The Tariff Tax Cut: Tariffs as Revenue

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October 2025

Introduction

- Tariffs on the rise. Idea floated to use revenue to fund tax cuts.
- Theory of the 2nd best: what is the optimal tariff in a distorted world?
- Here: Quantify dynamic effects of tariff policy when revenue finances tax cuts.
  - Estimate how ”constrained” optimal tariff determined by revenue use

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- Here: Quantify dynamic effects of tariff policy when revenue finances tax cuts.
  - Estimate how ”constrained” optimal tariff determined by revenue use
- Combine two literatures:
  1. Fiscal - labor/capital taxes, endogenous labor, capital accumulation
  2. Dynamic trade - tariffs, firm/exporter dynamics, input-output, trade composition
     - Rich production structure & dynamic margin of adjustments (factories, capital, ..)
     - Short- vs. long-run trade elasticity – how does revenue change over time?

Key Takeaways

- In distorted economy, optimal tariff depends on revenue use.
  - Zero (or even negative) tariffs optimal if rebated lump sum (even if unilateral)
  - Zero tariffs sub-optimal if used for fiscal reform (even cooperatively).

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- Dynamic Laffer curve.
  - Revenue-maximizing tariff from 91% in 1st quarter to 37% in SS.

Roadmap

1. Related Literature
2. Optimal tariffs (unilateral and cooperative)
3. Fiscal implications - Laffer curves
4. Policies
   - In paper: Welfare and SS - current policy
   - In paper: Transitions (Anticipation)

Related Literature

1. Gains from trade in dynamic economies
   - i.e. economies with micro-founded "adjustment frictions in trade"
   - Alessandria/Choi (07,14ab), Ruhl(08), AC/Ruhl (20,21), Mix (23), Hoang/Mix (25)
   - Alessandria & Mix (21) - aggregate effects of GATT rounds.
2. Optimal trade policy
   - Bickerdike (1906), Kaldor (40), Johnson (54), Dixit (85), Caliendo/Parro (21) survey
3. Theory of the second best
   - Lipsey/Lancaster (56), Bhagwati/Ramaswami (63), Boadway et al. (73), Lashkaripor (21), Carrol/Hur (23), Bianchi/Coulibaly (25), Ignatenko et al. (25)
4. Tax reform
   - Laffer (74), McGrattan (94), Prescott (04), Mendoza/Tesar (98), House/Shapiro (06), Trabandt/Uhlig (11)

Model

- Two countries (broadest tariffs)
- Gov't: distortionary taxes (τ^K, τ^L, τ), transfers (T), no spending ($G = 0$) or bonds.
- Households: rep agent & endogenous labor/saving
- Competitive agg's: capital (K), materials (M), & cons. (C) + iceberg by end-use, $\xi_G > 1$.

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- Competitive agg's: capital (K), materials (M), & cons. (C) + iceberg by end-use, $\xi_G > 1$.
- Differentiated intermediate goods producers
  - Owned locally
  - Produce with capital, labor, materials: $z_i(k_{ij}^{\alpha} l_{ij}^{1-\alpha})^{1-\alpha_m} m_{ij}^{\alpha_m}$
  - Het. firms with dynamic exporting decision + new exporter dynamics
  - Free entry (hire workers)
  - Exogenous firm survival (n_s)
  - Stock of firms & types of exporters are state variables & source of profits.

Households

$$V_i^H(K_i, B_i, S) = \max_{C_i, L_i, X_i, B_i'} \frac{\left[C_i^{\mu}(\bar{L}_i - L_i)^{1-\mu}\right]^{1-\sigma} - 1}{1-\sigma} + \beta V_i^H(K_i', B_i', S')$$

$$\text{s.t.} \quad P_{Ci}C_i + P_{Xi}X_i + \frac{P_{C1}B_i{}'}{R^B} \leqslant (1-\tau_i^L)W_iL_i + (1-\tau_i^K)(R_iK_i + \Pi_i)$$
$$+ \tau_i^K \delta P_{Xi}K_i + P_{C1}B_i - P_{C1}\frac{\phi}{2}\left(\frac{B_i}{Y_i^N} - \frac{\bar{B}_i}{\bar{Y}_i^N}\right)^2 + T_i$$

$$K_i' = (1-\delta)K_i + X_i\left[1 - \frac{\psi}{2}\left(\frac{X_i}{X_{i,-1}} - 1\right)^2\right]$$

Note: Treating corporate taxes same as capital income.

Also no taxes on international bonds.

Final Goods Producers

Each type of final good $G \in \{C, X, M\}$ is produced by a continuum of competitive firms.

$$G_i = \left[\sum_{j \in \mathcal{I}} \left[\int_{f \in \Omega_{ji}} G_{ji}(f)^{\frac{\theta-1}{\theta}} \right]^{\frac{\theta}{\theta-1}\frac{\gamma-1}{\gamma}} \right]^{\frac{\gamma}{\gamma-1}}$$

Ω_{ji} - set of firms in region j that export to region i,
θ - elas. of subs. across varieties of a common source region
$\gamma < \theta$ - elas. of subs. across varieties from different source regions.

$$\pi_{Gi} = \max P_{Gi} G_i - \sum_{j \in \mathcal{I}} (1 + \tau_{ji}) \int_{f \in \Omega_{ji}} P_{Gji}(f) G_{ji}(f) df$$

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$$P_{Gi} = \left[\sum_{j \in \mathcal{I}} ((1 + \tau_{ji}) P_{Gji})^{1-\gamma} \right]^{\frac{1}{1-\gamma}} \qquad \text{where} \qquad P_{Gji}^{1-\theta} = \int_{f \in \Omega_{ji}} P_{Gji}(f)^{1-\theta} df.$$

Intermediate Goods producers (new exporter dynamics)

Two key features of firm level export dynamics:

1. Exporting is very persistent (Baldwin/Krugman/Dixit/Roberts/Tybout)
- Relatively high upfront entry costs (sunk costs)
- Exporter's fixed export cost drawn from lower cost distribution than non exporters

2. New exporters take time to get exports to "scale" (Ruhl/Willis/Alessandria/Choi)
- Distribution technology requires repeated investments
- Shipping cost starts high and falls stochastically over time

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- Trade elasticity dynamics depend on the shock (persistence, anticipation).
- Investments in firm creation and exporting react in different ways to tariffs.

