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Quantifying International Tax Avoidance: A Review of the Academic Literature

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Summary

- This paper provides a brief **review of the academic literature that assesses the quantitative importance of tax avoidance behaviour of multinational entities (MNEs)** by means of income shifting from high-tax to low-tax affiliates.
- Existing studies unanimously report **evidence in line with tax-motivated profit shifting** (despite using different data sources and estimation strategies). In terms of shifting channels, there is evidence consistent with **strategic mispricing of intra-firm trade, the location of valuable intellectual property at low-tax affiliates and debt-shifting activities**.
- The **quantitative estimates vary across approaches and studies** though, with results at the lower (upper) end suggesting that MNEs transfer less than 5% (30% or more) of their income earned at high-tax affiliates to lower-tax entities.
- The paper, however, also stresses that some care should be warranted when interpreting shifting estimates as they often rely on non-trivial assumptions.

Introduction

With the emergence of the financial crisis and increasing fiscal strains in many countries, reports of multinational enterprises (MNEs) like Google, Apple, Starbucks and Ikea engaging in significant international tax avoidance activities triggered public outrage, with the media, NGOs and politicians heavily criticizing their “lousy behaviour“ (Larry Elliot, *The Guardian* (2013)) and labelling them to be modern “Robber Barons“ (John Simpson in *The Telegraph* (2012)).

Companies defended themselves by stressing that they fully abided by the tax law and that it is the role of the legislator to close existing loopholes for multinational tax avoidance activities. Anecdotal evidence points to many of these loopholes and suggests that firms set up complicated international tax structures to shift income from high-tax to low-tax locations, including the mis- pricing of intra-firm trade, the strategic location of valuable intellectual property (IP) at low-tax affiliates and debt-shifting arrangements, where low-tax entities lend to high-tax affiliates to strip out tax-deductible interest payments.¹ Mandated by the G20,

¹ One prominent scheme is the so-called “Double Irish Dutch Sandwich“, where a US-based multinational avoids the high corporate tax rates in European markets by selling its products from an Irish subsidiary. To further reduce the 12.5%-tax rate charged in Ireland, the firm transfers patents to a subsidiary in a haven economy with a zero rate, e.g. Bermuda, and strips income out of Ireland through royalty and license payments. To avoid withholding taxes, the money is furthermore channeled through a conduit in the Netherlands, exploiting the absence of withholding taxes under Dutch law. Finally, the group maneuvers around the application of US controlled foreign company (CFC) rules by founding a second Irish affiliate managed by the Bermudian subsidiary, exploiting that the firm is tax resident in Ireland under US law and tax resident in Bermuda under Irish law (e.g. IMF (2013)). Recently, the Irish finance minister announced that Ireland intends to change its tax

the OECD recently took up public concerns about this type of aggressive international tax avoidance and launched an action plan to combat base erosion and profit shifting (BEPS, see OECD (2013)).

As many anti-shifting provisions do not only deter MNEs' tax planning schemes but may also distort underlying business activity, increase firms' double taxation risk and raise compliance and enforcement costs, their welfare consequences depend on the extent to which MNEs actually do engage in tax avoidance behaviour. Against this background, the purpose of this paper is to go back one step and ask whether profit shifting is indeed a systematic and quantitatively important phenomenon that goes beyond the singular cases that were prominently featured in the media.

Descriptive Evidence

One may be tempted to jump to conclusions very quickly and argue that the observed presence of many MNEs in tax haven countries and their low aggregate effective corporate tax rates already prove the point.² Some words of caution are warranted though. Low effective tax rates may also (partly) relate to non-avoidance activities, e.g. to high levels of tax-deductible investment expenses or loss-

residence rules, thus sounding the death knell for the scheme.

