# An Empirical Analysis of Tariff Binding

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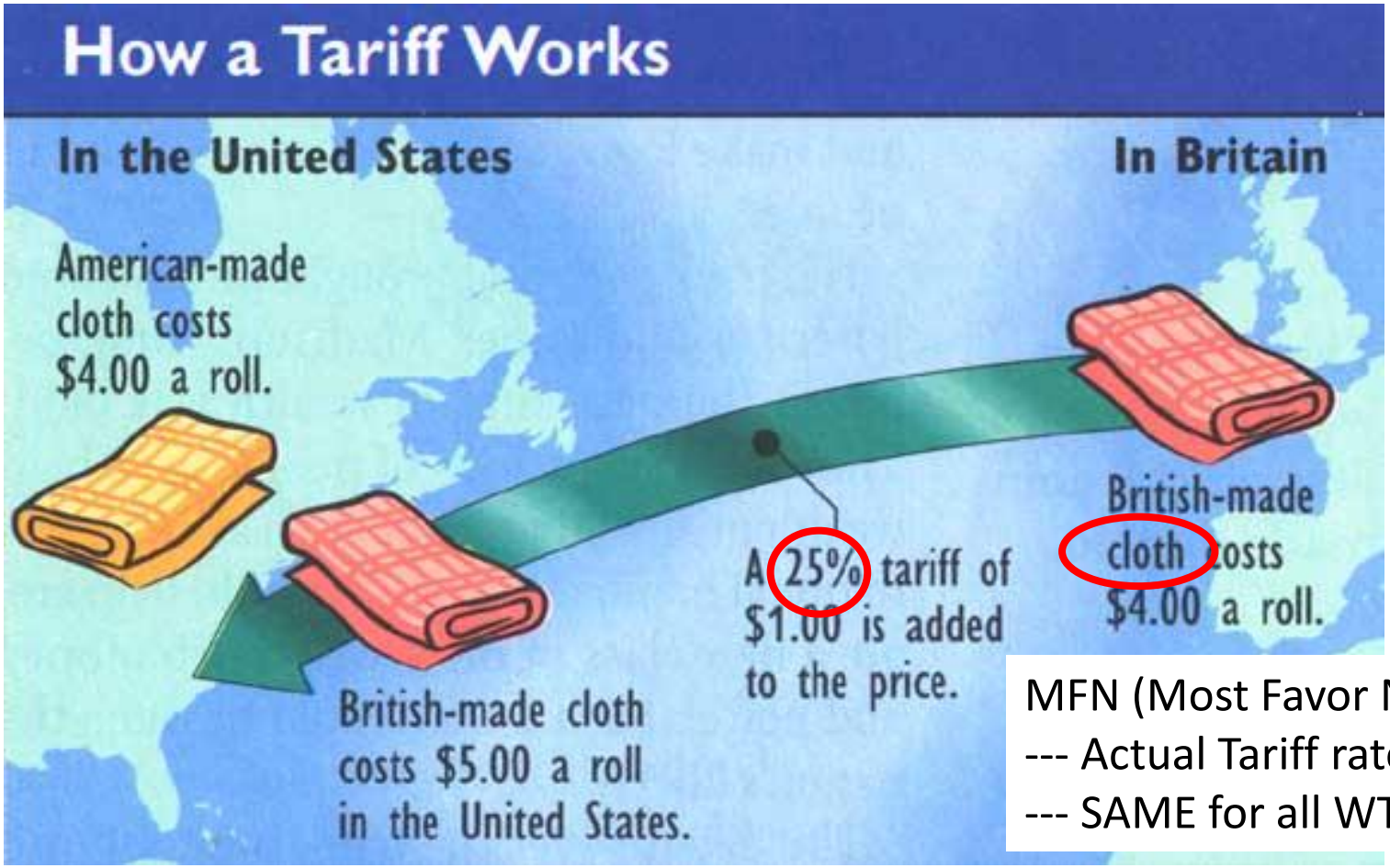
# Background