Fiscal Policy

- Tariff revenue:

$$TR_i = \sum_{G \in \{C,X,M\}} \sum_{j \neq i} \tau_{ji} \int_{f \in \Omega_{ji}} P_{Gji}(f) G_{ji}(f) df$$

- Government balances budget:

$$T_i = \tau_i^L W_i L_i + \tau_i^K (R_i K_i - \delta P_{Ii} K_i + \Pi_i) + TR_i$$

- Focus on how tariff revenue can be used to offset other taxes

Tariff Tax Cut

Four uses of tariff revenue:

1. Lump sum rebate

2. Labor subsidy:

$$s_t^L = \frac{TR_t}{(1-\tau^L)W_t L_t}$$

3. Capital subsidy:

$$s_t^K = \frac{TR_t}{(1-\tau^K)(R_t K_t - \delta P_{It} K_t + \Pi_t)}$$

4. Investment subsidy:

$$s_t^I = \frac{TR_t}{P_{It} I_t}$$

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Assume ROW follows same fiscal adjustment if it retaliates.

Similar results with constant subsidy = to PV of tariff revenue

Calibration

- Focus on two symmetric economies (US & ROW) in steady state
- Quarterly model
- Target US trade (level & composition) and taxes (22-24): $\tau_K = 0.15$, $\tau_L = 0.27$
  - Abstract from SS imbalances and asymmetries
- Trade elasticity dynamics determines trade, revenue $\implies$ GDP and optimal tariffs.
- Range of estimates:
  - 4-5: Simonovska & Waugh (14), Caliendo & Parro (15)
  - SR of 3, 15 LR based on $\Delta\tau_{cgt}$ with China & Vietnam (AKKRS, 2025)
  - Our calibration: 3.75 SR (quarterly) and 7.5 LR (to permanent).
- Focus on permanent, surprise, once and for all Δ.
  - Study 4 fiscal alternatives
  - Solve for transition and compare compensating differential.

[Details]

Welfare results - Unilateral tariff (maximizing tariff in parentheses)

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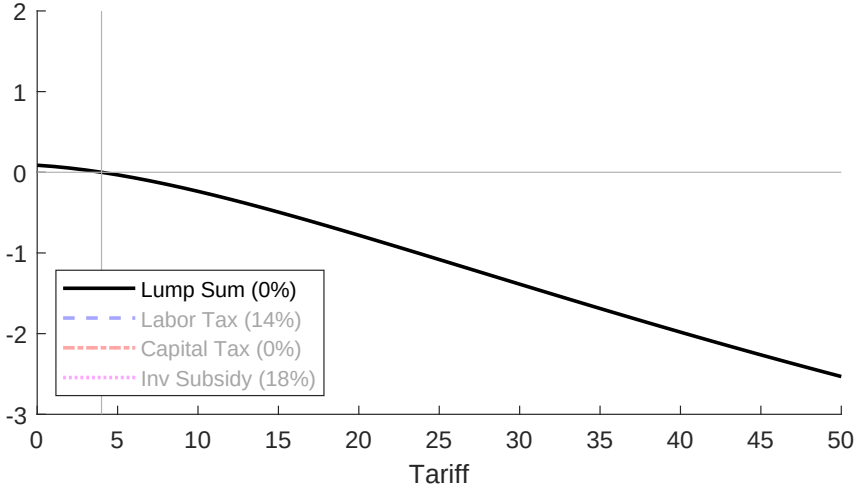
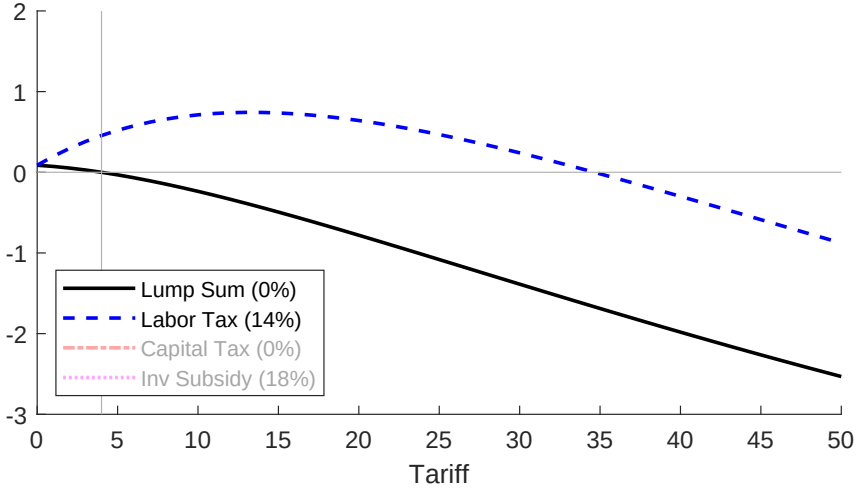


- Surprising: free trade is unilaterally optimal (more later)

Welfare results - Unilateral tariff (maximizing tariff in parentheses)



