
Illicit Financial Flows: Concepts, Measurement, and Evidence

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There is a growing consensus that the presence of illegal and harmful cross-border financial flows is one of the factors impeding economic and human development. In recent years, a new conceptual framework for describing these “illicit” financial flows (IFFs) has emerged that combines issues ranging from cross-border money laundering to tax evasion. This article summarizes and clarifies recent empirical work in this area. Three types of studies are considered and critiqued: (i) methods of measuring IFFs, (ii) constructed risk indicators, and (iii) forensic studies that aim to uncover instances where illicit flows have occurred. The article discusses the limitations of all three approaches and proposes ways in which the research agenda on IFFs could be reasonably advanced, given the hidden nature of the subject.

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1 Introduction

Several trillion dollars cross international borders every day (Mallaby 2016). Much of this movement is perfectly legitimate, part of the ordinary workings of the global financial system. Yet some of the money is considered to be either illegal or harmful because of the way it was generated, transferred, or used. These international transfers have come to be known as “illicit financial flows” (IFFs), a concept which combines several—occasionally disparate—activities ranging from illegal capital flight to international money laundering to tax evasion.

By their very nature, IFFs are usually hidden from sight and therefore difficult to measure. Global estimates—fraught with error—are of the order of magnitude of \$1–1.5 trillion a year.¹ While these estimates appear to have been largely stable or even decreasing over time relative to overall economic activity, international

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attention and concern around IFFs has been increasing. Multilateral initiatives, such as the Addis Ababa Action Agenda around Financing for Development and the Sustainable Development Goals, have resulted in renewed fervor for raising government revenue in developing countries, a process that is seen as being threatened by the prevalence of IFFs. Connected to this is a slowly mounting effort to curb international tax evasion and excessive tax avoidance, made particularly salient by recent events such as the Mossack Fonseca leaks. Independently, the past decade and a half has seen growing concern with international money laundering and terrorist financing, leading to global initiatives to curb these practices led by institutions such as the Financial Action Task Force (FATF).

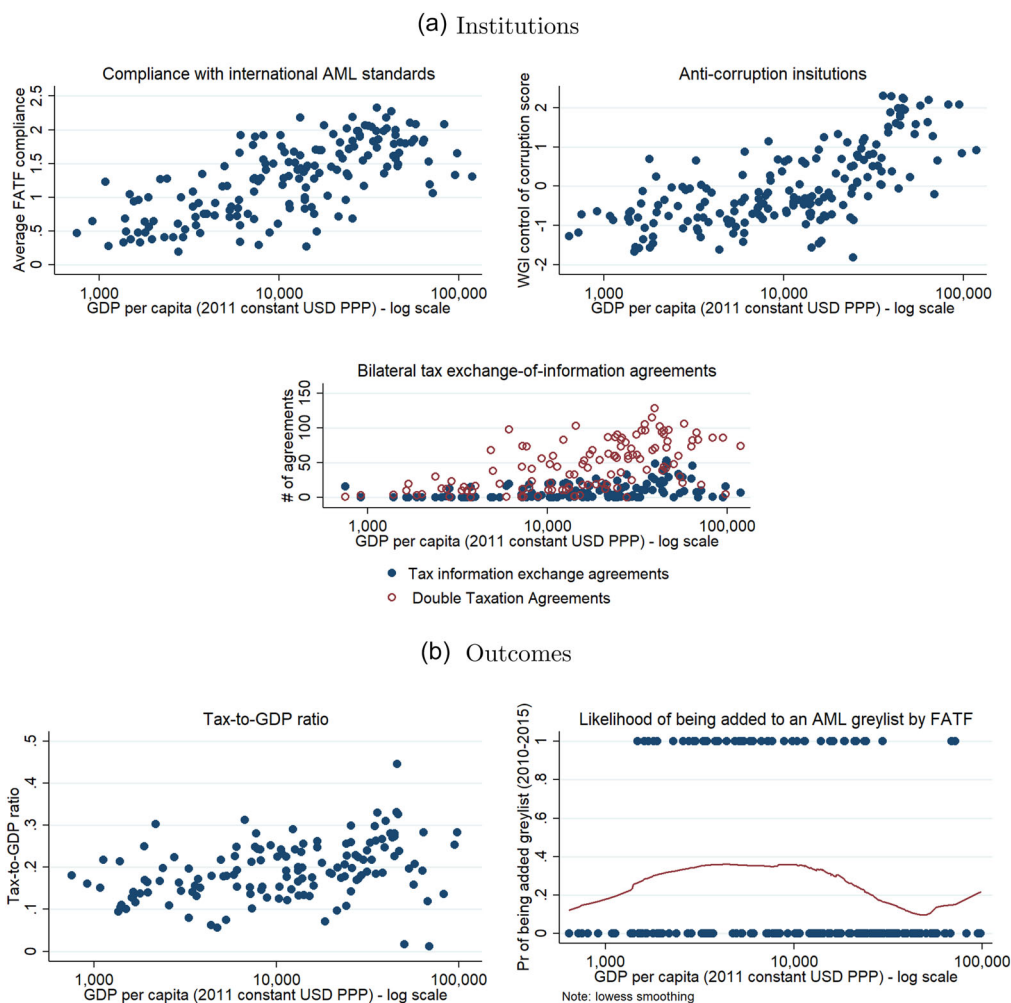
With the exception of work on tax evasion and crime, mainstream development economic research has largely failed to coherently engage with attempts to estimate IFFs, despite the growing attention from policymakers. This is in part due to the amorphous nature of IFFs, both in their definition and in their measurement. Despite this, there are several reasons to believe that IFFs are particularly relevant for developing and emerging economies.

The first of these is the fact that, because of poor-quality institutions and low capacity, many of these countries lack the apparatus to either detect IFFs or curb the practices that give rise to them. For example, governments of poorer countries are less likely to be compliant with international anti-money-laundering standards set by the FATF; see [fig. 1\(a\)](#). They are also less likely to have successfully negotiated bilateral tax-information exchange agreements or signed up to multilateral agreements that can be used by authorities to exchange information useful for tracking down international tax evasion cases. Developing and emerging economies are also more likely to suffer from corruption and informality, which are potential drivers of illicit flows. As this article will highlight, the empirical evidence base underlying the effectiveness of some of the institutions is still nascent, but the absence of such institutions suggests that developing countries are no better equipped to deal with the problem.

The second reason is that the damage that IFFs can do to developing and emerging economies is potentially greater. For one, as can be seen in [fig. 1\(b\)](#), developing countries struggle to raise the same proportion of their national income in tax revenue as richer countries. There is not enough evidence to indicate that the share of revenue lost to IFFs is higher in developing countries, but as many of these countries already struggle to maintain basic social services, functioning institutions, and a viable social contract, revenue losses will be more damaging to them ([OECD 2014](#); [Gaspar, Jaramillo, and Wingender 2016](#)). In addition to these harms, IFFs also potentially give rise to negative impacts through the underlying activities that generate them, such as violent crime associated with drug trafficking, government decisions distorted by corrupt practices, or outright kleptocracy/state capture of resources.²

Finally, developing countries are disproportionately likely to be punished by international institutions for failing to deter illicit flows. For example, emerging economies

Figure 1. Developing Countries have Weaker Anti-IFF Institutions and Potentially Face Worse Harm from IFFs



Source: FATF compliance data were taken from scores on Mutual Evaluation Reports (<https://www.fatf-gafi.org/publications/mutualevaluations/>) and from EATF’s high-risk and non-cooperative jurisdictions list (<https://www.fatf-gafi.org/publications/high-riskandnon-cooperativejurisdictions/>). The exchange-of-information data were obtained from the OECD’s exchange-of-information portal (<http://www.eoi-tax.org>). The tax-to-GDP ratios are from UNU-WIDER’s Government Revenue Dataset (UNU-WIDER 2018), and the data on GDP per capita and the World Governance Indicator Control of Corruption are from the World Bank’s Open Data Portal.

Note: IFF = illicit financial flow. The graphs show the cross-sectional relationships of (a) anti-IFF institutions (compliance with international standards, exchange-of-information agreements, and levels of corruption) and (b) IFF-related outcomes (tax revenue and greylisting by the FATF) with the log of GDP per capita.

are at higher risk of being added to the FATF’s “greylist” of countries that are not making enough effort to improve anti-money-laundering institutions; see [fig. 1\(b\)](#). This greylisting, which calls on regulators and banks to enact stricter procedures when dealing with listed countries, has the potential to do significant damage: [Collin, Cook, and Soramäki \(2016\)](#) found that the volume of international payment flows to greylisted countries decreased by approximately 10 percent.

The goal of this article is to give an overview of the issue of IFFs, discuss popular academic and policy-oriented methods of quantifying these flows, elucidate how the methods are related to each other, and suggest potential ways to advance the research agenda. [Section 2](#) discusses issues around the definition of, composition of, and policy efforts to fight IFFs. [Section 3](#) covers various methods for measuring specific types of IFFs and IFFs in aggregate. [Section 4](#) describes constructed indices of the risk of IFFs and reviews studies in the field of “forensic” economics that have been used to discover the contexts in which IFFs are likely to happen. [Section 5](#) details ongoing policy efforts to curb illicit flows and a few of the ways in which those efforts are being measured. [Section 6](#) discusses ways in which research on IFFs might progress, and [Section 7](#) concludes.

2 Defining and Classifying Illicit Financial Flows

In his book *Capitalism’s Achilles heel: Dirty money and How to Renew the Free-Market System*, [Baker \(2005\)](#) defined “dirty money” as money that is illegally earned, moved, or used. The most widely cited definition³ of IFFs involves just a minor tweak of Baker’s definition: an illicit financial flow is dirty money that crosses an international border.

This definition implies that a flow can be classified as illicit if either its origin (source), the method used for moving it across a border (channel), or its eventual use is illegal. Taking into account whether the source or channel is legal, [fig. 2](#) displays how a set of different types of international financial flows would be classified as IFFs.⁴ For simplicity, this figure leaves out the third dimension: the use of these funds when they reach their destination.⁵ Common sources of IFFs described by [Baker \(2005\)](#) include (i) corrupt proceeds, which include money stolen from the state or funds acquired through abuse of state power, (ii) criminal proceeds, which include drug money and individual tax evasion or tax fraud, and (iii) commercial proceeds, which include multinational tax or tariff evasion.

