The Ripple Effects of Global Tax Reform on the U.S. Economy

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Paris School of Economics | May 22, 2025

Motivation

Introduction

Multinational Enterprises (MNEs) shift large portions of their profits to tax havens:

- Tørsløv, Wier and Zucman (2022): 36% of global MNE profits shifted to tax havens
- OECD: $240 bn. (10%) of global corporate tax revenues lost annually

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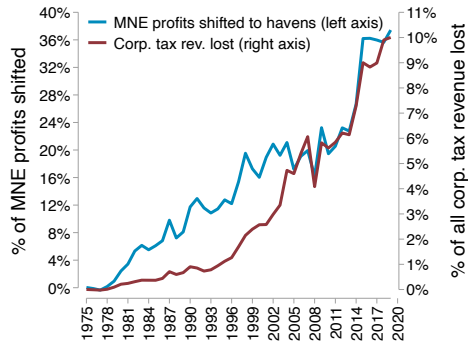
In this paper, we ask:
1. What are the effects of the global tax reforms on the US economy?
2. How does the multilateral GMT interact with the unilateral TCJA?

Importance of MNEs in the United States and global profit shifting

Introduction
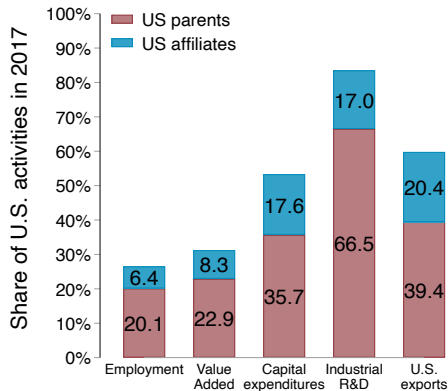
(a) Importance of MNEs

(b) Rise of profit shifting

Source: Panel (a): Bureau of Economic Analysis, National Income and Product Accounts; National Science Foundation, Science and Engineering Indicators; Census Bureau Annual Capital Expenditure Survey; Panel (b): Wier and Zucman (2022)

Profit shifting via transferring intangible capital

Introduction

- MNEs shift profits by transferring nonrival intangible capital to affiliates in tax havens

- Tax-haven affiliates charge parent (and other affiliates) licensing fees

- Empirical evidence
  - Delis et al. (2021): R&D-intensive firms shift more profits
  - Accoto et al. (2021): Profit shifters import IP services from tax havens

- End result: increases after-tax return on intangible investment

- Both TCJA and GMT aim to decrease the returns of profit shifting
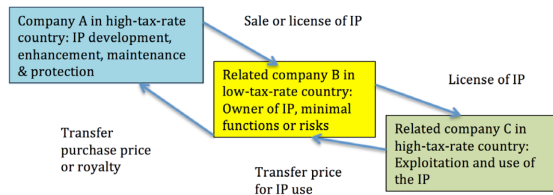
"95 percent of Apple's R&D… is conducted in the United States… [During] 2009 to 2012, ASI [Apple Ireland] paid… $5 billion to [Apple USA] as its share of the R&D costs. Over that same time period, ASI received profits of $74 billion. The difference between ASI's costs and the profits, almost $70 billion, is how much taxable income [should] have flowed to the United States."
— U.S. Senator Carl Levin, May 21, 2013

What we do

Introduction

1. Develop a quantitative model to study the effects of the GMT and TCJA on the US economy:

   $\rightarrow$ Profit shifting through transfer of the property rights to nonrival intangible capital
   $\rightarrow$ Technology spillovers associated with intangible capital production technology
   $\rightarrow$ Incorporate GMT and MNEs-related provisions introduced by the TCJA

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2. Conduct a series of experiments:

   $\rightarrow$ The macro effects of TCJA's provisions (GILTI today) applying to US MNEs
   $\rightarrow$ All but US introduce GMT
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3. Empirical validation of the model predictions on TCJA

What we find

Introduction

1. Local corporate income tax reforms can have global, **ripple macroeconomic effects**:

   $\rightarrow$ The channel is through nonrival intangible capital and spillovers
   $\rightarrow$ TCJA spills over to the rest of the world, encouraging foreign investment
   $\rightarrow$ GMT without US: negative effect for the US, without benefits of curbing profit shifting

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2. The design of the tax reforms is important for resolving the key economic trade-off:

   $\rightarrow$ **Core trade-off**: Limiting profit shifting depresses investment.

   $\rightarrow$ TCJA and GMT allow partial deductions for tangible capital, moderating the negative investment impact.

   $\rightarrow$ Effectiveness in reducing profit shifting and incentivizing investment depends heavily on specific implementation details.

Contributions to the literature

Introduction

1. **Profit shifting:** Hines and Rice (1994), Surrarez-Serrato (2018), Delis et al. (2021), Guvenen et al. (2022), Tørsløv et al. (2022), Bilicka et al. (2024)

    → Evaluate the global tax reforms using a general-equilibrium model

2. **Empirical assessment of TCJA:** Dowd et al. (2020), Wagner et al. (2020), Albertus et al. (2022), Huang et al. (2023), Chodorow-Reich et al. (2024), Santacreu and Stewart (2024)

    → Model the tax provisions for MNEs and study the impacts on both tangible and intangible investment

3. **Macro public finance:** Harberger (1962), Auerbach (1983), Barro and Furman (2018), Kaymak and Schott (2018), Bhandari and McGrattan (2020)

    → Aggregate implications of profit shifting for global corporate tax reform

Outline

Introduction

The Model

Environment overview

- Multi-country GE model:
  - → Five regions: US, Europe, Rest of the World, Low Tax (LT), Tax Haven (TH)
  - → Representative household with standard preferences choosing consumption, labor and tangible investment (▸ details)
  - → Aggregator: nontradeable final goods (▸ details)
  - → Governments collect corporate tax revenues and rebate it back to the consumers.

Environment overview

- Multi-country GE model:
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- Add multinational enterprises:
  - $\rightarrow$ A unit measure Ω_i of firms in each region i
  - $\rightarrow$ Tradable, firm-specific intermediate good variety
  - $\rightarrow$ FDI versus export decisions as in **Helpman, Melitz and Yeaple (2004)**
  - $\rightarrow$ Intangible capital as in **McGrattan and Prescott (2009; 2010)** with spillover externality
  - $\rightarrow$ Theory of transfer pricing and profit shifting as in **Dyrda et al. (2024)**

Intermediate Goods Producers: Technology

- Firms compete monopolistically within a region.

- A firm ω from region i produces in any productive region j according to:

$$y_{ij}(\omega) = \sigma_{ij} A_j a(\omega) z_i(\omega)^\phi k_{ij}(\omega)^\alpha \ell_{ij}(\omega)^\gamma$$

where
- $\rightarrow$ A_j is region productivity
- $\rightarrow$ $\sigma_{ij} \in [0,1]$ are FDI barriers (McGrattan and Prescott, 2010)
- $\rightarrow$ a is firm productivity
- $\rightarrow$ z_i is nonrival intangible capital
- $\rightarrow$ k_{ij} is tangible capital, ℓ_{ij} is labor

Production of Intangible Capital

- The intangible capital z is produced in the headquarter according to:

$$z_i(\omega) = a(\omega) A_i \left(\sum_{j \neq i} \int_{\Omega_{ji}} z_j(\omega) \, d\omega \right)^{\nu} \cdot l_i(\omega)^z$$

  where
  - $\rightarrow$ l_i^z: the measure of R&D workers
  - $\rightarrow$ $\sum_{j \neq i} \int_{\Omega_{ji}} z_j(\omega) \, d\omega$: the total amount of foreign intangible capital used in country i
  - $\rightarrow$ ν: spillover elasticity
  - $\rightarrow$ Ω_{ji}: the set of firms from j and have subsidiaries in i, depends on FDI decisions

- Empirical evidence on significant FDI spillovers to local TFP: **Javorcik (2004)** and **Liu (2008)**

Stage 2: Scale choice

- Present the firm's problem backwardly:
  1. Conditional on firms' export and FDI destinations and intangible capital investment, solve for demand for rival factors, i.e. scale choice.
  2. Choose export and FDI destinations, intangible capital, and profit shifting

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- The domestic parent corporation's problem (omit firm identifier ω)

$$\max_{q_{ii},\{q_{ij}^X\}_{j\in J_X},\ell_{ii},k_{ii}} (1-\tau_i)\Big(\underbrace{p_{ii}(q_{ii})q_{ii} + \sum_{j\in J_X} p_{ij}(q_{ij}^X)q_{ij}^X - W_i\ell_{ii} - \delta P_i k_{ii}}_{:=\pi_{ii}^D(a,z)} \Big) - r_i k_{ii}$$

$$\text{s.t} \quad q_{ii} + \sum_{j\in J_X} \xi_{ij}q_{ij}^X = y_{ii}.$$

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- Foreign subsidiaries' problem:

$$\max_{q_{ij},\ell_{ij},k_{ij}} (1-\tau_j)\Big(\underbrace{p_{ij}(q_{ij})q_{ij} - W_j\ell_{ij} - \delta P_j k_{ij}}_{:=\pi_{ij}^F(a,z)} \Big) - r_j k_{ij}, \ j \in J_F.$$

Stage 1: Locations, intangible capital and profit shifting.