- Two reforms: 1) existing revenue to offset taxes & 2) new revenue

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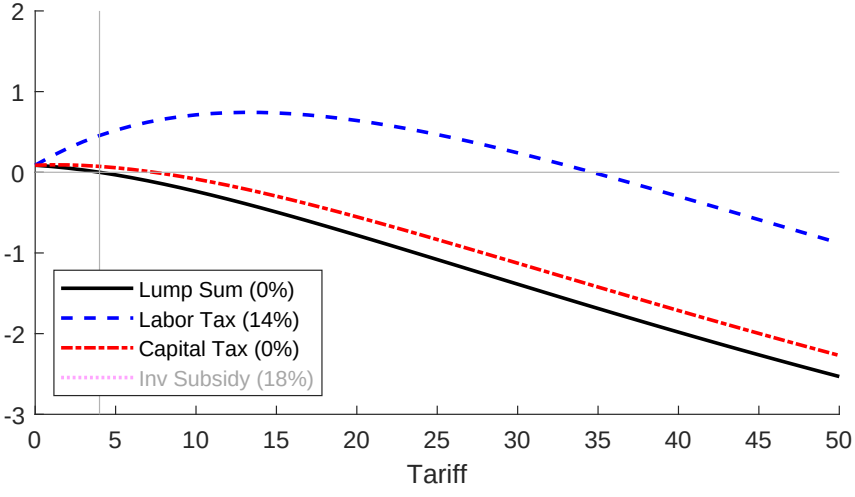
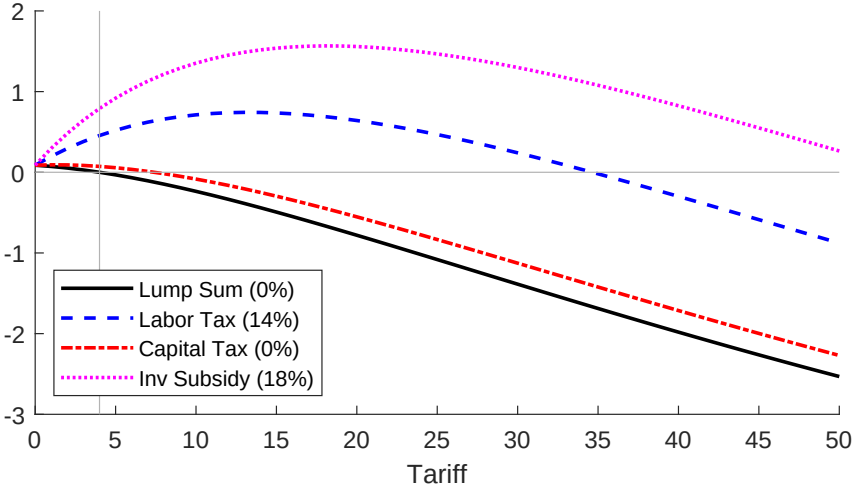


- Cutting capital tax like LS: return on physical & intangible capital + tariff increase P_I

Welfare results - Unilateral tariff (maximizing tariff in parentheses)



- Directly offsetting tariffs on investment and elastic input.

Rationales for Tariffs

Standard view:

- Unilateral tariffs to exploit terms-of-trade
- Based on lump-sum rebates and no distortions

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Distortions:

1. Distortionary taxes (τ_K, τ_L)
2. Markup on goods not primary inputs (K,L)
3. Markup and Roundabout Production - Double marginalization
4. Entry and gains from variety

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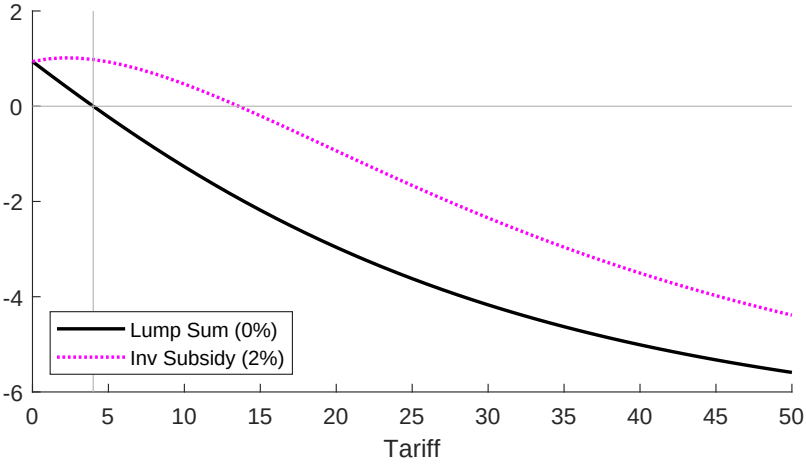
Next: Remove distortions & recompute optimal tariffs.
- With lump-sum taxes & Dixit-Stiglitz, fix w/ revenue subsidy (1+s)py, 1+s = $\frac{\theta}{\theta-1}$
- To kill TOT effect, start with global (optimal cooperative tariffs)

Welfare results - Global Cooperative Tariffs (maximizing tariff in parentheses)



- Positive optimal tariff $\Rightarrow$ small Δ welfare with τ <10% vs lump sum case
- Big differences in welfare

Effect of distortions on optimal tariff (Global)

	Global	
Offset:	**Lump sum**	**Investment**
Baseline	-0.23	0.02

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+ No taxes ($\tau_k = \tau_L = 0$)	-0.17	0.01
+ Revenue Subsidy	0.00	0.00

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Offset:	**Lump sum**	**Investment**
Baseline	-0.23	0.02
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+ Revenue Subsidy	0.00	0.00
No taxes ($\tau_k = \tau_L = 0$)	-0.17	0.01
+ Exogenous labor	-0.09	0.01
+ Common trade cost ($\xi_c = \xi_x = \xi_m$)	-0.05	0.03
+ No Roundabout	-0.01	0.03
+ No Capital good trade	0.01	0.04

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+ No Roundabout	-0.01	0.03
+ No Capital good trade	0.01	0.04

- Now lets add back the terms of trade effect by returning to unilateral case.

