

Profit Shifting in a Globalized World

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The term “profit shifting” refers to cross-border tax avoidance by multinational corporations (MNCs), primarily through the use of inter-affiliate debt and strategic transfer pricing (e.g. Dharmapala, 2014a).¹ This paper briefly reviews the measurement of the magnitude of profit shifting. Highlighting differences between estimates using microeconomic and macroeconomic approaches, it sketches a conceptual framework that can help explain these divergent estimates. It also discusses the future of profit shifting, drawing on a dataset that codes anti-avoidance measures undertaken by OECD countries over the period 2000-2014.

I. Estimates of the Magnitude of Profit Shifting

A. *Micro versus Macro Approaches*

There is a well-established literature on the estimation of profit shifting using microeconomic techniques, as surveyed in Dharmapala (2014a). A particularly influential approach is derived from Hines and Rice (1994).² Its basic premise is that the observed pretax profit of an MNC affiliate represents the sum of “true” profits (generated using capital and labor inputs, which are included in the analysis to predict the affiliate’s counterfactual profit) and “shifted” profits. Differences between observed and counterfactual profits are then attributed to profit shifting.

This approach is typically implemented using a log-linear specification that is used to estimate the tax semi-elasticity (i.e. the percentage change in reported profit associated with a one percentage point change in the tax rate difference across countries). Recent studies using affiliate-level microdata (such as

¹ Public concern about profit shifting tends to center on revenue losses, but its intellectual significance is related more closely to the issue of “under-sheltering” (e.g. Desai and Dharmapala, 2006; 2009) –

i.e. that there may be *less* profit shifting than the law appears to allow – and to the extent to which it entails deadweight costs.

² Several alternative micro approaches to the estimation of profit shifting have also been developed (e.g. Dharmapala and Riedel, 2013).

the Amadeus and Orbis databases compiled by the Bureau van Dijk) have estimated this semi-elasticity to be about 0.8 (Dharmapala, 2014a). This entails that a 10 percentage point increase in the tax rate difference between an affiliate and its parent would increase the pretax profit reported by the affiliate by 8%. Extrapolating from this semi-elasticity implies that less than 20% of MNCs' foreign profits are shifted to tax havens (Dharmapala, 2014a).³ The fraction of MNCs' foreign profits reported in havens is substantially larger than this: for instance, 42.6% of US MNCs' foreign income was reported in havens in 2011 (Dharmapala, 2014a, Table 2, p. 442), suggesting a potential disjuncture between the microeconomic evidence and the aggregate data.

A more recent literature instead uses aggregate data. For instance, Tørsløv, Wier and Zucman (2018) use newly available macroeconomic data on tax havens to infer the specific nonhaven countries from which income reported in havens is shifted. Their approach suggests that about 40% of the foreign profits of MNCs are shifted to havens.

B. Evidence from Bunching at Zero

A new strand of the profit shifting literature adopts an approach that differs from both of those sketched above, and focuses on the (differential) tendency of MNC affiliates to report zero profits (e.g. Habu, 2017). For instance, Dharmapala and Hebus (2017) use data from the Orbis database for the period 2011-2014, consisting of over 18 million observations on (unconsolidated) MNC affiliates and on domestic-only firms across the world. Figure 1 illustrates this approach, comparing the distributions of the ratio of pretax profits to assets for MNC affiliates and domestic firms across bins of width 0.005 (defined in terms of the profit-to-assets ratio). It suggests the existence of an excess mass at zero for MNC affiliates.

Drawing inferences from the observed excess mass poses some challenges, as there may be various underlying differences between MNC affiliates and domestic firms. Bunching at zero can be generated within a standard model (with convex costs of profit shifting) as the joint result of profit shifting and the asymmetric tax treatment of losses. Thus, isolating the profit shifting effect requires disentangling these two factors. Despite these

³ This calculation assumes that foreign nonhaven countries have a tax rate of 25% and that havens have a zero tax rate.

caveats, the bunching approach is a promising new avenue for future research on profit shifting.

C. Reconciling Micro and Macro Estimates

There are many limitations of the microdata that is typically used in microeconomic studies of profit shifting. For instance, the Orbis database has limited coverage of tax haven affiliates, and relatively limited coverage of US firms. To the extent that the tax-responsiveness of omitted firms differs from that of included firms, this may account for some of the divergence in micro and macro estimates.

