A Theory of Economic Coercion and Fragmentation

Christopher Clayton
Yale

Matteo Maggiori
Stanford

Jesse Schreger
Columbia

June 2024

BIS Annual Conference

Economic Coercion, Anti-Coercion, and Fragmentation

- Hegemonic countries use their economic strength from existing financial and trade relationships to achieve geopolitical and economic goals
- Recent policy emphasis on Economic Security, but risk of fragmentation
- Fundamental questions:
  - How should countries protect themselves from hegemonic influence?
  - Trade off between economic security and gains from trade
  - External economies of scale and specialization
  - Designing optimal anti-coercion policy: scope, tools, abuse

Key Ingredients and Mechanisms

- Key ingredients:
  - A collection of countries: Global production network
  - Threats of exclusion from hegemon controlled inputs
  - Ex-ante anti-coercion policy
- Key mechanism:
  - Increasing returns to scale and specialization are source of *both* gains from trade and hegemonic power by making other technologies poor substitutes for dominant ones
- Hegemon induces hyper-globalization centered on its economy: maximizes power
- Countries anti-coercion policies create a fragmentation doom-loop
- The importance of finance as a tool of hegemonic dominance

Literature

- **International Political Economy:** Kindleberger (1973), Keohane and Nye (1977), Gilpin (1981), Keohane (1984), Baldwin (1985), Blackwill and Harris (2016), Drezner (2003), Farrell and Newman (2019), Parks et al. (2022)

- **Geoeconomics:** Clayton, Maggiori, and Schreger (2023), Thoenig (2023), Becko and O'Connor (2024), Broner, Martin, Meyer, and Trebesch (2024), Kooi (2024), Liu and Yang (2024), Pflueger and Yared (2024)

- **Industrial Policy and Trade Theory:** Hirschman (1945,59), Bagwell and Staiger (1999), Maggi (2016), Martin, Mayer, and Thoenig (2008, 2012), Thoenig (2023) Baqaee and Farhi (2022, Bartelme, Costinot, Donaldson and Rodriguez-Clare (2019), Perez, Ottonello, Witheridge (2023), Antras and Miquel (2023), Kleinman, Liu, Redding (2023)

- **Networks:** Gabaix (2011), Acemoglu, Carvalho, Ozdaglar and Tahbaz-Salehi (2012), Blanchard et al. (2016), Bigio and Lao (2020), Baqaee and Farhi (2019), Liu (2019), Elliott, Golub and Leduc (2022)

Agenda

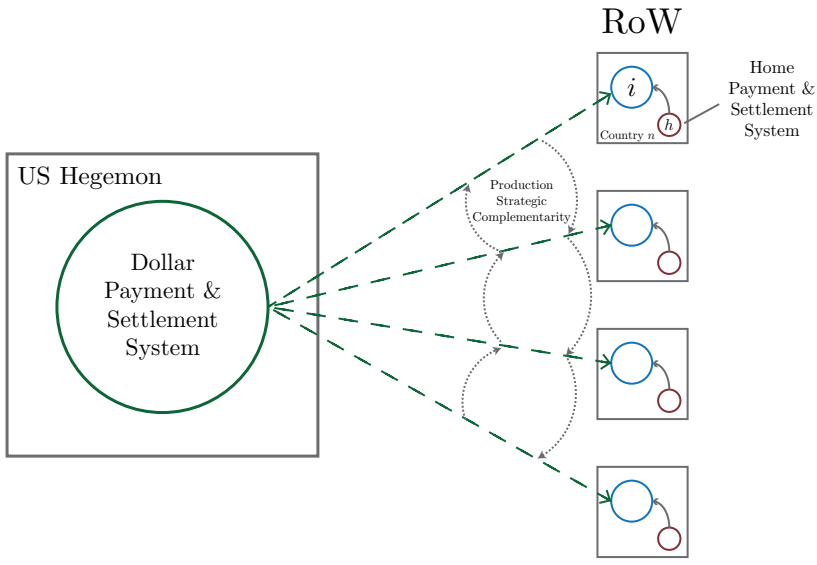
1. A minimalist example: Global Payment Systems
2. Welfare results: is the world better off with a hegemon? with anti-coercion policy?
3. General Model
4. Measuring Power and Fragmentation

