism can be rationalized through a decline in competitiveness in downstream industries. The negative employment effects effects are more pronounced in industries with higher demand elasticity .

Related Literature

1. Effects of Protectionism on Aggregate Outcomes: Barattieri, Cacciatore, Ghironi (2018), Furceri Swarnali Ostry Rose (2018).

2. Trade policy and vertical production linkages: Conconi, Garcia-Santana, Puccio and Venturini (2018), Blanchard, Bown and Johnson (2018).

3. Empirical literature that studies the determinants of TTBs: Bown Crowley (2013, 2014).

4. Long-run productivity effects of trade liberalization: Amity and Konings (2007) Goldberg Kumar Pavcnik Topalova (2018).

5. Effects on the US of recent Trade War with China: Fajglebaum, Goldberg, Kennedy and Khandelwal (2019) and Amity, Redding and Weinstein (2019).

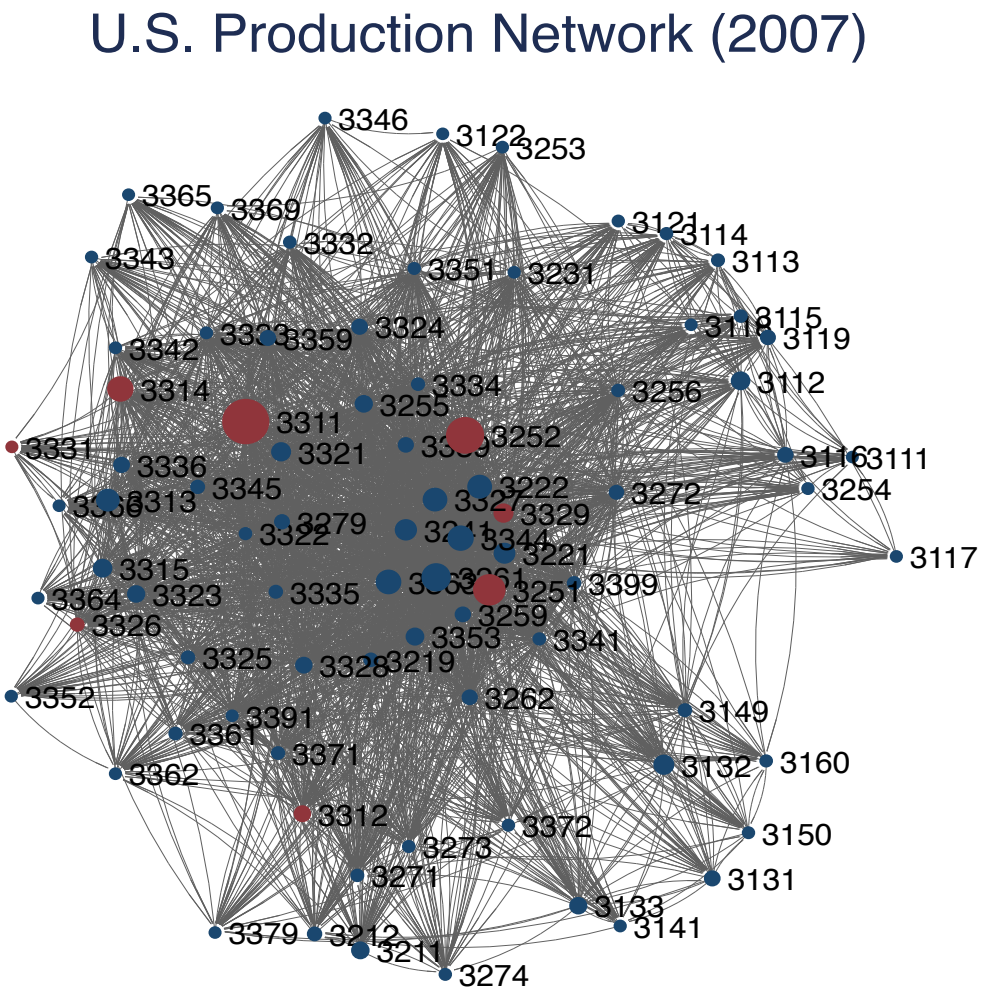
Outline

TTBs and Data

TTBs in the U.S.

Top TTB Users (NAICS-4)	TTB Episodes (# of Products)	% of TTB Success	Median Tariff	Average TTB Import Share	Max TTB Import Share	2007 Sectoral Import/Output
Iron, Steel and Ferro Alloy (3311)	60 (457)	82%	35.1%	1.87%	8.89%	33.55%
Basic Chemical (3251)	44 (63)	75%	101.0%	0.21%	2.26%	14.56%
Other Fabricated Metals (3329)	15 (28)	80%	57.5%	1.53%	8.14%	37.04%
Steel Products From Purchased Steel (3312)	11 (33)	64%	27.9%	11.09%	31.50%	8.61%
Resin, Rubber, Fibers (3252)	10 (14)	90%	24.8%	1.04%	3.18%	14.56%
Spring and Wire Products (3326)	9 (11)	100%	116.3%	7.23%	21.33%	36.49%
Arch., Constr. and Mining Machinery (3331)	8 (21)	88%	193.5%	1.34%	4.97%	59.37%
Nonferrous Metal Production (3314)	7 (17)	100%	60.5%	2.11%	5.47%	64.99%

TTBs and Production Networks (1)



TTBs and Production Networks (2)

Top TTB Users (NAICS-4)	NAICS-4 Output Share	NAICS-4 Av. Input Share Direct Req.	NAICS-4 Max Input Share Direct Req.	NAICS-4 Av. Input Share Total Req.	NAICS-4 Max Input Share Total Req.
Iron, Steel and Ferro Alloy (3311)	1.96%	3.21%	35.70%	5.93%	44.80%
Basic Chemical (3251)	1.92%	1.84%	44.72%	8.38%	84.56%
Other Fabricated Metals (3329)	1.32%	0.66%	3.63%	1.17%	4.77%
Steel Products From Purchased Steel (3312)	0.17%	0.42%	17.68%	0.68%	19.15%
Resin, Rubber, Fibers (3252)	1.92%	2.36%	36.77%	4.23%	41.78%
Spring and Wire Products (3326)	0.43%	0.17%	6.85%	0.24%	7.38%
Arch., Constr. and Mining Machinery (3331)	1.59%	0.003%	0.255%	0.23%	1.00%
Nonferrous Metal Production (3314)	1.10%	1.26%	18.29%	4.04%	35.59%
Total	10.40%	9.94%		24.90%	

Baseline Trade-Policy Measure

- Starting from product level information, we use concordance by Pierce and Schott (2011) to build a measure of protectionism at NAICS-4 industry level.

