Tax Evasion and Tax Avoidance in Developing Countries: The Role of International Profit Shifting

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Abstract

In the debate on the impact of illicit capital flows on developing countries, the view is widespread that profit shifting to low tax jurisdictions undermines the ability of developing countries to raise tax revenue. While the shifting of income out of developed countries is a widely debated issue, empirical evidence on the magnitude of the problem and on the factors driving income shifting is scarce. This paper reviews the literature on tax avoidance and evasion through border crossing income shifting out of developing countries. Moreover, we discuss methods and available datasets which can be used to gain new insights into the problem of corporate income shifting. We argue that results of many existing studies on tax avoidance and evasion in developing countries are difficult to interpret, mainly because the measurement concepts used have a number of drawbacks. We discuss some alternative methods and datasets and present some empirical evidence which supports the view that profit shifting out of many developing countries and into tax havens takes place.

1. Introduction

In the debate on the impact of illicit capital flows on developing countries, the view is widespread that illicit flows undermine the ability of developing countries to raise tax revenue. The reason is that illicit capital flows may channel resources to the informal economy or to other jurisdictions, in particular to tax havens, so that they escape taxation. A large part of this activity takes place in the shadow economy and largely escapes public attention. But parts of the 'official economy', in particular multinational firms, are accused to engage in tax avoidance and tax evasion as well. They are criticised for shifting income out of developing countries and into tax havens in order to avoid paying corporate income taxes. Since developing countries frequently lack appropriate legislative and administrative resources, they are generally seen to be more vulnerable to income shifting than developed countries.

While the shifting of income out of developed countries is a widely debated issue, empirical evidence on the magnitude of the problem and on the factors driving income shifting is scarce. This paper contributes to the debate as follows. Firstly, we review the literature on tax avoidance and evasion through border crossing income shifting out of developing countries. Secondly, we discuss methods and available datasets which can be used to gain new insights into the problem of corporate income shifting.

There is a growing number of empirical studies on corporate profit shifting in OECD countries. Many of these studies use appropriate data and sophisticated econometric methods, and the results offer valuable insights into corporate profit shifting. Unfortunately, almost none of these studies include developing countries. The main reason is that, for developing countries, much less data is available. There is a number of studies, mostly published by non governmental organisations (NGOs), which try to estimate income shifting and tax revenue losses suffered by developing countries.[1] These studies have the merit of attracting the attention of a wider public to the issue of income shifting out of developing countries. But the results of these studies are partly difficult to interpret, mainly because the measurement concepts used have a number of drawbacks (Fuest and Riedel (2009)).

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[1] These studies are reviewed in Fuest and Riedel (2009).

The setup of the rest of this paper is as follows. In section two, we briefly introduce the concept of profit shifting by multinational firms and discuss empirical approaches which have been used to detect profit shifting. In section 3, we review existing studies on profit shifting out of developing countries. This section builds on and extends our earlier work in Fuest and Riedel (2009). Section 4 discusses the particular role of tax havens. In section 5, we suggest and discuss the pros and cons of different econometric identification strategies and datasets which can be used to gain new insights into the phenomenon of profit shifting out of developing countries. We also provide some evidence from one of the datasets, which supports the view that a significant amount of profit shifting out of developing countries and into tax havens does take place. Section 6 concludes.

2. Multinational Firms and the Concept of Profit Shifting[2]

2.1 Intra Firm Profit Shifting

For purposes of taxation, the profits of a multinational firm have to be allocated to the individual jurisdictions where the firm files for income taxation. This is usually done through the method of separate accounting. Each entity (subsidiary or permanent establishment) of the multinational firm individually calculates the income it has generated. Transactions between different entities of a multinational firm (controlled transactions) should, in principle, be treated as transactions with third parties (uncontrolled transactions). However, multinational firms may use controlled transactions to shift income across countries. For instance, they may shift income from high tax jurisdictions to low tax jurisdictions using transfer pricing or intra firm debt.

The concept of income shifting raises the question of whether a 'true' or 'objective' distribution of profits earned by individual entities of a multinational firm can be identified. Achieving this is complicated for a number of reasons. In particular, entities of multinational firms typically jointly use resources specific to the firm like e.g. a common brand name or firm specific know how. Pricing these resource flows appropriately is difficult because goods traded between unrelated parties are usually different. It is an important characteristic of many multinational firms that the individual entities jointly use resources which could not be used in the same way if they were separate firms. If they could, there would be no reason to create the multinational firm in the first place. For this reason, it is difficult to establish what a profit distribution in the absence of profit shifting would look like.

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[2] Sections 2,3 and 4 build upon and extend the analysis in Fuest and Riedel (2009).

Most empirical studies on corporate income shifting, however, do not explicitly refer to a hypothetical distribution of profits which would occur in the absence of income shifting. Instead, they focus on particular factors which are likely to drive income shifting and try to explore whether these factors affect the distribution of reported income across countries and, if so, how large these effects are. In this paper, we focus on tax induced income shifting. Empirical work in this area essentially uses two types of approaches to investigate whether and to what extent firms shift income to exploit tax differences across countries. The first approach directly looks at the use of instruments for profit shifting. For instance, some studies focus on income shifting through debt and ask whether, other things equal, multinational firms use more debt in high tax countries than in low tax countries (see e.g. Büttner and Wamser (2007) or Huizinga, Laeven and Nicodeme (2008)). Other instruments which have been studied in the context of international profit shifting are transfer pricing (see e.g. Clausing (2003)) and the location of intangible assets (Dischinger and Riedel (2008)).

The second approach focuses on the result of tax induced profit shifting, the overall profitability of individual entities of multinational firms in different countries. In the presence of tax induced income shifting, one would expect to observe a negative correlation between reported profitability and tax levels (see e.g. Grubert and Mutti (1991), Huizinga and Laeven (2008) and Weichenrieder (2009)). One drawback of this approach is that a negative correlation between pre tax profitability and tax levels may even emerge in the absence of income shifting. The reason is that the location of economic activity itself is influenced by taxes. Firms have incentives to locate highly profitable projects in low tax jurisdictions.

Both approaches deliver estimates of the (marginal) impact of tax differences on income shifting behaviour. Under certain assumptions, these estimates can be used to calculate a hypothetical profit distribution across countries which would occur in the absence of tax differences. For instance, Huizinga and Laeven (2008) analyze a sample of European multinational firms and find that, in 1999, the corporate tax base of Germany, which was the country with the highest corporate tax rate in Europe, would have increased by 14% if there had been no tax incentives to shift income to other countries.[3]

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[3] Note that the data used in this study (the Amadeus database) is not representative for all European firms, although it does include most of the large firms. Therefore, the qualitative insight provided by this study, the result that a significant amount of income is shifted to low tax jurisdictions in Europe is probably more robust than the number of 14% for Germany.

2.2. Profit shifting and transactions between unrelated parties

Profit shifting as discussed in the previous section takes place through transactions between entities of multinational firms in different countries. If two corporations located in two different countries belong to the same multinational firm or are controlled by the same interest, it is uncontroversial that transactions between these two firms may be used to shift profits across borders. However, some authors have argued that transactions between unrelated firms may also be used to shift profits across borders. This is emphasized in particular by Raymond Baker in his book *Capitalism's Achilles Heel: Dirty Money and How to Renew the Free-Market system.* There, he quantifies the yearly illicit financial flows out of developing countries through the business sector with US-$ 500 to 800 billion.

Baker's book provides a break-down of this number into different activities. The analysis claims that slightly above 60% of these financial flows is related to legal commercial activities whereas the rest is assigned to criminal activity. Baker argues that money earned on legal commercial activities leaves developing countries through three potential channels: the mispricing of goods traded between independent parties, the distortion of transfer prices charged on goods traded within a multinational firm, and fake transactions.

With respect to mispricing between unrelated parties, Baker bases his estimate on 550 interviews he conducted in the early 1990s with officials from trading companies in 11 countries: the United States, the United Kingdom, France, Netherlands, Germany, Italy, Brazil, India, South Korea, Taiwan and Hong Kong. Since Baker assured anonymity, he does not make the data publicly available but argues that the data contains appropriate information on trading practices.

He reports that the interviewees confirmed collusion between importers and exporters to draw money out of developing countries to be common practice. Specifically, he states that "mispricing in order to generate kickbacks into foreign bank accounts was treated as a well-understood and normal part of transactions" (p.169) by the interviewed managers. As a result of this study, Baker estimates that 50% of foreign trade transactions with Latin American countries are mispriced by on average around 10% adding to a worldwide average mispricing of goods traded between third parties of 5%. Similar,

slightly larger figures are reported for countries in Africa and Asia suggesting mispricing of 5% to 7%.

The possibility of mispricing in uncontrolled transactions plays a role for the interpretation of studies on income shifting through mispricing and will be discussed further below.

3. Studies on international profit shifting in developing countries

Most existing empirical studies on tax induced profit shifting focus on OECD countries. Studies on profit shifting in developing countries are scarce. Most studies on tax induced profit shifting (as well as income shifting motivated by other reasons) in developing countries have been published by NGOs. Below, we will discuss and criticise some of these studies. It should be emphasized, though, that these studies have the merit of attracting the attention of a wider public to this important issue.

