



UNITED NATIONS
UNIVERSITY
UNU-WIDER

WIDER Working Paper 2020/169

Illicit financial flows and the Global South

A review of methods and evidence

Kasper Brandt*

December 2020

Abstract: Illicit financial flows (IFFs) constitute a major challenge for development in the Global South, as domestic resource mobilization is imperative for providing crucial public services. While several methods offer to measure the extent of IFFs, each has its benefits and drawbacks. Critically, methods based on the balance of payments identity may capture licit as well as illicit flows, and a method based on macroeconomic trade discrepancies suffers from doubtful assumptions. The most convincing estimate to date demonstrates that individuals hold financial assets worth around ten per cent of global GDP in tax havens. Evidence further indicates that countries in the Global South are more exposed to individuals and multinational enterprises illicitly transferring money out of the country. Further research is warranted on profit shifting out of countries in the Global South and the effectiveness of anti-IFF policies in countries outside Europe and the United States.

Key words: illicit financial flows, domestic resource mobilization, tax havens, multinational enterprises, profit shifting

JEL classification: H26, H87, F23, O23

Acknowledgements: I am grateful to Niels Johannesen, Finn Tarp, and Petr Janský for their valuable feedback.

* Department of Economics, University of Copenhagen, Denmark, kasper.brandt@econ.ku.dk

This study has been prepared within the UNU-WIDER project [Detecting and countering illicit financial flows](#) that is implemented in collaboration with the University of Copenhagen. The project is part of the [Domestic Revenue Mobilization](#) programme, which is financed through specific contributions by the Norwegian Agency for Development Cooperation (Norad).

Copyright © UNU-WIDER 2020

Information and requests: publications@wider.unu.edu

ISSN 1798-7237 ISBN 978-92-9256-926-6

<https://doi.org/10.35188/UNU-WIDER/2020/926-6>

Typescript prepared by Siméon Rapin.

United Nations University World Institute for Development Economics Research provides economic analysis and policy advice with the aim of promoting sustainable and equitable development. The Institute began operations in 1985 in Helsinki, Finland, as the first research and training centre of the United Nations University. Today it is a unique blend of think tank, research institute, and UN agency—providing a range of services from policy advice to governments as well as freely available original research.

The Institute is funded through income from an endowment fund with additional contributions to its work programme from Finland, Sweden, and the United Kingdom as well as earmarked contributions for specific projects from a variety of donors.

Katajanokanlaituri 6 B, 00160 Helsinki, Finland

The views expressed in this paper are those of the author(s), and do not necessarily reflect the views of the Institute or the United Nations University, nor the programme/project donors.

1 Introduction

Illicit financial flows (IFFs) constitute a major development challenge for countries in the Global South. First, while tax revenue relative to GDP has increased in the Global South, they remain low compared to high-income countries (Addison et al. 2018; World Bank 2020). Without adequate revenue to spend, states are limited in providing crucial public services such as education, healthcare, and infrastructure. Second, IFFs are inherently associated with international transactions, potentially resulting in unfair competition for domestic firms and misallocation of resources. Third, hiding of wealth is practised foremost by the richest households, thereby increasing inequality in society (Alstadsæter et al. 2019). Fourth, perceptions about other people evading (complying with) taxes may create a circle of reduced (increased) tax compliance (Alm et al. 2017; Hallsworth et al. 2017).¹

In the present paper, I provide a review of the existing literature on IFFs, focusing on tax and commercial practices, in the Global South.² This is not the first review of the literature. Past reviews and discussions include Beer et al. (2020); Collin (2020); Reuter (2012); Dharmapala (2014); Forstater (2018); Fuest and Riedel (2012); Heckemeyer and Overesch (2017); Johannesen and Pirttilä (2016).³ In addition to these, Cobham and Janský (2020) provide the most comprehensive review of the applied methodologies, findings, and discussion of practical indicators for the magnitude of IFFs.⁴ I do not intend to be as comprehensive, but will instead focus on what I consider the most prominent methodologies and discuss these in depth.

Based on the review of the literature, I further discuss important gaps in the current knowledge on IFFs. I hope this discussion will inspire initiatives to fill these gaps in future work. Finally, I examine current advances in data sources that researchers may find useful when refining existing estimates or answering new questions related to IFFs. This review of applicable data sources is intended to serve as a point of departure for future studies under the UNU-WIDER research project ‘Domestic Revenue Mobilization’⁵ and for other researchers interested in analyzing IFFs.

In the following Section 2, I discuss the concept of IFFs. In Section 3, I present a theoretical framework for studying IFFs, distinguishing between legal and illegal activities. In Section 4, I describe several methods applied in the literature and report the key findings. In Section 5, I discuss different gaps in the literature and useful data sources for future work. I conclude in Section 6.

¹ Slemrod (2019) reviews the literature on tax compliance and enforcement efforts. He finds that in most analyzed contexts, sending out letters focusing on morale of tax compliance had little impact on actual tax compliance.

² Other dimensions of IFFs remain of high importance as well, including kidnapping, slavery, financing of terrorism, money laundering, illegal markets, and corruption (2020). The extent of these activities, however, is particularly difficult to measure. It may further be that IFFs stemming from tax and commercial practices indirectly capture some of the other dimensions.

³ These review papers focus on different aspects of IFFs. For instance, Fuest and Riedel (2012); Johannesen and Pirttilä (2016) focus on estimates from the Global South, Beer et al. (2020); Dharmapala (2014); Heckemeyer and Overesch (2017) focus on base erosion and profit shifting more generally to derive a semi-elasticity, and Forstater (2018) extensively discusses the different definitions of IFFs.

⁴ (2020) further discuss challenges related to assessing the achievement of the Sustainable Development Goal 16.4, calling for significant reductions of illicit financial and arms flows.

⁵ See: <https://www.wider.unu.edu/about/domestic-revenue-mobilization-programme>.

2 Concept definition

Without a proper understanding and agreement on the concept, it will be difficult to achieve a consensus on the magnitude and relevance of IFFs. It may sound trivial to have a discussion, rather than a statement, on what the key outcome actually is, and it highlights the opposing interests at play. Some institutions have an agenda of deriving high estimates of IFFs, and these will often define the term in a broad way. Others, on the other hand, advocate for a narrower definition of IFFs in order to sharpen the distinctness from other activities and make the term more pragmatic. For in-depth discussions on the concept of IFFs, I refer to Cobham and Janský (2020); Forstater (2018). (2020) further provide an overview of how different activities feed into different dimensions of the IFF concept.

In general, the main question in relation to the meaning of IFFs is whether ‘illicit’ should be seen as purely illegal or further cover immoral behaviour. The word ‘financial’ limits the definition to activities involving cash, profits, loans, or equity, but excludes real estate and luxury goods. Finally, the word ‘flows’ entails that the assets are moving from one place or person to another. While analysis of the stock of hidden wealth is not IFFs, one can interpret them as cumulative IFFs over time.

By definition, ‘illicit’ refers to what is forbidden by law, rules, or customs, and for that reason itself, we should, at least conceptually, consider IFFs as covering more than illegal activities. While the UNCTAD and the EU explicitly include aggressive tax planning and profit shifting in the definition of IFFs, the World Bank and IMF only acknowledge that there is a global discussion on whether IFFs should include such practices. One of the arguments for equating illicit with illegal is to make the definition of IFFs more clear-cut. Such a distinction between legal and illegal activities, however, is not always as clear as one might think, since legality is assessed on a continuous scale. For instance, if transfer prices or interest rates are large enough, most jurisdictions will deem them illegal. Therefore, arguing for example that the famous ‘Double Irish with a Dutch Sandwich’ should not be considered illicit, because it creates confusion of the concept, seems far-fetched.⁶ Another argument for equating illicit with illegal is that it is not clear which rules and customs should be followed, as these may differ across space and time.

Only considering financial activities might not be representative for what the public sees as immoral behaviour when individuals or companies illicitly buy, sell, or hide assets. That is, to the public it does not matter whether an individual hides ten million dollars in a tax haven bank account, or if the individual hides ownership of a luxury resort in the same tax haven. Despite being difficult to measure, I find it reasonable to include other assets than purely financial in the definition. Thus, when studies focus solely on financial assets, they underestimate the extent of illicit flows. In order to follow the terminology of the literature, I continue with the wording ‘illicit financial flows’, despite the more meaningful concept of ‘illicit asset flows’.

While the general meaning of ‘illicit’ undoubtedly covers activities beyond what is illegal, global institutions working in the field have not found common ground on the definition of IFFs. Table 1 presents different definitions of IFFs from these institutions. All acknowledge that IFFs include activities related to illegal markets, terrorism, tax evasion, corruption, deliberate misreporting, and illegal trade practices. The main difference among the definitions, however, is whether legal practices designed to minimize tax payments by not adhering to the ‘spirit of the law’ should be considered ‘illicit’. While the IMF,

⁶ The ‘Double Irish with a Dutch Sandwich’ works by development of software in firm A (not located in a tax haven), which sells software cheaply to firm B located in a tax haven, which licenses software to firm C in Ireland, which licenses software to firm D in Netherlands, which licenses to firm E in Ireland, which sells to customer inside the EU. This generates US\$1 in revenue received by firm E in Ireland, which pays US\$1 in royalties to firm D in Netherlands, which pays US\$1 in royalties to firm C in Ireland, which pays US\$1 in royalties to firm B in a tax haven. This tax ‘loophole’ was eliminated in 2015 and fully phased out in 2020 (see *The Economist* article ‘[Death of the Double Irish](#)’, accessed July 17 2020).

the OECD, and the World Bank work with a narrow definition of IFFs equating ‘illicit’ with ‘illegal’, the EU and the Organization of African, Caribbean and Pacific States include tax avoidance and abusive transfer pricing in the definition of IFFs. Similarly, the UNCTAD and UNODC state that IFFs include both legal and illegal tax and commerce practices. The High Level Panel on Illicit Financial Flows from Africa follows the narrow approach where ‘illicit’ is equated with ‘illegal’, but also states that abusive transfer pricing should be considered as an IFF.

Table 1: Definitions of illicit financial flows

Source	Definition
African Development Bank Group (2017)	Follows High Level Panel on Illicit Financial Flows from Africa (2015)
African Union Commission (2019)	“IFFs can be traced back to commercial activities, such as tax evasion, trade misinvoicing, and abusive transfer pricing. Next on the list are criminal activities, including the drug trade, human trafficking, illegal arms dealing, and smuggling of contraband. And last but not least in this litany of crimes, is bribery and theft.”
EU-ACP Joint Parliamentary Assembly (2017)	“IFFs come from three sources: i) tax avoidance or evasion, ii) falsification of invoices in international trade, and abusive transfer pricing, iii) criminal activities such as drugs trafficking, human trafficking, ‘blood minerals’ trafficking, arms trafficking and active corruption.”
Global Financial Integrity (2020)	“IFFs are illegal movements of money or capital from one country to another. GFI classifies this movement as an illicit flow when funds are illegally earned, transferred, and/or utilized across an international border.”
High Level Panel on Illicit Financial Flows from Africa (2015)	“Money that is illegally earned, transferred or utilized. These funds typically originate from three sources: commercial tax evasion, trade misinvoicing and abusive transfer pricing; criminal activities, including the drug trade, human trafficking, illegal arms dealing, and smuggling of contraband; and bribery and theft by corrupt government officials.”
IMF (2020b)	“IFFs refer to the movement of money across borders that is illegal in its source, its transfer, or its use.”
OECD (2018)	“... IFFs are understood as the revenue and proceeds generated by the following activities: corruption: ...[:]commerce: the proceeds of tax evasion, misrepresentation, misreporting and misinvoicing related to trade activities, and money laundering through commercial transactions[:] crime: ...”
Picciotto (2018) for Tax Justice Network	“They [components of IFFs] include: the concealment of the proceeds of crime or corruption; tax evasion; tax avoidance and tax planning; hiding wealth from public agencies, business associates, or family members.”
UNCTAD and UNODC (2019)	“The Task Force identified four main types of IFFs ...: Tax and commercial practices: This group includes both illegal practices such as tariff, duty and revenue offences, tax evasion, corporate offences and market manipulation, but also practices that are legal but may be considered illicit[:] Corruption: ...[:] Theft-type and terrorism: ...[:] Illegal markets: ...”
World Bank (2017)	“Money illegally earned, transferred, or used that crosses borders.”

