Online Appendix to: "Self-Harming Trade Policy? Protectionism and Production Networks"

Authors: A. Barattieri and M. Cacciatore

A Data and Descriptive Statistics

Data Sources

The data used in the paper come from the following sources:

1. Current Employment Statistics of the Bureau of Economic Analysis

   (a) Series: monthly industry employment (*CES31xxxx0001* and *CES32xxxx0001*, where "xxxx" denotes the NAICS 4-digit code), available at

   `https://download.bls.gov/pub/time.series/ce/ce.data.31a.ManufacturingDurableGoods.Employment`

   and

   `https://download.bls.gov/pub/time.series/ce/ce.data.32a.ManufacturingNondurableGoods.Employment`.

   (b) Series: average hourly earnings for production employees (*CES31xxxx0008* and *CES32xxxx0008*, where "xxxx" denotes the NAICS 4-digit code), available at

   `https://download.bls.gov/pub/time.series/ce/ce.data.31c.ManufacturingDurableGoods.ProductionEmployeeHoursAndEarnings`

   and

   `https://download.bls.gov/pub/time.series/ce/ce.data.32c.ManufacturingNondurableGoods.ProductionEmployeeHoursAndEarnings`.

2. U.S. Bureau of Labor Statistics

   Series: Monthly producer price indexes (*PCUxxxx–xxxx–*, where "xxxx" denotes the NAICS 4-digit code), available at: `https://download.bls.gov/pub/time.series/pc/pc.data.0.Current`.

3. World Bank Temporary Trade Barriers Database

   The data are available at

https://thedocs.worldbank.org/en/doc/daa244edaf15115d5450d0fed90d436c-0350042021/original/TTBD-2020.zip.

The relevant Excel files are *GAD-USA.xls*, *GCVD-USA.xls*, and *GSGD-WTO.xls*.

4. UN Comtrade

   Series: Bilateral imports (Value) through WITS at https://wits.worldbank.org/. Register and login > select "Advanced Query" > select "Trade Data (UN Comtrade)" > choose a query name > set options as follows:

   - Reporters: United States
   - Products:
     - Clusters: ALL3 – Sub-Heading (all 6-digit HS codes)
     - Nomenclature: HS 1988/92 (for years 1993-1995); HS 1996 for years (1996-2001); HS 2002 (for years 2002-2005); HS 2007 (for years 2007-2011); HS-2012 (for the remaining years).
   - Partners: ARE ARG ARM AUS AUT AZE BEL BGD BLR BRA CAN CHE CHL CHN COL CRI CSK CZE DEU DNK ECU EGY ESP FIN FRA GBR GEO GRC HKG HUN IDN IND IRL IRN IRQ ISR ITA JPN KAZ KEN KGZ KOR LTU LUX LVA MDA MEX MKD MYS NLD NOR NZL OMN PAK PER PHL POL PRT ROM RUS SAU SGP SLV SVK SWE THA TJK TKM TTO TUR UKR UZB VEN VNM ZAF.
   - Trade Flow: Imports
   - Years: 1992 – 2014.

5. CRSP

   Proprietary firm-level data available at https://wrds-www.wharton.upenn.edu/. Series:

   (a) Share price (*prc*).

   (b) Outstanding shares (*shrout*).

   (c) Earnings per share from operations (*oeps12*).

6. Compustat

   Proprietary firm-level data available at: https://wrds-www.wharton.upenn.edu/. Series:

(a) Stockholders' equity plus deferred-tax and investment-tax credit (*txditcqin*).

(b) Book value of preferred shares (*pstkq*).

(c) Shareholders' equity (*seqq*).

(d) Net sales (*saleq*).

(e) Cost of goods sold (*cogsq*).

7. Federal Reserve Economic Data (Monthly Series)

(a) Real Broad Effective Exchange Rate (*RBUSBIS*): `https://fred.stlouisfed.org/series/RBUSBIS`.

(b) Employment (*USPRIV*): `https://fred.stlouisfed.org/series/USPRIV`.

(c) Fed Funds Rate (*FEDFUNDS*): `https://fred.stlouisfed.org/series/FEDFUNDS`.

(d) Monthly output (*USALORSGPNOSTSAM*): `https://fred.stlouisfed.org/series/USALORSGPNOSTSAM`.

(e) Crude Oil Prices: West Texas Intermediate (*MCOILWTICO*): `https://fred.stlouisfed.org/series/MCOILWTICO`.

(f) Global Price Index of All Commodities (*PALLFNFINDEXQ*): `https://fred.stlouisfed.org/series/PALLFNFINDEXQ`.

(g) Producer Price Index by Commodity: Metals and Metal Products: Nonferrous Metals (*WPU102*): `https://fred.stlouisfed.org/series/WPU102`.

(h) Producer Price Index by Industry: Resin, Synthetic Rubber, and Artificial/Synthetic Fiber/Filaments Manufacturing (*PCU32523252*): `https://fred.stlouisfed.org/series/PCU32523252`.

(i) Producer Price Index by Industry: Fabricated Metal Product Manufacturing (*PCU332332*): `https://fred.stlouisfed.org/series/PCU332332`.

(j) Producer Price Index by Commodity: Metals and Metal Products: Iron and Steel (*WPU101*): `https://fred.stlouisfed.org/series/WPU101`.

(k) Industrial Production: Total Index (*INDPRO*): `https://fred.stlouisfed.org/series/INDPRO`.

8. Survey of Professional Forecasters

   The data are available at

   https://www.philadelphiafed.org/surveys-and-data/real-time-data-research/median-forecasts

   Series: Industrial Production (*dindprod6*).

9. Kenneth French website

   The data are available at mba.tuck.dartmouth.edu/pages/faculty/ken.french/ftp/F-F_Research_Data_Factors_daily_CSV.zip. Open *F-F_ Research_ Data_ Factors_ daily.xls.*

   Series:

   (a) Daily market returns (*Mkt-RF*).

   (b) Risk-free rates (*RF*).

10. Census Bureau

    (a) Series: Total monthly imports (GenImportsCIFValBasis) available at:

    1996-2014: https://www.census.gov/foreign-trade/statistics/country/sitc/sitc39614digit.xlsx.

    2015-present: https://www.census.gov/foreign-trade/statistics/country/sitc/sitc315presdigit.xlsx.

    (b) Series: Bilateral monthly imports (Customs Import Values (Gen)), available at https://usatrade.census.g

    Register and login > select "NAICS District-level Data" > select "Measures" > select "Customs Import Values (Gen) ($US)".

    (c) Series: Customs unit value (Customs Unit Value (Gen)), available at https://usatrade.census.gov/.

    Register and login > select "Harmonized System (HS) District-level Data" > select "Imports" > select "Measures" > select "Customs Unit Value (Gen)".

    (d) Series: Customs value (Customs Value (Gen)) at HS 10-digit, available at https://usatrade.census.gov/

    Register and login > select "Harmonized System (HS) District-level Data" > select "Imports" > select "Measures" > select "Customs Value (Gen)".

11. Bureau of Economic Analysis (Input-Output Accounts Data)

    The data are available at http://www.bea.gov/industry/xls/IOUse_After_Redefinitions_PRO_2007_Detail.xlsx.Usethe2007tables.

12. US HS over time concordances (Pierce and Schott, 2012)

    The data are available at `https://www.dropbox.com/s/iycn7t7g1ax2dql/hssicnaics_20191205.zip?dl=0`.

