

Emerging Economies, Trade Policy, and Macroeconomic Shocks

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This version: March 2014

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Emerging Economies and Trade Agreements

Why do countries sign trade agreements that restrict their use of import tariffs?

- Terms of trade
 - Theory: Bagwell and Staiger (1990, 1999, 2002)
 - Evidence: Broda, Limão, and Weinstein (2008), Bagwell and Staiger (2011), Bown and Crowley (2013), Ludema and Mayda (2013)
- Commitment
 - Theory: Staiger and Tabellini (1987) , Maggi and Rodriguez-Clare (1998, 2007)
 - Evidence : Tang and Wei (2009) on growth and investment; Subramanian and Wei (2007) on trade flows
 - Very little evidence on trade policy

Overview

1. Do **macroeconomic shocks** determine emerging economy changes to time-varying trade policy?
2. What role does the **WTO** and **WTO tariff commitments** play in the use of time-varying import protection?

The Evolution of Trade Policy under the GATT/WTO System

- **Emerging Economies** since the 1980s...
 - If weren't already party to GATT; they joined the WTO
 - They liberalized by reducing “tariffs” through many routes: *unilateral* liberalization, *preferential* trade agreements, *WTO accession* terms, etc
 - Legally “bound” some of those applied MFN tariffs at the WTO
 - **Established** new domestic institutional infrastructure for how to apply **new** import protection in (potentially) WTO-consistent ways
 - Policy instruments collectively referred to as **temporary trade barriers (TTBs)**: **antidumping (AD)**, **countervailing duties (CVDs)**, and **safeguards**
 - **Result by mid-2000s...**
 - Relatively low applied MFN import tariffs, though with legal scope to raise them (scope is heterogeneous across countries)
 - Time-varying trade policy increases frequently arise through use of **TTBs**

Approach and Results

We examine 13 major emerging economies over 1989-2010:

- *Argentina, Brazil, China, Colombia, India, Indonesia, Malaysia, Mexico, Peru, Philippines, South Africa, Thailand, and Turkey*
- *Collectively by 2010, 21 percent of world merchandise imports and 22 percent of world GDP*

We find that trade policy implemented through TTBs in emerging economies is *generally* **counter-cyclical**

Counter-cyclical import protection is associated with the WTO era.

Temporary trade barriers (TTBs) arise from...

- Weak domestic GDP growth - A one s.d. decrease led to a 32% increase in TTBs.
- Weak foreign GDP growth - A one s.d. decline led to a 16% increase in TTBs.

Approach and Results

A real **appreciation** of the domestic currency leads to more TTBs

- A one s.d. increase leads to a 18% increase in TTBs

TTBs tend to increase when **more** imported products come under **WTO tariff discipline**

- An increase in the number of products under strict WTO disciplines - A one s.d. increase in the percent of products with applied tariff rates at the WTO maximum binding tariff rate led to a 18% increase in TTBs.

TTBs do **not** appear to be related to these aggregate level economic shocks **prior to** the WTO for these emerging economies

Why does this matter?

- **Optimal design of trade agreements:**
 - Theoretical models of trade agreements (Bagwell and Staiger, 1990) suggest that the sustainability of a self-enforcing trade agreement depends on flexibility over tariffs in response to import volume shocks.
 - Cross-industry empirical evidence from the US (Bown and Crowley, 2013, *AER*) finds that the US utilizes this flexibility.
 - It is important to understand what types of shocks drive use of contingent tariffs in emerging economies so that we can design appropriate trade agreements.