3.1. The Trade Mispricing Approach

Studies based on the so-called trade mispricing approach start with the idea that firms may manipulate prices of internationally traded goods in order to shift income across countries. This idea is known from empirical work on income shifting in developed countries (see Clausing (2003) and the literature cited there). The key question is how the manipulation of prices is identified. There are different identification strategies with very different implications.

As mentioned in the preceding section, Baker (2005) uses interviews to estimate the extent of mispricing in trade transactions with developing countries. He quantifies the income shifted out of developing countries through mispricing activities by multiplying the low end of his interview based mispricing estimate (i.e. mispricing of 5% of import and export value respectively) with the sum of imports and exports of developing countries, which is equal to approximately US-$ 4 trillion. Given this, he arrives at what he refers to as a lower-bound estimate of capital outflows due to trade of US-$ 200 billion.[4]

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[4] This number includes third-party and related-party trade.

The main disadvantage of Baker's approach to estimate capital outflows is that it is based on a relatively small number of interviews, and these interviews are confidential. Therefore the results cannot be replicated.

Another approach to identifying mispricing is used by Pak (2007)[5], who identifies abnormally priced import and export transactions through the so-called "price filter matrix" approach. The basic idea can be summarized as follows: trade statistics offer information on the prices of transactions for individual product groups. For instance, US trade statistics offer information about the prices of fridges which have been imported into the country in a given year. The price filter approach classifies all transactions with prices which exceed the average price for imported fridges by a certain amount (for instance, by being in the upper quartile of the price range) as overpriced while all transactions with prices sufficiently far below the average price in that product group as underpriced. On this basis, income shifted into and out of the country is calculated. Pak (2007) does so as follows: "The dollar amounts are computed by aggregating the amount deviated from lower quartile price for every abnormally low priced U.S. import and the amount deviated from upper quartile price for every abnormally high priced U.S. export."Ibid, p.120)

The analysis in Pak (2007) leads to the result that US imports from all other countries around the world were underpriced by approximately US-$ 202 billion in 2005, or 12.1% of total imports. The value of US exports in the same year was overpriced by $ 50 billion or 5.5% of overall exports. Zdanowicz, Pak and Sullivan (1999) investigate the international merchandise statistics between the US and Brazil and find that the amount of income shifted due to abnormal pricing is between 11.13% for under-invoiced exports from Brazil and 15.23 % for overinvoiced imports to Brazil. Pak et al. (2003) use the same framework to investigate capital outflows from Greece due to mispricing of internationally traded goods and services. The percentage of income shifted from Greece to the world varies between 2.04% for underinvoiced exports from Greece and 5.88% for overinvoiced imports to Greece.

Another study using this approach has been published recently by Christian Aid (2009). They argue that profit shifting out of developing countries through trade mispricing in the period 2005-2007 was above one trillion US-$ (Christian Aid (2009), p.5), giving rise to a yearly tax revenue loss of US-$

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[5] See also Zdanowicz et al. (1999), Pak et al. (2003) and Boyrie et al. (2005).

121.8 billion per year.[6] Using the same approach, Christian Aid (2008) calculate a tax revenue loss suffered by developing countries due to trade mispricing of US-$ 160 billion in 2008.

The mispricing approach as employed in these studies has the advantage of being simple and transparent. It uses publicly available data, and it is straightforward to replicate the results of existing studies. Unfortunately, the results of this type of analysis are difficult to interpret and effectively reveal little reliable information about income shifting in the context of tax avoidance and evasion, for the following reasons.

Firstly, it is likely that, to some extent, price differences within product groups simply reflect *quality differences*.[7] If there are price differences within product groups, it would be natural to assume that developing countries tend to export low-end/low-price products whereas developed countries export high-end products with higher prices. Chinese exports are an example for this pattern, as recently demonstrated by Schott (2008). How this affects the results of income shifting calculations depends on whether or not trade volumes of different countries in a given product group are considered jointly to identify mispricing. If they are considered jointly, and if the quality pattern is as described above, the mispricing approach systematically overestimates income shifting from developing to developed countries. If they are considered separately, this cannot happen, but in this case goods which are classified as overpriced in one country may be counted as underpriced in another country. This is inconsistent. As long as it is not possible to disentangle quality differences and income shifting, the interpretation of numbers generated by the mispricing approach is difficult.[8]

Secondly, identifying the highest and the lowest quartile of observed prices as abnormal prices implies that *any* price distribution with some variance would be diagnosed to include overpricing and underpricing, even if the observed price differences are small or are driven by factors other than mispricing. Empirical analysis should normally allow for the possibility that a hypothesis – in this case, the hypothesis that income is shifted from developing to developed countries – is not supported by the data. This is excluded by assumption, unless all prices within a commodity group are identical.

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[6] Some of these estimates are also referred to in TJN (2007,2009).

[7] Pak (2007, p.119) does mention that "Abnormally priced imports and exports may be due to heterogeneity of products within a given harmonized commodity code classification…" but he does not discuss the implications this may have for the analysis.

[8] Price volatility over time may also be an issue. But this is not specific to the mispricing method discussed here.

Thirdly, what makes the results difficult to interpret is that the counterfactual is not clear. Assume that, in one period, there is only one transaction in the upper quartile price range and one transaction in the lower quartile price range. All other transactions are priced below the upper quartile price and above the lower quartile price. In this case, the counterfactual, which is a hypothetical situation without mispricing, should be that the two mispriced transactions disappear or adjust their prices to be within the inner quartile price range. But now assume that, in the next period, the two transactions identified as mispriced in the first period take place at corrected prices, which are between the upper and lower quartile price identified for the preceding period; everything else remains the same. In this case, the quartile price ranges for the second period would change, and transactions which were not identified as mispriced in the previous period are now identified as mispriced. This inconsistency occurs because there is no well defined counterfactual.

Fourthly, the price filter method by construction identifies overpriced as well as underpriced transactions, so that it always identifies income shifting in two directions: into and out of the country under consideration. But many studies using the approach only report income shifting in one direction and ignore income shifting into the other direction. For instance, Pak (2007) reports underpriced imports into the US (table 2 p. 121) and overpriced US exports (table 3, p.122), but overpriced imports and underpriced exports (both of which would shift income out of the US) are neglected.[9] A similar approach is used by Christian Aid (2009) and other studies.

The restriction to one direction of income shifting leads to highly misleading results if the findings are used to estimate the impact of income shifting on corporate income tax revenue collected by a particular country or group of countries, as e.g. in Christian Aid (2008, 2009). A meaningful estimate of the tax revenue effects would have to take into account profit shifting in both directions. To see this, consider the following simple example: Assume that there are three exporters of a good in country A. Firm 1 exports the good at a price of 4, firm 2 exports the good at a price of 8 and firm 3 exports the good at a price of 12. The mispricing approach would identify the transaction at a price of 4 as underpriced and the transaction at a price of 12 as overpriced. Assume further that all firms have costs of 4 in country A which are deductible from the profit tax base in country A. The goods are exported to country B, where all three are sold at a price of 14 to consumers in country B.

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[9] GFI (2009) exploits discrepancies in trade volumes reported by exporting and importing countries to identify income shifting (the GER method). This study also reports illicit flows out of developing countries and neglects flows into developing countries. This may lead to biased results. For instance, in cases where the discrepancies are exclusively a result of unsystematic measurement errors, with an expected value of zero, the GER approach would still indicate a capital outflow.

In this example, the aggregate corporate income tax base in country A is equal to 12. Firm 1 shifts income out of country A and firm 3 shifts income into country A. In the absence of trade mispricing, the tax base in A would be the same. The tax revenue loss of country A due to mispricing is equal to zero. A method which only takes into account firm 1 and neglects the implications of mispricing by firm 3 is clearly misleading. The same applies to the impact of income shifting on country B.

What happens if other taxes are considered? For instance, one could be interested in measuring import duty revenue losses due to avoidance or evasion. Assume that there is a proportional import duty in country B. In this case, it is easy to check that tax revenue is again the same in the two cases under consideration, and it is of key importance to take into account both under- and overpriced imports to B. Note also that, in this case, firms would have an incentive to systematically understate the import price.[10] If this happens, income is shifted into the country. This is another reason why neglecting income shifting into developing countries is not appropriate in the context of studies on tax avoidance and evasion. Depending on the question asked, it may be appropriate to consider either net flows or gross flows, but reporting flows in one direction only and ignoring the flows into the other direction is not appropriate and may easily lead to misunderstandings.

Pak (2007) defends his approach by claiming that the price filter method he uses is also applied by the IRS (IRS regulation 482) to deal with transfer pricing issues. This is not correct. IRS regulation 482 stipulates that this method can only be applied to *uncontrolled* transactions (see section 1.482-1e) iii (C)), which means that only transactions between *unrelated* parties can be taken into account when assessing whether or not a transfer price is acceptable. Transactions within multinational firms must be excluded. The reason is that transactions between unrelated parties are more likely to reflect undistorted prices. Effectively, the IRS approach compares transactions between unrelated firms to transactions between related firms. In contrast, Pak (2007) applies the price filter method to *all* transactions, including transactions between related parties. This is fundamentally different.

