

Tax Policy and Investment in a Global Economy

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*The views expressed here are the authors' and do not necessarily reflect those of the Treasury Department.

Tax Cut and Jobs Act of 2017 (TCJA)

- Largest corporate tax reduction in U.S. history (\$1.5T per JCT):
- Policy evaluation questions:
 1. Effect on total investment?
 2. Effect on the location of investment?
 3. Do TCJA corporate provisions pay for themselves?
 4. Which provisions drive the responses?
- Economic questions:
 1. Nature of multinational production and investment.
 2. Policy counterfactuals.

This Paper

1. **Model** of global investment behavior extending Hall and Jorgensen (1967).
 - Domestic and foreign capital complements or substitutes and determined by domestic + foreign marginal rates (METRs) $\tau, \bar{\tau}$, cost-of-capital subsidies $\Gamma, \bar{\Gamma}$.
2. **Measurement** of firm-level tax changes using **tax returns**.
 - Panel of 9,000 C-corporations from U.S. Treasury.
3. **Estimation** using investment behavior of C-corporations:
 - Elasticities of domestic investment to 4 tax terms by firm type.
 - Use elasticities to estimate structural parameters.
 - Validate with foreign capital response, synthetic controls design, stock returns.
4. Model **quantification** and **counterfactuals**:
 - Long-run corporate capital accumulation in general equilibrium.
 - Tax revenue response and contributions by tax component.
 - Isolate impact of major provisions and future policy reforms.

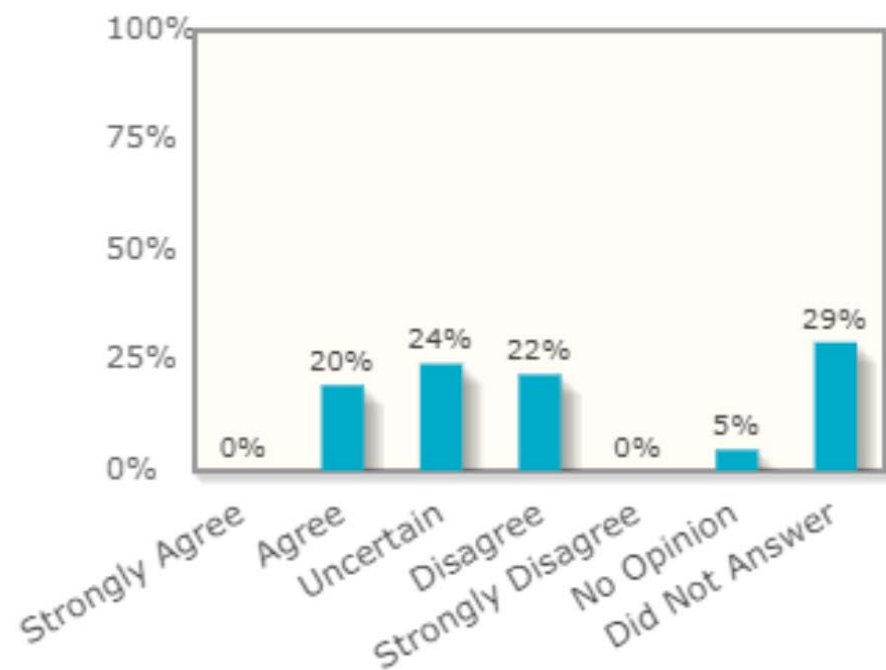
Main Findings:

1. Domestic investment **20%** higher for firm with average versus no tax change.
 - Large effects driven by large shock, not large elasticities.
2. Foreign capital \uparrow substantially due to novel tax incentives.
3. Domestic investment \uparrow in response to foreign incentives.
 - Domestic and foreign capital are **complements** in production.
4. Long-run general equilibrium: domestic capital **7%** and total capital **11%** higher.
5. Dynamic revenue feedback over 10 years $< 2\text{p.p.}$ of baseline corporate revenue.
 - Total corporate revenue in model is close to the mechanical effect.
 - Higher depreciation deductions offset additional labor and corporate tax from \uparrow K.
 - Investment response **too small** to overcome **lower tax revenue**.

Question B:

Corporate capital stock is substantially higher now as a result of the passage of the TCJA than it would have been had the TCJA not been passed, and all else was equal.

Responses

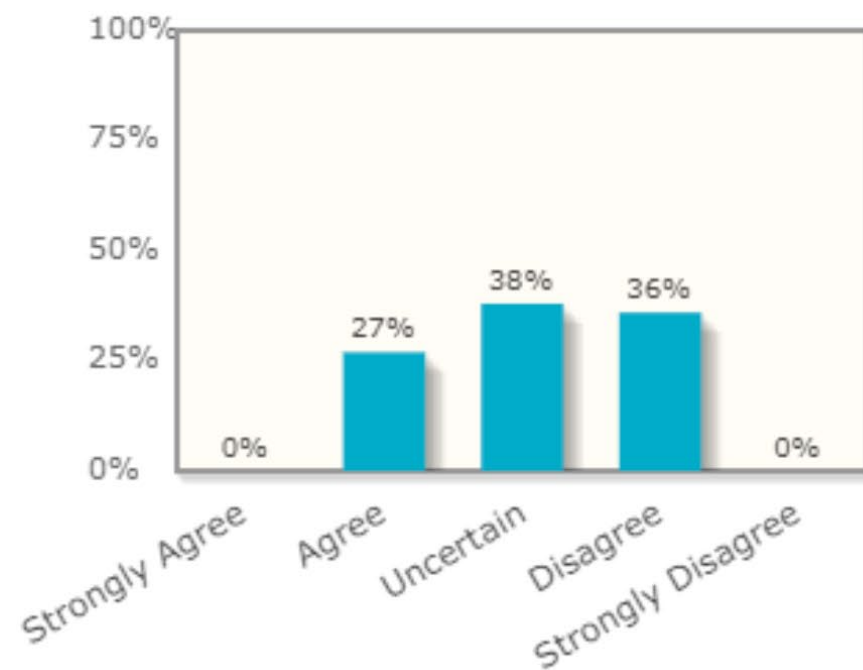


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Source: Clark Center Economic Experts Panel

Methodology

Responses weighted by each expert's confidence



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Source: Clark Center Economic Experts Panel

Methodology

Model Overview

Extend Hall and Jorgenson (1967) to a **multinational setting**:

- Firm operates domestic and international plants.
- Each plant's output depends on domestic capital K and international capital \bar{K} .
- Dynamic capital choice under perfect foresight.

Characterize investment response to **four tax terms** (regression specification):

- Domestic METR τ and cost-of-capital subsidy Γ .
- International METR $\bar{\tau}$ and cost-of-capital subsidy $\bar{\Gamma}$.

Four key parameters:

- Returns-to-scale α .
- Elasticity of substitution between domestic and foreign capital σ .
- Importance of foreign capital in local profits and vice-versa $1 - a$, $1 - \bar{a}$.

Special Cases and Implications

$$k = \frac{\omega_{k,r}\hat{\Gamma} + (1 - \omega_{k,r})\bar{\Gamma} - \omega_{k,\tau}\hat{\tau} - (1 - \omega_{k,\tau})\bar{\tau} + \epsilon}{1 - \alpha}.$$

- Domestic only ($a = 1$): $\omega_{k,r} = \omega_{k,\tau} = 1$.
 - Traditional “tax term” $(1 - \Gamma)/(1 - \tau)$ elasticity of $1/(1 - \alpha)$.
- $F_{K\bar{K}} = 0$ ($\alpha + 1/\sigma = 1$): $\omega_{k,r} = 1$.
 - No spillovers: domestic investment independent of foreign cost of capital.
- $\omega_{k,r} < 1$ iff $F_{K\bar{K}} > 0 \Leftrightarrow \alpha + 1/\sigma > 1$.
 - $\bar{\Gamma} \uparrow \Rightarrow \bar{K} \uparrow$. What happens to K depends on $F_{K\bar{K}}$.

Measurement of Tax Terms

$\Gamma_{i,t}$: firm-level depreciation allowances, Section 179, FDII incentive.

- Pre-2011 investment by capital type at firm level.
- TCJA: full expensing for equipment (assumed permanent); FDII. [▶ Details](#)

$\tau_{i,t}$: apply pre/post TCJA law to marginal \$ on firm-level simulated income path.

- Simulate path of income and credits/deductions using pre-TCJA data.
- TCJA: rate 35% to 21%; NOL limits; DPAD repeal; AMT repeal; FDII. [▶ Details](#)

$\bar{\Gamma}_{i,t}$: foreign depreciation incentives + GILTI.