- MNE maximizes dividends:

$$
d_i(a) = \max_{\substack{z, J_X, J_F, \\ \boldsymbol{\lambda} \in \Gamma}} \left\{ \pi_{ii} - T_i^{Total} + \sum_{j \in J_F \setminus \{LT\}} (1 - \tau_j)\pi_{ij} + (1 - \tau_{LT})\pi_{i,LT} 1_{\{LT \in J_F\}} \right.
$$

$$
\left. + (1 - \tau_{TH})\pi_{i,TH} 1_{\{\lambda_{TH} > 0\}} - \sum_{j \in J_F \cup \{i\}} r_j k_j \right\}
$$

subject to

$$
\Gamma = \left\{ \boldsymbol{\lambda} \in [0,1]^2 : \lambda_{LT} + \lambda_{TH} \leq 1 \right\}.
$$

where:
- $\rightarrow$ π_{ii}: taxable profits of the parent division
- $\rightarrow$ π_{ij}: taxable profits of affiliates in region j
- $\rightarrow$ $\pi_{i,LT}$: taxable profits of the low-tax affiliate
- $\rightarrow$ $\pi_{i,TH}$: taxable profits of the tax-haven affiliate
- $\rightarrow$ T_i^{Total}: Total tax liabilities for the headquarter of MNEs
- $\rightarrow$ $\boldsymbol{\lambda} = (\lambda_{LT}, \lambda_{TH})$: shares of rights to intangible capital sold to LT and TH

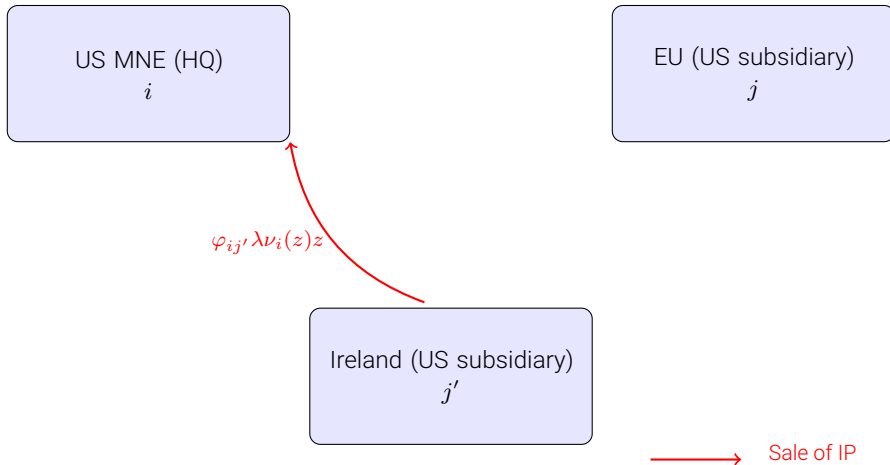# Profit Shifting Example

US MNE (HQ)
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EU (US subsidiary)
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Ireland (US subsidiary)
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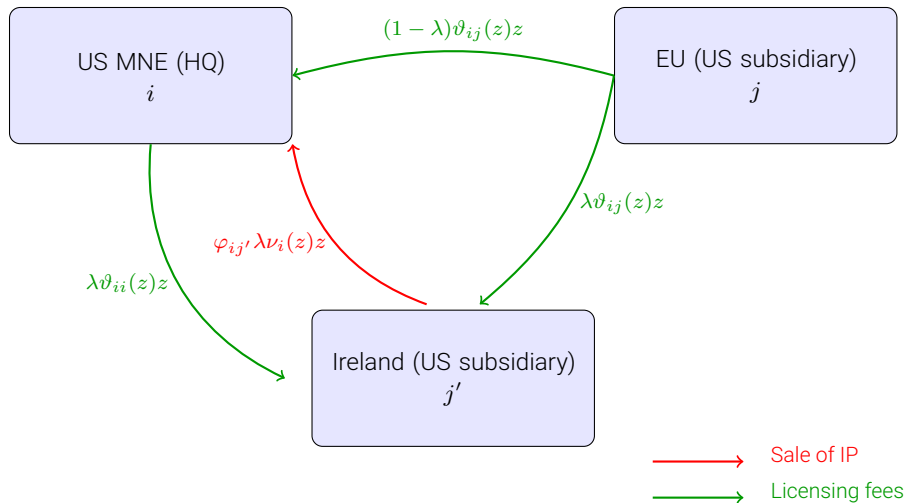
Taxable profits: parent division

$$
\pi_{ii} = \pi_{ii}^D(a, z; J_X) - W_i \overbrace{\left(l_i^z + \sum_{j \in J_X} \kappa_{ij}^X + \sum_{j \in J_F} \kappa_{ij}^F + \kappa_{iTH} 1_{\{\lambda_{TH} > 0\}} \right)}^{\text{Costs of intangible capital production and fixed costs}}
$$

$$
+ \overbrace{(\varphi_{iLT} \lambda_{LT} + \varphi_{iTH} \lambda_{TH}) \nu_i(z) z}^{\text{Proceeds from selling } z} + \overbrace{\sum_{j \in J_F} (1 - \lambda_{LT} - \lambda_{TH}) \vartheta_{ij}(z) z}^{\text{Licensing fee receipts}} - \overbrace{(\lambda_{LT} + \lambda_{TH}) \vartheta_{ii}(z) z}^{\text{Licensing fee payments}}
$$

$$
- \overbrace{W_i \mathcal{C}_i(\lambda_{LT}, \lambda_{TH}) \nu_i(z) z}^{\text{Cost of transferring } z}.
$$

where:

- κ_i^X: a fixed cost to export domestically produced goods
- κ_i^F: a fixed cost to open a foreign affiliate and produce locally
- $\vartheta_{ij}(z) z \equiv \phi p_{ij} y_{ij} / z$: licensing fee of a subsidiary in region j
- $\nu_i(z) z \equiv \sum_{j \in J_F \cup \{i\}} \vartheta_{ij}(z) z$: total amount of licensing fees across the conglomerate
- $\varphi_{iLT}, \varphi_{iTH}$: markdowns (mispricing) on selling rights to intangible capital

Taxable profits: foreign subsidiaries, LT and TH

- Foreign subsidiary j:

$$\pi_{i,j} = \pi_{ij}^F(a,z) - \underbrace{\vartheta_{ij}(z)z}_{\text{Licensing fee}}.$$

- Low Tax (LT) region:

$$\pi_{i,LT} = \pi_{i,LT}^F(a,z) - \underbrace{\varphi_{iLT}\lambda_{LT}\nu_i(z)z}_{\text{Cost of buying } z} + \overbrace{\sum_{j\in J_F\cup\{i\}\setminus\{LT\}}\lambda_{LT}\vartheta_{ij}(z)z}^{\text{Licensing fee receipts}} - \underbrace{(1-\lambda_{LT})\vartheta_{iLT}(z)z}_{\text{Licensing fee payment}}$$

- Tax Haven (TH) :

$$\pi_{i,TH} = \underbrace{\sum_{j\in J_F\cup\{i\}}\lambda_{TH}\vartheta_{ij}(z)z}_{\text{Licensing fee receipts}} - \underbrace{\varphi_{iTH}\lambda_{TH}\nu_i(z)z}_{\text{Cost of buying } z}.$$

Profit shifting and intangible investment

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- Profit shifting:
$$\lambda_{LT} = 1 - \exp\left(-\frac{(\tau_{US} - \tau_{LT})(1 - \varphi_{LT})}{(1 - \tau_{US})W_{US}}\right)$$

  $\rightarrow \lambda_{LT} \searrow$ in LT tax rate τ_{LT}
  $\rightarrow \lambda_{LT} \searrow$ in mispricing the intangible capital φ_{LT}