An approach which does use a method consistent with IRS regulation 482 is used in a study of trade mispricing by Clausing (2003). This study focuses on US external trade, however, not on developing countries in particular. Clausing (2003) compares prices of trade transactions between related parties

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[10] Note that, if all firms in our example cut their price by one unit to avoid paying import duties, revenue from import duties would decline but the mispricing approach would fail to identify any change.

to transactions between unrelated parties and shows that the differences are significantly influenced by tax rate differences. For instance, in transactions between related parties, prices of exports from high tax countries to low tax countries are higher than prices of transactions between unrelated parties. This suggests that multinational firms do try to reduce the taxes they have to pay by manipulating transfer prices. Of course, one could argue that mispricing is also likely to happen in transactions between unrelated parties. For instance, an exporter located in a low tax country and an importer in a high tax country could agree to increase the price of the transaction. This agreement could include a payment the exporter makes to the importer. Such a payment would have to be concealed from the tax authorities. If this happens, the approach used in Clausing (2003) systematically understates the impact of tax differences on profit shifting through transfer pricing. However, a mere price manipulation in a transaction between related parties is much easier than a price manipulation, combined with a concealed side payment by which the importer would participate in the tax savings.

3.2. Profitability and profit shifting

As mentioned in section 2, a second approach to measuring income shifting directly considers the profitability of firms and asks whether the observed profitability pattern can be explained as a result of income shifting. As in the case of mispricing, the insights provided by this type of study depend on how exactly profit shifting is identified. Oxfam (2000) estimates that tax revenue losses due to corporate profits shifted out of developing countries are equal to US-$ 50 billion per year. This number is calculated as follows. Oxfam multiplies the FDI stock in developing countries (US-$ 1219 billion in 1998, retrieved from UNCTAD, 1999) with a Worldbank estimate for the return on FDI in developing countries of 16 to 18%. The authors argue that the true estimate for the return on FDI is even higher since the Worldbank figure does not account for profit shifting activities. Thus, they set the rate of return to 20%. Next, the paper assumes an average tax rate of 35% and thus derives a hypothetical corporate tax payment of around US-$ 85 billion. Since the actual tax payments received are around US-$ 50 billion, according to Oxfam (2000), this leaves a tax gap of US-$ 35 billion. Oxfam (2000) augments this figure with revenue foregone due to the evasion of income from financial assets held abroad, which is estimated to equal US-$ 15 billion. This leads to the estimated tax revenue losses of US-$ 50 billion.

This approach raises a number of questions. Firstly, an important weakness of this calculation is to assume that, with perfect compliance, all income from foreign direct investment would effectively be

taxed at a rate of 35%. The issue is not that the average headline corporate tax rate may have been closer to 30% [11], as Oxfam (2000) recognizes. The key issue is that this approach neglects the existence of tax incentives for corporate investment. In the developing world, these investment incentives play a much larger role than in developed countries (see e.g. Klemm (2009) and Keen and Mansour (2008)). Many developing countries use tax incentives like e.g. tax holidays or free economic zones which offer low or zero corporate taxes, to attract foreign investment. It is controversial whether these incentives are efficient from a national or global welfare point of view (see also OECD 2001), but their revenue impact should be distinguished from the impact of tax avoidance and evasion. Neglecting this implies that the revenue losses due to evasion and avoidance are overestimated.

Secondly, the return on FDI is not identical with the corporate tax base. For instance, if foreign direct investment is financed by debt, it cannot be expected that the contribution of the investment to the corporate tax base will be 20% of this investment because interest is deductible from the tax base.

Finally, one should note that this type of analysis is purely descriptive and does not investigate the factors driving profit shifting. Taxation may not be the main factor which causes income shifting out of developing countries. Other factors like e.g. the threat of expropriation or confiscation of private property, economic and political uncertainty, fiscal deficits, financial repression or devaluation may be the real driving forces as pointed out e.g. by Boyrie et al. (2005). Thus, a shortcoming of the estimates mentioned above, as well as some the approaches discussed in the preceding sections, is that they reveal nothing about the reasons for profit shifting out of the developing world.

As mentioned in section 2, there is a growing literature which investigates the role played by taxation as a factor which drives income shifting. Unfortunately most of this work focuses on OECD countries, rather than developing countries. Grubert and Mutti (1991) do analyse profit shifting of U.S. multinational firms and use a dataset which includes developed as well as developing countries. They show that firms systematically report higher taxable profits in countries with lower tax rates. In their analysis, firms in countries with a tax rate of 40 % would report an average ratio of pre tax profit and sales of 9.3 per cent whereas firms in countries with a tax rate of 20 per cent would report a profit

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[11] KPMG (1998) reports an average corporate income tax rate of 35.67 % for OECD countries, 32.30% for non-OECD Asian-Pacific countries and 32.03% for Latin American countries.

sales ratio of 15.75 per cent. This suggests that some profit shifting which is motivated by taxation does occur. [12]

In a recent paper, Azemar (2008) investigates how the effectiveness of law enforcement affects profit shifting. Interacting a summary measure of law enforcement quality and tax profit ratios of firms in her regressions, she finds that a low quality of law enforcement goes along with a high sensitivity of tax payments to corporate tax rates. Her interpretation of this observation is that countries with ineffective law enforcement have greater difficulties to effectively implement anti tax avoidance measures like e.g. thin capitalization rules or transfer pricing corrections. This suggests that developing countries are more vulnerable to income shifting than developed countries.

4. The role of tax havens

Tax havens are widely seen as playing a major role for tax avoidance and tax evasion by multinational firms as well as individual taxpayers. Empirical research about income shifting to tax havens faces the difficulty that data on economic activity in these countries is scarce. Nevertheless, there are some studies on tax avoidance and evasion in tax havens and on the impact of tax havens on tax revenue collection by other countries. Unfortunately, these studies usually do not focus on developing countries.

Firstly, there are estimates of tax revenues foregone due to the existence of tax havens made by NGOs. But these are partly related to the potential impact of tax havens on tax rates set by other countries. For instance, Oxfam (2000) estimates that developing countries as a whole may be losing annual tax revenues of at least US-$ 50 billion as a result of tax competition and the use of tax havens (p.6). Oxfam argues that "tax competition, and the implied threat of relocation, has forced developing countries to progressively lower corporate tax rates on foreign investors. Ten years ago these rates were typically in the range of 30-35 per cent- broadly equivalent to the prevailing rate in most OECD countries. Today, few developing countries apply corporate tax rates in excess of 20 per cent. Efficiency considerations account for only a small part of this shift, suggesting that tax competition

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[12] Of course, it has to be taken into account that other factors may play a role. For instance, firms might systematically choose low tax countries as locations of profitable, mobile investment projects.

has been a central consideration. If developing countries were applying OECD corporate tax rates their revenues would be at least US-$ 50 billion higher."[13]

The issue here is that it is not clear to which extent the decline in corporate income tax rates which has occurred in both developing and developed countries is caused by tax havens. Tax rate competition would exist even in the absence of tax havens. In addition, some authors even argue that, under certain circumstances, tax havens may reduce the intensity of tax competition (Hong and Smart (2009)). Of course, the empirical relevance of this analysis remains to be investigated.

However, the main critique of tax havens is not that they force other countries to cut taxes. It is the perception that these countries offer opportunities for tax avoidance or tax evasion to multinational firms and individual taxpayers residing in other countries, so that other countries suffer tax revenue losses. One estimate of tax revenue losses due to the existence of tax havens has been published by the Tax Justice Network (TJN, 2005). TJN starts with estimates of global wealth in financial assets published by Banks and Consultancy Firms (a report by Merrill Lynch and Cap Gemini for 1998 and a report by Boston Consulting Group from 2003). This is combined with estimates of the share of financial assets held offshore by the Bank for International Settlement (which refers to US asset holdings, though). By combining these numbers, TJN (2005) claims that offshore holdings of financial assets are approximately US-$ 9.5 trillion. This is augmented by US-$ 2 trillion of non-financial wealth held offshore like e.g. real estate (no source is given for this number). On this basis, TJN (2005) estimates that globally approximately US-$ 11.5 trillion of assets are held offshore. Assuming an average return on these assets of 7.5 percent implies that these offshore assets yield a return of US-$ 860 billion. Moreover, the TJN assumes that these assets are taxable at 30% and thus calculates a revenue loss of US-$ 255 billion per year (in 2005).

The analysis in TJN (2005) does not try to estimate which part of these revenue losses occur in developing countries. Cobham (2005) uses the TJN (2005) results and estimates the share of developing countries as follows: Since 20% of worldwide GDP is accounted for by middle and low-income countries and given that offshore wealth holdings are not less likely in the developing world, 20% of the revenue loss can be assigned to these countries, i.e. US-$ 51 billion.

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[13] Another estimate by Weyzig and van Dijk (2008) argues that the tax haven features of the Netherlands alone lead to a loss of more than €100 million to developing countries.

Other estimates of these revenue losses use similar methods. Oxfam (2000) calculates revenue losses due to evasion of income from financial assets held abroad of around US-$ 15 billion per year. This result is mainly driven by an estimate for foreign asset holdings of residents in developing countries from 1990 (US-$ 700 billion), which is now outdated. In a more recent study, Oxfam (2009) estimates that US-$ 6.2 trillion of developing country wealth is held offshore by individuals. This leads to an estimated annual tax loss to developing countries of between US-$ 64 - 124 billion.