² Desai et al. (2006) present evidence that in 1999 more than every second US-based MNE had some presence in countries that appear on standard tax-haven lists (see Dharmapala and Hines (2009)). Gumpert et al. (2011) report a smaller figure for German-based MNEs (25%), which may relate to reporting thresholds that prevent the authors from observing small foreign entities in haven economies. Aggregate BEA data furthermore suggest that about 40% of (foreign) net income of US firms is located in tax havens (Dharmapala (2014)).

carryforwards. Tax havens moreover do not only woo firms with low tax rates but often provide good governance institutions, attractive public infrastructure and well-developed financial service and labour markets (see e.g. the economically important tax havens of Switzerland and Ireland). The corporate decision to locate investments in these countries may thus be driven by other determinants than corporate tax avoidance considerations.

Indirect Evidence: Pre-tax Profits and Corporate Tax Rates

Researchers have thus tried to develop better empirical strategies to identify multinational shifting behaviour. As MNEs have an incentive to hide avoidance activities from the public and corporate reporting requirements do not establish full transparency, existing strategies are necessarily indirect and present no “smoking gun” in the narrow sense of the word.

The most common approach pursued in the literature is to compare pre-tax profits of high-tax and low-tax affiliates as income shifting reduces the former and increases the latter. Survey evidence for US MNEs (provided by Bureau of Economic Analysis (BEA)) for example points to strongly elevated pre-tax profitability rates at tax-haven affiliates (see e.g. Sullivan (2004) and Clausing (2011)).

Unfortunately, this pattern may also be an artefact of the BEA’s data structure (see Altshuler and Grubert (2006) and footnote 3 for details)³ or may reflect variation in other

³ Problems may arise as foreign affiliates’ pre-tax income in the BEA data includes income from equity investments, which might trigger ‘double-counting’ of income and artificial profits at low-tax locations (if they host holding companies). To see this, imagine a US parent

profit- determinants that differ across host countries and affiliates (e.g. differences in worker productivity, public good provision or market competition).

The literature accounted for these shortcomings by making use of other firm databases (often drawing on accounting information) and by estimating empirical models that control for country and affiliate-specific profit-determinants. While early papers compare pre-tax profitabilities of high-tax and low-tax affiliates, more recent papers analysed *changes* in affiliates' reported pre- tax profitability in response to corporate tax reforms. The benefit of the latter approach is that time-constant unobserved differences across entities cannot confound the results.

Studies unanimously report an inverse relation between the corporate tax rate (difference) and affiliates' reported pre-tax profits. The size of the estimates varies across papers though. Heckemeyer and Overesch (2013) conduct a meta-analysis and present a semi-elasticity of 0.8 as a consensus estimate, implying that an increase in the host country's corporate tax (difference to foreign group locations) of 10 percentage points lowers affiliates' reported pre-tax profits by 8%. Thus, from every 1000 Euros earned at a high-tax location, MNEs would transfer 80 additional Euros to lower-tax entities after the increase in the corporate tax rate (differential).

with a holding company in a tax haven and a manufacturing affiliate in a foreign high-tax country. The manufacturing firm earns US \$1000, subject to a 40% corporation tax, and remits the full US \$600 to the holding company in the tax haven in form of dividends. The BEA data then shows US \$600 of after-tax profits in both affiliates. See Altshuler and Grubert (2006) and Dharmapala (2014).

While these findings are commonly interpreted as evidence for multinational income shifting, a number of caveats have to be kept in mind. To see this, let's do a thought experiment and assume that MNEs did *not* engage in income shifting. Are there other mechanisms that may establish a link between corporate taxes and affiliates' reported pre-tax profitability? Three candidates:

Firstly, MNEs may have an incentive to strategically sort high return projects to low-tax affiliates and vice versa. While no separation of economic activity and taxable income ("paper profit shifting") is involved, the mechanism establishes a *negative* correlation between corporate taxes and reported pre-tax profitability. Secondly, high corporate taxes may imply that MNEs require a higher pre-tax return in order to invest in a country, which establishes a *positive* correlation between taxes and reported pre-tax profitability. Thirdly, corporate taxation may affect affiliates' pre-tax profits through changes in *effort provision*.⁴ As owners can keep less of earned income when corporate taxes rise, manager-owners may exert less effort or, with separation of management and ownership, adjust staff's incentive contracts. Again, this gives rise to a *negative* correlation between pre-tax profits and corporate tax rates.⁵

⁴ Note that the first argument refers to MNEs that are subject to financing or operational constraints and for that reason implement a given set of projects only. The second argument in turn refers to unconstrained MNEs.