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$$\tau_{\iota t} \equiv \sum_{k} \sum_{s} \omega_{si}^{k} \mathcal{I}_{sit}^{k},$$

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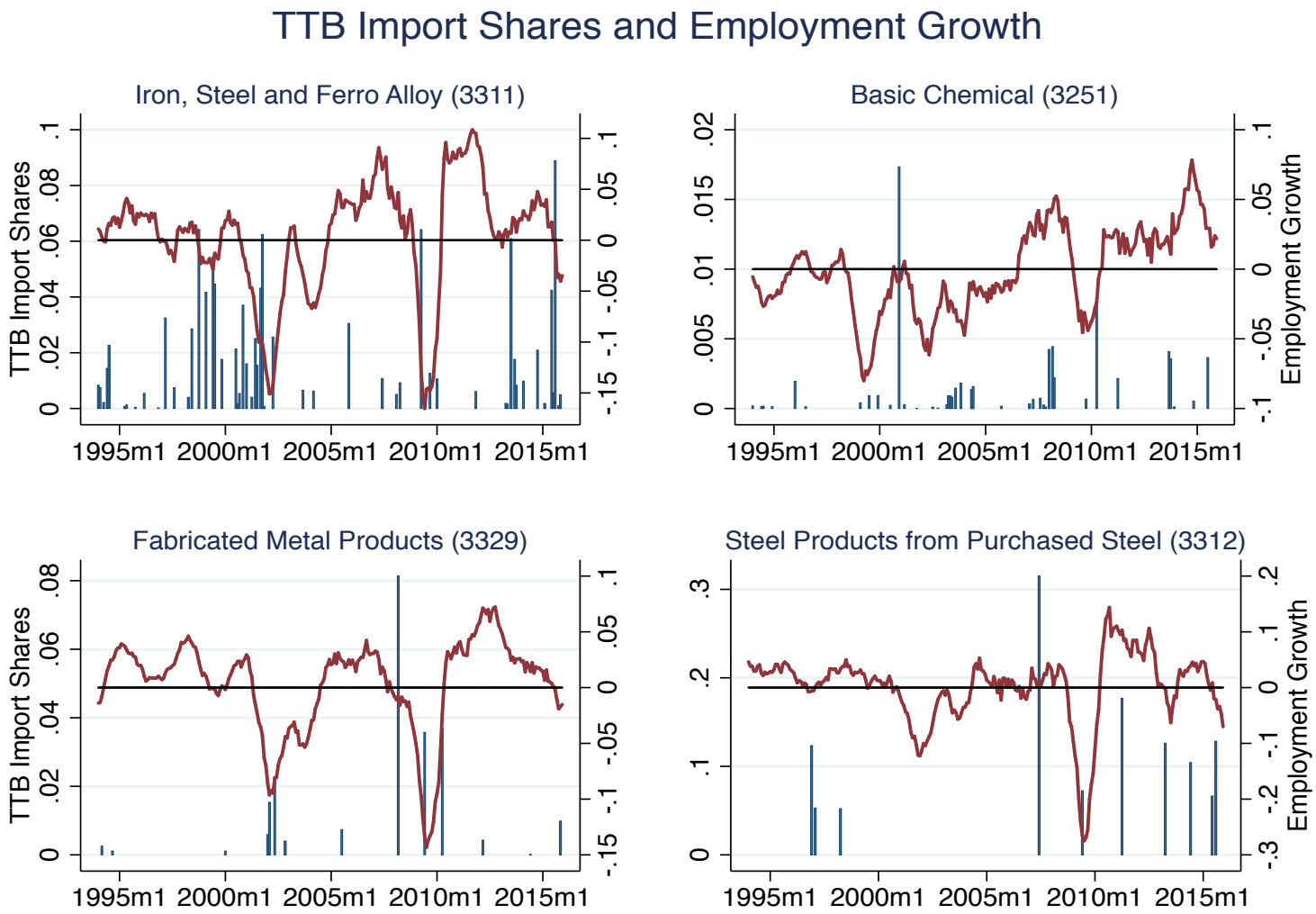
- ω_{si}^{k} is the previous-year, bilateral sectoral import share for each product under investigation.

Baseline Trade-Policy Measure: Top-4 TTBs Users



Identification

Overview

- Our objective is estimating exogenous shocks to trade-policy, both within a sector ($\hat{\varepsilon}_{i,t}$) and in upstream industries ($\hat{\varepsilon}^{IO}_{i,t}$).

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  - We need to control for past economic conditions and expectations.

- Two approaches:
  1. Time series
  2. Panel

Time-Series Approach

- Our benchmark estimation is the following fractional logit model for each industry i :

$$\tau_{\iota t} = \frac{e^{\delta_i + \sum_{\kappa=1}^{p_{x_i}} \phi_{x_i}^{\kappa} x_{\iota t-\kappa} + \sum_{\kappa=1}^{p_x} \phi_x^{\kappa} x_{t-\kappa}}}{1 + e^{\delta_i + \sum_{\kappa=1}^{p_{x_i}} \phi_{x_i}^{\kappa} x_{\iota t-\kappa} + \sum_{\kappa=1}^{p_x} \phi_x^{\kappa} x_{t-\kappa}}} + \varepsilon_{it},$$

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- x_t is a vector of aggregate controls: REER growth, Import growth, Aggregate IP growth, median expected future IP growth from SPF, VIX.

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- We verify that in 5 out of 8 industries among the top TTB users, MTB has forecasting power for future employment growth.

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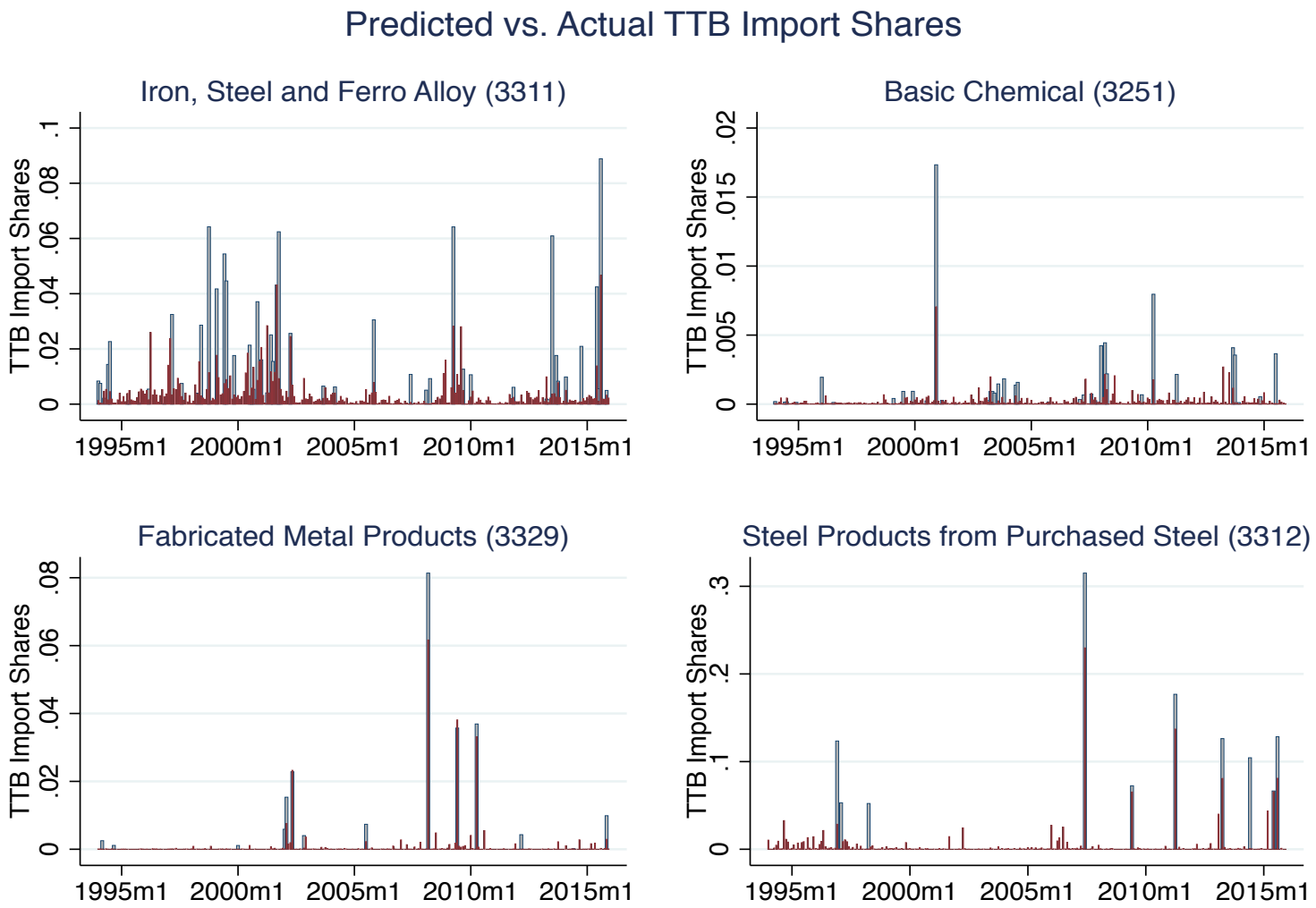
- Limitation: β^{κ} assumed to be symmetric across industries.