It is difficult to interpret these estimates for tax revenue losses due to offshore wealth holdings. They do not unambiguously over- or underestimate the revenue losses, but they rely on a large number of strong assumptions. These include the assumptions on the distribution of asset holdings across the developed and the developing world as well as taxable rates of return and average tax rates. In addition, there are several open questions which have to be addressed. First, it is unclear whether all income from offshore wealth holdings is taxable on a residence basis. Some developing countries do not tax the foreign source income of residents because it may not be administratively efficient to do so (Howard (2001), p. 259). Second, even if savings income is taxable on a residence basis, taxes paid in the source country may be deductible from tax in the residence country. Third, it is unlikely that all income from financial assets held offshore evades taxation in the country of residence of the owners. There may be other than tax reasons for offshore holdings of financial assets, and it is possible that owners of these assets declare their income in their countries of residence. To the extent that these assets generate passive investment income, they will also be subject to Controlled Foreign Corporations Legislation, which means that this income is excluded from deferral of home country taxation or exemption granted to active business income.

Here, further research is needed to e.g. determine the causal effect of the presence in tax haven countries on tax revenues paid by multinational affiliates in the developing world. Such an investigation should follow work by Desai et al. (2006a, 2006b) and Maffini (2009). These papers study the role of tax havens for the US and the European Union. In the next section, we discuss methods and datasets which can be used to do similar work on developing countries.

5. Data Sets and Identification Strategies for Assessing Tax Evasion and Avoidance in Developing Countries

Attempts to assess whether and to what extent (multinational) firms in developing countries engage in international tax evasion and tax avoidance activities have long been hampered by a lack of appropriate data. Thus, existing evidence on the issue is largely anecdotal in nature with the exception of a small number of studies reviewed in the previous section. As many of these papers face methodological difficulties and the identification strategies partly rely on strong assumptions, more research is needed to identify and quantify corporate tax avoidance and evasion in the developing world. In recent years, a number of data sets became available which may suit for this purpose. In the following, we will review a selection of these data bases and discuss potential identification strategies. The analysis will focus on micro data sources as we consider these to be better suited to identify corporate profit shifting activities than macro level data since they are less prone to give rise to endogeneity problems in the estimation strategy.

5.1. Identification Strategies

The basis for a valid empirical identification strategy is to develop and test hypotheses which derive effects that are unlikely to capture things other than corporate profit shifting. In the following, we will discuss two identification strategies that from our point of view largely fulfil this requirement and which can be applied to micro level data.

The first identification strategy builds on the notion that companies in developing countries differ with respect to their flexibility and opportunities to shift income out of their host countries. For example, companies which are part of a multinational group can plausibly undertake profit shifting activities more easily than firms without affiliates in foreign countries. This is because they can transfer profits to an *affiliated* company abroad.[14] Moreover, firms which belong to multinational groups with tax haven affiliates have particularly good opportunities to transfer income out of developing countries. Thus, they can be expected to engage in even larger profit shifting activities. Consequently, the identification strategy is to compare profit shifting measures for the treatment group of multinational firms (with tax haven connections) to a control group of national firms which are expected not to engage in significant profit shifting activities.

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[14] As discussed in section 2, there is anecdotal evidence (e.g. by Baker, 2004) that national companies also engage in profit shifting activities by colluding with unrelated parties in foreign countries. However, given the transaction costs of these arrangements, previous academic papers (e.g. Clausing, 2003) consider the associated volumes of multinational profit shifting to be quantitatively minor in comparison to profit shifting activities of multinational groups.

To identify profit shifting activities in this context, researchers need detailed information on corporate ownership structures and on company variables which are expected to capture profit shifting activities. According to previous empirical studies on corporate shifting activities in the industrialized world (see e.g. Clausing (2003), Huizinga and Laeven (2008), Buettner and Wamser (2006), Dischinger and Riedel (2008)), multinational firms use different channels to transfer taxable resources out of countries, the most important ones being the distortion of intra-firm trade prices and the debt-equity structure as well as the relocation of profitable assets like corporate patents. To test for this type of profit shifting thus requires associated information on trade prices, debt levels and patents. As this is often not available, researchers may also exploit information on corporate pre-tax profits and corporate tax payments as profit shifting outflows are expected to lower both variables. Thus, following the above identification strategy, we expect that multinational firms in developing countries (especially those with a tax haven connection) report lower pre-tax profits per unit of assets, pay lower taxes per unit of assets and per unit of profit, respectively, hold higher fractions of (intra-firm) debt and exhibit stronger distortions of intra-firm trade prices (i.e. enlarged import prices and diminished export prices) than the control group of national firms. The obvious challenge of this identification strategy is to empirically account for a potential selection of firms with differing characteristics into the control group (national firms) and the treatment group (multinational firms (with a tax haven connection)). Strategies to solve this problem have been presented in earlier papers for the developed world (see e.g. Desai et al. 2006; Maffini, 2009; Egger et al. 2007). If after accounting for all these issues, no differences between the considered profit shifting variables for national and multinational firms is found, the profit shifting hypothesis is rejected.

A second identification strategy starts with the question of *why* companies shift profits out of the developing world. One motive might be that they want to save on tax payments. A second might be that they draw their money out of corrupt and politically unstable countries where they are prone to threats of expropriation. To test for these hypotheses implies to determine whether companies in countries with a high-tax rate and/or a high corruption rate report lower pre-tax profits per assets, pay lower taxes on their assets and profits, have higher debt-to-equity ratios and more strongly distorted intra-firm transfer prices. In this case, again the challenge is to ensure that the identified effect between taxation/corruption and the profit shifting measures is not driven by an unobserved heterogeneity of firms which are located in high-tax (high-corruption) countries and low-tax (low-corruption) countries. This requires including a set of control variables which capture differences between affiliates and host countries. The most convincing approach here is to include a set of affiliate

fixed effects into a panel data regression which implies that the researcher accounts for all time-constant affiliate differences and the identification is achieved via corporate adjustments to changes in taxes and/or the corruption level. Again, for this identification strategy to be applied, stringent data requirements have to be met. Ideally, accounting data on pre-tax profits, tax payments, debt-levels or intra-firm transfer prices should be available in panel format for several years as should be information on corporate taxes and/or the level of corruption and political stability.[15]

5.2. Data Sets

A number of data sets may fulfil the requirements associated with the two identification strategies laid out above. In the following, we will present a selection of these data bases. In a first step, we will discuss one of the data sources, ORBIS, in some depth. In a second step, we will briefly describe alternative databases available for the purpose of testing tax avoidance in the developing world.

5.2.1. ORBIS

The ORBIS data provided by Bureau van Dijk contains information on companies worldwide (see Table A1 for a description of the data). While the majority of firms in ORBIS are located in industrialized economies, the data also contains information on countries in the developing world. ORBIS is available in different versions whereas the largest version of the data set in total comprises 57 million firms. The data is collected from various (partly private and partly official) sources which may differ between countries. Consequently, it is a well-known problem of the ORBIS data that the firm coverage differs across countries, with some economies being comparably poorly represented. Not surprisingly, this problem is especially pronounced in developing countries. While the firm coverage tends to be particularly small in Africa, information on a sufficiently large number of firms is reported for several economies in Latin American, South America and Asia. Hence, we think that focussing on those developing economies for which good information is available allows using the ORBIS data for the purpose of identifying corporate profit shifting behavior.

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[15] Moreover, the analysis must comprise time periods in which the host countries included in the sample experienced tax reforms or changes in corruption and political stability.

ORBIS provides balance sheet information and data on profit and loss account items. Thus, it contains detailed information on pre-tax and after-tax profit (both operating profits and financial plus operating profits) as well as on tax payments and debt variables. Moreover, information on ownership linkages is included, precisely on linkages to all direct and indirect shareholders of the firm as well as to subsidiaries within the multinational group. Last, ORBIS provides address information (postcode and city name) which may allow researchers to determine the location of firms (or at least the headquarter) within developing countries and thus to identify, for instance, companies located in free economic zones or to determine the role of taxes levied at the regional level. Like with other data bases provided by private sources, it is important to stress that there may be issues regarding the quality of the ORBIS data. In line with previous papers, we however think that these problems can be handled by rigorous plausibility checks and data cleaning efforts.

In the following, we will present and discuss descriptive statistics for some countries in the ORBIS data. Note that the ORBIS version available to us contains large and very large firms only. Analysing the full ORBIS version which also accounts for smaller firms is likely to enhance the firm coverage compared to our exercise. Moreover, we restrict the analysis to the Asian continent and only employ data for countries with a sufficient firm coverage. The countries included in the sample are China, Indonesia, India, Malaysia, Philippines, Pakistan, Thailand and Taiwan. Our final data set is a cross section of 87,561 firms for the year 2006 (see Table B1 for a country distribution).