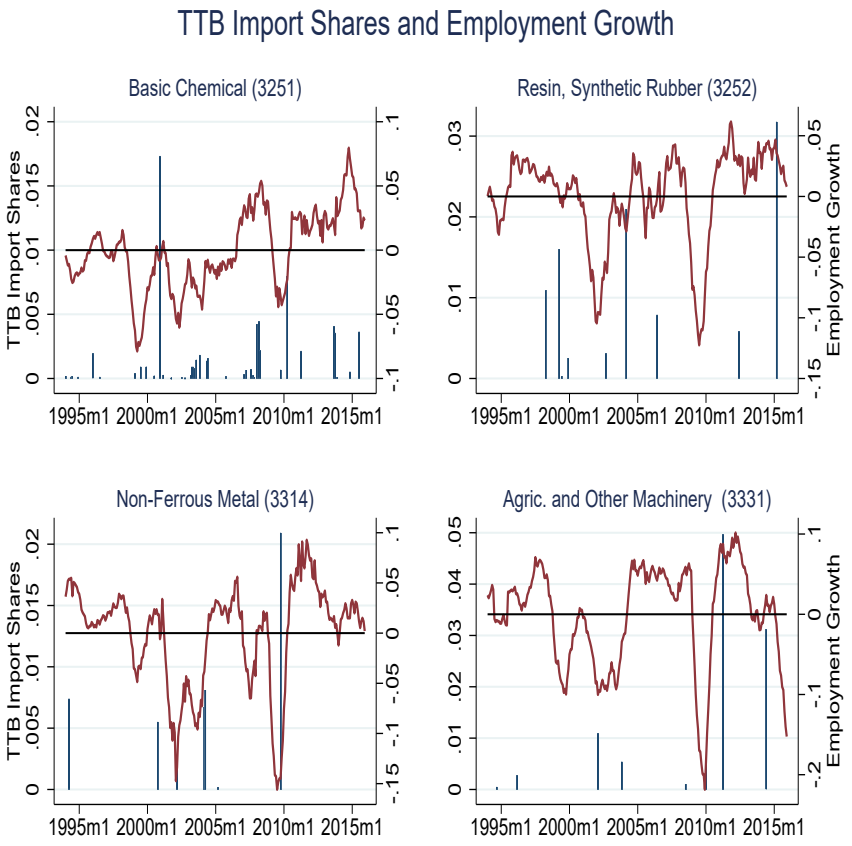

Figure A.1: Share of imports subject to new TTB investigations in selected NAICS-4 industries (histograms) and employment growth (continuous line).

Share of Imports Subject to New TTBs

Figure A.1 plots time series data for τ_{it} (measured on the left axis) and industry employment growth (measured on the right axis) for the industries appearing in Table 1 that are not plotted in the main text.

Market-to-Book Ratio

Figures A.2 and A.3 plot the market-to-book ratio and employment growth for the industries in Table 1. The figure shows that movements in MB_{it} lead movements in ΔL_{it}. Figure A.4 shows the market-to-book ratio also contains information about TTB petitioners' expected profitability. To illustrate this result, we construct a petitioner-specific market-to-book ratio for the most important TTB user, industry 3311 ("Iron, Steel, and Ferro-Alloy"). For each of the 60 U.S. TTB episodes in that industry, we identify the petitioners present in Compustat and CRSP through a manual

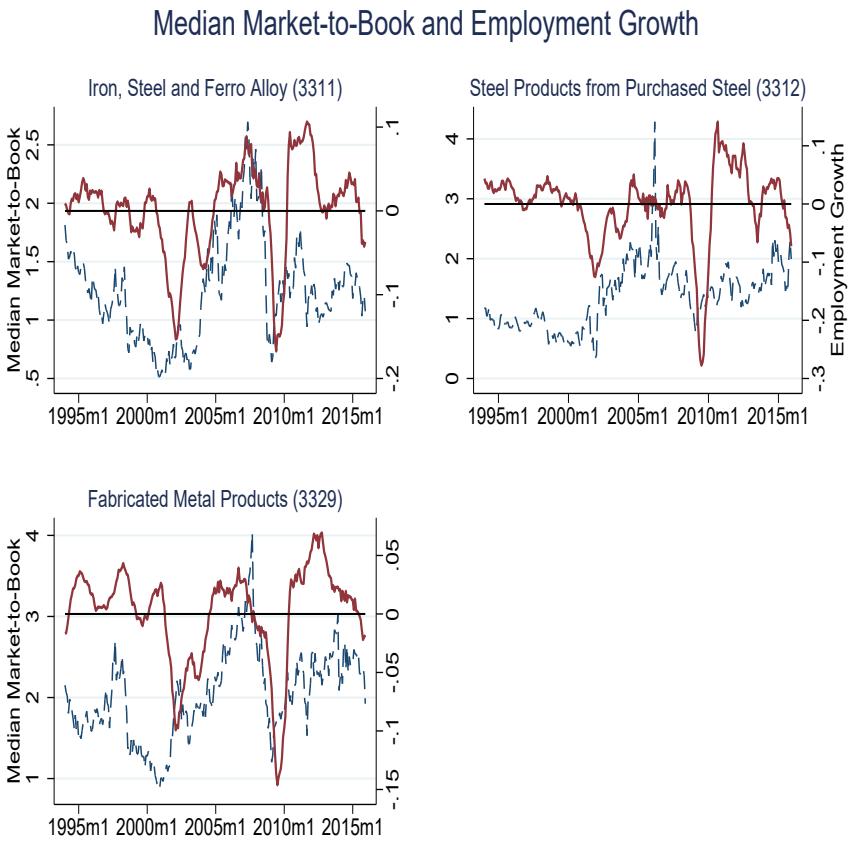

Figure A.2: Market-to-book ratio in selected NAICS-4 industries (dashed line) and employment growth (continuos line).

match by company name. In industry 3311, about 20% of firms are also TTB petitioners in our sample period. We use those firms to compute the petitioner-specific median market-to-book ratio, $MBP_{3311,t}$. Figure A.4 plots $MBP_{3311,t}$ against the market-to-book ratio for the whole industry, $MB_{3311,t}$. The figure shows a very high correlation (approximately equal to 0.95).

B First-Stage Regression

Figure A.5 plots the predicted values implied by the fractional-response model against the data for the industries appearing in Table 1 that are not plotted in the main text.

C Additional Outcome Variables

Here we present the response of additional outcome variables following TTB shocks.

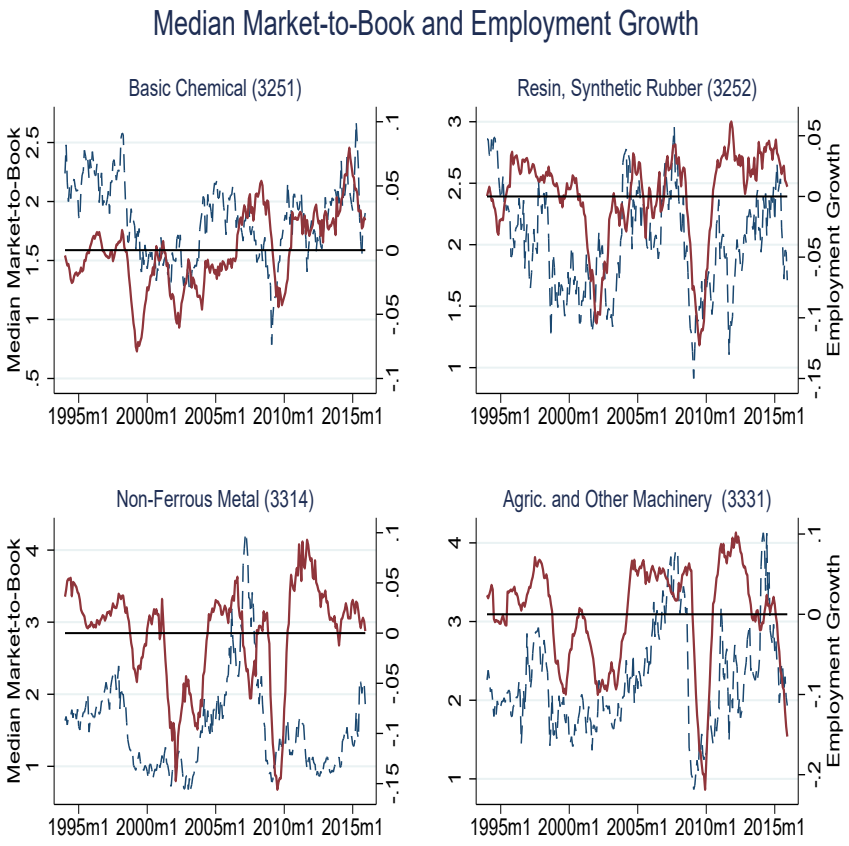

Figure A.3: Market-to-book ratio in selected NAICS-4 industries (dashed line) and employment growth (continuos line).

Bilateral Imports

We first investigate the response of bilateral, industry imports following TTBs. We construct a dummy variable, d_{ict}, that takes value one when industry-i in country c faces new U.S. TTBs in month t. We then construct a dummy variable, $\tilde{d}_{ict}$, that is equal to one if country c does not face new TTBs in industry i while the U.S. imposes TTBs against other countries in the same month and industry. For example, suppose that in January 2000, the U.S. imposes new TTBs in the industry 3311 against Brazil. In this case, $d_{3311,Brazil,2000:1} = 1$ and $\tilde{d}_{3311,Brazil,2000:1} = 0$. At the same time, $d_{3311,China,2000:1} = 0$ and $\tilde{d}_{3311,China,2000:1} = 1$. The use of d_{ict} and $\tilde{d}_{ict}$ avoids endogeneity concerns associated with the baseline measure used in the paper—τ_{it} already uses (lagged) imports data.

