Profit Shifting of Multinational Corporations Worldwide

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Act 1: Setting
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Act 2: Model
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Act 3: Scale
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Act 4: Loss
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Act 5: Harm
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Conclusion
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Scale of tax avoidance

Innovations:

- New methodology: Challenging linear assumptions
- New data: Country-by-Country Reporting

Subquestions:

Who loses the most?   Who harms the most?

Act 1: Setting
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Act 2: Model
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Previous estimates of tax revenue losses

Study	USD bn	Data	Country-level
Cobham & Janský (2018)	90+	Revenue	Yes
IMF's Crivelli et al. (2016)	123+	Revenue	No
Janský & Palanský (2019)	125+	FDI	Yes
Cobham & Janský (2017)	133+	FDI	Yes
IMF (2014)	180	National accounts	Yes
UNCTAD (2015)	200	FDI	No
Tørsløv, Wier, & Zucman (2018)	230	Combination	Yes
OECD's Johansson et al. (2017)	100-240	Orbis	No
Clausing (2016)	280+	FDI	Yes
Garcia-Bernardo & Janský (2021)	**200-300**	**CBCR**	**Yes**

Source: Authors and Cobham and Janský (2020)

New data: Country-by-Country reporting

- Aggregated large MNCs' profits and tax payments in over 190 countries
- Statistics for both profit-making and loss-making affiliates
- No double counting in revenue and only limited in profit due to intercompany dividends or stateless entities

Loss-making firms are important!
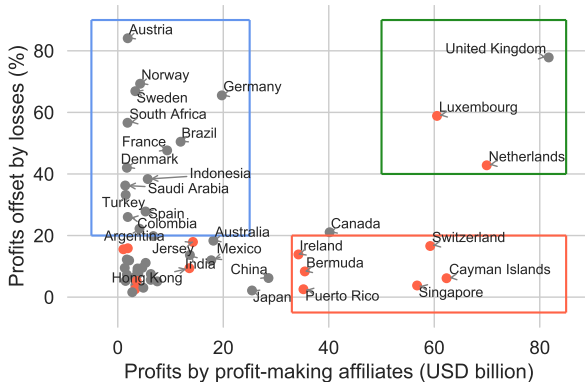
- Profit-making affiliates: Calculate ETR
- Loss-making affiliates: Real operations of MNCs

New methodology: Logarithmic semi-elasticity

Most common model (Hines and Rice (1994))

$$\underbrace{\log\left(\pi_i\right)}_{\text{Profits booked}} = \beta_0 + \underbrace{\beta_1 \log\left(K_i\right)}_{\text{Capital}} + \underbrace{\beta_2 \log\left(L_i\right)}_{\text{Labor}} + \underbrace{\beta_3(\tau_i)}_{\text{Tax rate}} + \underbrace{\gamma\chi}_{\textit{Controls}} + \epsilon,$$

For simplicity

$$\underbrace{\log\left(\pi_i\right)}_{\text{Profits booked}} \propto \underbrace{\beta_3(\tau_i)}_{\text{Tax rate}}$$

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Tax semi-elasticity

Most common model (Hines and Rice (1994))

$$\underbrace{\log\left(\pi_i\right)}_{\text{Profits booked}} \propto \underbrace{\beta_3(\tau_i)}_{\text{Tax rate}}$$

- Important assumption in almost all the literature: Linear incentive
- Empirical observation: Profits accumulate in tax havens

Tax semi-elasticity

Improvement (Dowd et al. (2017))

$$\underbrace{\log\left(\pi_i\right)}_{\text{Profits booked}} \propto \underbrace{\beta_3(\tau_i)}_{\text{Tax rate}} + \underbrace{\beta_4(\tau_i)^2}_{\text{Tax rate squared}}$$

■ Empirical observation: The model still doesn't fit the
data well

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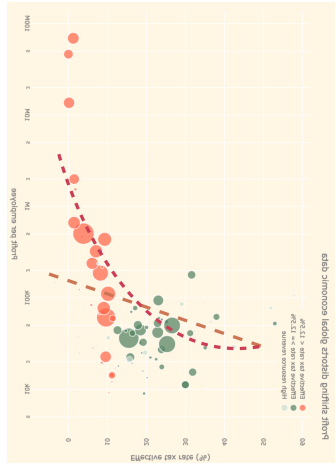Act 4: Loss
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Act 5: Harm
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Conclusion
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Profit shifting distorts global economic data