Sensitivity: Optimal tariff (Unilateral)

Offset:	Unilateral	
	Lump sum	**Investment**
Baseline	-0.06	0.18
+ No taxes ($\tau_k = \tau_L = 0$)	0	0.17
+ Revenue Subsidy	0.17	0.16

Sensitivity: Optimal tariff (Unilateral)

Offset:	Unilateral **Lump sum**	Unilateral **Investment**
Baseline	-0.06	0.18
+ No taxes ($\tau_k = \tau_L = 0$)	0	0.17
+ Revenue Subsidy	0.17	0.16
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+ Common trade cost ($\xi_c = \xi_x = \xi_m$)	0.13	0.18
+ No Roundabout	0.18	0.20
+ No Capital good trade	0.21	0.22

*Calibrated to have same trade share

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Baseline	-0.06	0.18
+ No taxes ($\tau_k = \tau_L = 0$)	0	0.17
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+ No Roundabout	0.18	0.20
+ No Capital good trade	0.21	0.22

*Calibrated to have same trade share

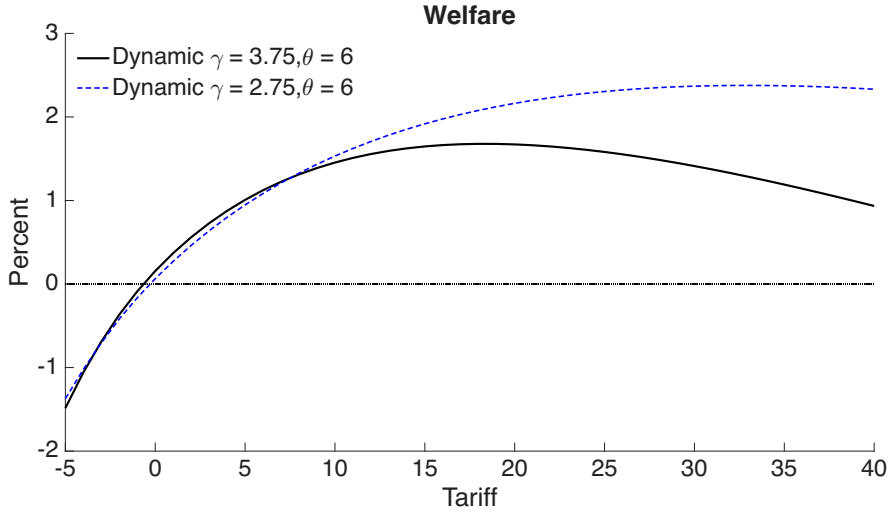
* Envelope-type condition in tariff tax cut case

Sensitivity - Trade Elasticity

1. Trade elasticity - lower Armington elasticity $\Rightarrow$ higher optimal tariff

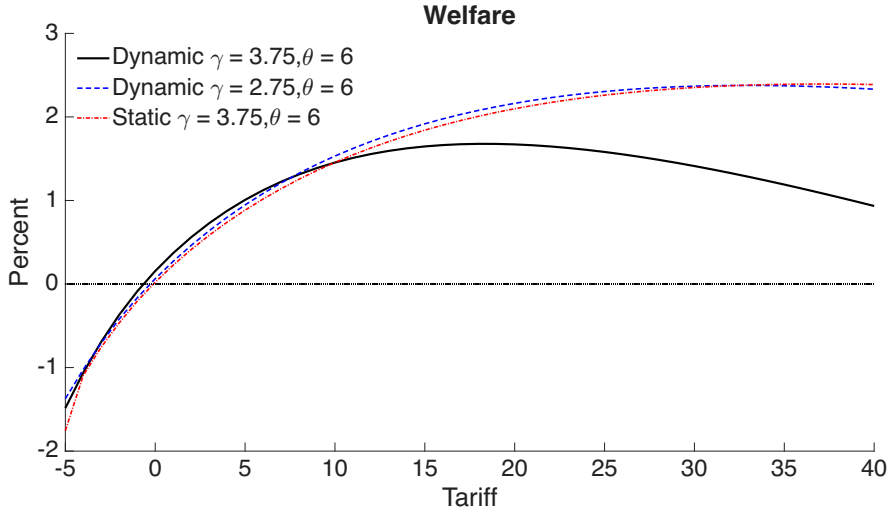
2. Trade dynamics - static model
- No exporter dynamics
- No firm creation
- No dynamics in trade elasticity
  $\Rightarrow$ Higher optimal tariffs

Unilateral - Optimal Policy & Trade Elasticity



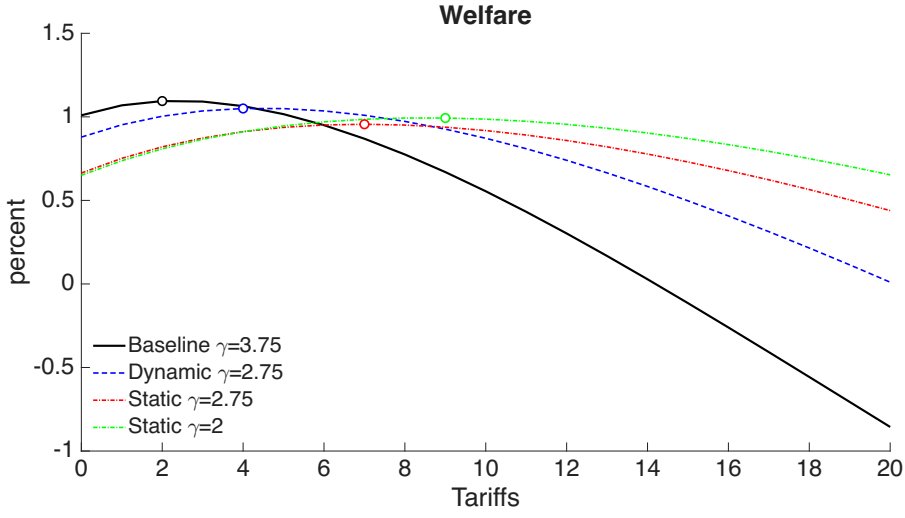
Optimal tariff is 33%

Unilateral - Optimal Policy & Trade Elasticity



Optimal tariff rises to 37%

Global - Optimal Policy & Trade Elasticity



As trade elasticity falls should rely more on tariffs.