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- Intangible investment

$$z = z^{NS} \times \underbrace{(1 + W_i(\lambda\mathcal{C}'(\lambda) - \mathcal{C}(\lambda)))}_{\Xi(\lambda) \geq 1}^{\frac{\gamma + \rho - \rho\gamma}{\alpha + \gamma + \rho(1 - \phi - \gamma)}}$$

where
  $\rightarrow z^{NS}$: optimal intangible investment when firms do not shift profits, i.e. $\lambda = 0$
  $\rightarrow \Xi(\lambda) \geq 1$: net gain from profit shifting per unit of intangible capital, $\nearrow$ in λ (Albertus et al. 2019)

Profit shifting and allocation of intangible investment
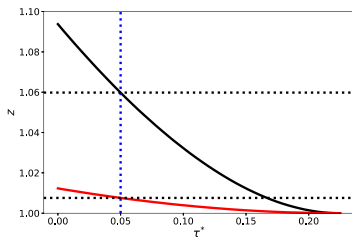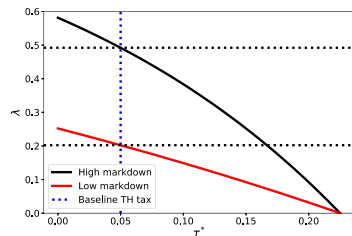
- The fraction λ of licensing rights sold to tax haven and intangible investment z <u>fall</u> with the tax-haven's tax rate.

- The fraction λ of licensing rights sold to tax haven and intangible investment z <u>rise</u> with the markdown.

Market Clearing

1. Labor market

2. Capital market

3. Government budget constraint

4. Balance of payments

Tax Reforms: TCJA and GMT

Global Tax Reforms: TCJA and GMT

- TCJA was passed by Congress and signed into law by President Trump on December 22, 2017
    - $\rightarrow$ reduction in statuary corporate tax rate from 35% to 21%
    - $\rightarrow$ shift from a worldwide tax system towards a partial territorial tax system
    - $\rightarrow$ provisions on taxing intangible income to reduce profit shifting: GILTI, FDII, BEAT
    - $\rightarrow$ key provisions are set to expire December 31, 2025

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- GMT is part of the two-pillar framework by OECD signed in October 2021
    - $\rightarrow$ country-by-country calculation of the top-up tax to the minimum rate of 15%
    - $\rightarrow$ three-tier taxing right for under-taxed profits: QDMTT, IIR and UTPR
    - $\rightarrow$ EU has implemented GMT starting from January 1, 2024, many countries are following

Global intangible low-taxed income (GILTI)

- Net Tested Income (NTI) is defined as follows

$$\pi_i^{NTI} = \sum_{j \in J_F \setminus J_F^{HT}} \pi_{ij} + \pi_{iTH}$$

where $J_F^{HT} = \{j \in J_F | \tau_j > 0.9 \times \tau_{US}\}$ (GILTI High-Tax Exclusion)

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- GILTI base is:

$$\pi_i^{GILTI} = \underbrace{(1 - \chi^{GILTI})}_{\substack{\text{tax base adjustment} \\ \chi^{GILTI} = 50\%}} \times \left(\pi_i^{NTI} - \sum_{j \in J_F \setminus J_F^{HT}} \underbrace{\theta^{QBAI} \times P_j k_j}_{\substack{\text{tax exemption for} \\ \text{tangible assets base} \\ \text{with } \theta^{QBAI} = 10\%}} \right)$$

  $\rightarrow$ The QBAI deduction incentivize tangible investment in low-tax subsidiaries

Foreign Derived Intangible Income (FDII)

- Deemed Intangible Income:

$$\pi_{ii}^{DII} = \pi_{ii} - \underbrace{\theta^{QBAI} \times P_i k_i}_{\substack{\text{exemption for domestic} \\ \text{tangible assets base with} \\ \theta^{QBAI} = 10\%}}$$

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- FDII deduction:

$$D^{FDII} = \underbrace{\chi^{FDII}}_{\substack{\text{FDII deduction rate} \\ \theta^{FDII} = 37.5\%}} \times \underbrace{FDR}_{\substack{\text{Foreign Derive Ratio (FDR) i.e.} \\ \text{share of foreign derived income (exports)}}} \times \pi_{ii}^{DII}$$

- FDII essentially works as a "export subsidy" (Clausing, 2024).

Base Erosion and Anti-Abuse Tax (BEAT)

- Base Erosion Payments: licensing fees paid by US corporation to LT and TH subsidiaries

$$BEP_{ii} = (\lambda_{LT} + \lambda_{TH}) \times \vartheta_{ii}(z_i) \times z_i$$

- Modified Taxable Income:

$$\pi_{ii}^{MTI} = \pi_{ii} + BEP_{ii}$$

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- The BEAT liability becomes:

$$T_i^{BEAT} = \max\left(0, \underbrace{\left(\chi^{BEAT} \times \pi_{ii}^{MTI} - \tau_{US} \times \pi_{ii}^{TI}\right)}_{\substack{\text{excess of licensing-fees-adjusted tax liability} \\ \text{with } \chi^{BEAT} = 10\% \text{ over regular tax liability}}}\right)$$

Total Tax Liability under TCJA

- Foreign tax credits (FTC):

$$FTC_i = \min \left\{ \underbrace{\chi^{FTC} \times \sum_{j \in J_F \setminus J_F^{HT}} (\tau_j \times \pi_{ij})}_{\substack{\text{Deemed paid foreign taxes (DPFT)} \\ \text{where } \chi^{FTC} = 80\%}}, \quad \underbrace{\tau_{US} \times \pi_{US}^{GILTI}}_{\text{Foreign tax credit limitation}} \right\}$$

- Total Tax Liability:

$$T_{US}^{Total} = \tau_{US} \times \underbrace{\left(\pi_{ii} + \pi_i^{GILTI} - D_i^{FDII} \right)}_{\substack{\text{Taxable profits adjusted for} \\ \text{GILTI base and FDII deduction}}} + \underbrace{T_i^{BEAT}}_{\substack{\text{Adjustment} \\ \text{for BEAT liability}}} - FTC_i$$

Global Minimum Tax (GMT): Implementation

US MNE (HQ) i — EU (US subsidiary) j: $(1-\lambda)\vartheta_{ij}(z)z$

EU (US subsidiary) j → Ireland (US subsidiary) j': $\lambda\vartheta_{ij}(z)z$

Ireland (US subsidiary) j' → US MNE (HQ) i: $\varphi_{ij'}\lambda\nu_i(z)z$

US MNE (HQ) i → Ireland (US subsidiary) j': $\lambda\vartheta_{ii}(z)z$

Sale of IP

Licensing fees

Global Minimum Tax (GMT): Implementation

Qualified Domestic Minimum Top-Up Tax (QDMTT):

$$T_{ij'}^{\text{QDMTT}} = \mathbf{1}_{j' \in \text{QDMTT}} \cdot \mathbf{1}_{\tau_{ij'}^{\text{eff}} < \tau^{\text{GMT}}} \cdot (\tau^{\text{GMT}} - \tau_{ij'}^{\text{eff}}) \cdot \pi_{ij'}$$

Carve-out

Global Minimum Tax (GMT): Implementation

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Income Inclusion Rule (IIR):

$$T_i^{\text{IIR}} = \mathbf{1}_{j' \notin \text{QDMTT}} \cdot \mathbf{1}_{i \in \text{IIR}} \cdot \mathbf{1}_{\tau_{ij'}^{\text{eff}} < \tau^{\text{GMT}}}$$
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Undertaxed Profits Rule (UTPR):

$$T_{ij}^{\mathsf{UTPR}} = \mathbf{1}_{j' \notin \mathsf{QDMTT}} \cdot \mathbf{1}_{i \notin \mathsf{IIR}} \cdot \mathbf{1}_{\tau_{ij'}^{\mathsf{eff}} < \tau^{\mathsf{GMT}}} \cdot \mathbf{1}_{j \in \mathsf{UTPR}}$$
$$\cdot (\tau^{\mathsf{GMT}} - \tau_{ij'}^{\mathsf{eff}}) \cdot \pi_{ij'}$$

Qualified Domestic Minimum Top-Up Tax (QDMTT):

$$T_{ij'}^{\mathsf{QDMTT}} = \mathbf{1}_{j' \in \mathsf{QDMTT}} \cdot \mathbf{1}_{\tau_{ij'}^{\mathsf{eff}} < \tau^{\mathsf{GMT}}} \cdot (\tau^{\mathsf{GMT}} - \tau_{ij'}^{\mathsf{eff}}) \cdot \pi_{ij'}$$

