# Profit Shifting of Multinational Corporations Worldwide

Javier Garcia-Bernardo, Petr Janský

Institute of Economic Studies, Faculty of Social Sciences, Charles University, Prague, Czechia

Interregional training workshop on the statistical measurement of tax and commercial illicit financial flows (IFFs), 6 December, 2021



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# The effects of profit shifting of multinational corporations $(\mathsf{MNCs})$

Illicit financial flows and SDG target 16.4

The effects of profit shifting of multinational corporations  $(\mathsf{MNCs})$ 

- Illicit financial flows and SDG target 16.4
- Uneven level playing field
- Lower government revenues
- Globalisation perceived as inequitable

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#### Overview

- Data: Country-by-country reporting (CBCR) by MNCs for many countries
- Methodology: A logarithmic function to model the extremely non-linear relationship between profits and tax rates

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#### Overview

- Data: Country-by-country reporting (CBCR) by MNCs for many countries
- Methodology: A logarithmic function to model the extremely non-linear relationship between profits and tax rates
- 1 Scale
- 2 Tax Havens
- 3 Headquarters
- 4 Low-income countries

# Contributions to the existing literature (and policy debates)

- Methodology: Hines and Rice (1994), Dowd et al. (2017)
- Data: Clausing (2020), Garcia-Bernardo, Janský, and Tørsløv (2021), Fuest, Hugger, et al. (2021), Garcia-Bernardo, Janský, and Zucman (2021)
- Scale: Crivelli et al. (2016), Álvarez-Martínez et al. (2021), Tørsløv et al. (2020), Bilicka (2019), Dharmapala and Riedel (2013)
- 2 Tax havens: Zucman (2015), Guvenen et al. (2021)
- B Headquarters: Dischinger et al. (2014), Wright and Zucman (2018)
- Low-income countries: Fuest, Hebous, et al. (2011), Janský and Palanský (2019), Johannesen et al. (2020)

# The country-by-country reporting data

- Aggregated large MNCs' profits and taxes in around 190 countries
- Profit-making affiliates for effective tax rates (ETRs) and both profit- and loss-making affiliates for real operations of MNCs
- The 2017 US CBCR data
- The 2016 OECD CBCR data with data imputations to further improve coverage
- The data are a major step forward, albeit imperfect

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# Country availability



Reporting country

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# Methodology

- Tax semi-elasticity model: linear, quadratic and logarithmic
- (Also: reallocation of the shifted profit and misalignment model)

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#### Tax semi-elasticity

The most common model (Hines and Rice, 1994)



Profits booked

Tax rate

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#### Tax semi-elasticity

The most common model (Hines and Rice, 1994)



Tax rate

Profits booked

Tax rate squared

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#### Tax semi-elasticity

The most common model (Hines and Rice, 1994)



Empirical observation: The model still does not fit the data very well



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Data

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#### Our model: Logarithmic semi-elasticity

 $\propto \beta_3(\tau_i) + \beta_4 \log(t + \tau_i)$  $\log(\pi_i)$ Profits booked Tax rate Logarithmic tax rate

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# Results for ETR 0.1% (Jersey)



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Conclusion

#### The scale of estimated revenue losses (billion USD)

Study	Profit shifting	Revenue loss	Data (type)	Individua coun- tries	l Countries (num- ber)	Year (data)
Cobham and Janský (2018)	-	90	Revenue	Yes	102	2013
IMF's Crivelli et al. (2016)	-	123	Revenue	No	173	2013
Janský and Palanský (2019)	420	125	FDI	Yes	79	2016
IMF (2014)	-	180	Revenue	Yes	46	2012
UNCTAD's Bolwijn et al. (2018)	330-450	200	FDI	No	72	2012
Tørsløv et al. (2020)	616-646	230	FDI	Yes	48	2015
OECD's Johansson et al. (2017)	-	100-240	Orbis	No	46	2010
Clausing (2016)	1076	279	FDI	Yes	25	2012
This paper	965-994	186-307	CBCR	Yes	192	2016

