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**Trillion Dollar Estimate:
Illicit Financial Flows from Developing Countries**

Volker Nitsch

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**Trillion Dollar Estimate:
Illicit Financial Flows from Developing Countries***

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Abstract

Recent estimates suggest that developing countries lose about 1 trillion US dollars each year due to illicit financial flows. This paper reviews the empirical methodology that underlies those estimates. Various critical aspects of the analytical approach are highlighted, focusing in particular on deficiencies in the use of mirror trade statistics to quantify the extent of capital outflows due to trade misinvoicing. Serious issues in the empirical analysis include, among others, arbitrary assumptions, mixed methodologies and skewed sampling. As a result, it is argued that the quantitative results obtained from those exercises have no substantive meaning. The trillion-dollar estimate of illicit financial flows from developing countries, therefore, lacks evidence and is uncorroborated.

Keywords: trade misinvoicing; mispricing; capital flight

JEL Code: F14; F38

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1. Introduction

In December 2014, the Washington, DC-based advisory organization Global Financial Integrity (GFI) published a report (Kar and Spanjers, 2014) in which they provide a detailed empirical assessment of the possible magnitude of illicit financial flows from developing countries. Applying various techniques to analyze official balance of payments and international trade data, GFI estimates that illicit flows of money out of developing countries amounted to 991.2 billion US dollars in 2012. In addition to this summary estimate, detailed results of illicit financial flows by country, by year and by method of measurement are provided.

In this paper, I review the methodology that underlies the GFI's estimates. In particular, I highlight various critical aspects of their analysis, adding to the more general discussion of issues in trade misinvoicing in Nitsch (2012). Overall, I conclude that the GFI estimates of illicit financial flows from developing countries lack evidence and are uncorroborated.

2. Challenges

The identification and estimation of illegal activities, such as moving money unrecorded out of a country, is a challenging task. Criminals seek to hide activities such that, almost by definition, official data does not exist. Still, economic techniques and statistical models may be applied to accessible information, including published data, in order to detect and quantify the extent of such activities. In this case, however, any estimate should be based on a methodology that displays at least the following four features.

Reasonable. Empirical attempts to analyze illegal activities typically require working assumptions. These assumptions, which include definitions, thresholds, and mechanisms, should be reasonable. Quantitative results which largely depend on questionable, unrealistic assumptions are only of limited value.

Unbiased. The empirical model that is used to detect illegal activities should yield unbiased results. Methodological features and design configurations which systematically affect estimation results in a particular direction should be avoided.

Consistent. The interpretation of the estimated empirical outcomes should be consistent. A selective analysis which emphasizes some (preferred) findings, while ignoring others, produces questionable and unconvincing conclusions.¹

Robust. The estimation results should be robust. Quantitative findings that turn out to be sizably affected by minor adjustments and changes in the empirical methodology or the use of new vintages of data are not trustworthy.

¹ Since an inconsistent analysis is likely to produce biased results, the two points seem to be related. However, suppose that a methodology yields unbiased empirical results. Inconsistencies in the application of this methodology or in the interpretation of the quantitative findings may then still invalidate the conclusions.

3. Assessment of the GFI Estimate

Global Financial Integrity apparently aims to meet these conditions in their attempts to quantify illicit financial flows from developing countries. As GFI is keen to emphasize, clearly-defined empirical methodologies are applied to analyze official, readily-available data.² Also, the policy of GFI to make earlier publications (and, therefore, earlier estimates) still available on their website adds to transparency.³

A proper assessment of the GFI estimate is complicated, however, by the fact that Kar and Spanjers (2014) provide only a shallow discussion of their analytical approaches. Since their report is the latest release in a series of annual updates of Kar and Cartwright-Smith (2008), readers are occasionally referred to earlier issues. In addition, methodologies have been regularly modified (and sometimes even mixed with previous approaches), making an analysis of procedures and results difficult.

In view of these problems, I begin with a description of the methodologies underlying the GFI's estimates. In particular, I focus on their analysis of mirror trade statistics (labeled by GFI as the Gross Excluding Reversals [GER] approach⁴). I then discuss their procedures in more detail and highlight a number of critical issues.

3.1 A Description of GFI's Methodologies

In their initial study of illicit financial flows from developing countries, Kar and Cartwright-Smith (2008) provide an overview of methods for estimating unrecorded capital transfers that have been applied in the literature. After a discussion of the advantages and disadvantages of the various analytical approaches, GFI combines the results from two different methods in order to derive their total estimates of illicit flows. While one of these methods is based on an analysis of balance of payments statistics or other macroeconomic data, the other approach explores international trade statistics.

GFI's annual estimates of a country's total illicit financial flows are computed by summing the numerical values obtained from the two conceptually distinct approaches (as long as the numbers indicate a capital outflow, otherwise they are set to zero). A discussion of whether the two components are indeed disjoint in practice, without any overlap, is not provided. Instead, it is argued that various combinations of the models are 'tested'; see, for example, Kar and Cartwright-Smith (2008, p. i).⁵

Table 1 lists GFI's benchmark estimates of illicit financial flows from developing countries in the most recent year at the time of publication, along with a (partial) decomposition of the

² By doing so, GFI allows replication of their results. Reproducibility is another important precondition for credibility.