⁵ Other sources of bias include a lack of book-tax conformity (when studies rely on accounting data) and worldwide taxation. Moreover, due to reporting exemptions many official and private data sources do not include small firms. If shifting activities vary with entity size, existing estimates are not representative for the population of firms.

Interpreting the above estimates as evidence for paper profit shifting hence assumes that these mechanisms are of minor importance. If they are not, the estimates may understate (see second argument) or overstate (see first and third argument) the true extent of profit shifting.⁶

The approach has been used to quantify revenue losses from income shifting for the US. Clausing (2009, 2011) estimates that revenue costs in 2004 and 2008 amounted to \$60 and \$90 billion respectively or about 30% of US corporate tax revenues. The findings should be interpreted with some care though since the above methodological caveats apply and the

⁶ Note that modelling the tax incentive by the corporate tax rate differential between group affiliates does not solve (all of) these issues. Specifically, variation in the tax rate differential is either induced by changes in the host country tax or by changes in the tax rate at foreign group locations. Identification through the former involves all problems described above; identification through the latter is not subject to the second and third alternative mechanism, but to the first. Moreover, as shifting-partners cannot be directly observed, studies commonly model the tax difference using a(n) (weighted) average of foreign affiliates' tax rates. Since many affiliates are, however, not part of a firm's shifting network, this is a noisy measure and may result in a downward bias of the estimate, making the direction of the overall bias unclear. Note, however, that modelling MNEs' shifting incentives by the tax rate differential is nevertheless preferred relative to models that account for the affiliate's host country tax rate only as disregarding foreign taxes may distort the shifting estimate for two reasons: Firstly, if MNEs found new (close existing) low-tax affiliates in response to corporate tax increases (decreases), the change in the tax rate differential is larger than the change in the host country tax, which implies shifting estimates to be too large if the foreign tax rate is omitted. If, in turn, in line with international tax competition, tax decreases in one country trigger tax decreases in neighboring economies, the change in the tax differential is smaller than the change in the host country tax, implying estimates to be too small if foreign taxes are omitted.

tax-sensitivity of corporate profits underlying Clausing's estimates is large compared to other papers (3.3 relative to the 0.8-semi-elasticity consensus estimate in Heckemeyer and Overesch (2013)).

Alternative Approaches: Profitability Shocks and Corporate Twins

The literature has proposed two alternative approaches to test for multinational income shifting. Both approaches do not rely on identification based on variation in corporate tax rates and are hence not prone to the identification concerns sketched above.

The first approach, proposed by Dharmapala and Riedel (2013), exploits profitability shocks to multinational affiliates as a source for empirical identification. The authors argue that, if MNEs engage in tax-motivated income shifting, positive profit shocks at high-tax locations should partly translate into higher reported income at the group's low-tax affiliates (but not at other high-tax affiliates). Using data on European firms, profitability shocks are modelled by changes in industry profitability in a given country. The findings suggest that MNEs shift around 2% of the additional income to lower tax entities. Three features of the data and model set-up suggest that the estimate is a lower bound to the true effect: firstly, the authors construct profit shocks to *parent* firms and investigate whether these are transmitted to lower-tax subsidiaries. Previous papers (Dischinger et al. (2014)) suggest though that MNEs are more reluctant to shift income away from their headquarters location than from high-tax subsidiaries. Secondly, the observed average tax rate differential between parents and lower-tax subsidiaries is relatively small in the

authors' data, implying limited shifting incentives. Thirdly, for conceptual reasons, the study disregards subsidiaries that operate in the same industry as their parent (since they may be subject to the same profitability shock). If a significant fraction of profit shifting takes place between entities in the same sub-industry, e.g. related to high levels of intra-firm trade and much leeway in setting tax-favorable transfer prices, this is not captured in the analysis and observed profit relocations may mainly reflect debt-shifting behavior.⁷