These sources of illicit flows should be distinguished from the channels used to transfer them. In some cases, the channels themselves are illegal due to a failure to report the existence of assets or their transfer, or because they actively circumvent government policy on the transfer of resources, such as capital controls. Channels commonly thought of as being illicit include all forms of cross-border money laundering. This includes cash smuggling and trade-based money laundering, accomplished

Figure 2. Classification of Channels and Sources of Illicit Financial Flows

Channels	<i>Trade-based money laundering, cash smuggling</i>			<i>Illicit (narrow)</i>
	<i>Transfer price abuse</i>		<i>Illicit (broad)</i>	
	<i>Wire transfer, Declared cash</i>	<i>Licit</i>		
		<i>Declared income</i>	<i>Aggressive tax avoidance</i>	<i>Corrupt or criminal proceeds, tax evasion</i>
		Sources		

Source: Author's classification of illicit financial flows according to their sources and channels.

Note: The figure illustrates the author's classification of various combinations of sources and channels of financial flows as either licit flows or the narrow and broad definitions of illicit flows.

by obscuring the true price or quantity of goods being exported or imported. Sometimes the source and channel of an IFF are hard to disentangle. For example, a person may transfer their assets to a “tax haven,” a jurisdiction that does not share beneficial ownership or taxpayer information with the person’s tax authority back home, in an effort to evade taxation. In this case, the flow could be considered illicit because the activity that gave rise to it involves the intention to evade tax or because moving money to tax havens regardless of the purpose might be considered by some to be use of an illicit channel.

Other definitions of IFFs go beyond flows that explicitly break the law. These include more normative or consequentialist definitions which take into account whether the flows are within the spirit of the law or the impact they can have on an economy. For example, [Cobham \(2014\)](#) argues that IFFs should also include socially damaging

flows that are not necessarily illegal, such as aggressive profit-shifting by multinational corporations and other forms of tax avoidance. Some take the definition even further: [Blankenburg and Khan \(2012\)](#) consider illicit (capital) flows to include any cross-border flows that have a negative effect on an economy, either directly (e.g., via lost tax revenue) or indirectly (e.g., by eroding institutions). These definitions often rely on the idea that the word “illicit” should also capture the socially undesirable as well as the explicitly illegal. [Bohoslavsky \(2016\)](#) refers to this as the “broad” definition of IFFs, as opposed to the “narrow” definition described at the beginning of this section.

While the narrow definition is more or less objective in nature, the broad definition suffers from being largely subjective: whether or not a flow is socially undesirable can be debated and judged differently by different parties. By contrast, the narrow view can occasionally lead to uncomfortable classifications, such as when legal money is moved out of a country to avoid expropriation by an autocratic regime or flows that lead to economic instability.

As such, this article will largely be concerned with the narrow definition of IFFs based around illegality, which has the advantage of being concrete. However, given the attention that corporate tax avoidance has received in the IFF-related literature, it will also include estimates or discussions of estimates of these phenomena, as they are closely related. To reflect this, [fig. 2](#) includes transfer price abuse,⁶ the manipulation of intra-subsidiary transactions by multinationals in order to shift profits between countries, as a potential channel of IFFs. In addition to this, “aggressive tax avoidance” has been included as an illicit source under the broad definition to account for any aggressive or undesirable behavior of firms or individuals that could lead to a reduction in their tax obligations.

Certain flows may not be considered IFFs at the time they were moved abroad. For example, a transfer of money to an overseas tax haven may not break any domestic laws until the owner fails to declare the wealth or subsequent interest to their domestic tax authority. Also, the inclusion of “use” in the categorization of IFFs can be problematic for their measurement, as money that has crossed a border may not be used for an illegal purpose until some time after its transfer.⁷

Also, funds that are considered IFFs may not have actually been transferred in the traditional sense. Value may be created in one jurisdiction as the result of illegal behavior in another. For example, if a company bribes a government official by depositing funds in an account in the official’s name in a tax haven, this could be considered an illicit outflow. A generalization of Raymond Baker’s definition to account for these indirect transfers might include any money that is generated in one jurisdiction as a result of illegal activity in another jurisdiction by an entity who has a controlling interest in that money after it has been generated. Thus, illicit flows might also include value that is controlled across borders by those who generated that value illegally (or use it for an illegal purpose). They might also include financial instruments which at

first glance do not appear to involve a transfer of money (e.g., equity or securities) and the transfer of non-monetary assets (e.g., precious stones or paintings).

Many studies refer to illicit flows as being hidden by definition (OECD 2014; Financial Transparency Coalition 2015) or implicitly assume this by attempting to measure only unreported international flows, but this need not be the case. Money that has been generated through illegal activity may be moved out of a country through an entirely legitimate channel and held in a transparent manner, especially if it has been laundered prior to crossing a border.

3 Measuring Illicit Flows

By their very nature, IFFs are difficult to measure and even harder to aggregate. There are three main challenges in estimating IFFs. The first is a *measurement* issue. As the true value of illicit flows to and from an economy is never truly observed, most methods produce a constructed estimate, which will deviate from the true estimate by an error term of unknown size and direction. These estimates are often indexed over time and by the direction or type of flow. They are likely to be unbiased if the measurement error is truly random, although if there is a high degree of noise in the data, it can be difficult to determine whether observed changes over time are meaningful.

However, in practice, the error term of an IFF estimate is likely to contain more than just noise. For example, if the error term is not centered at zero then estimates of IFFs will be biased up or down, even if changes over time would still contain meaningful information. Worse, if the error associated with an IFF estimate is spuriously correlated with other characteristics that change over time, then trends in IFF estimates will be difficult to interpret. Thus, the problem of estimating IFFs—measuring an unobserved, latent variable—is very similar to that of measuring the informal economy (Frey and Weck-Hanneman 1984). Unsurprisingly, many of the methods described here closely mirror both direct and indirect methods used in the economics literature to measure informality (Medina and Schneider 2018).

The second challenge in estimating IFFs comes from the fact that most methods of estimating specific types of IFFs are *overlapping* in nature: they are measuring in part the same source or channel. This makes constructing an aggregate figure summing all types of IFFs particularly challenging—perhaps even fruitless. Section 6 will discuss how different measures can be more meaningfully aggregated.

The final challenge is that measures of IFFs are going to favor types of illicit flows that can be more easily measured or for which measures are more likely to be constructed. Therefore it is difficult to make definitive statements as to whether certain sources or channels of IFFs are more prevalent, as the relative importance of a source or channel in global estimates may be driven merely by the relative demand for or supply of those estimates. For example, the proceeds of grand corruption may actually make up a large proportion of global IFFs but appear smaller relative to tax evasion

because the latter is easier to model. This can also make changes in IFFs over time or across certain dimensions—such as GDP—hard to interpret, as they may reflect a shift in illicit activity from things that are more easily measured to those that are not. How this should affect considerations about lumping measures of IFFs together will be discussed in section 6.

The rest of this section will review popular, data-driven methods that researchers have used to estimate IFFs, examine what estimates have actually been produced, and discuss their relative strengths and weaknesses.⁸

Balance-of-Payments Methods

One of the most common ways of estimating illicit flows relies on methods developed in the capital flight literature. Researchers often use macroeconomic identities, specifically balance-of-payment statistics, to determine when capital is shifting overseas. The “sources-and-uses method” is based on the fact that a country’s balance-of-payment identity must hold: sources of capital inflows (net increases in foreign debt and foreign direct investment, FDI) should only exceed the uses of capital inflows (the current account deficit and changes in reserves) when capital is moving overseas (Johannesen and Pirttilä 2016). The sum of the net change in debt, FDI, current account surplus, and change in reserves is then used as an empirical estimate of capital flight.

To better distinguish between ordinary capital flight and that which is hidden from official statistics (and hence presumably illicit), researchers have begun to rely on more narrowly defined measures of deviation. The “hot-money-narrow method” focuses only on the net errors and omissions (NEOs) entry in balance-of-payment statistics, and occasionally also on flows of short-term capital. The underlying argument is that because NEOs are unexplained, they are more likely to capture hidden flows. Various attempts to estimate aggregate IFFs use variations of either the sources-and-uses method or the hot-money-narrow method, but all are conceptually similar (Ndikumana and Boyce 2008; Kar and Cartwright-Smith 2010; Kar and Spanjers 2015; UNECA 2015).

Estimates using the hot-money-narrow method have typically involved substantial sums: the nonprofit organization Global Financial Integrity (GFI) estimates that in 2015, roughly \$342 billion left developing countries, an increase on previous years (Salomon 2019), although this is only a fraction of their total estimate of IFFs (most of which consist of trade-based estimates, to be discussed next). Henry (2012) estimates annual IFFs of roughly the same magnitude and also uses the sources-and-uses method to produce estimates of the total stock of hidden capital held overseas. Following this approach, he estimates that up to \$9.3 trillion in unrecorded wealth has been generated from a group of 139 lower and middle-income countries since the 1970s.

Criticisms of the hot-money-narrow approach fall into two categories: reasons why the flows it captures might not be illicit and reasons why it might not be capturing anything at all. Researchers have pointed out that short-term capital, which is included in some hot-money-narrow calculations (albeit not GFI's), largely consists of commercial credit, which is not usually thought of as either being capital flight or at risk for being an illicit flow. Thus the hot-money-narrow method may lead to overcounting or false positives. Others have pointed out that NEOs, which make up the bulk of hot-money estimates, are largely going to be driven by compilation errors in capital accounts, incomplete measurement, or inadequate currency conversions (Schneider 2003). Therefore, large-scale estimates may be significantly made up of noise in the data, making it impossible to know precisely how much capital has left.

Finally, methods based on balance-of-payment statistics will provide a net estimate of capital flight or illicit flows (Johannesen and Pirttilä 2016). Inflows and outflows are likely to have different effects on a local economy, and there is currently no consensus on whether these flows should be netted out or added up (Nitsch 2016).

As can be seen in [fig. 3](#) (in [section 4](#)), illicit outflows as a percentage of trade volumes measured using GFI's variant of the hot-money-narrow method are weakly increasing with a country's income, suggesting that to the extent that the hot-money-narrow method is picking up meaningful variation in IFFs, they are likely to be an emerging country phenomenon.