³ See <http://www.gfintegrity.org/reports/>. The website also provides country-level estimates in spreadsheet format.

⁴ For simplicity and comparability, I often use the GFI's terminologies and acronyms.

⁵ Along similar lines, Kar and Freitas (2012, p. 9) note: "It is somewhat premature to make a definitive judgment as to which method provides a more accurate method for estimating illicit flows. [...] We invite our readers to provide comments on the two alternative methodologies and the reasons why one of them should be preferred over the other."

total estimate by the method of estimation. Two findings are noteworthy. First, there has been a change in the methodology for the analysis of macroeconomic data. In 2012, the World Bank residual method (CED) has been replaced by the hot money (narrow) approach (HMN), which was associated with a further reduction in the overall estimation result. Second, the analysis of international trade statistics has gradually increased in importance for the aggregate estimate. According to the most recent estimate, illicit financial flows due to trade misinvoicing account for about three fourths of the overall figure. In the following, therefore, I will focus on the GFI's analysis of mirror trade statistics.⁶

Table 1. Illicit Financial Flows by Method of Estimation

Date of publication	Final year of results	Estimate of illicit financial flows	Methods of Estimation	Estimate of Errors in Mirror Trade Statistics (GER)	Share of GER in total illicit financial flows
		mn. US\$		mn. US\$	%
December 2008	2006	1,056,000	CED, GER	–	–
January 2011	2008	1,440,167	CED, GER	634,900	44.1
December 2011	2009	902,843	CED, GER	475,690	52.7
December 2012	2010	858,843	HMN, GER	551,711	64.2
December 2013	2011	946,677	HMN, GER	763,444	80.6
December 2014	2012	991,245	HMN, GER	729,881	72.8

Notes: CED refers to the World Bank residual approach which compares a country's use and source of funds in a macroeconomic setting. HMN refers to 'hot money (narrow)' which is the net errors and omissions entry in the balance of payments statistics. GER refers to 'gross excluding reversals' which explores errors in mirror trade statistics.

Source: All estimates are compiled from various GFI publications.

It seems to be conventional wisdom that the misdeclaration of shipments in international trade documents (or, in short, trade misinvoicing) is a prominent channel for moving capital unrecorded out of a country; Bhagwati (1964) provides an early description of this phenomenon. In order to circumvent capital controls, a trader may, for instance, understate the value of its exports (export underinvoicing) and have the difference between the actual and the stated export values deposited abroad. Alternatively, a trader may overstate the value of its imports (import overinvoicing), with similar effects. Each international trade transaction,

⁶ In addition, it should be noted that GFI's estimates based on the HMN method are a country's entry on 'Net Errors and Omissions' in the International Monetary Fund's Balance of Payments Statistics and, therefore, not the quantitative outcome of an analytical exercise.

however, should be recorded twice, in the country of origin (as an export) and in the country of destination (as an import). As a result, trade misinvoicing is, in principle, empirically identifiable, as long as only one side of the transaction is affected by such behavior. Specifically, a comparison of entries of individual trade transactions in mirror trade statistics may provide a full quantification of such activities.⁷

GFI applies this basic logic on aggregate bilateral trade data between pairs of countries. Using annual data obtained from the International Monetary Fund's Direction of Trade Statistics, they compute, in their baseline approach, the difference between world imports from a country and the country's corresponding exports to the world. Any positive difference that is larger than 10 percent of a country's exports is then interpreted as a quantitative estimate of unrecorded capital outflows (due to export underinvoicing). Likewise, any positive difference between a country's imports from the world and the corresponding world exports to this country in excess of 10 percent of the export value is interpreted as an estimate of unrecorded capital outflows from this country (due to import overinvoicing). A country's total capital outflows due to trade misinvoicing are then computed as the arithmetic sum of the two measures.

For the quantitative results of this exercise, and their interpretation, four assumptions are crucial. First, only differences between export and import values that are above a critical threshold value of 10 percent of exports are considered as misinvoicing. This correction aims to take into account the customary procedure in international trade statistics that different valuation methods are used to compile export and import data. While the value of exports refers to fob (free on board) values, that is, the transaction value of the goods and the value of services performed to deliver goods to the border of the exporting country, import values are recorded as cif (cost, insurance, and freight) values, which additionally include the value of services performed to deliver the goods from the border of the exporting country to the border of the importing country.⁸ As a consequence, imports (cif) should exceed corresponding exports (fob) by definition. More importantly, quantitative results of the estimated extent of misinvoicing are directly proportional to the hypothesized ratio between the cif and fob values of a transaction. The larger the share of an observed difference between the trade values reported in import and export statistics that is explained by transportation costs, the smaller the unexplained difference is. Second, reasons other than transportation costs are considered to be irrelevant for the explanation of observed discrepancies in international trade statistics. Any difference between export and import values that is not attributed to bilateral

⁷ The key identifying assumption for trade misinvoicing is that faked transactions enter the trade statistics of the two countries involved in the transaction differently. The extent to which this specific type of misreporting behavior is indeed relevant for the transfer of capital, in contrast to other potential vehicles, such as using a faked invoice at both customs borders or hiding a transaction completely (i.e., smuggling), seems to be unknown. Fisman and Wei (2009) provide an interesting analysis along these lines for a specific product group, antique cultural goods, for which there are strong incentives to hide exports (since many countries restrict the shipments of such goods, which are often considered to be national treasures) while imports are likely to be cleared correctly (because of a risk of confiscation); see also Berger and Nitsch (2012) for a more general discussion.