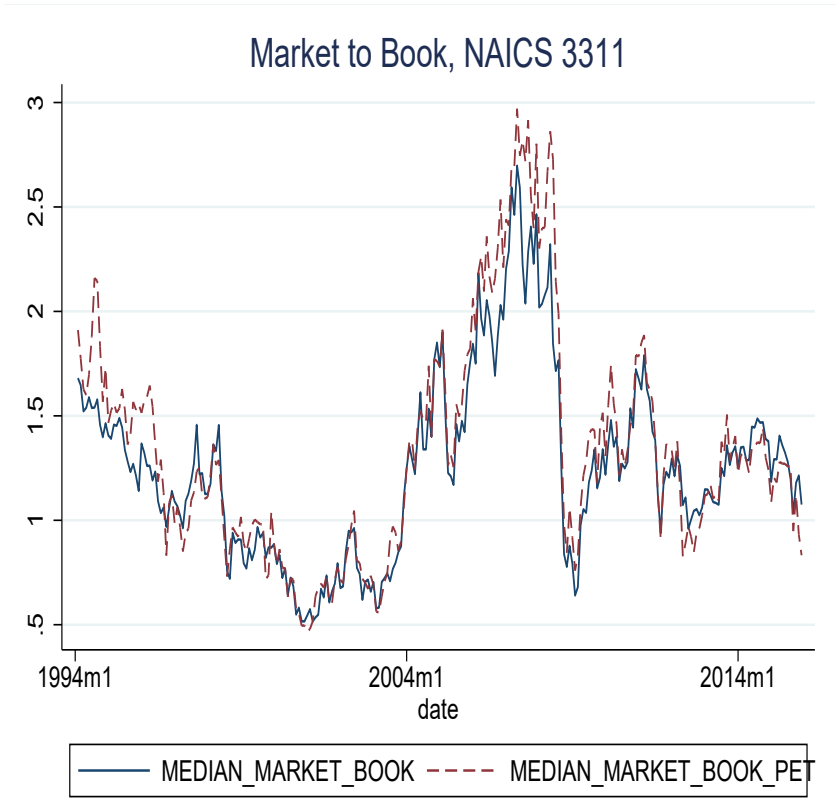

Figure A.4: Market-to-book ratio: median for the industry 3312 (continuous line) and median for TTB petitioners in industry 3312 (dashed line).

We then estimate the following set of h-steps ahead local projections:

$$\begin{aligned}\Delta IMP_{ict+h} = \nu_{ih} + \nu_{ch} + \beta_h d_{ict} + \tilde{\beta}_h \tilde{d}_{ict} + \sum_{s=1}^{p_{IMP}} \phi_{sh} \Delta IMP_{ict-s} \\ + \sum_{s=1}^{p_L} \varsigma_{sh} \Delta L_{it-s} + \sum_{s=1}^{p_{L^{DI}}} \varsigma_{sh}^{DI} \Delta L_{it-s}^{DI} \\ + \sum_{s=1}^{p_{MB}} \varphi_{sh} MB_{it-s} + \sum_{s=1}^{p_{MB^{DI}}} \varphi_{sh}^{DI} MB_{it-s}^{DI} + \psi_{t+h} + \epsilon_{ict+h},\end{aligned}$$

where $\Delta IMP_{ict} \equiv \log IMP_{ict} - \log IMP_{ict-1}$ is the log-difference of bilateral U.S. imports in industry i from country c, ν_{ih} is an industry fixed effect, ν_{ch} is a country fixed effect, and ψ_{t+h} is a time fixed effect. The coefficient β_h measures the response of imports subject to TTBs h periods after the shock. The coefficient $\tilde{\beta}_h$ measures the response of imports not subject to TTBs in the same industry.

We control for the lagged log-difference of bilateral imports, lags of the employment log-

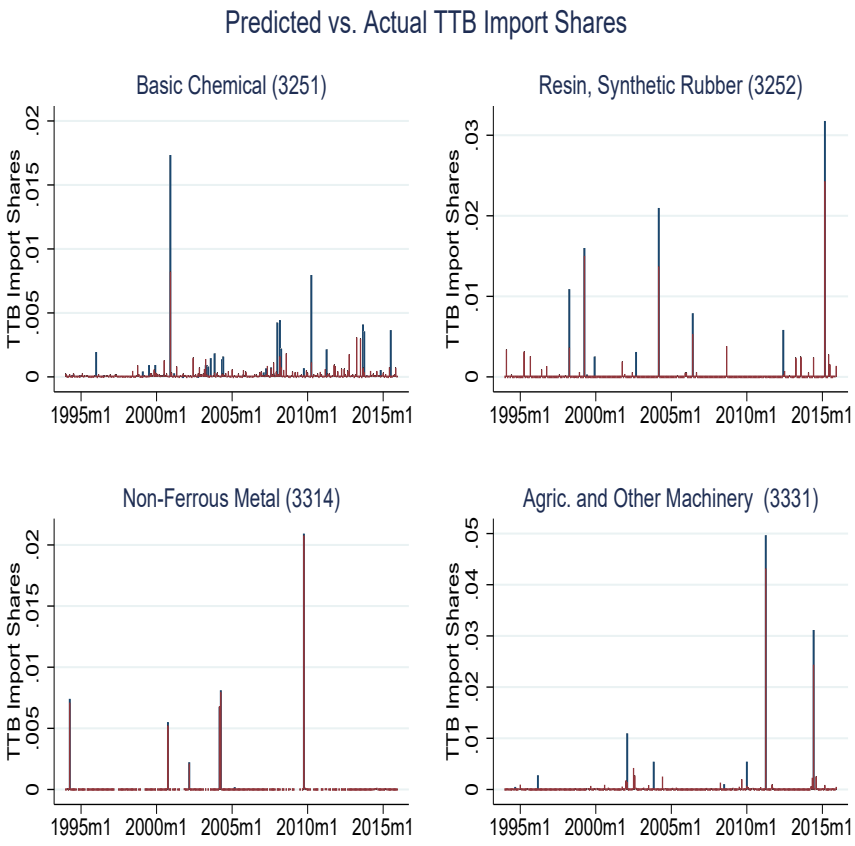

Figure A.5: Share of imports subject to new TTB investigations in selected NAICS-4 industries (light histograms) and predicted values from the fractional-response model (dark histograms).

difference ($\Delta L_{it} \equiv \log L_{it} - \log L_{it-1}$), lags of the industry market-to-book ratio (MB_{it}), and their downstream counterparts (ΔL_{it}^{DI} and MB_{it}^{DI}). We do so since variation in d_{ict} and $\tilde{d}_{ict}$ may partly reflect an endogenous response to past or expected industry dynamics. We include twelve lags for the growth rate of employment and three lags for ΔIMP_{ict}, ΔL_{it}^{DI}, MB_{it}, and MB_{it}^{DI}.

Figure A.6 shows a statistically significant decline in bilateral imports subject to U.S. TTBs. In addition, bilateral imports increase when considering countries that do not face U.S. protectionism. These results provide additional support to the main results of the paper. In addition, they suggest that U.S. TTBs trigger some imports substitution, contributing to explain the absence of positive employment effect in protected industries.