WTO
(World Trade Organization)

MFN (Most Favor Nation)
--- Actual Tariff rate
--- SAME for all WTO members

**Binding** (or ceiling, or cap) : maximum MFN, negotiated

Overhang , a form of the trade policy flexibility, create policy uncertainty
= Binding – MFN

# Tariffs

## Binding – MFN = Overhang

## Binding differ across sectors and countries

| Country | Sector | Binding | MFN | Overhang |
|---|---|---|---|---|
| Colombia | cotton | 75.8 | 5 | 70.8 |
| | clothing | 40 | 15 | 25 |
| China | cotton | 22 | 15 | 7 |
| | clothing | 16.1 | 16 | 0.1 |

Source: world tariff profiles 2012

# Research Question

- Why does tariff binding vary across sectors and countries?
  - Beshkar, Bond and Rho (2012)
    - Theory: mechanism of setting optimal binding
    - Empiric: within 66 WTO members
  - My paper
    - Based on their methodology
    - Also by selected individual country

# Trade Agreement

## Negotiation for optimal Binding

- Everyone wants overhang, but partners will get hurt
- Government Preferences
  - Consumers, producers, tax revenue
  - Uncertain political pressure
- The WTO maximize joint welfare of all members
  - Binding is designed to
    - prohibit some countries imposing too large tariffs
    - allow some countries to have flexibility

# Model from Beshkar, Bond and Rho (2012)

## Individual country

- Maximize political welfare V by choosing optimal MFN

$$\text{Max} \quad V = CS + \theta\pi + T$$

$$\Rightarrow \qquad \boxed{t^N = \frac{\eta\omega + \theta}{\eta - \theta}} \qquad (MFN)$$

  - $\boldsymbol{\omega}$: inverse export supply elasticity (+) ----market power
  - $\eta$: $\varepsilon * \frac{m}{y}$ (import demand elasticity *import penetration) (-)
  - $\theta$: political pressure (+)
  - $\theta < \eta$, international trade exits