⁸ See, for instance, chapter XIV in United Nations (2013).

transportation costs is automatically considered as evidence of misinvoicing and, thus, an illicit financial flow. Third, only positive differences between (adjusted) import values and their corresponding export values are considered as evidence of misinvoicing. By assumption, GFI's Gross Excluding Reversals (GER) approach ignores the possibility of bidirectional illicit financial flows and, therefore, does not allow, for instance, for a possible illicit repatriation of external funds. Fourth, the analysis of a country's aggregate trade with the world as a group is assumed to yield representative results for the misinvoicing behavior of a country's traders. While the faking of invoices is a transaction-specific phenomenon, it is argued that discrepancies in aggregate trade provide a lower-bound estimate of a country's illicit outflows since net outflows to some countries may be compensated by net inflows from others.

Not surprisingly, all these assumptions are, in principle, debatable. Therefore, beginning with Kar and LeBlanc (2013), GFI has modified its baseline methodology along two lines. For one thing, the comparison of mirror trade statistics between a country and the world as a group has been replaced by an analysis of mirror trade statistics between individual pairs of countries. This new methodological approach, however, is applied highly selectively. Instead of examining trade discrepancies for all trade partners of a country, only trade with a sample of 33 advanced countries is analyzed, with estimated outflows due to export underinvoicing and import overinvoicing then being scaled up by the country's total exports and imports, respectively. More importantly, the methodology applies to only 19 developing countries who report trade bilaterally to all advanced countries. For all other countries, the previous methodology, based on a country's aggregate trade, remains in use.

Another modification takes into account that discrepancies in mirror trade statistics may be caused by factors other than transportation costs and misinvoicing. In particular, a correction is made for re-exports through Hong Kong which mainly affects estimates of illicit financial flows from China.⁹ China was originally estimated to account for about one half of all illicit financial flows from developing countries; after the correction, 250 billion US dollars, or about 30 percent of the latest estimate of total illicit financial flows from developing countries, had disappeared.¹⁰

Even with these adjustments, however, GFI's estimates of illicit financial flows (due to trade misinvoicing) are crucially dependent on a number of controversial assumptions about errors in mirror trade statistics. I now discuss their methodology in more detail, confronting selected

⁹ Kessler and Borst (2013) provide an extensive discussion of the GFI's initial, implausibly large estimate of trade misinvoicing for China.

¹⁰ According to Kar and Freitas (2012, Table E), China is estimated to have lost annually about 274 billion US dollars in illicit financial flows over the period from 2001 to 2010, a sum that accounts for about 47 percent of all illicit financial flows from developing countries. After the correction for re-exports, the estimates in Kar and LeBlanc (2013, Table 4) indicate for China an average annual loss of 108 billion US dollars over the period from 2002 to 2011, reducing the share of total illicit financial flows that is attributed to China to about 18 percent.

features of their estimation procedure with the challenges which arise when quantifying hidden activities.¹¹

3.2 Discussion

The GFI's estimates of illicit financial flows due to trade misinvoicing are based on a comparison of stated export and import values in mirror trade statistics. While the statistics are constructed from official sources, the numerical entries in the matched data differ by definition such that the estimation outcomes depend on a proper identification and interpretation of errors in trade statistics.

Gross Excluding Reversals. A key driver of the GFI's estimate of illicit financial flows is their deliberate choice of focusing exclusively on capital outflows while ignoring capital inflows. From a (macroeconomic) policy perspective, the relevant figure seems to be how much capital leaves a country on a net basis.¹² Also, conceptually the assumption that some differences in mirror trade statistics indicate trade misinvoicing (that is, as long as they have the 'correct' sign which is in line with an interpretation as a capital outflow) while other differences are irrelevant is troublesome.

Interestingly, Kar and Spanjers (2014, Table 6) provide a decomposition of their observed discrepancies in mirror trade statistics into different practices of trade misinvoicing. According to their estimates, illicit capital outflows from developing countries (due to export underinvoicing and import overinvoicing) sum to a total of about 5.1 trillion US dollars over the period from 2003-2012. The corresponding estimate of capital inflows (due to export overinvoicing and import underinvoicing), in contrast, amounts to a total of 12.9 trillion US dollars. If one is unwilling to accept the conclusion that developing countries have experienced an unrecorded net capital inflow over the past decade, this finding seems to suggest that the empirical methodology is largely inappropriate to quantify the extent of illicit financial flows.