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Act 2: Model
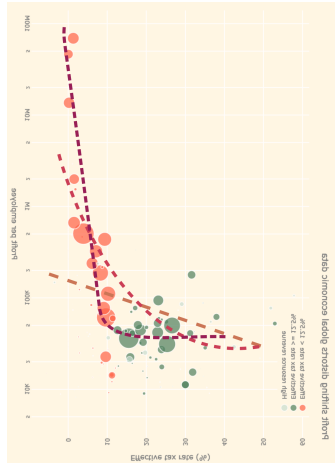●000

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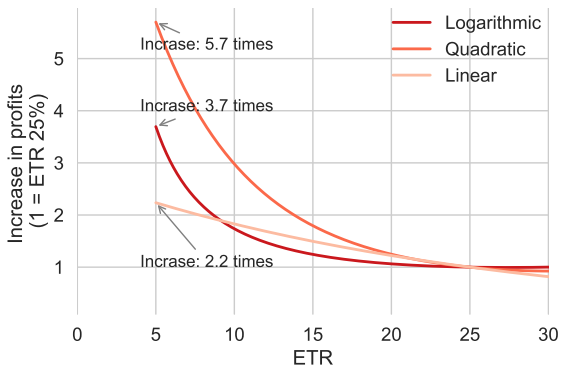o

Act 4: Loss
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Act 5: Harm
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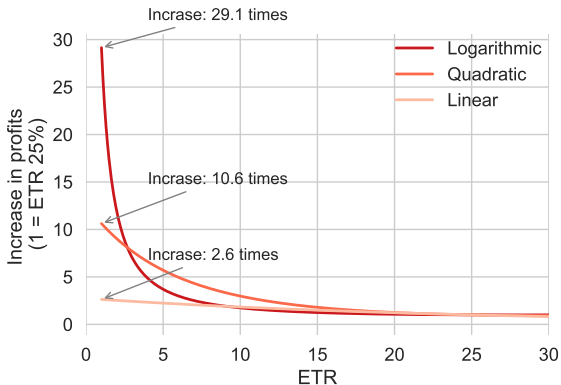
Conclusion
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Our model: Logarithmic tax-semielasticity

$$\underbrace{\log\left(\pi_i\right)}_{\text{Profits booked}} \propto \underbrace{\beta_3(\tau_i)}_{\text{Tax rate}} + \underbrace{\beta_4\log\left(t+\tau_i\right)}_{\text{Logarithmic tax rate}}$$

Country	ETR	Misal.	Log	Quad	Linear	Quad (DLM)	Linear (DLM)
Jersey	0.1%	96%	99%	92%	63%	38%	23.5%
Switzerland	5.5%	71%	70%	81%	54%	26%	19%
Ireland	12.4%	35%	30%	56%	40%	13%	13%

Results for ETR 5% (Switzerland)

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Results for ETR 1% (Luxembourg)

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Act 3: Scale
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Results for ETR 0.1% (Jersey)
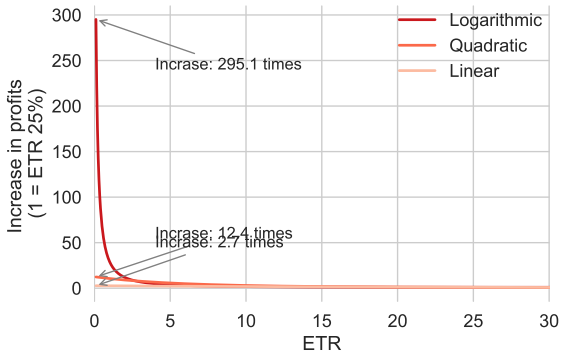
Profits shifted in and out of countries

Profits shifted out Profits shifted in

Shifted profits in (US $tn)

United States	France	Cayman Islands	China	BVI	Switzerland
Japan	South Korea	Netherlands	Hong Kong	Puerto Rico	Singapore
Germany	Brazil	Luxembourg	Bermuda		