Financial System as a Tool of Hegemonic Dominance

- Financial system has large strategic complementarities: US system is dominant
- Finance is one of the most used tools in sanctions and pressure by the US:
  - Financial sanctions on Russia
  - Pressure on SWIFT to disconnect targeted entities
  - Pressure on EU banks not to finance trade with Iran
  - Pressure on HSBC to reveal Huawei's transactions
- Often demand a foreign entity to stop or alter activities that are legal in its jurisdiction (e.g. secondary sanctions)
- US offers a stark choice: stop the activity or lose your business with the US
- Signs of Fragmentation: countries are reacting by building their own systems to shield themselves from influence, e.g. China, India, Russia

▸ Examples

Sketch of Example Environment



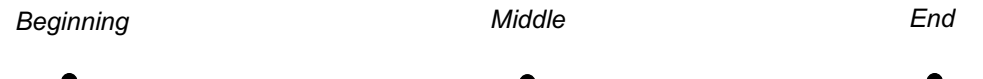
Production, Financial Services, and Strategic Complementarities

- Hegemon m (US) has financial service sector: $f_j(\ell_j) = \frac{1}{p_j}\ell_{jm}$
- Each foreign country has a Home alternative: $f_h(\ell_{hn}) = \frac{1}{p_h}\ell_{hn}$
- Each foreign country has a manufacturing sector with CES production:

$$f_i(x_{i_n j}, x_{i_n h_n}, z) = \left(A_j(z) x_{i_n j}^{\sigma} + A_{i_n h}(z) x_{i_n h}^{\sigma} \right)^{\beta/\sigma}$$

  - Global strategic complementarity in Hegemon finance: $A_j(z) = \frac{1}{N}\sum_{n=1}^{N} \overline{A}_j z_{i_n j}^{\xi_j \sigma}$
  - Local strategic complementarity in Home Alternative: $A_{i_n h}(z) = \overline{A}_h z_{i_n h}^{\xi_h \sigma}$
  - In equilibrium $z_{i_n h} = x_{i_n h}$, so z tracks production externalities
  - Hegemon Finance and Home alternative are substitutes: $0 < \beta < \sigma$
  - Cross-country use of Hegemon finance are complements: $(1 + \xi_j)(1 - \frac{\beta}{\sigma}) \leq 1$
- Assume constant prices

Timeline and Policy Tools



All Countries choose:
- Policies on domestic firms
- Set of taxes $\tau_{n,ij}$
- Revenue neutral

Hegemon Country chooses:
- Threatens foreign entities with loss of access to inputs it controls
- Demands costly actions:
  - Additional taxes $\tau_{m,ij}$
  - Transfers T

Rest of the world entities decide:
-whether to accept hegemon's offer

Production and Consumption

Hegemon's Threats and Sources of Power

- Hegemon's government maximizes representative consumer welfare (profits):
  - Threatens foreign entities with loss of access to its system if they do not comply with its demands
  - Demands transfers (or political concession) and imposes taxes (quantities restrictions) on target's activities
- Hegemon's power comes from difference between targeted entities' inside and outside option
- Entities participation constraint: $V_i(\tau_{m,i}, \{j, h\}) - T_i \geq V_i^o(\{h\})$
  - $V_i(\tau_{m,i}, \{j, h\})$: Firm i value (ex transfer) if accept contract
  - $V_i^o(\{h\})$: Firm i value if reject contract
- **Hegemonic Power:** power to demand costly actions to foreign entities by threatening suspension of economic relationship with the hegemon

Hegemon's Optimal Use of Power

- Hegemon subsidizes use of its system j by foreign entities to make it attractive on the inside option:

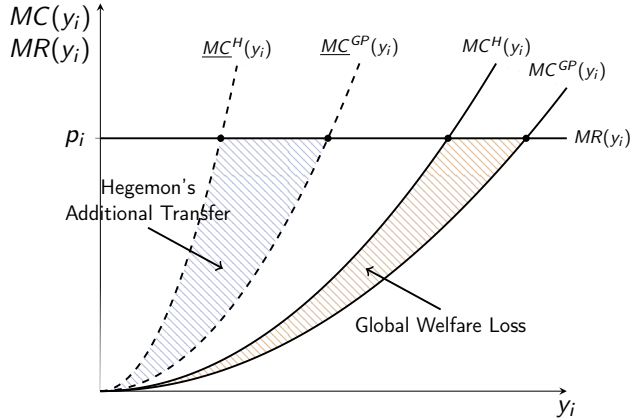
$$\tau^{x}_{m,i_n j} = -\frac{\xi_j}{1+\xi_j}\left(p_j + \tau^{x}_{n,i_n j}\right)$$