Cif-Fob-Ratios. Another simplification is the assumption of a flat 10 percent difference between matched import (cif) values and export (fob) values which is considered as freight and insurance costs between any pair of countries. This arbitrary assumption has a direct impact on the results since any difference in the observed cif-fob-ratio above or below a value of 1.1 is interpreted as overinvoicing or underinvoicing, respectively.

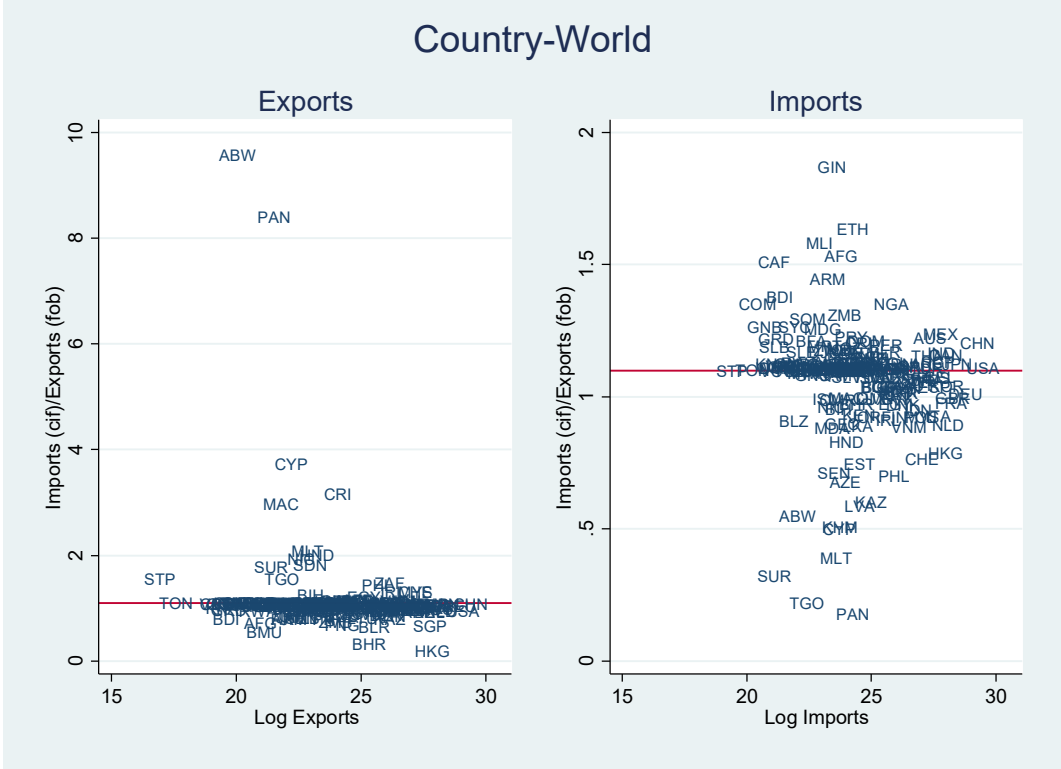
The assumption is arbitrary since, in practice, cif-fob-ratios vary strongly, for various reasons. For illustration, Figure 1a provides scatter plots of the import (cif)/export (fob) ratios for the trade of countries with the world against a country's total trade, separately for exports and imports, showing large discrepancies across countries. The assumption of flat 10 percent

¹¹ Nitsch (2012) provides a more general assessment of trade misinvoicing and illicit financial flows.

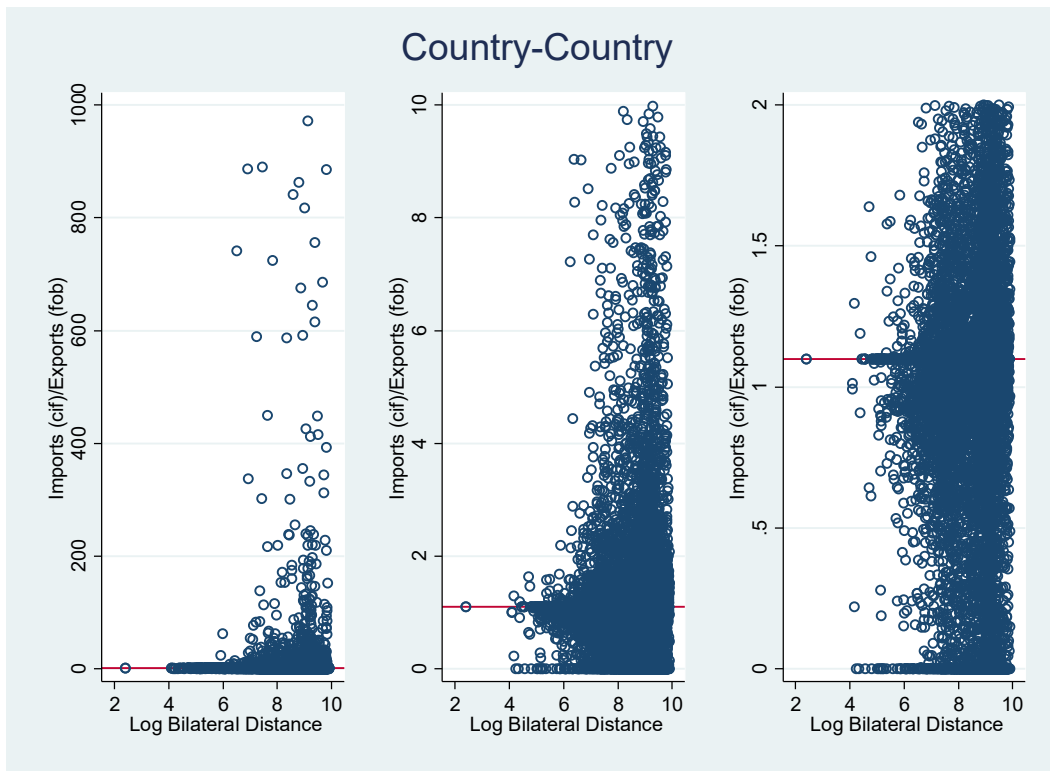
¹² Alternatively, from a political economy point of view, a country's total illicit capital flows (that is, the sum of inflows and outflows) may be of interest. In any case, measured illicit inflows convey important information. For example, the effects of a change in domestic policies that leads to an illicit repatriation of funds from abroad (that is, a return of flight capital) remain unobserved when inflows are ignored.

