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Preliminary

Trade Misinvoicing*

Volker Nitsch

Darmstadt University of Technology
and CESifo

Abstract

This paper discusses selected issues in the analysis of trade misinvoicing. It starts by examining various motives for the misdeclaration of trade activities. It is argued that the broad range of incentives to fake customs declarations provides an important challenge for the empirical assessment of the extent of trade misinvoicing. After analyzing the costs and benefits of different empirical approaches to quantify trade misinvoicing, the accuracy and reliability of estimation results reported in the literature are reviewed.

Keywords: trade misinvoicing; mispricing; capital flight

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Address:

Volker Nitsch
Darmstadt University of Technology
Department of Law and Economics
Bleichstrasse 2
64283 Darmstadt, Germany
Tel.: +49-6151-16 57261
Fax: +49-6151-16 57262
E-mail: nitsch@vwl.tu-darmstadt.de
Web: <http://www.vwl2.wi.tu-darmstadt.de>

1. Introduction

A common and frequent feature of many fraudulent acts is the misdeclaration of economic activities. Income and earnings from illegal businesses, for instance, typically remain unreported to fiscal authorities in order to hide such operations. Expenditures eligible for public fund reimbursement, in contrast, may be overstated to increase transfer revenues. In general, publicly recorded activities may be misreported for a broad range of potential reasons.

Declarations of cross-border trade transactions are not exempt from such misbehavior. Similar to other cases of false reporting, criminal traders face incentives to fake data entries in customs declarations and other official documents for various reasons and along almost every dimension. For instance, the quantity and the value of a shipment may be manipulated to either reduce the payment of customs duties (underinvoicing) or to better take advantage of export subsidies (overinvoicing); a misclassification of products or a misdeclaration of the final destination of a shipment may allow circumventing trade restrictions. Overall, the accuracy of international trade statistics is likely to be compromised, to an unknown degree, by fake transactions.

Misreporting of economic activities is far from being a new phenomenon. It has also been analyzed extensively, especially by statistical offices seeking to produce more reliable statistics. Still, despite the ongoing interest in identifying and correcting for misreporting, misinvoicing of international trade transactions seems to have recently attracted growing attention, for at least three reasons. First, international trade typically accounts for an increasing share of a country's GDP. As trade has become relatively more important, there has also been a growing interest in the precision of the measurement of trade activities.¹ Second, in contrast to other forms of misbehavior, misinvoicing of international trade transactions seems to be, in principle, more easily to detect because of the existence of mirror statistics. Since every cross-border shipment is recorded independently by two separate authorities, at the time of leaving the source country as an export and at the time of arriving in the destination country as an import, any discrepancy between corresponding data entries may provide a direct indication of misreporting. Finally, it has been argued that trade misinvoicing is a major conduit to move capital unrecorded out of a country. Observed evidence of misinvoicing may therefore serve as a reasonable benchmark estimate of the magnitude of illicit financial flows.

In this paper, instead of reviewing the literature extensively, I discuss selected issues in the analysis of trade misinvoicing. The remainder of the paper is structured as follows. In Section 2, I examine various motives for the misdeclaration of trade activities. Specifically, it is argued that the broad range of incentives to fake customs declarations provides an important challenge for the empirical assessment of the extent of trade misinvoicing. Consequently, Section 3 analyzes the costs and benefits of different empirical approaches to quantify trade

¹ For instance, when in 2003 the United Kingdom's Office for National Statistics made corrections to trade figures for VAT fraud, real GDP growth for previous years was lowered by up to 0.2 percentage points. Ruffles, Tily, Caplan and Tudor (2003) provide a more detailed description.

misinvoicing, followed by a review of the accuracy and reliability of estimation results that are reported in the literature. Finally, Section 5 briefly concludes.

2. Motives

For traders, it may be attractive to manipulate official trade documents along various lines and for various reasons. While individual motives to fake invoices are probably highly diverse, often depending on circumstances, general incentives to misreport trade activities are directly related to a country's trade and fiscal policies. Trade restrictions, for instance, provide an incentive to hide trade activities; trade subsidies, in contrast, imply an incentive to inflate trade values.

Measured by their impact on a country's national trade statistics, then, four types of trade misinvoicing can be distinguished: overinvoicing of exports, underinvoicing of exports, overinvoicing of imports, and underinvoicing of imports. Each type of misinvoicing is observed in practice and documented by both anecdotal evidence and empirical findings.

Export overinvoicing, for instance, is a frequent phenomenon in countries which seek to promote exports by offering tax incentives. Celâsun and Rodrik (1989a, 1989b) provide a detailed account of this form of misbehavior for Turkey. In the early 1980s, a comprehensive package of policy measures was introduced that was explicitly oriented toward encouraging manufactured exports; these measures included export tax rebates, subsidized export credits, and preferential allotment of foreign exchange and duty-free imports. To take advantage of these subsidies, "Turkish entrepreneurs, never too shy in exploiting arbitrage opportunities" (Celâsun and Rodrik, 1989b, p. 723), changed their invoicing practices; exporters substantially overinvoiced shipments or simply declared exports where none had in fact taken place. Celâsun and Rodrik (1989a, p. 207) conclude that "a non-negligible share of the increase in exports after 1980 turns out to have been the result of a statistical fiction".