Beyond this, however, there appear to be some basic conceptual differences between the notions of profit shifting underlying micro and macro approaches. In particular, as noted above, micro estimates take as given the location of productive assets. Their location may of course be influenced by tax rate differences across countries. However, this is generally viewed as a behavioral (or “real”) response to taxation, rather than as tax avoidance. The latter is typically defined as “the lawful reduction of tax obligations, while maintaining the same substantive economic outcome” (Dharmapala, 2017, p. xv). Both tax avoidance and behavioral responses give rise to distortions, but they are conceptually different:

the former is constrained by tax law and by the costs of tax planning, while the latter is primarily constrained by nontax frictions.

Arguably, much of the difference between micro and macro estimates may be attributed to the location of intangible assets and holding companies in havens (which the micro – but not the macro – approach tends to take as given). For instance, Hines (2010) argues that the presence of holding companies can mechanically inflate the fraction of income reported in havens (such as the 42.6% number reported above). The macro approach presumes that these locational choices are themselves a form of tax avoidance. However, it is arguably an empirical question whether they should instead be viewed as a behavioral response to tax rate differences.

The existing evidence (e.g. Desai, Foley and Hines, 2006; Karkinsky and Riedel, 2012) suggests that the location of holding companies and intangible assets is highly responsive to taxes, but arguably not sufficiently so as to suggest the absence of nontax frictions. The extent of these nontax frictions (such as the legal infrastructure and the availability of legal and business expertise in different locations) is an important issue for further research. Ultimately, this discussion suggests that the micro and macro literatures capture different notions (narrower and broader, respectively) of

profit shifting. It may be best to view these as being useful for different purposes, rather than seeking to determine which one is “correct.”

II. The Future of Profit Shifting: Evidence on the Rise of Anti-Avoidance Measures

Although this is rarely emphasized in public discussions of the topic, governments have powerful tools to combat profit shifting. These include controlled foreign corporation (CFC) rules, thin capitalization rules (TCRs), and transfer pricing regulations.⁴

Suppose that country i has corporate tax rate τ_{it}^c in year t . Then, a CFC rule specifies a minimum tax rate τ_{it}^{min} such that if an MNC resident in i earns passive income in country j (with local tax rate τ_{jt}^c), it pays tax at a rate of τ_{jt}^c if $\tau_{jt}^c \geq \tau_{it}^{min}$ and at τ_{it}^c if $\tau_{jt}^c < \tau_{it}^{min}$. Thus, a CFC rule taxes at the residence country rate passive income earned in foreign low-tax jurisdictions. It eliminates the incentive of i -resident MNCs to shift passive income from i itself or from other higher-tax jurisdictions to any country with a tax rate below τ_{it}^{min} . Thus, while the adoption of a CFC rule results in a reduction in profit shifting out of i to havens, it

also discourages i -resident MNCs from avoiding foreign taxes.

The increased foreign tax payments represent a loss of national welfare for country i (though of course the higher revenue for foreign governments is not a loss from a global perspective). Thus, residence countries arguably face a collective action problem in introducing CFC rules, and are likely to do so to a suboptimal extent (e.g. Dharmapala, 2014b; Haufler *et al.*, 2018).

TCRs limit the use of inter-affiliate debt to erode the tax base of higher-tax source countries (which occurs when a low-tax affiliate lends to a high-tax affiliate of the same MNC). There are two main forms of TCRs (e.g. Büttner *et al.*, 2012). One relies on safe harbor rules, establishing a maximum ratio of debt to assets that an affiliate must satisfy in order to deduct interest paid (either to related parties or to third parties). For the analysis below, it is more convenient to specify this instead as a minimum ratio of equity (E) to assets (A) above which interest deductions are allowed, defined as $q_{it} = \frac{E_{it}}{A_{it}}$ for an affiliate operating in country i in year t .

An alternative (and generally newer) form of TCR involves specifying a limit to interest

⁴ For reasons of space, only the first two are discussed here. Note also that in the terminology of international taxation, the income generated by normal business operations in the source country (in

which MNC affiliates undertake business activity) is referred to as “active” income; income not associated with these business activities (such as interest and royalties) is referred to as “passive” income. The residence country is the country in which the MNC parent is located.

deductions as a fraction of pretax income. That is, interest deductions (either for inter-affiliate debt or for all debt) are limited to $d_{it}Y_{it}$, where Y_{it} is income and $d_{it} \leq 1$ is the (fractional) limit. The adoption of TCRs by source countries generates revenue, but increases effective tax rates on investment by MNCs. Thus, the strength of TCRs is likely to be inhibited by tax competition in a noncooperative setting.