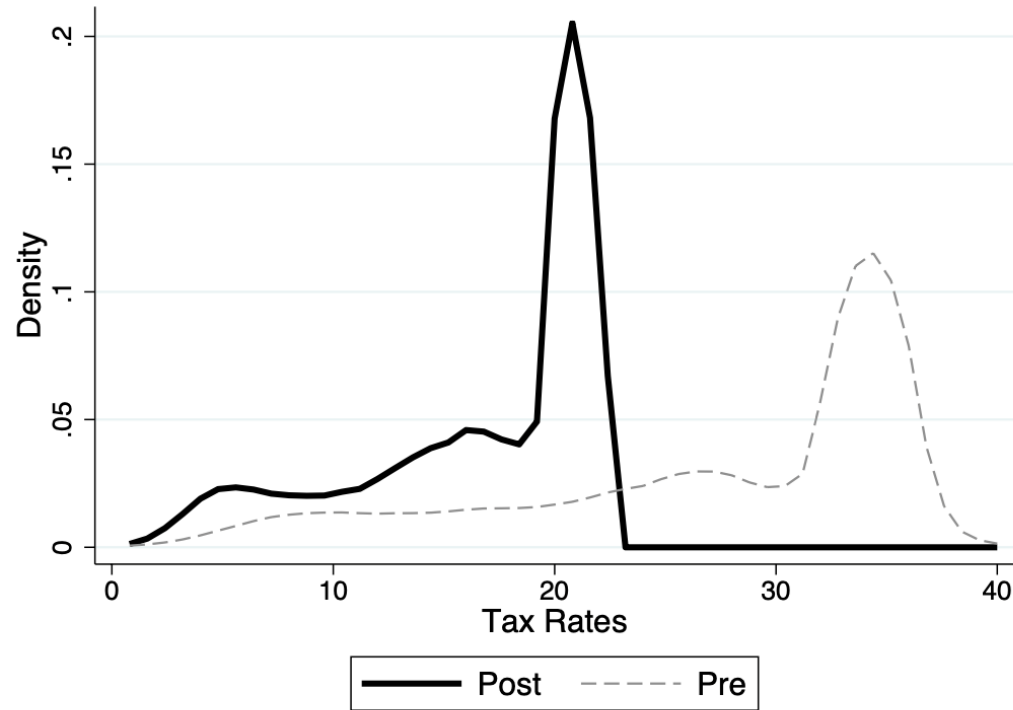
- OECD average tax rate and PV of tax depreciation from Foertsch (2021).
- TCJA: deduction for 10% of foreign tangible capital via GILTI. [▶ Details](#)

$\bar{\tau}_{i,t}$: pre-reform expectations of GILTI-like transition tax.

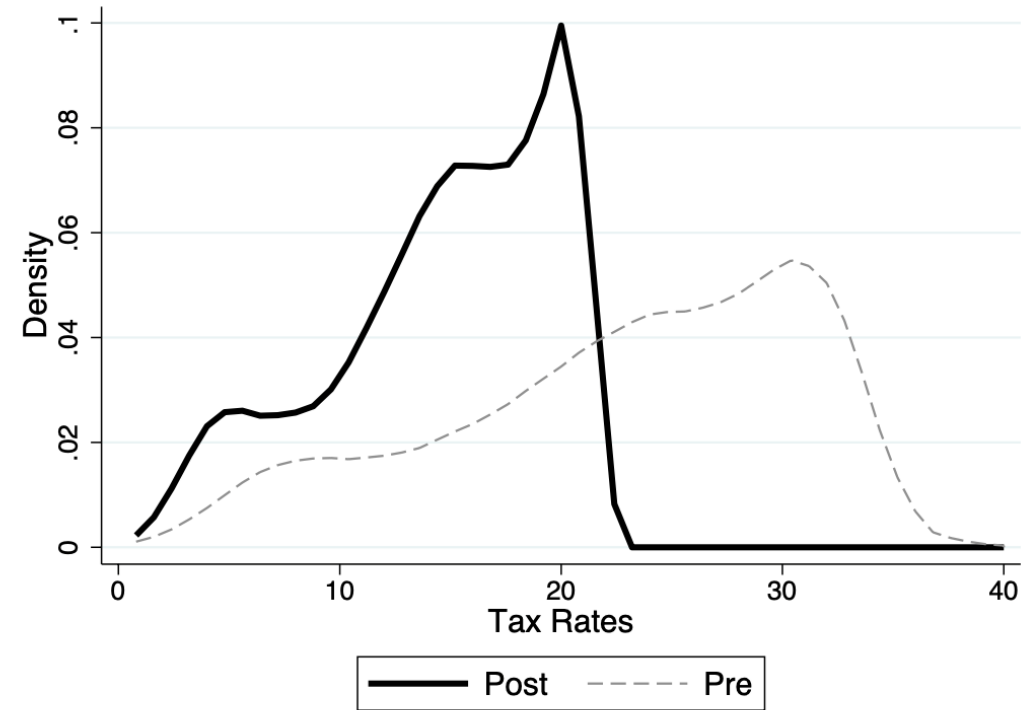
- Plausible: actual transition rate 8-15.5%.
- Practical: exclude $\hat{\tau}_{i,t}$ from regression.

Kernel Density of Domestic Tax Rates ▶ Changes

A: Pre- and post-TCJA τ



B: Pre- and post-TCJA Γ



- τ \downarrow more if high pre-TCJA rate or exporter, less if DPAD or AMT user.
- Γ \downarrow less if higher equipment share or low depreciation equipment, more if FDI.

Specification

- Key equation from model:

$$k = \frac{\omega_{k,r}\hat{\Gamma} + (1 - \omega_{k,r})\hat{\Gamma} - \omega_{k,\tau}\hat{\tau} - (1 - \omega_{k,\tau})\hat{\tau} + \epsilon}{1 - \alpha}.$$

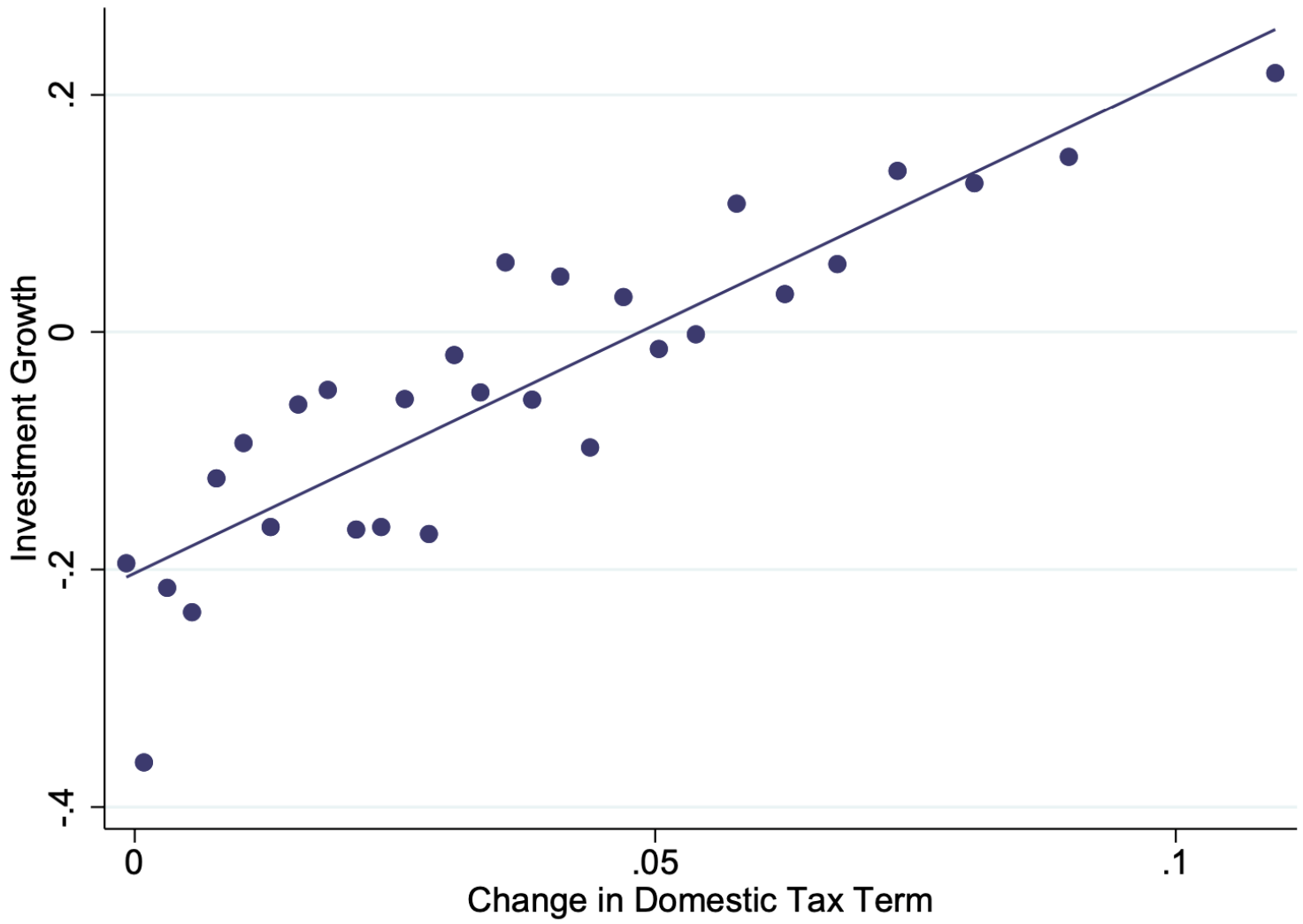
- $k = d \ln l$: main outcome is log investment 2018-19 less 2015-16.
- Associated cross-firm regression:

$$d \ln l_i = b_0 + b_1\hat{\Gamma}_i + b_2\hat{\Gamma}_i + b_3\hat{\tau}_i + e_i.$$

- e_i : firm-level productivity shocks, depreciation, capital goods purchase price, etc.
- Samples: domestic, multinat. high ($\bar{K}/K > 0.15$), multinat. low ($\bar{K}/K < 0.15$).
- Note: model equation is cross steady state while regression is short horizon.