correction factor, at best, splits the sample of countries into two halves of equal size.¹³ Figure 1b presents the analogues for bilateral trade between pairs of countries as a function of the geographic distance between them, gradually expanding the scale of the y-axis for better visibility. Again, the assumption of a fixed correction factor that is applied across the board seems to be a debatable oversimplification.

Figure 1. Cif-Fob-Ratios, 2012



¹³ The scales of the y-axis differ due to a few outliers. For some countries, such as Aruba (ABW) and Panama (PAN), it turns out that the entry in the Direction of Trade Statistics for the country’s trade with the world as a whole is much smaller than the corresponding entry for the world’s trade with the country. For instance, the world’s imports (cif) from Panama exceed Panama’s exports (fob) to the world by factor 8.4, while the world’s exports (fob) to Panama exceed Panama’s imports (cif) from the world by factor 5.6 (which implies a cif-fob ratio of 0.18).



Source: Trade data has been obtained from the IMF's [Direction of Trade Statistics](#) database.

The assumption has a direct impact on the results since any remaining discrepancy in matched export and import data, after correcting for the difference between cif and fob values, is interpreted as evidence of intentional misinvoicing. While cif-fob-ratios above the threshold value of 1.1 are treated as evidence of capital outflows due to trade misinvoicing, occurrences of ratios below 1.1 are ignored. As a result, an increase (reduction) in the cif-fob correction factor leads to a proportional reduction (increase) in the estimate of illicit financial flows.

Results reported in Kar and Cartwright-Smith (2008, Table 6) show that, in line with intuition, the impact of the correction factor on the estimate of illicit financial flows is highly nonlinear. Most notably, even a moderate change in the correction factor can have a sizable effect on the estimation outcome, as shown in Table 2. For African countries, for instance, an increase in the correction factor from 1.05 to 1.10 reduces the estimated amount lost through illicit financial flows by more than one half.

Table 2. Effect of the Cif-Fob-Correction Factor on Estimates of Trade Misinvoicing

Region	Trade Misinvoicing (Yearly Average, 2002-2006)			Change in the Estimate of Trade Misinvoicing With a Cif-Fob Correction Factor of	
	With a Cif-Fob Correction Factor of			5%	10%
	0%	5%	10%	5%	10%
	bn. US\$	bn. US\$	bn. US\$	%	%
Africa	10.0	9.6	4.2	-4.0	-58.0
Asia	304.4	299.8	299.2	-1.5	-1.7
Europe	15.8	8.4	7.6	-46.8	-51.9
Middle East & North Africa	6.4	5.9	4.7	-7.8	-26.6
Western Hemisphere	62.4	58.5	55.5	-6.3	-11.1
All developing countries	399.1	382.2	371.4	-4.2	-6.9

Source: Estimates of trade misinvoicing by cif-fob correction factor are obtained from Kar and Cartwright-Smith (2008, Table 6).

Advanced Countries. A consistent application of an empirical methodology gives all countries identical treatment. However, when estimating illicit financial flows, GFI frequently deviates from such procedure. In particular, GFI differentiates between advanced and developing countries. While it seems plausible that, given GFI's focus on developing countries, estimation results of illicit financial flows are only reported for the countries of interest, the validity of their methodology and findings could have also been usefully checked for a broader sample of countries.