Carve-out

Global Tax Reforms and Profit Shifting

- Without TCJA:

$$\lambda_{LT} = 1 - \exp\left(-\frac{(\tau_{US} - \tau_{LT})(1 - \varphi_{LT})}{(1 - \tau_{US})W_{US}}\right)$$

$\rightarrow \lambda_{LT} \searrow$ in LT tax rate τ_{LT}

$\rightarrow \lambda_{LT} \searrow$ in mispricing the intangible capital φ_{LT}

Global Tax Reforms and Profit Shifting

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  $\rightarrow \lambda_{LT} \searrow$ in LT tax rate τ_{LT}
  $\rightarrow \lambda_{LT} \searrow$ in mispricing the intangible capital φ_{LT}

- With GILTI:

$$\lambda_{LT} = 1 - \exp\left(-\frac{\left(\tau_{US} - \left((1 - \chi^{GILTI})\tau_{US} + (1 - \chi^{FTC})\tau_{LT}\right)\right)(1 - \varphi_{LT})}{(1 - \tau_{US})W_{US}}\right)$$

  $\rightarrow \lambda_{LT} \nearrow$ in χ^{GILTI} and χ^{FTC}: GILTI raises the tax rate of income in LT to 10.5%−13.125 %

Global Tax Reforms and Profit Shifting

- Without TCJA:
$$\lambda_{LT} = 1 - \exp\left(-\frac{(\tau_{US} - \tau_{LT})(1 - \varphi_{LT})}{(1 - \tau_{US})W_{US}}\right)$$

  $\rightarrow \lambda_{LT} \searrow$ in LT tax rate τ_{LT}

  $\rightarrow \lambda_{LT} \searrow$ in mispricing the intangible capital φ_{LT}

- With GILTI + GMT
$$\lambda_{LT} = 1 - \exp\left(-\frac{\left(\tau_{US} - \tau^{GMT}\right)(1 - \varphi_{LT})}{(1 - \tau_{US})W_{US}}\right)$$

  $\rightarrow \lambda_{LT} \searrow$ in τ^{GMT}: subsidiaries of US MNEs pay top-up tax in LT to 15%

Global Tax Reforms and Profit Shifting

- Without TCJA:

$$\lambda_{LT} = 1 - \exp\left(-\frac{(\tau_{US} - \tau_{LT})(1 - \varphi_{LT})}{(1 - \tau_{US})W_{US}}\right)$$

→ λ_{LT} ↘ in LT tax rate τ_{LT}

→ λ_{LT} ↘ in mispricing the intangible capital φ_{LT}

- With FDII

$$\lambda_{LT} = 1 - \exp\left(-\frac{\left((1 - \chi^{FDII}FDR)\tau_{US} - \tau_{LT}\right)(1 - \varphi_{LT})}{(1 - (1 - \chi^{FDII}FDR)\tau_{US})W_{US}}\right)$$

→ λ_{LT} ↘ in FDII rate χ^{FDII}: FDII decreases the tax rate of foreign income

Global Tax Reforms and Profit Shifting

- Without TCJA:

$$\lambda_{LT} = 1 - \exp\left(-\frac{(\tau_{US} - \tau_{LT})(1 - \varphi_{LT})}{(1 - \tau_{US})W_{US}}\right)$$

  $\rightarrow \lambda_{LT} \searrow$ in LT tax rate τ_{LT}

  $\rightarrow \lambda_{LT} \searrow$ in mispricing the intangible capital φ_{LT}

- With BEAT

$$\lambda_{LT} = 1 - \exp\left(-\frac{(\chi^{BEAT} - \tau_{LT})(1 - \varphi_{LT})}{(1 - \chi^{BEAT})W_{US}} + \underbrace{\frac{\chi^{BEAT}\vartheta_{US}}{W_{US}\nu_{US}}}_{\text{Tax on BEP}}\right)$$

  $\rightarrow \lambda_{LT} \searrow$ in BEAT tax rate χ^{BEAT}: BEAT lowers the marginal tax rate in HQ and levies taxes on BEP

Global Tax Reforms and Investment

- **Intangible investment** by an MNE is

$$z = z^{NS} \times \underbrace{\left(1 + W_i \left(\lambda \mathcal{C}'(\lambda) - \mathcal{C}(\lambda)\right)\right)}_{\Omega(\lambda) > 1}^{\frac{\gamma + \rho - \rho\gamma}{\alpha + \gamma + \rho(1 - \phi - \gamma)}}$$

$\rightarrow$ Both TCJA and GMT decrease λ, thus have a negative impact on z

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  $\rightarrow$ Both TCJA and GMT decrease λ, thus have a negative impact on z

- **Tangible investment** by a subsidiary j of MNE i is

$$k_{ij} = \Xi_{ij}^k \cdot (R_j)^{-\frac{1 + (\alpha + \phi)(\varrho - 1)}{1 + \phi(\varrho - 1)}}$$

  $\rightarrow$ R_j is the user cost of capital
  $\rightarrow$ Both TCJA and GMT have counteracting effects on R_j: higher tax rate vs tax deduction $\boxed{\text{Carve-out}}$

Global Tax Reforms and Investment

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  $\rightarrow$ R_j is the user cost of capital
  $\rightarrow$ Both TCJA and GMT have counteracting effects on R_j: higher tax rate vs tax deduction $\boxed{\text{Carve-out}}$

- **Feedback loop**: intangible investment is also affected by tangible investment through z^{NS}, as tangible investment affects its marginal product; and vice versa.

Taking the Model to the Data

Calibration
Taking the Model to the Data

Discipline for key parameters:

- TFP (A_i) and prod. dispersion (σ_a): GDP and firm size dist.

- Intangible share (ϕ): Foreign MNEs' intangible share

- Trade costs (κ^X, ξ): Num. exporters, trade flows

- FDI costs (κ^F, σ): Num. MNEs, foreign MNEs' VA shares

- Corporate tax rates (τ): taken from Tørsløv et al. (2022)

- Profit shifting parameter (ψ_{ij}): Lost profit estimates from Tørsløv et al. (2022)
  - Lost profits/GDP: 0.6% for US, 1.4% for EU, 0.7% for RoW.

Parameters Validation

Measuring profit shifting in the model
Taking the Model to the Data

- The profits shifted out of region j by firm ω is

$$ps_{ij}(\omega) = \tilde{\pi}_{ij}(\omega) - \pi_{ij}(\omega).$$

  where $\tilde{\pi}_{ij}$ are the profits a firm would have reported in region j if it did not shift profits.

- $\tilde{\pi}_{ijt}(\omega)$ can be computed in PE or in GE
  - $\rightarrow$ we use the PE calculation which correspond to the conceptual framework in Tørsløv et al. (2022)

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  - $\rightarrow$ we use the PE calculation which correspond to the conceptual framework in Tørsløv et al. (2022)

- Aggregating firm-level shifted profits yields the total profits shifted out of region j:

$$PS_{jt} = \sum_{i=1}^{I} \int_{\Omega_{ij}} ps_{ijt}(\omega) \, d\omega.$$

Experiments

Overview

We conduct a series of experiments:

1. US introduces GILTI
2. All but US introduce GMT + GILTI
3. All including US introduce GMT + GILTI

Compare two scenarios:

1. With technology spillovers $\nu = 0.4$ **(Javorcik, 2004)**
2. Without technology spillovers $\nu = 0$

The Global Effect of GILTI

Region	Lost profits	CIT rev.	GDP	Tangible capital	Intangible capital
	(% chg.)				
(a) Baseline model					
USA	-42.01	0.92	0.34	0.05	1.34
Europe	-0.17	0.12	0.39	0.02	0.01
Rest of world	-0.09	0.05	0.51	0.03	0.19
Low tax	-2.49	-1.10	0.91	3.38	-0.86
(b) No spillovers					
USA	-41.99	0.84	0.28	0.04	1.33
Europe	-0.17	0.00	0.23	0.00	-0.10
Rest of world	-0.10	-0.01	0.23	0.00	-0.07
Low tax	-2.52	-1.25	0.77	3.37	-0.95

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Rest of world	-0.10	-0.01	0.23	0.00	-0.07
Low tax	-2.52	-1.25	0.77	3.37	-0.95