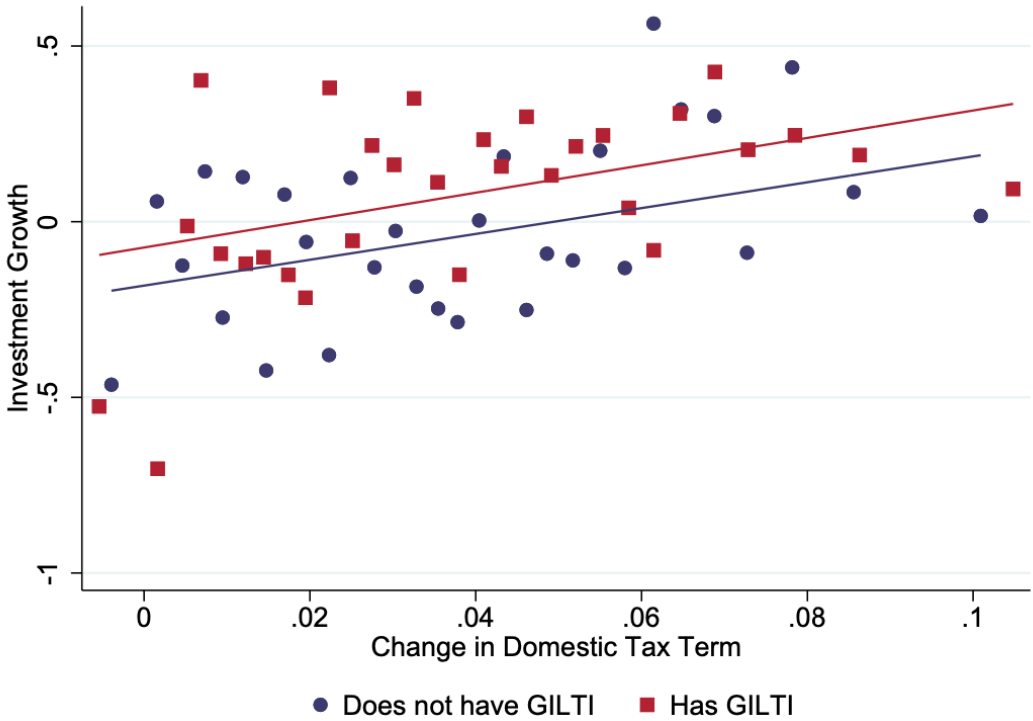
Non-Parametric Evidence of Tax Changes on Domestic Investment

Panel A: Domestic Firms

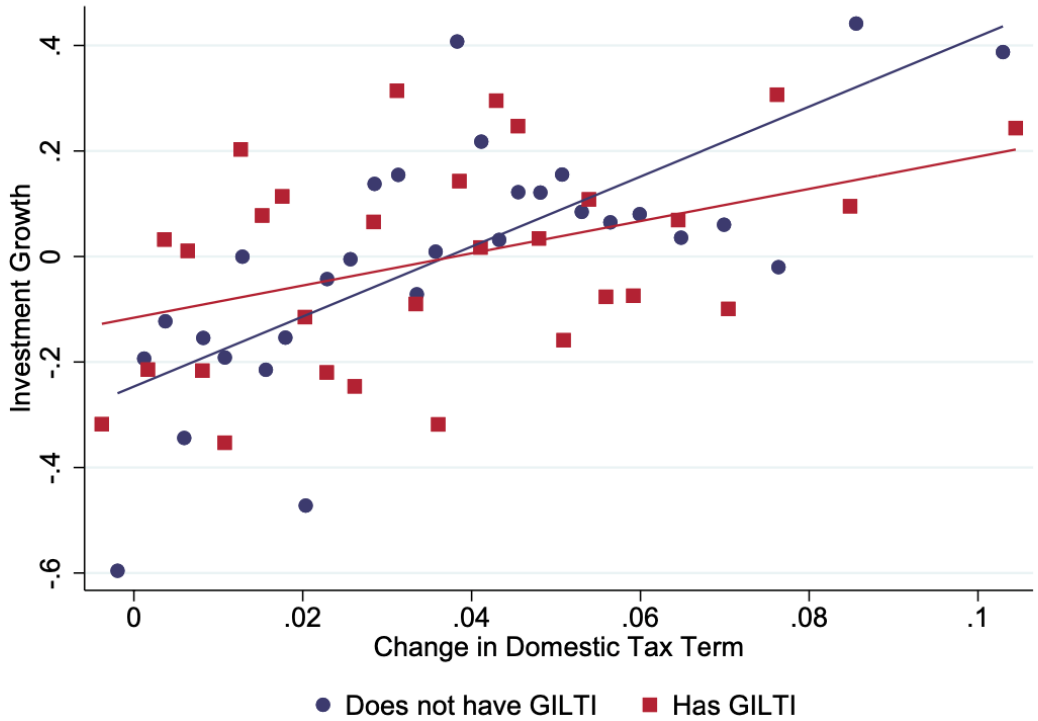


Non-Parametric Evidence of Tax Changes on Domestic Investment

Panel B: Multinational-High Firms

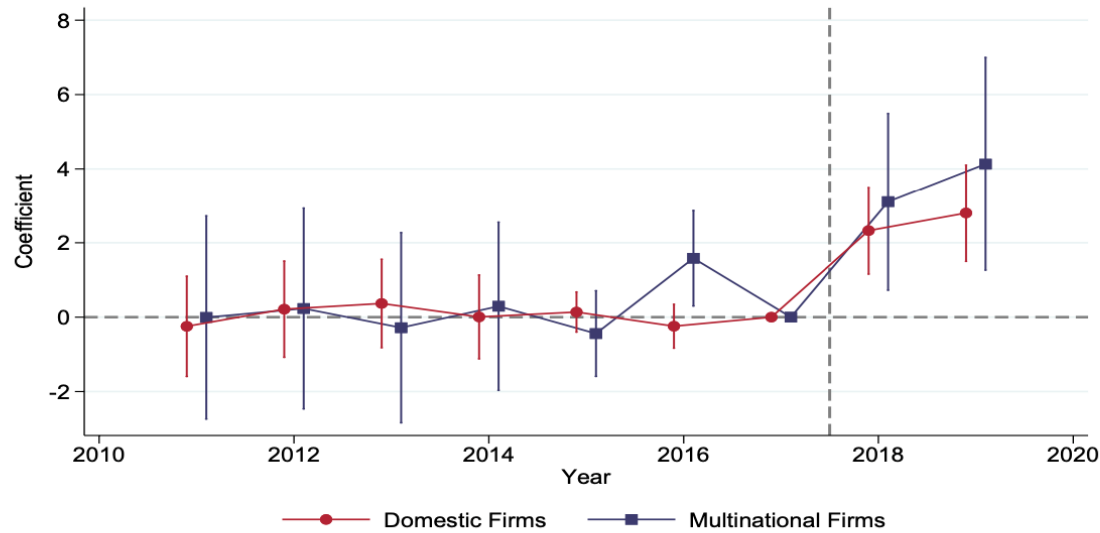


Panel C: Multinational-Low Firms

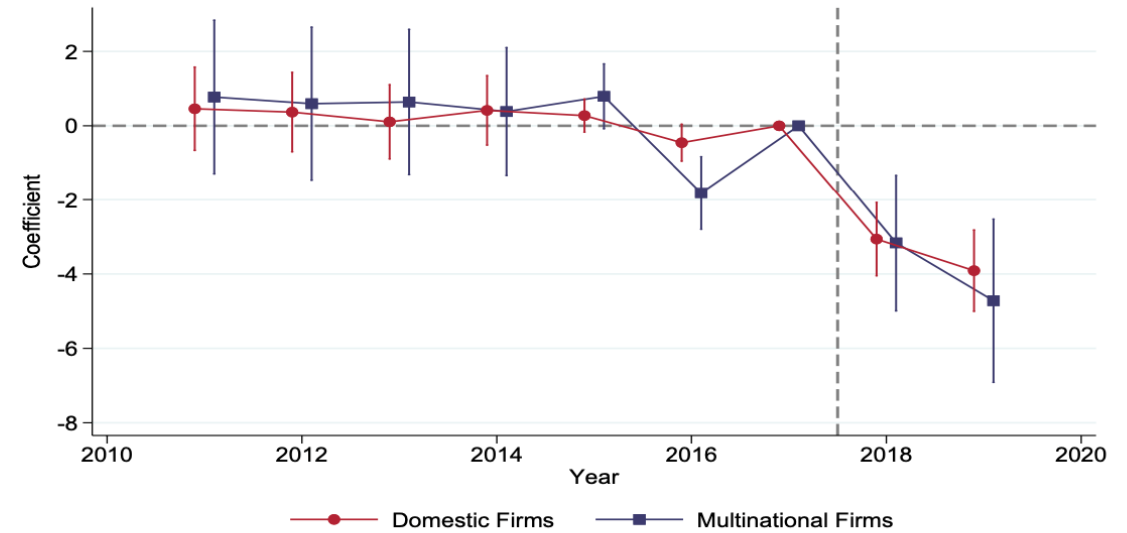


Coefficients by Year on Investment Relative to 2017 [▶ back](#)