Results: Actual vs. Predicted TTB Import Shares



Measuring Upstream Protectionism

- Once obtained $\hat{\varepsilon}_{i,t}$, we compute the exposure to upstream protectionism for a given industry i as a weighted average of the identified structural shocks across industries, excluding the industry i:

$$\hat{\varepsilon}^{IO}_{i,t} \equiv \sum_{j \neq i} \theta_{ij} \hat{\varepsilon}_{j,t}, \tag{1}$$

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- In our baseline results, we consider total requirement tables, considering both direct and indirect contributions.

Local Projections

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- Thus, we construct impulse responses as a direct multistep forecasting regression.
- Advantages of this method:
  1. it does not impose (potentially inappropriate) dynamic restrictions.
  2. it is robust to mis-specification of the data generating process.
  3. it is simple and can accommodate non-linearities

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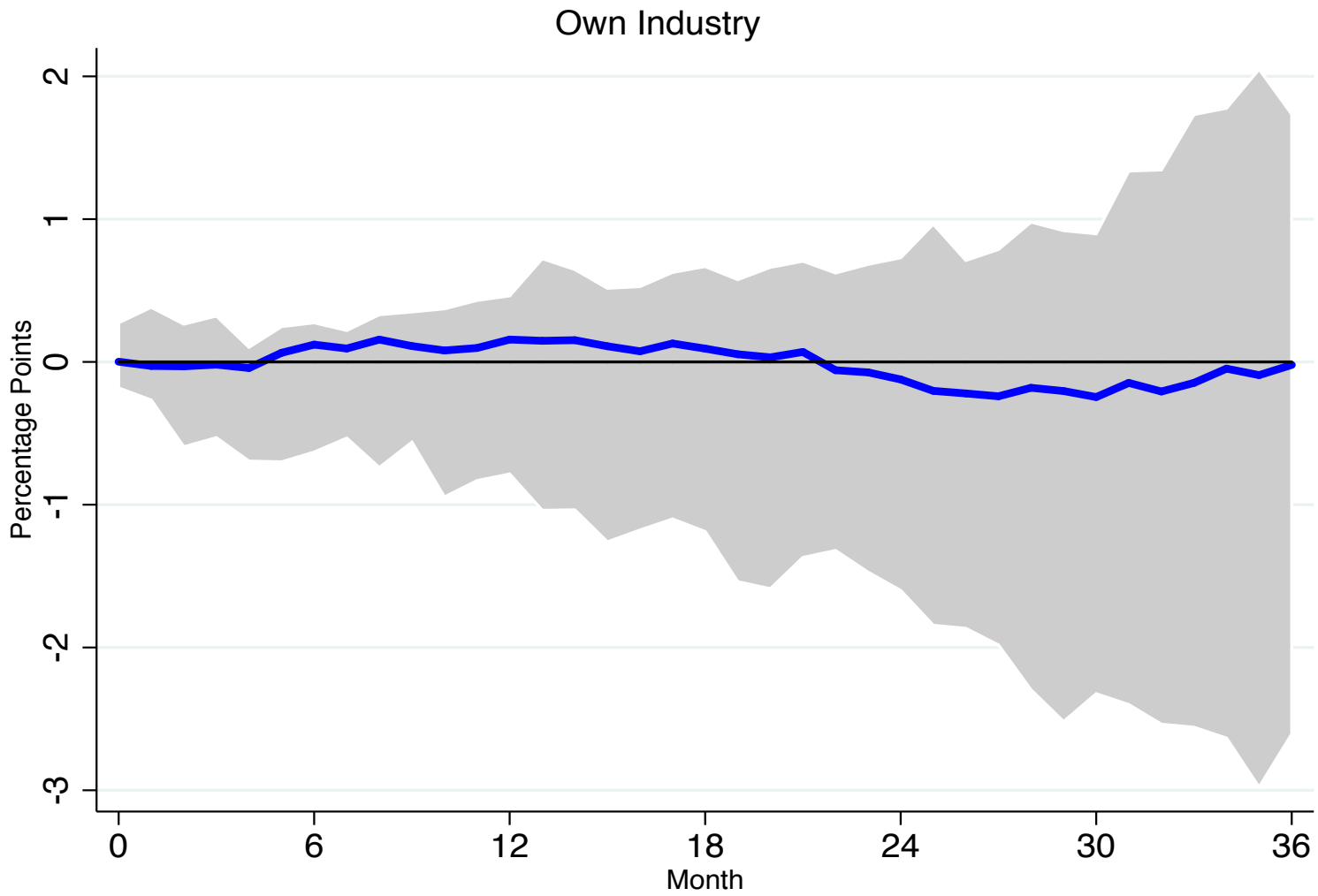
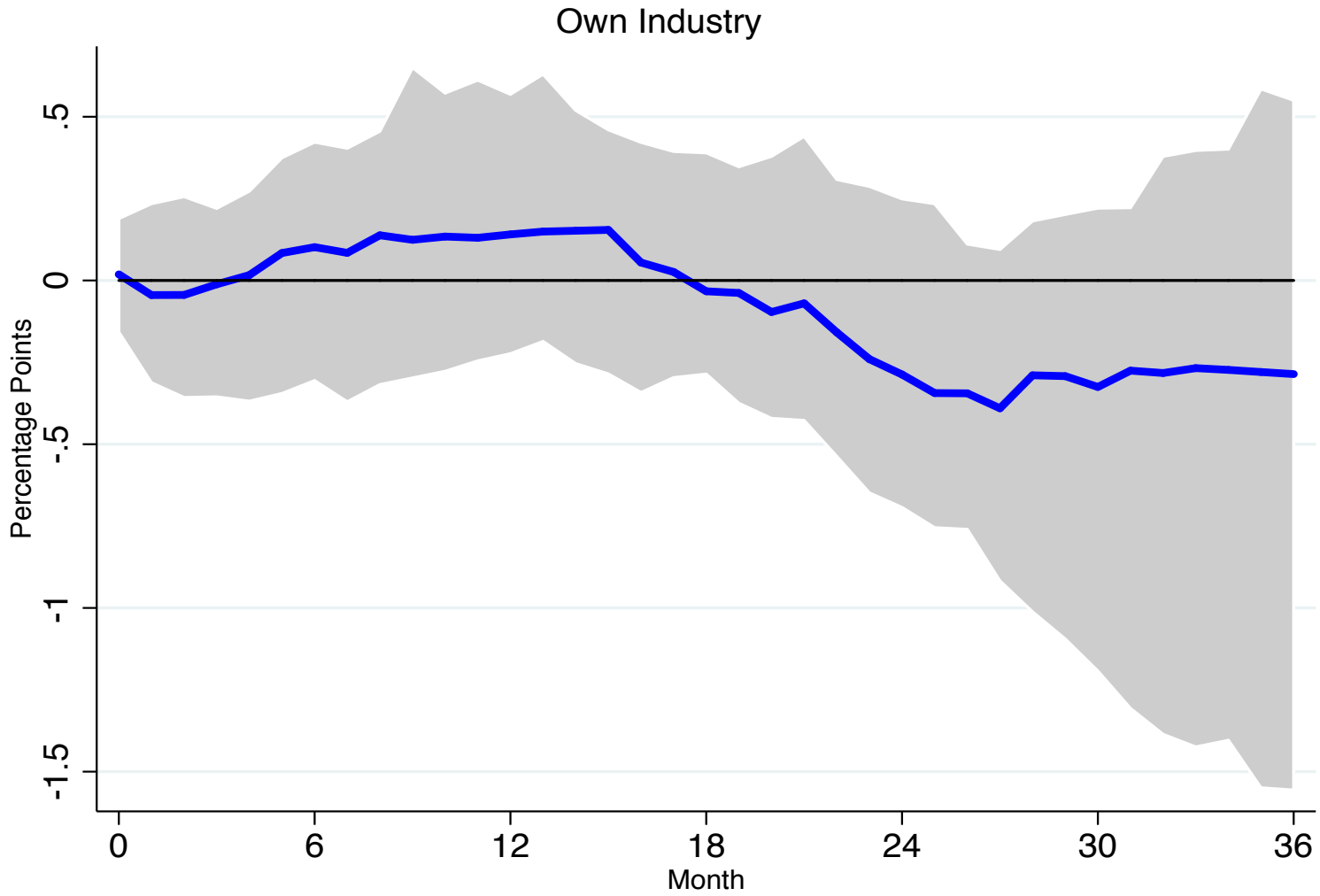
- ν_{ih}^{N4} and ψ_{t+h} are industry and time fixed effects.