As the ORBIS data provides information on ownership connections between firms, it allows us to pursue the first identification strategy described in the previous section. We define a firm in a developing country to observe a direct link to a foreign economy if it directly owns a subsidiary in a foreign country with at least 50% of the ownership shares or if it is directly owned by a parent firm in a foreign country with at least 50% of the ownership shares.[16] Moreover, we adopt a second, less restrictive definition of a multinational firm which applies if any affiliate within the multinational group is located in a foreign country (including subsidiaries of the immediate or global ultimate owner which do not have a direct ownership link to the considered firm). According to these definitions, 2,202 firms in our data set observe a *direct* ownership link to a foreign affiliate and 2,807 firms belong

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[16] Note that the information on ownership shares in ORBIS is missing for many cases in the sample. As the ownership information in general suggests that most firms are majority owned in our sample, we follow previous papers which worked with this data (see e.g. Budd et al., 2005) and assume majority ownership if the information on ownership percentages is missing.

to a multinational group in the broader sense that at least one affiliate in the group is located in a foreign country (irrespective of a direct or indirect ownership link).

Here, a comment is in order as we face the potential challenge that information on some affiliates within the multinational group is missing in the data. If missing affiliates are located in foreign countries (from the point of view of the considered firm), then we might declare a corporation to be a national firm which is actually part of a multinational group. This misclassification, however, introduces noise into our analysis and is expected to bias the results against us. This implies that the results should be interpreted as a lower bound to the true effect.

The same exercise is undertaken to identify firms with ownership linkages to affiliates in a tax haven country. A tax haven is defined according to the OECD's tax haven list. Again, we define a group of firms to have a direct ownership link to a tax haven country if they directly own a tax haven subsidiary with at least 50% of the ownership shares or are directly owned by at least 50% of the ownership shares by a foreign parent firm in a tax haven.[17] In a second step, we moreover adopt a broader definition of tax haven linkages which identifies firms in our data which belong to multinational groups with a tax haven affiliate (irrespective of a direct or indirect ownership link). According to these definitions, 207 firms in our data observe a direct ownership link to a tax haven country while 691 corporations belong to groups which observe a tax haven affiliate (directly or indirectly connected to the considered firm). Thus, according to the broader definition, 25% of the multinational firms in our sample observe an ownership link to a tax haven country while only 9% of the firms have a direct ownership link to a foreign tax haven.

Again, we might face the problem that information may not be available for all affiliates which belong to a multinational group. As a large fraction of multinational firms from industrialized countries is known to operate subsidiaries in tax haven countries, we run a cross check on the data and restrict the analysis to firms which are owned by immediate and global ultimate owners (in foreign countries) and for which information on the owners' subsidiary list is available. For this subgroup of firms, we find that 63% belong to multinational groups with a tax haven affiliate.[18] Nevertheless, we are again not too concerned about potential shortcoming of the data in this dimension as missing information on tax haven connections introduces noise into the estimation and biases our results against us.

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[17] Again, we consider majority ownership if the ownership information is missing.
[18] Desai, Foley and Hines (2006b) find that, in 1999, 59 per cent of US multinationals had affiliates in tax haven countries.

Thus, we compare different corporate variables which are expected to capture profit shifting activities for the subgroup of firms defined above. As mentioned above, the ORBIS data contains information on a wide range of accounting variables, including the unconsolidated corporate pre-tax profit, tax payments and debt-levels. In Table B2, we provide descriptive statistics which discriminate between first, all firms in the data; second, firms which belong to groups that own affiliates in a foreign country; third, firms which observe a direct ownership link via a parent firm or a subsidiary to a foreign country (this is thus a subset of the second group of firms); fourth, firms which belong to a multinational group that observes an affiliate in a tax haven country and fifth, firms which have a direct ownership link (via a direct parent firm or subsidiary) in a tax haven country. The rationale behind investigating groups with direct ownership linkages to foreign countries and tax havens separately is that group affiliates which are connected through direct ownership are presumed to be closer connected in an economic sense. This is expected to facilitate profit shifting between the entities.

As table B2 shows, the firms included in the analysis on average have total asset investments of 23.3 million US dollars. Not surprisingly, multinational firms observe larger asset stocks, with 98.1 million US dollars and 94.9 million US dollars for firms with any link to a foreign affiliate and firms with a *direct* link, respectively. Moreover, among the multinational firms, corporations with a tax haven linkage are reported to have higher total asset investments than other multinational firms with 140.5 million US dollars and 172.3 million US dollars respectively (for firms with any link to a tax haven country and firms with a *direct* link to a tax haven respectively). All the differences are statistically significant as indicated by the 95% confidence intervals around the means.

Moreover, the table presents the pre-tax profit per total assets reported by the companies in our sample which may be considered as a proxy for the firm's corporate tax base.[19] The average pre-tax profitability for the firms in our sample is estimated with 0.092. Interestingly, multinational firms (irrespective of direct or indirect ownership linkages to foreign countries) observe a lower pre-tax profitability which is measured to be 0.071 on average and which is thus significantly lower than the average pre-tax profitability of the full sample as indicated by the 95% confidence interval around the mean. This result may seem counterintuitive at first sight as multinational firms are commonly found

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[19] To avoid distortions through outliers, we drop observations with a pre-tax profitability low -1 or a pre-tax profitability above 1. That, however, does not qualitatively affect our results.

to observe larger productivity rates than national firms (see e.g. Helpman et al., 2004) which would suggest them to also report larger pre-tax profitability values. However, as indicated above they may on the other hand side equally face more opportunities to engage in tax avoidance and tax evasion through international channels which may lower reported pre-tax profits in our sample countries (that do not comprise any tax haven). Or alternatively, the higher international mobility of their investments may endow them with a higher bargaining power against host country governments and allow them to obtain lower tax bases than less mobile national firms.

Interestingly however, firms which belong to multinational groups that include tax haven affiliates do not report significantly lower profitability rates than national firms. As multinational firms with a tax haven linkage are presumed to face higher tax avoidance possibilities and probably also a higher willingness to take up avoidance and evasion opportunities, this suggests that multinationals with a tax haven connection are more profitable in their operations than other multinational firms. This picture prevails if we restrict the profitability variable to rates above zero.

Moreover, Table B2 depicts the tax payments per total assets reported by the firms in our sample. The broad picture resembles the one for the profitability rates. While national firms pay the highest taxes per total assets reported with an average of 0.018, the tax payments per total assets of multinational firms are significantly smaller and measured with 0.015 and 0.014 respectively (for firms belonging to multinational groups in general and firms with a direct ownership link to a foreign country respectively). The subgroup of multinational firms with a tax haven link does not observe significantly lower tax payments per total assets than national firms (which is likely driven by the profitability pattern discussed in the paragraphs above).

Furthermore, we report descriptive statistics for the tax payments per pre-tax profit which are a proxy for the average tax rate of the observed firm.[20] The results suggest that again national firms face the highest average tax rate of 20% which is significantly larger than the average tax rate of multinational firms which is 16.9% and 16.4% respectively (for firms belonging to multinational groups in general and firms with a direct ownership link to a foreign country respectively). Among multinationals, the lowest average tax rate is faced by firms which belong to multinational groups with a tax haven linkage. Those firms pay 13.2% and 11.2% taxes on their profits (for firms with any tax haven link and firms with a direct tax haven link respectively) which is again significantly lower than the rates

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[20] In doing so, we restrict our sample to firms which observe a positive pre-tax profit.

faced by multinationals in general and thus, also significantly lower than the rates faced by national firms. This strongly suggests that firms with a tax haven connection indeed manage to significantly reduce their corporate tax burden.

Furthermore, the ORBIS data includes information on corporate debt-ratios (calculated as debt over total assets). As (a fraction of) interest payments are commonly deductible from the corporate tax base, firms which want to reduce their corporate tax burden have an incentive to employ comparably high debt levels. This incentive generally applies to both, national and multinational firm whereas multinational firms (with a tax haven connection) have the additional opportunity to use intra-firm lending as a device to shift profits to a foreign country. The descriptive statistics in Table B2 suggest that multinational firms in fact, however, observe lower debt-ratios than their national counterparts indicating that debt shifting might not be a major device of multinational firms to transfer income abroad.

To account for the fact that firms which belong to multinational groups (with tax haven connections) might differ in characteristics that may equally determine the described profit shifting measures, we also run a set of regressions which attempt to control for some of the potential source of heterogeneity. Table B3 presents the result of a simple OLS model which regresses the pre-tax profitability (defined as pre-tax profits over total assets) of the firms in our sample on two dummy variables indicating entities that belong to multinational groups in general and those that belong to groups with tax haven affiliates in particular. In Specifications (1) to (4), these definitions require the firm to have a direct ownership link to a foreign firm and tax haven affiliate respectively while the multinational and tax haven definition in Specifications (5) to (8) allows for indirect connections, too. Specification (1) presents the regression results without any control variables which derives analogous findings to the descriptive statistics in Table B2. Precisely, the results again suggest that firms which belong to multinational groups observe significantly lower reported pre-tax profits per total assets than national firms whereas the pre-tax profitability of firms belonging to multinational groups with a tax haven affiliation does not statistically differ from national firms.