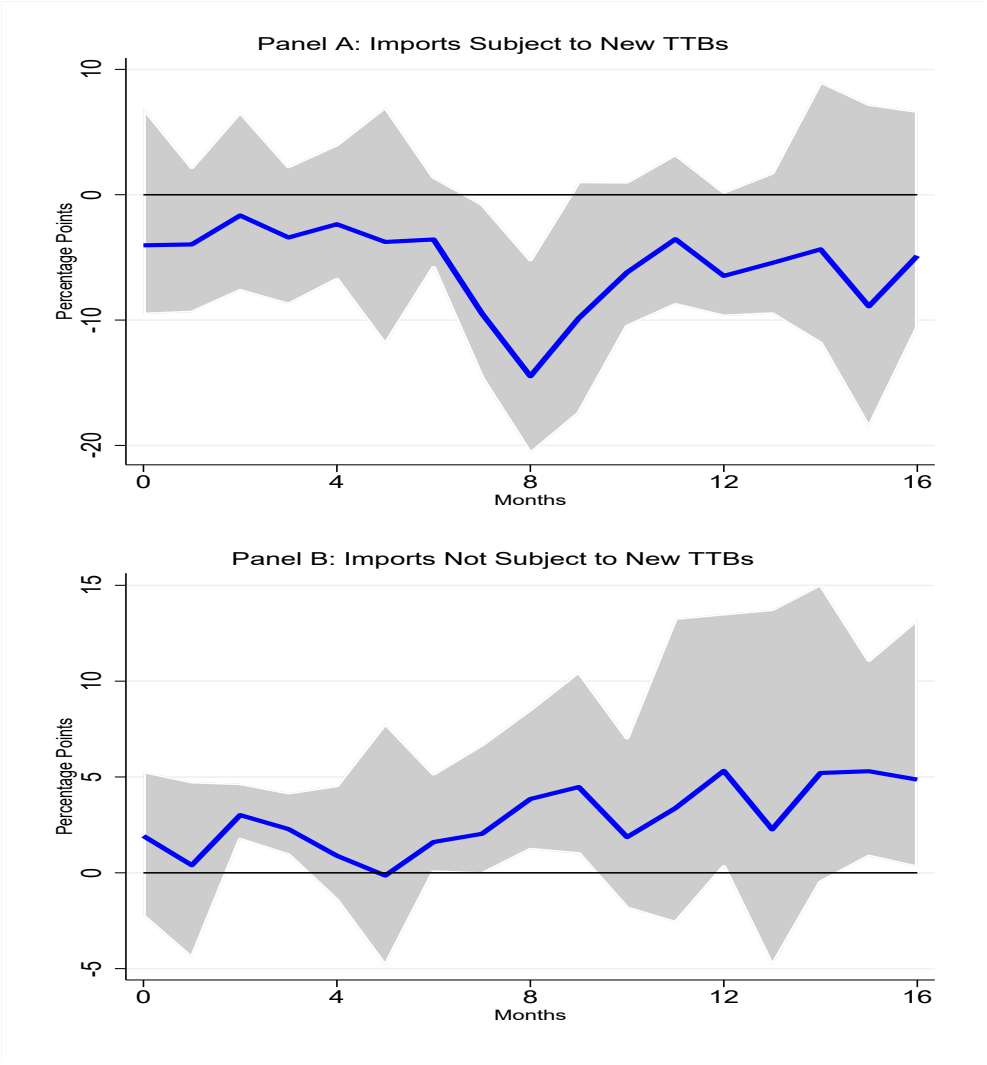

Figure A.6: Impulse responses following a U.S. protectionism shock, average bilateral U.S. imports response. *Panel A*: Bilateral imports in industries subject to new TTBs. *Panel B*: Bilateral imports in industries not subject to new TTBs when other countries face TTBs in the same industry.

Custom Unit Values

We also investigate the response of custom unit values (which exclude tariffs), exploring the extent to which foreign producers absorb TTB tariffs. The U.S. Census provides data only at the HS 10-digit level. As a result, we must aggregate unit values to the NAICS 4-digit level—the most disaggregated level at which it is possible to identify TTB shocks. We use HS 10-digit product shares over the whole sample and apply the conversion table constructed by Pierce and Schott (2009). Figure A.7 plots unit values dynamics in the eight NAICS 4-digit upstream industries

considered in the analysis. We then estimate the following panel local projection for $h = 0, .., H$:

$$\Delta UV_{it+h} = \nu_{ih} + \chi_h \hat{\varepsilon}_{it} + \sum_{s=1}^{p} \phi_{sh} \Delta UV_{it-s} + \psi_{t+h} + \epsilon_{it+h},$$

where ΔUV_{it+h} denotes the log-change in unit values between time t and $t+h$, ν_{ih} is an industry fixed effect, and ψ_{t+h} is a time fixed effect. We include three lags of ΔUV_{it} to control for TTB variation potentially correlated to past unit-value dynamics. The coefficient χ_h measures the response of unit values h periods after the shock. Figure A.8 shows the effect of TTBs on unit values is not statistically significantly different from zero. This finding is consistent with recent evidence that documents full tariff pass-through (Cavallo, Gopinath, Neiman, and Tang, 2021). However, we warrant caution in interpreting the evidence in Figure A.8 as conclusive. The reason is that aggregating HS 10-digit unit values unavoidably introduces noise in the measure (unit values are not summable quantities like imports). As a result, unit values' response at the NAICS 4-digit level may not be tightly estimated.

Profits in Downstream Industries

We construct quarterly industry-level profits using Compustat data. We consider the difference between net sales and the cost of goods sold. We obtain quarterly TTB shocks by aggregating monthly TTB shocks.

We estimate the following set of h-steps ahead predictive panel regressions, for $h = 0, .., H$:

$$\Delta \pi_{it+h} = \nu_{ih} + \gamma_h \hat{\varepsilon}_{it}^{IO} + \psi_{t+h} + \epsilon_{it+h},$$

where $\Delta \pi_{it+h} \equiv \log \pi_{it+h} - \log \pi_{it-1}$ denotes the cumulative profit difference between time t and $t+h$, ν_{ih} is an industry fixed effect, ψ_{t+h} is a time fixed effect, $\hat{\varepsilon}_{it}^{IO}$ is the upstream TTB shock, and ϵ_{it+h} is the prediction error term.

Figure A.9 below shows a statistically significant decline in downstream profits following an increase in upstream TTBs, consistent with the results of the paper.

Prices in Upstream Industries

We estimate the following set of h-steps ahead predictive panel regressions, for $h = 0, .., H$:

$$\Delta P_{it+h} = \nu_{ih} + \gamma_h \hat{\varepsilon}_{it} + \psi_{t+h} + \epsilon_{it+h},$$

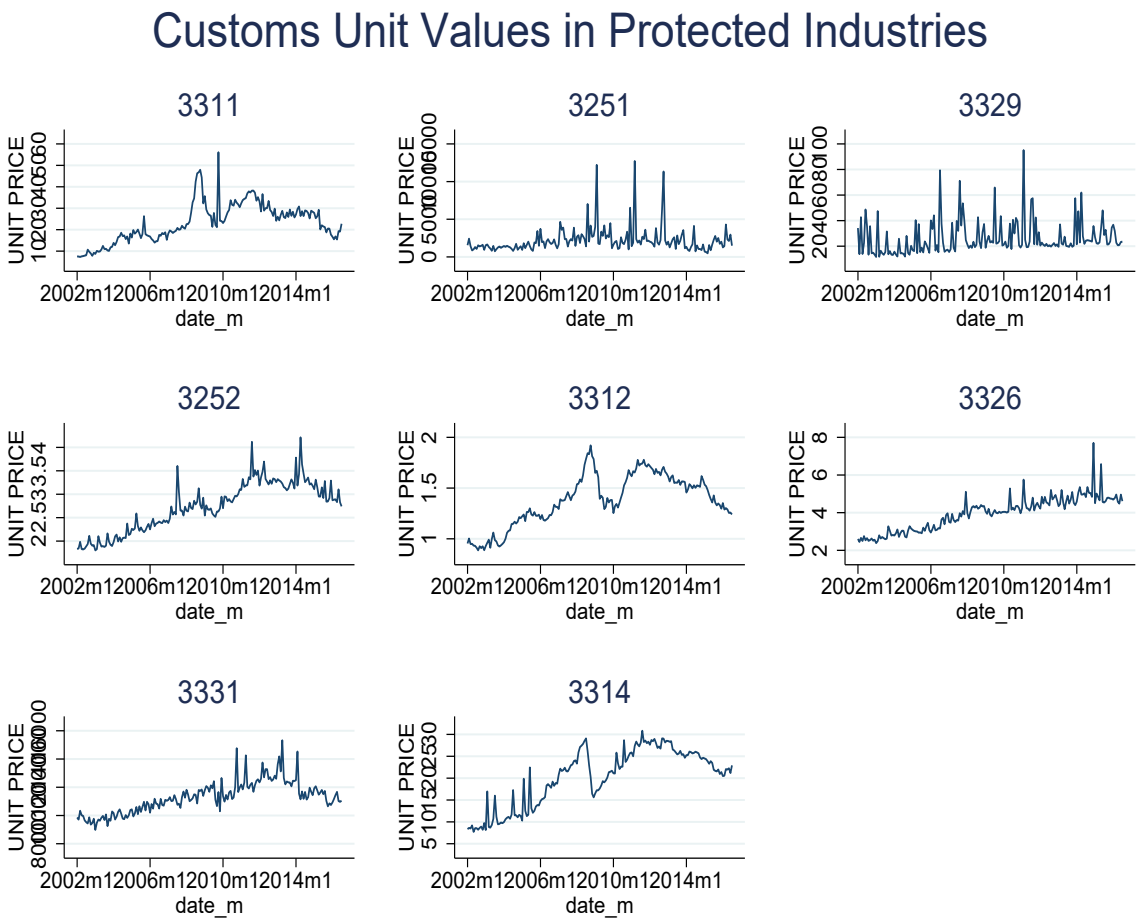

Figure A.7: Import unit values in upstream NAICS 4-digit industries.

where $\Delta P_{it+h} \equiv \log P_{it+h} - \log P_{it-1}$ denotes the cumulative producer price difference between time t and $t+h$ in industry i; $\hat{\varepsilon}_{it}$ denotes the trade-policy shock for the same industry; ν_{ih} is an industry fixed effect; ψ_{t+h} is a time fixed effect; and ϵ_{it+h} is the prediction error term.