# Model

## WTO rules

- Maximize expected joint welfare W

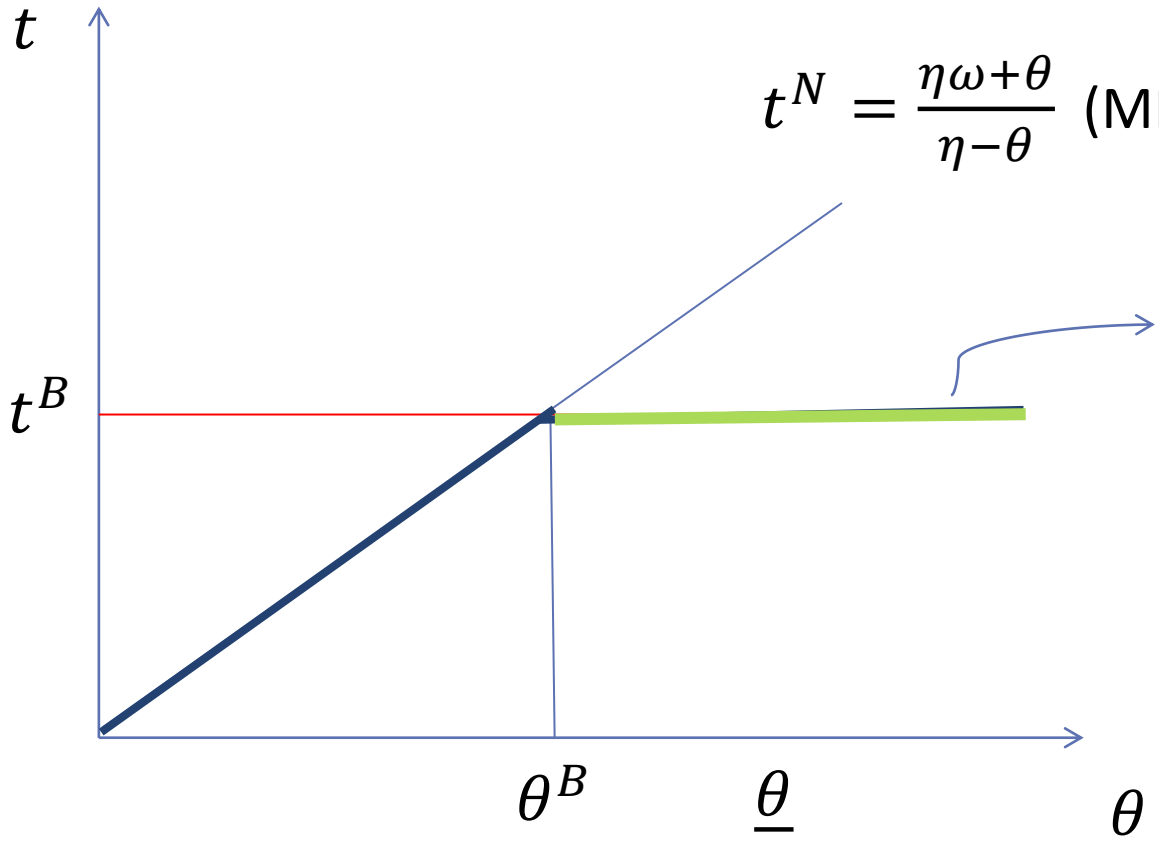
$$\text{Max } E[W] = P(t^N) + P(t^B)$$

$$\Longrightarrow \quad \boxed{t^B = \frac{E[\theta]}{\eta - E[\theta]}} \quad ,\theta > \theta^B$$