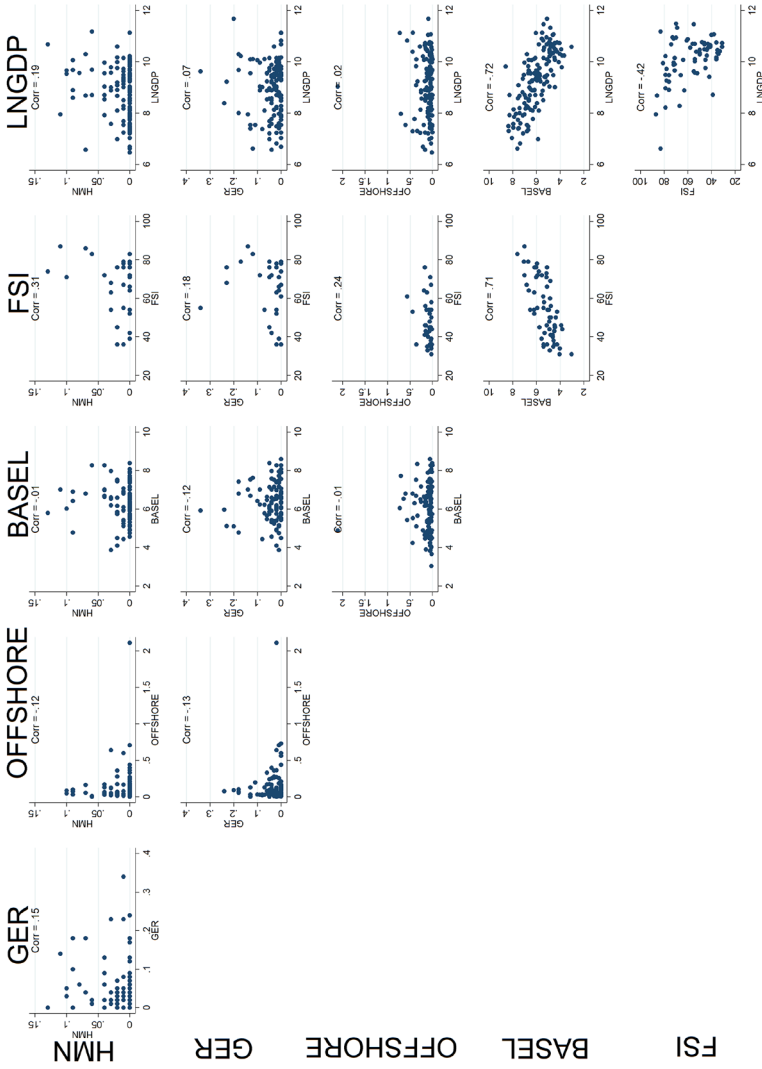
Trade Gap Analyses

Although its intellectual origins are half a century old (Bhagwati 1964), the method of using trade data to estimate or detect illicit behavior has risen to particular prominence in the past 15 years, largely due to the work of GFI in deriving global estimates of IFFs. The concept is fairly simple: after accounting for shipping and insurance costs, the declared price and quantity of an export from one country should match the declared price and quantity when that shipment reaches its destination and is recorded as an import. The only legitimate deviation between the two records should come from shipping and insurance costs (which typically go unrecorded in aggregate trade statistics) or an error in recording the import/export value or quantity.

As described by Bhagwati (1964), there may be incentives to either under- or over-report the value (or quantity) of an export or import. For example, if an agent wished to quietly move money out of Malawi, they could over-invoice an imported shipment of mobile phones from the United States by \$100,000, paying the difference to an intermediary that they own outside of Malawi. There are various incentives ascribed to over-/under-reporting exports/imports, which include:

- (1) over-invoicing imports—retaining money abroad, avoiding capital controls (by obtaining excess foreign exchange), reducing taxable profit;

Figure 3. Correlation between Various IFF Measures and Indices



Source: Author's analysis based on data from Salomon and Spanjers (2017) for HMN, Salomon and Spanjers (2017) for GER, Alstadæter, Johannesen, and Zacman (2018) for OFFSHORE, ICAR (2017) for BASEL, Tax Justice Network (2016) for FSI, and the World Bank for LNGDP.

Note: Each graph shows the scatterplot of an estimation measure (or a risk measure) for illicit financial flows (IFFs) against another measure or against log(GDP per capita). HMN = illicit outflows in 2014 measured using the hot-money-narrow method as a percentage of total trade; GER = illicit outflows in 2014 measured using the gross excluding reversals method as a percentage of total trade; OFFSHORE = total offshore wealth as a percentage of GDP; BASEL = Basel AML Index score (lower is "better"); FSI = Financial Secrecy Index secrecy score; LNGDP = log(GDP per capita in constant 2011 dollars). The figure shows every possible combination of measures, with measures listed along the left side being assigned to the vertical axis and those listed along the top assigned to the horizontal axis. Pairwise correlations are listed within each graph.

- (2) under-invoicing imports—evading customs duties;
- (3) over-reporting exports—taking advantage of export credits;
- (4) under-invoicing exports—avoiding export tariffs, retaining money abroad, avoiding capital controls (by obtaining excess foreign exchange).

Note that for a source country, only (1) over-invoicing imports and (4) under-invoicing exports have the potential to be driven by the desire to secretly (or illicitly) move or retain money abroad. The other two are likely to be driven by the desire to avoid paying tariffs, which, while it deprives one country of potential tax revenue, does not necessarily involve the transfer of resources abroad. However, GFI's estimates consider both (2) and (3) as potential signs of illicit inflows.

To quantify total trade-based IFFs, GFI's "gross excluding reversals" (GER) method examines mirrored statistics (i.e., what country A declares it has exported to country B and what country B declares it has imported from country A) between developed countries and developing countries, under the assumption that values reported to customs officials in the former are likely to be true. GER does take into account that there will be a natural discrepancy between the two reported values due to shipping and insurance costs, which it assumes to be 6 percent of the value of the export when actual data on these costs are not available.⁹ In light of the incentives listed above, after correcting for shipping costs, the GER method assumes that any deviation in mirrored trade statistics that indicates an over-invoiced import or an under-invoiced export is an illicit financial outflow. Note that the 6 percent assumption is invariant with respect to the distance the export is traveling, so it is likely to lead to a declaration of under-invoicing (a false positive) when the distance leads to a higher shipping cost, and vice versa.

To come up with country and global estimates, GFI first uses the GER method to sum up the total amount of IFFs due to trade-based money laundering between each developing country and the set of richer country counterparts.¹⁰ It does this using both aggregate data from the IMF's Direction of Trade Statistics database and, in its most recent release, commodity-specific data from the UN's COMTRADE database. It then uses this sum to calculate the share of the country's trade that involves illicit transactions and multiplies that share by aggregate estimates of the country's trade to arrive at an aggregate value for illicit outflows. Summing country-level estimates results in a global estimate of trade-based money laundering. GFI's latest estimates of trade-based money laundering exceed those obtained via the hot-money-narrow approach by a significant margin: GFI's estimates put the total amount of money that left developing countries due to mis-invoicing at roughly 85 percent of the total (\$598–807 billion a year) in 2015 alone (Salomon 2019). Besides GFI, several research outfits and non-governmental organizations have produced similar figures for individual countries, groups of countries, and specific product categories (Nicolaou-Manias 2016).

These methods have come under heavy criticism from those who point to more innocent reasons why there might be a deviation in mirrored trade statistics: errors in recording prices or amounts, differences between countries in categorizing products, differences in reporting rules or transparency, and deviations between actual shipping and insurance costs and the fixed 6 percent assumption used in the GER method (Johannesen and Pirttilä 2016; Nitsch 2016). Many of the same critics have also questioned the GER assumption that trade statistics from rich countries are measured without (or at least with less) error. Because of these legitimate criticisms, aggregates based on trade gaps are likely to be both imprecise and over-inflated. Others have pointed out that the GER method will not appropriately account for re-exporting via, for example, bonded warehouses. GFI does correct its figures for re-exports between China and Hong Kong,¹¹ but this issue is still likely to plague other bilateral estimates (Forstater 2016).

These concerns are not purely theoretical, as there have been some high-profile examples of the GER method leading to substantial overestimates of IFFs. Most notable was a report released by the United Nations Conference on Trade and Development (UNCTAD) in 2016 which claimed that 67 percent of gold exports from South Africa were mis-invoiced, resulting in IFFs of nearly \$80 billion between 2000 and 2014. It was later revealed that much of the discrepancy was due to a deviation in the reporting standards which prevented gold exports from being correctly recorded in the COMTRADE database (Forstater 2017a; Eunomix 2017).

The correlation between GER estimates of illicit outflows (as a share of total trade) and the log of per capita GDP is 0.07 (see fig. 3 in section 4), indicating that if this method is picking up trade-based money laundering, it is equally an issue in poor and emerging economies.

Trade Price Deviation Analyses

There is a separate line of research that estimates illegal capital flight based on deviations of exports/imports from some reasonable range of prices, rather than using mirror trade statistics. Zdanowicz (2009) examines US exports and imports and concludes that transfers for which the price exceeds some distributional margin (e.g., 50 percent of the average price or the upper/lower quartile) are plausibly the result of illicit behavior. Using this form of analysis combined with data on corporate tax rates, Christian Aid (2009) calculated that developing countries are losing up to \$160 billion a year due to trade mis-pricing.

The difficulty with this approach is that it conceptually conflates two types of transfers: trade mis-invoicing (over-/under-invoicing at one end of the transfer and reporting truthfully at the other end) and transfer mis-pricing (where the price is reported correctly at both ends of the transaction but is distorted to affect the location where

profits are reported).¹² An unusually low export price could be due to an artificially low transfer price, or it might be due to under-invoicing.

Given that estimates of IFFs obtained with this method will be increasing in the price variance within a given product category, it is difficult to know what proportion of these estimates are driven by natural deviations in price and which estimates are actually driven by some form of illicit flow. As with trade gap analyses, errors in the data will often manifest as phantom illicit flows. [Forstater \(2015\)](#) notes that price outliers in trade data (such as a bucket priced at \$973 which has been used by many nonprofits as an example of mis-pricing) are likely to be partially explained by mistakes in recording either the value or the quantity of the shipment. Similarly, goods that are of higher/lower quality than or otherwise differentiated from the intended classification may be mistakenly flagged as being priced higher/lower than the norm.

Despite these limitations, analyzing extreme deviations in trade prices is likely to be a useful tool in forensic approaches to detecting illicit behavior used by interested parties such as customs agents. Using trade price deviations as a risk indicator to drive auditing decisions may make more sense than using them to estimate aggregate IFFs.

Transfer Price Analyses

Tax authorities typically enforce transfer price regimes by comparing firm-level data on transfer prices with some reasonable comparator (usually the price set for the same product for transfers between unrelated parties) or by calculating the profit margin of transactions for an entire enterprise. The former approach is known as the arms-length principle: that related firms should transfer goods at the same price as they would have if they had been unrelated, and that significant deviations in the transfer price are a sign of attempted profit-shifting.