As in the paper, we consider a uniform 1 percentage-point increase in the share of imports subject to TTBs. Figure A.10 shows that the peak in upstream producer prices precedes the peak of the price increase in downstream industries. This finding provides additional evidence to the loss of competitiveness triggered by upstream protectionism.

D Tariff-Equivalent

Figure A.11 plots the total sectoral imports share subject to TTB tariffs in each month. Figure A.12 plots the corresponding tariff series. In the industry that uses TTBs more intensively ("Iron,

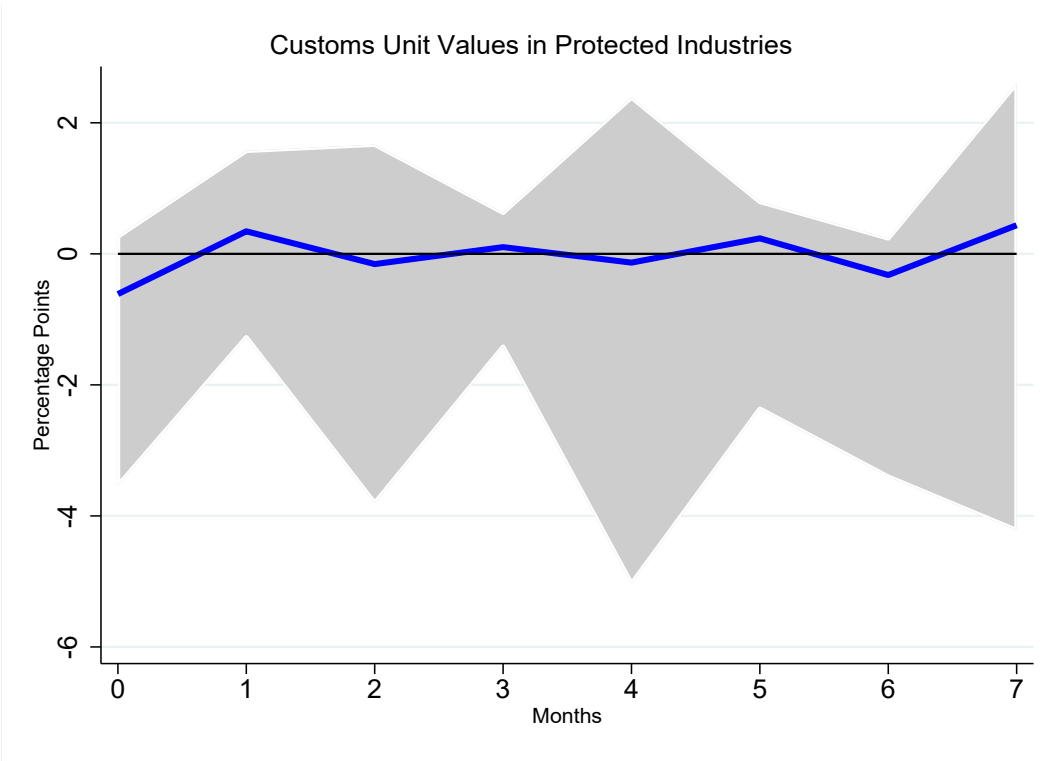

Figure A.8: Impulse responses following a U.S. protectionism shock, import unit-values response.

Steel, and Ferro-Alloy," industry 3311), the uniform-tariff equivalent reaches up to 22%. The series displays substantial persistence in all industries, reflecting that TTB tariffs remain in place for several years (ten on average). The tariff increase can be as high as 50%.

E Abnormal Returns

We first calculate "normal" (i.e., expected) returns using the standard "market model." Motivated by the CAPM, the model imposes the market portfolio return R_d^m as the only systematic factor affecting firms' returns:

$$R_{id} = \alpha_i + \beta_i R_d^m + \varepsilon_{id},$$

where the median return for industry i and the market portfolio return, R_{id} and R_d^m, are expressed as excess returns with respect to the risk-free rate, i.e., the one-month T-bill. The estimated "normal" return at date d is $\hat{\alpha}_i + \hat{\beta}_i R_d^m$, which yields the standard estimate for abnormal returns:

$$R_{id}^A \equiv R_{id} - \left(\hat{\alpha}_i + \hat{\beta}_i R_d^m\right).$$

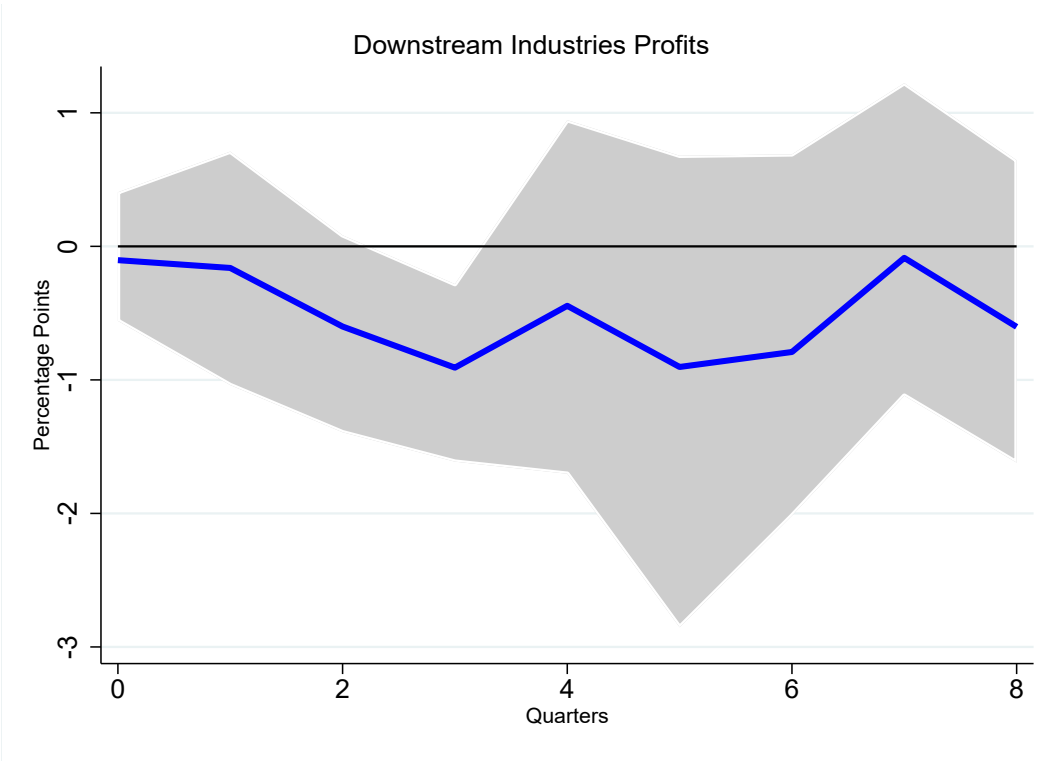

Figure A.9: Impulse responses following a U.S. protectionism shock, profits in downstream industries.

We then estimate the following panel local projection:

$$\Delta R^A_{id+h} = \nu_{ih} + \gamma^{IO}_h \hat{\varepsilon}^{IO}_{id} + \epsilon_{id+h},$$

where $\Delta R^A_{id+h} \equiv R^A_{id+h} - R^A_{id}$. Figure A.13 shows the results are very similar to Panel C in Figure 6.

F Aggregate Effects

Figure A.14 plots impulse responses for the log-difference of aggregate employment.

G Additional Aensitivity Analysis

Additional Controls in the First-Stage Regression

As discussed in Section 3, we consider four additional industry-level controls in the first-stage regression: the growth rate of hourly earnings, imports, sales, and industry-specific commodity prices.