A. Data and Descriptive Statistics

The dataset of CFC rules and TCRs used here builds on the coding of these provisions by Haufler *et al.* (2018) for all OECD countries in 2000 and 2014, but is extended in certain respects to enable quantification. For instance, residence countries' CFC rules are used to infer a minimum tax rate τ_{it}^{min} on foreign passive income earned by MNCs resident in country i in year t (with the absence of a CFC rule represented by $\tau_{it}^{min} = 0$). Source countries' TCRs are used to infer q_{it} and/or d_{it} for each country, with the absence of a TCR represented by $q_{it} = 0$ and/or by $d_{it} = 1$.⁵

OECD countries have significantly strengthened their anti-profit-shifting rules from 2000 to 2014, despite the collective action

and tax competition problems noted above. The mean of τ_{it}^{min} has increased slightly from 10.8% to 10.9% over this period, while the median has increased from zero to 12% (indicating that CFC rules have become substantially more widespread among OECD countries). This increase is more pronounced when τ_{it}^{min} is scaled by τ_{it}^c (which is arguably appropriate because many CFC rules specify τ_{it}^{min} as a fraction of τ_{it}^c). Figure 2 shows that the mean ratio $\frac{\tau_{it}^{min}}{\tau_{it}^c}$ has increased from 0.34 to 0.42 (and the median ratio from 0 to 0.5).

For TCRs, Figure 3 shows that the mean q_{it} has risen from 0.14 to 0.22. This indicates that the required fraction of equity in MNC affiliates has risen, thereby reducing opportunities for profit shifting. The mean d_{it} has fallen from 1 to 0.65, implying that only about two thirds of income was potentially subject to interest deductions in 2014.

A simple test of the statistical significance of these changes uses regressions of the form:

$$(1) \quad \tau_{i,2014}^{min} = \alpha + \beta \tau_{i,2000}^{min} + \varepsilon_i$$

The test centers on the sign and significance of the constant term α . Table 1 reports that the increase in τ_{it}^{min} (of about 3 percentage points for the typical OECD country) is significant at the 5% level (Column 1), as is the increase in

⁵ Some countries have safe harbor rules and others have earnings stripping rules (and a few countries have switched from one type of

rule to the other). The two types of TCRs are not directly comparable, so both q_{it} and d_{it} have some missing values.

$\frac{\tau_{it}^{min}}{\tau_{it}^c}$ (Column 2). The increase in q_{it} is of borderline statistical significance (Column 3). A slightly different approach is used in Column 4 for d_{it} due to collinearity between $d_{i,2000}$ and α ; this shows that the decline in d_{it} is significant at the 1% level.

B. Implications

The evidence regarding anti-avoidance measures by OECD countries reported above suggests that profit shifting (in the narrower “micro” sense) may be in the process of gradually disappearing. While there remains considerable scope for strengthening these rules further, it is noteworthy that these changes occurred prior to the implementation of the recent multilateral Base Erosion and Profit Shifting (BEPS) initiative (OECD, 2015). However, while reductions in profit shifting generate revenue, they potentially have costs in terms of reduced investment: profit shifting and real responses to taxation are often substitutes (e.g. Suarez Serrato, 2018). Thus, governments would be expected not to eliminate profit shifting, but rather to balance the costs and benefits. Multilateral cooperation (such as the BEPS initiative) makes it more likely that these costs and benefits will be assessed at a global, rather than at a merely national, level.

Finally, profit shifting has been linked in some discussions to inequality and to the distribution of tax burdens. Any such links depend on assumptions about corporate tax incidence and about underlying political mechanisms. A simple conceptual point to bear in mind is that existing tax-transfer systems reflect the political influence of different income groups. If an exogenous reduction in profit shifting were to occur, then (holding the distribution of political influence fixed) it would be expected that offsetting adjustments - such as lower personal taxes on high-income groups - would be made in a new political-economic equilibrium. Thus, reducing profit shifting would not have any distributional consequences in equilibrium, unless the transaction costs of making offsetting changes are very high.