These analyses require micro-level data on the transfer price decisions of firms, decisions that are typically available only to the firms themselves or to tax authorities. Researchers often look for evidence of transfer pricing and profit-shifting using publicly available or purchasable data, which typically contain information about a multinational's cross-border operations, revenues, and profits, but often does not include transfer pricing decisions. However, exceptions exist, such as the US Census Bureau Longitudinal Firm Trade Transactions Database, which was used by [Bernard, Jensen, and Schott \(2006\)](#) to determine that US exporters systematically set lower prices when exporting to related parties than when exporting to unrelated firms. Recently, researchers have begun to use similar data sources to produce estimates of the revenue loss from tax-motivated transfer mis-pricing ([Vicard 2015](#); [Cristea and Nguyen 2016](#); [Liu, Schmidt-Eisenlohr, and Guo 2017](#); [Davies et al. 2018](#); [Wier 2018](#)). These estimates are largely obtained by first calculating the deviation in the arms-length price observed when a firm transacts with related parties and then observing how that deviation changes when the transacting firms face different

corporate tax rates. The resulting estimates of the response of the declared prices to differential tax rates are then used to calculate how much extra revenue would have resulted if there were no tax incentives to misreport. These estimates, which currently cover only developed countries, range from less than 0.5 percent for the United States to roughly 2.5 percent for France (Wier 2018). This work also fits into a wider forensic literature investigating the determinants of corporate profit-shifting, which will be discussed later.

International Portfolio and Deposit Data

Instead of estimating cross-border flows, Zucman (2013) attempted to estimate the overall stock value of wealth that is held offshore. While money held overseas is not necessarily of illicit origin, its unreported nature might indicate a substantial risk that a law has been broken. Zucman's estimation strategy relies on the fact that unreported wealth drives a wedge in international portfolio statistics: because owners of hidden financial assets do not declare them, the asset position of source countries will be systematically under-reported. Because tax havens record liabilities on their books correctly (although the ultimate source of a liability will usually not be recorded), this will leave a gap between aggregate worldwide reported assets and liabilities.

Zucman (2013) uses aggregate international investment position data.¹³ Assuming that gaps in the global aggregates of portfolio liabilities and assets represent hidden securities, the aggregate value is combined with reported data on cross-border deposits provided by the Bank of International Settlements (BIS) to yield an estimate that approximately 8 percent of household financial wealth is held overseas, with no more than a fifth of that being reported in the source countries.

One potential criticism of Zucman's method is that, similar to the balance-of-payment estimates discussed above, it relies on deviations in aggregate data that could also be explained by measurement error. To support the main result with more detailed evidence, Zucman used bilateral portfolio data taken from the IMF's Coordinated Portfolio Investment Survey to show, for a limited group of countries, that bilateral estimates of unreported wealth are largest for countries recognized to be tax havens and are minimal otherwise. In a more recent study, Alstadsæter, Johannesen, and Zucman (2018) used updated BIS bilateral banking statistics to allocate the estimates of offshore wealth to each country in the world. As can be seen in fig. 3 (section 4), these estimates suggest that offshore wealth is roughly proportional to country income, with lower-, middle-, and upper-income countries maintaining roughly the same shares of their national income in offshore tax havens.

Deviations from Traditional Gravity Models of Financial Flows

Another method for estimating illicit flows is based on an empirical model that predicts cross-border flows and attempts to estimate an "illicit premium," the

additional amount that is sent to a certain jurisdiction solely because of its attractiveness in terms of hiding illicit funds. An example of this can be found in [Pérez, Brada, and Drabek \(2012\)](#), which estimates a variation of a gravity model that predicts FDI from transition economies to the rest of the world. After controlling for source and destination characteristics that would normally be expected to predict FDI, the authors found that the designation of a destination jurisdiction as a “jurisdiction of primary concern” by the US State Department’s International Narcotics Control Strategy Report (INCSR) predicts a higher share of FDI; this extra share is assumed to be a direct estimate of FDI directed toward the purpose of facilitating IFFs.

These models are attractive because they are easy to estimate given any measure of bilateral flow. However, they potentially suffer from an omitted variable problem. If the chosen measure of attractiveness is systematically correlated with unobservable characteristics that predict FDI but have nothing to do with the “illicit premium,” then these models will lead to an overstatement of the level of illicit finance. Because of these limitations, most gravity model estimates of the attractiveness of destination countries as tax havens or money laundering centers do not attempt to calculate actual amounts (e.g., [Rose and Spiegel 2007](#)).

Bottom-up Methods of Estimating Money Laundering

In addition to estimation based on macro-data on bilateral flows, changes in the current account, or trade data, there are a few methods of estimating IFFs that rely on aggregating data on crime to produce a national-level measure of money laundering. These methods vary in the sophistication of the aggregation approach used.

The Walker Model

Walker’s model of money laundering is part of a class of “constructed” money laundering estimates. To generate these estimates, researchers first estimate or assume a relationship between observed indicators of crime (e.g., estimates of drug proceeds, national crime surveys, corruption indicators, and suspicious transaction reports) and the amount of money laundering in a country. The estimates are often educated guesses or based on expert surveys and are rarely derived from true estimates of money laundering. Once an estimated relationship between observed crime statistics and money laundering is established, a total amount for a country can be calculated.

[Walker’s \(1999\)](#) variation on this approach was to also estimate the share of laundered money that is sent abroad, which is presumed to be related to a country’s rating on the Transparency International Corruption Perceptions Index, with

the most corrupt countries sending 70–80 percent of laundered money abroad and the least corrupt sending nothing abroad. To determine where in the world laundered money would be sent, Walker defined the attractiveness of a destination country as a function of several observable characteristics (such as GNP per capita and measures of bank secrecy and anti-money-laundering effort), parameters that are impossible to verify. Discounting this measure of attractiveness by the distance between the source and destination countries, Walker then used it to estimate money laundering flows between all countries in the world, which could be summed to produce a global estimate of IFFs. The main critique of such models was that many of the choices of parameters seemed arbitrary, despite attempts by some (e.g., Walker 1999; Walker and Unger 2009) to triangulate the results using other estimates of IFFs.

In an attempt to generate empirical estimates of the parameters in the Walker model, Ferwerda et al. (2013) estimated an empirical gravity model with the same structure as the Walker model but using estimates from the trade price deviation method of estimating money laundering flows used in Zdanowicz (2009). The parameter estimates in that exercise deviated wildly from the original Walker estimates, and it is unknown whether this is because the estimates in Ferwerda et al. (2013) are closer to the truth or because both methods are flawed.

Structural Models of Money Laundering

Avoiding the ad hoc nature of the Walker model, other researchers have attempted to model the relationship between existing data on the sources of illicit finance and the flows themselves in a more rigorous fashion. In a recent article, Villa, Misa, and Loayza (2016) created a model to describe the Colombian economy made up of a licit sector and an illicit sector, the latter comprising both the cocaine market (which has market value) and common crime (which does not). In the model a proportion of savings from the illicit economy is laundered back into capital investment. From this structural model the authors derived a series of equations that can be estimated using existing data on the illicit economy, allowing them to estimate both the amount of undetected illicit income and the stock of laundered assets as a share of Colombian GDP. The analysis is confined to money laundering in a broad sense, making it difficult to determine what proportion of illicit income eventually leaves the country.

Studies such as these that rely on economic theory and structural modeling do have an advantage over ad hoc methods such as the Walker model in that they carefully consider the equilibrium effects of changes in the illicit economy. However, these models are also based on assumptions that are difficult to test empirically, making estimates based on the models equally hard to verify.

4 Predicting Illicit Flows

Faced with the difficulty (or impossibility) of precisely calculating illicit flows, many researchers have instead tried either to construct indicators that proxy for the exposure of a country to illicit flows or to empirically identify the correlates of IFFs.

Indices Indicating the “Risk” of Illicit Flows

Instead of attempting to measure illicit flows directly, some researchers have turned to constructing indices that reflect the exposure a jurisdiction might have to IFFs. To do this, they assume that there is an empirical relationship between unobserved illicit flows and a set of observable characteristics of a given country. As actual data on illicit flows are unavailable, this relationship is usually an assumed one. Frequently, such a constructed index is a linear combination of the observable characteristics and typically takes the form of a composite index. In this context, the index is not expressed in meaningful units and is not considered to be an actual estimate of illicit flows. Rather, it is treated as a quantity that is thought to be meaningfully correlated with actual IFFs or with the probability that those flows exceed some arbitrary threshold. Thus the term “risk” in this context is not used in the economic sense (i.e., variation or deviation from expectations) but rather in the probabilistic sense.

One difficulty with this approach is in choosing a functional form that accurately reflects the direction of the true relationship between observed characteristics and IFFs. Most importantly, exposure to IFFs (or the risk of IFFs) should be monotonically increasing with the value of an index. If this relationship holds, then a ranking of countries based on the index will be equivalent to a ranking based on the true value of IFFs. But because the functional form of the indices is often ad hoc, it is difficult to know how often the monotonic relationship holds in practice.

Financial Secrecy Index

The Financial Secrecy Index (FSI) is a product of the Tax Justice Network. It is intended to measure both the level of financial secrecy available in a given jurisdiction and the scale of financial activity based there. It reflects a careful review of the regulatory, legal, and tax situations in approximately 100 countries, covering four main attributes: beneficial ownership transparency, regulation of corporate transparency, efficient tax and financial regulation, and compliance with international standards around tax and anti-money-laundering (AML). These qualitative assessments are used to compile a “secrecy score,” which is normalized to range from zero to 100. To calculate the overall index, the proportion of global financial services exported from the jurisdiction in question, referred to as a “global scale weight,” is transformed and then multiplied by a transformed secrecy score.¹⁴ Thus the FSI is both a measure of

the financial secrecy afforded by moving money to a jurisdiction and a measure of how much money sits in that jurisdiction.

While infamous small island tax havens typically have the highest secrecy scores (as can be seen in [fig. 3](#), middle-income countries tend to have higher secrecy scores), once the global scale weight is applied, large economies such as the USA, Germany, Japan, and the UK end up near the top of the ranking. While the secrecy score can be thought of as a measure of the risk that a marginal dollar sent to that jurisdiction is hidden, the full FSI can be thought of as a measure of the risk that a dollar floating around in the global economy is hidden in that jurisdiction. This might make the secrecy score component of the FSI more useful in gauging IFF risk, as it is easier to infer that a dollar sent from a developing country to a country that has a high secrecy score is in fact at risk of being hidden.

The FSI does not measure illicit cash directly, only the characteristics that would make holding cash in a jurisdiction attractive from a secrecy standpoint. Thus it can be thought of as a country risk indicator largely for illicit financial inflows. However, unusual levels of cross-border transfers to countries that have a high secrecy score might themselves be suspicious. Although the FSI does not distinguish between sources and channels of IFFs, the fact that most countries scoring high on the FSI are considered to be “tax havens” suggests that tax evasion is a strong motive for moving money to these locations. Empirically, the FSI is correlated with other tax haven measures: an analysis of data leaked from the Panamanian law firm Mossack Fonseca revealed that an increase of one standard deviation in a country’s FSI was associated with a 90 percent increase in the number of entities from the country named in the Panama Papers ([Collin 2016](#)).