Source: author's compilation.

3 Theoretical framework

In the current section, I present a theoretical framework for engaging in IFF practices. Specifically, I consider the tax minimization problem for a multinational enterprise (MNE), where it has to decide whether to engage in legal or illegal profit shifting. While I use the profit shifting terminology, the framework can also be broadened to other types of IFFs. That is, other types of IFFs, such as hiding

of earnings and wealth or misreporting of profits and earnings, could be interpreted as ‘profit shifting’ either for an individual or a firm.⁷

The academic literature on profit shifting tends to view profit shifting as illegal, and agents stop shifting profits when the risk of getting caught multiplied by the punishment exceeds the marginal gain (Allingham and Sandmo 1972). This framework implies that the optimal magnitude of profit shifting is likely to have an interior solution given costs of profit shifting are convex in the size of profit shifting. Only when the marginal cost of shifting the last dollar of profit is lower than the marginal gain, or the marginal cost of shifting the first dollar of profit is higher than the marginal gain, will a corner solution emerge.

Taking fixed costs of profit shifting into account, corner solutions become more likely (Davies et al. 2018; Johannesen, Tørsløv, and Wier 2020). That is, agents may abstain entirely from profit shifting or shift all profits depending on the size of the fixed and variable costs. If the costs of setting up a tax scheme is more expensive than the total expected tax savings, agents abstain entirely. If fixed costs are low and marginal costs never exceed marginal gains, agents shift all profits.

Given there is a range in which profits can be shifted illicitly, but not illegally, agents will engage in some profit-shifting activity as long as the fixed costs of setting up the tax scheme is lower than the expected tax savings.⁸ Since the actions taken by the tax optimizing agent may depend on whether activities are legal or illegal, it is worth distinguishing between these in a theoretical framework. Equation 1 states the optimization problem for an agent seeking to reduce tax payments.

$$\Gamma = (\tau_i - \tau_j) \times PS_{legal} - C_{legal} + (\tau_i - \tau_j) \times PS_{illegal} - C_{illegal} - \alpha \times \beta \times (\tau_i - \tau_j) \times PS_{illegal}^{\gamma} \quad (1)$$

where Γ represents additional profits; $\tau_i - \tau_j$ is the tax rate gap between country i and country j ; PS_{legal} is profits shifted legally; C_{legal} represents fixed costs of legal profit shifting; $PS_{illegal}$ is profits shifted illegally; $C_{illegal}$ represents the additional fixed costs of engaging in illegal profit shifting; $(\tau_i - \tau_j) \times PS_{illegal}^{\gamma}$ represents authorities being more likely to investigate trades where the tax rate gap is higher ($\tau_i - \tau_j$) and where the agent shifts a lot of profits illegally ($PS_{illegal}^{\gamma}$); α is capacity of the tax authorities; β is the punishment if being caught; and γ represents the potential convexity in risk of being caught from increasing the intensity of illegal profit shifting. The optimization problem is further subject to the sum of legal and illegal profit shifting being less than or equal to total profits, and only a fraction of profits can be shifted legally. The latter can advantageously be incorporated into the model by substituting PS_{legal} with $\Pi \times \eta$ (total profits times the fraction of profits that can be shifted legally).

The tax optimizing agent first has to determine the costs and additional profits from engaging in legal profit shifting. Given the fixed costs of legal profit shifting are lower than the gains, the agent will shift as much profit as possible legally. When the fixed costs of legal profit shifting are higher than the gains, the agent may still decide to engage in legal profit shifting if the additional net gains from illegal profit shifting are large enough. This implies that legal and illegal activities are connected such that the illegal activity builds on top of the framework for the legal activity.⁹ Without binding constraints, the optimal

⁷ More in-depth theoretical work on different dimensions of profit shifting includes, but is not limited to, Haufler et al. (2018); Koethenbueger et al. (2019); Mardan and Stimmelmayer (2020).

⁸ Another fixed cost associated with engaging in legal profit shifting is risk of bad publicity.

⁹ For instance, an agent may set up a legal transfer mispricing scheme with a maximum allowed price of p^{max} . Next, the agent decides whether to illegally set the price higher than p^{max} . Another example would be trade misinvoicing, where the scope for legal activity is arguably lower compared to setting up a transfer mispricing scheme. That is, the legal component in Equation 1 is heavily restricted, and the agent might only be able to justify small amounts of waste.

size of illegal profit shifting can be derived as follows:

$$\begin{aligned}
\frac{\partial \Gamma}{\partial PS_{illegal}} &= (\tau_i - \tau_j) - \gamma \times \alpha \times \beta \times (\tau_i - \tau_j) \times PS_{illegal}^{\gamma-1} = 0 \\
\Rightarrow \gamma \times \alpha \times \beta \times PS_{illegal}^{\gamma-1} &= 1 \\
\Rightarrow PS_{illegal}^{\gamma-1} &= \frac{1}{\gamma \times \alpha \times \beta} \\
\Rightarrow PS_{illegal} &= \left(\frac{1}{\gamma \times \alpha \times \beta} \right)^{\frac{1}{\gamma-1}}.
\end{aligned} \tag{2}$$

Thus, the optimal size of illegal profit shifting is declining in the tax capacity of the authorities and the punishment from being caught. Taking the derivative of Equation 2 with respect to γ , one further sees that a higher convexity parameter for the variable costs associated with illegal profit shifting lowers the optimal size of illegal profit shifting. Worth highlighting is that the optimal interior solution does not depend on the tax rate gap. This is a result of the assumption that tax authorities are more focused on trades where the tax rate gap is high. Relaxing this assumption, the numerator in Equation 2 is replaced by the tax rate gap and the optimal interior solution will be positively associated with the tax rate gap.

In order for the agent to engage in illegal profit shifting, three conditions must be met:

1. The optimal size of illegal profit shifting results in positive net gains for the illegal activity.
2. The optimal size of illegal profit shifting is smaller than or equal to total profits minus legally shifted profits, or the corner solution of illegally shifting the remaining profits results in positive net gains for the illegal activity.
3. The net total gain for legal and illegal activity is positive.

Even when it is not optimal to engage in illegal profit shifting, it can be optimal for the agent to engage only in legal profit shifting. This is the case when either condition 1 or condition 2 is not met, but there is still a positive net gain from legal profit shifting.

This framework relies on there being trade between country i and country j . An alternative option for the tax optimizing agent is to engage in smuggling or misreporting of profits. In these cases, the relevant τ_j is equal to zero and the legal component is no longer relevant.

4 Methodologies and findings

One key motivation for engaging in IFFs is secrecy, thereby limiting the ease of identifying them. Without detailed data and thorough investigations, it is difficult to judge whether a single firm or individual takes part in IFFs. At the aggregate level, however, macroeconomic patterns may reveal the severity of IFFs at a global or country-specific scale. At the firm level, comparison of profitability between firms with high and low incentives to shift profits may produce an overall estimate of intra-firm profit shifting. Specific mechanisms can also be examined by, for instance, comparing transfer prices or interest rates between affiliates in the same firm with transfer prices and interest rates between unrelated parties.

While various methods have been applied in the literature to study IFFs, each has its own limitations. Some methods are criticized for producing biased estimates, others struggle with arbitrary and doubtful assumptions, and yet others are challenged by low data coverage in terms of one-country-analysis or

unrepresentative samples. Despite the challenges, however, several studies are worth highlighting, and the good news is that the field is evolving rapidly together with data quality improvements.

The current section proceeds by explaining one method at a time followed by the findings based on that particular method. I start by explaining methods based on macroeconomic statistics and the accompanying results. Next, despite the introductory statement of picking out best practices in the field, I briefly explain the trade misinvoicing method and the main challenges it faces. In the third subsection, I review research on intra-firm profit shifting. In the fourth and last subsection, I explain other approaches taken by researchers to study IFFs, including direct rent seeking, changes in firm value and wealth reporting after tax haven leaks, and impacts of anti-IFF legislation.

4.1 Macroeconomic statistics

Balance of payments (method)

Two well-known methods using macroeconomic identities for measuring capital flight, which is not necessarily illicit, are the ‘sources-and-use’ method and the ‘hot money narrow’ method. Both methods rely on the balance of payments identity in Equation 3 (Johannesen and Pirttilä 2016).

$$-CA = FDI + STC + PI + BA + CPR + NEO + LTC, \quad (3)$$

where CA is the current account; FDI is net foreign direct investments; STC is net short-term capital flows; PI is net portfolio investments; BA is deposit banks’ foreign asset change; CPR is the change in central bank foreign reserves; NEO represents net errors and omissions; and LTC is net long-term capital flows of the government sector. This identity can be rewritten such that the left-hand side includes sources (LTC and FDI) and uses (CA and CPR) of capital, whereas the right-hand side includes changes in short-term capital, bank deposits, portfolio investments, and errors:

$$-(LTC + FDI + CA + CPR) = STC + PI + BA + NEO. \quad (4)$$

The ‘sources-and-use’ method measures capital flight, but not necessarily IFFs. There can be several reasons why individuals wish to place their money (also legally earned) in foreign accounts or investment portfolios. For instance, if the home country is a risky place to store deposits due to risk of devaluation, or if banks are not financially sound. That is, the right-hand side of Equation 4 is not necessarily equal to zero.

The ‘hot money narrow’ method more closely measures illicit flows, as it accounts for portfolio investments and deposit banks’ foreign asset change. However, individuals can still have other legitimate reasons for transferring capital to another country, and net errors may in fact just be errors, meaning that the ‘hot money narrow’ method is not capturing only IFFs.

The ‘source-and-use’ method and the ‘hot money narrow’ method measure only capital flight and not the more sophisticated intra-firm approaches to transferring earnings from one country to another in order to avoid corporate taxes. While capital flight may reflect earnings that individuals wish to hide because they have been illegally earned, they may also reflect earnings that individuals wish to transfer for legitimate purposes.

Balance of payments (results)

Based on the ‘sources-and-use’ method, the 48 least developed countries lost an estimated US\$26.3 billion in capital flight, with a lower bound of US\$20.2 billion, in 2008 (UNDP 2011). This estimate has increased by 6.2 per cent per year since 1990, and it corresponds, on average, to 4.8 per cent of GDP. Considering all developing countries (including populous countries like China, India, Indonesia,

and Nigeria), Henry (2012) estimates yearly capital flight of US\$150–200 billion in 2010. Using yearly estimated capital flight since 1970, the author employs an accumulated wealth model and predicts total offshore wealth at US\$21–32 trillion as of 2010. This figure is substantially higher than the—arguably more reliable—estimates by Zucman (2013, 2015), which are presented below.