Fiscal Implications

1. How much revenue can be raised? and at what horizon?

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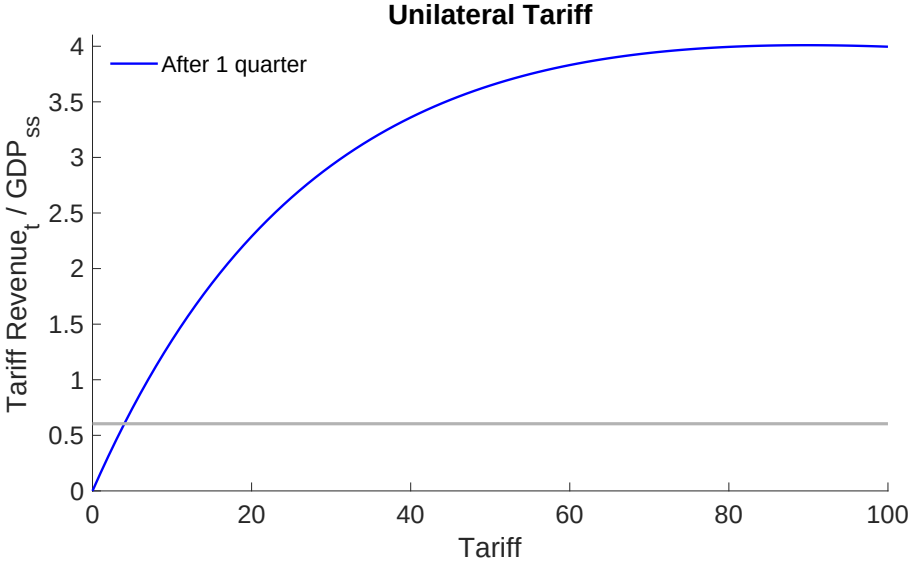
2. Largely determined by:
   - Tariff change
   - Trade elasticity dynamics (long-run matters, ε_∞)
   - Retaliation (Δ exchange rate)
   - Aggregate response (small)
3. Focus on one time **permanent** changes and h-horizon Laffer curve

Dynamic Laffer Curves



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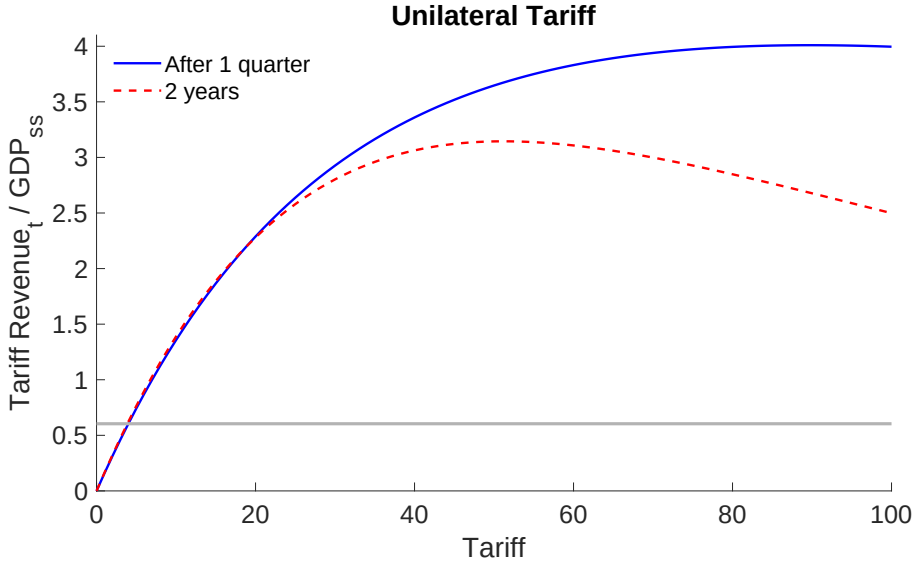

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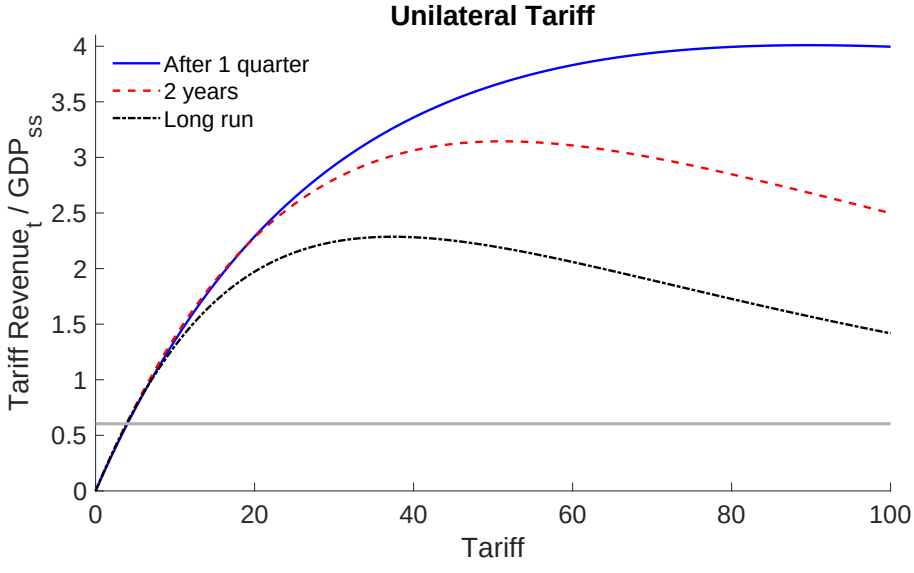
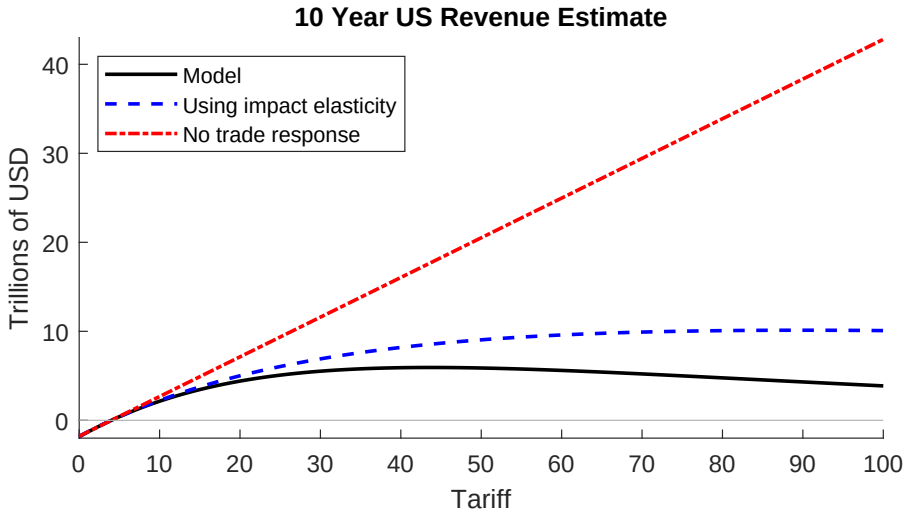
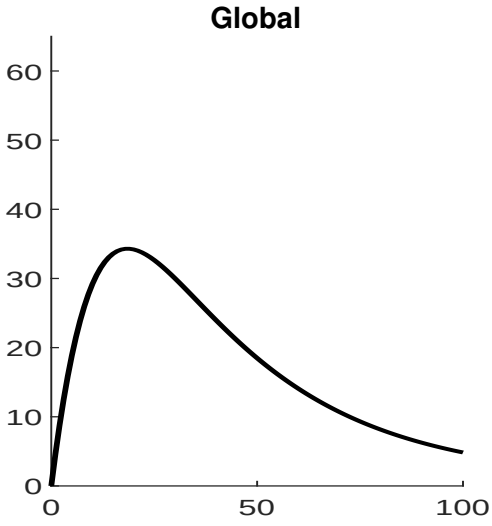
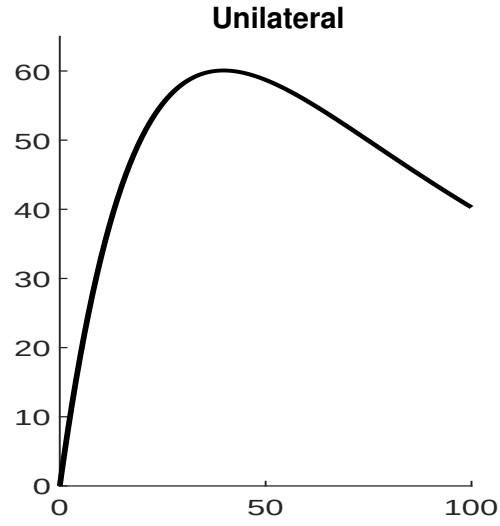