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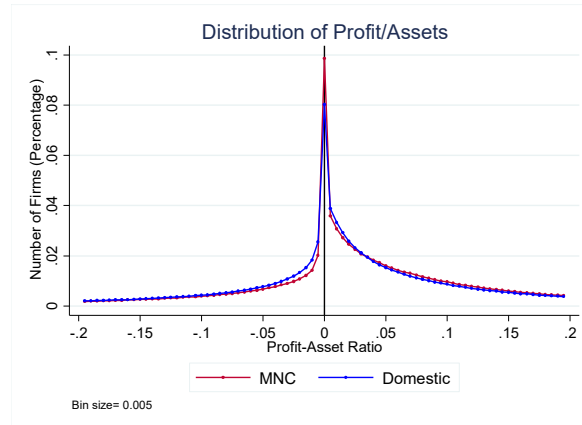


FIGURE 1. DISTRIBUTION OF THE PROFIT-TO-ASSETS RATIO FOR MNC AFFILIATES AND DOMESTIC FIRMS

Note: This figure, from Dharmapala and Hebus (2017), depicts the distributions of the profits-to-assets ratio for MNC affiliates and domestic firms in the Orbis database for the period 2011-2014.

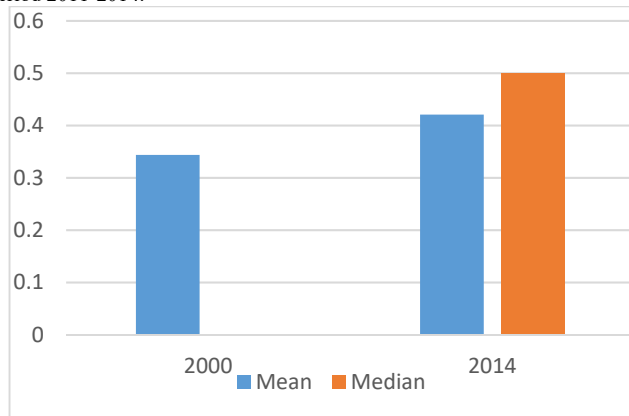


FIGURE 2. RATIO OF MINIMUM TAX RATE ON FOREIGN PASSIVE INCOME TO THE CORPORATE TAX RATE, OECD COUNTRIES 2000-2014

Note: This figure depicts the mean and median ratios of τ_{it}^{min} to τ_{it}^c (as defined in the text) for OECD countries in 2000 and 2014. The median in 2000 was zero. Based on author's calculations.

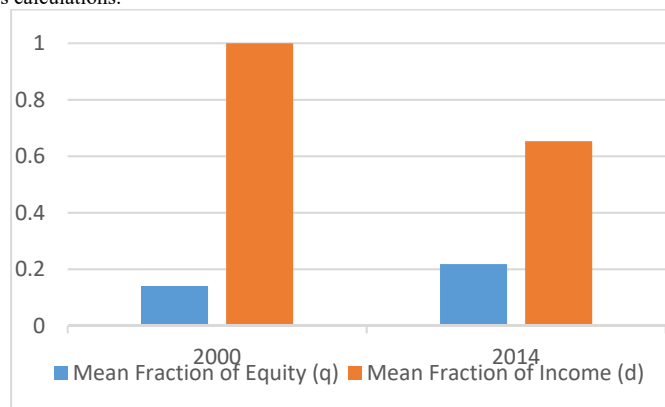


FIGURE 3. THIN CAPITALIZATION RULES, OECD COUNTRIES 2000-2014

Note: This figure depicts the mean values of q_{it} and d_{it} (as defined in the text) for OECD countries in 2000 and 2014. Based on author's calculations.

TABLE 1— CHANGES IN CFC RULES AND THIN CAPITALIZATION RULES, OECD COUNTRIES 2000 TO 2014

	Dependent Variable:			
	$\tau_{i,2014}^{min}$	$\frac{\tau_{i,2014}^{min}}{\tau_{i,2014}^c}$	$q_{i,2014}$	Δd_{it}
$\tau_{i,2000}^{min}$	0.75***			
	(0.062)			
$\frac{\tau_{i,2000}^{min}}{\tau_{i,2000}^c}$		0.82***		
		(0.071)		
$q_{i,2000}$			0.46	
			(0.311)	
Constant	2.78**	0.14**	0.15*	-0.35***
	(1.206)	(0.054)	(0.081)	(0.080)
Observations	34	34	26	17
R-squared	0.831	0.764	0.088	0.000

Notes: This table reports regressions of the form shown in Equation (1). Variables are defined in the text. Robust standard errors are shown in parentheses.

Source: Author's calculations.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.