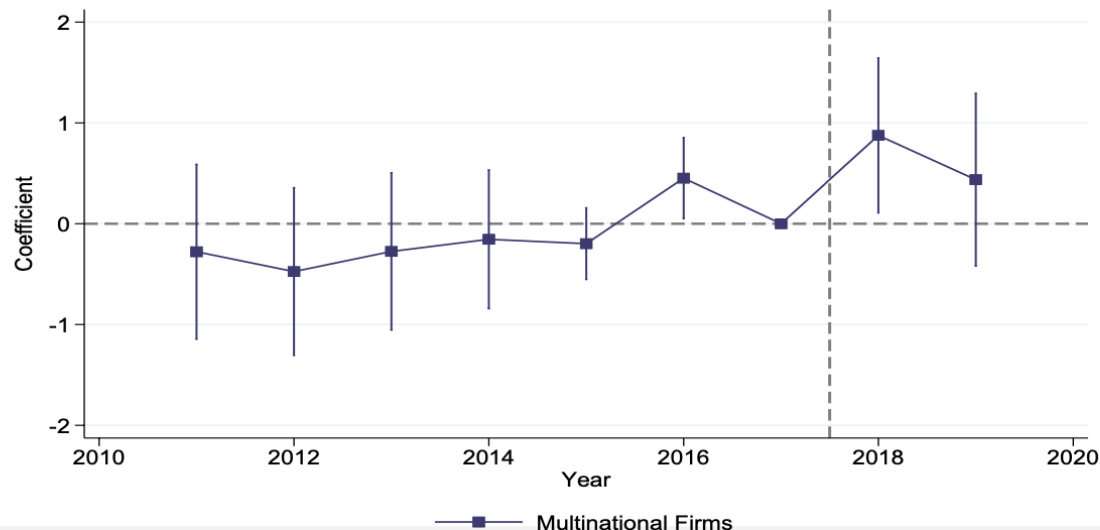
A. Domestic Cost-of-Capital $\hat{\Gamma}$



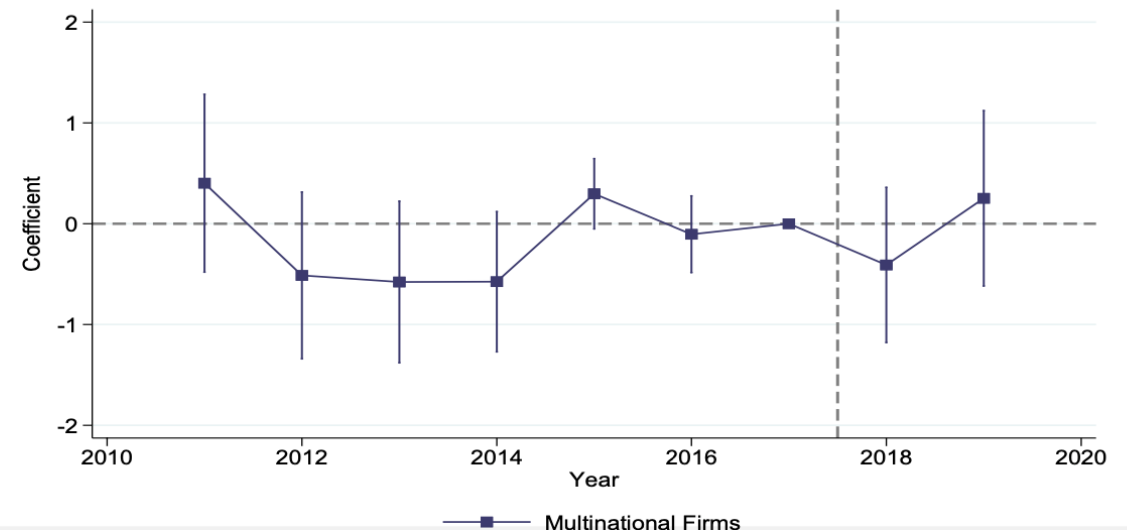
B. Domestic Tax Rate $\hat{\tau}$



C. Foreign $\hat{\Gamma}$: Multinational-High



D. Foreign $\hat{\Gamma}$: Multinational-Low



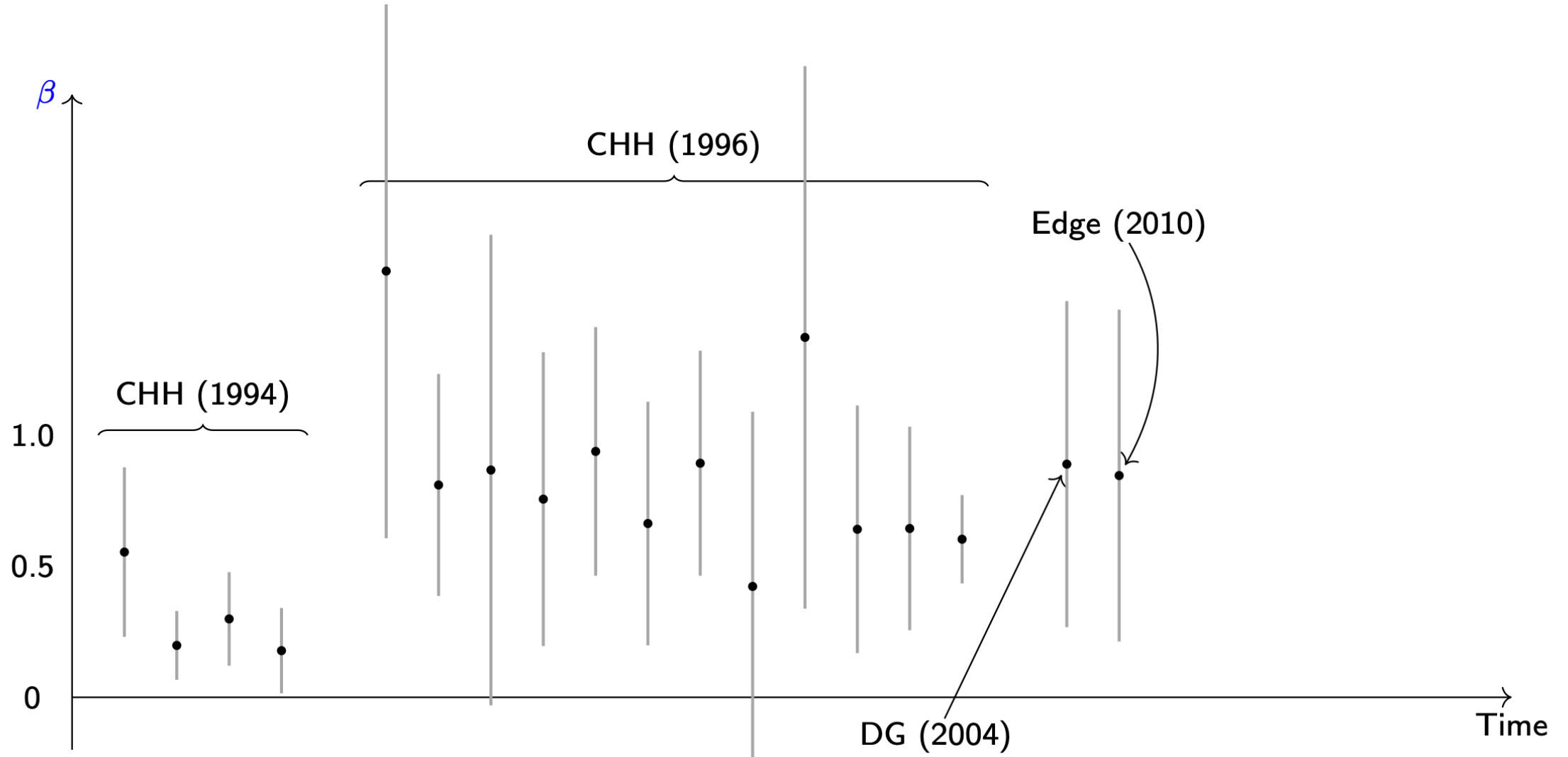
Baseline Investment Growth Regression Results

Magnitudes: Reduced form coefficients \times mean shock

\Rightarrow 20% increase in domestic investment vs. no-shock baseline (partial equilibrium)