The ‘hot money narrow’ method is used by Global Financial Integrity (GFI) to estimate capital flight to and from all developing countries (Spanjers and Salomon 2017).¹⁰ The authors’ preferred estimate adds together capital inflows and outflows, as they argue that ‘...both types of illicit flows represent a challenge to economic and social progress in the developing world.’ (Spanjers and Salomon 2017: vii). For better comparison with other estimates, subtracting estimated inflows from outflows yields US\$172 billion lost in capital flight per year from developing countries in year 2014.¹¹ Interestingly, a back-of-the-envelope calculation suggests this estimate is only slightly smaller than the findings by Henry (2012) using the less precise ‘sources-and-use’ method.¹²

Aggregate liabilities and assets (‘Zucman method’)

Instead of measuring capital flight based on the balance of payments identity, Zucman (2013) comes up with the innovative approach of comparing global liabilities with global assets. The author uses an updated version of a database constructed by Lane and Milesi-Ferretti (2007) and extends it by including central bank reserves, data on hedge funds holdings in the Cayman Islands, and assumptions about holdings of oil exporters and asset composition of Chinese reserves. When someone reports a liability of US\$100, someone else should also own an asset of US\$100. Tax havens, however, generally do not report asset holdings of foreigners. Consequently, some liabilities are not matched by an equivalent asset, and globally there will be more liabilities than assets. The author argues that these missing asset holdings held in tax havens are most likely to belong to households, as there is no tax or regulatory advantage for companies to do the same (Zucman 2013: 1331).

In addition to Zucman (2013), Alstadsæter et al. (2018) estimate offshore wealth at the country level instead of the global level. They utilize data on funds held by non-Swiss nationals in Swiss banks, together with information from the Bank for International Settlements on deposits held by foreigners in several tax havens. This information is used to derive the shares of total offshore wealth held by nationals in specific countries.

While the ‘Zucman method’ is considered to be of higher precision in terms of measuring capital flight to tax havens, a few limitations apply. Similar to the ‘sources-and-use’ method and the ‘hot money narrow’ method, the ‘Zucman method’ does not capture tax avoidance by companies, which the author also clearly recognizes. In addition, and in line with most of the literature, the method examines only financial wealth, and may therefore underestimate missing asset holdings in tax havens. For the estimates of country-specific offshore wealth, a key issue is that shell companies are not covered by the analysis, thereby increasing the uncertainty about asset ownership.

¹⁰ The authors label their outcome variable ‘IFFs’, as they mix together trade misinvoicing with net errors and omissions from the balance of payments identity. While trade misinvoicing is both illicit and illegal, net errors and omissions from the balance of payments identity need not be.

¹¹ The estimated inflows and outflows are US\$41 billion and US\$213 billion, respectively.

¹² Using a yearly discount factor of 6.2 per cent, which is equivalent to the estimated growth rate of capital flight in the 48 least developed countries (UNDP 2011), and discounting back from 2014 to 2010, the US\$172 billion lost in 2014 implies that an estimated US\$135 billion was lost in 2010.

Aggregate liabilities and assets (results)

Zucman (2013) finds that approximately US\$4.5 trillion were held in unrecorded portfolios in tax havens in year 2008. This amount corresponds to around six per cent of financial wealth of individuals. In 2001, the estimated amount of hidden wealth was US\$2.5 trillion, suggesting a considerable increase of around nine per cent per year. Updated figures for 2014 indicate similar yearly growth of nine per cent per year, resulting in unrecorded financial wealth held by individuals in tax havens at US\$7.6 trillion (Zucman 2015).

Relative to GDP, Alstadsæter et al. (2018) estimate all financial wealth held by individuals in tax havens at around ten per cent. Since 2001 and until 2015, this figure varies between eight and twelve per cent, with the highest estimate derived in 2015. Importantly, the figure includes both unrecorded and recorded financial wealth in tax havens, and Zucman (2013) argues that around 75 per cent of the financial wealth is unrecorded.

While one might be able to construct a legitimate narrative for the discrepancy between global assets and global liabilities, it is striking that this discrepancy is driven predominantly by tax havens. Zucman (2013) uses the IMF's Coordinated Portfolio Investment Survey to demonstrate that asset holdings are not missing, or only to a minimal extent, in non-tax haven countries. This exercise adds further credibility to the conclusion that the discrepancy in assets and liabilities are caused by deliberately hidden wealth.

Aggregate domestic versus foreign firms (method and results)

Recently, statistical institutes around the world have started publishing macroeconomic statistics on the activities of foreign firms operating within their countries (FATS), including wages and profits. This information provides a useful source for analyzing profit shifting between firms at an aggregate level. Following Tørsløv et al. (2018), the idea is to compare profitability of foreign firms in low-tax countries (relative to domestic firms) with profitability of foreign firms in high-tax countries (relative to domestic firms). The authors further propose to decompose the gap in profitability into real effects and profit shifting effects by controlling for tangible assets. Finally, using balance of payments statistics, 'above-normal-profits' in tax havens are apportioned to the countries where they hypothetically would have been reported in a world without differences in corporate tax rates.

Using foreign affiliates statistics (FATS), Tørsløv et al. (2018) find strong evidence of aggressive profit shifting behaviour of MNEs. First, pre-tax profits to wages ratios for domestic firms are around 30–40 per cent in both low- and high-tax countries. For MNEs, however, this profitability measure is typically lower in high-tax countries and substantially higher in tax havens, reaching up to 800 and 1,625 per cent in Ireland and Puerto Rico, respectively. These figures are driven predominantly by profit shifting rather than differences in capital intensities. At the aggregate, almost 40 per cent of profits made by MNEs outside the host country of their parent company are shifted to tax havens. While the authors estimate high-income countries losing a larger proportion of corporate tax revenues relative to middle-income countries, the revenue loss for middle-income countries is non-negligible. The results demonstrate that, on average, Brazil, China, Colombia, Costa Rica, India, Russia, and South Africa lose four per cent of corporate tax revenues. This corresponds to a total loss of US\$25 billion caused by profit shifting in 2015 for these countries. No low-income country is covered by Tørsløv et al. (2018).

Country-by-country reporting of MNEs (method and results)

Large MNEs headquartered in countries with implemented country-by-country reporting requirements must report key financial elements by country of operation.¹³ Despite approximately 100 countries having implemented country-by-country reporting requirements, only 19 countries have agreed to share this information in an aggregated form and some of them allow reporting to be by region rather than by country (Garcia-Bernardo and Janský 2020). Garcia-Bernardo and Janský (2020) discuss the advantages and limitations of this new data and further present estimates of profit shifting based on the aggregate data. The main advantage is data coverage for countries with generally low coverage in other data sources. For instance, one may observe revenues, profits, and taxes paid in Italy by Italian MNEs, but also revenues, profits, and taxes paid for example in Ethiopia by Italian MNEs. The identification of profit shifting follows a standard Cobb-Douglas production function, where the authors further include a profit shifting incentive component.

While strong data limitations apply, Garcia-Bernardo and Janský (2020) offer some initial insights into profit shifting behaviour by large MNEs based on aggregate financial country-by-country information. The preferred estimate by the authors suggests that US\$1 trillion of profits worldwide was shifted to tax havens in 2016, resulting in a tax revenue loss of US\$300 billion. Low- and middle-income countries are estimated to lose most relative to total tax revenues. While the authors clearly acknowledge various limitations of this method, one concern is that MNEs located in low-tax countries are generally more profitable relative to MNEs located in high-tax countries, which introduces a potential bias. Moreover, while intangible assets can be used as a mechanism for profit shifting, there is also the possibility that MNEs located in low-tax countries have more genuine intangible assets, thereby making them more profitable. Despite the concerns highlighted, this method holds great potential in measuring profit shifting, in particular if the current level of aggregation can be disbanded.

Aggregate corporate income tax bases (method and results)

Crivelli (2016) highlights the lack of evidence from developing countries and proposes a method for examining profit shifting based on international differences in corporate income tax bases. Specifically, the method proceeds by estimating a model where the outcome variable is the corporate income tax base for country i in year t . The explanatory variables include the lagged outcome variable, corporate tax rate (CTR) in country i , a weighted average of other countries' CTRs, a vector of control variables, and country and time fixed effects. To address different endogeneity concerns, the model is estimated by system generalized method of moments (GMM). In addition to the profit shifting analysis, the authors further replace the outcome variable with statutory tax rates to study tax competition between countries. While the analysis is carried out separately for both OECD and non-OECD countries, country-level estimates remain absent.

Cobham and Janský (2018) improve upon the analysis of Crivelli (2016) by utilizing more detailed data and presenting country-level estimates of tax revenue losses. In particular, the authors utilize a new data source from the ICTD and UNU-WIDER named Government Revenue Dataset (GRD), explore alternative data on the average effective tax rate, and introduce another list of tax havens. In addition, the estimated models for OECD and non-OECD countries are used to derive tax revenue losses from profit shifting to tax havens by 'turning off' the effect from tax haven CTRs on the corporate income tax base.

The findings from employing this method of estimating corporate income tax bases reveal that both country i 's own CTR and the CTRs of other countries matter for the tax base of country i . This suggests

¹³ Following the OECD Base Erosion and Profit Shifting (BEPS) Action 13, MNEs with consolidated group revenues of at least €750 million are impacted by this regulation.

that CTRs have both ‘real’ and profit shifting effects. At the aggregate, and dependent on whether the GRD or the IMF database is used, this method estimates an annual global tax loss of US\$500–650 billion. Importantly, while the results are accompanied with high uncertainty, the evidence suggests that non-OECD countries (in particular low-income countries) are more exposed to tax haven profit shifting when evaluating losses relative to GDP.¹⁴

Phantom FDI (method and results)

While FDI is often perceived as real economic activity, Damgaard et al. (2019) propose a method for disentangling what they call ‘Phantom FDI’ from ‘Real FDI’. The working hypothesis is that a fraction of FDI is not meant for investments into the local economy. Instead, these ‘Phantom FDI’ are passed through a country arguably for tax planning purposes. For instance, the authors provide the example of Luxembourg recording inward FDI of US\$4 trillion, which is similar to the US. At the same time, outward FDI from Luxembourg are of similar size, suggesting Luxembourg is only a transit for the investments. Supporting this hypothesis is the negative correlation between the rate of return on FDI and the share of FDI coming from tax havens (Janský and Palanský 2019).

The authors build a global database of inward FDI and divide them into ‘Phantom FDI’ and ‘Real FDI’, and further narrow down ‘Real FDI’ by nationality of ultimate owner rather than immediate owner for countries with sufficient data coverage. The method proceeds as follows. First, IMF’s Coordinated Direct Investment Survey (CDIS) provides inward FDI for around 110–115 economies. When no inward FDI are reported (e.g. for the Cayman Islands), mirror statistics are used, meaning that inward FDI to the Cayman Islands from Canada equals outward FDI from Canada to the Cayman Islands. Next, a group of OECD countries report inward FDI by FDI to small domestic firms with little to no activity and FDI to other firms. The former FDI are used as the measure of ‘Phantom FDI’ for the countries reporting these statistics. For countries without these statistics, the share of ‘Phantom FDI’ to total FDI is predicted based on the relationship between *Phantom FDI relative to Total FDI* and *Total FDI relative to GDP* for the group of OECD countries reporting the statistics. The global database now covers inward FDI divided into estimated ‘Phantom FDI’ and ‘Real FDI’.