#### Profits shifted in and out of countries



#### Tax revenue loss as a percentage of total revenue



#### Results from other papers

- Double counting in the CBCR data
- Some MNCs publish their CBCR data
- Banks' CBCR
- Extractive industry's CBCR

Conclusion •00000

# Summary of findings

- Bigger than previously estimated
- Low effective tax rates
- Low-income countries more hardly hit
- US multinational corporations are special

#### Implications for a global corporate tax reform

- Postponements costly for low-income countries in particular
- Unanimous support unlikely if only because of the major players
- The importance of tax havens with low effective tax rates
- The importance of the global minimum tax rate

#### Implications for measuring illicit financial flows

- Estimation of profit shifting is possible
- The more detailed data, the better
- The CBCR data is great, combining it with other data even better

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# Implications for future research

Company-level data from governments or MNCs

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# Implications for future research

- Company-level data from governments or MNCs
- New years of data

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#### Petr Janský

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Charles University

petrjansky.cz 🗹

@petr\_jansky ♥

petr.jansky@fsv.cuni.cz 🔽

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

Appendix 000000000



Figure: Distribution of the scale of profit shifted estimated by the misalignment model at the country level. The largest origins (top two rows, in blue) and

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Methodology specifications

Linear:

$$\log(\pi_i) = \beta_0 + \beta_1 \log(K_i) + \beta_2 \log(L_i) + \beta_3(\tau_i) + \beta_\chi \chi + \epsilon, \quad (1)$$

Linear:

$$\log(\pi_i) = \beta_0 + \beta_1 \log(K_i) + \beta_2 \log(L_i) + \beta_3(\tau_i) + \beta_\chi \chi + \epsilon, \quad (1)$$

Quadratic:

 $\log(\pi_i) = \beta_0 + \beta_1 \log(K_i) + \beta_2 \log(L_i) + \beta_3(\tau_i) + \beta_4(\tau_i)^2 + \beta_\chi \chi + \epsilon, \quad (2)$ 

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 $\log(\pi_i) = \beta_0 + \beta_1 \log(K_i) + \beta_2 \log(L_i) + \beta_3(\tau_i) + \beta_4 \log(t + \tau_i) + \beta_\chi \chi + \epsilon.$ (3)

Linear:

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Profit misalignment model and the redistribution formula, R<sub>i</sub>:

$$R_{i} = 1/4 \frac{L_{i}}{\sum_{i} L_{i}} + 1/4 \frac{W_{i}}{\sum_{i} W_{i}} + 1/2 \frac{Rev_{i}}{\sum_{i} Rev_{i}},$$
(4)

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	Log	Quad	Log+Quad	Linear	DLM-Quad	DLM-Linear
Intercept	-6.8326***	-0.8160	-7.3478***	-0.8683		2.482
	(2.0061)	(2.1996)	(2.1783)	(2.4403)		(0.136)
ETR	5.5093***	-17.2618***	8.5732	-4.0226***	-3.748	-1.076
	(1.4594)	(3.0732)	(5.1545)	(1.0793)		(0.108)
log(0.0014 + ETR)	-1.5176***	. ,	-1.6464***	. ,		. ,
,	(0.1920)		(0.2834)			
ETR <sup>2</sup>		28.5306***	-4.8589		7.184	
		(6.2822)	(7.8373)			
log(Population)	0.3694***	0.2885**	0.3671***	0.1807		
	(0.1051)	(0.1235)	(0.1056)	(0.1344)		
log(GDPpc)	0.4721***	0.4953**	0.4698***	0.4917**		
	(0.1628)	(0.1926)	(0.1634)	(0.2137)		
log(Tangible assets)	0.4874***	0.6354***	0.4841***	0.7436***		
	(0.0748)	(0.0832)	(0.0753)	(0.0885)		
log(Wages)	0.1617*	0.0291	0.1648*	-0.0670		
	(0.0929)	(0.1066)	(0.0934)	(0.1159)		
N	91	91	91	91	96.959	96.959
R2	0.90	0.86	0.90	0.82	0.465	0.465
BIC	222.58	253.21	226.67	268.68		