Outline

1. Literature review
2. Trade policy institutions and facts for emerging economies
3. The empirical model and data
4. Results
5. Conclusion

1. Literature Review:

Empirical Studies of trade-policy determination

- Political economy models
Trefler (1993), Goldberg and Maggi (1999), Gawande and Bandyopadhyay (2000)
- Terms-of-trade and trade agreement models
Broda, Limao and Weinstein (2008), Bagwell and Staiger (2011), Bown and Crowley (2013), Ludema and Mayda (2013)
- Macroeconomic determinants of time-varying trade barriers
Feinberg (1989), Knetter and Prusa (2003), Crowley (2011), Bown and Crowley (2013)

Theoretical models of temporary protection

Trade Agreements Models

- Bagwell and Staiger (AER 1990)
- Bagwell and Staiger (BEPress 2003)

Literature: Time-varying Trade Barriers

Knetter and Prusa (2003)

- Four high-income countries – US, EC, Australia, Canada
- Antidumping policy only, coarse measure of policy changes
- Annual data for 1980-1998

Bown and Crowley (2013)

- Five high-income economies – US, EU, Australia, Canada, South Korea
- All temporary trade barriers (TTBs), not only antidumping
- More detailed measures of trade policy changes (at the trading partner, product level)
- Quarterly data for 1988:Q1-2010:Q4

Literature: Counter-cyclical tariffs

Rose (2012): e.g., from his website “The line: barriers to trade like tariffs and quotas don't change much over the business cycle.”

- Large sample of high-income, middle-income and low-income economies.
- Univariate regression of a measure of domestic GDP growth on different multilateral trade policy measures.

Critique:

- **Policy instruments**: It is important to look at time-varying trade policy **instruments** like **TTBs** and not just tariffs and quotas (the policy instruments that the GATT/WTO system has sought to take “off the table”)
- **Channels**: It is important to look at **bilateral relationships** through which these shocks might affect policy, especially since TTB import protection is frequently imposed bilaterally (unlike more general MFN tariffs)
- **Measurement**: It is important how you measure **changes in trade policy**, even when focusing on the relevant policy instruments like antidumping

2. Trade policy institutions and facts for emerging economies

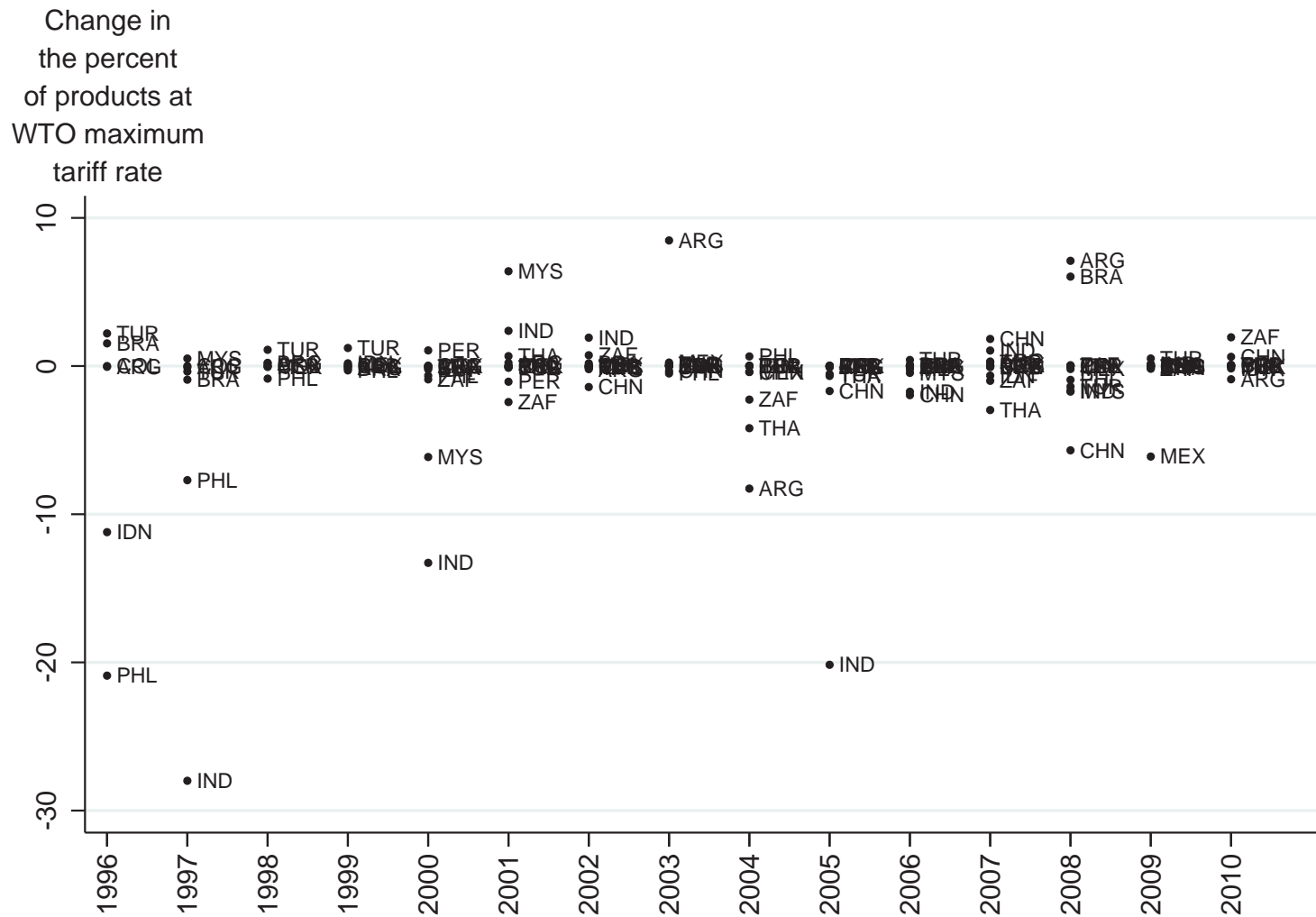
Table 1. Temporary Trade Barriers and WTO Disciplines Over Tariffs