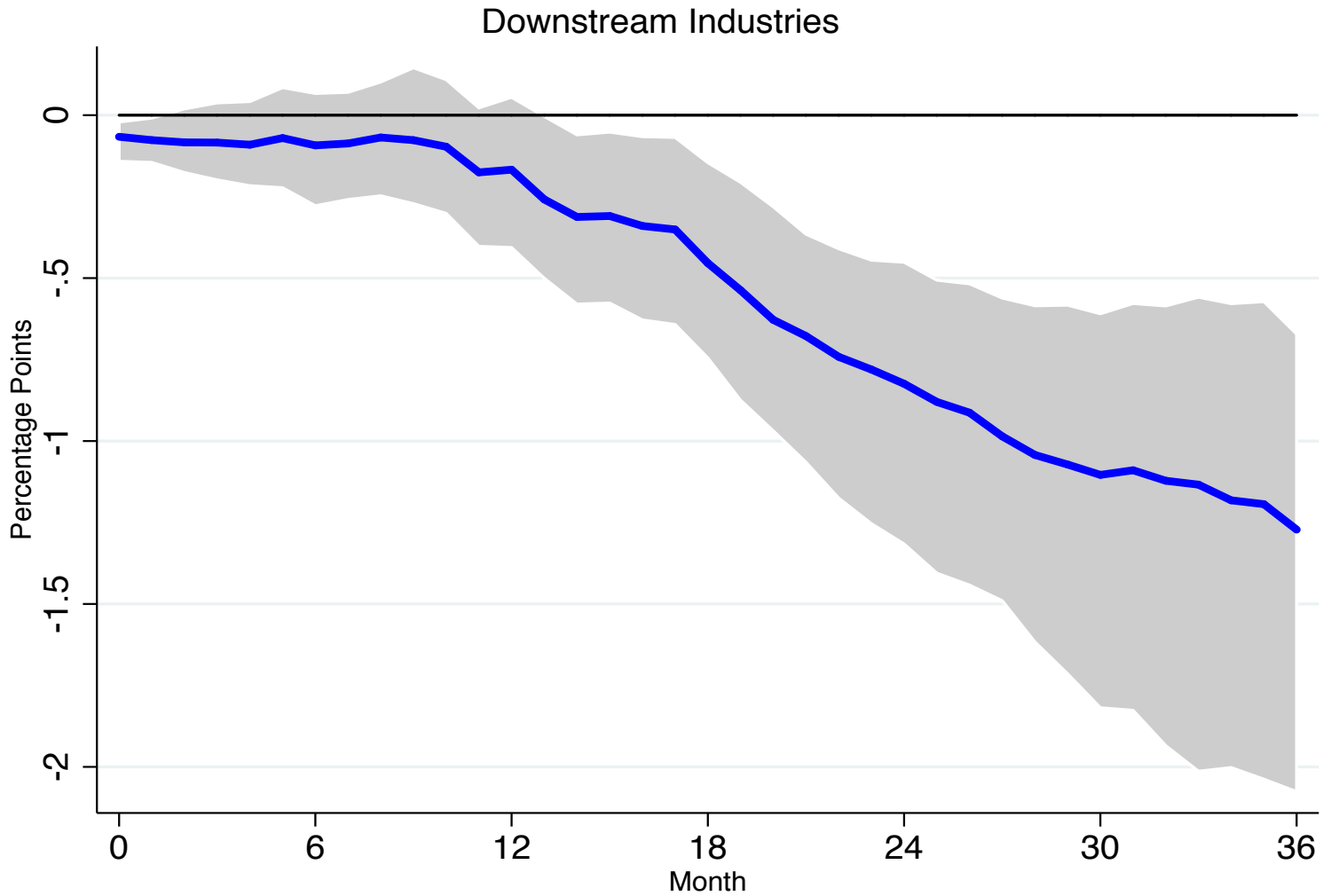
The Effect of Industry Protectionism (Time Series)



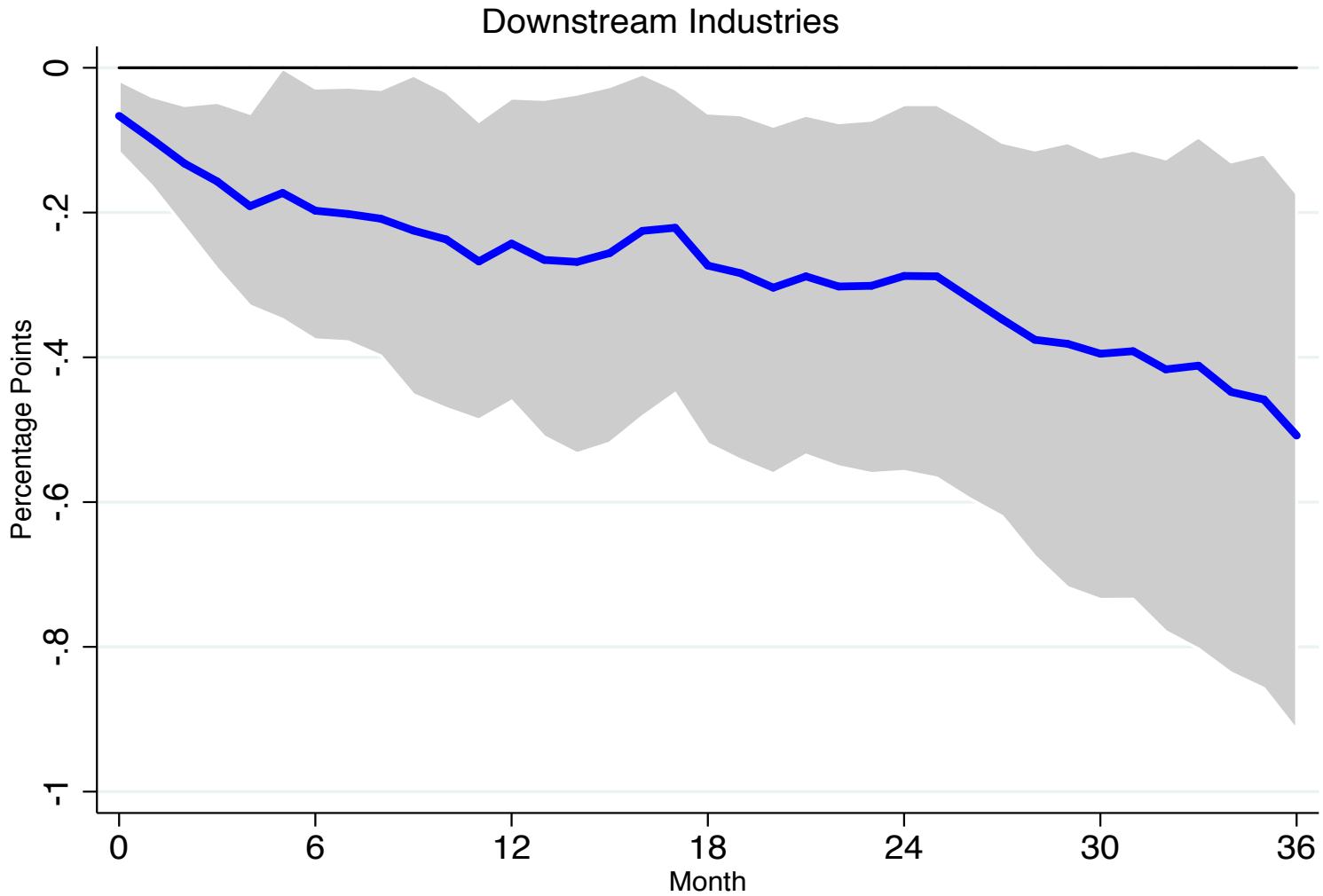
The Effect of Industry Protectionism (Panel)