The Basel Anti-Money-Laundering Index

The Basel AML Index is a product of the International Centre for Asset Recovery (ICAR), based at the Basel Institute for Governance. Running since 2012, it is an annual assessment and ranking of countries based on their “risk regarding money laundering/terrorism financing” that covers 149 countries. The index is a composite of about 14 publicly available indicators, which are divided into five broad categories: (i) money laundering or terrorist finance risk; (ii) corruption risk; (iii) financial transparency and standards; (iv) public transparency and accountability; and (v) political and legal risk. ICAR aggregates these indicators into a single index using weights based on expert assessment.¹⁵ The result is both an index and a ranking, which ICAR updates and releases every year.

The Basel AML Index’s composite nature makes it difficult to discern what exactly is being measured. There is a substantial amount of conceptual overlap between components, as many of them are designed to measure similar factors. Because neither the index nor the underlying subindices have even been calibrated against actual

measures of financial crime or money laundering, changes in illicit flows cannot readily be inferred from changes in the index.

One attractive feature of the Basel AML Index is its partial reliance on subindices that measure government policy, such as the FSI and, to lesser extent, the results of Mutual Evaluation Reports produced by members of the FATF. However, a number of the subindices are based on subjective expert assessments of a country, such as Transparency International's Corruption Perceptions Index. Many of these indicators (such as the Corruption Perceptions Index) are not direct measurements of AML-related policies, but instead are measures of environments or activities that are likely to result in stolen or illicit money (even if that money never leaves the jurisdiction in question). As with many of these other indicators, the Basel AML Index is likely to be a composite measure of the risk of illicit outflows, illicit inflows, and illicit finance that does not leave the country.

Unsurprisingly, the Basel AML Index is strongly correlated with a country's per capita income (fig. 3), as its components are largely measures of institutions that typically vary with income.

Correlations between Indices and IFF Outcomes

Figure 3 displays bilateral correlations between the FSI's secrecy score, the Basel AML Index, and three of the main IFF outcomes described in the previous section—GFI's hot-money-narrow measure, its GER measure,¹⁶ and recent country-level estimates of offshore wealth by Alstadsæter, Johannesen, and Zucman (2018). The FSI's secrecy score and the Basel AML Index are strongly correlated by construction (as the former is an input into the latter); neither display a particularly strong correlation with measured IFFs. In the case of the secrecy score, there is a moderate correlation of 0.31 with the hot-money-narrow measure of illicit *outflows*. This is somewhat less intuitive as financial secrecy should be a determinant of illicit *inflows* (the correlation between the secrecy score and the hot-money-narrow measure of inflows, not shown, is 0.27). The fact that these indices of illicit flows are only weakly correlated with popular measures of IFFs suggests that either the indices are not particularly useful at predicting IFFs, or the measures themselves should be treated with caution. None of the illicit outcomes themselves are highly correlated, indicating that they either are measuring different concepts or are all very noisy.

Forensic Studies of Illicit Flows

Both aggregate estimates of IFFs and indices are difficult to verify as they are rarely tested against actual data on illicit flows. In the absence of certainty regarding these methods, a growing “forensic” literature aims to identify specific instances

where there is likely to have been an increase in IFFs. These methods have the advantage of not relying solely on estimates that might be prone to error, instead focusing on how these estimates change across different economic actors or contexts.

Most studies in this forensic literature estimate a relationship by taking an estimate or a proxy for IFFs and regressing it on a series of observable characteristics (or exogenous shocks) that are thought to be correlated or causally linked to illicit flows. If a particular characteristic is found to have a significant impact on the measure of IFFs, and that effect is suggested by theory, then there are two ways—depending on one's priors—to interpret the result. The first is that if the theoretical relationship between the characteristic in question and the latent value of IFFs is believed to be true, then the result can be interpreted as indicating that the estimate of IFFs contains meaningful information. For example, theory suggests that the capacity of a country's customs administration will affect the level of trade mis-invoicing. If a study then finds a negative correlation between a cross-country trade-gap measure and a proxy for a country's quality of customs administration, then one way to interpret the finding is that the trade-gap measure is meaningfully picking up variation in trade mis-invoicing.

The second interpretation is that if one's prior was that the measure of IFFs (e.g., the trade-gap measure) picks up meaningful variation in IFFs (e.g., trade mis-invoicing), then correlation with a given characteristic (e.g., customs administration quality) provides empirical validation as to which characteristics predict IFFs. For example, if one's measure of IFFs is found to increase after an unexpected windfall in natural resource rents, but only in countries with weak institutions, then this might contain information on where IFFs are likely to be occurring.

Disconcertingly, these two interpretations are somewhat competing: they require priors either about the theoretical relationship between the measure of IFFs and the characteristics being regressed on or about the validity of the IFF measure in the first place. Furthermore, both interpretations rely on an important identification assumption: that the various characteristics being investigated are uncorrelated with measurement error in the estimate of IFFs. For example, countries lacking institutional capacity might struggle both to detect illicit behavior and to produce error-proof statistics that can be used in IFF estimates. Despite these concerns, the forensic approach can still be used to identify candidate characteristics for future investigation.

The rest of this subsection will describe recent studies that fit into this class of research. These have been categorized roughly according to the origins of illicit flows and the channels that they can take. However, many of the studies cover more than one source or channel of illicit flows. [Table 2](#) summarizes the main results of these studies, including roughly which sources and channels of IFFs they cover.

Table 1. Different Methods of Quantifying Illicit Financial Flows and Their Rough Classification

Estimation method	Flow	Channels	Sources	Closest definition of IFFs
Balance of payments methods (sources and uses, hot-money-narrow, etc.)	All unrecorded, unaccounted capital flows	Any formal channel	Any source	Narrow
International portfolio and deposit data	Transfers of assets overseas that remain undeclared to (source) tax authorities	Wire transfer	Any source	Narrow
Trade gap analyses	Money moved (or retained) abroad due to mis-invoicing	Trade-based money laundering	Any source	Narrow
Transfer price analyses	Profits shifted due to aggressive transfer pricing	Transfer mis-pricing	Corporate profits	Broad
Trade price deviation analyses	Combination of trade gap and transfer price analyses	Combination of trade gap and transfer price	Any source	Broad
Gravity model deviations	Money sent to a jurisdiction solely for its secrecy	Wire transfer	Any source	Narrow
Walker model	Money generated illegally (or illegally withheld from state) that crosses a border	Any channel	Any illegal source	Narrow
Structural models	Estimates of illicit finance that is laundered	Any channel	Any illegal source	Narrow

Source: Author's summary and elaboration of estimation methods, along with assessment of their appropriate classification.

Note: This table lists various methods of estimating illicit financial flows (IFFs), the types of flows, sources, and channels they likely measure, and the most appropriate definition of IFFs they measure, as determined by the author.

Trade Gaps and Trade Misinvoicing

There is a large economic literature on the determinants of trade mis-invoicing. One component focuses on how measures of the trade gap change as the incentives to evade increase. [Fisman and Wei \(2004\)](#) found that the evasion gap between Hong Kong exports and Chinese imports is positively correlated with Chinese tax rates. Similar studies have been conducted in India ([Mishra, Subramanian, and Topalova 2008](#)), in Kenya, Mauritius, and Nigeria ([Bouet and Roy 2012](#)), and cross-nationally ([Kellenberg and Levinson 2019](#)), all yielding similar results. [Vézina \(2015\)](#) found that trade discrepancies in exports of natural resources are more likely to occur when export controls are in place. [Yang \(2008\)](#) found that efforts to curb tariff evasion in the Philippines reduced evasion gaps but were displaced by other forms of tariff evasion, such as importing into an special export-processing zone with tariff

Table 2. Links between Forensic Studies and IFF Channels, Sources and Risk Factors

Study	Risk factor identified	Outcome	Channels	Sources	Notes
Trade gaps and trade mis-invoicing					
Fisman and Wei (2004)	Import taxes	1% increase in tax rate = 3% increase in trade gap Higher trade gaps	Trade-based money laundering (TBML) TBML	Tax/tariff evasion Tax/tariff evasion	Import taxes on Hong Kong shipments to China India
Mishra, Subramanian, and Topalova (2008)	Export processing zones	Higher trade gaps	TBML	Tax/tariff evasion	Philippines
Yang (2008)	Differentiated products	1.3% increase in trade gap	TBML	All potential sources	Germany to Eastern Europe (1992–2003)
Javorcik and Narciso (2008)	• Tariff rates • Trading partner with significant percentage of co-ethnics	Higher trade gap	TBML	Tax/tariff evasion; potentially all other sources of IFFs	China and trade partners
Rotunno and Vézina (2012)					
Bouet and Roy (2012)			TBML		Kenya, Mauritius, and Nigeria
Vézina (2015)	Export controls	Higher trade gaps (36–50%)	TBML		Global; effects higher for more corrupt countries and those that had higher levels of customs official bribes (WEF Expert Opinion Survey, 2010)
Rijkers, Baghdadi, and Raballand (2015)	Politically connected firms	Higher trade gaps	TBML	Tax/tariff evasion; corrupt proceeds; potentially all other sources of IFFs	Tunisia
Kellenberg and Levinson (2019)	• Export/import tariffs or taxes • Poor auditing standards • Corruption • Lack of a trade agreement	Higher trade gaps	TBML	Tax/tariff evasion; corrupt proceeds; potentially all other sources of IFFs	Global

Table 2. continued

Study	Risk factor identified	Outcome	Channels	Sources	Notes
Sequeira (2016)	<ul style="list-style-type: none"> • Tariff rates • Bribe payments to customs officials 	Higher trade gaps	TBML	Tax/tariff evasion; potentially all other sources of IFFs	Mozambique and South Africa
Worku, Mendoza, and Witelhouwer (2016)	<ul style="list-style-type: none"> • Tariff rates • Levels of corruption (in both sending and receiving) 	Higher trade gaps	TBML	Tax/tariff evasion; corrupt proceeds; potentially all other sources of IFFs	SSA
Javorcik and Narciso (2017)	Lack of WTO accession (customs valuation agreements)	Higher trade gaps	TBML	Tax/tariff evasion; potentially all other sources of IFFs	Global
Illegal capital flight and money laundering					
Shortland (2012)	Unexpected economic development	Satellite-based measures of economic growth in pirate-held areas	All, including legitimate transfers	Criminal proceeds (ransom money)	Somalia
Chernykh and Mityakov (2017)	Banks make high percentage of payments to tax haven/secret jurisdictions	Higher rates of money laundering charges, estimated tax evasion	Legitimate transfer of money/assets to a tax haven	Criminal proceeds; potentially all sources of IFFs	Russian banks
Badarizna and Ramadorai (2018)	Political risk	Higher amounts of capital flight to overseas property markets	All, including legitimate transfers	All, including licit sources	London/NY property market, all potential source countries
Oliver, Jablonski, and Hastings (2017)	Unexpected increases in commodity prices	Commodity prices in areas associated with Somali piracy	All, including legitimate transfers	Criminal proceeds (ransom money)	Somalia
Profit shifting, transfer pricing (and transfer pricing abuse)					
Huizinga and Laeven (2008)	Import taxes; higher corporate tax rates (relative to other countries with multinational presence)	Lower reported profits	Transfer price abuse	Aggressive tax avoidance or tax evasion	European multinationals