As Canada may still receive large real investments from the Cayman Islands, and these investments may originate from an investor in another country, the authors seek to identify the ultimate investor of ‘Real FDI’ instead of the immediate investor in IMF’s CDIS. For a group of OECD countries, this information is readily available from self-reported ultimate owners in the survey data. For countries where the information is not readily available, they estimate conversion factors based on the Orbis database when country coverage is adequate. For instance, in Orbis, Spain receives investments worth US\$13 billion from the United States when considering the immediate owner. Considering the ultimate owner, Spain receives US\$29 billion from the United States. Hence, a conversion factor of 2.2. As Spain, in IMF’s CDIS, receives US\$23 billion from immediate owners in the United States in ‘Real FDI’, it is estimated that Spain actually receives $23 * 2.2 = US\$51$ billion from ultimate owners in the United States.

In 2017, the authors estimate that FDI worth US\$15 trillion out of US\$40 trillion are not related to real activity and can be labelled ‘Phantom FDI’. The share has been growing from just above 30 per cent in 2009 to almost 40 per cent in 2017.¹⁵ In particular, Luxembourg and the Netherlands each take up more than US\$3 trillion, and other commonly known tax havens such as Ireland, Hong Kong SAR, the British Virgin Islands, Bermuda, Singapore, and the Cayman Islands each have inward ‘Phantom FDI’ worth US\$0.5–1 trillion. In terms of country exposure to ‘Phantom FDI’, countries with higher CTRs are

¹⁴ As low-income countries tend to extract a larger proportion of their tax revenue from corporate tax income, the exposure is even greater when evaluating profit shifting relative to corporate income taxes rather than GDP.

¹⁵ These figures are in line with the share of global FDI stock intermediated through tax havens (Haberly and Wójcik 2015).

expected to have a higher proportion of both inward and outward FDIs being labelled ‘Phantom FDIs’. This relationship is stronger for low-income countries.

The database on ‘Phantom FDIs’ and ‘Real FDIs’ is made publicly available (see Table 2).

4.2 Trade misinvoicing

Trade misinvoicing occurs when exporters or importers deliberately report false trading prices, volumes, or product type in order to gain an economic advantage. As argued by Kellenberg and Levinson (2019), there are several reasons why companies may want to misreport their exports or imports. These include tariffs, auditing and accounting standards, corruption, and CTRs. For instance, high import tariffs may induce the importing company to report a lower price in order to reduce tariff payments. On the other hand, a corrupt government may induce the importing company to report a higher price in order to channel money out of the country.

The way trade misinvoicing is measured today, the researcher has to make a few doubtful assumptions. First and foremost, shipping and insurance costs are assumed to be independent of distance and product type, which is obviously not true. For countries with generally high shipping and insurance expenses, the method will imply a high trade discrepancy.¹⁶ Second, countries do not necessarily classify products in the same way (UN Trade Statistics 2020). Consequently, commodity-level discrepancies may incorrectly arise.¹⁷ Third, prices reported by industrialized countries are assumed to be correct, which is a strong assumption given evidence of the opposite (Kellenberg and Levinson 2019). Fourth, some analysts have further argued that only outflows matter for IFFs and that one should not consider the net capital flight. The reasoning is that capital inflow due to trade misinvoicing can also be harmful to a country when used, for example, for financing of insurgent groups or bribery. This assumption, however, makes it impossible for a country to be a ‘winner’, even for tax havens.

Having imposed the strict assumptions outlined above, the methodological approach for measuring IFFs follows three steps. First, since export values do not include shipping and insurance expenses, these are adjusted upward to make them comparable to the import values. Generally, a fixed markup for all is assumed, e.g. ten per cent. Second, capital outflows from developing country X to industrialized country Y are identified based on discrepancies in the export and import values. If country X reports a higher import value from country Y compared to the (upward-adjusted) export value reported by country Y, there is an outflow from country X due to trade misinvoicing. Similarly, if country X reports a lower (upward-adjusted) export value compared to the import value reported by country Y, there is also an outflow from country X to country Y. In the last step, outflows to all industrialized countries are summed for each developing country to derive the total loss for developing countries to industrialized countries.

Results from trade misinvoicing

The academic community has largely abstained from using trade misinvoicing to measure IFFs.¹⁸ One academic study that does rely on this method is Chalendar et al. (2019). They use it, however, mainly as a warning system for the authorities to detect suspicious import operations to be further investigated, and

¹⁶ For instance, landlocked countries and countries exporting goods with a short expiration date might face higher transport costs. The trade misinvoicing method will suggest that these countries have a high discrepancy between import values reported by the receiving countries and their own reported export values.

¹⁷ This should only be problematic for commodity-level analysis and not country-level analysis, as country-level analysis aggregates all trades.

¹⁸ Researchers have used intra-firm transfer prices to estimate profit shifting, but this is a different approach for minimizing tax payments compared to reporting false prices or volumes.

not as a measure of total IFFs stemming from trade misinvoicing. Not yet published work by Chalendar et al. (2020) further investigates a potential channel through which trade misinvoicing is made possible. The authors use administrative transaction-level customs data and data from the largest port in Madagascar to construct a measure of risk of collusion between inspectors and brokers. Despite official rules prescribing random assignment between inspectors and brokers, almost ten per cent of all declarations are handled by an inspector interacting significantly more frequently with a broker than expected. The results suggest that suspicious declarations are significantly undervalued, leading to lower tax revenue, and re-randomization of inspector–broker assignment by a third party organization eliminates the deviation from random assignment.

Due to the current weaknesses of measuring IFFs from trade discrepancies, and despite heavy media attention, I will not present any estimates of trade misinvoicing. If the reader still finds the method a valid approach for measuring IFFs, Spanjers and Salomon (2017) provide an estimate on how much developing countries lose to developed countries. The authors only consider outflows and not inflows. Ndikumana and Boyce (2010) do a similar exercise for sub-Saharan African countries when estimating one component of capital flight. Importantly, however, the authors emphasize that they estimate capital flight, and they do not claim to be studying IFFs.

4.3 Intra-firm profit shifting

Intra-firm profit shifting takes place when an MNE moves profits between its affiliates in order to achieve a tax advantage. This movement can be exerted by letting affiliates located in high-tax jurisdictions buy goods and services, or obtaining loans, at a relatively high price from affiliates in low-tax jurisdictions. That way, the MNE ends up with more profits in low-tax jurisdictions. The after-tax profits can now be channelled back to investors or be re-invested in the company by, for instance, lending more money to the high-tax jurisdictions.

To measure the extent of profit shifting, the literature generally relies on indirect evidence. Indirect evidence stems from studying overall profitability of affiliates, whereas direct evidence stems from analyzing the profit shifting mechanisms themselves, e.g. transfer prices or interest rates between affiliates. First employed by Hines and Rice (1994), and conditional on capital and labour inputs, profitability of affiliates in low-tax jurisdictions is compared to profitability of affiliates in high-tax jurisdictions at the country level. Huizinga and Laeven (2008) take the analysis to the firm level, where they use the gap between the CTR faced by affiliate X and a weighted average of the tax rates faced by foreign affiliates as the incentive to shift profits. If the gap is positive, the owner of the affiliate has an incentive to shift profits out.

As countries might not randomly have settled at different levels of CTRs, researchers argue for studying changes in tax incentives and profitability rather than levels. The problem concerning levels is that other factors might influence both the tax rate setting and the ability of MNEs to shift profits. For instance, Mardan and Stimmelmayer (2020) model country tax competition with different risks and costs of shifting profits. They find that the optimal size of CTRs in high-risk countries relative to low-risk countries depends on the cost for the MNEs to shift profits. Therefore, the CTR depends both on country risk, cost of shifting profits (e.g. administrative capacity of authorities), and trading partners' risks and costs. While tax rate changes could be driven, for instance, by a drop in state capacity, the results arguably become more convincing when exploiting variation in policies.

More recently, Johannesen, Tørsløv, and Wier (2020) suggest using only the CTRs in foreign affiliates instead of the gap between the domestic rate and the rates in foreign affiliates. The reasoning follows the model by Mardan and Stimmelmayer (2020), as the setting of the domestic CTR is influenced by a number of factors. Furthermore, a higher domestic CTR might induce other economic responses than only profit shifting. Consequently, a negative correlation between profitability and the CTR gap may

reflect either a negative domestic response to a high domestic CTR, or profit shifting caused by a high incentive to reduce tax payments.

Related to the theoretical framework outlined in Section 3, two well-published papers have replaced the traditional continuous-scale measure of profitability with an indicator for ‘around zero profits’ (Bilicka 2019; Johannesen, Tørsløv, and Wier 2020). The reasoning follows the fixed costs argument, suggesting that there are substantial costs of setting up a scheme to avoid taxes. The method then proceeds by first classifying a range to be considered as ‘around zero profits’. Next, a regression model estimates the risk of zero profits conditional on production inputs, industry, and CTRs faced by foreign affiliates. This method identifies the most aggressive form of tax avoidance, where all profits are shifted abroad. One can further examine the less-intensive form of profit shifting by changing the outcome variable to profitability instead of a zero profits indicator, and excluding ‘around zero profits’ firms from the analysis.

While the methods explained above measure profit shifting indirectly through lower profitability when incentives are right, one can also study the mechanisms through which profit shifting occurs. For instance, transfer mispricing can be analyzed by comparing intra-firm transfer prices with transfer prices between unrelated parties when transaction-level data are available. That is, relative to the indirect analysis, firm profitability is replaced by unit prices as the outcome variable. Similarly, comparing intra-firm interest rates with interest rates between unrelated parties tests whether debt shifting is a viable mechanism to reduce tax payments. Even without transaction-level data on loans, one may still obtain a good understanding of the debt shifting mechanism by comparing leverage ratios of affiliates in low- versus high-tax jurisdictions. While this approach is feasible, in particular, when information on both internal and external debt is available (Fuest et al. 2011), comparing financial income and total leverage ratios between affiliates may provide indications of debt shifting (Dharmapala and Riedel 2013; Huizinga et al. 2008).

Results from intra-firm profit shifting

The academic literature has provided many estimates of intra-firm profit shifting, including the pioneering work by Huizinga and Laeven (2008) suggesting a semi-elasticity of profitability relative to the CTR gap of -1.3. This means that when the CTR gap increases by one percentage point, expected profits drop by 1.3 per cent. Two meta-analyses arrive at slightly smaller semi-elasticities of -1.0 and -0.8 (Beer et al. 2020; Heckemeyer and Overesch 2017). While Beer et al. (2020) illustrate a relatively stable semi-elasticity over time based on micro-level studies, there is substantial variation in the included estimates. Several estimates are below minus five and others are even above zero.

In line with data from macroeconomic statistics, the literature on intra-firm profitability also finds evidence of less-developed countries, in terms of income and quality of governance, being more exposed to profit shifting compared to more advanced economies (Fuest et al. 2011; Godar and Janský 2020; Johannesen, Tørsløv, and Wier 2020). Fuest et al. (2011) use the Microdatabase Direct investment (MiDi), consisting of German MNEs investing abroad. These MNEs are required to provide balance sheet information to the German authorities, including information on intra-firm loans. The authors find that the effect of the foreign affiliate CTR on intra-firm debt financing is twice as large in developing countries compared to the effect in developed countries. Godar and Janský (2020) also use the MiDi database and find that German MNEs tend to report considerably lower profits relative to economic activity in affiliates located in Eastern Europe, Africa, and big European countries like Spain, Italy, and France. Johannesen, Tørsløv, and Wier (2020) employ the Orbis database, consisting of financial and ownership information of individual firms. The authors find that reported profits react negatively to profit shifting incentives, and that this effect is more pronounced in countries with lower levels of economic and institutional development. These findings are in line with a theoretical model accounting for financial

development, suggesting that lower risk of being audited in countries with lower financial development increases the incentive to evade taxes (Guo and Hung 2020).