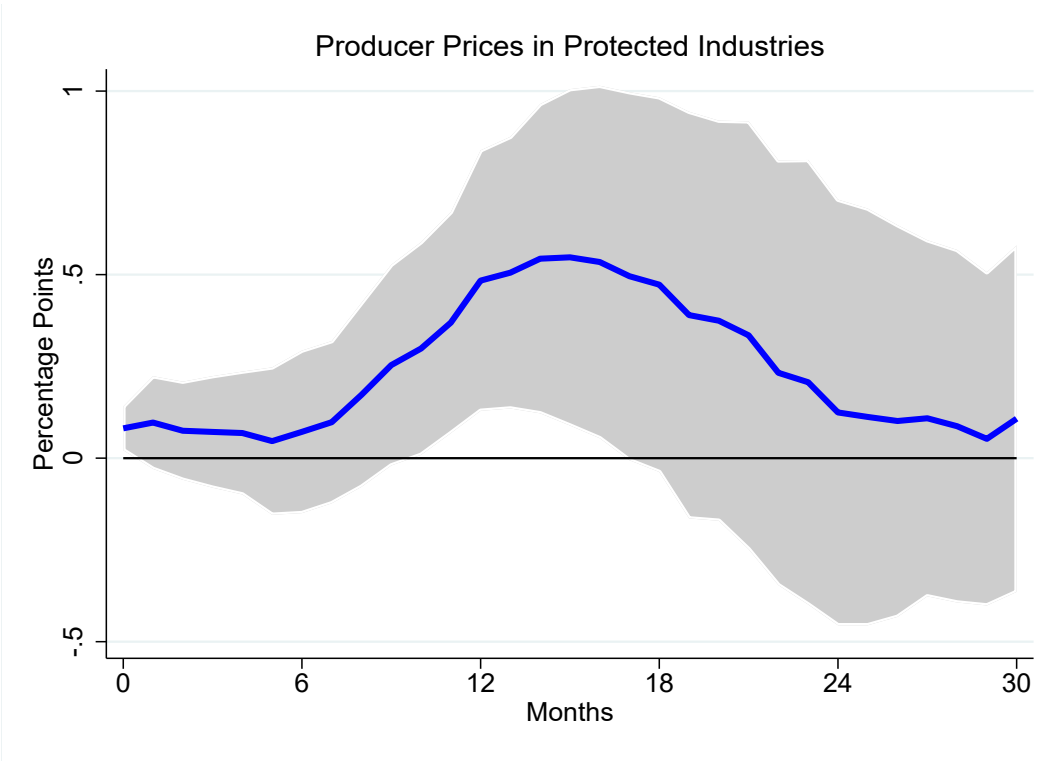

Figure A.10: Impulse responses following a U.S. protectionism shock, prices in upstream industries.

For the NAICS codes 3311, 3312, 3314, and 3326, hourly earnings are not available. For these industries, we use NAICS 3-digit data. When including imports, we construct the trade-policy measure τ_{it} using average import shares over the entire sample (rather than using previous-year import shares, as in the baseline specification). In this case, we compute:

$$\tau_{it} \equiv \sum_k \sum_j \bar{\omega}_{ij}^k \mathcal{I}_{ijt}^k,$$

where $\bar{\omega}_{ij}^k$ denotes the bilateral sectoral import share over the entire sample for each product under investigation.

Concerning sales, we use quarterly data from Compustat (net sales), aggregating firm-level data within each NAICS code. Finally, for commodity prices, we consider lags of aggregate and industry-specific series. Aggregate series include the oil price and a global price index of all commodities. In addition, for the commodity-producing industries appearing in Table 1—industries 3331, 3312, 3329, 3252, and 3314—we also control for lags of their commodity price growth rate.

Figure 7 shows the results are not affected by the inclusion of hourly earnings (Panel A), imports (Panel B), net sales (Panel C), and commodity prices (Panel D).

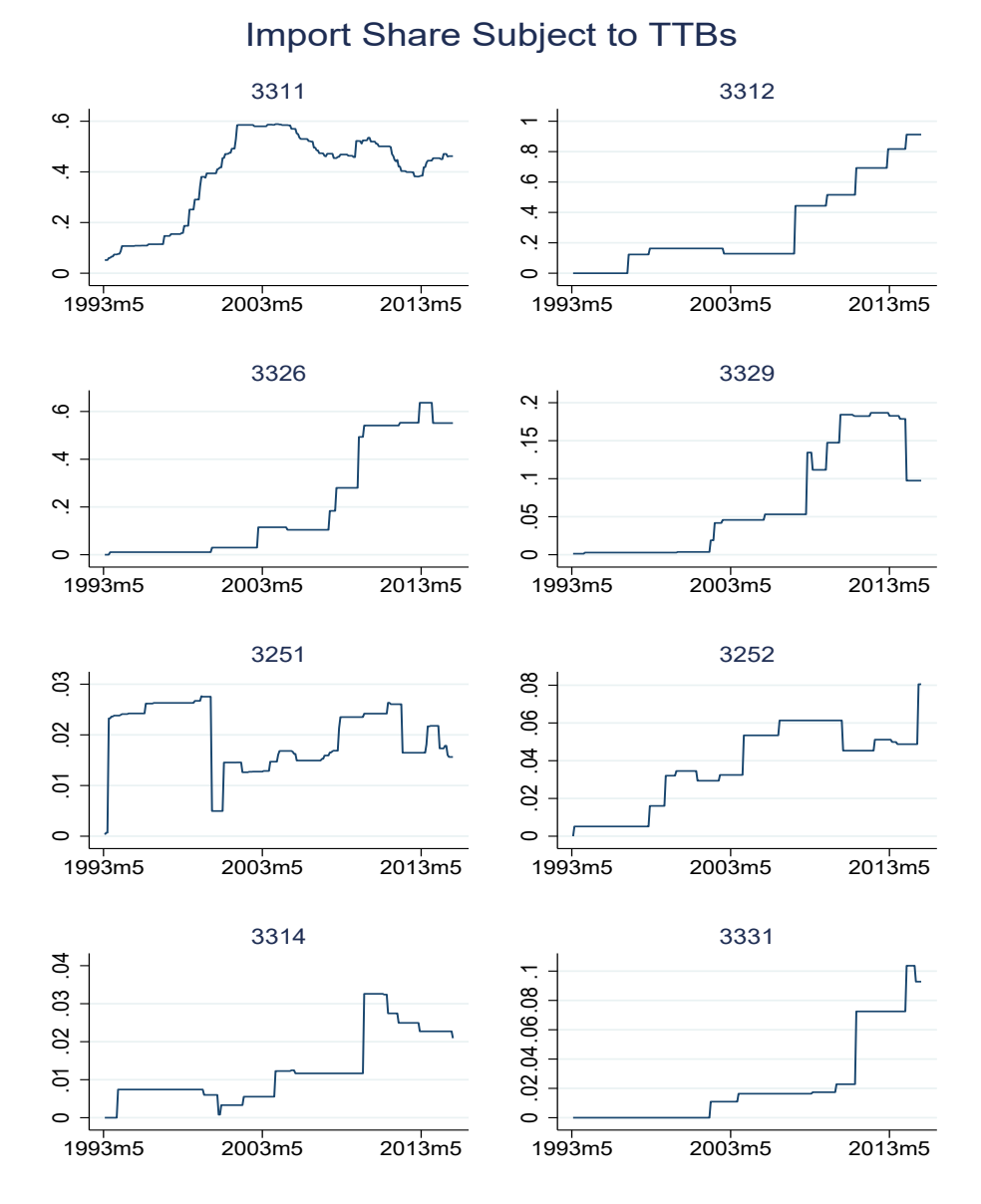

Figure A.11: Share of imports subject to TTBs.

Alternative Measures of Protectionism

Tariffs

We consider an alternative protectionism measure that uses variation in the TTB uniform-tariff equivalent, τ_{it}^U. As discussed in Section 4 and Appendix D, τ_{it}^U corresponds to a tariff rate that if applied to all sectoral imports, would result in a tariff revenue equivalent to that generated by the stock of products subject to TTB tariffs. When $\Delta\tau_{it}^U \equiv \tau_{it}^U - \tau_{it-1}^U > 0$, new TTBs are imposed within the month. As a result, we use $\Delta\tau_{it}^U$ as an alternative measure of industry protectionism.