Study	Risk factor identified	Outcome	Channels	Sources	Notes
Fuest and Riedel (2012)	Firm has related subsidiary or parent in a tax haven	Lower reported profits	Transfer price abuse	Aggressive tax avoidance or tax evasion	
Jansky and Prats (2015)	Firm has related subsidiary or parent in a tax haven	Lower reported profits	Transfer price abuse	Aggressive tax avoidance or tax evasion	
Liu, Schmidt-Eisenlohr, and Guo (2017)	Territorial system of taxing foreign profits	Lower reported profits	Transfer price abuse	Aggressive tax avoidance or tax evasion	United Kingdom
Johannesen, Torslöv, and Wier (2017)	Higher corporate tax rates (relative to other countries with multinational presence)	Lower reported profits	Transfer price abuse	Aggressive tax avoidance or tax evasion	Developing countries
Wier (2018)	Higher corporate tax rates (relative to other countries with multinational presence)	Lower reported profits	Transfer price abuse	Aggressive tax avoidance or tax evasion	South African-based subsidiaries
Private tax evasion and hidden wealth					
Johannesen and Zucman (2014)	Lack of a bilateral exchange of information (EOI) treaty	Higher levels of offshore wealth held in a tax haven	Legitimate transfer of money/assets to a tax haven, potentially other channels	Tax evasion, potentially other sources	Evidence suggests that bilateral EOIs largely displace offshore wealth rather than leading to a repatriation
Gorea (2015)	Lack of EOI	Higher levels of offshore wealth held in a tax haven	Legitimate transfer of money/assets to a tax haven, potentially other channels	Tax evasion, potentially other sources	Evidence suggests that bilateral EOIs largely displace offshore wealth rather than leading to a repatriation

Table 2. Continued

Study	Risk factor identified	Outcome	Channels	Sources	Notes
Caruana-Galizia and Caruana-Galizia (2016)	Lack of withholding tax on undeclared wealth	Higher levels of offshore wealth held in a tax haven	Legitimate transfer of money/assets to a tax haven, potentially other channels	Tax evasion, potentially other sources	Evidence suggests that withholding taxes largely displace offshore wealth rather than leading to a repatriation
Omartian (2016)	Lack of automatic exchange of information	Higher levels of offshore wealth held in a tax haven	Legitimate transfer of money/assets to a tax haven, potentially other channels	Tax evasion, potentially other sources	Overall reduction in overseas undeclared wealth
Alstadsæter, Johannessen, and Zucman (2019)	High levels of wealth	Higher propensity to appear in the Panama Papers database	Legitimate transfer of money/assets to a tax haven, potentially other channels	Tax evasion, potentially other sources	Denmark, Norway, and Sweden
Andersen et al. (2017)	<ul style="list-style-type: none"> • High natural resource (petroleum) rents • Source country is an autocracy 	An increase in cross-border banking deposits in tax havens	Legitimate transfer of money/assets to a tax haven, potentially other channels	Tax evasion, theft of state resources	Relies on BIS Locational Banking Statistics; outcome is driven by autocracies
Johannessen et al. (2018)	Lack of EOI, amnesty programs	Higher levels of offshore wealth held in a tax haven	Legitimate transfer of money/assets to a tax haven, potentially other channels	Tax evasion, potentially other sources	
Londoño-Vélez and Ávila-Machecha (2018)	Increase in wealth taxes/lack of amnesty	Higher propensity to appear in the Panama Papers database	Legitimate transfer of money/assets to a tax haven, potentially other channels	Tax evasion, potentially other sources	Colombia

Source: Author's summary of the cited studies, together with author's assessment of each study's classification.

Note: The table lists each study discussed in the article, the risk factors associated with illicit financial flows (IFFs) that the study identifies, the outcome measure used to proxy for IFFs, the likely channels and sources that are covered, and any context-specific information.

exemptions. [Javorcik and Narciso \(2008\)](#) determined that evasion is more responsive when the taxed products are differentiated and hence harder for customs officials to gauge whether the price has been understated or overstated.

Corruption is also found to be a predictor of evasion gaps ([Worku, Mendoza, and Wielhouwer 2016](#); [Kellenberg and Levinson 2019](#)). [Sequeira \(2016\)](#) found a similar connection between tariff rates, bribe payments to customs officials, and evasion gaps in the Mozambique to South Africa trade corridor. [Javorcik and Narciso \(2017\)](#) showed that evasion gaps are reduced by the customs valuation agreements imposed by WTO accession.

There is a connected line of research showing that trade gaps are more likely for certain types of economic actors. [Rotunno and Vézina \(2012\)](#) found that the semi-elasticity between tariff rates and missing exports is higher between China and countries where a higher percentage of the population is ethnically Chinese, suggesting that trade along these routes is more likely to be subject to abusive practices. Mispricing could also be more frequent among firms that are less likely to be subject to scrutiny by the state: [Rijkers, Baghdadi, and Raballand \(2015\)](#) found that politically connected firms in Tunisia were more likely to engage in under-invoicing.

Illegal Capital Flight and Money Laundering

In an ingenious study of Russian banks, [Chernykh and Mityakov \(2017\)](#) used central bank data to construct an “exposure index” based on the proportions of payments that banks make to tax havens in a year. They found that bank exposure to less scrupulous tax havens is correlated with an increase in an index of tax evasion, constructed using the deviation between an employee’s official salary and the value of their car. Moreover, they found that firms which are more closely connected to banks using tax havens also score higher on the tax evasion index. Banks that engage more readily with tax havens are also more likely to subsequently face money laundering charges or have a criminal investigation brought against their top managers, suggesting that some of the transactions that these banks had made are likely to have been illicit.

Researchers have also attempted to detect capital flight by looking for changes in the prices of assets that are likely to be in high demand by people who are moving their money out of a country. For example, [Badarinsa and Ramadorai \(2018\)](#) found that when a country’s political risk goes up, there is a concurrent rise in the price of real estate in neighborhoods in New York and London that have a relatively large share of residents from that same country. The interpretation is that political instability leads people to stash their money in safe assets (e.g., property) in areas where they have pre-existing connections and that the increased demand for such assets leads to the observed increase in prices. As with many studies of this type, it is impossible to tell whether this capital flight is actually illicit. A significant amount of (presumably foreign-owned) property in cities such as London is purchased via

anonymous offshore shell corporations, arrangements that are significantly more likely to come under criminal investigation ([Transparency International 2016](#)).

Several studies have attempted to find evidence of laundered or illicit assets within the context of Somali piracy, although these do not strictly qualify as cross-border IFFs. [Shortland \(2012\)](#) investigated how satellite-based measures of economic growth show that geographic areas connected to Somali pirate groups see improvements in local economic conditions. Similarly, [Oliver, Jablonski, and Hastings \(2017\)](#) investigated how ransom disbursements coincide with changes in commodity prices in areas of Somalia associated with piracy.

Private Tax Evasion and Hidden Wealth

A growing strand of literature focuses on identifying what happens to hidden wealth when destination countries are forced to reveal information about its source or ownership. Using data from the Bank of International Settlements (BIS) locational banking statistics (bilateral data on the amount of deposits in country A held by residents of country B), [Johannesen and Zucman \(2014\)](#) investigated the impact of the signing of bilateral exchange of information (EOI) treaties on cross-border wealth held in tax havens. They found that bilateral treaties tend to reduce offshore deposits in signatory countries but that this effect is largely counterbalanced by a shift of deposits to tax havens which have not signed up to an EOI treaty. While it is impossible to know what share of such shifting wealth is illicit (e.g., part of a tax avoidance scheme), the behavioral response to the introduction of a treaty suggests that it is nonnegligible. Likewise, bilateral efforts to crack down on unreported wealth, such as the USA-initiated drive that began in the late 2000s, have been shown to have an impact on reported wealth ([Johannesen et al. 2018](#)).

Similarly, the results of studies using other measures of indirect wealth—such as official statistics ([Gorea 2015](#)) or leaked data from tax havens ([Caruana-Galizia and Caruana-Galizia 2016](#))—suggest that standard bilateral EOI treaties or larger initiatives such as the EU Tax and Savings Directive displace, rather than reduce, hidden wealth. However, unpublished work by [Omartian \(2016\)](#) using data leaked as part of the Mossack Fonseca/Panama Papers scandal suggests that adoption of the OECD Common Reporting Standard, which requires automatic exchange of information, does lead to a reduction in assets held offshore.

The recent high-profile leaks of sensitive data from banks and law firms have also been used to examine whether or not the risk of cross-border tax evasion increases with wealth. In a recent study, [Alstadsæter, Johannesen, and Zucman \(2019\)](#) matched detailed data leaked from HSBC Switzerland and from Mossack Fonseca to estimate the incidence of undeclared wealth and use of offshore shell companies across the wealth distribution in Denmark, Norway, and Sweden. They found a sharp increase in (presumed) tax evasion (95 percent of the Swiss accounts were not

declared) and use of shell companies by the ultra-rich, behavior that had not been detected in randomized audits by the Scandinavian authorities. Using a similar method, [Londoño-Vélez and Ávila-Machecha \(2018\)](#) found that offshore entities connected to Colombian taxpayers increased as wealth taxes in Colombia grew, and that after an individual opens up a new offshore entity the total value of assets they declare to the tax authority fell by nearly 11 percent on average.

The release or acquisition of information itself can lead to changes in behavior, as tax evaders anticipate future enforcement when tax authorities gain access to confidential information. [Bethmann and Kvasnicka \(2016\)](#) found that voluntary disclosures of wealth by residents of the German state of North Rhine-Westphalia increased after local tax authorities purchased confidential data on Swiss bank account holders.

Hidden wealth has also been shown to be correlated with natural resource rents. Using BIS data, [Andersen et al. \(2017\)](#) showed that an increase in petroleum rents (driven by increases in the global oil price) leads to an increase in wealth held in tax havens by citizens of autocratic, oil-producing countries.

Profit-Shifting and Transfer Pricing Abuse

While it is difficult to use aggregate data to estimate financial flows driven by transfer pricing abuse, economists have been successful in using econometric methods to detect behavior consistent with transfer pricing abuse and aggressive profit-shifting. Using detailed micro-data on European multinationals, [Huizinga and Laeven \(2008\)](#) found that companies report fewer profits in jurisdictions where the tax rate is higher than the rates other affiliates face. [Johannesen, Tørslov, and Wier \(2017\)](#) extended this analysis to a global set of multinationals, finding that evidence of profit-shifting is higher among developing countries.