- Hegemon reduces subsidy (or taxes) home alternative system h to make outside option worse

$$\tau^{x}_{m,i_n h} = \frac{\xi_h}{1+\xi_h}\left(\frac{x^{o}_{i_n h}}{x^{*}_{i_n h}} - 1\right)\left(p_h + \tau^{x}_{n,i_n h}\right)$$

- Hegemon wants to get the world hooked on its system to make the withdrawals more costly

Welfare Consequences of Hegemonic Dominance



- Hegemon adds value by correcting global externalities: foster integration
- Destroys value by generating hyper-integration to increase its power
- Extract difference between inside and outside value as transfer

Fragmentation As a Doom Loop

- What happens if country n increases tariff on hegemon system?
- Direct impact: country n shifts towards home alternative
  - Hegemon has to expend more power to maintain same usage of global system
  - Hegemon relents and country n shifts towards home alternative
- Loop: all other countries shift towards home alternatives
  - Hegemon system becomes less attractive to all (strategic complementarity)
  - As each country shifts to its home alternative, other countries want to shift to

▸ Proposition

Uncoordinated Anti-Coercion and Fragmentation

Economic Security: government shapes domestic economy ex-ante to minimize the ex-post influence that the hegemon has over the country

- Optimal anti-coercion policy of country n

$$\tau^{x}_{n,i_n j} \to \infty$$

$$\tau^{x}_{n,i_n h} = -\frac{\xi_h}{1+\xi_h} p_h$$

- In this extreme example: induces full fragmentation
- Country n maximizes its outside option, which is the value of its Home alternative
- In general: reduce reliance on sectors the hegemon controls and that are difficult to substitute away from ex-post

Hegemonic Power, Anti-Coercion, and Welfare

- The non-cooperative outcome without a hegemon *Pareto* dominates the outcome with both optimal anticoercion and a hegemon
- Hegemon (potentially) increased total surplus by subsidizing its global system j
- But, also distorts use of home alternatives and extracts transfers
- Even while increasing total surplus, hegemon can make countries worse off by holding them to their outside option
- To maximize their outside option, foreign countries fragment and bolster their Home alternative

▸ Proposition ▸ Benchmarks

General Model

In slides for today:

- General production functions and externalities
- Full network amplification with many sectors $\Rightarrow$ sectors can be strategic because of high indirect impact on the economy
- Can be parameterized to produce structural gravity and sufficient statistics to measure in the data

More in the paper:

- Endogenous Prices $\Rightarrow$ ToT manipulation incentive
- Direct geopolitical preferences in utility

Hegemon's Optimal Contract

- Maximal punishments, binding participation constraints optimal

Proposition

Hegemon's optimal tax on a foreign firm is:

$$\tau^{x}_{m,ij} = -\overbrace{\sum_{k\in\mathcal{I}_m}\frac{\partial\Pi_k}{\partial z}\frac{dz}{dx_{ij}}}^{\text{Domestic Profits}} - \frac{1}{1+\eta_i}\overbrace{\sum_{k\in\mathcal{C}_m}\left(1+\eta_k\right)\left[\left(\frac{\partial\Pi_k}{\partial z}-\frac{\partial\Pi^{o}_k}{\partial z}\right)\frac{dz}{dx_{ij}}\right]}^{\text{Building Foreign Power}}$$

+ an adjustment for private distortions

$\frac{d\mathbf{x}_i}{dx_{ij}} = \frac{\partial\mathbf{x}_i}{\partial z}\frac{dz}{dx_{ij}}$

η_k: is the Lagrange multiplier on k's participation constraint

Optimal Anti-Coercion

Proposition

The optimal domestic policy of country n satisfies

$$\tau_n \frac{dx_n^o}{d\tau_n} = -\underbrace{\sum_{i \in \mathcal{I}_n} \frac{\partial \Pi_i^o}{\partial z} \frac{dz}{d\tau_n}}_{\text{Domestic Profits}}$$

Binding PC $\Rightarrow$ government values *outside option* of firms that contract with hegemon

Anti-Coercion: Maximize outside option, shift equilibrium via hegemon's policies

x_n^o: input, factor usage at outside option

$\frac{d\mathbf{x}_n^o}{d\tau_n} = \frac{\partial \mathbf{x}_n^o}{\partial \tau_n} + \frac{\partial \mathbf{x}_n^o}{\partial z} \frac{dz}{d\tau_n}$