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	Logarithmic	Quadratic	Log*FE + Quad	Log + Quad*FE	Linear
ETR	0.8875	-8.5032***	1.9793	0.0754	-3.6634***
	(0.7719)	(1.6584)	(2.5847)	(2.6843)	(1.2751)
ETR <sup>2</sup>		11.9405***	-2.1320	-1.6397	
		(4.2511)	(4.8163)	(5.3813)	
log(0.0007 + ETR)	-0.8665***		-0.8957***	-0.3379***	
	(0.1642)		(0.1770)	(0.0838)	
Australia*tax	0.4306**	1.0065	0.4330**	-0.7650	-0.3838
	(0.1998)	(7.8104)	(0.2000)	(7.7249)	(2.6301)
Belgium*tax	0.2948	-4.5105	0.3008*	-4.2598	-1.7723
	(0.1790)	(4.5443)	(0.1796)	(4.4877)	(1.9625)
Bermuda*tax	0.0943	-3.5274	0.0956	-3.8274	-0.9763
	(0.2169)	(4.2640)	(0.2171)	(4.2111)	(1.9457)
China*tax	0.8757***	13.2458**	0.8777***	12.5428**	5.5597**
	(0.1945)	(5.4004)	(0.1947)	(5.3355)	(2.1749)
Denmark*tax	0.3397**	-3.7208	0.3466**	-2.7414	-1.8929
	(0.1615)	(3.8300)	(0.1623)	(3.7897)	(1.6508)
India*tax	0.7779***	8.0289	0.7821***	8.1251*	4.2697**
	(0.1947)	(4.9194)	(0.1950)	(4.8578)	(2.1596)
Italy*tax	0.6494***	6.1330	0.6505***	4.8425	1.4175
	(0.1857)	(6.4195)	(0.1858)	(6.3470)	(2.2274)
Luxembourg*tax	0.2824	5.0685	0.2859	4.3634	-0.0267
	(0.1837)	(5.2002)	(0.1840)	(5.1380)	(2.0815)
Mexico*tax	0.9279***	9.8344**	0.9364***	10.2409**	5.5226***
	(0.1825)	(4.1190)	(0.1837)	(4.0686)	(1.8670)
South Africa*tax	0.9362***	9.7287**	0.9404***	10.1278**	5.4227***
	(0.1829)	(4.1038)	(0.1840)	(4.0486)	(1.8683)
log(Population)	0.0990**	0.0641	0.0978**	0.0789**	0.0334
	(0.0387)	(0.0397)	(0.0388)	(0.0394)	(0.0390)
log(GDPpc)	0.1027*	0.1262**	0.1024*	0.1206**	0.1238**
	(0.0573)	(0.0597)	(0.0574)	(0.0590)	(0.0599)
log(Tangible assets)	0.3251***	0.3136***	0.3254***	0.3167***	0.3183***
	(0.0240)	(0.0243)	(0.0240)	(0.0240)	(0.0246)
log(Wages)	0.2440***	0.2198***	0.2442***	0.2352***	0.2172***
	(0.0334)	(0.0344)	(0.0334)	(0.0341)	(0.0344)
FE interaction	log	quad	log	quad	lin
N	622	622	622	622	622
R2	0.73	0.71	0.73	0.72	0.71
BIC	2220.79	2270.04	2227.02	2259.72	2268.14

#### Top destinations of profit shifting

	Misalignment			Logarithmic		
Country	P (all groups)	PS (B)	PS (%booked)	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

#### Estimates of profits shifted and tax revenue loss

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

#### Profits shifted as a percentage of GDP