Introducing fixed costs to the tax optimizing scheme, it becomes more likely that firms either shift all profits or no profits at all.¹⁹ Johannesen, Tørsløv, and Wier (2020) find that the probability of reporting ‘around zero profits’, corresponding to a return on assets between -0.5 and 0.5 per cent, increases by three percentage points (equivalent to around 20 per cent of baseline probability) when the average foreign affiliate tax rate drops by ten percentage points.²⁰ In the UK, Bilicka (2019) compares the probability of reporting zero profits for MNE subsidiaries relative to domestic firms. She finds that foreign subsidiaries are around half as profitable relative to domestic firms, which is driven predominantly by zero profit subsidiaries. These findings are also in line with evidence suggesting that profit shifting is concentrated among a few large MNEs, as these have the resources to pay for the setup of a tax avoidance scheme (Davies et al. 2018; Wier and Reynolds 2018).

The literature further analyzes the direct channels through which MNEs shift profits between affiliates. Bernard et al. (2006); Cristea and Nguyen (2016); Davies et al. (2018) study transfer prices for MNEs headquartered in the United States, Denmark, and France, respectively. All three studies find that the difference between export prices to other affiliates and unrelated firms widens when the CTR gap increases. In Denmark, this leads to an estimated loss of more than three per cent of the tax returns from MNEs. In France, the correlation becomes insignificant when excluding ten tax havens from the analysis, suggesting transfer mispricing is heavily concentrated among MNEs trading with affiliates in tax havens. Despite the common finding that countries in the Global South are more exposed to IFFs, Wier (2020) finds similar results for transfer mispricing in South Africa as in advanced economies. This might indicate that other channels are used relatively more in the Global South. Apart from transfer mispricing, evidence has shown that MNEs shift profits through debt shifting (Dharmapala and Riedel 2013; Fuest et al. 2011; Huizinga et al. 2008), and that profit shifting is more pronounced in research-intensive firms (Bilicka 2019; Wier 2020).

4.4 Other approaches to study IFFs

Other approaches to gauge the role of IFFs include studying changes in offshore bank deposits following windfall gains in the resource sector or aid disbursements, changes in firm value and wealth reporting after leaks from tax havens, and impacts of anti-IFF legislation.

Andersen et al. (2017) and Andersen et al. (2020) study how windfall gains in the resource sector and large aid disbursements, respectively, correlate with changes in offshore bank deposits. Both papers use, as the dependent variable, bank deposits held in tax jurisdictions known for secrecy and asset protection. This information stems from the Bank for International Settlements. Andersen et al. (2017) explore in a difference-in-difference framework whether the relationship between changes in offshore bank deposits and changes in the international oil price is stronger in oil-rich countries relative to oil-poor countries. Andersen et al. (2020) explore whether aid disbursements by the World Bank correlate with changes in offshore bank deposits held by individuals in the aid-receiving country.

O’Donovan et al. (2019) exploit the so-called ‘Panama Papers’ leak from 2016 to estimate how much firms value different motives for acquiring secrecy services from tax haven law firms. The authors proceed by creating a database of top executives and board members of firms and their subsidiaries, which are listed in the Orbis and Datastream databases. Next, they match the bank accounts in Panama

¹⁹ See Section 3.

²⁰ This effect of 20 per cent is derived by taking the coefficient estimates associated with ‘Parent tax rate’ and ‘Average foreign affiliate tax rate’ in their Table 2 columns 5 to 8 (0.276–0.333), dividing by ten, and further dividing by the ‘baseline probability of reporting of zero profits’ (15 per cent).

(provided by the leak from Mossack Fonseca & Co.) with the database of top executives and board members to determine which firms are likely to be using secrecy services. In a difference-in-difference framework, the authors estimate how the leak influenced the value of involved firms relative to non-involved firms. As firms may just change their provider of secrecy services, the estimate arguably constitutes a lower bound of firm valuation of secrecy services. To better understand the motives, they separately investigate the bribery motive, the tax motive, and the expropriation motive for acquiring secrecy services. Finally, the authors derive a conservative estimate of the share of firms using secrecy services based on the approximate global market share held by Mossack Fonseca & Co. prior to the leak. Londoño-Vélez and Ávila-Mahecha (2018) present another use of the leak by studying changes in wealth reporting in Colombia.

While a first step for countering IFFs is to detect and understand them, knowing which policies limit the scope of IFFs is of utmost importance. Among evaluated policies to limit IFFs are: thin-capitalization rules (Buettner et al. 2012; Overesch and Wamser 2010), transfer pricing regulations (Beer and Loepnick 2015; Lohse and Riedel 2013), controlled foreign corporation rules (Clifford 2019; Egger and Wamser 2015), financial transparency legislation (Johannesen and Larsen 2016; Overesch and Wolff 2019), information exchange treaties between tax havens and non-tax havens (Johannesen and Zucman 2014; Menkhoff and Miethe 2019); and international law on corporate transparency (Allred et al. 2017; Sharmar 2010). Importantly, these studies provide evidence from advanced economies, whereas evidence from the Global South is completely missing.²¹

In an innovative approach for studying individual and corporate tax avoidance, Slemrod et al. (2020) investigates the impact of public disclosure of tax payments in Pakistan. Tax payments for all taxpayers are reported online including the name of the taxpayer. Importantly, only one-third of taxpayers have a unique full name, making them more exposed to the disclosure programme compared to taxpayers with name duplicates. The authors identify the impact of public disclosure by comparing the change in tax payments for taxpayers with unique versus frequent names. In a second analysis, the authors evaluate tax responses from a recognition programme granting certain privileges and honors to the top 100 self-employed individuals, wage-earners, and corporations. Specifically, they compare changes in tax payments for individuals and corporations close to the top 100 cut-off point relative to others in top 1,000.

Results from other approaches to study IFFs

Studying changes in offshore bank deposits following windfall gains in the oil sector and aid disbursements, Andersen et al. (2017, 2020) provide evidence of possible rent seeking. Andersen et al. (2017) estimate that a doubling of the oil price is associated with a 22 per cent increase in offshore bank deposits of individuals residing in oil-rich autocratic countries. For individuals residing in oil-rich non-autocracies, there is no significant effect. In regard to leakages from World Bank aid disbursements, Andersen et al. (2020) estimate that five per cent is channelled to tax havens in countries receiving at least two per cent of GDP in aid.²² Considering only the highest aid-dependent countries receiving at least three per cent of GDP in aid (seven countries), the leakage rate increases from 5 to 15 per cent.

Exploiting the ‘Panama Papers’ leak in 2016, O’Donovan et al. (2019) demonstrate that firms involved in the leak, on average, lost market value of 0.9 per cent relative to non-involved firms. This average, however, masks important heterogeneity, since different motives for acquiring secrecy services may net out. In line with this hypothesis, the authors show that firms more likely to use secrecy services for

²¹ As an exception, Allred et al. (2017) study both OECD countries, tax havens, and developing countries.

²² The authors argue this is likely a lower bound of rent seeking, as it accounts only for paper money and not money spent on real estate or luxury goods.

bribery and tax reasons lost more market value, whereas the negative valuation effect is smaller for firms more likely to use secrecy services for expropriation reasons. Based on an approximate global market share of five to ten per cent held by Mossack Fonseca & Co., and assuming firms use only one secrecy service provider, the authors estimate that between 14 to 29 per cent of the considered firms acquire secrecy services.

In another study using the ‘Panama Papers’, Londoño-Vélez and Ávila-Mahecha (2018) find that individuals reduced reported wealth in Colombia following wealth tax reforms by hiding assets in tax haven entities. In addition, the authors show that both tax and non-tax incentives led to disclosure of wealth. Even after three years of initial disclosure, these individuals paid 39 per cent more in income taxes. After the leak of the ‘Panama Papers’, there was a surge in disclosures of wealth for individuals named in the leak. Being named in the leak is associated with a 27 percentage points increase in the likelihood of disclosing any wealth, corresponding to more than an eightfold increase relative to taxpayers not named prior to the leak.

Regarding anti-IFF policies, evidence from high-income countries shows that: thin-capitalization rules lower the use of internal debt (Buettner et al. 2012; Overesch and Wamser 2010); transfer pricing regulation, such as documentation requirements, reduce profit shifting behaviour (Beer and Loeprick 2015; Lohse and Riedel 2013); controlled foreign corporation rules induce MNEs to redirect income and real investments away from low-tax jurisdictions, as income is otherwise included in the tax base of the parent company (Clifford 2019; Egger and Wamser 2015); a European Union reform, making it mandatory for firms in extractive industries to disclose their tax payments, led to significant drops of five to ten per cent in market value, suggesting the ability to hide tax payments was valuable to these firms (Johannesen and Larsen 2016); requiring European multinational banks to report key financial elements for each country of operation increased the effective tax rate of exposed banks by an estimated 2.3 percentage points (Overesch and Wolff 2019); information exchange treaties between tax havens and non-tax havens reduce bank deposits in cooperating tax havens, but, rather than being repatriated, these deposit changes are reallocated to other tax havens or hidden in another way (Johannesen and Zucman 2014; Menkhoff and Miethe 2019);²³ and slightly more than half of responding corporate service providers in OECD countries were not fully compliant with international law when researchers, disguised as business owners, inquired assistance on forming an international corporation, suggestive of weak enforcement (Allred et al. 2017).²⁴ Worth mentioning in relation to anti-IFF policies, however, is that unintended consequences may include lower domestic employment and investment, thereby underpinning the distortionary effect of taxation (Suárez Serrato 2018).

While public disclosure of tax payments are in use in several high-income countries such as Australia, Japan, and most of the Scandinavian countries, the Pakistani public disclosure programme provides an interesting case for other low- and middle-income countries. Slemrod et al. (2020) estimate that tax liability for taxpayers with less common names increased by 9 log points relative to taxpayers with more common names after releasing information on tax payments and full name of taxpayers. The authors further show that a recognition programme granting certain privileges and honors to the top 100 corporations increased tax payments for corporations around the cut-off point (corporations ranked 81–

²³ Johannesen, Langetieg, et al. (2020), however, demonstrate with data from the United States that exchange of information combined with a series of enforcement efforts and reduced sanctions, starting in 2008, led to more foreign account disclosures, generating an increase of US\$2–4 billion in annual reported capital income. This increase corresponds to US\$0.6–1.2 billion in tax revenue each year.

²⁴ Allred et al. (2017) further study corporate service providers in tax havens and developing countries, finding that slightly more than half of responding providers in developing countries were also not fully compliant with international law. In tax havens, only 30 per cent were not fully compliant, as ending up on the Financial Action Task Force black list would be particularly troubling for them. In addition, Sharman (2010) investigates whether corporate service providers are willing to assist him forming an anonymous shell corporation, finding that 13 out of 17 responding corporate service providers in OECD countries were willing to do so.

120 in terms of tax payments) by 27 log points relative to other corporations in top 1,000. These findings suggest that individuals and corporations avoided taxes, and potentially still do to a lesser extent, prior to the disclosure programmes.

5 Future scope

The field of IFFs is developing fast, and I will by no means be able to give a precise direction on where research will or ought to go. That being said, I do provide a few suggestions for future work based on the review of the literature in this paper. In addition, I present a list containing a short description of relevant data sources for studying IFFs.

5.1 Suggestions for future work

There is ample evidence of profit shifting behaviour by MNEs from indirect profitability studies and direct studies on profit shifting mechanisms. This evidence, however, is based predominantly on data from high-income countries. To gain a better understanding of profit shifting in the Global South, expanding existing data sources to contain more MNEs operating in the Global South is encouraged. Collaboration between specific tax authorities and researchers provides another avenue for studying profit shifting behaviour in country-specific settings, as these tax authorities may hold valuable data for research purposes. It further remains an open question how to tax, monitor, and audit MNEs, potentially depending on a country's tax capacity (Best et al. 2015; Bustos et al. 2019).