The second alternative approach to quantify tax losses through international income shifting was proposed by Egger et al. (2010) and Finke (2013). Using firm level data for Europe and Germany respectively, the authors aim to identify income-shifting behaviour by comparing corporate tax payments of multinational and national enterprises (NEs). As MNEs and NEs may differ in various other tax-determining characteristics, the authors employ matching techniques to identify similar twins in the two subgroups (as determined by firm characteristics, e.g. age, size, industry and productivity as well as host region characteristics). Both papers report large differences between corporate taxes paid by comparable MNEs and NEs. Egger et al. find that, in European high-tax countries, the corporate tax burden on MNEs is more than 30% lower than the burden on NEs. For Germany, Finke (2013) suggests a gap of 27% in 2007, which declined after the 2008 corporate tax reform,

⁷ The tax sensitivity approach presented in the previous section predicts that in Dharmapala and Riedel (2013)'s sample around 4% of additional income is shifted to low-tax entities (=average corporate tax rate difference of 7.7% between sample affiliates times the profit-tax semi-elasticity estimate of 0.5 reported in Dischinger et al. (2014)).

presumably related to the reduction in the headline corporate tax rate and the implementation of tighter thin-capitalization rules. The Achilles' heel of the approach is that these matching estimates are biased if tax-determinants, which are unobserved by researchers, systematically differ between MNEs and NEs. It does not seem farfetched that this is the case. MNEs' managements may e.g. be more aggressive in exploiting tax-planning opportunities than NEs' managements. MNEs may also engage in more extensive government lobbying than NEs and, in consequence, receive more firm-specific tax benefits (e.g. through laxer tax audits).⁸ On top, to prevent mobile MNEs from relocating investment to foreign countries, governments may grant firm-specific tax reductions to multinationals (as acknowledged in Egger et al. (2010), see also Böhm et al. (2014)). All three arguments suggest that part of the observed gap in tax payments may be driven by other mechanisms than international tax avoidance of MNEs.

Other Estimates: Tax Authorities and NGOs

On top, several tax authorities estimate corporate tax revenue gaps related to avoidance behaviour (commonly not distinguishing between international and national avoidance though – or even pooling avoidance activities with illegal evasion, filing errors and criminal activity). In the United Kingdom, the British HM Revenue and Customs (HMRC) determined a tax avoidance gap for large businesses of £1.1 billion in 2012/13 or 5% of the firms' theoretical tax liabilities (£0.1 billion for small and medium-

⁸ If lobbying for example involved fixed costs, only groups above a given size threshold would engage in lobbying (which are then also often MNEs), see e.g. Bombardini (2009), Böhm et al. (2014).

sized firms), see HMRC (2014).⁹ This is likely a lower bound to the true gap as their analysis relies on internal knowledge from HMRC's case management systems and tax specialists are unlikely to identify all avoidance schemes.

As an alternative strategy, TUC (2008) and The Guardian (2009) proposed to quantify revenue losses from multinational tax avoidance for the UK by comparing the amount of tax paid as declared in firms' accounts with an estimate of the tax due. As stressed in Miller (2013) and others, the shortcoming of this approach is that it does not account for the deliberate elements in the structure of the tax system that lead to a reduction in tax liabilities (such as capital allowances, the R&D tax credit and loss carry-forwards) or the genuine commercial reasons why taxes may be paid in other jurisdictions. Thus, while their tax gap estimates are substantially larger than those in the HMRC analysis – for 2006, TUC (2008) e.g. estimates an avoidance gap of £12 billion in the UK – they are likely overstated (and possibly by a wide margin).¹⁰

⁹ Large firm's tax avoidance hence contributes the lion's share to the total corporation tax gap of £3.9 billion.