Another form of misinvoicing, underinvoicing of exports, allows fraudulent traders to evade export restrictions. At an extreme, it may be attractive for traders to not only report reduced trade values but to manipulate official trade documents at even greater scale. Sanctions of countries, for instance, may be circumvented by a misdeclaration of the final destination of a shipment (thereby adding further distortions to a country's trade statistics by effectively overinvoicing its exports to other destinations); export bans on specific products may be bypassed by a misdeclaration of the product category. Fisman and Wei (2009) provide an illustrative example for this type of misreporting by examining trade for a specific product category, cultural objects, for which exports are often prohibited without permission. Specifically, Fisman and Wei (2009, p. 83) argue that for this product there is a "stark difference in legality of shipments between importing and exporting countries". Analyzing mirror trade statistics, they find that the observed gap in reported trade figures is highly correlated with corruption levels of exporting countries, with particularly strong effects for artifact-rich countries.

Import overinvoicing is typically observed in product categories with low or zero import tariffs. In practice, fake imports appear in international trade statistics for at least two reasons. First, a large import bill allows producers to lower their domestic profits (which are then

subject to lower taxation). Since this strategy comes at the cost of inflated tariff payments, however, the approach only seems reasonable for products which are largely exempt from taxes. Second, overreporting of imports is a direct consequence of misclassification. If imported goods are not declared under the appropriate tariff heading (e.g., in order to evade trade taxes by classifying high-taxed goods as zero-taxed products), imports in the product category that is mistakenly reported in the customs declaration are effectively overreported. Chalendar, Raballand and Rakotoarisoa (2016) document this fraudulent behavior for Madagascar. Noting that the importation of fertilizers, books and some cereals is exempt from tariff and VAT in Madagascar, they find that the import value for these products indeed significantly exceeds the corresponding export value. Overall, their estimates suggest that customs fraud reduced non-oil customs revenues (duties and import value-added tax) in Madagascar by at least 30 percent in 2014, with tariff misclassification (and, consequently, import overinvoicing) accounting for slightly less than one half of these losses.

Finally, the opposite strategy of manipulating customs declarations at the time of arrival, underinvoicing of imports, is probably the most prominent form of trade misreporting, mainly because of its immediate benefits. Since customs duties are typically determined based on the declared value of the article, which may be difficult to verify in practice, undervaluation directly reduces tax payments. Yang (2008) provides an illustrative example that highlights tax evasion behavior of importers. When Philippine customs increased enforcement by hiring private firms to conduct preshipment inspection of imports from a subset of countries, imports from treatment countries shifted to an alternative duty-avoidance method: shipping via duty-exempt export processing zones.

In view of these alternative motives and methods to manipulate customs declarations, it seems difficult to identify a predominant type of misreporting. Country studies suggest that the incentives to fake trade declarations often depend on specific circumstances and, therefore, vary sizably both across countries and over time; these studies typically put strong emphasis on a specific form of misreporting that seems to be particularly relevant for the episode that is analyzed. Still, the findings in Chalendar, Raballand and Rakotoarisoa (2016) and Yang (2008) indicate that underinvoicing of imports to evade payment of import taxes is a frequent and widely-used practice of trade misinvoicing.

As a consequence of the diversity in misinvoicing behavior, a general focus on the capital flight motives of trade misreporting seems misguided. Approaches that automatically attribute instances of import overinvoicing and export underinvoicing to illicit financial outflows ignore other (potentially more relevant) motives of traders for this type of misbehavior. More notably, the analysis of import overinvoicing and export underinvoicing covers only a fraction of a country's total trade misinvoicing. Overall, the extent to which intentions to move capital unrecorded out of the country indeed determine trade misinvoicing behavior in practice is unknown. The special interest in trade misinvoicing when quantifying illicit financial flows is mainly motivated by the idea that faking trade declarations is a main conduit for the illicit movement of capital. Beja Jr. (2005, p. 63), for instance, claims that "trade misinvoicing may be the least risky technique for capital flight".

3. Empirics

In the literature, various empirical approaches are applied to quantify the extent of trade misinvoicing. While each method has specific strengths and weaknesses, discussed in more detail below, all quantitative results are subject to an important qualification, as not all fraudulent trade activities are taken into account in the analysis.² More specifically, the empirical identification of trade misinvoicing practices crucially depends on two features of a trade transaction. First, the transaction has to be recorded somewhere. Trade activities which remain hidden completely from public authorities, often labeled as smuggling, are not considered in the analysis of trade misinvoicing. Second, the trade declaration should have at least some correct entries. For instance, trade misinvoicing is difficult to identify from mirror statistics when the same details are misreported in both the exporting and the importing country. Similarly, a transaction is less suspicious of mispricing when both the value and volume of the transaction are misreported. Overall, given that only an unknown fraction of all misreported trade activities is identified from official statistics, also the accuracy of trade misinvoicing estimates is unknown.