GILTI is effective at reducing profit shifting and increasing CIT in US

The Global Effect of GILTI

Region	Lost profits	CIT rev.	GDP	Tangible capital	Intangible capital
			(% chg.)		
(a) Baseline model					
USA	-42.01	0.92	0.34	0.05	1.34
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Rest of world	-0.10	-0.01	0.23	0.00	-0.07
Low tax	-2.52	-1.25	0.77	3.37	-0.95

At the same time, GILTI increases GDP by encouraging greater investment

The Global Effect of GILTI

Region	Lost profits	CIT rev.	GDP	Tangible capital	Intangible capital
			(% chg.)		
(a) Baseline model					
USA	-42.01	0.92	0.34	0.05	1.34
Europe	-0.17	0.12	0.39	0.02	0.01
Rest of world	-0.09	0.05	0.51	0.03	0.19
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Rest of world	-0.10	-0.01	0.23	0.00	-0.07
Low tax	-2.52	-1.25	0.77	3.37	-0.95

Other countries also benefit through the non-rivalry of intangible capital and the spillover effect

The Global Effect of GILTI

Region	Lost profits	CIT rev.	GDP	Tangible capital	Intangible capital
			(% chg.)		
(a) Baseline model					
USA	-42.01	0.92	0.34	0.05	1.34
Europe	-0.17	0.12	0.39	0.02	0.01
Rest of world	-0.09	0.05	0.51	0.03	0.19
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Rest of world	-0.10	-0.01	0.23	0.00	-0.07
Low tax	-2.52	-1.25	0.77	3.37	-0.95

The worldwide increases in GDP are significantly smaller without the spillover effect

The Global Effect of GILTI

Region	Tangible capital				Intangible capital		
	Total	Non MNEs	Domestic MNEs	Foreign MNEs	Total	Non MNEs	Domestic MNEs
				(% chg.)			
(a) Baseline model							
USA	0.05	-0.15	0.25	-0.01	1.34	-0.18	1.46
Europe	0.02	0.01	-0.03	0.15	0.01	0.15	-0.00
Rest of world	0.03	0.03	0.01	0.10	0.19	0.30	0.18
Low tax	3.38	-0.88	-0.61	13.66	-0.86	-1.35	-0.79
(b) No spillovers							
USA	0.04	-0.15	0.25	-0.14	1.33	-0.22	1.45
Europe	0.00	0.00	-0.03	0.07	-0.10	0.01	-0.11
Rest of world	0.00	0.01	-0.02	0.09	-0.07	0.01	-0.08
Low tax	3.37	-0.86	-0.60	13.58	-0.95	-1.46	-0.88

The Global Effect of GILTI

Region	Tangible capital				Intangible capital		
	Total	Non MNEs	Domestic MNEs	Foreign MNEs	Total	Non MNEs	Domestic MNEs
				(% chg.)			
(a) Baseline model							
USA	0.05	-0.15	0.25	-0.01	1.34	-0.18	1.46
Europe	0.02	0.01	-0.03	0.15	0.01	0.15	-0.00
Rest of world	0.03	0.03	0.01	0.10	0.19	0.30	0.18
Low tax	3.38	-0.88	-0.61	13.66	-0.86	-1.35	-0.79
(b) No spillovers							
USA	0.04	-0.15	0.25	-0.14	1.33	-0.22	1.45
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GILTI increases tangible investment of US MNEs' subsidiaries in LT

The Global Effect of GILTI

Region	Tangible capital				Intangible capital		
	Total	Non MNEs	Domestic MNEs	Foreign MNEs	Total	Non MNEs	Domestic MNEs
				(% chg.)			
(a) Baseline model							
USA	0.05	-0.15	0.25	-0.01	1.34	-0.18	1.46
Europe	0.02	0.01	-0.03	0.15	0.01	0.15	-0.00
Rest of world	0.03	0.03	0.01	0.10	0.19	0.30	0.18
Low tax	3.38	-0.88	-0.61	13.66	-0.86	-1.35	-0.79
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Increases the marginal product of intangible in LT, pushes up intangible investment of US MNEs

The Global Effect of GILTI

Region	Tangible capital				Intangible capital		
	Total	Non MNEs	Domestic MNEs	Foreign MNEs	Total	Non MNEs	Domestic MNEs
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(a) Baseline model							
USA	0.05	-0.15	0.25	-0.01	1.34	-0.18	1.46
Europe	0.02	0.01	-0.03	0.15	0.01	0.15	-0.00
Rest of world	0.03	0.03	0.01	0.10	0.19	0.30	0.18
Low tax	3.38	-0.88	-0.61	13.66	-0.86	-1.35	-0.79
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Low tax	3.37	-0.86	-0.60	13.58	-0.95	-1.46	-0.88

Non-rivalry of intangible capital pushes up tangible capital demand at home

The Global Effect of GILTI

Region	Tangible capital				Intangible capital		
	Total	Non MNEs	Domestic MNEs	Foreign MNEs	Total	Non MNEs	Domestic MNEs
				(% chg.)			
(a) Baseline model							
USA	0.05	-0.15	0.25	-0.01	1.34	-0.18	1.46
Europe	0.02	0.01	-0.03	0.15	0.01	0.15	-0.00
Rest of world	0.03	0.03	0.01	0.10	0.19	0.30	0.18
Low tax	3.38	-0.88	-0.61	13.66	-0.86	-1.35	-0.79
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Rest of world	0.00	0.01	-0.02	0.09	-0.07	0.01	-0.08
Low tax	3.37	-0.86	-0.60	13.58	-0.95	-1.46	-0.88

Total tangible investment increases by less, as investment by other firms gets crowded out

GMT: All regions except US

Region	Lost profits	CIT rev.	GDP	Tangible capital	Intangible capital
			(% chg.)		
(a) Baseline model					
USA	-0.04	-0.22	-0.15	-0.01	-0.13
Europe	-73.01	3.11	-0.07	-0.01	-0.58
Rest of world	-80.29	1.53	-0.09	-0.01	-0.33
Low tax	-45.51	5.29	0.00	1.31	0.69
(b) No spillovers					
USA	-0.04	-0.19	-0.00	0.00	-0.00
Europe	-73.01	3.18	0.03	0.01	-0.49
Rest of world	-80.29	1.57	0.01	-0.00	-0.23
Low tax	-45.50	5.36	0.15	1.31	0.86

GMT: All regions except US

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Rest of world	-80.29	1.57	0.01	-0.00	-0.23
Low tax	-45.50	5.36	0.15	1.31	0.86

Without adoption by US, GMT has little effect on lost profits in US, but almost kills profit shifting everywhere else

GMT: All regions except US

Region	Lost profits	CIT rev.	GDP	Tangible capital	Intangible capital
			(% chg.)		
(a) Baseline model					
USA	-0.04	-0.22	-0.15	-0.01	-0.13
Europe	-73.01	3.11	-0.07	-0.01	-0.58
Rest of world	-80.29	1.53	-0.09	-0.01	-0.33
Low tax	-45.51	5.29	0.00	1.31	0.69
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USA	-0.04	-0.19	-0.00	0.00	-0.00
Europe	-73.01	3.18	0.03	0.01	-0.49
Rest of world	-80.29	1.57	0.01	-0.00	-0.23
Low tax	-45.50	5.36	0.15	1.31	0.86

GMT decreases intangible capital investment, thus having mildly negative effects on GDP

GMT: All regions except US

Region	Lost profits	CIT rev.	GDP	Tangible capital	Intangible capital
			(% chg.)		
(a) Baseline model					
USA	-0.04	-0.22	-0.15	-0.01	-0.13
Europe	-73.01	3.11	-0.07	-0.01	-0.58
Rest of world	-80.29	1.53	-0.09	-0.01	-0.33
Low tax	-45.51	5.29	0.00	1.31	0.69
(b) No spillovers					
USA	-0.04	-0.19	-0.00	0.00	-0.00
Europe	-73.01	3.18	0.03	0.01	-0.49
Rest of world	-80.29	1.57	0.01	-0.00	-0.23
Low tax	-45.50	5.36	0.15	1.31	0.86

The spillovers effect is important in generating the ripple and negative effect of GMT