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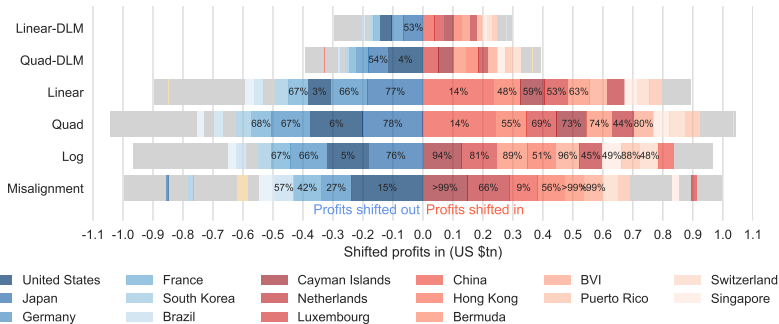
Tax revenue loss as a percentage of total revenue

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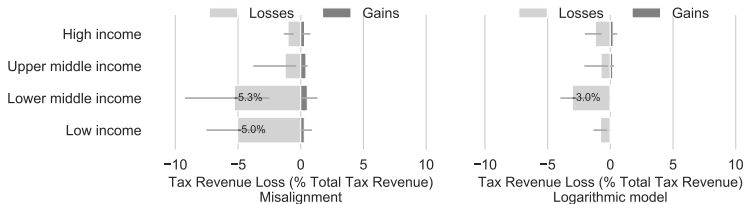
Most aggressive companies

- Most aggressive:
    - United States
    - Bermuda
    - Luxembourg
    - Belgium

- Least aggressive:
    - South Africa
    - Mexico
    - China
    - India

Act 1: Setting
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Concluding remarks

- How much? More than previously estimated: $200-$300 vs $100-$150
- Which tax havens? Those with extremely low tax rates
- Which countries lose most? Low-income countries relatively more
- Are US multinational corporations special? The most aggressive ones in profit shifting

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Implications for a global tax reform

- Low-income countries lose the most, and they should be included on an equal footing in the tax reform: Potential move to the UN

- A reform needs to affect tax havens with extremely low rates: The importance of a sufficiently high global minimum tax rate

- Unanimous support unlikely if only because of US MNCs most aggressive, British Overseas Territories, EU member states

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Act 2: Model
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Thank you!

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Cobham, A. and Janský, P. (2020). *Estimating Illicit Financial Flows: A Critical Guide to the Data, Methodologies, and Findings*. en_US. Oxford University Press (cited on p. 3).

Dowd, T., Landefeld, P., and Moore, A. (Apr. 2017). "Profit Shifting of U.S. Multinationals". en. *Journal of Public Economics*, 148 (cited on p. 8).

Hines, J. R. and Rice, E. M. (1994). "Fiscal Paradise: Foreign Tax Havens and American Business". *The Quarterly Journal of Economics*, 109(1) (cited on pp. 6, 7).

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Tørsløv, T., Wier, L., and Zucman, G. (2020). "The Missing
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    Research Working Paper*, 2018, revised April
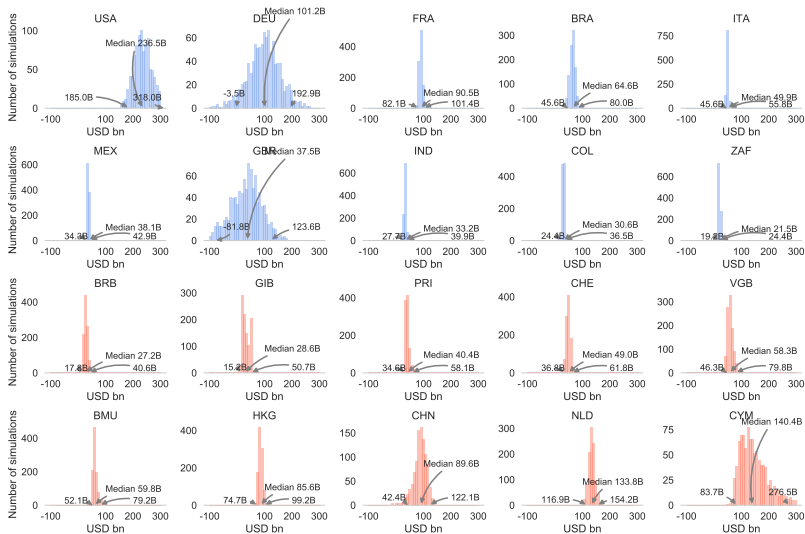   2020(24071) (cited on p. 25).