Studies investigating the impacts of anti-IFF legislation and information exchange treaties focus, to the best of my knowledge, exclusively on high-income countries. The reason for this is likely caused by data availability, and not because anti-IFF legislation nor information exchange treaties are less important in low-income countries. On the contrary, evidence suggests countries in the Global South are relatively more affected by IFFs compared to countries in the Global North. This implies that the potential gains from anti-IFF legislation and information exchange treaties are greater in the Global South all else equal. On the other hand, the administrative capacity must be of a certain level in order to exert the power given by law, implying smaller potential gains in lower-income countries. Consequently, there are reasonable grounds to suspect that the current evidence on anti-IFF legislation and information exchange treaties is not representative for countries in the Global South. Studying what works and what does not work in these countries is a field of first-order importance.

Related to the above, improving the capacity of tax authorities is seen as a viable instrument with high hopes (Pomeranz and Vila-Belda 2019). As a point of departure, how have tax bases evolved in countries investing in, or receiving targeted aid to improve, tax capacity relative to countries not doing the same? Have some sources of tax revenue been affected more than others? Have deposits in offshore bank accounts held by individuals dropped relative to deposits held by citizens of other countries? In particular, it is of great importance to come to grips with how technical assistance works best. Is it through experts coming in and taking charge, training of local officials, letting countries find their own paths and supporting them financially in doing so, or something else? In addition, evidence from taxpayer deterrence letters in the United States and Denmark suggests that increased risk of being audited significantly change self-reported income (Kleven et al. 2011; Slemrod et al. 2001), and evidence from firm deterrence letters in Chile and Costa Rica increased tax payments for treated firms (Brockmeyer et al. 2019; Pomeranz 2015). Do these deterrent effects also hold in low-income settings with limited tax capacity, and is there any within-country variation in compliance?

I argue in Section 4 that studies using export and import price discrepancies to identify IFFs make a very strong assumption about homogeneous shipping and insurance costs. In order to improve the validity of

this method, users must advance on the precision of these delivery costs and account for heterogeneity. For instance, shipping a product from Kenya to Tanzania should not cost the same as shipping from Kenya to Brazil, and products shipped by air is arguably more expensive than products shipped by sea. In addition, and despite inflow IFFs arguably having a negative effect as well, by abstaining from considering the difference between outflows and inflows, there will undoubtedly be a natural scepticism toward the estimates.

Meta-analyses of the tax semi-elasticity in relation to firm profitability are based on peer-reviewed studies. While it seems like a valid threshold to include studies that have been peer-reviewed, the variance in estimates is worryingly large. This large variance justifies an updated review of studies that are reporting a semi-elasticity, in which the validity of each estimate is scrutinized rather than included automatically. This adds some arbitrariness to the sample, but it should also improve the precision when excluding outlier estimates.

5.2 Data sources

Table 2 provides an overview of readily available data sources, confidential data sources used by researchers, and potentially upcoming data sources. While the list is not exhaustive, it aims to provide a decent overview of the most commonly applied data in the literature on IFFs. Studies mentioned in the third column are only subsets of larger pools of studies utilizing these data sources.

Table 2: Data sources suitable for analysis of IFFs (page 1 of 2)

Data source	Description	Used by e.g.
Fund managers:		
Offshore Leaks database (link)	Contains the Offshore Leaks, Bahamas Leaks, Panama Papers, and Paradise Papers, covering more than 720,000 names of people and companies. These records match named individuals to specific entities, day of incorporation, and current status of the entity.	Alstadsæter et al. (2019); O'Donovan et al. (2019)
Swiss Leaks data (link)	Not publicly available. Contains 30,412 clients, 112,000 accounts, and account value for the beneficial owner (Alstadsæter et al. 2019).	Alstadsæter et al. (2019)
Swiss National Bank (link)	Publicly available data on the value of offshore portfolios managed by Swiss banks on behalf of foreign citizens.	Zucman (2013); Alstadsæter et al. (2018)
Macro statistics:		
Government Revenue Dataset (link)	Yearly country-level tax revenues, distinguishing between various sources of revenue.	Cobham and Janský (2018)
Balance of Payments (BOP) and International Investment Position (IIP) Statistics (link)	The IIP and BOP show the stock and yearly flows, respectively, of cross-border investments, such as direct investments, portfolio securities, loans, and deposits. Derivation of IIP follows Lane and Milesi-Ferretti (2007).	Zucman (2013); Alstadsæter et al. (2018)
Coordinated Direct Investment Survey (CDIS)	Supports the IMF IIP statistics by improving the quality of direct investment positions.	
Coordinated Portfolio Investment Survey (CPIS)	Supports the IMF IIP statistics by improving the quality of portfolio investment statistics.	
Phantom and Real FDIs (link)	Based on CDIS, divide Total FDIs into 'Phantom FDIs' and 'Real FDIs'.	Damgaard et al. (2019)
Foreign affiliates statistics (FATS) of EU member countries (link)	Information on foreign affiliates in the EU with an owner outside the EU (inward FATS), and affiliates outside the EU with an owner in the EU (outward FATS). Currently, 13 countries provide outward FATS.	Tørsløv et al. (2018)
Bank for International Settlements (link)	Data on the amount of deposits held by foreigners in key offshore jurisdictions. Portfolio securities, which constitute the bulk of offshore wealth (Alstadsæter et al. 2018), are not included.	Henry (2012); Alstadsæter et al. (2018)
Country-by-country reporting of MNEs (OECD link) (US link)	Key financial elements of large MNEs by country of operation. Available statistics are aggregated and anonymized.	Garcia-Bernardo and Janský (2020)
International trade statistics:		
Direction of Trade Statistics (DOTS) (link)	Bilateral value of merchandise exports and imports. Imports are based on cost, insurance, and freight (CIF), whereas exports are based on cost only (FOB).	Ndikumana and Boyce (2010); Spanjers and Salomon (2017)
UN Comtrade (link)	Bilateral value of exports and imports. While similar to IMF (2020a), UN Comtrade further includes services and trade disaggregated by product codes.	Kellenberg and Levinson (2019)

Data source	Description	Used by e.g.
Micro-level data on firms:		
Orbis by Bureau van Dijk (formerly AMADEUS) (link)	Non-free data product on domestic and multinational companies, including balance sheet information and ownership linkages between companies. While the database has a comprehensive coverage of companies in high-income countries, coverage in low- and middle-income countries is low. Importantly, the ownership information is a snapshot, and it does not provide historical changes.	Huizinga and Laeven (2008); Dharmapala and Riedel (2013); Beer and Loeprick (2015); Clifford (2019); Johannesen, Tørsløv, and Wier (2020); O'Donovan et al. (2019)
Compustat (link)	Non-free data product mostly on US firms. Figures are aggregated to domestic and foreign level without information on activity in specific countries.	Dyreng et al. (2017)
Microdatabase Direct investment (MiDi) (link)	Information on FDIs by German MNEs. Importantly, these MNEs are required to provide balance sheet information to the German authorities, including information on intra-firm loans.	Fuest et al. (2011); Buettner et al. (2012); Egger and Wamser (2015)
Activities of U.S. Multinational Enterprises (link)	Information on FDIs by US MNEs, including employment, turnover, capital expenditures, and R&D expenditures of the foreign affiliates.	Clausing (2009); Guvenen et al. (2017)
Longitudinal Firm Trade Transactions Database (LFTTD) (link)	Available for research in social science. Transaction-level database of US exports and imports. Importantly, the database includes information on whether transactions are between unrelated or related parties.	Bernard et al. (2006)
Confidential sources of transaction-level trade between firms	Transaction-level information on trades between both unrelated and related parties are available for at least France, Denmark, and South Africa.	Cristea and Nguyen (2016); Davies et al. (2018); Wier (2020)
Country-by-country reporting of multinational banks	Key financial elements of multinational banks headquartered in Europe by country of operation.	Overesch and Wolff (2019)
Ongoing administrative data work	Cleaning of tax data for research purposes is gaining popularity in the Global South (e.g., Rwanda, Tanzania, Uganda, and Zambia have work in progress).	

Source: authors' compilation.

6 Conclusion

While it is commonly agreed that IFFs cover activities related to illegal markets, terrorism, tax evasion, corruption, deliberate misreporting, and illegal trade practices, there is no consensus on whether legal practices designed to minimize tax payments should be covered by the IFF concept. I argue that, in order to follow the definition of the word ‘illicit’, we ought to consider activities not adhering to the ‘spirit of the law’ as part of the IFF concept.

Studies seeking to measure the extent of IFFs by individuals rely heavily on macroeconomic statistics. Some of the first results are based on the balance of payments identity. These estimates are quite imprecise as they are susceptible to capturing others flows than what is ‘illicit’. Comparing aggregate liabilities and aggregate assets arguably constitutes a more convincing approach for measuring the stock of hidden wealth in tax havens. In 2014, an estimated US\$7.6 billion was hidden by individuals in tax havens, and financial wealth worth around 10 per cent of GDP is held by individuals in tax havens.

Macroeconomic statistics are also used to fathom the extent of profit shifting by MNEs. Aggregate profitability of foreign affiliates is compared to profitability of domestic firms to estimate ‘over-profitability’ of foreign affiliates in tax havens. In addition, researchers analyze developments in corporate income tax bases when statutory corporate tax rates change in tax havens. Lastly, a recently developed method disentangle ‘Real FDIs’ from ‘Phantom FDIs’, as some investments are channelled through tax havens for secrecy purposes. All three methods find substantial evidence of profit shifting by MNEs, and the last method suggests that almost 40 per cent of FDIs are ‘Phantom FDIs’ without any real relation to the local economy of the receiving country.

Despite heavy media attention, I argue that estimates derived from the trade misinvoicing method suffer from considerable identification issues. In particular, users tend to assume a constant markup to account for shipping and insurance costs, which is a problem of first-order importance. Users must come to grips with these uncertainties before presenting aggregate estimates of IFFs based on bilateral trade statistics.

The literature on profit shifting within MNEs is vast and informative, but it is based predominantly on accounting records from firms in high-income countries. There is ample evidence of profit shifting, as MNEs tend to be much more profitable in low-tax jurisdictions conditional on a given amount of capital inputs. On average, a semi-elasticity of profitability relative to the CTR gap around -0.8 to -1.0 is proposed by meta-analyses. Recent studies further suggest that profit shifting is driven by firms reporting near to zero profits in high-tax jurisdictions.

Other dimensions studied by researchers in the field include rent seeking by the political elite, effects of document leaks from tax havens, and how anti-IFF policies impact IFF behaviour. These studies provide innovative insights into more narrow aspects of IFFs, and they are key to understanding how IFFs work. Unfortunately, current evidence on anti-IFF policies are based exclusively on information from high-income countries, providing an essential and large gap in the literature for future studies to answer.

Evidence from different methods tend to align on whether countries in the Global South are equally exposed to IFFs compared to advanced economies. Arguably driven by lack of regulatory quality and administrative capacity, countries in the Global South are more exposed to IFFs. They are more exposed both relative to the size of the economy and relative to total tax revenues.