Economy	MFN tariff binding coverage (1)	Average bound MFN tariff rate (2)	Average applied MFN tariff rate in 1995* (3)	Average applied MFN tariff rate in 2010 (4)	TTB import product coverage in 1995 (5)	TTB import product coverage in 2010 (6)
<i>Emerging economy G20 members in sample</i>						
Argentina	100.0	31.9	12.1	12.5	1.3	3.3
Brazil	100.0	31.4	13.0	13.7	0.4	1.6
China	100.0	10.0	15.9	9.6	0.0	1.4
India	73.8	49.4	14.5	12.4	0.2	6.6
Indonesia	95.8	37.2	15.3	6.7	0.0	0.6
Mexico	100.0	35.0	13.1	8.9	24.1	1.2
South Africa	96.6	19.2	14.2	7.6	0.4	0.6
Turkey	50.4	28.5	9.4	9.9	0.7	6.9
<i>Emerging economy non-G20 members in sample</i>						
Colombia	100.0	42.9	13.7	12.5	0.1	0.8
Malaysia	84.3	14.6	8.1	7.0	0.0	0.1
Peru	100.0	30.1	16.5	5.4	0.2	2.5
Philippines	67.0	25.7	20.3	6.3	0.0	0.2
Thailand	75.0	25.7	23.1	9.7	0.0	0.5
<i>Industrialized economies as comparison</i>						
United States	100.0	3.6	5.2	3.6	3.3	5.7
European Union	100.0	4.2	6.0	4.2	3.4	2.9

Table 1. Temporary Trade Barriers and WTO Disciplines Over Tariffs (cont)

Economy	Year of first TTB in our estimation (7)	Share of products with imposed TTBs under WTO discipline, 1995-2010 (8)	Share of products with new TTB imposed under WTO discipline, 1995-2010 (9)	Share of products with no new TTB imposed under WTO discipline, 1995-2010 (10)
Emerging economy G20 members in sample				
Argentina	1989	18.3	20.2	15.3
Brazil	1989	39.4	27.3	17.6
China	1997	76.8	67.9	67.3
India	1992	55.4	49.4	30.1
Indonesia	1996	12.0	12.7	8.4
Mexico	1989	3.8	9.0	8.1
South Africa	1992	77.4	78.1	63.0
Turkey	1989	3.7	4.4	25.6
Emerging economy non-G20 members in sample				
Colombia	1991	0.0	0.0	0.3
Malaysia	1996	24.9	32.7	69.1
Peru	1992	27.0	37.1	12.9
Philippines	1994	11.1	10.0	19.1
Thailand	1996	0.0	32.6	27.9