Network Propagation and Anti-Coercion

- Production externalities lead to endogenous amplification
- Anti-Coercion Doom Loop: Country n's policy changes the equilibrium via hegemon's reaction

Proposition

The aggregate response of z^* and P to a perturbation in ex-post constant e is

$$\frac{dz^*}{de} = \Psi^z \left(\frac{\partial x}{\partial e} + \frac{\partial x}{\partial \tau_m} \frac{d\tau_m}{de} \right)$$

where $\Psi^z = \left(\mathbb{I} - \frac{\partial x}{\partial z^*} \right)^{-1}$

A First Pass at Measurement

- Specialize production function to nested CES:

$$f_i(x_i) = \left(\sum_{J \in \mathcal{J}} \alpha_{iJ} \sum_n \alpha_{iJn} x_{iJn}^{\frac{\sigma_J - 1}{\sigma_J}} \right)^{\frac{\sigma_J}{\sigma_J - 1} \frac{\rho - 1}{\rho}} \Bigg)^{\frac{\rho}{\rho - 1} \beta}$$

- Assume outer-nest Cobb-Douglas ($\rho = 1$), then loss to firm i from losing access to hegemon m's industry J:

$$\log \nu_i(\mathcal{J}_i) - \log \nu_i(\mathcal{J}_i \backslash \{(Jm)\}) \approx \frac{\beta}{1 - \beta} \times \frac{1}{\sigma_J - 1} \times \Omega_{iJ} \times \omega_{iJm}$$

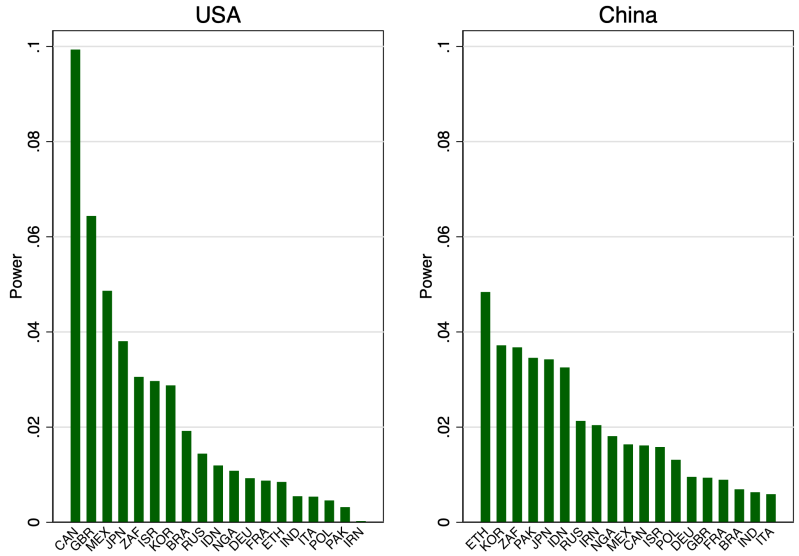
- Aggregate loss to all firms from country n of losing access to hegemon's goods

$$\tilde{\nu}_n \equiv \sum_{i \in \mathcal{I}_n} \sum_{J \in \mathcal{J}} \left(\log \nu_i(\mathcal{J}_i) - \log \nu_i(\mathcal{J}_i \backslash \{(Jm)\}) \right)$$

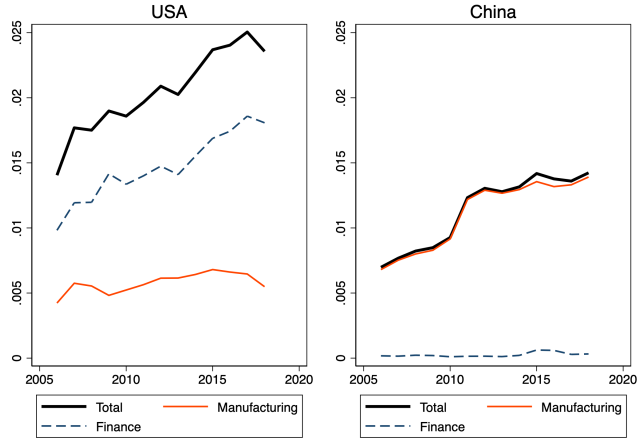
Empirical Measure of Hegemonic Power: The Importance of Finance