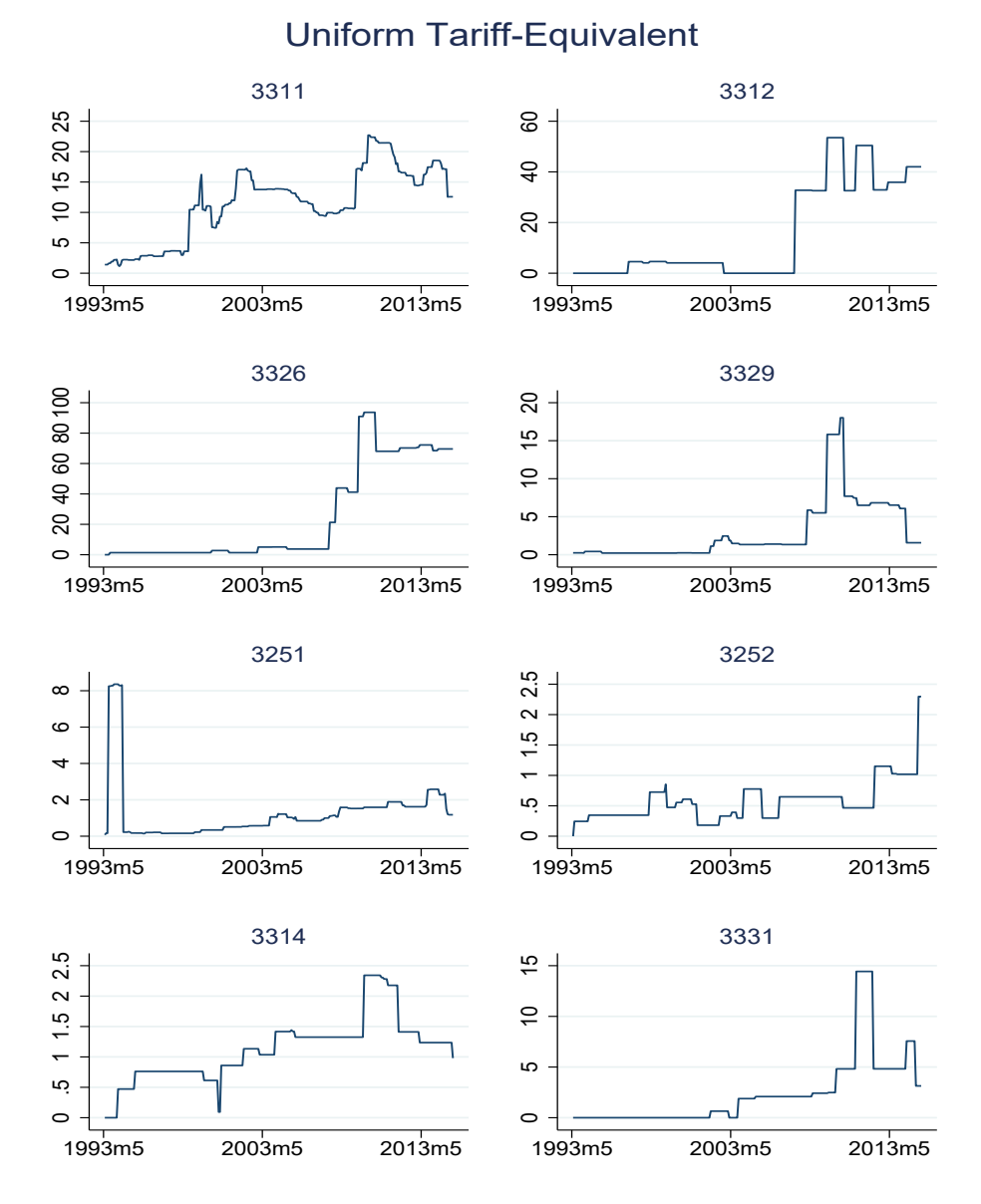

Figure A.12: TTB-implied uniform tariff equivalent.

Panel A in Figure A.16 plots the employment response in protected industries (left panel) and downstream industries (right panel) following a uniform 1% increase in the average uniform tariff in the eight upstream industries. The magnitude of the shock matches the shock we consider for the baseline measure in the paper. Overall, the results remain similar to the baseline specification.

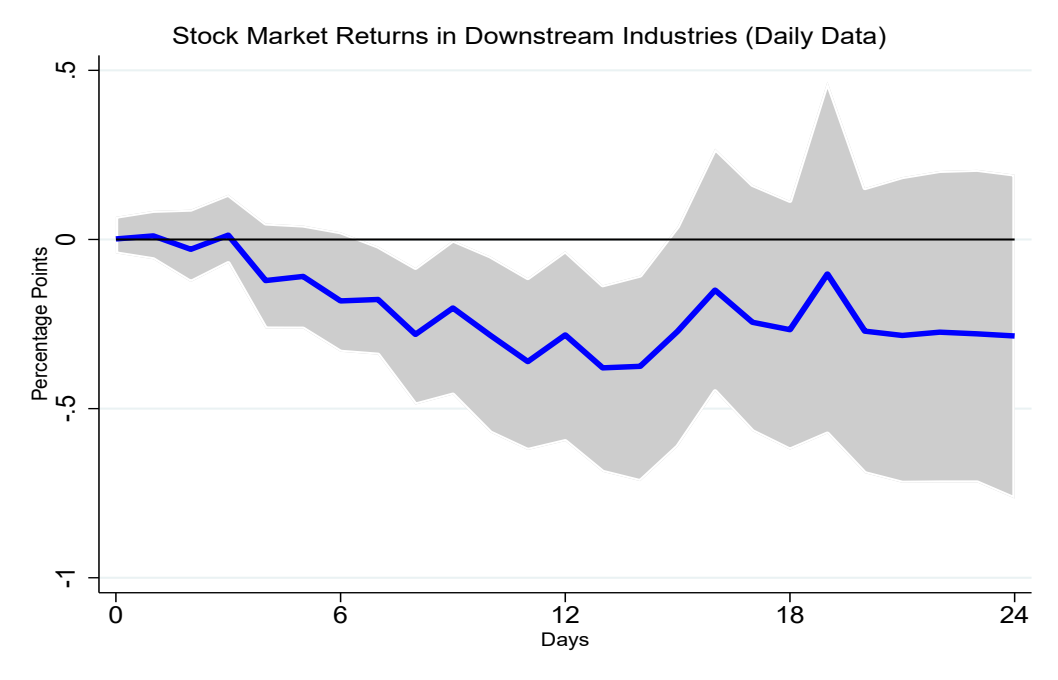

Figure A.13: Impulse responses following a U.S. protectionism shock, median cumulative downstream stock-market abnormal return (days).

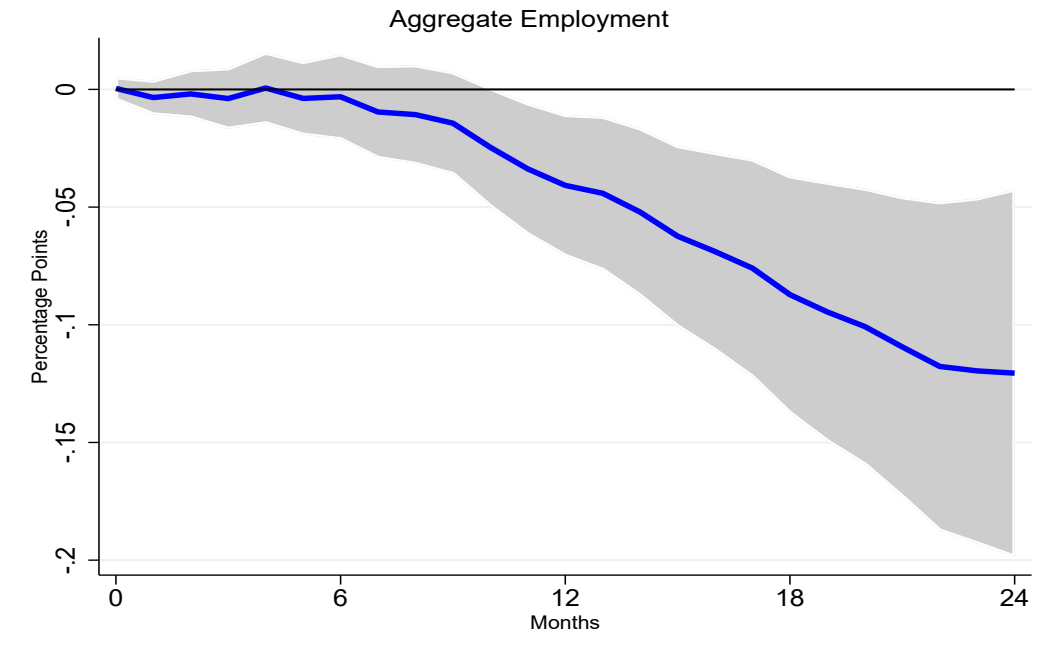

Figure A.14: Impulse responses following an aggregate TTB shock.