Figure 1. Changes to WTO Disciplines over Emerging Economy Applied Tariffs, 1996-2010



Empirical model

Estimate counts of HS-06 products subject to new TTBs

- Panel data: Importing country j , trading partner i , in year t (1989-2010)
- **Negative binomial regression model**:
 - Estimate using maximum likelihood
 - With bilateral, importing country-trading partner fixed effects
 - Identification
 - Inter-temporal variation in domestic real GDP growth and changes in products under WTO discipline
 - Inter-temporal and cross-sectional variation in bilateral real exchange rates, foreign GDP growth and bilateral import growth
 - Report Incidence Rate Ratios (IRRs)

Data

Dependent variable (defined at year t):

- Count of 6-digit Harmonized System (HS) products subject to new TTB investigations per trading partner per year

Explanatory variables (defined at year $t-1$):

- Percent change in the bilateral real exchange rate (ij)
- Domestic real GDP growth (j)
- Foreign real GDP growth (i)
- Bilateral import growth (ij)
- Change in the share of products for which the MFN applied tariff rate is equal to the WTO maximum tariff rate (i)
- Indicators to interact explanatory variables with GATT (1989-1994) vs. WTO (1995-2008) years

4. Results

Table 3. Negative Binomial Model Estimates of Determinants of Import Protection, 1995-2010

Explanatory Variables	Baseline specification (1)
Percent change in bilateral real exchange rate $ijt-1$	1.01 ^b (2.30)
Domestic real GDP growth $jt-1$	0.94 ^a (3.56)
Domestic unemployment rate change $jt-1$	--
Real GDP growth of trading partner $jt-1$	0.97 ^c (1.86)
Bilateral import growth from trading partner $ijt-1$	1.00 (0.95)
Time trend	1.02 (1.62)
Importer-exporter combined indicators	yes
Separate importer and exporter indicators	no
Observations	2373

Interpretation

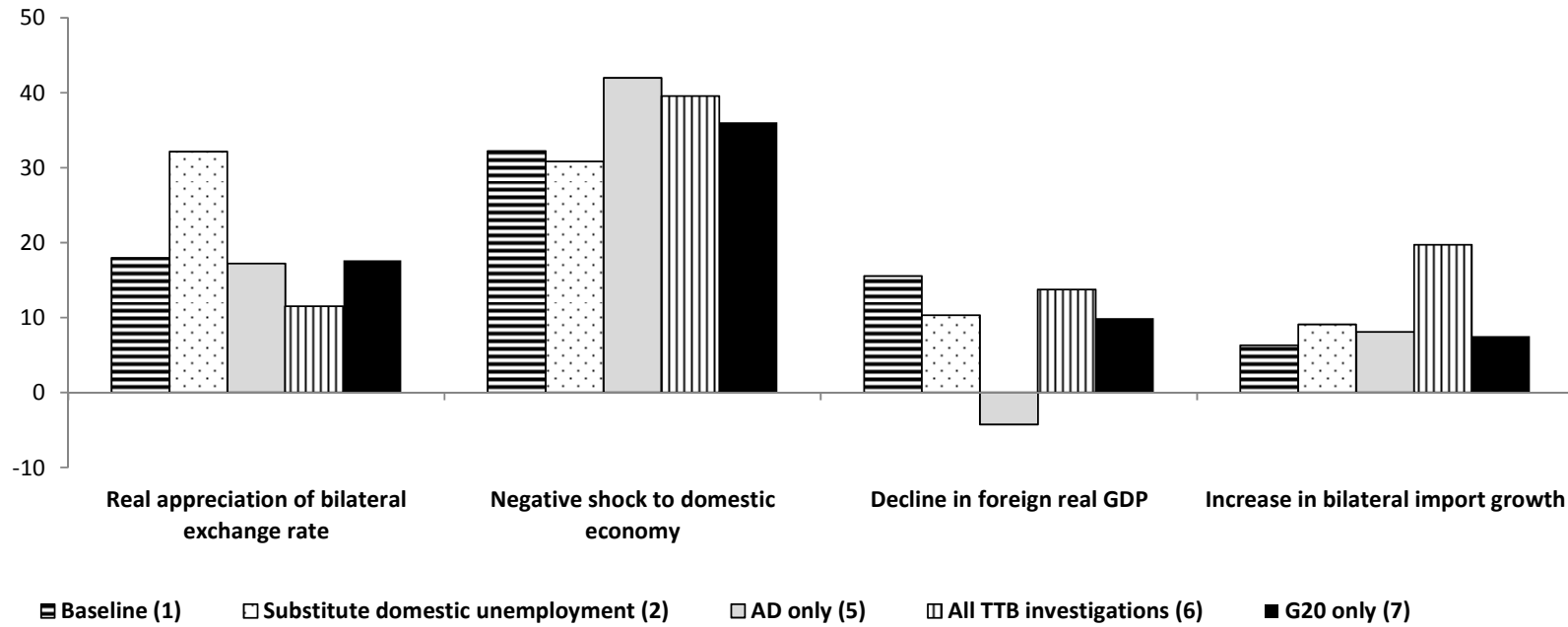
- We report **Incidence Rate Ratios (IRRs)** and ***t*-statistics** (in parentheses)
- IRR estimate **> 1** is **positive effect**
- IRR estimate **< 1** is **negative effect**