The Effect of Upstream Protectionism (Time Series)



The Effect of Upstream Protectionism (Panel)



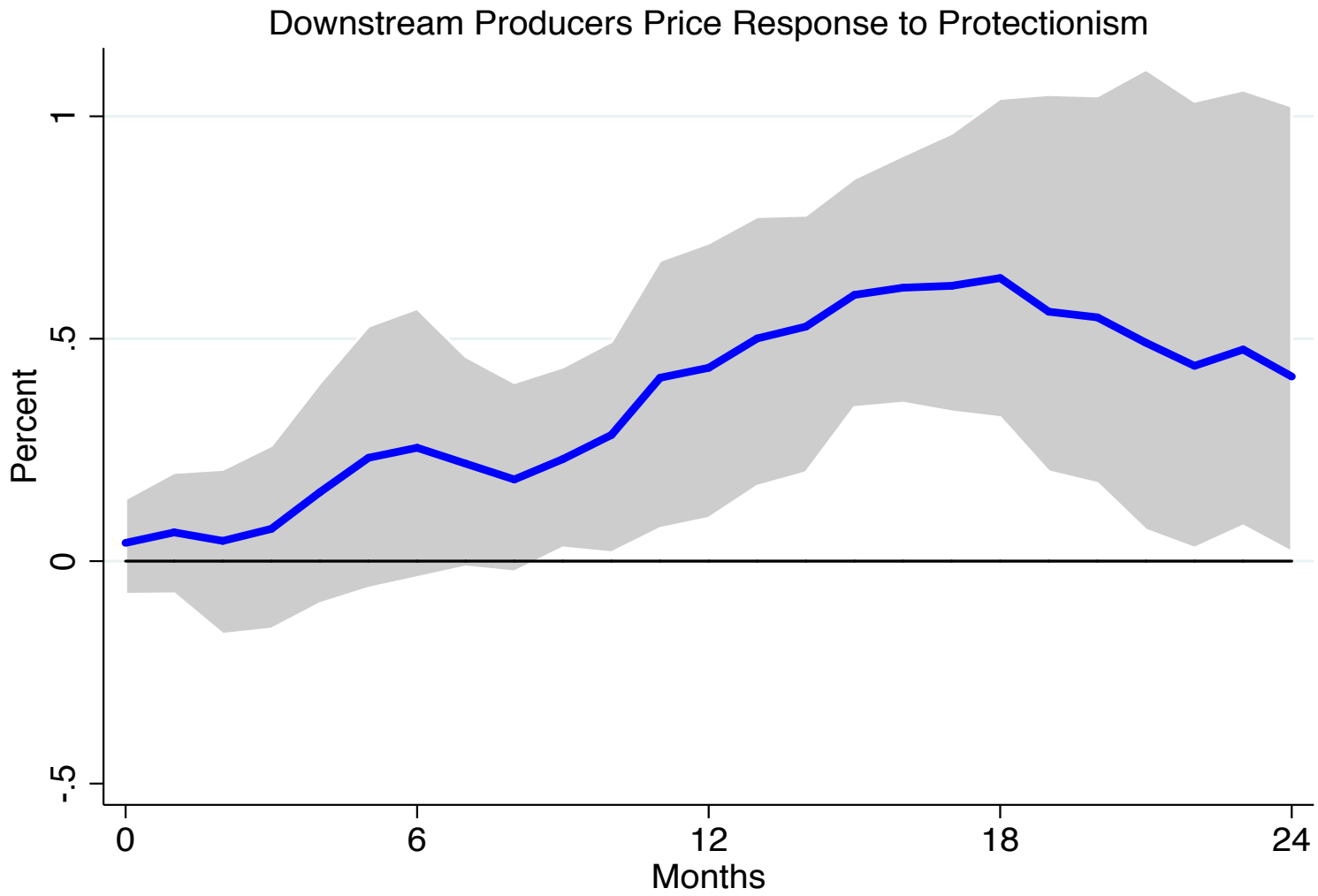
Robustness

We check the robustness of our results in several ways:

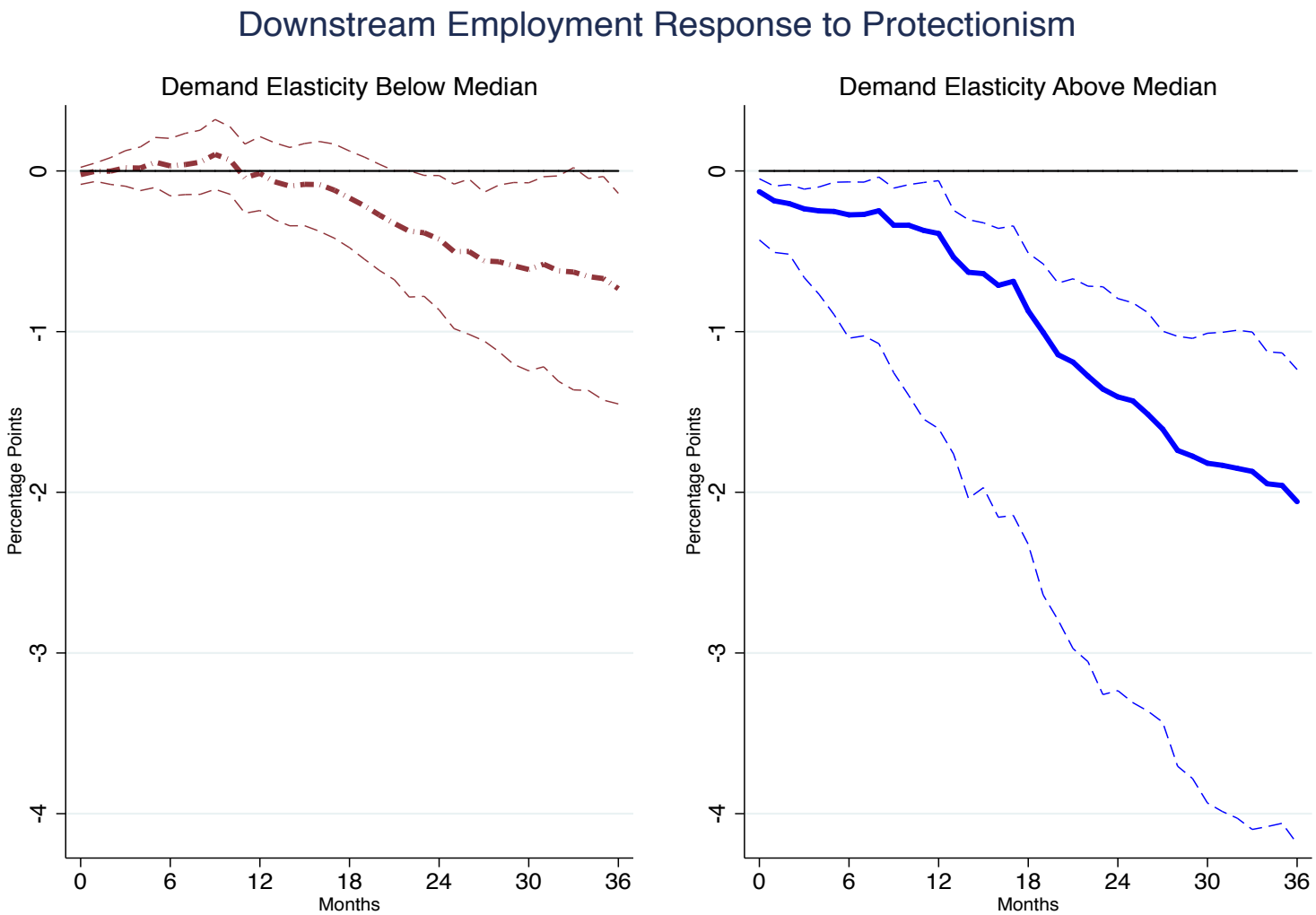
1. Different Identification of Trade Policy shocks:
   - Distributed Lags Model ▸ DL
   - Probit ▸ Probit
2. Measuring Upstream Protectionism:
   - Weight upstream TTB also by sector import shares. ▸ Weight
3. Alternative Measures of Protectionism:
   - Including also Global Safeguards. ▸ GSG
   - Average import shares over 1993-2015 in the computation of $\tau_{\iota t}$. ▸ Av Shares
   - Only TTB episodes that led to the imposition of tariffs. ▸ Tariff

Inspecting the Mechanism

Price Effects of Protectionism in Upstream Industries



Heterogeneus Effects of Protectionism: Demand Elasticity



Conclusion

- We identified exogenous measures of industry protectionism and protectionism faced by downstream producers.

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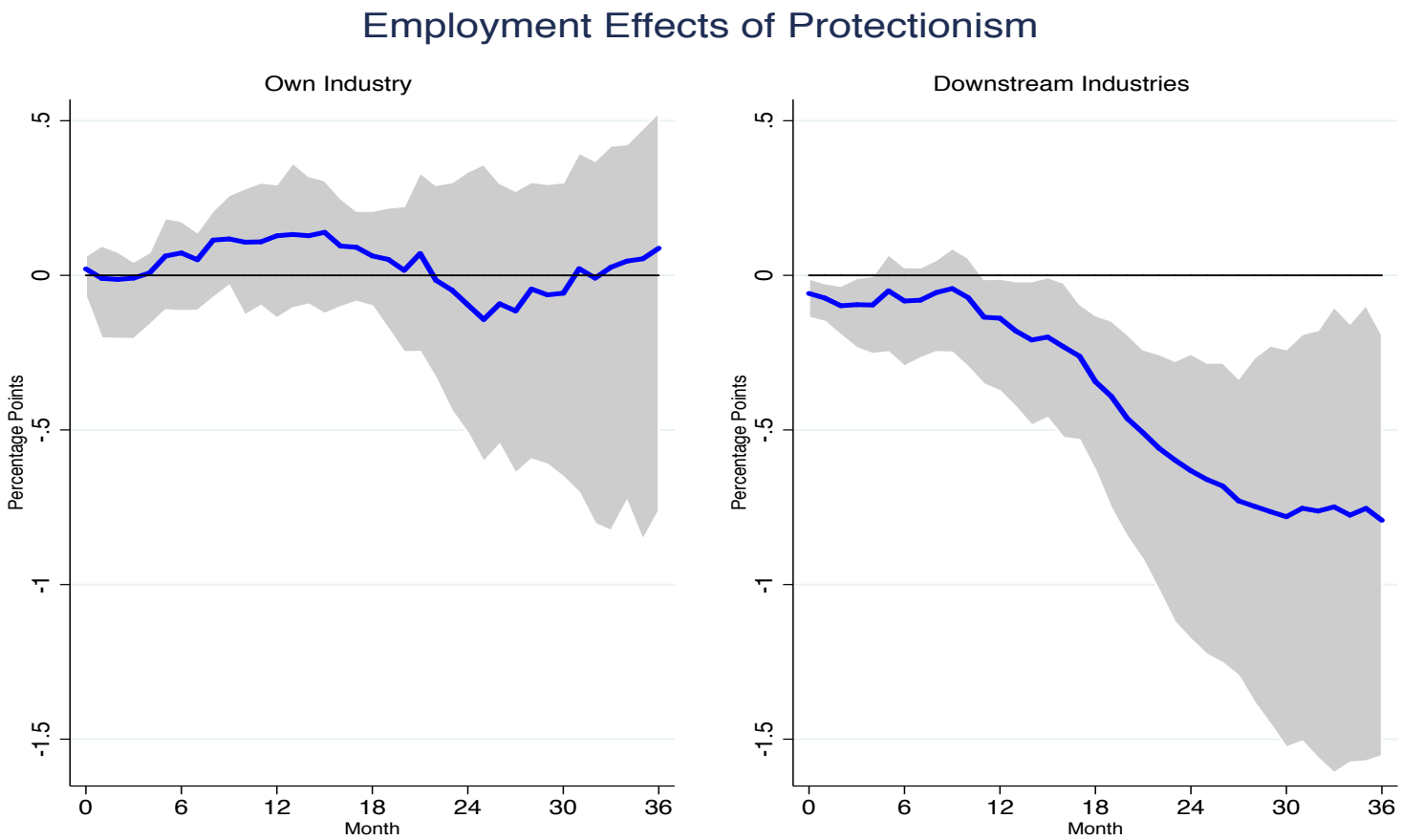
- We identified exogenous measures of industry protectionism and protectionism faced by downstream producers.
- We estimated panel local projections using the identified trade-policy shocks to determine the dynamic effects of protectionism on employment within and across industries.
- We found that protectionism has on average small, statistically non-significant and short-lived effects on industry employment and negative, persistent, and significant effects on employment in downstream industries.