In Specifications (2) to (4), we include additional control variables to this estimation framework to account for heterogeneity in other firm characteristics. Precisely, in Specification (2), we add a full set of country fixed effects which absorbs time constant heterogeneity in the pre-tax profitability of firms in different sample countries. This renders the coefficient estimate for the dummy variable indicating

multinational firms insignificant and suggests that the pre-tax profitability of multinational firms in general and those with tax haven connections in particular does not differ from the one of national entities. In Specification (3), we moreover add a full set of two-digit industry dummies to account for heterogeneity in the profitability ratios of different industries which does not change the results. Last, Specification (4) additionally controls for the fact that profitability rates may vary with firm size and includes the logarithm of the firm's total assets as an additional control variable. The coefficient estimate for the size effect turns out negative and statistically significant at the 1 percent level. This indicates decreasing returns to scale, i.e. in our sample, large firms tend to report lower pre-tax profitability rates than small firms. Accounting for this, in turn derives positive and statistically significant coefficient estimates for the dummy variables indicating multinational firms (with tax haven connections). Hence, conditional on their size, multinational firms (with tax haven connections) report a larger pre-tax profitability than their national counterparts which is in line with previous evidence in the literature that suggests higher productivity – and in consequence higher profitability - levels of multinational firms. Specifications (5) to (8) re-estimate the regression model accounting for multinational firm and tax haven definitions that captures direct and indirect ownership linkages. This derives comparable results.

In Table B4, we repeat the exercise and determine the connection between multinational ownership linkages (to tax haven affiliates) and the corporate tax payments per assets. Analogously to the previous table, Specification (1) regresses the corporate tax payment ratio on dummy variables indicating direct ownership links to foreign firms (in tax haven countries). Again, the results indicate that multinational firms in general tend to pay significantly less taxes on their total asset stock than national firms while the tax payments of multinational firms with a tax haven connection do not significantly differ. This result prevails if we account for a full set of country fixed effects and industry fixed effects in Specifications (2) and (3). In Specification (4), we additionally include a size control (the logarithm of total assets). Similar to the results in the previous table, the coefficient estimate for the size variable is negative and significant suggesting that the tax payments per total assets decrease in firm size. Moreover, conditional on firm size, the specifications indicate that multinational firms in general and especially those with a tax haven connection report larger tax payments per total assets than national firms. This result again may reflect that multinational firms tend to observe larger underlying productivity characteristics and hence earn higher profits per total assets which result in larger tax payments.

Last, we assess the difference in the average effective tax rate of national and multinational firms (with a tax haven connection) as measured by tax payments over the firm's pre-tax profits. To do so, we restrict our sample to firms which observe both a positive pre-tax profit and non-negative tax payments. Specification (1) regresses the average tax burden on dummy variables indicating multinational firms (with tax haven connections) as determined by direct ownership linkages. Interestingly, the regression results suggest that multinational firms in general do not observe a lower average tax rate than their national counterparts while multinational corporations with tax haven linkages report a 5 percentage point lower average tax rate. Additionally controlling for a full set of country fixed effects and industry fixed effects equally renders the coefficient estimate for the multinational dummy negative and statistically significant suggesting that both, multinational firms in general and those with a tax haven connection pay lower taxes on their reported pre-tax profits compared to national firms. This result is moreover robust against including a size control into the model as presented in Specification (4). Quantitatively, the results suggest that multinational firms pay 1 percentage points less taxes on their pre-tax profit than national corporations while multinational firms with a tax haven connection pay 4.4 percentage points less taxes on their profit. In Specifications (5) to (8) we rerun the regression accounting for indirect ownership linkages in the definition of the multinational dummy (with tax haven connections) and find comparable results.

Thus, summing up, the results suggest that multinational firms tend to report higher pre-tax profits and tax payments per assets than comparable national firms which may reflect that they have a higher underlying productivity level. However, we also find that multinational firms, and especially those with a tax haven connection, face a significantly lower average tax burden, i.e. lower average tax payments per pre-tax profits.

Nevertheless, also note that some caution is warranted when interpreting the results. As discussed above, an in-depth analysis requires us to account for selection of different firms in the groups of national corporations, multinationals and multinationals with an ownership link to avoid that the results are driven by unobserved heterogeneity between groups.[21] One important issue in this respect is also to assess to what extent the difference in the average tax rates of national firms and multinationals (with a tax haven connection) is driven by the fact that multinationals tend to benefit from the location in special economic zones or receive special tax breaks by the countries'

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[21] For example, it is not possible to conclude from the descriptive results presented in this paper that a tax haven ownership link *causes* a reduction in the firm's average tax rate. It may be the case that firms with many shifting opportunities have a higher tendency to locate in tax haven countries.

governments through other sources. This is methodologically feasible as demonstrated by previous studies for the industrialized countries (see e.g. Desai et. al., 2006; Maffini, 2009; Egger et al., 2007). An analogous analysis for the developing world, however, goes beyond the scope of this paper and is delegated to future research.

Moreover, the structure of the ORBIS data also allows pursuing the second identification strategy, i.e. to determine how changes in the corporate tax rate and corruption parameters affect profit shifting variables. This is possible as ORBIS includes rich information on firm and group characteristics which may be used as control variables and ORBIS is available in a panel structure which allows controlling for time-constant differences between the affiliates. In the course of this paper, we only determine the correlation between the corporate statutory tax rate (obtained from various sources) and a corruption index (obtained from Transparency International) with the profit shifting variables named above and find small correlations only. Note that this, however, does not necessarily reflect that firms in the sample do not engage in profit shifting behaviour but in the contrary indicates that profit shifting measures are determined by several factors that correlate with the tax rate and corruption indices. These factors have to be accounted for in a regression framework to make meaningful statements about the effect of taxes/corruption on profit shifting behaviour. This is left to future research.

5.2.2. Other Data Sources

Apart from ORBIS, several other data sets may be used to analyse tax evasion and tax avoidance in developing economies. A comparable database to ORBIS is COMPUSTAT Global which is provided by Standard and Poor's. The data comprises firm level information on balance sheet items and profit and loss accounts of companies around the world. Thus, information on pre-tax profits, corporate tax payments, debt levels, interest payments and R&D expenditure is included which allows to identify corporate profit shifting and to assess the importance of different profit shifting channels out of the developing world. In total, COMPUSTAT covers more than 30,000 companies in 100 countries, including several developing countries. The coverage is especially good in the Asian-Pacific region where information on almost 16,000 firms is available (see Table A2 for a description).

The data has some drawbacks though. First, it lacks ownership information, i.e. it is not possible to link subsidiaries and parent firms in the data. Consequently, COMPUSTAT does not allow applying the first identification strategy as foreign firms and tax haven affiliates cannot be systematically identified. However, as the data is available in panel format for several years, it allows to pursue the

second identification strategy and to determine how tax rate changes and changes in the corruption index affect profit shifting measures. A second drawback of the data is that information is only provided for companies which are listed on a stock exchange. This imposes a sample restriction although large (listed) firms are likely to be the main profit shifters and thus profit shifting effects should nevertheless be identifiable. Third, as already stressed above, the data quality of data sets provided by private institutions has been criticized in the past.

To address the latter concern, researchers may consider using data sources provided by official institutions which became available recently and allow for investigating tax avoidance and evasion in the developing world. These data sets comprise information on outward investments by multinational firms located in a respective country, the most widely known data sets being the US BEA firm-level dataset (see Table A3), the German Micro database on Direct Investment (MiDi) (see Table A4), the UK Annual Inquiry into Foreign Direct Investment (AFDI) (see Table A5). All three data sets comprise information on multinational parent firms in the respective countries and their foreign subsidiaries, including subsidiaries in the developing world. The main advantage of these data sources is that the reporting is mandatory by national law which suggests that the quality of the reported information is high. Moreover, commonly information on directly and indirectly held affiliates is available. Only the AFDI data is restricted to information on directly held subsidiaries. Despite some limitations, the data sets thus allow for studies based on the first identification strategy.

Moreover, the data includes several variables which capture profit shifting behaviour like after-tax profits, information on tax payments and debt ratios. Nevertheless, the data is somewhat less comprehensive than in ORBIS or COMPUSTAT. Thus, both AFDI and MiDi include only information on company profits after taxation, not on pre-tax profits (whereas the former may be less suited to investigate profit shifting behaviour). MiDi also does not report any information on the foreign subsidiary's tax bill in the contrary to AFDI and BEA. Nevertheless, one major advantage of these data sets is that they include information on intra-firm lending and intra-firm interest flows, which allows to test for debt shifting activities between affiliates.

Additionally, in the US, researchers of the US treasury have access to confidential US firm-level data which is not available to the general public. The data includes information on US tax returns (see Table A6) and includes variables on the tax payments, profits and investments of US multinationals in the US and information on income and tax payments at foreign controlled companies including

subsidiaries in developing economies. Finally, Table A7 lists some other country-specific firm-level datasets which contain information on foreign activities of domestic companies.