As there is evidence that tax havens allow firms to efficiently avoid taxes ([Bennedsen and Zeume 2015](#)), multinationals with connections to tax havens may be more likely to engage in profit-shifting. [Fuest and Riedel \(2012\)](#) and [Jansky and Prats \(2015\)](#) have both found evidence in a number of developing countries that multinationals with such connections report fewer profits and pay less tax.

The type of tax regime that a country has in place influences the propensity of companies to engage in profit-shifting. [Liu, Schmidt-Eisenlohr, and Guo \(2017\)](#) found evidence of transfer pricing among UK-based multinational firms using methods similar to those of the aforementioned studies, but they also found that the relationship between relative tax rates and profit-shifting became stronger when the UK authorities moved from a worldwide to a territorial system of taxing foreign profits.

Evidence of profit-shifting is not in itself sufficient evidence that abusive transfer pricing practices are at play, but it does suggest that corporations are rationally arranging their operations in a way that minimizes their tax burden in high-tax jurisdictions. To investigate this hypothesis, researchers typically combine the

methods used by [Huizinga and Laeven \(2008\)](#) and [Johannesen, Tørslov, and Wier \(2017\)](#) with data on actual or imputed transfer prices, as described above in the subsection on transfer price analyses ([Bernard, Jensen, and Schott 2006](#); [Vicard 2015](#); [Cristea and Nguyen 2016](#); [Liu, Schmidt-Eisenlohr, and Guo 2017](#); [Davies et al. 2018](#); [Wier 2018](#)).

5 Current Policy Efforts to Curb IFFs

The expansive definition of IFFs has given rise to quite a large and diverse set of policy efforts to fight these flows. This section briefly covers some of the domestic and international efforts on this front, including some methods used to measure the efforts.

Fighting the Sources of Illicit Flows

The first set of policy efforts can broadly be thought of as attempts to stop the illegal activities that give rise to IFFs. This includes work on fighting “standard” crimes such as drug and people trafficking, violent crime, theft, and terrorism. These crimes are typically dealt with by local law enforcement agencies, although international organizations such as the United Nations Office on Drugs and Crime and the myriad multilateral counter-terrorism groups play a major role in coordinating efforts around curbing criminal activities with a cross-border element.

Domestic tax evasion can be another precursor to illicit flows. Efforts to increase domestic tax compliance include adopting or adjusting specific tax regimes in order to encourage compliance, such as introducing or adjusting value-added tax ([Pomeranz 2015](#)), encouraging voluntary compliance ([Luttmer and Singhal 2014](#)), and broader endeavors to increase tax administrations’ ability to detect tax evasion ([Keen and Slemrod 2017](#)) through risk assessments and audits. However, when tax evasion or avoidance is inherently cross-border (as it would be when undeclared wealth is earning interest overseas or when a corporation uses abusive transfer pricing techniques), the tax authority will be limited by its ability to obtain taxpayer information from overseas.

Corruption can also be a source of IFFs, and international conventions such as the UN Convention Against Corruption, the OECD Anti-bribery Convention, and the USA’s Foreign Corrupt Practices Act have been used to establish norms and best practices around preventing corrupt practices. Many countries around the world have established anti-corruption offices, which are government agencies specifically tasked with examining and investigating government corruption, although their efficacy is likely to be context-specific. Specific interventions have typically focused on increasing transparency concerning politicians’ finances and conflicts of interest

as well as the financial decisions made by governments (Djankov et al. 2010). In areas where there is a perception of increased risk of corruption, such as the natural resources and mining sectors, initiatives such as the Extractive Industries Transparency Initiative have attempted to shed more light on the contracts signed between governments and the private sector as well as the flow of subsequent revenues.

Making the Formal Financial Sector More Hostile to IFFs

When illicit activity cannot be staunched, the formal financial sector is a common conduit for the resulting flows. The large banking scandals involving money laundering and sanctions violations in recent years suggest that this remains a sizable problem (Collin, Cook, and Soramäki 2016). As a result, policymakers have focused on making the financial sector as inhospitable for IFFs as possible. These efforts come mainly in the form of AML regulations, for which common standards are now set by the FATF. The FATF has produced 40 recommendations of actions for governments to take, such as to implement international AML conventions, to make money laundering itself a crime, to promote due-diligence efforts in the public and private sectors, to establish special institutions (known as financial intelligence units) to fight money laundering, and to increase cooperation between law enforcement agencies in different jurisdictions (Financial Action Task Force 2012).¹⁷ These actions also include putting pressure on the financial sector or related industries to report suspicious transactions to authorities and to collect and share beneficial ownership information when it is requested. There has been near-universal adoption of FATF standards across the globe, although many jurisdictions are not fully compliant with the 40 recommendations.¹⁸

In the following, three ways in which AML institutions or underlying risks are commonly measured—by the FATF, by the US State Department, and by countries themselves—will be detailed.

FATF Mutual Evaluation Reports

To judge how countries are performing against its recommendations, the FATF facilitates a review of each country's effort in fighting money laundering. Members of what are called "FATF-style regional bodies" are subject to mutual evaluations every five to ten years. Over an 18-month process, expert groups assess the extent to which countries are compliant with FATF's recommendations. Countries are rated as non-compliant, partially compliant, largely compliant, or compliant. Much like the FSI, FATF's Mutual Evaluation Reports (MERs) are likely to be reasonable estimates of how conducive a country is for money launderers. However, to date there has been no attempt to link FATF ratings to any indicators of money laundering (actual or constructed). Furthermore, the infrequency of MERs and follow-up reporting and the lack of any consolidated database of MER results make it difficult to construct a

useful time-varying measure of risk from this exercise. Finally MERs can be thought of as assessments of overall money laundering risk, including the risk of internal money laundering, which does not qualify as an IFF under standard definitions. However, flows either entering or leaving countries that score poorly on MERs might be considered at risk for being illicit flows.

With regard to the channels of IFFs, the FATF recommendations are largely focused on ensuring that both the facilitators of cross-border financial transactions (mainly banks) and the methods used for those transactions (e.g., wire transfers and money orders) are secure and not at risk of abuse. However, many FATF recommendations deal with a country's overall ability to detect and address suspicious cross-border activity, which is likely to affect all potential IFF channels to some degree. In terms of sources of IFFs, the FATF recommendations have a keen focus on criminal money laundering, terrorist financing, and money handled by those in political power, but they have the potential to affect all potential sources of IFFs.

It is unclear whether lack of compliance with FATF standards, as measured by MERs, is likely to be a strong predictor of actual illicit behavior. While FATF-compliant countries tend to be more prosperous (see [fig. 1](#)) and less corrupt, this tells us very little about their actual propensity for IFFs. What little evidence there is suggests that national FATF compliance may not strongly affect the decisions of the private sector when it comes to dodgy behavior: a study by [Findley, Nielson, and Sharman \(2014\)](#) found that when approached, corporate service providers in countries that scored well on MERs were just as likely to offer offshore services without the required due-diligence checks as those in countries with low scores. Furthermore, countries that score well on MERs appear more likely to make use of offshore shell corporations based in tax havens, even accounting for differences in income ([Collin 2016](#)).

International Narcotics Control Strategy Reports

Every year the US Department of State produces an International Narcotics Control Strategy Report (INCSR), which contains an expert (though largely desk-based) assessment of countries' susceptibility to money laundering abuse. This includes an assessment of 23 actions (mainly laws and regulations) and designation of a subset of countries as "jurisdictions of primary concern." As with previous exercises, it is hard to discern how closely the INCSR assessments are correlated with underlying illicit flows. While INCSRs are largely focused on the proceeds of drug trafficking as a source of IFFs, the 23 actions they assess, similar to the FATF's recommendations, are likely to affect all potential sources and channels of IFFs.

National Risk Assessments

The FATF requires countries to identify and assess the money laundering and terrorist financing risk that they face. National Money Laundering and Terrorist Financing

Risk Assessments (NRAs) are comprehensive expert assessments of the degree to which an economy risks abuse by either money launderers or terrorist financiers. Although countries have been performing these kinds of assessments for a number of years, recent FATF guidance concerning the structure and format of NRAs has led to an increase in their use. As per the FATF guidelines, NRAs consider country-level risks to be a function of three factors: the underlying threat of money laundering, the vulnerability of the economy to money laundering abuse, and the consequences that money laundering (or terrorist financing) might have on the country. Countries undergoing an NRA exercise typically form an “expert team” or “working group,” comprising experts from relevant agencies who assess these three factors using all available information and data. Many developing countries use a standardized toolkit designed and supported by the World Bank to conduct these risk assessments. At present, NRAs are conducted too infrequently and idiosyncratically to produce comparable cross-country data on IFF risk.

Helping Governments Detect and Track Down IFFs

International borders create a substantial information asymmetry problem for tax authorities and financial intelligence units. It can be difficult, for instance, for a tax authority to determine whether a specific taxpayer holds untaxed assets overseas or if the subsidiary of a multinational corporation is reporting the majority of its profits in an offshore financial center. Similarly, if an anti-corruption agency wants to know whether a local politician is the true owner of a shell corporation that just bought property in London, it will be unable to find answers without assistance from the British authorities.

To overcome the asymmetry problem, there have been recent efforts to increase information sharing between relevant government agencies (sometimes referred to as “competent authorities”). Tax authorities can form bilateral and multilateral arrangements with other competent authorities for the purpose of sharing information, either by requesting information on specific taxpayers (known as exchange of information on request, or EOIR) or through the automatic receipt of information on all relevant taxpayers on a regular basis (known as automatic exchange of information, or AEOI). A recent addition has been the move to require parent multinational companies to file country-by-country reports (CBCR) in their home jurisdiction, detailing aggregate information on the profits, tax payments, and operations of their subsidiaries in every jurisdiction of operation. The creation and proliferation of standards and legal frameworks for AEOI, EOIR, and sharing CBCR are promoted by initiatives such as the Global Forum on Transparency and Exchange of Information for Tax Purposes and the OECD Base Erosion and Profit Shifting action plan.

Finally, when illicit flows that involve stolen assets are detected ex post, repatriating lost revenue or government resources can be legally difficult. Programs such as the Stolen Asset Recovery Initiative (StAR), a collaboration between the United Nations Office on Drugs and Crime and the World Bank, assist countries in requesting legal assistance from other jurisdictions to freeze and repatriate stolen assets.

Many of the policies described here have not yet been subject to careful empirical investigation, although some of them have been examined in the forensic literature discussed earlier.