GFI's special treatment of advanced countries also applies to their analysis of discrepancies in mirror trade statistics on a country-by-country basis. As noted above, only bilateral trade discrepancies between a country of interest and the various advanced countries in the sample are analyzed, with the observed difference then being proportionately scaled up to the country's total trade. As a result, GFI's aggregate estimates of illicit financial flows are based on the implicit assumption that there is no difference between advanced and developing countries as a destination for a country's trade misinvoicing outflows. To the extent that illicit resource transfers from developing countries are predominantly directed towards advanced countries, this assumption implies that the estimates are biased upwards.¹⁴

¹⁴ In its final report, the High Level Panel on Illicit Financial Flows from Africa (2015, p. 40) emphasizes the crucial role of non-African governments in stemming illicit financial flows from the continent. They note: "We found that while some developed countries were taking a firm stance against some aspects of illicit financial outflows, others had put in place

Double counting. The exclusive focus on country pairs between developing countries and advanced economies in the country-by-country comparison is motivated by the difficulty of properly attributing observed discrepancies in mirror trade statistics to one of the partners. As Kar and LeBlanc (2013, p. 5) note, “the existence of import overinvoicing in one country is mathematically equivalent to export underinvoicing in the other (both indicative of an illicit outflow)”. Therefore, if no adjustment is made in the aggregation, the same single transaction shows up as evidence of trade misinvoicing for both trading partners, implying a double counting of illicit outflows.

The GFI’s approach to limit the country-by-country analysis to trade discrepancies between developing and developed countries seems useful because any evidence of export underinvoicing and import overinvoicing is, by assumption, interpreted as a capital outflow from the developing country (although this assumption rules out the possibility of a return of flight capital). However, by scaling up this evidence of misinvoicing with a country’s total trade, trade transactions between developing countries are again counted twice.

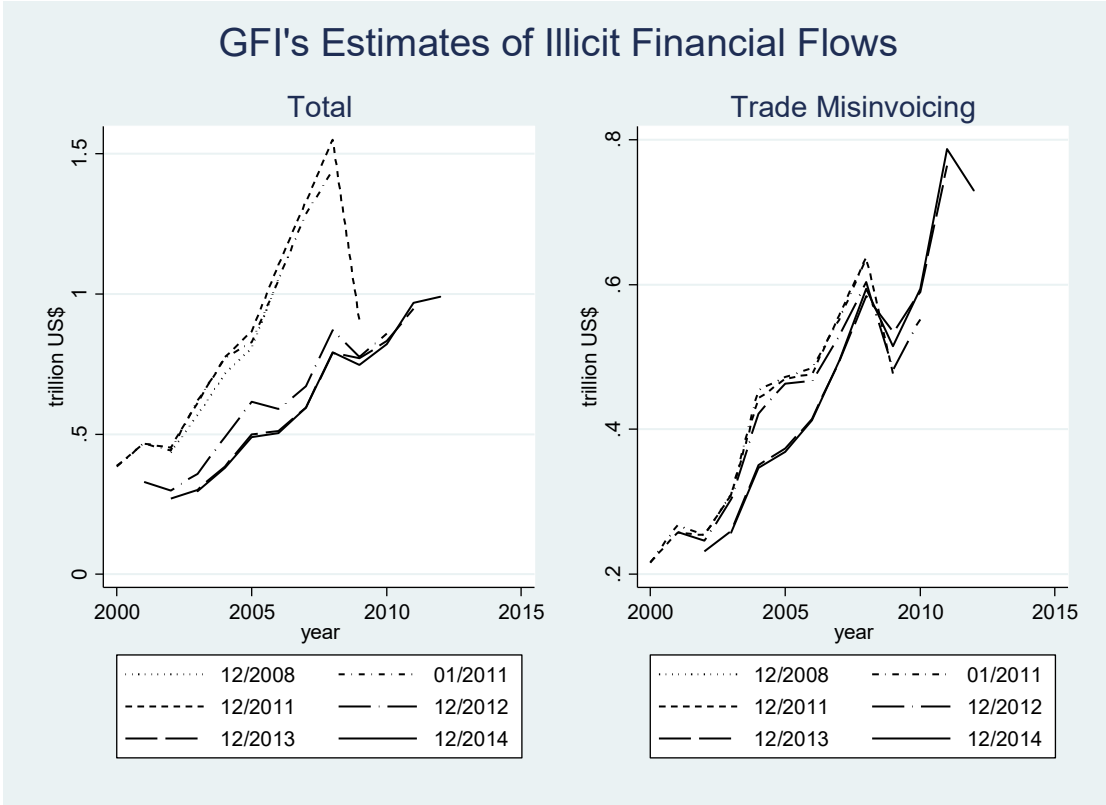
Robustness. For a detailed assessment of quantitative results, it is essential that the estimation outcomes turn out to be reasonably robust. GFI’s estimates of illicit financial flows, however, display considerable variation, both across countries and over time, such that a reliable interpretation of the empirical findings seems difficult.