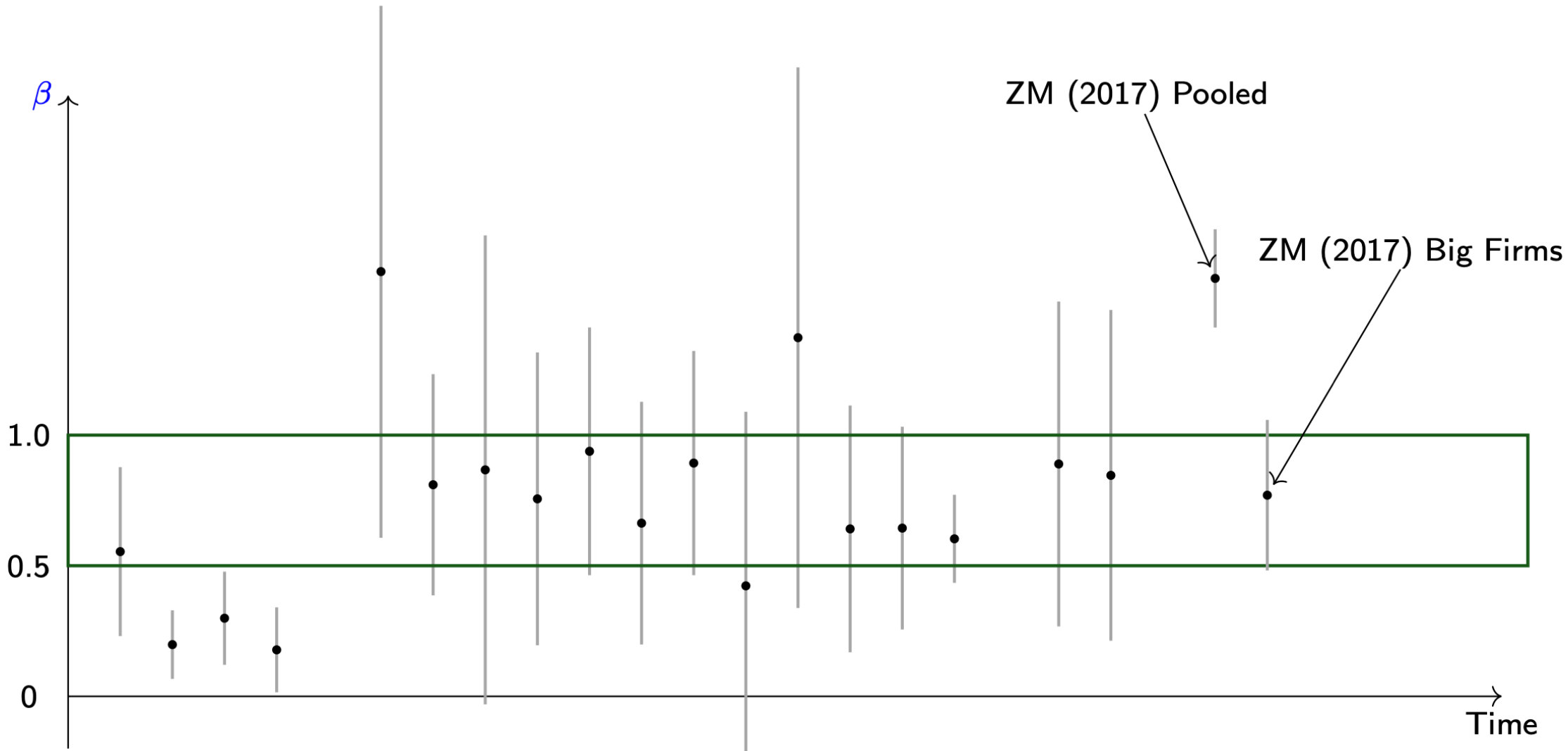
Comparison to Past Estimates

$$\frac{I_t}{K_{t-1}} = \alpha_i + \delta_t + \beta \frac{1 - \tau_Z}{1 - \tau} + \gamma X_{it} + \varepsilon_{it}$$



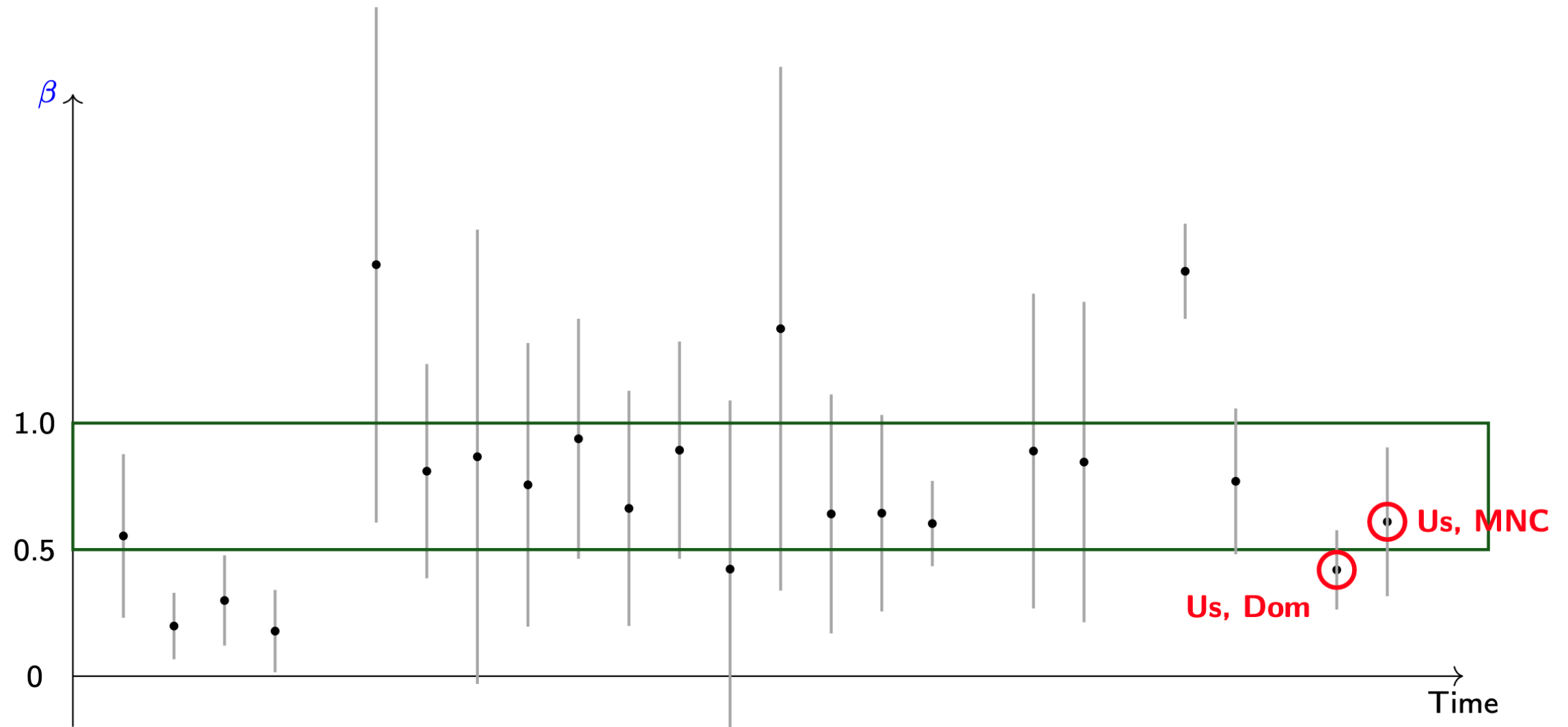
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$$\frac{I_t}{K_{t-1}} = \alpha_i + \delta_t + \beta \frac{1 - \tau_Z}{1 - \tau} + \gamma X_{it} + \varepsilon_{it}$$



Identification via Method of Moments

- Calibrate foreign adjustment costs $\bar{\phi} = 0$ given b_2/b_1 .
- Convert short-run elasticities to long-run using ratio χ_{SR} . [▶ details](#)
- 5 moments all functions of $\alpha, \sigma, a, \bar{a}, \chi_K$, plus $\chi_R = 1, \chi_{SR} = 1.3$ (Winberry, 2021):

$$\text{Reg. coef. } \Gamma: \quad b_1 = \chi_{SR} \omega_{k,r} / (1 - \alpha),$$

$$\text{Reg. coef. } \bar{\Gamma}: \quad b_2 = \chi_{SR} (1 - \omega_{k,r}) / (1 - \alpha),$$

$$\text{Reg. coef. } \tau: \quad b_3 = \chi_{SR} \omega_{k,\tau} / (1 - \alpha),$$

$$\text{Relative capital:} \quad \bar{K}_0 / K_0 = \chi_K,$$

$$\text{Relative profits:} \quad \frac{(1 - \bar{\tau}_0) \bar{F}_0}{(1 - \tau_0) F_0} = \left(\frac{(1 - a) \chi_K^{-\frac{1}{\sigma}} - a \chi_R}{(1 - \bar{a}) \chi_R - \bar{a} \chi_K^{-\frac{1}{\sigma}}} \right) \left(\frac{\bar{a} \chi_K^{\frac{\sigma-1}{\sigma}} + (1 - \bar{a})}{a + (1 - a) \chi_K^{\frac{\sigma-1}{\sigma}}} \right).$$