¹⁰ NGOs also published estimates for the income tax gap related to *both*, illegal tax evasion and avoidance (of firms and individuals). Murphy (2012) claims that the income tax gap in the European Union exceeds 1 trillion Euro, accounting for evasion and avoidance activities of firms and individuals. The lion's share of his estimate relates to tax evasion. Losses due to tax avoidance are quantified with 150 billion Euros per year. The number is based on a simple average of tax authority estimates and the methodology in TUC (2008) and may, for the reasons stated above, over- or underestimate the actual revenue loss.

Analysing Specific Relocation Channels

Another strand of the literature tries to account for the discussed shortcomings by investigating specific income shifting channels. As sketched in the Introduction, prominent international tax avoidance strategies include the mispricing of intra-firm trade, strategic location of valuable IP at low-tax locations and debt-shifting activities.¹¹

The literature on tax-motivated distortions of MNEs' transfer prices compares prices for intra-firm and extra-firm trade within specific industries or product groups. The seminal work by Clausing (2003) uses US trade data and finds that a 1%-drop in the foreign tax rate reduces intra-firm export prices by a large 1.8%. Bernard et al. (2006) confirm this result.¹² Cristea and Nguyen (2013) study trade pricing of Danish firms before and after they set up their first foreign subsidiary.¹³ After owning an affiliate in a low-tax

¹¹ Other international tax avoidance channels include tax treaty shopping and hybrid mismatch arrangements. There is, to the best of our knowledge, no systematic empirical evidence on hybrid mismatch arrangements (see also Johannesen (2014)). Collins and Shackelford (1997), Desai et al. (2003) and Weichenrieder and Mintz (2008) present empirical evidence in line with treaty shopping activities.

¹² Clausing's results may be biased if MNEs and NEs trade systematically different goods (e.g. in terms of quality) within the same product and industry group respectively. Bernard et al. (2006) account for this shortcoming by using data on US export prices linked to firm-level information. Comparing intra-firm and extra-firm trade of the *same* firm, they find a large average price wedge of 43%, which also depends on foreign tax rates.

¹³ Cristea and Nguyen (2013) argue that MNEs have a strategic incentive to deviate the export price on extra-firm trade from its profit maximizing level to a value closer to the transfer price of intra-firm trade in order to comply with the arm's length

country, MNEs are found to reduce prices for exports from Denmark by 5.7 percent. The associated loss in tax income equals 3.2% of Danish MNEs' tax returns. This is likely a lower bound to the true effect though as the analysis is limited to manufacturing trade and hence disregards many IP-related transactions that offer large mispricing opportunities (see e.g. Grubert (2003), Dischinger and Riedel (2011), Beer and Loprnick (2014)). Recently, Davies et al. (2014) reported similar evidence for France, stressing, however, that the lion's share of income shifting relates to a minority of only 400 multinational groups (and their export flows to tax haven economies).

A number of recent papers moreover suggest that the location of valuable intangible property is systematically distorted towards low-tax locations (see Dischinger and Riedel (2011)). Karkinsky and Riedel (2012) use data on corporate patent holdings of European multinational firms and find that the location of patents across group affiliates strongly responds to tax incentives, with a 1%- increase in the corporate tax rate lowering patent holdings by around 3.5% (see Griffith et al. (2014) for similar evidence). Böhm et al. (2012) furthermore suggest that MNEs strategically relocate patents with above average value to tax haven economies.