GMT: All regions except US

Region	Tangible capital				Intangible capital		
	Total	Non MNEs	Domestic MNEs	Foreign MNEs	Total	Non MNEs	Domestic MNEs
				(% chg.)			
(a) Baseline model							
USA	-0.01	0.01	0.00	-0.09	-0.13	-0.14	-0.13
Europe	-0.01	0.08	-0.12	0.05	-0.58	-0.00	-0.63
Rest of world	-0.01	0.05	-0.05	-0.13	-0.33	-0.03	-0.36
Low tax	1.31	0.51	-3.32	6.23	0.69	0.91	0.66
(b) No spillovers							
USA	0.00	0.01	0.00	-0.04	-0.00	0.02	-0.01
Europe	0.01	0.08	-0.11	0.10	-0.49	0.11	-0.54
Rest of world	-0.00	0.06	-0.04	-0.06	-0.23	0.09	-0.26
Low tax	1.31	0.48	-3.32	6.27	0.86	1.11	0.83

GMT: All regions except US

Region	Tangible capital				Intangible capital		
	Total	Non MNEs	Domestic MNEs	Foreign MNEs	Total	Non MNEs	Domestic MNEs
				(% chg.)			
(a) Baseline model							
USA	-0.01	0.01	0.00	-0.09	-0.13	-0.14	-0.13
Europe	-0.01	0.08	-0.12	0.05	-0.58	-0.00	-0.63
Rest of world	-0.01	0.05	-0.05	-0.13	-0.33	-0.03	-0.36
Low tax	1.31	0.51	-3.32	6.23	0.69	0.91	0.66
(b) No spillovers							
USA	0.00	0.01	0.00	-0.04	-0.00	0.02	-0.01
Europe	0.01	0.08	-0.11	0.10	-0.49	0.11	-0.54
Rest of world	-0.00	0.06	-0.04	-0.06	-0.23	0.09	-0.26
Low tax	1.31	0.48	-3.32	6.27	0.86	1.11	0.83

Similarly to GILTI, GMT incentivizes foreign tangible investment in Low Tax region

GMT: All regions including US

Region	Lost profits	CIT rev.	GDP	Tangible capital	Intangible capital
			(% chg.)		
(a) Baseline model					
USA	-36.96	0.53	-0.22	-0.01	-0.42
Europe	-73.00	3.08	-0.17	-0.01	-0.60
Rest of world	-80.29	1.51	-0.22	-0.02	-0.38
Low tax	-49.10	4.55	-0.10	1.20	0.73
(b) No spillovers					
USA	-36.97	0.58	-0.06	0.00	-0.30
Europe	-73.00	3.18	-0.03	0.00	-0.48
Rest of world	-80.29	1.56	-0.05	-0.00	-0.22
Low tax	-49.09	4.66	0.08	1.20	0.92

GMT: All regions including US

Region	Lost profits	CIT rev.	GDP	Tangible capital	Intangible capital
			(% chg.)		
(a) Baseline model					
USA	-36.96	0.53	-0.22	-0.01	-0.42
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Low tax	-49.10	4.55	-0.10	1.20	0.73
(b) No spillovers					
USA	-36.97	0.58	-0.06	0.00	-0.30
Europe	-73.00	3.18	-0.03	0.00	-0.48
Rest of world	-80.29	1.56	-0.05	-0.00	-0.22
Low tax	-49.09	4.66	0.08	1.20	0.92

If US joins GMT, the effects on lost profits and CIT are limited with GILTI in place.

GMT: All regions including US

Region	Lost profits	CIT rev.	GDP	Tangible capital	Intangible capital
			(% chg.)		
(a) Baseline model					
USA	-36.96	0.53	-0.22	-0.01	-0.42
Europe	-73.00	3.08	-0.17	-0.01	-0.60
Rest of world	-80.29	1.51	-0.22	-0.02	-0.38
Low tax	-49.10	4.55	-0.10	1.20	0.73
(b) No spillovers					
USA	-36.97	0.58	-0.06	0.00	-0.30
Europe	-73.00	3.18	-0.03	0.00	-0.48
Rest of world	-80.29	1.56	-0.05	-0.00	-0.22
Low tax	-49.09	4.66	0.08	1.20	0.92

However, it further dampens capital investment and thus GDP.

Real GDP Change: All regions including US introduce GMT
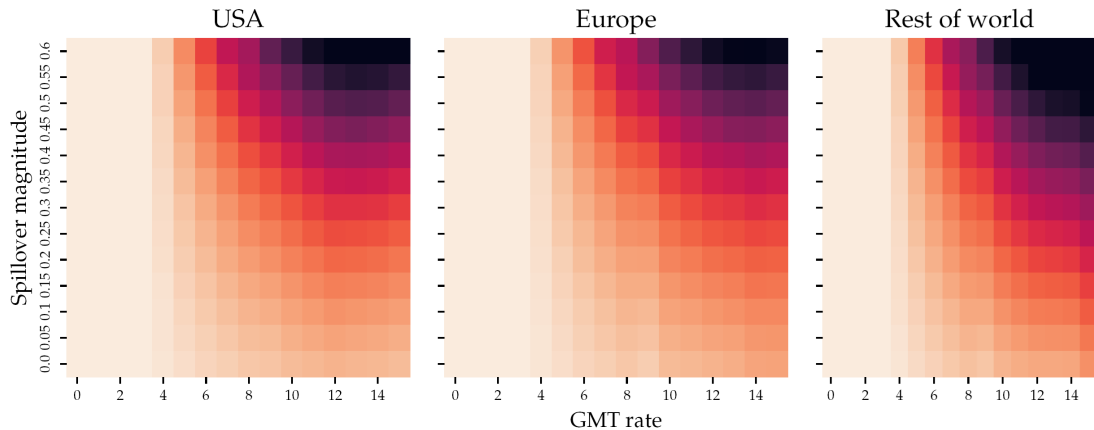
Real GDP Change: All regions including US introduce GMT
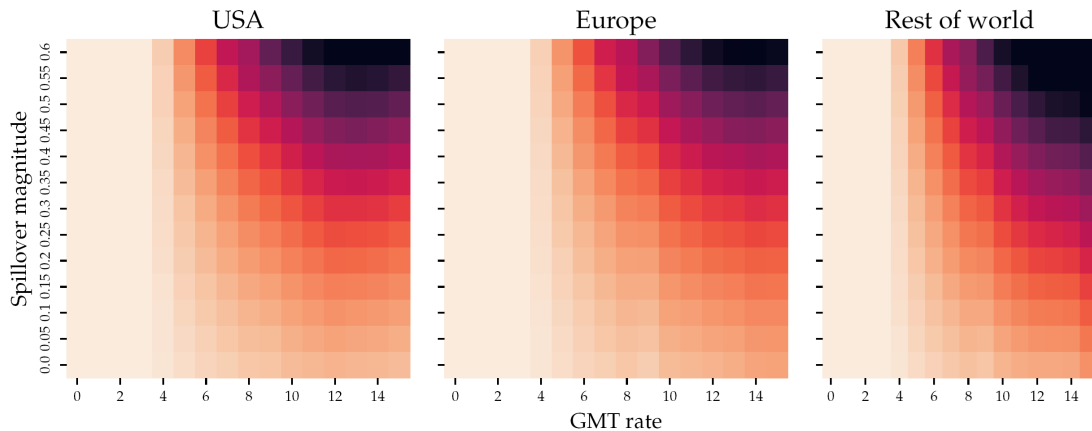
Spillovers amplify the effects of the GMT across the world.

Empirical Validation

Empirical Design

- We use firm balance-sheet data from Compustat North America.
  - $\rightarrow$ Consolidated financial statement on sales, tangible and intangible capital, investment, pre-tax income and tax liabilities
  - $\rightarrow$ Measure intangible capital following Peters and Taylor (2017)
  - $\rightarrow$ Focus on multinational enterprises (subsidiary information from Exhibit 21 of 10-K forms)

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- We estimate the following event-study regression:

$$Y_{it} = \sum_{t=-4}^{3} \beta_t \cdot \text{Intan\_Intensity}_i + \gamma_t + \delta_i + \epsilon_{it} \tag{1}$$

where

  - $\rightarrow$ Y_{it}: firm outcome
  - $\rightarrow$ Intan_Intensity$_i$: pre-TCJA intangible intensity, calculated for 2013-2015
  - $\rightarrow$ γ_t: year fixed effects; δ_i: firm fixed effects.