- Expenditure Shares
  - Expenditure share on industry J, Ω_{nJ}
  - Share of spending on country m variety of industry J, ω_{nJm}
  - Measure both from ITPD-E dataset (Borchert et al. (2022), USITC)
- Elasticity of Substitution
  - HS06 good-level from Fontagne et al. (2022), aggregated to ITPD industry
- **Most Measures Ignore Finance and Financial Services:**
  - Finance plays major role in U.S. geoeconomic strategy, measure of exports + elasticity difficult
  - Starting point: treat symmetrically with goods trade. ITPD-E data on "Financial Services" and "Insurance and Pension Services"
  - $\sigma_J = 1.3$ from Pellegrino et al. (2021) from demand-based asset pricing

Estimated US and Chinese Geoeconomic Power, 2018



US Power Comes from Finance, Chinese Power from Manufacturing



- Measuring finance is crucial for assessing US power, but difficult to measure

▸ σ Finance

Assessing Fragmentation: Structural Gravity and Geoeconomic Alignment

Purchases x_{iJn} by firm i of the industry-J goods produced in country n' satisfy a gravity equation. When countries have geopolitical utility spillovers:

$$\log x_{iJn'} \approx \gamma_{iJ} + \gamma_{Jn'} + \sigma_J \log \alpha_{iJn'} + \underbrace{\theta \sigma_j \epsilon_j \zeta_{nn'}}_{\log\left(1+t_{n,iJn'}\right)}$$

More in paper:

- Estimate gravity to show geopolitical consideration increased in 2022
- Geopolitics affected more trade in industries in which it less expensive to distort away from politically not aligned countries
- Extend framework to potentially identify where hegemon exerts pressure

▸ Regression Table

Conclusion

- Many countries pursuing new Economic Security policies
- A simple model to shape and assess these policies
- Mechanisms that lead to gains from integration can lead to interdependent global systems that become instruments of economic coercion
- Hegemons generate hyper-globalization in their favor
- Countries pursuing anti-coercion over-fragment the global economy
- Payment systems, and their fragmentation, will continue to be strategic. BIS (project Angora, etc...) has an important role to play

Financial System as a Tool of Hegemonic Power

- *"Financial sanctions are among the most oft-used and powerful ways that the United States has to exert macroeconomic pressure. [...] Most of the financial sanctions leverage the privileged position of the United States in the global financial infrastructure."* (Kilcrease (2023))

- *"in contrast, secondary sanctions target normal arms-length commercial activity that does not involve a U.S. nexus and may be legal in the jurisdictions of the transacting parties. [...] Secondary sanctions present non-U.S. targets with a choice: do business with the United States or with the sanctioned target, but not both. Given the size of the U.S. market and the role of the U.S. dollar in global trade, secondary sanctions provide Washington with tremendous leverage over foreign entities as the threat of isolation from the U.S. financial market almost always outweighs the value of commerce with sanctioned states."* (Bartlett and Ophel (2021)

Back

Positive Effects of Anti-Coercion on Fragmentation

Proposition

Suppose that all countries apart from n have adopted symmetric domestic policies. Then accounting for the hegemon's endogenous response:

1. *An increase in the country n tax on the hegemon's good j lowers every country's use of j and raises every country's use of h, that is:*

$$\frac{\partial z_{i_r j}}{\partial \tau^{x}_{n,i_n j}} \leq 0, \quad \frac{\partial z_{i_r h}}{\partial \tau^{x}_{n,i_n j}} \geq 0 \quad \forall r = 1, \ldots, N$$

2. *For $0 \leq \xi_h \leq \overline{\xi}_h$ (defined in the proof), an increase in the country n subsidy on the home alternative h lowers every country's use of j and raises every country's use of h, that is:*

$$\frac{\partial z_{i_r j}}{\partial (-\tau^{x}_{n,i_n h})} \leq 0, \quad \frac{\partial z_{i_r h}}{\partial (-\tau^{x}_{n,i_n h})} \geq 0 \quad \forall r = 1, \ldots, N$$

Back

Hegemonic Power, Anti-Coercion, and Welfare

Proposition

Let $N \to \infty$. The following welfare rankings hold:

1. *The noncooperative outcome without a hegemon* Pareto *dominates the outcome with optimal anticercion and a hegemon.*
2. *Let $\xi_h = 0$. Then, the hegemon's outcome without anticoercion implements the global planner's efficient allocation and so increases total surplus. However, every country $n \neq m$ is worse off than in the noncooperative outcome without a hegemon.*