6 Reconciling and Advancing Research on IFFs

Despite the considerable number of studies dealing with IFFs, rigorous research on the topic is still in its infancy. This section discusses a few directions in which the research might progress if it is to become more coherent and useful for detecting and fighting IFFs.

Efforts to Verify the Scale and Scope of Actual IFFs

The three broad approaches surveyed here share a similar limitation: a lack of data on the underlying phenomenon. Without reliable, representative data on actual illicit activity, the estimates will inevitably contain an unverifiable amount of error, which will limit their usefulness for determining the scale of illicit flows and in identifying areas of urgency. Refinements to existing methods might help to reduce the error. For example, recent revisions to GFI's methodology have led to a reduction in their global estimates of IFFs. However, these refinements can carry with them a false sense of precision; without the ability to calibrate or compare the estimates with actual numbers, the effects of methodological improvements will always be in the abstract.

It would then seem that uncovering better data on actual IFFs should be a priority. On a micro scale, randomized audits could play a role. For any population that could be contaminated by IFFs (e.g., taxpayers, exports, or financial transactions), a randomized audit can uncover the true amount that was illicit, as well as the underlying characteristics that predict it. For example, [Alstadsæter, Johannesen, and Zucman \(2019\)](#) combined randomized audits and leaked tax haven data to determine that high levels of wealth predict greater levels (and proportions) of tax evasion.

There are limits to this approach; audits are expensive and can cover only specific populations in specific contexts. Those wishing to quickly verify global estimates of IFFs will not find this approach satisfactory. The process would be slowed down even further by the fact that randomization omits any risk criteria that investigators might have used to select their audit sample, and so may be an inefficient way to detect illicit behavior.¹⁹ Finally, while audits are considered to reveal the “truth”

in many contexts, they are less likely to pick up cross-border activity ([Alstadsæter, Johannesen, and Zucman 2019](#)). Despite these limitations, combining estimates of IFFs with actual audit data could be a useful way to gain understanding of how robust the estimation methods really are.

In addition to carefully targeted attempts to verify IFF estimates, more work could be done to compare existing estimates (or construct new ones) using proprietary or government-generated data sources. Governments and multilateral institutions gather and control many sources of data that are pertinent to the study of illicit flows, ranging from crime data to suspicious transactions reports to more detailed trade and firm data. Such data could be used to improve upon the forensic methods and evidence presented earlier in the article. The refinement process is likely to continue in the piecemeal way it has so far, but more gains may be achieved with a more concerted effort by governments and multilateral organizations to share and link data.

The Dashboard Approach to Illicit Financial Flows

Aggregating IFFs into a single number may not make much sense. As discussed earlier, certain types of flows may be easier to measure, or there may be more demand for measuring them. Estimates can sometimes conflate sources and channels or double count. This could make certain problems seem worse than others solely because they are more readily measured. While having a single global number may seem desirable from the perspective of tracking progress, such numbers can convey a false sense of precision and make it more difficult to understand whether policy efforts are actually having an impact on illicit flows. Instead, research and measurement work would be more fruitful if a “dashboard” approach to IFFs is taken ([Ravallion 2011](#)), such that efforts to measure different sources and channels are both considered and improved upon separately.

Taking Lessons from the Impact Evaluation

Although research on IFFs is growing in scope and sophistication, the focus has been largely descriptive so far. Even the forensic results are somewhat limited in their ability to causally connect changes in policies to reductions in estimates of IFFs. This is often a consequence of the scale of these studies—causal identification for cross-country studies is a difficult problem. Ignoring the issue of noise in IFF estimates, many of the studies involving risk factors fall victim to the [Lucas \(1976\)](#) critique that even if a change in a risk factor is associated with a change in the outcome of interest, policies which affect that risk factor may not lead to actual changes in the outcome.

Carefully designed impact evaluations, particularly those that rely on experimental or quasi-experimental methods, could help shed more light on the policies

that are most effective at fighting IFFs. This approach is already becoming more popular in areas closely associated with IFFs, including tax compliance (Hallsworth 2014; Pomeranz 2015; Carrillo, Pomeranz, and Singhal 2017), corruption (Olken 2007), and regulatory compliance (Duflo et al. 2013). The concern that changes in certain characteristics seen in many forensic studies may also lead to changes in the measurement error of IFFs was discussed above. A further benefit of relying on rigorous, well-identified studies is that they more often focus on very specific policy changes, which are likely to have a more direct effect on the outcome of interest.

Turning to Structural Methods

Where causal or direct estimates are difficult or impossible to obtain, the IFF research agenda may benefit from techniques developed in other areas concerned with estimating unobserved, latent phenomena. As discussed previously, there are already similarities between IFF research and the literature on measuring the informal economy. Indirect structural methods such as the “multiple indicators, multiple causal” (MIMIC) approach, which are popular in the latter literature, might both allow for the construction of meaningful estimates and solve the interpretation problem posed in the section on forensic studies. However, without calibration with actual underlying data, structural methods for estimating latent variables will not escape criticism (Feige 2016; Kirchgässner 2017).

Opening up Methods and Data to Verification and Replication

To date, although most estimates of the volume of IFFs are available to the public, the underlying data and code used to calculate them are not. Given that economic research is facing a replication crisis similar to, albeit less severe than, that of other social sciences (Chang and Li 2017), opening the data and code up to the public could have a number of benefits. Many estimates, especially those involving the manipulation of detailed bilateral trade data, entail substantial fixed costs for any researchers wishing to calculate new figures or replicate older ones. Recent work by Nitsch (2016) has suggested that small changes to underlying assumptions can have large implications for the resulting estimates. Sometimes, as in the case of UNCTAD’s study on gold exports from South Africa, the resulting revision to estimates can be substantial (Forstater 2017a). As assumptions are difficult to investigate without the source data and code, estimates often enter the public debate before they have been externally verified. Increasing the transparency around these calculations might also make it easier for researchers to discuss ways to improve them for future iterations.

Looking at the Impact of IFFs on Source and Destination Countries

The majority of the studies discussed in this article attempt to either measure IFFs or examine their determinants. As laid out in the introduction of this article, the reasons that economists and policymakers should be concerned with IFFs stem from their potential negative impacts on both sending and receiving economies. As measurement of IFFs improves, a natural next step will be to examine these negative impacts, which at this stage are largely theoretical. Current estimates have mostly focused on lost tax revenue due to base erosion and profit-shifting (Crivelli, De Mooij, and Keen 2016; Cobham and Jansky 2018) or interest on undeclared wealth (Zucman 2013). There is considerable room for further research on other negative impacts, such as market distortions driven by incoming illicit flows, distortions in policymaking due to incomplete information on financial flows, and whether or not underlying criminal activities are elastic with respect to the ability to channel ill-gotten gains overseas.

7 Conclusion

Many will find the term “illicit financial flows” to be arbitrary and overly broad. However, this concept can still be useful for broadly classifying cross-border flows that deserve further attention from researchers and policymakers. As IFFs represent a diverse, disparate group of activities and flows, it would make sense to break the definition down into specific, manageable problems and lines of inquiry.

This article has attempted to survey the current state of thinking about the definition of IFFs and to present and critique methods of measuring and investigating such flows. While this review is not fully comprehensive, it should nevertheless be indicative of the empirical state of knowledge around the issue of IFFs. Finally, the article has suggested some potential ways forward for the IFF research agenda, largely relying on a bottom-up approach to validating estimates and considering specific types of flows. While top-down estimates might be more useful for garnering attention to and support for the issue, bottom-up approaches can potentially yield more effective policies for dealing with illicit flows.

Notes

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1. [Salomon and Spanjers \(2017\)](#) estimates illicit flows from developing countries to have been nearly \$1 trillion in 2014. In a recent report for the United Nations Office on Drugs and Crime, [Pietschmann and Walker \(2011\)](#) estimated total money laundering to be approximately \$1.5 trillion a year as of 2009, although it is not clear what proportion of this would qualify as illicit flows under prevailing definitions.
2. Other negative consequences might include increases in inequality driven by untaxed offshore wealth, market distortions driven primarily by the demand for illicit flows to remain hidden, such as real estate bubbles or tax haven services, and finally distortions in official statistics and lack of government influence over financial flows, both of which can impede macroeconomic forecasting and planning.
3. This is the definition followed by the non-governmental organization Global Financial Integrity, the International Monetary Fund, and the World Bank.
4. The use of “sources” and “channels” as ways of characterizing IFFs was developed by Peter Reuter.
5. A flow will also qualify as an IFF if its ultimate use is illegal. The most commonly cited illicit use of cross-border funds is terrorist financing.
6. “Abuse” in this context is often ill-defined, but a common metric is whether or not a transaction between subsidiaries deviates from the arms-length principle—that related firms should transfer goods at the same price as they would have if they had been unrelated.
7. One way of restricting the range of funds that might be classified as IFFs due to illegal use would be to consider only funds transferred for the sole purpose of that use.
8. The working paper of [Johannesen and Pirttilä \(2016\)](#) provides a useful summary of methods for estimating various forms of capital flight or IFFs.
9. GFI updated this markup from 10 percent to 6 percent following updates to the OECD International Transport and Insurance Cost (ITIC) database.
10. Until its most recent publication, for a subset of countries with lack of data coverage or idiosyncratic errors in their bilateral statistics, GFI used global comparisons rather than bilateral ones ([Forstater 2017b](#)).
11. This change was made after criticism by [Kessler and Borst \(2013\)](#).
12. The GER method discussed earlier might also pick up transfer mis-pricing when exports or imports are routed through marketing hubs.
13. [Zucman \(2013\)](#) uses a constructed dataset, namely the “External Wealth of Nations” produced by [Lane and Milesi-Ferretti \(2007\)](#).
14. The formula is $FSI = (\text{Secrecy Score})^3 \times 3\sqrt{\text{of Global Scale Weight}}$.
15. In reality, the weighting is highly subjective and somewhat arbitrary. The author notes that he has twice been part of an expert panel that reviews the AML Index on an annual basis.
16. The results here use GER and hot-money-narrow results published by the GFI in 2017 ([Salomon and Spanjers 2017](#)), as this is the latest year in which GFI released both its GER and hot-money-narrow calculations at the country level.
17. Since 2014, the FATF has included indicators intended to capture the effectiveness of AML institutions, rather than focusing solely on technical compliance.
18. For the 46 countries that have been assessed against the 2012 FATF standards, the average country had a rating of “mostly compliant” or “compliant” for only 24 out of the 40 technical recommendations (author’s calculation).
19. A second approach might involve using existing estimates of IFFs and their risk indicators as the criteria for audit decisions. For example, recent research on trade gaps in Madagascar has suggested that with detailed data, specific products or firms could be targeted for further investigation by customs officials ([Chalendard, Raballand, and Rakotoarisoa 2019](#)).

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