Firm-Level Effects of the TCJA: The Role of Intangible Intensity

- We use the effective tax rate (ETR) as a measure of the firm-level effect of TCJA:
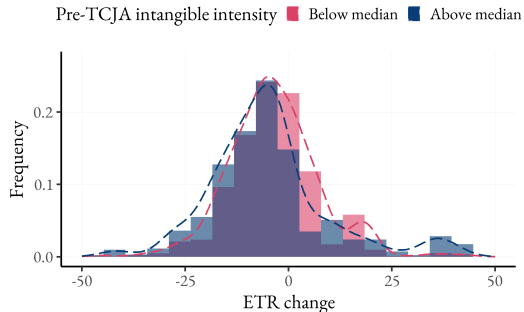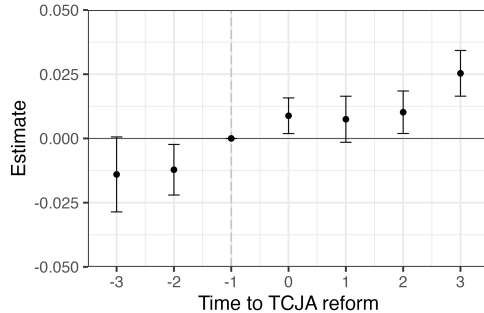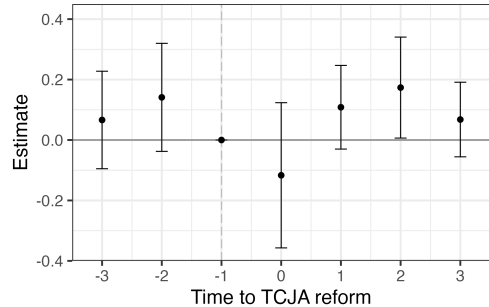

(c) Histogram of ETR Changes
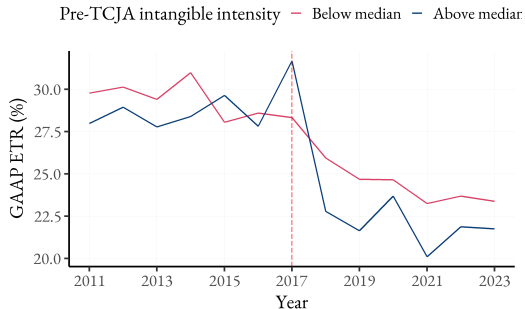
(d) Time Series of ETR

Greater decreases in ETR for high-intangible firms: (1) more mobile tax base, (2) receive greater FDII tax credits (> GILTI tax liabilities).

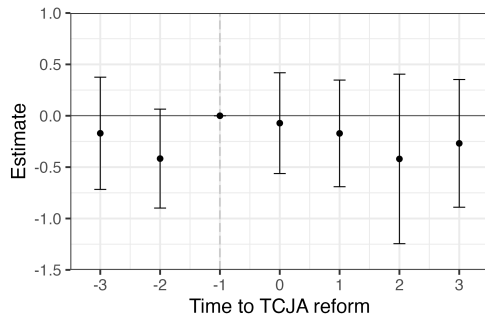# Event study results – Tangible and Intangible Investment
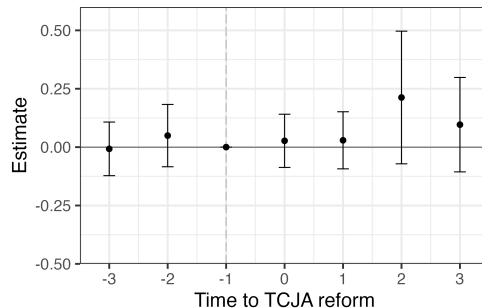

(e) Tangible investment rate

(f) Intangible investment rate

Suggests that TCJA has a positive effect on the tangible investment rate for high intangible-intensity firms

Event study results – Pre-tax Income

(g) Total pre-tax income

(h) The share of pre-tax foreign income

Suggests that TCJA has a somewhat positive effect on foreign income for high intangible-intensity firms

Conclusion

Conclusions

- We evaluate the ripple effects of global tax reforms using a quantitative model.

- Our model features key linkages of the world economy:
  1. Extensive margin: FDI and export decisions
  2. Intensive margin: non-rival intangible capital and technology spillovers

- Key insights:
  1. **Global Reach:** Tax reforms in economies with nonrival intangibles create spillovers that hurt even non-adopting countries. Outsized importance of US MNEs in global economy makes them particularly susceptible.
  2. **Inaction:** US abstention from GMT doesn't shield it from negative effects, and fails to raise revenue or reduce profit shifting.
  3. **Investment:** The QBAI design of GILTI is effective at curbing profit shifting without depressing tangible investment.

Thank you very much!

Additional Slides

Households: preferences and budgets

- In each region i representative household solves:

$$\max_{\{C_{it}, L_{it}, X_{it}, B_{it+1}\}_{t=0}^{\infty}} \sum_{t=0}^{\infty} \beta^t \left[\log\left(\frac{C_{it}}{N_i}\right) + \psi_i \log\left(1 - \frac{L_{it}}{N_i}\right) \right].$$

  where C_{it} is consumption, L_{it} is labor supply.

- Budget constraint:

$$P_{it}[C_{it} + X_{it}] + P_{bt}B_{it+1} = W_{it}L_{it} + R_{it}K_{it} + B_{it} + D_{it} + T_{it},$$

  where X_{it} is tangible investment and B_{it+1} are internationally-traded bonds, D_{it} dividends of MNEs headquartered in i, and T_{it} are lump sum transfers.

  The law of motion for tangible capital:

$$K_{it+1} = (1-\delta)K_{it} + X_{it},$$

Final Goods Producers

In each region i representative final-good producer that combines domestic and foreign products into a nontradable aggregate:

$$Q_{it} = \left[\sum_{j=1}^{J} \int_{\Omega_{jit}} q_{jit}(\omega)^{\frac{\varrho-1}{\varrho}} d\omega \right]^{\frac{\varrho}{\varrho-1}},$$

where $q_{jit}(\omega)$ is the quantity of variety ω from region j, Ω_{jit} is the set of goods from j available in i (determined by firms' exporting and FDI decisions specified later).

The aggregate price index is:

$$P_{it} = \left[\sum_{j=1}^{J} \int_{\Omega_{jit}} p_{jit}(\omega)^{1-\varrho} d\omega \right]^{\frac{1}{1-\varrho}}$$

Aggregation and accounting measures: GDP and Goods trade

- Gross domestic product:

$$GDP_i = \sum_{j=1}^{I} \int_{\omega \in \Omega_j, i \in J_F(\omega)} p_{ji}(\omega) y_{ji}(\omega) \, d\omega.$$

- Goods trade:

$$EX_i^G = \sum_{j \neq i} \int_{\Omega_i} p_{ij}^X(\omega) \, (1 + \xi_{ij}) \, q_{ij}^X(\omega) \, d\omega,$$

$$IM_i^G = \sum_{j \neq i} \int_{\Omega_j} p_{ji}^X(\omega) \, (1 + \xi_{ji}) \, q_{ji}^X(\omega) \, d\omega.$$

Aggregation and accounting measures: Services trade

- High-tax regions' services:

$$EX_i^S = \sum_{j \neq i} \int_{\Omega_i} \left[1 - \lambda_{LT}(\omega) - \lambda_{TH}(\omega))\right] \vartheta_{ij}(\omega) z(\omega) \, d\omega + \int_{\Omega_i} \varphi_i (\lambda_{LT}(\omega) + \lambda_{TH}(\omega)) \nu_i(\omega) z(\omega) \, d\omega$$

$$IM_i^S = \sum_{j \neq i} \int_{\Omega_i} \left[\lambda_{LT}(\omega) + \lambda_{TH}(\omega)\right] \vartheta_{ij}(\omega) z(\omega) \, d\omega + \sum_{j \neq i} \int_{\Omega_j} \vartheta_{ji}(\omega) z(\omega) \, d\omega.$$

- The low-tax region's services:

$$EX_{LT}^S = \sum_{j \neq i} \int_{\Omega_i} \left[1 - \lambda_{TH}(\omega)\right] \vartheta_{ij}(\omega) z(\omega) \, d\omega + \sum_{j \neq i} \int_{\Omega_j} \lambda_{LT} \vartheta_{ji}(\omega) z(\omega) \, d\omega,$$

$$IM_{LT}^S = \sum_{j \neq i} \int_{\Omega_i} \lambda_{TH}(\omega) \vartheta_{ij}(\omega) z(\omega) \, d\omega + \sum_{j \neq i} \int_{\Omega_j} \left[1 - \lambda_{LT}(\omega)\right] \vartheta_{ji}(\omega) z(\omega) \, d\omega +$$

$$\sum_{j \neq i} \int_{\Omega_j} \varphi_j \lambda_{LT}(\omega) \nu_j(\omega) z(\omega) \, d\omega.$$