Back

Benchmarks: Efficient Allocation and Noncooperative Outcome

- Global planner subsidizes both Hegemon Finance and Home Alternative

$$\tau^{x}_{n,i_n j} = -\frac{\xi_j}{1+\xi_j} p_j$$

$$\tau^{x}_{n,i_n h} = -\frac{\xi_h}{1+\xi_h} p_h$$

- Small foreign countries ($N \to \infty$) would only subsidize Home alternative

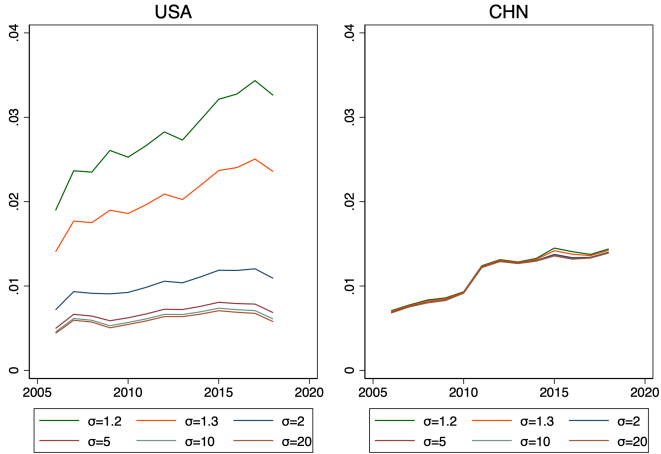
$$\tau^{x}_{n,i_n j} = 0$$

$$\tau^{x}_{n,i_n h} = -\frac{\xi_h}{1+\xi_h} p_h$$

Back

Power and the Elasticity of Substitution of Finance

Back



Time-Variation in Weight on Geopolitical Alignment θ_t

Back

	(1) 2013	(2) 2016	(3) 2019	(4) 2022
UN Agreement	-0.0220	0.199	0.170	0.462***
	(0.122)	(0.165)	(0.140)	(0.153)
Log(Distance)	-0.813***	-0.766***	-0.770***	-0.744***
	(0.0261)	(0.0249)	(0.0259)	(0.0279)
Contiguity	0.576***	0.574***	0.539***	0.550***
	(0.0541)	(0.0544)	(0.0544)	(0.0630)
Exporter × Industry FE	Yes	Yes	Yes	Yes
Importer × Industry FE	Yes	Yes	Yes	Yes
Observations	968,934	1,084,394	1,130,290	1,074,208

Elasticity of Substitution and Geopolitical Alignment

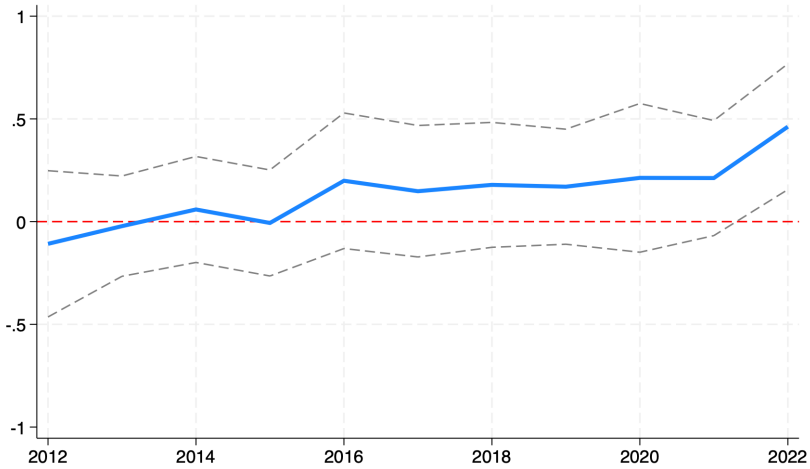
Back

$$\hat{\theta}_J = \alpha + \beta\sigma_J + \epsilon_J$$

	(1)	(2)	(3)
σ_J	0.0360***	0.0377***	0.0963***
	(0.00828)	(0.00772)	(0.0262)
Constant	-0.156	-0.341*	-0.926***
	(0.128)	(0.190)	(0.236)
Observations	138	138	123
R-squared	0.186	0.278	0.207
Weighted	No	Yes	Yes
σ<20	No	No	Yes

Time-Variation in Weight on Geopolitical Alignment

Back



Industry Heterogeneity

Back

- Model predicts government divert trade where least costly to do so
- Run cross-sectional regression where geopolitical desire varies by industry