Empirical evidence furthermore confirms that MNEs engage in debt-shifting behaviour. While both MNEs and NEs have an incentive to shield their profits from taxation by debt financing, MNEs may additionally inject equity

principle of taxation. While this leads to an underestimation of the mispricing effect in the Bernard et al. (2006) paper, Cristea and Nguyen (2013)'s approach is immune to this concern.

into low-tax subsidiaries, which then lend to high-tax affiliates and strip-out tax-deductible interest without raising the group's overall debt-to-equity ratio (and hence its bankruptcy risk). Existing papers test for debt-shifting based on firm level data and by regressing affiliates' internal debt-holdings on the host country's corporate tax rate or the tax differential to other group affiliates respectively (see e.g. Altshuler and Grubert (2003), Desai et al. (2004), Büttner and Wamser (2013), Moen et al. (2012)).¹⁴ Reported semi-elasticities are around 1, suggesting that a 10-percentage point increase in the local statutory tax rate is associated with a 10% increase of the affiliate's internal debt-ratio.¹⁵ As internal debt holdings tend to be small and the transferred income is the product of internal debt and the interest rate, the estimates, overall, imply relatively small debt-shifting volumes (see e.g. Büttner and Wamser (2013) and Dharmapala (2014)). A recent meta-analysis by Heckemeyer and Overesch (2013) confirms this notion (suggesting that debt-shifting makes up around 30% of overall income shifting activities and mispricing of intra-firm trade makes up around 70%).¹⁶

¹⁴ While the credit donor in the group can commonly not be identified, finding a positive response of affiliates' internal debt to host country corporate tax increases plausibly captures debt shifting as only internal debt provided by low-tax affiliates reduces the MNE's tax burden (internal debt provided by higher-tax affiliates would increase it).

¹⁵ Büttner and Wamser (2013) and Moen et al. (2012) point out that internal debt-shifting incentives relate to the host country's corporate tax rate as well as to the corporate tax rate of the lowest-tax affiliate in the multinational group.

¹⁶ Specifically, Heckemeyer and Overesch (2013) compare the estimates of papers that determine the corporate tax sensitivity of operating income (EBIT) with papers that determine the corporate tax sensitivity of pre-tax profit (which comprise operating and financial income). The latter captures both, transfer pricing and the strategic use of debt, whereas the former isolates profit shifting through the mispricing of intra-

Conclusions

Researchers have taken various routes to identify tax-motivated international income shifting. As MNEs have an incentive to hide avoidance activities from the public, identification approaches are indirect and rely on a number of assumptions, which – if violated – lead to biased estimates. Studies unanimously report qualitative evidence in line with international tax avoidance behaviour. The quantitative estimates vary across approaches though, with results at the lower (upper) end suggesting that MNEs transfer less than 5% (30% or more) of their income earned at high-tax affiliates to lower-tax entities. While the range of estimates is wide, academic evidence points to smaller shifting volumes in the population of (medium-sized and large)¹⁷ MNEs than recent media reports which feature groups with virtually no taxable income in high-tax countries (e.g. Daily Mail (2013), City AM (2014)). The most convincing empirical evidence has been presented by academic studies that investigate specific profit shifting channels as their empirical tests are more direct and offer less room for results being driven by mechanisms unrelated to income shifting. The latter studies are still scarce though and evidence on some BEPS strategies, e.g. hybrid mismatch arrangements, is completely missing. It is thus too early to draw final conclusions on the quantitative importance of international tax avoidance activities. Whether the upcoming years will see progress in

firm trade (and relocation of valuable IP).

¹⁷ While some studies rely on data for the population of MNEs in specific countries or host regions, most papers make use of accounting data from private data providers which include medium-sized and large firms only.

quantifying BEPS (and assessing the effectiveness of anti-shifting provisions in limiting multinational income shifting behaviour) will critically depend on whether researchers can access high-quality data that allows identifying MNEs' reported tax bases, tax liabilities/tax payments and business activity across group locations. While tax authorities in many countries have so far been restrictive in providing researchers access to anonymized corporate tax return and audit data, changing that policy might help to close prevailing knowledge gaps on the size of international tax avoidance. This would especially hold true if countries adopted the OECD's recent proposal to augment MNEs' corporate tax returns by country-by-country reports (see OECD (2014)).

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