Last, data on international trade prices may be exploited to investigate profit shifting out of developing countries which takes place through trade mispricing (of multinational firms). Previous studies reviewed above use the United States Merchandise Trade Databases which contain price data for import-harmonized commodity codes and for export-harmonized commodity codes. The shortcoming of this data is that it hardly allows for a clear identification strategy to ferret out profit shifting behaviour. As the data does not discriminate between trade of related and unrelated parties, our first identification strategy is not applicable. This shortcoming can however be addressed by using a different data source: Clausing (2003) exploits data from the International Price Program of the US Bureau of Labor Statistics which publishes information on 700 aggregate export and import price indexes. The data differentiates trade between related and unrelated parties which makes the control group approach feasible. Assuming that profit shifting via trade price distortions is negligible between third parties (see Clausing, 2003), trade prices of intra-firm trade between multinational affiliates can be compared to trade pricing between third parties. A different strategy to develop a valid identification strategy is to exploit the panel dimension of the trade price data which has not been done in existing studies. Precisely, one might investigate how trade prices are affected by policy reforms like tax rate changes or changes in the level of law enforcement or political stability in the partner countries, which implies that the countries without tax reforms serve as a control group.

6. Conclusions

The issue of tax avoidance and evasion through profit shifting out of developing countries is an important and widely debated issue. Yet, relatively little is known about the magnitude of and the factors driving profit shifting in the developing world. The main reason is that the available data is limited in terms of both quality and quantity. The results of most existing empirical studies on developing countries are difficult to interpret because the methods used to measure income shifting raise a number of issues. We have suggested and discussed a number of datasets, some of which have become available recently, and methods to do more research on profit shifting in the developing world. While these approaches also have their limitations, they do have the potential to improve our understanding of this important issue and to inform policies directed at crowding back tax avoidance and evasion in the developing world.

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Table A1. ORBIS and other firm-level datasets produced by Bureau van Dijk	
Coverage	Population of 57 million public and private companies around the world.[22]
	Frequency: annual
Type of data and observation unit	Accounting and financial data, consolidated and unconsolidated on the firm level.
Variables	**Profit and income variables:** Information from the profit and loss account, e.g. • Sales • Pre-tax profit (operating profit (EBIT) / financial and operation profit) • After-tax profit **Tax variables:** • Taxes charged to the P&L account **Ownership variables:** • Country, name and identifier of all direct and indirect shareholders • Country, name and identifier of all direct and indirect subsidiaries • Direct/total percentages of ownership • Type of shareholders[23] • Independence indicator **Other relevant variables:** • Current and non-current debt • Interest expenses • Intangible assets
Sources of data and collection methods	Data are derived from the official balance sheet, P&L account, and financial statements notes and are complemented with news, market research, information from official bodies (for example, stock exchanges) and private correspondence. The producer of the data has developed a uniform format which is applied to each entity analysed in order to address comparison issues.
Drawbacks of the data	There might be differences in accounting standards which could make the comparison difficult. The coverage in many developing countries is small.
Availability	The data set is compiled by the Bureau van Dijk and can be accessed online with an annual subscription or bought as a DVD.
Information on the dataset	www.bvdep.com

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[22] There are three different modules available. The *very large companies module* contains data for all listed companies, regardless of their size and for companies satisfying at least one of the following criteria: operating revenues larger than 130 million US$, total assets larger than 260 million US$, or number of employees larger than 1000. In the *large companies module*, companies are included if they satisfy at least one of the following criteria: operating revenues larger than 13 million US$, total assets larger than 26 million US$, or number of employees larger than 150. In the *medium companies module*, companies are included if their operating revenues are larger than 1.3 million US$, their total assets are larger than 2.6 million US$, or their number of employees is larger then 15. Small companies include the entities not fulfilling the aforementioned criteria.

[23] Shareholder types are divided in 11 categories: banks and financial companies, insurance companies, industrial companies, public authorities/State/Government, one or more individuals or families, foundations (inc. research institutes), mutual and pension funds/nominees/trusts/trustees, employees/managers/directors, unnamed individuals and families, bulk lists of companies and private owners, public (used only for publicly listed companies).

Table A2. COMPUSTAT Database

Coverage	*Compustat Global*: non-US and non-Canadian publicly traded companies in more than 80 countries, representing 90 per cent of the world's market capitalisation. **Frequency**: annual and quarterly
Type of data	Financial and accounting data, consolidated and unconsolidated.
Variables	**Profit and income variables** Information from the profit and loss account, e.g. • Pre-tax earnings • After-tax earnings • Sales from foreign operations to unaffiliated foreign customers **Tax variables** • Total tax expenses • Cash taxes paid • Foreign taxes paid **Other relevant variables** • R&D expenditures • Current debt and long-term debt (total, issuance, reduction) • Interest expenses • Exports to unaffiliated foreign customers
Sources of data and collection methods	The producer of the dataset employ original company sources by extracting financial information, removing reporting biases and reconciling data discrepancies. It standardise data by financial statement and by specific data item definition, preparing information that is broadly comparable across companies, industries, time periods and sectors.
Drawbacks of the data	Not possible to link parent data with subsidiaries. Only listed companies? The coverage in many developing countries is small. Good coverage of Asian countries.
Availability	Created and sold by Standard and Poor's.
Information on the dataset	www.compustat.com
Note	Standard and Poor's also sells the *Compustat Global Financial Service file* which contains information on the Income Statement, the balance sheet and the flow of funds for financial companies.

Table A3. Bureau of Economic Analysis (BEA) Operations of Multinational Companies Database

Coverage	The *Outward Investment database* contains data for all foreign business enterprises owned 10 per cent or more, directly or indirectly, by a US person or corporation. **Frequency:** every five years and annual.
Type of data and observation unit	Unconsolidated accounting and financial data on the firm level.[24]
Variables	**Profit and income variables** • US parent's domestic sales • Affiliates' domestic sales • Affiliates' arms-length sales to United States[25] • Foreign sales[26] • Value added **Tax variables** • Direct and indirect[27] taxes paid • Foreign income taxes paid • Foreign indirect taxes **Ownership variables** • Link between affiliate and parent **Other relevant variables** • Intermediate inputs shipped intra-firm (in both directions) • R&D expenditures • Capital expenditures • Dividends/net income to owners • Information of company financing
Sources of data and collection methods	Data are taken from the mandatory Benchmark and Annual Surveys of US Direct Investment Abroad. In non-benchmark survey years, a sample survey is conducted excluding small affiliates in order to reduce reporting burden on them. The BEA estimates the data for these affiliates by extrapolating their data from most recent Benchmark Survey.
Drawbacks of the dataset	For smaller firms, data between two Benchmark Surveys are estimated.
Availability	It can be accessed only on site at the Bureau of Economic Analysis through the "BEA Program for Outside Researchers".
Information on the dataset	www.bea.org Mataloni, 1995 and Quijano, 1990

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[24] Information on foreign subsidiaries is collected according to US accounting principles. This implies that variables are comparable across subsidiaries located in different countries (Desai et al., 2006).

[25] The BEA data do not contain US parents' arms-length sales to the country where the affiliate is located.

[26] These are sales to unaffiliated foreign customers from foreign operations.

[27] The indirect tax burden is reported as a sum of sales taxes, value added taxes, and excise taxes paid. For more information, see Desai et al. (2004).

Table A4. Deutsche Bundesbank Microdatabase on Direct Investment (MiDi)

Coverage	Foreign-owned firms based in Germany and directly and indirectly owned foreign affiliates of German parent companies.
	Time period: Panel data are available from 1996. From 1989 to 2001, only semi-aggregated data by country and (or) by sector are available.
	Frequency: annual
Type of data and observation unit	Unconsolidated (and sometimes consolidated) balance sheet data on the firm level
Variables	**Profit and income variables** • Profit and loss after tax and before dividend distributions **Ownership variables** • Link between affiliate and parent **Other relevant variables** • Liabilities to shareholders and (or) affiliates • Total balance sheet of affiliates and parent • Shares in the assets and liability positions of the non-residents
Sources of data and collection methods	According to the Foreign Trade and Payments Regulation (*Außenwirtschaftsverordnung*) and the Law on Foreign Trade and Payments (*Außenwirtschaftsgesetz*), foreign-owned firms based in Germany have to submit answers to an annual stock survey organized by the Deutsche Bundesbank if the enterprise has a balance sheet total of more than €3 million in which a non-resident (or several economically linked non-residents) holds 10 per cent or more of the shares or voting rights, directly or indirectly. Reports are also required if foreign-owned branches or permanent establishments located Germany have operating assets in excess of €3 million. German-owned enterprises have to report their foreign direct investments if either the capital shares or voting rights in the foreign affiliate exceed directly or indirectly some threshold (10 per cent starting in 2002) and (or) the balance sheet total of the foreign affiliate is above a thresholds (3 million EUR starting in 2002).
Drawbacks of the data	Data for the foreign parent are scarce: information is restricted to the economic sector and the country in which the firm is active. There are neither income statement items, except for after tax balance sheet profits, or tax data. Threshold for mandatory reporting of data varies over time and therefore the number of firms available every year varies before 2002.
Availability	Data are confidential and available only on site at the Research Centre of the Deutsche Bundesbank Central Office in Frankfurt**.**
Information on the data	Lipponer (2008)

Table A5. UK Office of National Statistics Annual Inquiry into Foreign Direct Investment (AFDI)