Figure 2 examines the stability of the GFI’s aggregate annual estimates of illicit financial flows from developing countries over time. The plot on the left of Figure 2 presents the GFI’s headline figures of total illicit flows, while that on the right plots the corresponding estimates of illicit financial flows due to trade mispricing. As shown, there seems to be a clear pattern. Typically, illicit financial flows have tended to sizably increase over the sample period; according to the GFI’s projections, illicit financial flows are estimated to have risen, on average, by about 70 percent over the previous five years. At the same time, however, estimates at the beginning of the sample period have been consistently revised downwards. For instance, the total estimate of illicit financial flows from developing countries in 2003 has been cut by about one half, from 569 billion US dollars in Kar and Cartwright-Smith (2008) to 297 billion US dollars in Kar and Spanjers (2014).¹⁵ In sum, the latest estimate of the annual amount of unrecorded money shifting out of developing countries has remained relatively stable at around 1 trillion US dollars since GFI’s first publication in 2008.

institutional mechanisms that encouraged such flows and that could qualify them as financial secrecy jurisdictions.”

¹⁵ The majority of this decline is explained by the GFI’s shift from the World Bank residual method (CED) to the hot money (narrow) approach (HMN). Kar and Freitas (2012, Table 4) compare the estimation results for different methods directly; they report that the change in methodologies has lowered their estimate of illicit financial flows in 2003 from 617 billion US dollars to 359 billion US dollars. Since then, the estimate has been further reduced by 17 percent.

Figure 2. Estimates of Illicit Financial Flows



Notes: Longer line patterns mark estimates obtained from more recent publications. See Table 1 for a list of publication dates of GFI estimates on illicit financial flows from developing countries.

Source: All estimates are compiled from various GFI publications.

Table 3 examines the stability in the GFI’s estimates for individual countries. As discussed above, GFI has revised the methodology for the estimation of trade mispricing, for a selected group of countries, from a country-world comparison to a country-by-country comparison of mirror trade statistics. In addition, trade data has been adjusted for re-exports through Hong Kong.

Table 3 confronts the country estimates of illicit financial flows from Kar and Freitas (2012) with the corresponding new estimates from Kar and Spanjers (2014). The shift to a new methodology has, in most cases, dramatic effects on the quantitative estimates for individual countries. At one extreme, illicit outflows from the Russian Federation, which were initially estimated to amount to about 7 billion US dollars in 2009, are now estimated to amount to 123 billion US dollars in 2009, an increase by factor 20. At another extreme, the initial estimate of illicit financial outflows from China has been reduced by about 200 billion US dollars. Overall, the downward correction of the estimate of trade misinvoicing for China has been more than matched by a measurable upward adjustment for a few other countries, most notably Russia and India, raising serious questions about the robustness and reliability of the country level estimates.

Table 3. Estimates of Trade Misinvoicing by Country

	Country-World comparison		Country-by-Country comparison		Difference	
	2009	Yearly average, 2001-10	2009	Yearly average, 2003-12	2009	Yearly averages
	mn. US\$	mn. US\$	mn. US\$	mn. US\$	%	%
Armenia, Republic of	1,071	523	832	735	-22.3	40.5
Aruba	1,829	2,351	8,034	8,237	339.3	250.4
Belarus	.	.	7,569	8,404	.	.
Brazil	5,795	2,437	21,977	20,549	279.2	743.2
Bulgaria	526	477	886	1,498	68.4	214.0
Chile	939	1,751	3,303	3,957	251.8	126.0
China, P.R.: Mainland	294,726	264,265	98,528	105,726	-66.6	-60.0
Cote d'Ivoire	506	579	1,177	2,297	132.6	296.7
India	0	11,999	28,723	43,495	n.a.	262.5
Indonesia	8,586	9,425	17,576	16,897	104.7	79.3
Latvia	0	563	2,093	2,370	n.a.	321.0
Lithuania	1,239	653	981	2,085	-20.8	219.3
Malaysia	25,172	22,766	29,245	32,057	16.2	40.8
Paraguay	1,447	681	2,882	3,586	99.2	426.6
Philippines	8,292	12,807	5,637	7,783	-32.0	-39.2
Russian Federation*	6,876	7,835	123,065	90,357	1,689.8	1,053.2
Thailand	8,406	5,938	14,755	15,966	75.5	168.9
Togo	200	194	4,250	1,823	2,025.0	839.7
Zambia	206	486	1,977	2,547	859.7	424.1

Note: * Kar and Spanjers (2014, Table 1) do not indicate the Russian Federation as a developing country that reports bilateral trade to all advanced economies. However, they follow Kar and LeBlanc (2013) in reporting results based on a country-by-country comparison.

Source: Estimates of trade misinvoicing based on a country-world comparison are obtained from Kar and Freitas (2012, Table 7). Estimates of trade misinvoicing based on a country-by-country comparison are obtained from Kar and Spanjers (2014, Table 4).