Note: $\omega_{k,r}, \omega_{k,\tau}$ functions of $\alpha, \sigma, a, \bar{a}, \chi_K$. [▶ Details](#)

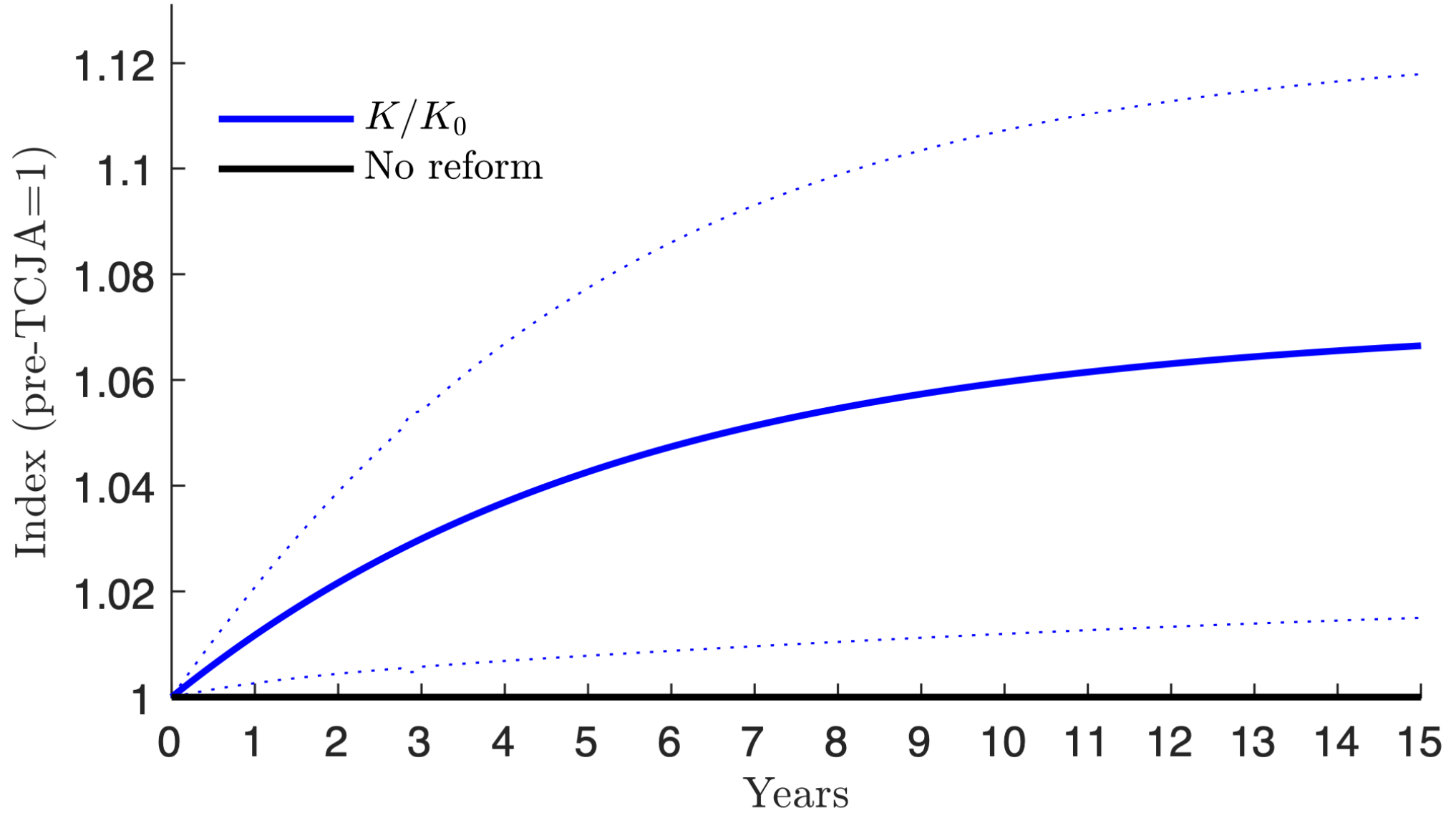
- Apply separately to domestic and multinational samples.

Moments and Parameters

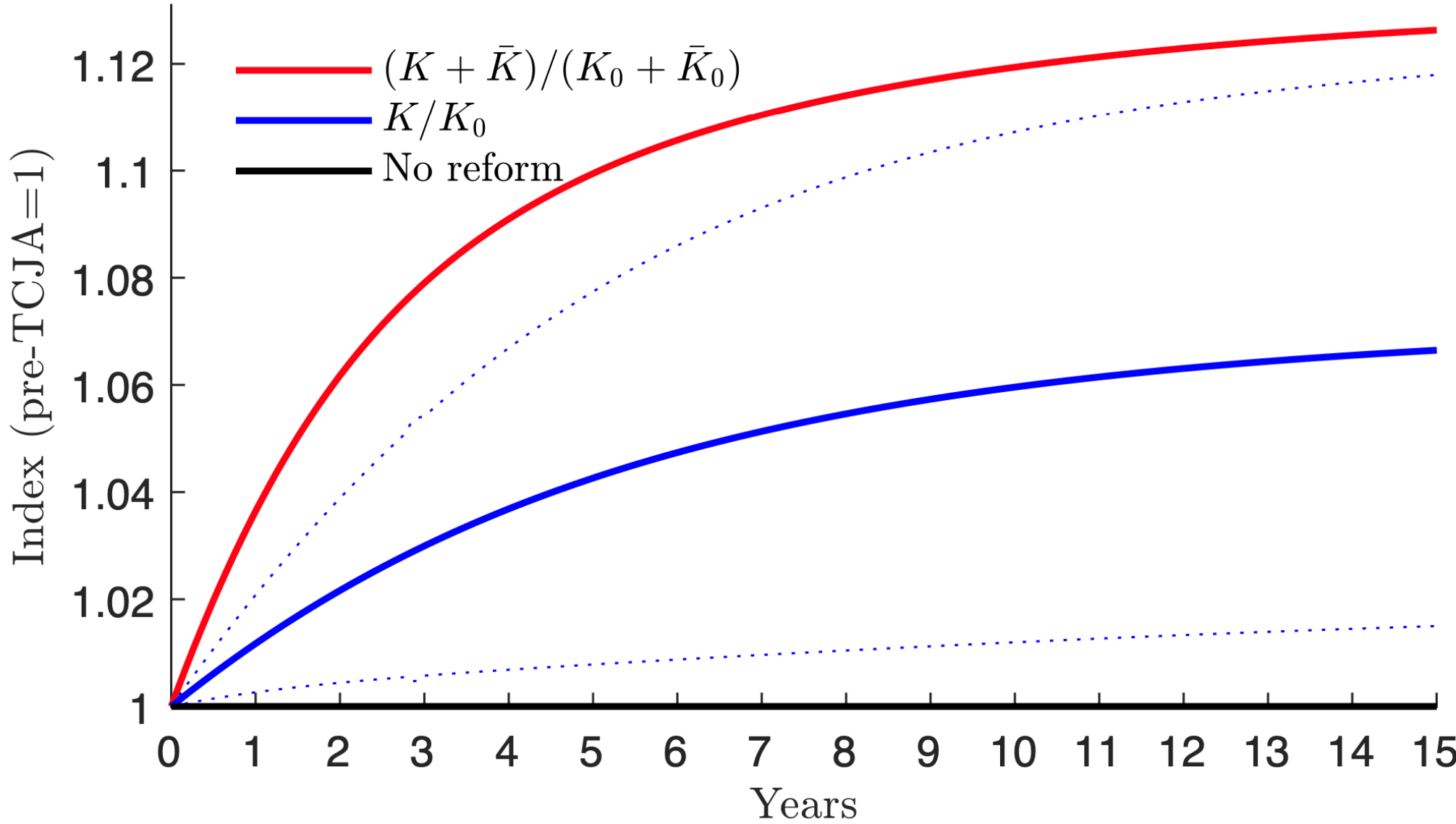
Panel A: Moments										
	b_1		b_2		b_3		χ_K		$\chi_\tau \chi_F$	
	Data	Model	Data	Model	Data	Model	Data	Model	Data	Model
Group:										
Domestic	3.06	3.06			-3.06	-3.06				
Multinat. high	3.50	3.50	0.62	0.62	-3.27	-3.27	0.57	0.57	0.62	0.63
Multinat. low	2.41	3.00	-0.10	-0.10	-3.19	-2.83	0.05	0.05	0.12	0.11

Panel B: Parameters chosen to match moments					
	χ_K	α	σ	a	\bar{a}
Group:					
Domestic		0.67			
Multinat. high	0.57	0.76	1.25	0.95	0.88
Multinat. low	0.05	0.66	12.19	1.00	0.93