  - Political uncertainty : $\theta \in [\underline{\theta},\ \overline{\theta}]$

# Model

## Optimal binding




$$t^N = \frac{\eta\omega+\theta}{\eta-\theta} \text{ (MFN)}$$

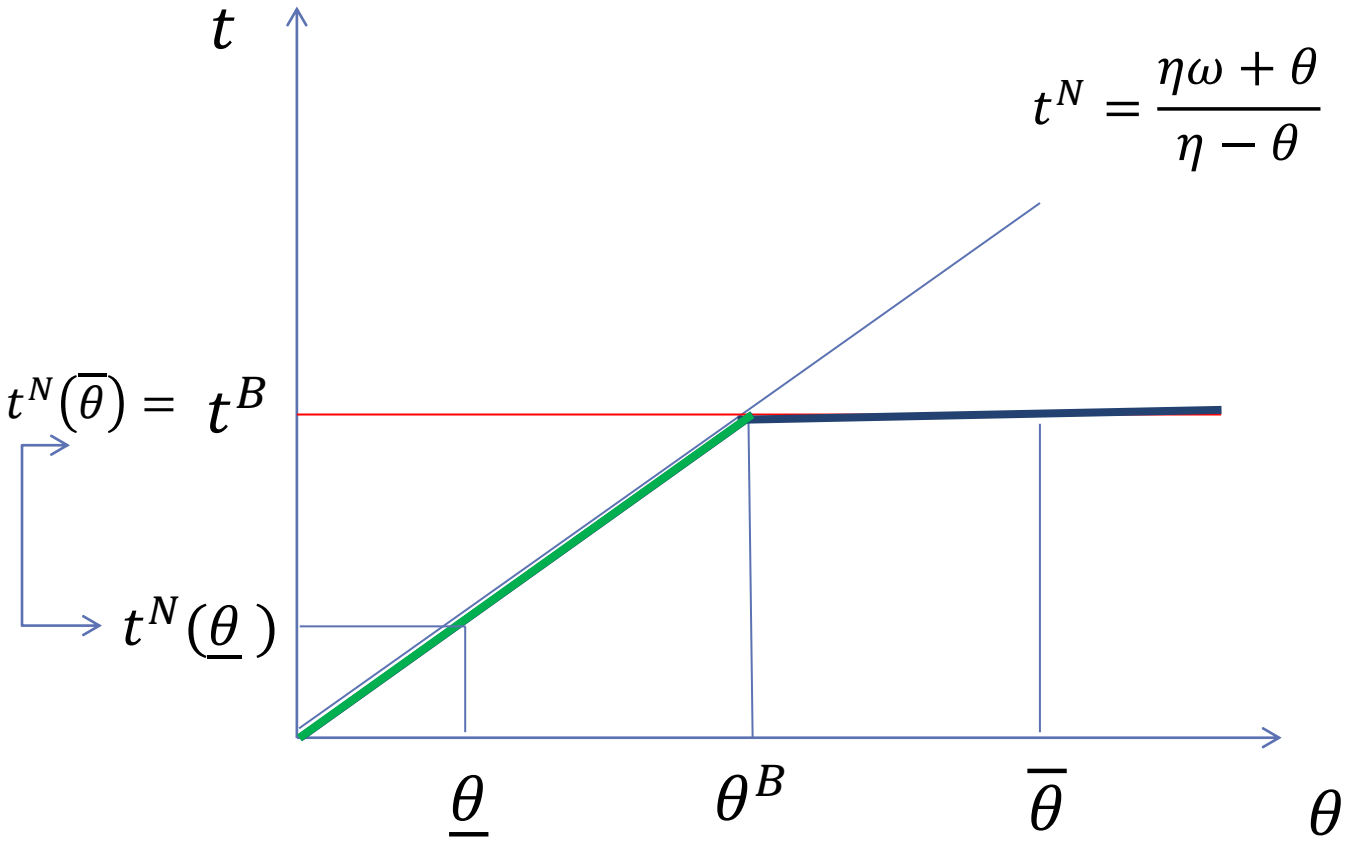
$$t^N > t^B$$

$$\Longrightarrow \omega > \frac{E[\theta]-\underline{\theta}}{\eta-E[\theta]} \text{ and}$$