Dynamic Laffer Curves (unilateral)



PV Laffer Curves





Conclusion

- Tariffs revenue use determines welfare effect - focus on GBC.
  - Tariff rebate checks a bad idea! Investment subsidies best use.
  - Global free trade suboptimal & welfare gains pretty small $< 10\%$
  - Unilateral still mostly beggar-thy-neighbor
  - Trade elasticity dynamics key.
- Laffer curve is dynamic:
  - More funding for fiscal reform in initial periods
  - PV of revenue determined by long-run trade elasticity.
- Policy advice requires solving for transition of dynamic trade model.
  - Need to specify expectations
- Inventory frictions also important in near term (AKM, 2011, AKKMR, 2023)

Sensitivity

1. Initial Imbalances
2. Country size differences
3. Retaliation
4. Temporary trade wars

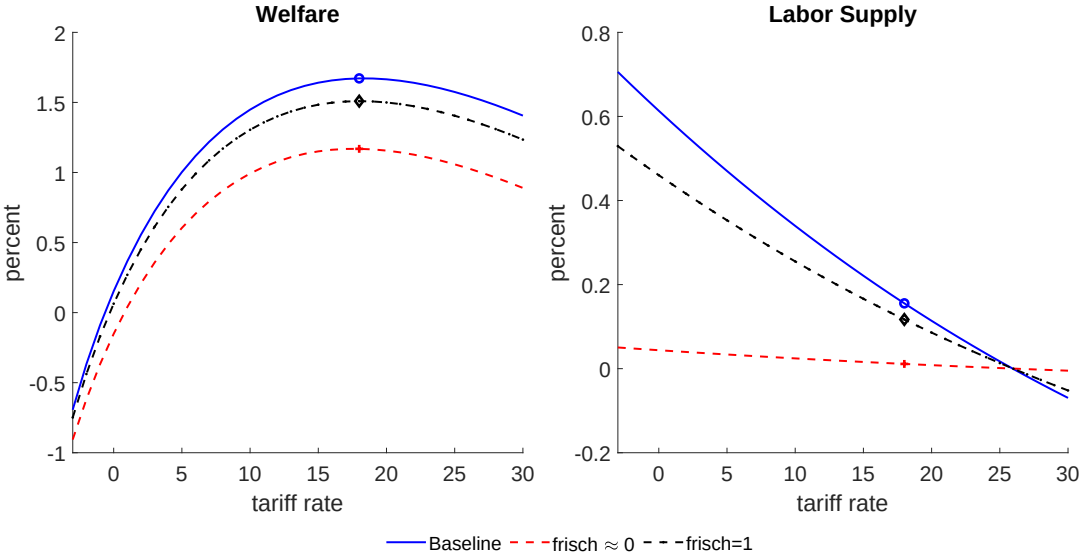
Panel A: Externally Calibrated Parameters

Param	Description	Value	Target
β	discount factor	0.99	
δ	capital depreciation rate	0.025	
σ	CRRA parameter	1	
γ	Armington elasticity	3.75	Quarterly tariff elasticity = 3.75
θ	Elast. of subst. between varieties	6	Markup = 20%
n_s	Firm survival rate	0.995	Surviving labor share
α_m	Share of materials in interm. production	0.6	GO/VA
$\bar{L}_i$	Labor endowment	1	Normalization
τ^K	Marginal Capital Tax	0.147	OMB (01/25)
τ^L	Marginal Labor Tax	0.272	OMB (01/25)