Market clearings

- Labor market:

$$
L_i = \overbrace{\sum_{j=1}^{I} \int_{\Omega_j} \ell_{ji}(\omega) \, d\omega}^{\text{goods production}} + \overbrace{\int_{\Omega_i} l_i^z \, d\omega}^{z \text{ production}} + \overbrace{\int_{\Omega_i} \left(\sum_{j \in J_X(\omega)} \kappa_i^X + \sum_{j \in J_F(\omega)} \kappa_i^F + 1_{\{\lambda_{TH}(\omega) > 0\}} \kappa_i^{TH} \right) d\omega}^{\text{fixed costs}}
$$

$$
+ \underbrace{\int_{\Omega_i} \mathcal{C}_i(\lambda_{LT}, \lambda_{TH}) \nu(\omega) z(\omega) \, d\omega}_{\text{costs of shifting } z} \, .
$$

- Capital market:

$$
K_i = \sum_{j=1}^{I} \int_{\Omega_{ji}} k_{ji}(\omega) \, d\omega
$$

- Government budget constraint:

$$
T_i = \tau_i \sum_{j=1}^{I} \int_{\Omega_{ji}} \pi_{ji}(\omega) \, d\omega.
$$

Market clearings

- Balance of payments:

$$EX_i^G + EX_i^S - IM_i^G - IM_i^S + NFR_i - NFP_i = 0.$$

where:

$$NFR_i = \sum_{j \neq i} \int_{\Omega_{ij}} (1 - \tau_j) \pi_{ij}(\omega) \, d\omega,$$

$$NFP_i = \sum_{j \neq i} \int_{\Omega_{ji}} (1 - \tau_i) \pi_{ji}(\omega) \, d\omega.$$

are net factor receipts from (payments to) foreigners.

The Interaction between GILTI and FDII

- Tax reductions in IRS Form 8992 if $\pi_{ii}^{GILTI} + \pi_{ii}^{FDII} - \pi_{ii} > 0$, specifically

$$R^{FDII} = \begin{cases} 0 & \text{if } \pi_{ii}^{GILTI} + \pi_{ii}^{FDII} - \pi_{ii} \leq 0 \\ \frac{\pi_{ii}^{FDII}}{\pi_{ii}^{GILTI} + \pi_{ii}^{FDII}} \times \left(\pi_{ii}^{GILTI} + \pi_{ii}^{FDII} - \pi_{ii}\right) & \text{if } \pi_{ii}^{GILTI} + \pi_{ii}^{FDII} - \pi_{ii} > 0 \end{cases}$$

and

$$R^{GILTI} = \begin{cases} 0 & \text{if } \pi_{ii}^{GILTI} + \pi_{ii}^{FDII} - \pi_{ii} \leq 0 \\ \frac{\pi_{ii}^{GILTI}}{\pi_{ii}^{GILTI} + \pi_{ii}^{FDII}} \times \left(\pi_{ii}^{GILTI} + \pi_{ii}^{FDII} - \pi_{ii}\right) & \text{if } \pi_{ii}^{GILTI} + \pi_{ii}^{FDII} - \pi_{ii} > 0 \end{cases}$$

- Then

$$D^{FDII} = \chi^{FDII} \times \left(\pi_{ii}^{FDII} - R^{FDII}\right)$$

and

$$D^{GILTI} = \chi^{GILTI} \times \left(\pi_{ii}^{GILTI} - R^{GILTI}\right)$$

GMT Rules Summary

Feature	QDMTT	IIR	UTPR
Full Name	Qualified Domestic Minimum Top-Up Tax	Income Inclusion Rule	Undertaxed Profits Rule
Who Applies It?	Source country (where profits are earned)	Parent country (MNE HQ)	Countries where MNE has operations (if parent doesn't apply IIR)
What It Taxes	Low-taxed profits of domestic subsidiaries	Low-taxed profits of foreign subsidiaries	Low-taxed profits of MNEs from non-GMT countries
Trigger Condition	Local ETR < 15%	Foreign affiliate's ETR < 15%	No IIR applied & ETR < 15%
Priority in Application	**First**	**Second** (after QDMTT)	**Third** (after QDMTT and IIR)
Purpose	Keep top-up tax in source country	Prevent HQ-based income shifting	Prevent free-riding by non-GMT HQs
Tax Revenue Collected By	Local tax authority	HQ country's tax authority	GMT countries, allocated by substance
Relies on Substance Test?	No	No	**Yes** (employees and tangible assets)
Blocks Other Rules?	**Yes** (preempts IIR and UTPR)	No	No

Carve-out in GMT

- To isolate the abnormal profits due to profit shifting, GMT implements a carve-out design:

- Specifically,

$$\tau_{ij}^{ETR} = \frac{\tau_j \pi_{ij}}{\pi_{ij} - \underbrace{\left(\chi^{GMT,L} W_j l_{ij} + \chi^{GMT,K} P_j k_{ij}\right)}_{\text{Tax Base Carve-out}}}$$

  $\rightarrow$ where $\chi^{GMT,L}$ and $\chi^{GMT,K}$ are carve-out ratios.

- Similar to QBAI in GILTI, these carve-outs increase labor demand and tangible investment in LT.

Data Moments

Statistic	US	Europe	Low-tax	RoW	Tax haven
Population (NA = 100)	100	137	17	2,041	–
Real GDP (NA = 100)	100	98	18	383	–
Corporate tax rate (%)	21.0	17.3	11.4	17.4	3.3
Foreign MNEs' VA share (%)	11.12	19.82	28.73	9.55	–
Total lost profits ($B)	143	216	–	257	–
Lost profits to TH (%)	66.4	44.5	–	71.1	–
Imports from… (% GDP)					
North America	–	1.54	0.33	8.92	–
Europe	1.01	–	2.99	8.24	–
Low tax	1.49	12.43	–	7.89	–
Row	2.36	3.70	0.59	–	–

Calibrated Parameters

Parameter value	US	Europe	Low-tax	RoW	Tax haven
TFP (A_i)	1.00	0.76	1.19	0.24	–
Prod. dispersion (η_i)	4.74	4.75	5.23	4.59	–
Fixed export cost (κ_i^X)	3.8e-3	7.5e-3	2.0e-3	3.1e-2	–
Variable FDI cost (σ_i)	0.44	0.54	0.51	0.54	–
Fixed FDI cost (κ_i^F)	2.33	3.02	0.91	16.0	–
Cost of shifting profits to LT (ψ_{iLT})	2.59	0.43	–	3.29	–
Cost of shifting profits to TH (ψ_{iTH})	2.17	1.39	–	2.42	–
Fixed FDI cost to TH (κ_i^{TH})	0.10	0.10	–	0.90	–
Variable export cost (ξ_{ij}) from …					
North America	–	3.09	3.31	1.75	–
Europe	2.09	–	1.73	1.33	–
Low tax	2.20	1.57	–	1.53	–
RoW	2.24	2.59	3.07	–	–

Table: Validation

(a) Share of corporate taxes paid by foreign MNEs (%)

Source	North America	Europe	Low tax	RoW
Data	16.65	41.58	72.40	16.32
Model	24.44	40.13	73.62	18.35

(b) Global profit-shifting costs ($bn)

Source	Estimate
Tørsløv et al. (2022)	25
Model	82

(c) Firm-level semi-elasticity of profit shifting

Source	Estimate
Johansson et al., 2017	1.11
Heckemeyer and Overesch, 2017	0.79
Beer et al., 2020	0.98
Model	0.90

GMT: All regions including US

Region	Tangible capital				Intangible capital		
	Total	Non MNEs	Domestic MNEs	Foreign MNEs	Total	Non MNEs	Domestic MNEs
				(% chg.)			
(a) Baseline model							
USA	-0.01	0.06	-0.05	-0.09	-0.42	-0.08	-0.45
Europe	-0.01	0.08	-0.11	0.01	-0.60	-0.04	-0.65
Rest of world	-0.02	0.05	-0.05	-0.16	-0.38	-0.10	-0.41
Low tax	1.20	0.57	-3.27	5.76	0.73	0.97	0.70
(b) No spillovers							
USA	0.00	0.06	-0.05	-0.00	-0.30	0.09	-0.33
Europe	0.00	0.08	-0.11	0.08	-0.48	0.11	-0.53
Rest of world	-0.00	0.06	-0.04	-0.09	-0.22	0.09	-0.25
Low tax	1.20	0.54	-3.28	5.82	0.92	1.20	0.89