References

- Addison, T., Niño-Zarazúa, M., and Pirttilä, J. (2018). 'Fiscal Policy, State Building and Economic Development'. *Journal of International Development*, 30(2): 161–72. <https://doi.org/10.1002/jid.3355>
- African Development Bank Group (2017). 'Bank Group Policy on the Prevention of Illicit Financial Flows'. Group Policy Document. Abidjan: African Development Bank Group.
- African Union Commission (2019). 'Domestic Resource Mobilization: Fighting against Corruption and Illicit Financial Flows'. Report. Addis Ababa: AUC Publishing.
- Allingham, M. G., and Sandmo, A. (1972). 'Income Tax Evasion: A Theoretical Analysis'. *Journal of Public Economics*, 1(3): 323–38. [https://doi.org/10.1016/0047-2727\(72\)90010-2](https://doi.org/10.1016/0047-2727(72)90010-2)
- Allred, B. B., Findley, M. G., Nielson, D., and Sharman, J. C. (2017). 'Anonymous shell companies: A global audit study and field experiment in 176 countries'. *Journal of International Business Studies*, 48(5): 596–619. <https://doi.org/10.1057/s41267-016-0047-7>
- Alm, J., Bloomquist, K. M., and McKee, M. (2017). 'When You Know Your Neighbour Pays Taxes: Information, Peer Effects and Tax Compliance'. *Fiscal Studies*, 38(4): 587–613. <https://doi.org/10.1111/1475-5890.12111>
- Alstadsæter, A., Johannesen, N., and Zucman, G. (2018). 'Who Owns the Wealth in Tax Havens? Macro Evidence and Implications for Global Inequality'. *Journal of Public Economics*, 162(-): 89–100. <https://doi.org/10.1016/j.jpubeco.2018.01.008>
- Alstadsæter, A., Johannesen, N., and Zucman, G. (2019). 'Tax Evasion and Inequality'. *American Economic Review*, 109(6): 2073–103. <https://doi.org/10.1257/aer.20172043>
- Andersen, J. J., Johannesen, N., Lassen, D. D., and Paltseva, E. (2017). 'Petro Rents, Political Institutions, and Hidden Wealth: Evidence from Offshore Bank Accounts'. *Journal of the European Economic Association*, 15(4): 818–60. <https://doi.org/10.1093/jeea/jvw019>
- Andersen, J. J., Johannesen, N., and Rijkers, B. (2020). 'Elite Capture of Foreign Aid: Evidence from Offshore Bank Accounts'. Policy Research Working Paper 9150. Washington, D.C: World Bank.
- Beer, S., de Mooij, R., and Liu, L. (2020). 'International Corporate Tax Avoidance: A Review of the Channels, Magnitudes, and Blind Spots'. *Journal of Economic Surveys*, 34(3): 660–88. <https://doi.org/10.1111/joes.12305>
- Beer, S., and Loeprick, J. (2015). 'Profit Shifting: Drivers of Transfer (Mis)Pricing and the Potential of Countermeasures'. *International Tax and Public Finance*, 22(3): 426–51. <https://doi.org/10.1007/s10797-014-9323-2>
- Bernard, A. B., Jensen, J. B., and Schott, P. K. (2006). 'Transfer Pricing by U.S.-Based Multinational Firms'. Working Paper 12493. Cambridge, MA: National Bureau of Economic Research. <https://doi.org/10.3386/w12493>
- Best, M. C., Brockmeyer, A., Kleven, H. J., Spinnewijn, J., and Waseem, M. (2015). 'Production versus Revenue Efficiency with Limited Tax Capacity: Theory and Evidence from Pakistan'. *Journal of Political Economy*, 123(6): 1311–55. <https://doi.org/10.1086/683849>
- (2020). 'Conceptual Framework for the Statistical Measurement of Illicit Financial Flows'. Tech. Rep.. Vienna: UNODC and UNCTAD.
- Bilicka, K. A. (2019). 'Comparing UK Tax Returns of Foreign Multinationals to Matched Domestic Firms'. *American Economic Review*, 109(8): 2921–53. <https://doi.org/10.1257/aer.20180496>
- Brockmeyer, A., Smith, S., Hernandez, M., and Kettle, S. (2019). 'Casting a Wider Tax Net: Experimental Evidence from Costa Rica'. *American Economic Journal: Economic Policy*, 11(3): 55–87. <https://doi.org/10.1257/pol.20160589>
- Buettner, T., Overesch, M., Schreiber, U., and Wamser, G. (2012). 'The Impact of Thin-Capitalization Rules on the Capital Structure of Multinational Firms'. *Journal of Public Economics*, 96(11): 930–38. <https://doi.org/10.1016/j.jpubeco.2012.06.008>
- Bustos, S., Pomeranz, D., Vila-Belda, J., and Zucman, G. (2019). 'Challenges of Monitoring Tax Compliance by Multinational Firms: Evidence from Chile'. *AEA Papers and Proceedings*, 109(): 500–05. <https://doi.org/10.1257/pandp.20191045>
- Chalendard, C., Fernandes, A. M., Raballand, G., and Rijkers, B. (2020). 'Technology (Ab)use and Corruption in Customs'. Unpublished Manuscript.
- Chalendard, C., Raballand, G., and Rakotoarisoa, A. (2019). 'The Use of Detailed Statistical Data in Customs Reforms: The Case of Madagascar'. *Development Policy Review*, 37(4): 546–63. <https://doi.org/10.1111/dpr.12352>

- Clausing, K. A. (2009). ‘Multinational Firm Tax Avoidance and Tax Policy’. *National Tax Journal*, 62(4): 703–25. <https://doi.org/10.17310/ntj.2009.4.06>
- Clifford, S. (2019). ‘Taxing multinationals beyond borders: Financial and locational responses to CFC rules’. *Journal of Public Economics*, 173(-): 44–71. <https://doi.org/10.1016/j.jpubeco.2019.01.010>
- Cobham, A., and Janský, P. (2018). ‘Global Distribution of Revenue Loss from Corporate Tax Avoidance: Re-Estimation and Country Results’. *Journal of International Development*, 30(2): 206–32. <https://doi.org/10.1002/jid.3348>
- Cobham, A., and Janský, P. (2020). *Estimating Illicit Financial Flows: A Critical Guide to the Data, Methodologies, and Findings*. Oxford: Oxford University Press.
- Collin, M. (2020). ‘Illicit Financial Flows: Concepts, Measurement, and Evidence’. *The World Bank Research Observer*, 35(1): 44–86. <https://doi.org/10.1093/wbro/lkz007>
- Cristea, A. D., and Nguyen, D. X. (2016). ‘Transfer Pricing by Multinational Firms: New Evidence from Foreign Firm Ownerships’. *American Economic Journal: Economic Policy*, 8(3): 170–202. <https://doi.org/10.1257/pol.20130407>
- Crivelli, E. (2016). ‘Base Erosion, Profit Shifting and Developing Countries’. *FinanzArchiv*, 72(3): 268–301. <https://doi.org/10.1628/001522116X14646834385460>
- Damgaard, J., Elkjaer, T., and Johannesen, N. (2019). ‘What is Real and What is Not in the Global FDI Network?’. IMF Working Paper 19/274. Washington, D.C: IMF.
- Davies, R. B., Martin, J., Parenti, M., and Toubal, F. (2018). ‘Knocking on Tax Haven’s Door: Multinational Firms and Transfer Pricing’. *The Review of Economics and Statistics*, 100(1): 120–34. https://doi.org/10.1162/REST_a_00673
- Dharmapala, D. (2014). ‘What Do We Know about Base Erosion and Profit Shifting? A Review of the Empirical Literature’. *Fiscal Studies*, 35(4): 421–48. <https://doi.org/10.1111/j.1475-5890.2014.12037.x>
- Dharmapala, D., and Riedel, N. (2013). ‘Earnings shocks and tax-motivated income-shifting: Evidence from European multinationals’. *Journal of Public Economics*, 97(-): 95–107. <https://doi.org/10.1016/j.jpubeco.2012.08.004>
- Dyregang, S. D., Hanlon, M., Maydew, E. L., and Thornock, J. R. (2017). ‘Changes in Corporate Effective Tax Rates over the Past 25 Years’. *Journal of Financial Economics*, 124(3): 441–63. <https://doi.org/10.1016/j.jfineco.2017.04.001>
- Egger, P. H., and Wamser, G. (2015). ‘The Impact of Controlled Foreign Company Legislation on Real Investments Abroad. A Multi-Dimensional Regression Discontinuity Design’. *Journal of Public Economics*, 129(0): 77–91. <https://doi.org/10.1016/j.jpubeco.2015.07.006>
- EU-ACP Joint Parliamentary Assembly (2017). ‘Joint Parliamentary Assembly of the Partnership Agreement Concluded between the Members of the African, Caribbean and Pacific Group of States, of the One Part, and the European Union and Its Member States, of the Other Part - Minutes of the Sitting of Wednesday, 21 December 2016’. Document 22017P0530(03). Official Journal of the European Union.
- Forstater, M. (2018). ‘Illicit Financial Flows, Trade Misinvoicing, and Multinational Tax Avoidance: The Same or Different?’. CGD Policy Paper 123. Washington, DC: Center for Global Development.
- Fuest, C., Hebous, S., and Riedel, N. (2011). ‘International debt shifting and multinational firms in developing economies’. *Economics Letters*, 113(2): 135–38. <https://doi.org/10.1016/j.econlet.2011.06.012>
- Fuest, C., and Riedel, N. (2012). ‘Tax Evasion and Tax Avoidance: The Role of International Profit Shifting’. In P. Reuter (ed.), *Draining development?: Controlling flows of illicit funds from developing countries*. Washington, DC: World Bank Publications.
- Garcia-Bernardo, J., and Janský, P. (2020). ‘Profit Shifting by Multinational Corporations Worldwide: Evidence from Country by Country Reporting’. Mimeo.
- Global Financial Integrity (2020). *Illicit Financial Flows*. Available at: <https://gfinintegrity.org/issue/illicit-financial-flows/> (accessed 24 June 2020)
- Godar, S., and Janský, P. (2020). ‘Corporate Profit Misalignment: Evidence from German Headquarter Companies and Their Foreign Affiliates’. *Post-Communist Economies*, 1–25. <https://doi.org/10.1080/14631377.2020.1827201>
- Guo, J.-T., and Hung, F.-S. (2020). ‘Tax Evasion and Financial Development under Asymmetric Information in Credit Markets’. *Journal of Development Economics*, 145(-): 102463. <https://doi.org/10.1016/j.jdeveco.2020.102463>
- Güvener, F., Mataloni, J., Raymond, J., Rassier, D. G., and Ruhl, K. J. (2017). ‘Offshore Profit Shifting and Domestic Productivity Measurement’. Working Paper 23324. Cambridge, MA: National Bureau of Economic Research. <https://doi.org/10.3386/w23324>
- Haberly, D., and Wójcik, D. (2015). ‘Tax Havens and the Production of Offshore FDI: An Empirical Analysis’. *Journal of Economic Geography*, 15(1): 75–101. <https://doi.org/10.1093/jeg/ibu003>