Coverage	Foreign affiliates of UK entities (*Outward Inquiry*). It covers all UK firms engaging in FDI and their directly held foreign affiliates if the investor holds at least 10 per cent of the capital of the recipients. **Frequency**: annual
Type of data and observation unit	Information on financial flows on the firm level
Variables	**Profit and income variables** • Subsidiary or branch net profit and loss • Subsidiary or branch net earnings **Tax variables** • Subsidiary tax credits • Subsidiary tax refunds **Ownership variables** • Link between UK parent and foreign affiliate or branch • Parent identificator which (partly) allows to identify group linkages • Percentage owned **Other relevant variables** • Interest (net, received, paid) • Branch/head office debt from and to the United Kingdom • Subsidiary interest payment • Subsidiary dividends payment
Sources of data and collection methods	Data are collected through survey forms sent to the head of enterprise groups in the United Kingdom. Firms are sampled from different registers, including HM Customs & Revenue, Dunn & Bradstreet's "Worldbase" system, and ONS inquiries on Acquisitions & Mergers. The largest firms all receive the survey forms every year, while only a proportion of the smaller firms do.
Drawbacks of the data	Information on FDI is not always entered promptly, depending on when the Office of National Statistics learns about the investment from various sources. There are no income statement items, except for after tax balance sheet profits. Only information on directly held affiliates. Only information on "flow" variables, no information on "stock" variables (e.g. investment size).
Availability	Data are confidential and available only on site at the Office of National Statistics in London or Newport**.**
Information on the data	www.ons.gov.uk
Note	Through the enterprise group reference, the AFDI can be linked to the Annual Respondents Database (ARD) to derive more balance sheet and P&L account information on the domestic- and foreign-owned establishments based in the United Kingdom. Information in ARD includes turnover, costs of intermediate inputs, number of employees, labour costs.

Table A6. US Firm-level tax returns

Coverage	All companies filing tax returns in the United States.
	Frequency: annual
Type of data and observation unit	Tax return data on the firm level
Variables	**Profit and income variables:** • Income of US parent • Income of controlled foreign company (CFC) **Tax variables**: • Income taxes paid at the US parent • Foreign taxes paid at the subsidiary **Other relevant variables**: • Inter-company transactions • R&D expenditures of the parent
Sources of data and collection methods	Data are taken directly from US tax returns Forms 1120, 1118 and 5471. The former is the basic parent corporate income tax return. The second is the form used to claim a foreign tax, and the latter contains the CFC's income, foreign taxes paid, and transactions with related parties, including the parent company.
Availability	Data are confidential and not available to the general public.
Information on the dataset	Grubert and Mutti, 2000

Table A7. Other firm-level datasets available

Country	Name of Dataset	Coverage
France	*Liaison financières* (LIFI), annual mandatory survey developed by the Institute National de la Statistique et des Etudes Economiques (INSEE).	Private enterprises with 20 or more employees.
Italy	*Reprint Database* developed at the Department of Economics and Production of the *Politecnico di Milano* with the support of the ICE (National Institute for Foreign Trade) and CNEL (the Italian National Council for Economy and Labour).	Mining and manufacturing firms based in Italy and controlled by foreign companies or foreign entities controlled by Italian companies.
Japan	*Annual Survey on Trends in Business Activities of Foreign Affiliates in Japan & on Japanese Investors and their Foreign Affiliates* carried out by the Enterprise Statistics Division, Research and Statistics Department and the International Business Affairs Division, Industrial Policy Bureau, MITI.	Majority foreign-owned firms based in Japan (excluding financial, insurance and real estate sector) and Japanese investors abroad.
Sweden	*Surveys on Swedish owned enterprises abroad* conduced by NUTEK.	All Swedish groups having subsidiaries abroad with more than one employee.
	Repeated survey (every 4/5 years) prepared by the Research Institute of Industrial Economics (IUI).	Manufacturing Swedish companies with 50 or more employees.

Table B1: Country Distribution					
	All	*MNE (any link)*	*MNE (direct link)*	*Tax Haven (any link)*	*Tax Haven (direct link)*
China	82,517	1,483	1,154	427	120
Indonesia	37	15	15	12	3
India	2,439	238	131	112	14
Malaysia	57	37	28	37	18
Philippines	984	13	9	11	3
Pakistan	34	9	4	5	2
Thailand	37	12	7	10	2
Taiwan	1,456	1,000	854	77	45
Total	**87,561**	**2,807**	**2,202**	**691**	**207**

Table B2: Descriptive Statistics					
Variable	*Observations*	*Mean*	*Std. Dev.*	*95% Confidence Interval*	
Total Assets					
All Firms	87,561	23,288	62,845	22,872	23,704
MNE (any link)	2,807	98,089	143,856	92,765	103,413
MNE (direct link)	2,202	94,930	139,892	89,084	100,777
Tax Haven (any link)	691	140,534	176,439	127,356	153,713
Tax Haven (direct link)	207	172,254	196,629	146,309	200,198
Profitability					
All Firms	87,561	.092	.178	.091	.093
MNE (any link)	2,807	.071	.136	.066	.076
MNE (direct link)	2,202	.071	.133	.065	.076
Tax Haven (any link)	691	.089	.132	.079	.098
Tax Haven (direct link)	207	.081	.132	.063	.099
Profitability above zero					
All Firms	71,684	.126	.173	.125	.128
MNE (any link)	2,298	.107	.110	.102	.111
MNE (direct link)	1,820	.105	.108	.100	.110
Tax Haven (any link)	573	.124	.110	.115	.133
Tax Haven (direct link)	172	.118	.102	.102	.133
Tax Payment per asset					
All Firms	71,440	.018	.037	.017	.018
MNE (any link)	2,208	.015	.021	.014	.016
MNE (direct link)	1,756	.014	.021	.013	.015
Tax Haven (any link)	502	.018	.025	.016	.020
Tax Haven (direct link)	148	.015	.023	.011	.019
Tax Payment per Profit					
All Firms	71,148	.200	1.315	.191	.210
MNE (any link)	2,111	.169	.170	.162	.176
MNE (direct link)	1,669	.164	.164	.156	.171
Tax Haven (any link)	486	.137	.140	.124	.149
Tax Haven (direct link)	142	.112	.110	.093	.130
Debt Ratio					
All Firms	83,857	.552	.244	.550	.553
MNE (any link)	2,644	.501	.220	.493	.509
MNE (direct link)	2,092	.493	.216	.484	.502
Tax Haven (any link)	588	.491	.221	.473	.509
Tax Haven (direct link)	174	.490	.209	.458	.521

Table B3: Multinationals, Tax Havens and Pre-tax Profitability								
OLS, Dep. Var.: Pre-tax Profitability								
Explanatory Variables:	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Tax Haven (direct link) x 100	0.575 (0.925)	0.818 (0.911)	0.777 (0.939)	5.373*** (0.938)				
MNE (direct link) x 100	-2.237*** (0.304)	-0.290 (0.354)	0.128 (0.370)	1.837*** (0.377)				
Tax Haven (any link) x 100					1.954*** (0.569)	1.868*** (0.604)	1.829*** (0.619)	3.527*** (0.629)
MNE (any link) x 100					-2.623*** (0.300)	-0.728** (0.361)	-0.348 (0.376)	1.271*** (0.381)
Total Assets				-.0196*** (.0005)				-.198*** (.0005)
Country Dummies		√	√	√		√	√	√
NACE Dummies			√	√			√	√
Obs.	87,561	87,561	85,873	85,873	87,561	87,561	85,873	85,873

Table B4: Multinationals, Tax Haven and Tax Payments per Total Assets								
OLS, Dep. Var.: Tax Payments per Total Assets								
Explanatory Variables:	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Tax Haven (direct link) x 100	.083 (0.169)	.057 (0.166)	.067 (0.172)	0.349** (0.171)				
MNE (direct link) x 100	-0.292*** (.047)	-0.251*** (.055)	-0.134** (.056)	0.139** (.057)				
Tax Haven (any link) x 100					0.362*** (0.106)	0.293*** (0.106)	0.267** (0.107)	0.542*** (0.108)
MNE (any link) x 100					-0.310*** (.045)	-0.280*** (.055)	-0.161*** (.056)	.098* (.056)
Total Assets				-.0031*** (.0001)				-.0031*** (.0001)
Country Dummies		√	√	√		√	√	√
NACE Dummies			√	√			√	√
Obs.	87,251	87,251	85,564	85,564	87,251	87,251	85,564	85,564

Table B5: Multinationals, Tax Haven and Tax Payments per Pre-tax Profits								
OLS, Dep. Var.: Tax Payment per Profit								
Explanatory Variables:	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Tax Haven (direct link) x 100	-5.053*** (0.987)	-4.825*** (0.896)	-4.770*** (0.939)	-4.438*** (0.937)				
MNE (direct link) x 100	-0.403 (0.370)	-2.040*** (0.417)	-1.357 *** (0.431)	-1.014** (0.433)				
Tax Haven (any link) x 100					-3.737*** (0.689)	-4.222 *** (0.653)	-4.465*** (0.672)	-4.148*** (0.671)
MNE (any link) x 100					0.546 (0.375)	-1.012** (0.442)	-0.279 (0.457)	.035 (0.458)
Total Assets				-.0037*** (.0001)				-.0037*** (.0001)
Country Dummies		√	√	√		√	√	√
NACE Dummies			√	√			√	√
Obs.	70,562	70,562	69,214	69,214	70,562	70,562	69,214	69,214

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