Table 3. Negative Binomial Model Estimates of Determinants of Import Protection, 1995-2010

Dependent variable: Bilateral (<i>ij</i>) count of products initiated under all temporary trade barrier (TTB) policies in year <i>t</i> that result in import protection							
Explanatory Variables	Baseline specification	Substitute domestic un-employment	Modify country indicators	Drop import growth	Redefine dependent variable to AD only	Redefine dependent variable to all TTB investigations	G20 emerging economies only
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Percent change in bilateral real exchange rate <i>ijt-1</i>	1.01 ^b (2.30)	1.01 ^b (2.10)	1.01 ^b (2.04)	1.01 ^b (2.25)	1.01 ^b (2.30)	1.01 ^c (1.69)	1.01 ^b (2.00)
Domestic real GDP growth <i>jt-1</i>	0.94 ^a (3.56)	--	0.96 ^b (2.35)	0.94 ^a (3.60)	0.92 ^a (4.26)	0.93 ^a (4.37)	0.93 ^a (3.56)
Domestic unemployment rate change <i>jt-1</i>	--	1.20 ^a (2.85)	--	--	--	--	--
Real GDP growth of trading partner <i>it-1</i>	0.97 ^c (1.86)	0.98 (0.65)	0.97 ^c (1.79)	0.96 ^c (1.94)	1.01 (0.54)	0.97 ^c (1.86)	0.98 (1.19)
Bilateral import growth from trading partner <i>ijt-1</i>	1.00 (0.95)	1.15 (0.57)	1.00 (0.22)	--	1.00 (1.21)	1.00 (0.72)	1.00 (0.99)
Time trend	1.02 (1.62)	0.97 (1.04)	1.01 (0.41)	1.02 (1.57)	0.97 ^b (2.09)	1.06 ^a (3.95)	1.03 ^c (1.83)
Indicator that exporter is China*	--	--	9.09 ^a (5.26)	--	--	--	--
Importer-exporter combined fixed effects	yes	yes	no	yes	yes	yes	yes
Separate importer and exporter fixed effects	no	no	yes	no	no	no	no
Observations	2,373	1,393	2,373	2,373	2,373	2,373	1,541

Figure 2: Temporary Trade Barrier Responsiveness to Macroeconomic Shocks, 1995-2010

Percent change in HS-06 products subject to new import protection in response to one s.d. shock



Summary of Table 3 results

Temporary trade barriers (TTBs) arise from...