- Hallsworth, M., List, J. A., Metcalfe, R. D., and Vlaev, I. (2017). ‘The Behavioralist as Tax Collector: Using Natural Field Experiments to Enhance Tax Compliance’. *Journal of Public Economics*, 148(-): 14–31. <https://doi.org/10.1016/j.jpubeco.2017.02.003>
- Haufler, A., Mardan, M., and Schindler, D. (2018). ‘Double Tax Discrimination to Attract FDI and Fight Profit Shifting: The Role of CFC Rules’. *Journal of International Economics*, 114(-): 25–43. <https://doi.org/10.1016/j.jinteco.2018.04.007>
- Heckemeyer, J. H., and Overesch, M. (2017). ‘Multinationals’ Profit Response to Tax Differentials: Effect Size and Shifting Channels’. *Canadian Journal of Economics*, 50(4): 965–94. <https://doi.org/10.1111/caje.12283>
- Henry, J. S. (2012). ‘The Price of Offshore Revisited’. Report. Chesham: Tax Justice Network.
- High Level Panel on Illicit Financial Flows from Africa. (2015). ‘Illicit Financial Flows: Report of the High Level Panel on Illicit Financial Flows from Africa’. Report. (accessed 15 September 2020)
- Hines, J. R., and Rice, E. M. (1994). ‘Fiscal Paradise: Foreign Tax Havens and American Business’. *The Quarterly Journal of Economics*, 109(1): 149–82. <https://doi.org/10.2307/2118431>
- Huizinga, H., and Laeven, L. (2008). ‘International Profit Shifting within Multinationals: A Multi-Country Perspective’. *Journal of Public Economics*, 92(5-6): 1164–82. <https://doi.org/10.1016/j.jpubeco.2007.11.002>
- Huizinga, H., Laeven, L., and Nicodeme, G. (2008). ‘Capital Structure and International Debt Shifting’. *Journal of Financial Economics*, 88(1): 80–118. <https://doi.org/10.1016/j.jfineco.2007.05.006>
- IMF (2020a). *Direction of Trade Statistics (DOTS)*. Available at: <https://data.imf.org/?sk=9D6028D4-F14A-464C-A2F2-59B2CD424B85> (accessed 14 July 2020)
- IMF (2020b). *The IMF and the Fight Against Illicit Financial Flows*. Available at: <https://www.imf.org/en/About/Factsheets/Sheets/2018/10/07/imf-and-the-fight-against-illicit-financial-flows> (accessed 24 June 2020)
- Janský, P., and Palanský, M. (2019). ‘Estimating the Scale of Profit Shifting and Tax Revenue Losses Related to Foreign Direct Investment’. *International Tax and Public Finance*, 26(5): 1048–103. <https://doi.org/10.1007/s10797-019-09547-8>
- Johannesen, N., Langetieg, P., Reck, D., Risch, M., and Slemrod, J. (2020). ‘Taxing Hidden Wealth: The Consequences of US Enforcement Initiatives on Evasive Foreign Accounts’. *American Economic Journal: Economic Policy*, 12(3): 312–46. <https://doi.org/10.1257/pol.20180410>
- Johannesen, N., and Larsen, D. T. (2016). ‘The Power of Financial Transparency: An Event Study of Country-by-Country Reporting Standards’. *Economics Letters*, 145(-): 120–22. <https://doi.org/10.1016/j.econlet.2016.05.029>
- Johannesen, N., and Pirttilä, J. (2016). ‘Capital Flight and Development: An Overview of Concepts, Methods, and Data Sources’. WIDER Working Paper 2016/95. Helsinki: UNU-WIDER. <https://doi.org/10.35188/UNU-WIDER/2016/138-3>
- Johannesen, N., Tørsløv, T. R., and Wier, L. S. (2020). ‘Are Less Developed Countries More Exposed to Multinational Tax Avoidance? Method and Evidence from Micro-Data’. *The World Bank Economic Review*, 34(3): 790–809. <https://doi.org/10.1093/wber/lhz002>
- Johannesen, N., and Zucman, G. (2014). ‘The End of Bank Secrecy? An Evaluation of the G20 Tax Haven Crackdown’. *American Economic Journal: Economic Policy*, 6(1): 65–91. <https://doi.org/10.1257/pol.6.1.65>
- Kellenberg, D., and Levinson, A. (2019). ‘Misreporting Trade: Tariff Evasion, Corruption, and Auditing Standards’. *Review of International Economics*, 27(1): 106–29. <https://doi.org/10.1111/roie.12363>
- Kleven, H. J., Knudsen, M. B., Kreiner, C. T., Pedersen, S., and Saez, E. (2011). ‘Unwilling or Unable to Cheat? Evidence From a Tax Audit Experiment in Denmark’. *Econometrica*, 79(3): 651–92. <https://doi.org/10.3982/ECTA9113>
- Koethenbueger, M., Mardan, M., and Stimmelmayer, M. (2019). ‘Profit Shifting and Investment Effects: The Implications of Zero-Taxable Profits’. *Journal of Public Economics*, 173(-): 96–112. <https://doi.org/10.1016/j.jpubeco.2019.01.007>
- Lane, P. R., and Milesi-Ferretti, G. M. (2007). ‘The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004’. *Journal of International Economics*, 73(2): 223–50. <https://doi.org/10.1016/j.jinteco.2007.02.003>
- Lohse, T., and Riedel, N. (2013). ‘Do Transfer Pricing Laws Limit International Income Shifting? Evidence from European Multinationals’. CESifo Working Paper Series 4404. Munich: CESifo.
- Londoño-Vélez, J., and Ávila-Mahecha, J. (2018). ‘Can Wealth Taxation Work in Developing Countries? Quasi-Experimental Evidence from Colombia’. Job Market Paper. Berkeley: University of California.
- Mardan, M., and Stimmelmayer, M. (2020). ‘Tax Competition between Developed, Emerging, and Developing Countries – Same Same but Different?’ *Journal of Development Economics*, 146(-): 102491. <https://doi.org/10.1016/j.jdeveco.2020.102491>

- Menkhoff, L., and Miethe, J. (2019). ‘Tax Evasion in New Disguise? Examining Tax Havens’ International Bank Deposits’. *Journal of Public Economics*, 176(-): 53–78. <https://doi.org/10.1016/j.jpubeco.2019.06.003>
- Ndikumana, L., and Boyce, J. K. (2010). ‘Measurement of Capital Flight: Methodology and Results for Sub-Saharan African Countries*’. *African Development Review*, 22(4): 471–81. <https://doi.org/10.1111/j.1467-8268.2010.00243.x>
- O’Donovan, J., Wagner, H. F., and Zeume, S. (2019). ‘The Value of Offshore Secrets: Evidence from the Panama Papers’. *The Review of Financial Studies*, 32(11): 4117–55. <https://doi.org/10.1093/rfs/hhz017>
- OECD (2018). ‘Illicit Financial Flows: The Economy of Illicit Trade in West Africa’. Report. Paris: OECD Publishing. <https://doi.org/10.1787/9789264268418-en>
- Overesch, M., and Wamser, G. (2010). ‘Corporate Tax Planning and Thin-Capitalization Rules: Evidence from a Quasi-Experiment’. *Applied Economics*, 42(5): 563–73. <https://doi.org/10.1080/00036840701704477>
- Overesch, M., and Wolff, H. (2019). ‘Financial Transparency to the Rescue: Effects of Country-by-Country Reporting in the EU Banking Sector on Tax Avoidance’. SSRN Scholarly Paper. Rochester, NY: Social Science Research Network ID 3075784. <https://doi.org/10.2139/ssrn.3075784>
- Picciotto, S. (2018). *Illicit Financial Flows and the Tax Haven and Offshore Secrecy System*. Available at: <https://www.taxjustice.net/2018/02/08/illicit-financial-flows-tax-haven-offshore-secrecy-system/> (Tax Justice Network, accessed 24 June 2020)
- Pomeranz, D. (2015). ‘No Taxation without Information: Deterrence and Self-Enforcement in the Value Added Tax’. *American Economic Review*, 105(8): 2539–69. <https://doi.org/10.1257/aer.20130393>
- Pomeranz, D., and Vila-Belda, J. (2019). ‘Taking State-Capacity Research to the Field: Insights from Collaborations with Tax Authorities’. *Annual Review of Economics*, 11(1): 755–81. <https://doi.org/10.1146/annurev-economics-080218-030312>
- Reuter, P. (ed.). (2012). *Draining Development?: Controlling Flows of Illicit Funds from Developing Countries*. Washington, DC: World Bank Publications.
- Sharman, J. C. (2010). ‘Shopping for Anonymous Shell Companies: An Audit Study of Anonymity and Crime in the International Financial System’. *Journal of Economic Perspectives*, 24(4): 127–40. <https://doi.org/10.1257/jep.24.4.127>
- Slemrod, J. (2019). ‘Tax Compliance and Enforcement’. *Journal of Economic Literature*, 57(4): 904–54. <https://doi.org/10.1257/jel.20181437>
- Slemrod, J., Blumenthal, M., and Christian, C. (2001). ‘Taxpayer Response to an Increased Probability of Audit: Evidence from a Controlled Experiment in Minnesota’. *Journal of Public Economics*, 79(3): 455–83. [https://doi.org/10.1016/S0047-2727\(99\)00107-3](https://doi.org/10.1016/S0047-2727(99)00107-3)
- Slemrod, J., Rehman, O. U., and Waseem, M. (2020). ‘How Do Taxpayers Respond to Public Disclosure and Social Recognition Programs? Evidence from Pakistan’. *The Review of Economics and Statistics*,(-): 1–44. https://doi.org/10.1162/rest_a00929
- Spanjers, J., and Salomon, M. (2017). ‘Illicit Financial Flows to and from developing Countries: 2005–2014’. Report. Washington, DC: Global Financial Integrity.
- Suárez Serrato, J. C. (2018). ‘Unintended Consequences of Eliminating Tax Havens’. Working Paper 24850. Cambridge, MA: National Bureau of Economic Research. <https://doi.org/10.3386/w24850>
- Tørsløv, T. R., Wier, L. S., and Zucman, G. (2018). ‘The Missing Profits of Nations’. Working Paper 24701. Cambridge, MA: National Bureau of Economic Research. <https://doi.org/10.3386/w24701>
- UN Trade Statistics (2020). *Bilateral asymmetries*. Available at: <https://unstats.un.org/unsd/tradekb/Knowledgebase/50657/Bilateral-asymmetries> (accessed 8 July 2020)
- UNCTAD, and UNODC (2019). ‘UNCTAD-UNODC Task Force Meeting on Statistical Methodologies for Measuring Illicit Financial Flows’. Minutes of Meeting. Geneva. Available at: <https://unctad.org/en/pages/MeetingDetails.aspx?meetingid=2218> (accessed 24 June 2020)
- UNDP (2011). ‘Illicit Financial Flows from the Least Developed Countries: 1990–2008’. Discussion Paper. New York: UNDP.
- Wier, L. S. (2020). ‘Tax-Motivated Transfer Mispricing in South Africa: Direct Evidence Using Transaction Data’. *Journal of Public Economics*, 184(): 104153. <https://doi.org/10.1016/j.jpubeco.2020.104153>
- Wier, L. S., and Reynolds, H. (2018). ‘Big and ‘Unprofitable’: How 10 per Cent of Multinational Firms Do 98 per Cent of Profit Shifting’. WIDER Working Paper 2018/111. Helsinki: UNU-WIDER. <https://doi.org/10.35188/UNU-WIDER/2018/553-4>
- World Bank (2017). *Illicit Financial Flows (IFFs)*. Available at: <https://www.worldbank.org/en/topic/financialsector/brief/illicit-financial-flows-iffs> (accessed 24 June 2020)
- World Bank (2020). *World Development Indicators: Tax revenue (% of GDP)*. Available at: <https://data.worldbank.org/indicator/GC.TAX.TOTL.GD.ZS> (accessed 22 June 2020)

- Zucman, G. (2013). 'The Missing Wealth of Nations: Are Europe and the U.S. net Debtors or net Creditors?' *The Quarterly Journal of Economics*, 128(3): 1321–64. <https://doi.org/10.1093/qje/qjt012>
- Zucman, G. (2015). *The Hidden Wealth of Nations: The Scourge of Tax Havens*. Chicago: University of Chicago Press.