Since GFI applies the modified empirical approach to only a selected group of countries, the country estimates of illicit financial flows due to trade misinvoicing are effectively derived from different methodologies. GFI justifies this mix of methodologies by arguing that results derived from the country-world comparison of mirror trade statistics understate outflows as a country's outflows to one partner would cancel out with inflows from another country. In similar fashion, however, a country-by-country comparison may overstate a country's outflows when only (one-sided) errors in mirror trade statistics indicating capital outflows are considered. Specifically, since exports for which the final destination is unknown at the time of shipment typically cause offsetting errors in trade statistics, a country-by-country comparison which ignores one component of the transaction artificially inflates estimates of illicit financial flows due to trade misinvoicing.¹⁶

4. Moving Forward

In view of the shortcomings of the GFI's approach to quantify illicit financial flows from developing countries, it seems useful to highlight possible methodological improvements that may help to generate more reliable estimates. Obviously, there is no first-best solution, given the limitations of available information and data; illicit flows are, by their very nature, difficult to identify. Still, a key precondition for the estimation of illicit financial flows due to trade misinvoicing and, more generally, a proper interpretation of observed discrepancies in international trade statistics is to take a more nuanced approach that goes beyond the routine analysis of aggregate trade flows and takes more details of pairwise trade relationships into account. In particular, I suggest proceeding along three lines.

First, there is a strong need for more micro evidence about procedures using misinvoiced trade transactions to move capital unrecorded out of a country. For one thing, evidence obtained 'from the field' may provide insights on the overall relevance of trade misinvoicing. Since there is a broad range of methods available to move funds illegally across national borders, including the smuggling of cash, any quantitative estimate of a country's illicit financial flows crucially depends on the assumption about the relative importance of trade misinvoicing—an aspect about which relatively little is known. In addition, anecdotal evidence may provide useful details for an informed assessment of observed discrepancies in trade statistics. For instance, it seems reasonable to assume that most of a country's illicit

¹⁶ To illustrate the problem, consider a shipment of a developing country to the European Union. Assume that the container is directed to the port of Antwerp in Belgium, but that the goods are intended to be sold throughout the European Union, with the final destination being only determined when the container is already en route. In the trade statistics of the developing country, this transaction will be recorded as an export to Belgium without a corresponding entry in the Belgian trade statistics (because the goods are immediately transshipped), while the European Union countries report an import from the developing country without a corresponding entry in the developing country's trade statistics. In a country-world comparison, these (factitious) findings of export overinvoicing (to Belgium) and export underinvoicing (to other European Union countries) would cancel out. In a country-by-country comparison, observed export underinvoicing may be interpreted as evidence of an illicit financial outflow.

financial flows are destined to a small number of countries. Consequently, differences in matched trade statistics with other countries are unlikely to reflect illicit financial flows.

Second, it may be useful to restrict the empirical analysis. A limited sample does not only allow a more detailed analysis of misinvoicing behavior, instead of automatically attributing any discrepancy in bilateral trade statistics to illicit financial flows, it also yields, in most cases, empirical results of sufficient accuracy. For instance, for the quantification of illicit financial flows at a global scale, it seems suitable to focus on a few large countries that account for the overwhelming majority of illicit outflows. At the country level, the analysis may be centered on a few selected partner countries that turn out to be the main destinations for the country's illicit flows. Ferrantino, Liu, and Wang (2012) provide an interesting example of a detailed assessment of the U.S.-China trade data discrepancy.

Third, to the extent that institutional knowledge about practices of trade misinvoicing is missing, a systematic analysis of observed differences in matched partner trade statistics is helpful, especially for trade data at the product level. By identifying any systematic variation in discrepancies across products and countries, this analysis allows correcting for alternative sources of disparities in pairwise trade statistics; see, for example, Berger and Nitsch (2012) for an application.

5. Summary

A growing literature applies economic theories, statistical methods and forensic techniques in order to detect and quantify illegal and otherwise hidden activities. Despite large efforts, the analysis is challenging, and the results often strongly depend on heroic assumptions.

In this paper, I review estimates of the illicit outflow of capital from the developing world. In particular, I highlight and discuss various critical aspects of the analytical approach that underlies those estimates.

A fundamental challenge for the GFI's methodology is their quantitative result that illicit financial inflows into developing countries sizably exceed illicit financial outflows out of these countries. According to the estimates in Kar and Spanjers (2014), total trade misinvoicing inflows are larger than total trade misinvoicing outflows by about factor 2 over the period from 2003 through 2012. Conceptually, this result raises the issue why the methodology that is proposed and used by GFI to quantify misinvoicing behavior in one direction (that is, for capital outflows from developing countries) should be inappropriate or flawed for the identification and quantification of misinvoicing activities in the other direction (capital inflows). In any case, the detailed numerical results provide a new perspective on the GFI's argumentation against 'netting out' capital flows and to focus exclusively on gross outflows (labeled as 'gross excluding reversals' method).

Another source of major concern is the large variability of country-level estimates of illicit financial flows. For some countries, the estimated loss of resources through illicit financial flows changed by hundreds of billions of US dollars after adjustments in the methodology. Since the estimation results for individual countries turn out to be highly sensitive to arguable

assumptions, also the (much more stable) findings about aggregates and trends seem to be invalidated.

Overall, I conclude that the quantitative results reported by GFI have no substantive meaning. Therefore, the claim that in 2012 the illicit flow of money from developing countries totaled 1 trillion US dollars lacks evidence and is uncorroborated.

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