1. A relatively weak domestic economy
 - A one s.d. decrease (4.3 percentage points) in real GDP growth leads to a 32% increase in TTBs.
2. Real appreciations in bilateral exchange rates
 - A one s.d. increase (18 percent appreciation) leads to a 18% increase in TTBs.
3. Weak GDP growth in a foreign trading partner
 - A one s.d. decrease (4.2 percentage points) leads to a 16% increase in TTBs.
4. Strong bilateral import growth
 - A one s.d. increase (7 percent) leads to a 6% increase in TTBs.

Emerging Economy use of TTB import protection under the WTO

- ***Is it different from how emerging economies used TTB import protection under the GATT?***

Table 4. The Impact of the WTO Agreement on Time-Varying Import Protection, 1989-2010

Dependent variable: Bilateral (*ij*) count of products initiated under all temporary trade barrier (TTB) policies in year *t* that result in import protection

Explanatory variables	Baseline (1)
Percent change in bilateral real exchange rate <i>ijt-1</i> x GATT	0.99 (0.86)
Percent change in bilateral real exchange rate <i>ijt-1</i> x WTO	1.01^a (2.75)
[Test statistic]	[7.99]^a
Domestic economy <i>jt-1</i> x GATT	1.05 (1.11)
Domestic economy <i>jt-1</i> x WTO	0.95^a (2.96)
[Test statistic]	[4.72]^b
Real GDP growth of trading partner <i>it-1</i> x GATT	0.85 ^a (4.12)
Real GDP growth of trading partner <i>it-1</i> x WTO	0.96^b (1.98)
[Test statistic]	[9.99]^a
Import growth from trading partner <i>ijt-1</i> x GATT	0.89 (1.13)
Import growth from trading partner <i>ijt-1</i> x WTO	1.00 (1.04)
[Test statistic]	[1.28]
WTO	1.84^c (1.67)
Time trend included	yes
Import and exporter combined fixed effects	yes
Observations	2,777

Table 4. The Impact of the WTO Agreement on Time-Varying Import Protection

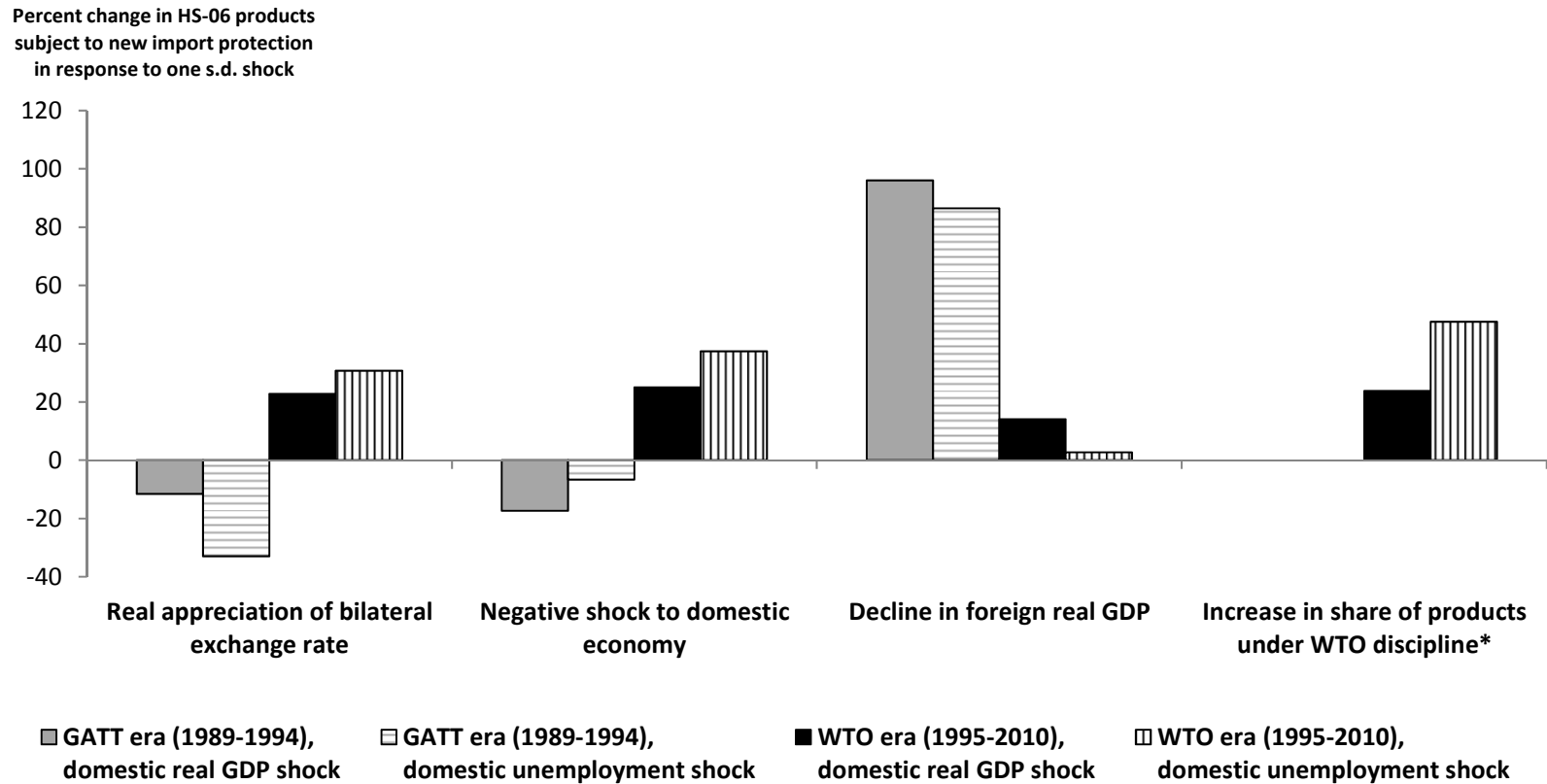
Dependent variable: Bilateral (*ij*) count of products initiated under all temporary trade barrier (TTB) policies in year *t* that result in import protection