Figure: Distribution of the scale of profit shifted estimated by

Robustness checks and sensitivity analyses (1)

1 A variety of methodological approaches, semi-elasticity and misalignment
2 The robustness of the 25 per cent ETR threshold
3 A comparison of our results to those of Tørsløv et al. (2020)
4 A comparison the tax revenue loss with a variety of benchmarks
5 Limiting the sample to those countries that report information on at least eight offshore centres
6 The sensitivity of our results to the offset in the logarithmic model
7 A comparison of the logarithmic specification with other specifications that can accommodate extreme non-linearities, including $1/(\tau + ETR)^1$, $1/(\tau + ETR)^2$, $1/(\tau + ETR)^3$ and $coth(\tau + ETR))$

Robustness checks and sensitivity analyses (2)

8 A different redistribution formula

9 We estimate missing data using 1,000 bootstrapped data samples (using a median, showing confidence intervals)

10 A comparison of the location of employees and revenue according to our missing data model with the information in the original data as well as GDP

11 A comparison of our missing data imputation method with other models

12 A robustness test in which the data of China is not adjusted

Top destinations of profit shifting

| Country	Misalignment P (all groups)	PS (B)	PS (%booked)	Logarithmic P (groups>0)	PS (B)	PS (%booked)
Cayman Islands	148,968	147,879	99.27	136,653	128,895	94.32
Netherlands	212,366	140,896	66.35	166,854	75,624	45.32
China	1,000,565	94,385	9.43	1,746,828	50,073	2.87
Hong Kong	160,805	90,199	56.09	185,760	94,270	50.75
Bermuda	63,542	62,992	99.13	113,955	101,749	89.29
British Virgin Islands	60,895	60,895	100.00	81,794	78,354	95.79
Switzerland	129,518	51,611	39.85	127,879	61,244	47.89
Puerto Rico	44,639	42,565	95.35	72,012	63,336	87.95
Ireland	65,106	28,062	43.10	76,753	18,496	24.10
Singapore	111,477	22,850	20.50	129,768	63,969	49.30
Luxembourg	28,228	17,536	62.12	146,916	119,057	81.04

Notes: Top 7 destinations of profit shifting (PS (B)) for misalignment and logarithmic models and as a percentage of the total profits booked in the jurisdiction (PS (% booked)). The total profits for all groups ((P (all groups)) and groups with positive profits (P (groups>0) are shown for comparison. Puerto Rico, Ireland and Luxembourg are not part of the top seven jurisdictions, but are included to provide context.

Estimates of profits shifted and tax revenue loss

	Profits shifted	TRL (total ETR)	TRL (foreign ETR)	TRL (CIT)
Misalignment	$ 994 bn	$ 205 bn	$ 214 bn	$ 307 bn
Logarithmic	$ 965 bn	$ 186 bn	$ 200 bn	$ 300 bn

Notes: Estimates of profits shifted and tax revenue loss (TRL) for the misalignment and logarithmic models. Three different tax rates are used, the total ETR (both domestic and foreign MNCs), the foreign ETR (only foreign MNCs), and the statutory tax rate (CIT).

Profits shifted as a percentage of GDP
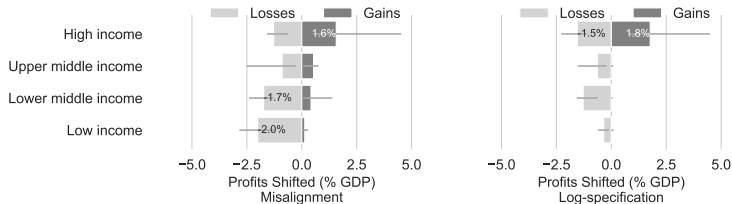
Notes: Profits shifted as a percentage of GDP for countries in different income groups, as estimated by the misalignment (left graph) and logarithmic (right graph) models. Confidence intervals show 95% intervals, calculated via bootstrapping.