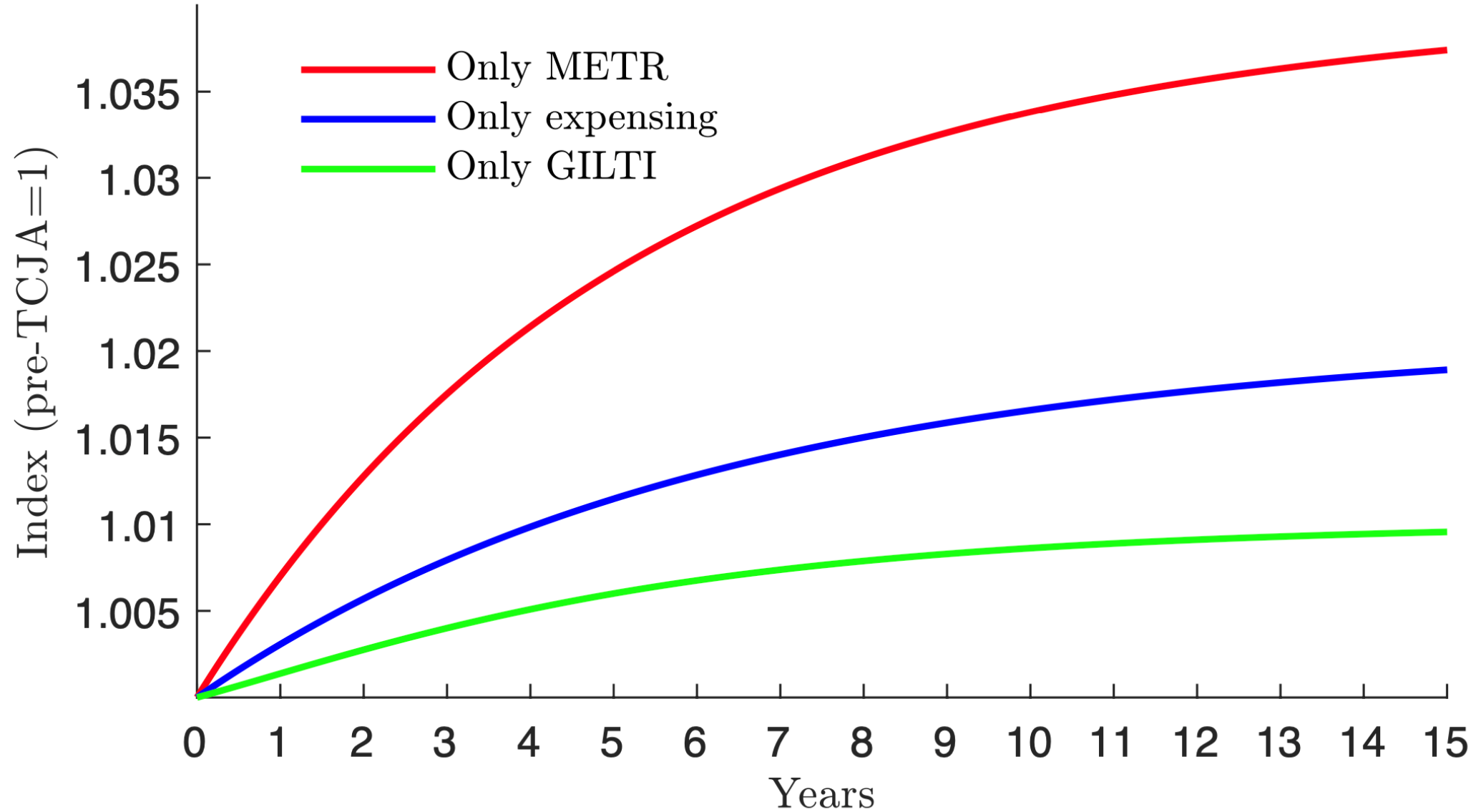
TCJA and Model-Implied Capital



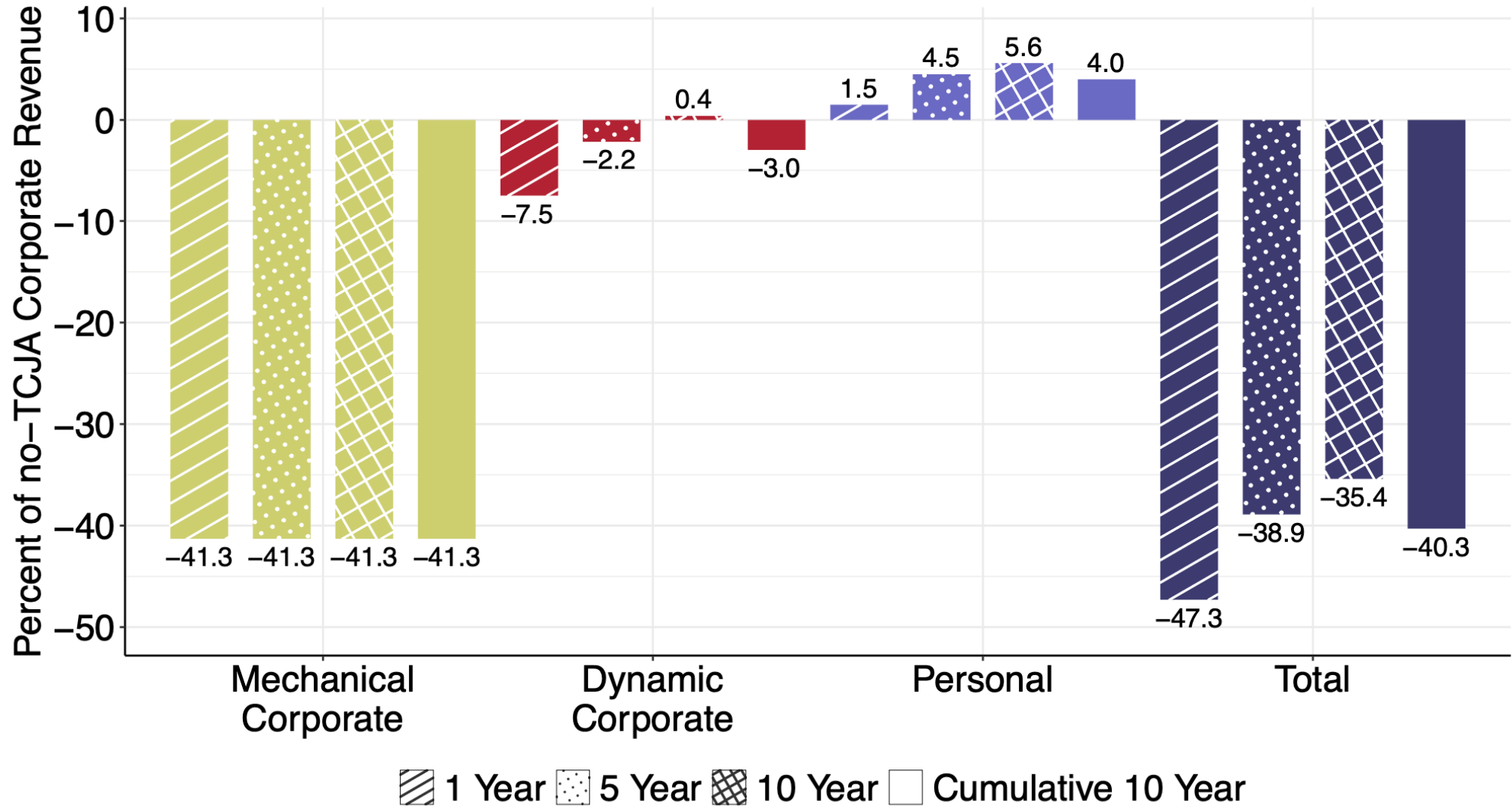
TCJA and Model-Implied Capital



Domestic Capital by Provision

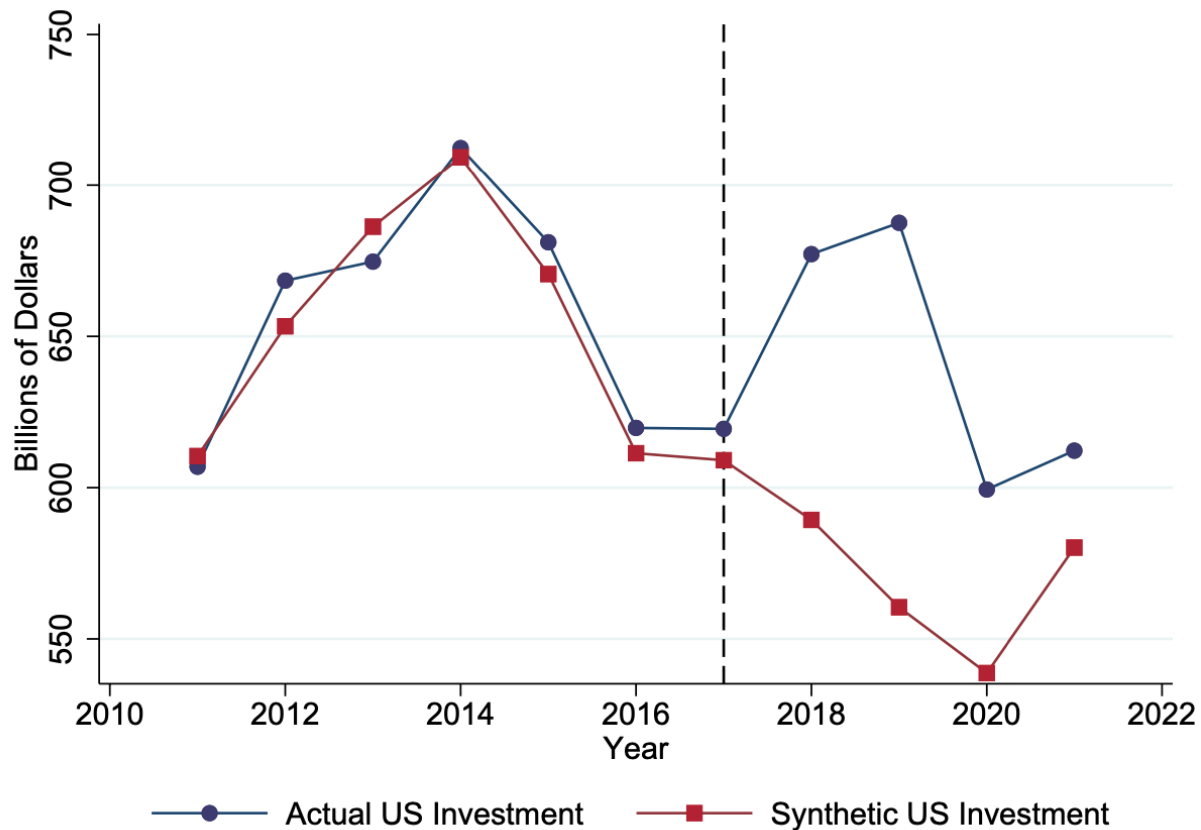


Revenue Effects

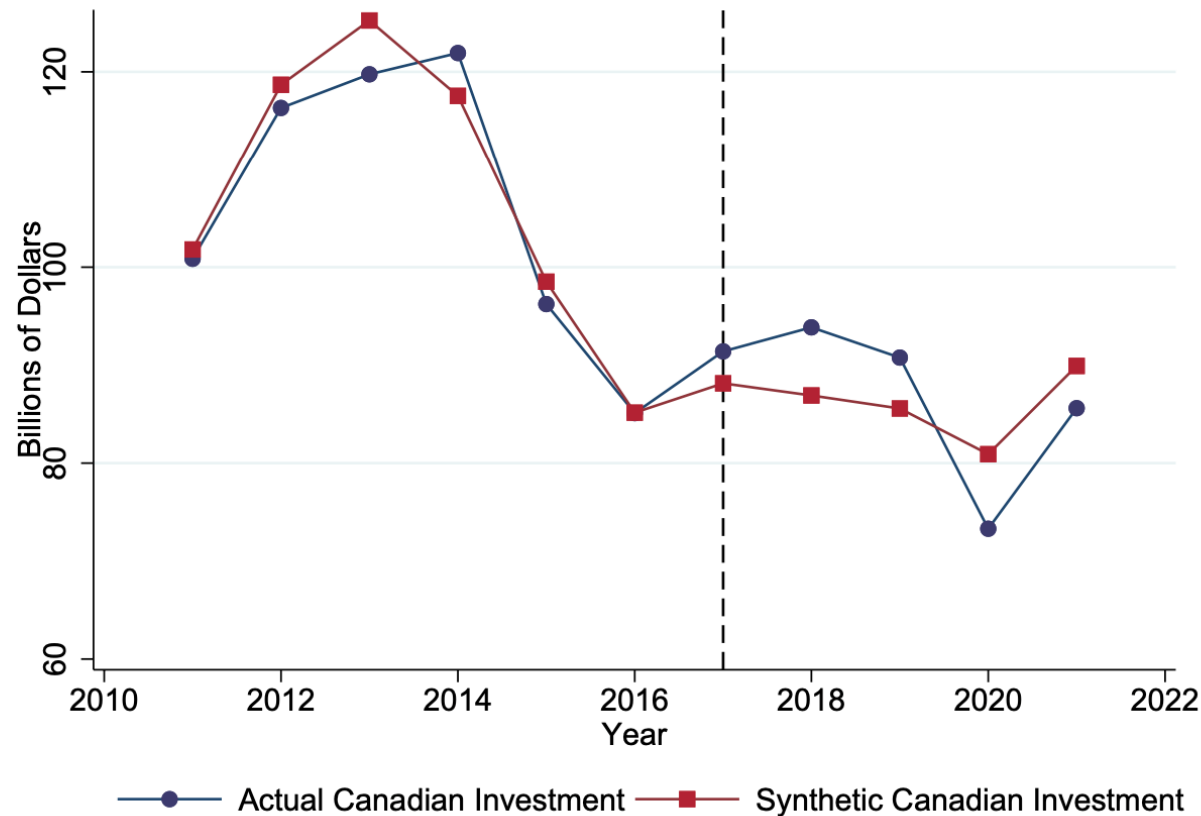


Compustat Investment versus Synthetic Control ▸ Regressions

Actual Experiment



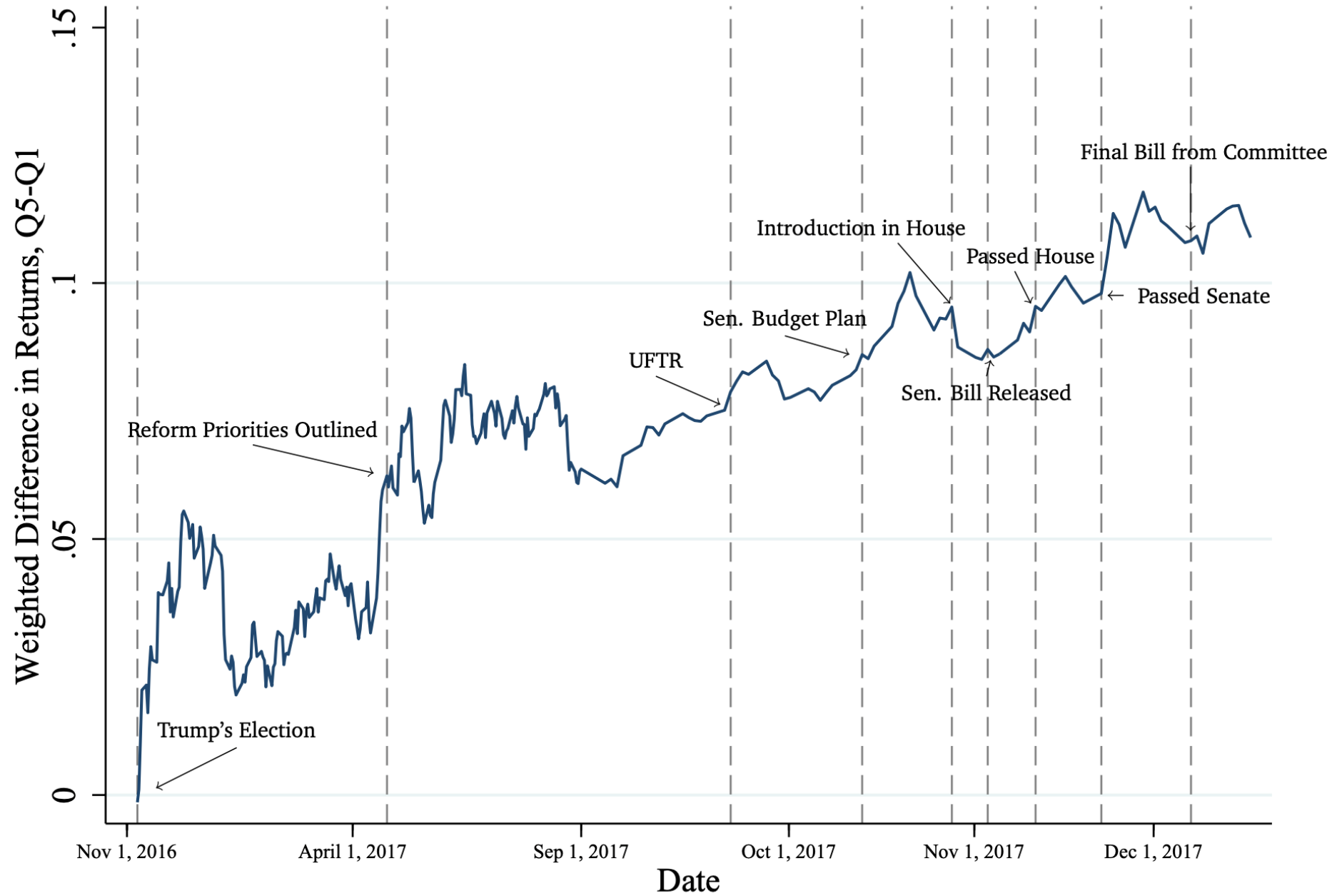
Placebo with Canadian Firms



Validation and robustness:

- Total taxes fall, revenues are unchanged → not demand shocks.
- Not driven by one region or industry.
- Pre-period placebo test passes (Abadie 2021).

Cumulative Stock Returns [▶ More](#)



Conclusion

1. **Domestic investment** ↑ due to large tax changes.
2. Provisions targeting intangible capital **increased foreign tangible capital**.
3. **Complementarity**: domestic response partly due to international provisions.
4. Total investment response too small to overcome **lower tax revenue**.