Explanatory variables	Baseline (1)	Add tariff variable (2)
Percent change in bilateral real exchange rate <i>ijt-1</i> x GATT	0.99 (0.86)	0.99 (0.83)
Percent change in bilateral real exchange rate <i>ijt-1</i> x WTO	1.01^a (2.75)	1.01^a (2.77)
[Test statistic]	[7.99]^a	[8.01]^a
Domestic economy <i>jt-1</i> x GATT	1.05 (1.11)	1.05 (1.15)
Domestic economy <i>jt-1</i> x WTO	0.95^a (2.96)	0.95^a (2.97)
[Test statistic]	[4.72]^b	[4.88]^b
Real GDP growth of trading partner <i>it-1</i> x GATT	0.85 ^a (4.12)	0.85 ^a (4.09)
Real GDP growth of trading partner <i>it-1</i> x WTO	0.96^b (1.98)	0.97^c (1.70)
[Test statistic]	[9.99]^a	[10.64]^a
Import growth from trading partner <i>ijt-1</i> x GATT	0.89 (1.13)	0.89 (1.11)
Import growth from trading partner <i>ijt-1</i> x WTO	1.00 (1.04)	1.00 (1.02)
[Test statistic]	[1.28]	[1.25]
WTO	1.84^c (1.67)	1.92^c (1.80)
Change in the share of imported products under WTO discipline <i>jt-1</i> x WTO	--	1.04^a (3.24)
Time trend included	yes	yes
Import and exporter combined fixed effects	yes	yes
Observations	2,777	2,777