$$t^B = \frac{E[\theta]}{\eta - E[\theta]}$$

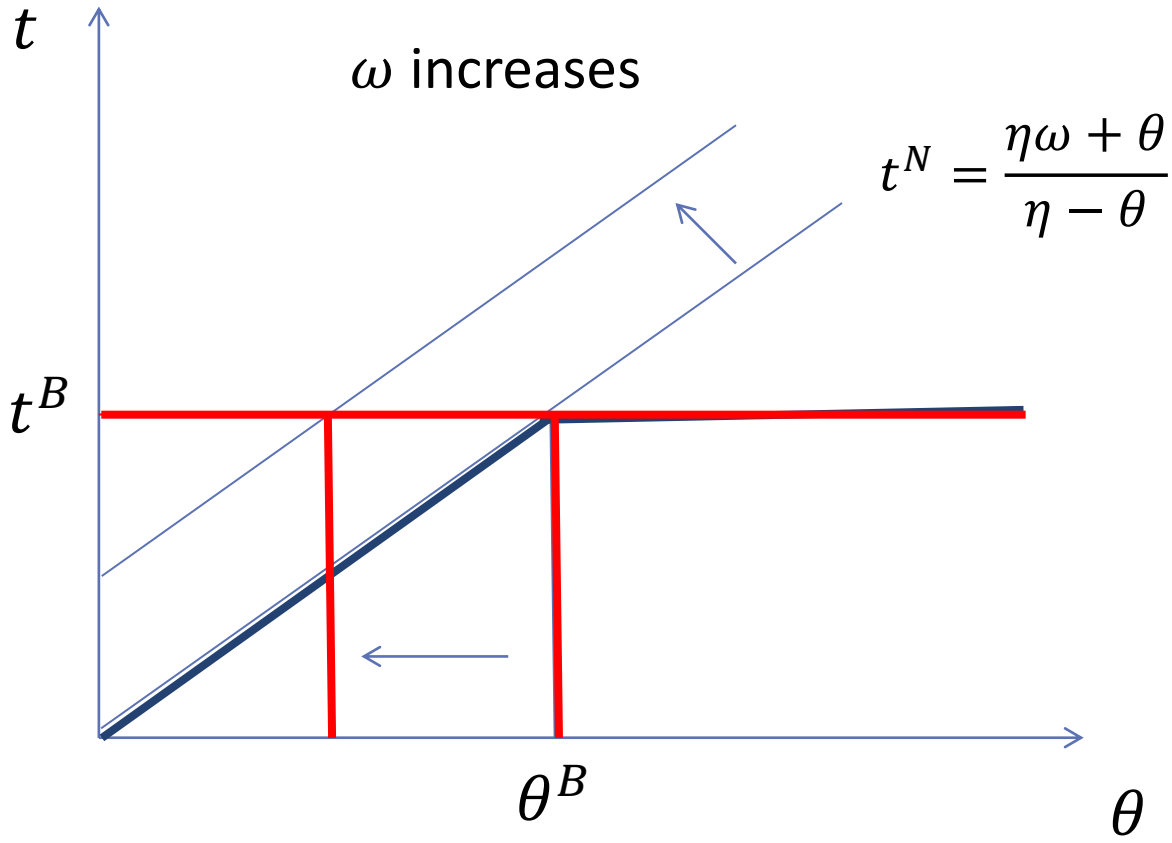
# Model

## Optimal binding



# Model

## How does market power play a role?



# Key variable

## Market power (-)

- $\theta^B \downarrow \quad , E[\theta|\theta > \theta^B] \downarrow$

$$t^B = \frac{E[\theta]}{\eta - E[\theta]} \downarrow$$

- Binding decreases in market power when market power is below a certain level
- Another market power measurement
  - GDP, import share

# Other variables

- Binding increases in political pressure $\theta$
- The effect of $\eta$ $(\varepsilon * \frac{m}{y})$ is not clear
- GDP per capita (-)
  - Similar to market power
  - Big countries are expected to have low binding

# New variable

## Trade-weighted Import Concentration (-)

- $\xi$ = imports * Import concentration
- Import concentration
  - $\sum_{i=1}^{N}(s_{ij}^{k})^2$
  - s is the import share of exporting country i in importing country j in sector k

# Econometrics Model

## Estimation Equation (Tobit)

- Binding across sectors k within countries j

$$\tau_{kj}^{B*} = \beta_0 + \beta_1 \omega_{kj} + \beta_2 \eta_{kj} + \beta_3 \xi_{kj} + \beta_4 \theta_j + \beta_5 cgdp_j + \varepsilon_{kj}$$