Robustness: Different Identification of Trade Policy shocks

Distributed Lag Model

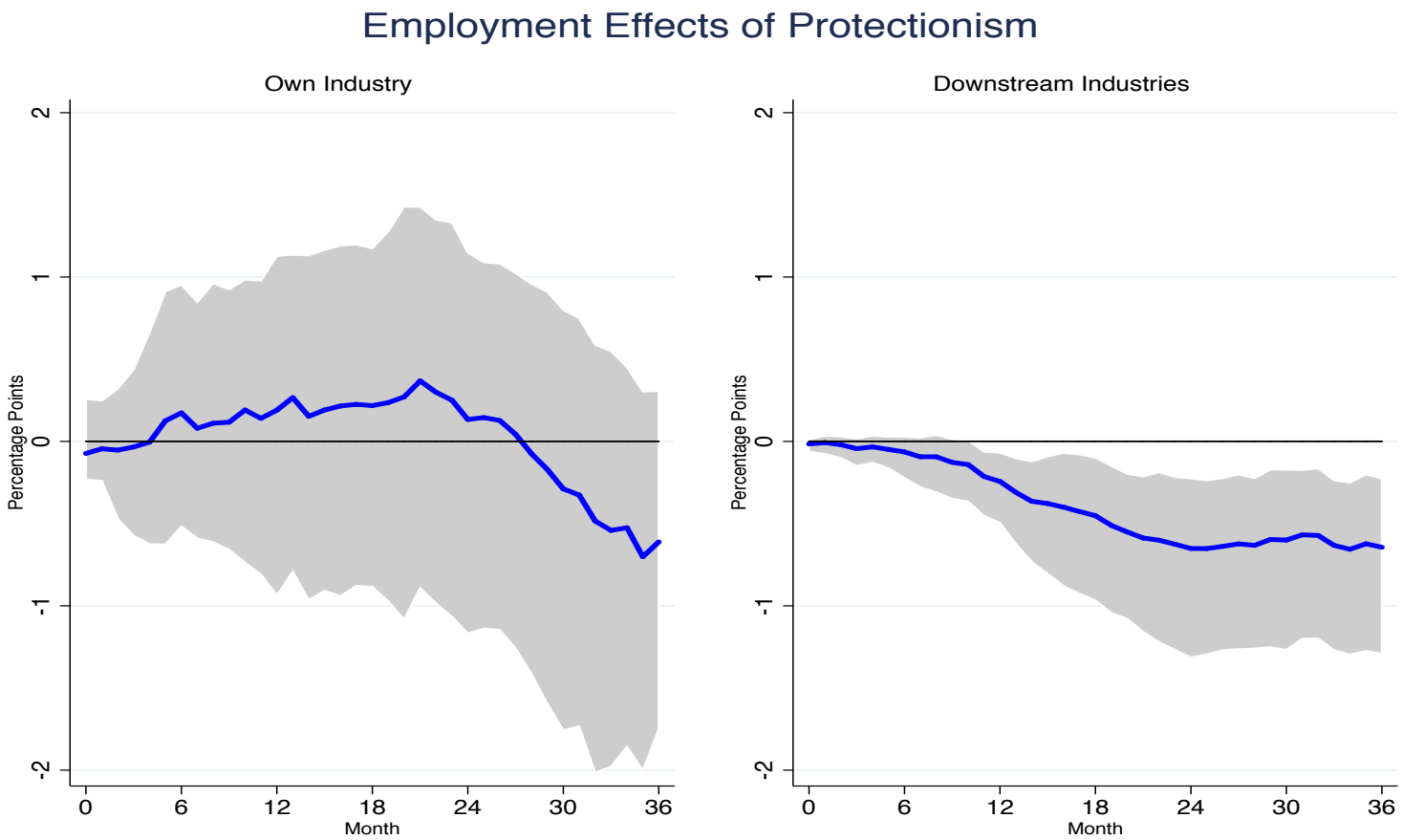
Back



Robustness: Different Identification of Trade Policy shocks

Probit

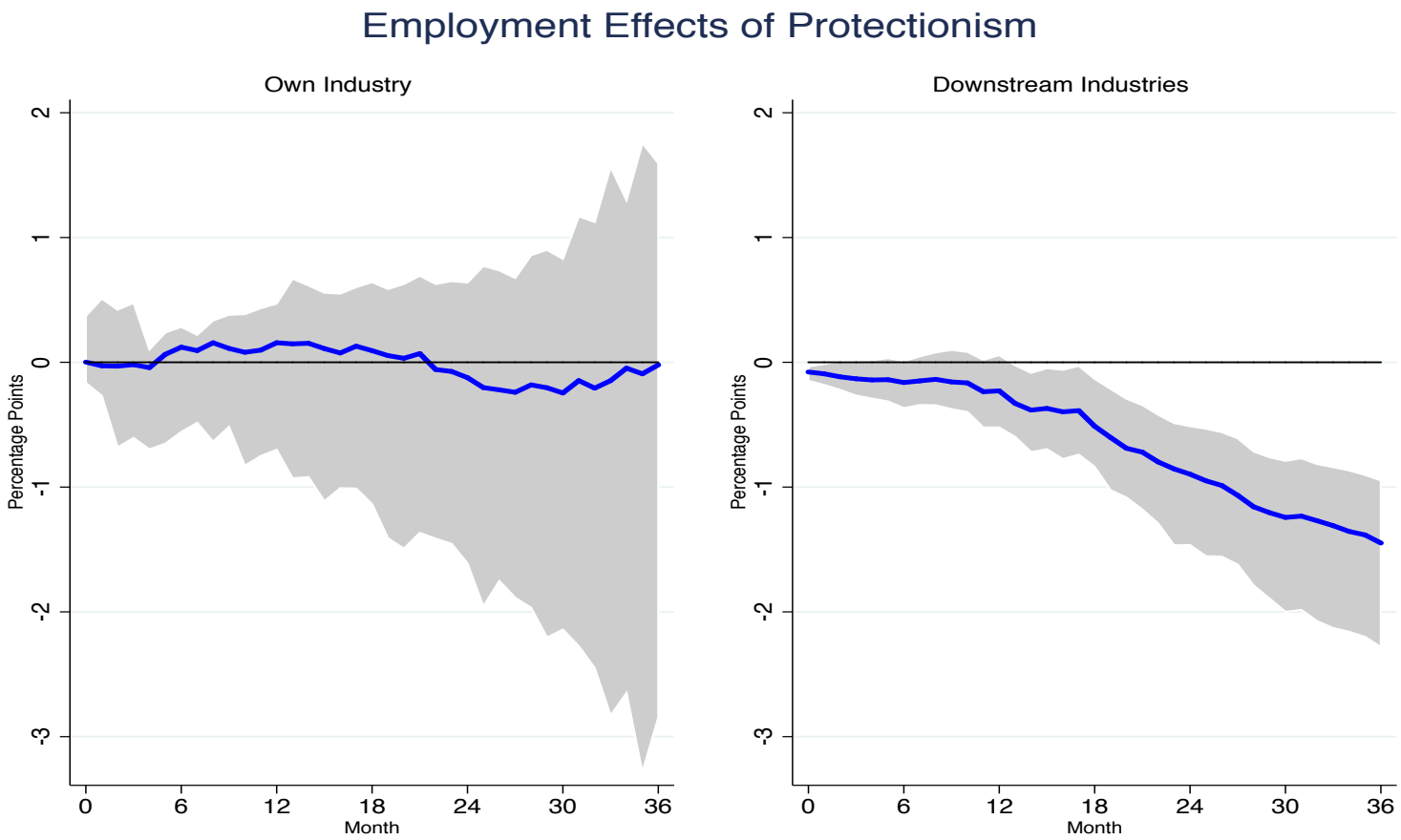
Back



Robustness: Measuring Upstream Protectionism

Weighting Upstream AD also by import shares of sectors.