Panel B: Internally Calibrated Parameters			
μ	Relative preference C vs. L	0.49	Average Frisch elasticity=2
f_e	Entry cost	10.26	Average $N_i = \bar{L}_i$
α	Capital share of value added	0.19	Average WL/VA = 66%
f_0	Fixed cost scale (nonexporters)	23.23	Fraction exporters = 0.2
f_1	Fixed cost scale (exporters)	0.030	Incumbent export share = 0.95
ν	Fixed cost shape parameter	0.65	Churning & export volume relationship
ξ_{LH}	Ratio ξ_{GL}/ξ_{GH}	0.58	Export share: firms $\leqslant$5 years tenure
ξ_{CH}	Consumption-good iceberg cost	3.54	End-use trade flows
ξ_{XH}	Investment-good iceberg cost	1.10	End-use trade flows
ξ_{MH}	Material-good iceberg cost	2.38	End-use trade flows
ρ	Persistence of efficiency state	0.92	Target jointly w/ other parameters

[Back]

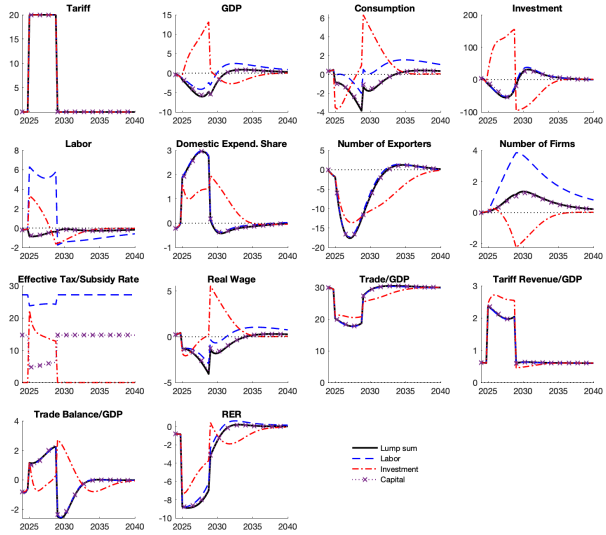
Sensitivity - Frisch



Sensitivity - Temporary Tariffs

1. Some think US will undo policies in future.
2. Will generate more revenue in short-run
   - Less trade substitution.
3. But, can be strongly contractionary
4. Study effects when used to offset taxes in same window (least contractionary)

Sensitivity - Temporary Tariffs



Sensitivity Optimal tariffs — Global

Global Investment	τ_k (%)	τ_L (%)	Optimal tariff (%)
Baseline	14.7	27.2	2.0
High capital tax	40.0	17.0	5.0
No capital tax	0.0	32.7	1.0
Capital Subsidy	-15.0	38.5	0.0
No Domestic taxes	0.0	0.0	1.0

Households

$$V_i^H(K_i, B_i, S) = \max_{C_i, L_i, X_i, B_i'} \frac{\left[C_i^{\mu}(\bar{L}_i - L_i)^{1-\mu}\right]^{1-\sigma} - 1}{1-\sigma} + \beta V_i^H(K_i', B_i', S')$$

$$\text{s.t.} \quad P_{Ci}C_i + P_{Xi}X_i + \frac{P_{Ci}B_i{}'}{R^B} \leqslant (1-\tau_i^L)W_iL_i + (1-\tau_i^K)(R_iK_i + \Pi_i)$$
$$+ \tau_i^K \delta P_{Ii} K_i + P_{Ci}B_i - P_{Ci}\frac{\phi}{2}\left(\frac{B_i}{Y_i^N} - \frac{\bar{B}_i}{\bar{Y}_i^N}\right)^2 + T_i$$

$$K_i' = (1-\delta)K_i + X_i\left[1 - \frac{\psi}{2}\left(\frac{X_i}{X_{i,-1}} - 1\right)^2\right]$$

Note: Treating corporate taxes same as capital income.

Also no taxes on international bonds.

Final Goods Producers

Each type of final good $G \in \{C, X, M\}$ is produced by a continuum of competitive firms.

$$G_i = \left[\sum_{j \in \mathcal{I}} \left[\int_{f \in \Omega_{ji}} G_{ji}(f)^{\frac{\theta-1}{\theta}} \right]^{\frac{\theta}{\theta-1}\frac{\gamma-1}{\gamma}} \right]^{\frac{\gamma}{\gamma-1}}$$

Ω_{ji} - set of firms in region j that export to region i,
θ - elas. of subs. across varieties of a common source region
$\gamma < \theta$ - elas. of subs. across varieties from different source regions.

$$\pi_{Gi} = \max P_{Gi} G_i - \sum_{j \in \mathcal{I}} (1 + \tau_{ji}) \int_{f \in \Omega_{ji}} P_{Gji}(f) G_{ji}(f) df$$

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$$P_{Gi} = \left[\sum_{j \in \mathcal{I}} ((1 + \tau_{ji}) P_{Gji})^{1-\gamma} \right]^{\frac{1}{1-\gamma}} \qquad \text{where} \qquad P_{Gji}^{1-\theta} = \int_{f \in \Omega_{ji}} P_{Gji}(f)^{1-\theta} df.$$

Intermediate Goods producers (new exporter dynamics)

Two key features of firm level export dynamics:

1. Exporting is very persistent (Baldwin/Krugman/Dixit/Roberts/Tybout)
- Relatively high upfront entry costs (sunk costs)
- Exporter fixed costs drawn from lower costs distribution than non exporters

2. New exporters take time to get exports to “scale” (Ruhl/Willis/Alessandria/Choi)
- Distribution technology requires repeated investments
- Shipping cost starts high and is expected to fall

Intermediate Goods producers (new exporter dynamics)

- Firms heterogeneous in fixed κ_{ij} and iceberg costs ξ_{ij}
- Each pd, firms in *i* draw fixed costs to export to *j* based on exporting status $e_{ij} \in \{0, 1\}$

$$V_{ij}(\xi_{ij}, \kappa_{ij}; F_{i,e_{ij}}, S) = \max_{e'_{ij}, p_{Gij}, l_{ij}, k_{ij}, m_{ij}} e_{ij} \left[\sum_G p_{Gij} G_{ij}(f) - W_i l_{ij} - R_i k_{ij} - P_{Mi} m_{ij} \right] - W_i e'_{ij} \kappa_{ij} + n_s \mathbb{E} D_i V_{ij}(\xi'_{ij}, \kappa'_{ij}; F_{i,e'_{ij}}, S')$$

$$\text{s.t.} \quad \sum_{G \in \{C,X,M\}} \xi_{G\xi_{ij}ij} G_{ij}(f) = z_i (k_{ij}^{\alpha} l_{ij}^{1-\alpha})^{1-\alpha_m} m_{ij}^{\alpha_m}$$

$$G_{ij}(f) = \left(\frac{p_{Gij}}{P_{Gij}} \right)^{-\theta} \left(\frac{P_{Gij}}{P_{Gj}} \right)^{-\gamma} G_j$$

Constant markup pricing.