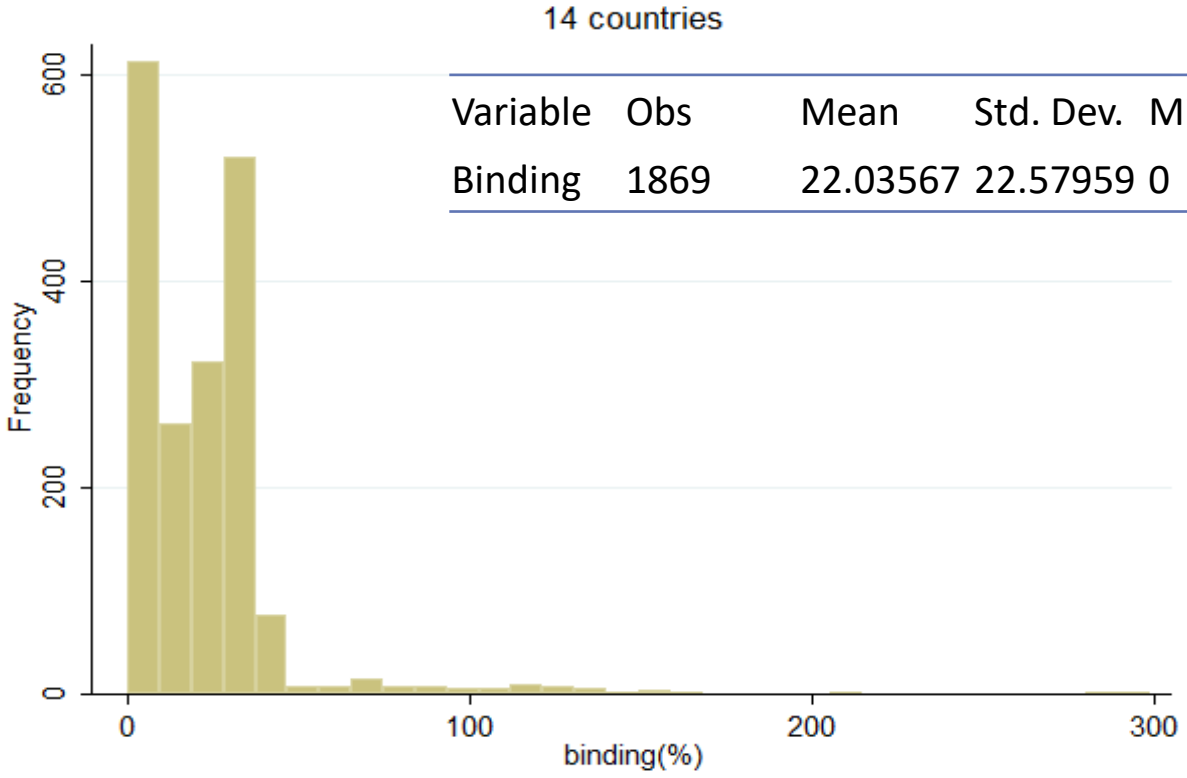
- Binding across sectors k by country j

$$\tau_{k}^{B*} = \beta_0 + \beta_1 \omega_{k} + \beta_2 \eta_{k} + \beta_3 \xi_{k} + \varepsilon_{k}$$

  - $\omega$: inverse export supply elasticity (-) -----market power
  - $\eta$: $\varepsilon * \frac{m}{y}$ (import demand elasticity *import penetration) (?)
  - $\xi$: import concentration*imports (-)
  - $\theta$: political pressure (+)
  - GDP /capita (-)

# Data

- Data set from Beshkar, Bond, and Rho (2012)
- 14 selected countries with variation
  - USA, China, Japan, Canada, Korea, Thailand, Malaysia, Turkey, India, Peru, Brazil, Uruguay, Colombia, and Chile




| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Binding | 1869 | 22.03567 | 22.57959 | 0 | 298.7852 |

# Results

Table 1. Baseline , Market power

| | Dependent variable: Tariff Binding | | | | | |
|---|---|---|---|---|---|---|
| | All | | GDP | | omega | |
| | ALL | ALL | High7 | The rest | Top 33% | The rest |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| import share (-) | -56.61*** | | -61.72*** | -187.90*** | | |
| | (7.16) | | (8.32) | (43.98) | | |
| $\varepsilon * \frac{m}{y}$ (?) | -0.01* | -0.00 | -0.03 | -0.01** | -0.01* | 0.02** |
| | (0.01) | (0.01) | (0.02) | (0.01) | (0.00) | (0.01) |
| Political (+) | 1.10** | 1.48*** | 4.93*** | -4.45*** | 1.14** | 1.62** |
| | (0.45) | (0.45) | (0.86) | (0.73) | (0.57) | (0.64) |
| log(GDP /c)(-) | -7.79*** | -8.49*** | -5.20*** | -15.26*** | -6.74*** | -9.26*** |
| | (0.90) | (0.87) | (1.02) | (1.79) | (0.89) | (1.21) |
| w.imp.con. (-) | -0.15 | -0.39** | -0.12 | -1.31** | -0.34 | -0.48*** |
| | (0.11) | (0.16) | (0.09) | (0.56) | (0.24) | (0.17) |
| log(omega) (-) | | -0.93*** | | | 0.21 | -1.51*** |
| | | (0.22) | | | (0.56) | (0.39) |
| Obs | 1869 | 1869 | 929 | 940 | 618 | 1251 |
| Pseudo R-sq | 0.038 | 0.037 | 0.040 | 0.014 | 0.032 | 0.040 |