Back



Robustness: Measuring Upstream Protectionism

Including also Global Safeguards

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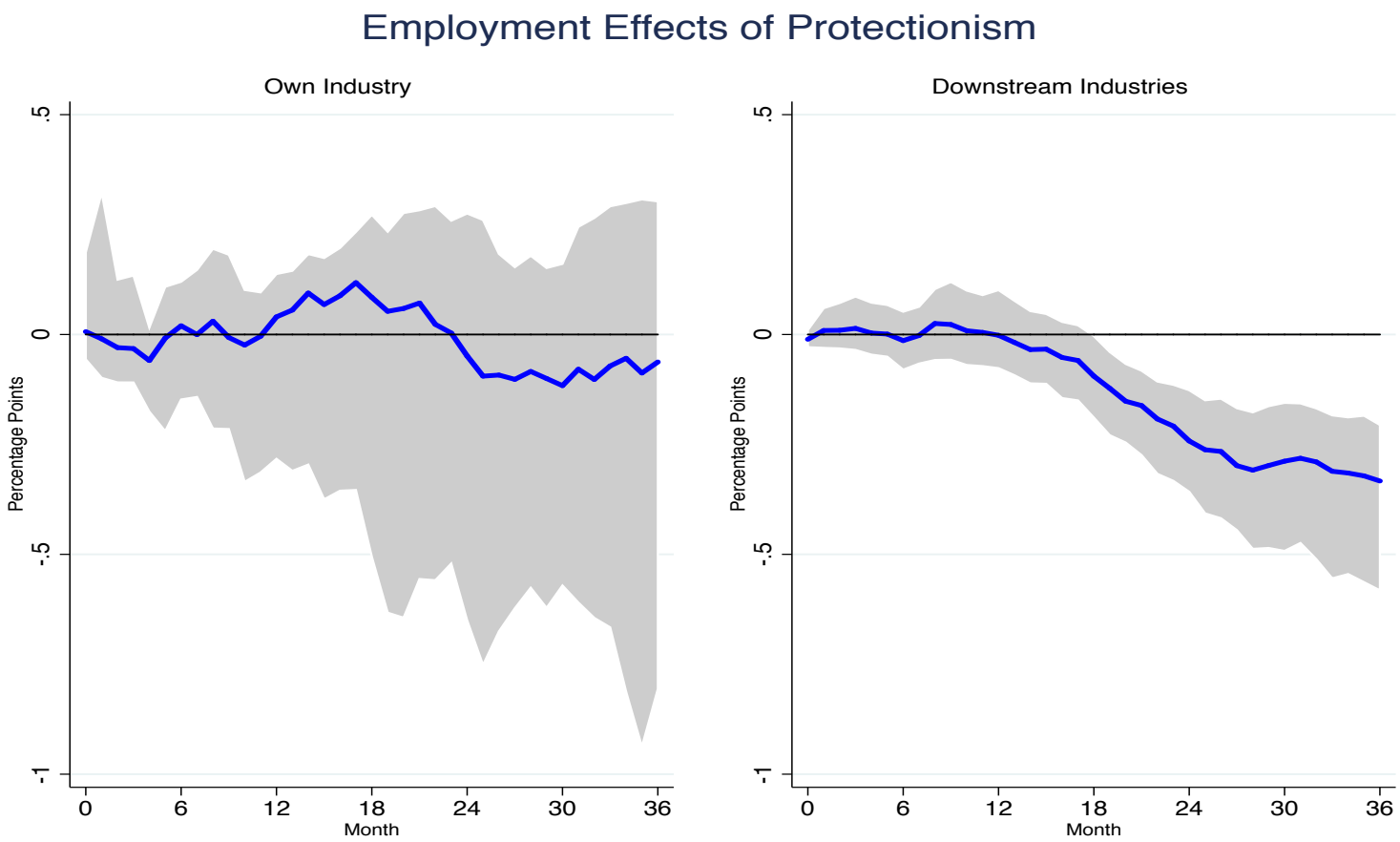
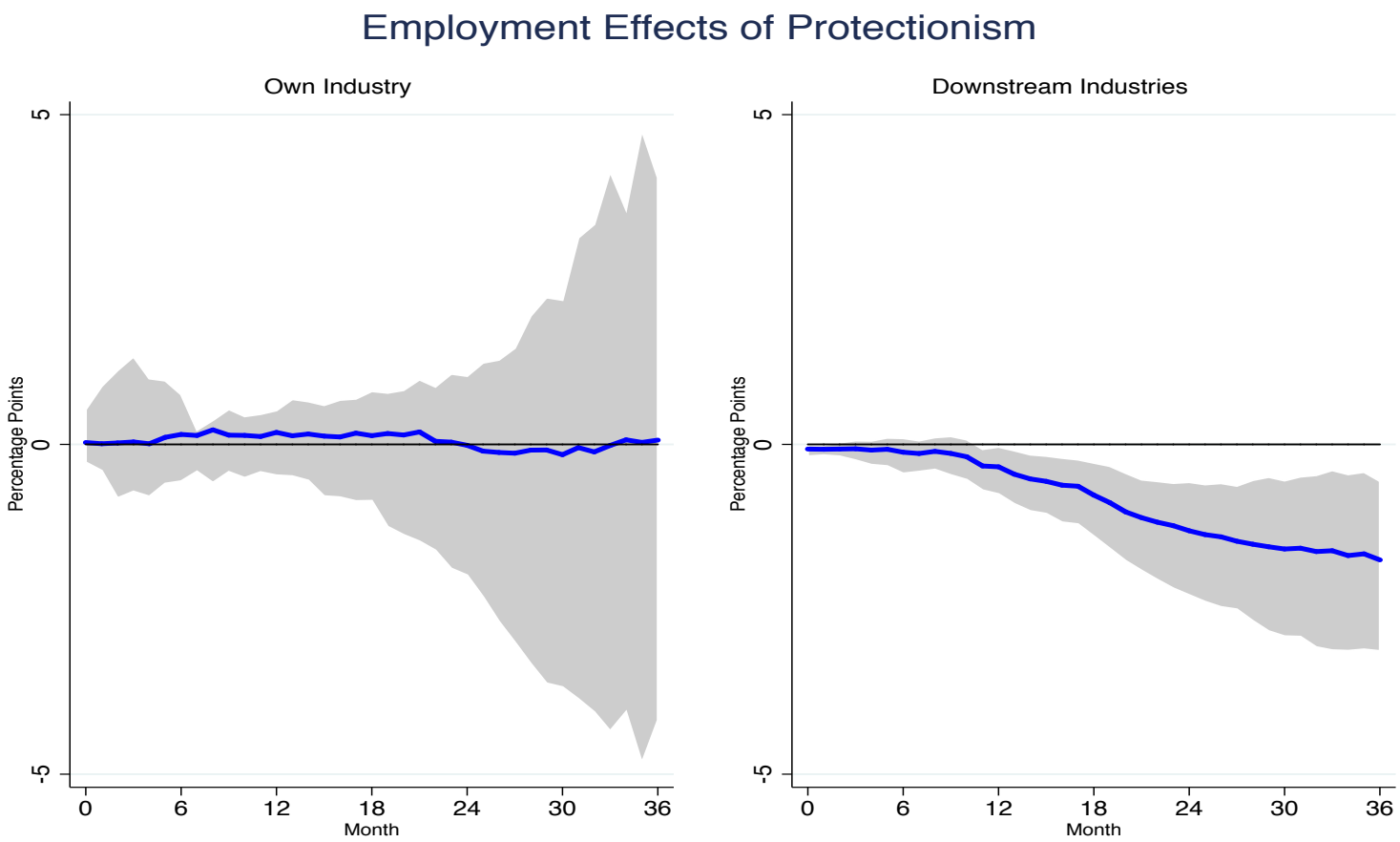


Robustness: Alternative Measures of Protectionism

Average import shares 1993-2015

Back



Robustness: Alternative Measures of Protectionism

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