Dynamic exporting from shock process & delayed entry:

Free Entry

$$W_i f_e = n_s \mathbb{E} D_i \left[V'_{dom,i} + \sum_{j \neq i} V'_{\infty,ij} \right],$$

where

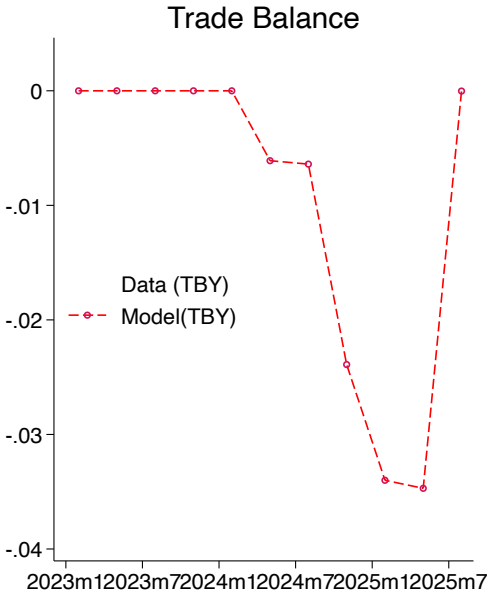
$$V_{dom,i} = \pi_{ii} + n_s \mathbb{E} D'_i V'_{dom,i},$$

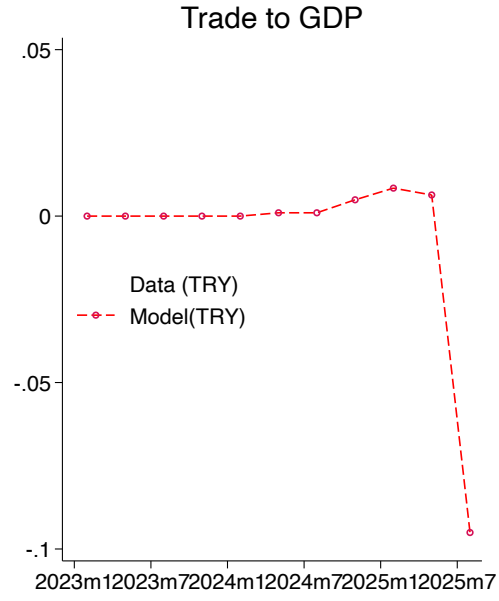
- π_{ii} is the optimal static profits from operating in the domestic region.
- $V_{\infty,ij}$ is the value of starting as a non-exporter.
- As value of exporting is "discounted" relative to domestic value $\Rightarrow$ tariffs are pro-variety
  - Reduced domestic comp. more important than lost foreign opportunities (AC14)
  - In static trade models these margins completely offset and trade is variety-neutral.
- Generates a flow in of firms, N_{ei}, and LOM: $N'_i = (1 - n_s)N_i + N_{ei}$
- Denomination of fixed costs (labor/goods) matters (Ekerdt, 23; Romer, 87)

Fitting

- Large widening of US trade deficit in advance of tariffs suggest acting in advance.
- Choose a path of expected future tariffs starting in 2023Q4 to match dynamics of US net exports.
- Update expectations as we go along.
- Yields a good fit of trade balance.

Model and Data





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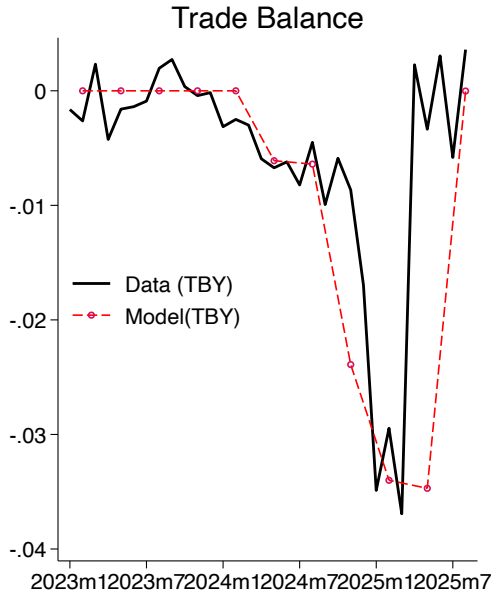

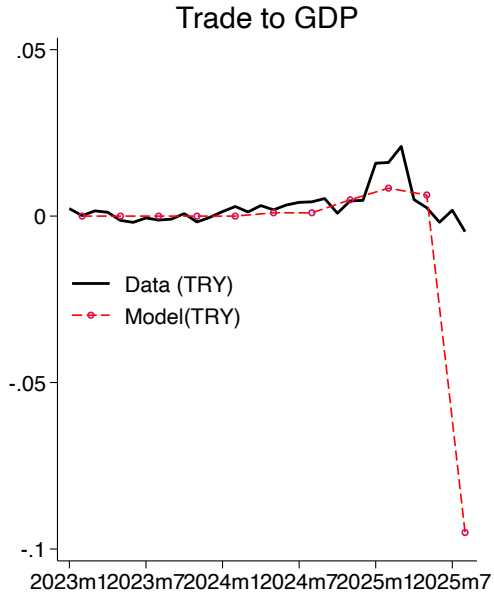

Model, Data and Prediction