# Results

Table 2

| | Dependent variable: Binding | | | |
|---|---|---|---|---|
| | sector | | region | |
| | Agriculture | Manufaturing | Asia | S.America |
| | (7) | (8) | (9) | (10) |
| import share (-) | -74.97** | -55.96*** | -102.90*** | 187.39 |
| | (29.54) | (4.68) | (13.91) | (156.48) |
| $\varepsilon * \frac{m}{y}$ (?) | -0.21 | 0.00 | -0.01 | -0.02 |
| | (0.33) | (0.01) | (0.01) | (0.01) |
| Political (+) | -2.59* | 2.14*** | -1.98*** | 14.53*** |
| | (1.50) | (0.21) | (0.49) | (2.30) |
| log(GDP /c)(-) | -17.69*** | -4.27*** | -11.31*** | 22.69*** |
| | (2.71) | (0.33) | (1.11) | (4.44) |
| w.imp.con. (-) | -1.04 | -0.06 | -0.22 | 1.24** |
| | (1.65) | (0.06) | (0.14) | (0.54) |
| Obs | 412 | 1457 | 858 | 618 |
| Pseudo R-sq | 0.030 | 0.107 | 0.036 | 0.020 |

# Results

Table 3. Tariff binding across sectors by country (High GDP group)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| | USA | Japan | China | Canada | Brazil | India | Korea |
| lomega (-) | -0.15 | -0.50*** | 0.29 | -0.24 | 0.45 | -3.27** | 2.00 |
| | (0.30) | (0.17) | (0.25) | (0.16) | (0.36) | (1.50) | (2.16) |
| $\varepsilon * \frac{m}{y}$ (?) | 0.44*** | 0.63*** | -0.33* | 0.00 | 0.03 | -0.16** | -0.44* |
| | (0.14) | (0.16) | (0.17) | (0.01) | (0.03) | (0.08) | (0.26) |
| w.imp.con. | -0.12 | -0.07** | -0.23** | -0.07 | -0.07 | -1.31*** | -0.36 |
| (-) | (0.09) | (0.04) | (0.10) | (0.05) | (0.25) | (0.37) | (0.25) |
| N | 150 | 152 | 153 | 142 | 60 | 120 | 152 |
| pseudo R-sq | 0.001 | 0.028 | 0.017 | 0.004 | 0.010 | 0.006 | 0.004 |

Table 4. Tariff binding across sectors by country (others)

| | (8) | (9) | (10) | (11) | (12) | (13) | (14) |
|---|---|---|---|---|---|---|---|
| | Turkey | Thailand | Colombia | Malaysia | Chile | Peru | Uruguay |
| lomega (-) | -2.00* | -0.46 | -1.85*** | -0.19 | -0.03* | -0.11 | -0.06 |
| | (1.02) | (0.31) | (0.56) | (0.43) | (0.01) | (0.08) | (0.28) |
| $\varepsilon * \frac{m}{y}$(?) | -0.82*** | -0.01*** | -0.07 | 0.07 | 0.00 | -0.02*** | 0.00 |
| | (0.30) | (0.00) | (0.06) | (0.20) | (0.00) | (0.00) | (0.00) |
| w.imp.con. | -5.16** | -0.77* | -1.37 | -2.00** | 0.00 | 0.81** | -0.21 |
| (-) | (2.55) | (0.46) | (11.48) | (0.77) | (0.05) | (0.40) | (7.05) |
| N | 101 | 133 | 151 | 148 | 147 | 142 | 118 |
| pseudo R-sq | 0.014 | 0.005 | 0.008 | 0.002 | 0.007 | 0.018 | 0.000 |

# Conclusion

## Compare to Beshkar et al. (2012)

- Market power
  - Binding decreases in market power in many cases within countries, but not significant by individual country
- Weighted Import concentration
  - Insignificantly negative in many cases
- Limited data for sectoral political pressure

Thank you