Exposure to Upstream Protectionism

We consider an alternative measure of upstream protectionism, using sectoral weights that consider upstream industries' average openness—measured by their imports over sectoral output. In this

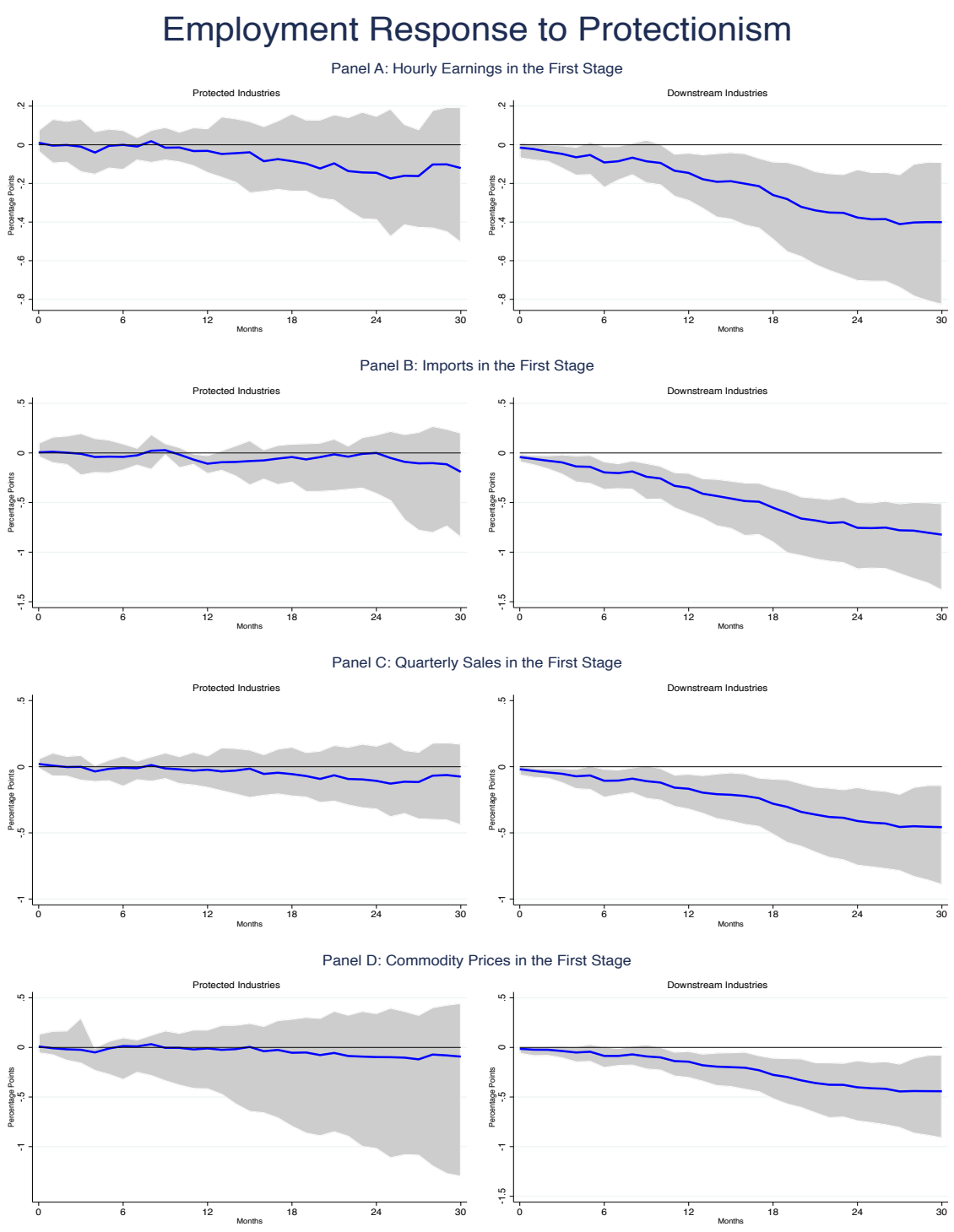

Figure A.15: Impulse responses following a protectionism shock. *Panel A*: First-stage regression includes hourly earnings. *Panel B*: First-stage regression includes imports. *Panel C*: First-stage regression includes sales. *Panel D*: First-stage regression includes commodity prices.

case, the upstream shock is

$$\hat{\varepsilon}_{it}^{IO} \equiv \sum_{j \neq i} \theta_{ij} \tilde{s}_j \hat{\varepsilon}_{jt},$$

where $\tilde{s}_j$ is the average share of imports relative to output. Also in this case, we consider a uniform 1-percentage-point increase in upstream protectionism. Panel B in Figure A.16 shows that the results remain similar to the benchmark specification.

Global Safeguards

In the baseline specification, we exclude global safeguards from TTBs. Panel C in Figure A.16 shows that, qualitatively, the results are not affected by their inclusion. Quantitatively, magnitudes are somewhat smaller, driven by a large outlier in the "Iron, Steel, and Ferro-Alloy."

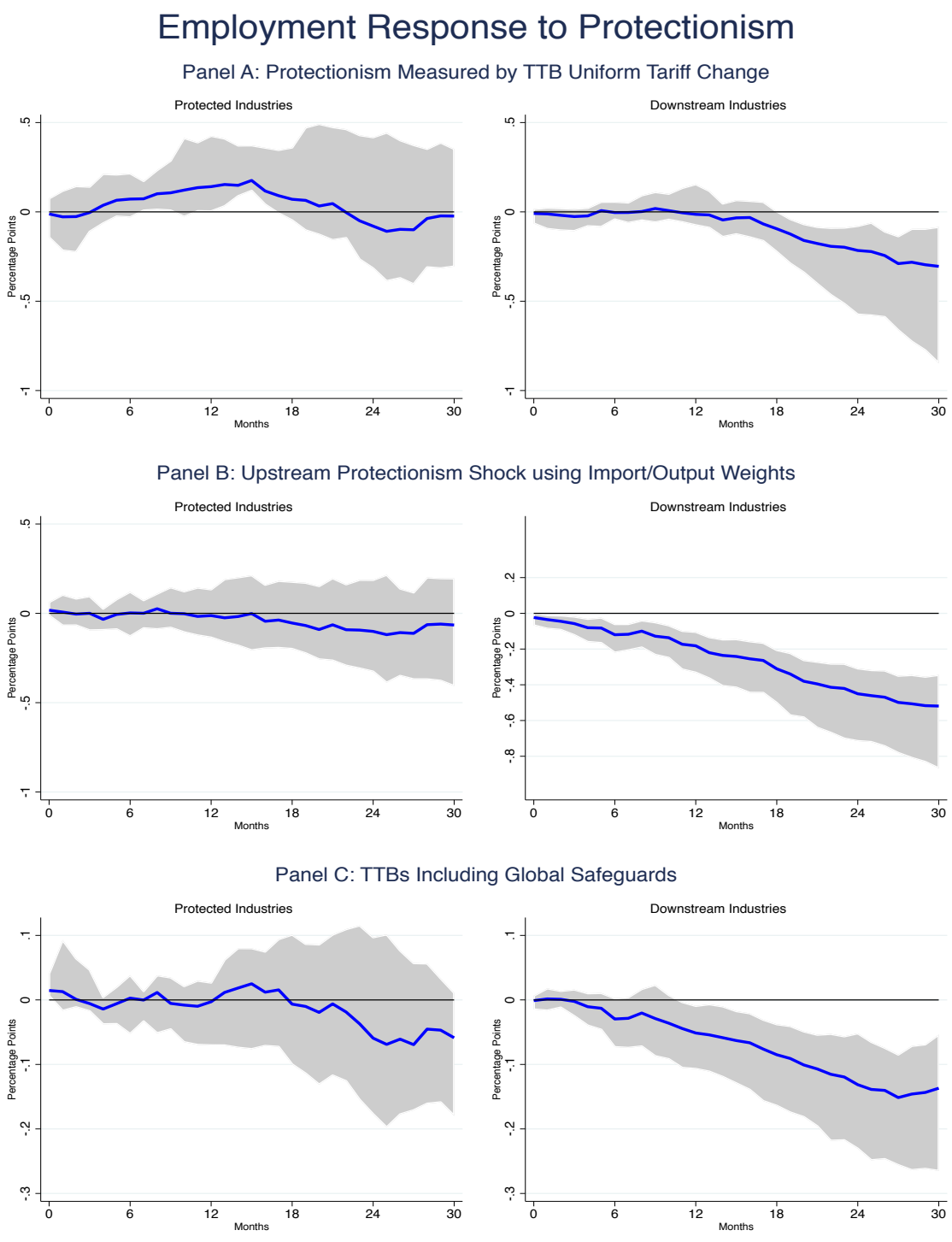

Figure A.16: Impulse responses following a protectionism shock. *Panel A*: τ_{it} measures TTB uniform tariff changes. *Panel B*: τ_{it} constructed using average shares of imports over output. *Panel C*: TTBs include global safeguards.