Table 4. The Impact of the WTO Agreement on Time-Varying Import Protection

Dependent variable: Bilateral (<i>ij</i>) count of products initiated under all temporary trade barrier (TTB) policies in year <i>t</i> that result in import protection						
Explanatory variables	Baseline (1)	Add tariff variable (2)	Change definition of tariff variable (3)	Substitute unemploy- ment rate change (4)	Real GDP on same subsampl e as (4) (5)	G20 only (6)
Percent change in bilateral real exchange rate <i>ijt-1</i> x GATT	0.99 (0.86)	0.99 (0.83)	0.99 (0.84)	0.99 ^c (1.91)	0.99 (1.09)	0.99 (0.45)
Percent change in bilateral real exchange rate <i>ijt-1</i> x WTO	1.01^a (2.75)	1.01^a (2.77)	1.01^a (2.65)	1.01^b (2.06)	1.01^c (1.80)	1.01^b (2.41)
[Test statistic]	[7.99]^a	[8.01]^a	[7.44]^b	[6.57]^a	[4.21]^b	[5.54]^b
Domestic economy <i>jt-1</i> x GATT	1.05 (1.11)	1.05 (1.15)	1.05 (1.14)	0.94 (0.29)	1.15 ^a (2.30)	1.06 (1.47)
Domestic economy <i>jt-1</i> x WTO	0.95^a (2.96)	0.95^a (2.97)	0.95^a (2.83)	1.24^a (3.44)	0.94^b (2.03)	0.95^a (2.59)
[Test statistic]	[4.72]^b	[4.88]^b	[4.62]^b	[1.57]	[8.62]^a	[6.17]^b
Real GDP growth of trading partner <i>it-1</i> x GATT	0.85 ^a (4.12)	0.85 ^a (4.09)	0.85 ^a (4.11)	0.85 ^b (2.54)	0.88 ^c (1.88)	0.85 ^a (4.03)
Real GDP growth of trading partner <i>it-1</i> x WTO	0.96^b (1.98)	0.97^c (1.70)	0.97^c (1.81)	0.99 (0.19)	1.00 (0.07)	0.97 (1.37)
[Test statistic]	[9.99]^a	[10.64]^a	[10.41]^a	[6.00]^b	[3.70]^c	[10.90]^a
Import growth from trading partner <i>ijt-1</i> x GATT	0.89 (1.13)	0.89 (1.11)	0.89 (1.13)	0.81 (1.39)	0.73 (1.57)	0.87 (1.28)
Import growth from trading partner <i>ijt-1</i> x WTO	1.00 (1.04)	1.00 (1.02)	1.00 (1.06)	1.21 (0.79)	1.18 (0.65)	1.00 (1.04)
[Test statistic]	[1.28]	[1.25]	[1.28]	[2.01]	[2.22]	[1.65]
WTO	1.84^c (1.67)	1.92^c (1.80)	1.83^c (1.66)	0.98 (0.03)	3.78^b (2.32)	2.39^b (2.38)
Change in the share of imported products under WTO discipline <i>jt-1</i> x WTO	--	1.04^a (3.24)	1.03^a (2.71)	1.07^a (2.94)	1.06^a (2.61)	1.03 (1.60)
Time trend included	yes	yes	yes	yes	yes	yes
Import and exporter combined fixed effects	yes	yes	yes	yes	yes	yes
Observations	2,777	2,777	2,777	1,633	1,633	1,863

Figure 3: TTB Import Protection and Macroeconomic Shocks during the GATT versus WTO Periods



Conclusions

Temporary trade barriers (TTBs) in emerging economies arise from...

- Weak domestic GDP growth - A one s.d. decrease led to a 32% increase in TTBs.
- Real appreciations in bilateral exchange rates - A one s.d. increase led to a 18% increase.
- Weak foreign GDP growth - A one s.d. decline led to a 6% increase in TTBs.
- Strong bilateral import growth – A one s.d. increase led to a 6% increase.
- An increase in the number of products under strict WTO disciplines - A one s.d. increase in the percent of products with applied tariff rates at the WTO maximum binding tariff rate led to a 24-48% increase in TTBs.

Conclusions

Some evidence that trade policy determination through TTBs under the WTO is “more” counter-cyclical and responsive to macro shocks than under the GATT

- GATT: RXR depreciations and domestic GDP growth led to TTBs
- WTO: RXR appreciations and domestic GDP declines led to TTBs, similar to estimated relationship for high-income economies (Bown and Crowley, 2013 *JIE*)

Channels

- WTO itself
- Role of tariff bindings and trade policy substitution