Apart from this general source of uncertainty, estimates of trade misinvoicing are highly sensitive to the type and quality of data that is analyzed. Misinvoicing practices are, in principle, best identified by examining information from individual trade declarations. This highly disaggregated transaction-level data, however, is only rarely available to researchers, especially for the broad range of countries for which data is needed in order to provide a meaningful empirical analysis. Given the lack of data, misinvoicing behavior is often identified from more aggregate trade information which introduces at least two types of problems. First, at a more aggregate level, discrepancies in mirror trade statistics from misinvoiced trade transactions may cancel each other out. At an extreme, a country's reported trade with the rest of the world can be perfectly identical to the corresponding figure of the rest of the world's trade with the country (which would imply that there is no evidence of trade misinvoicing), although there are possibly large differences in mirror trade statistics with individual partners. Second, for the analysis of aggregate data, the set of assumptions that is used for the identification of misinvoicing practices typically becomes even more restrictive (and debatable). In view of these difficulties, estimates of the extent of trade misinvoicing activities often seem to lack any substantive meaning.

3.1 Mirror Trade Statistics

The most prominent method to identify trade misinvoicing is to compare the reported value of a trade transaction in a country with the corresponding entry in the mirror statistics of the partner country. Implicitly, it is assumed that traders have an incentive to misdeclare on only one side of a transaction, while the data entry on the opposite side of the transaction is correct. The difference between the flawed and the correct declaration of a transaction is then interpreted as misinvoicing.

² Missing some activities in the analysis does not automatically imply that reported results of trade misinvoicing are a lower bound estimate of misinvoicing activities; observed misinvoicing may still be overestimated.

Although this approach seems to be generally intuitive, there are, in practice, a number of critical issues, each having the potential to seriously affect (and possibly distort) quantitative results. As it is well known, for instance, discrepancies in mirror trade statistics do not necessarily provide evidence of misinvoicing, but often arise for legitimate statistical reasons, ranging from conceptual differences in the valuation of exports and imports to the redirection of shipments while en route; Nitsch (2012) provides a more comprehensive discussion. To the extent that these factors are not properly taken into consideration in the empirical analysis of mirror trade statistics, estimates of trade misinvoicing are misspecified. Moreover, the often-used practice of applying a plain correction factor to adjust matched export and import values for their different statistical treatment of freight and insurance costs introduces additional distortions; see Nitsch (2015).

Another source of concern is the assumption that misinvoicing of trade activities is limited to only one side of a transaction. Fisman and Wei (2009) convincingly make this case for a specific product category, cultural property and antiques. For these goods, traders often face strict export restrictions, with many countries prohibiting the export of cultural objects, while zero import tariffs and the risk of forfeiture (in case of improper declaration) imply strong incentives to truthfully report shipments upon entry. For other goods, however, the difference in reporting incentives between source and destination countries may be less pronounced. At a more aggregate level, it has become common practice to only analyze a country's trade with developed countries, arguing that the trade statistics of these countries are generally more accurate than those in developing countries.³ While this assumption seems plausible, trade flows between developing countries are not ignored in the analysis, but observed discrepancies in mirror statistics with developed countries are simply scaled up for a country's overall trade; see, for instance, Beja Jr. (2005). Accordingly, observed evidence of misreporting is hypothesized to affect all partners alike, proportional to the partner's share in a country's total trade.

A key concern for the analysis of mirror trade statistics is the common unavailability of transaction-level trade data. In principle, misinvoicing can only be identified if the export and import declarations of a transaction are compared and, therefore, the corresponding entries in mirror trade statistics are successfully matched.⁴ Once an inconsistency is detected, it may be possible to figure out the likely reason for the difference in the declarations (allowing to reasonably interpret this finding). Any analysis of aggregate trade data, in contrast, produces, by definition, unreliable results, with quantitative outcomes being potentially distorted in either direction. At aggregate levels, for instance, a misclassification of a trade transaction, when a product is reported under different tariff headings in the export and import declarations, may imply a double counting of misinvoicing practices, thereby inflating the overall estimate. Alternatively, the empirical assessment of trade misinvoicing is biased

³ Potential explanations for this claim range from a better quality of the national statistical service to smaller incentives for a misdeclaration of trade activities.

⁴ As a result, it is not sufficient to get access to transaction-level trade data from one country (which is typically highly restricted), but the matching procedure requires access to similar data for at least one other country.

downwards when different types of misinvoicing (that is, overinvoicing in one transaction and underinvoicing in another transaction) simply cancel each other out.

3.2 Abnormal Prices

Another promising approach to identify trade misinvoicing practices is the analysis of reported unit values in trade declarations. For any given transaction, the manipulation of either trade values or trade quantities (but not both) implies a deviation of the observed unit value from its true value. Consequently, substantial deviations in unit values (i.e., outliers) may be indicative of misinvoicing behavior.

4. Estimates

4.1. Global Estimates

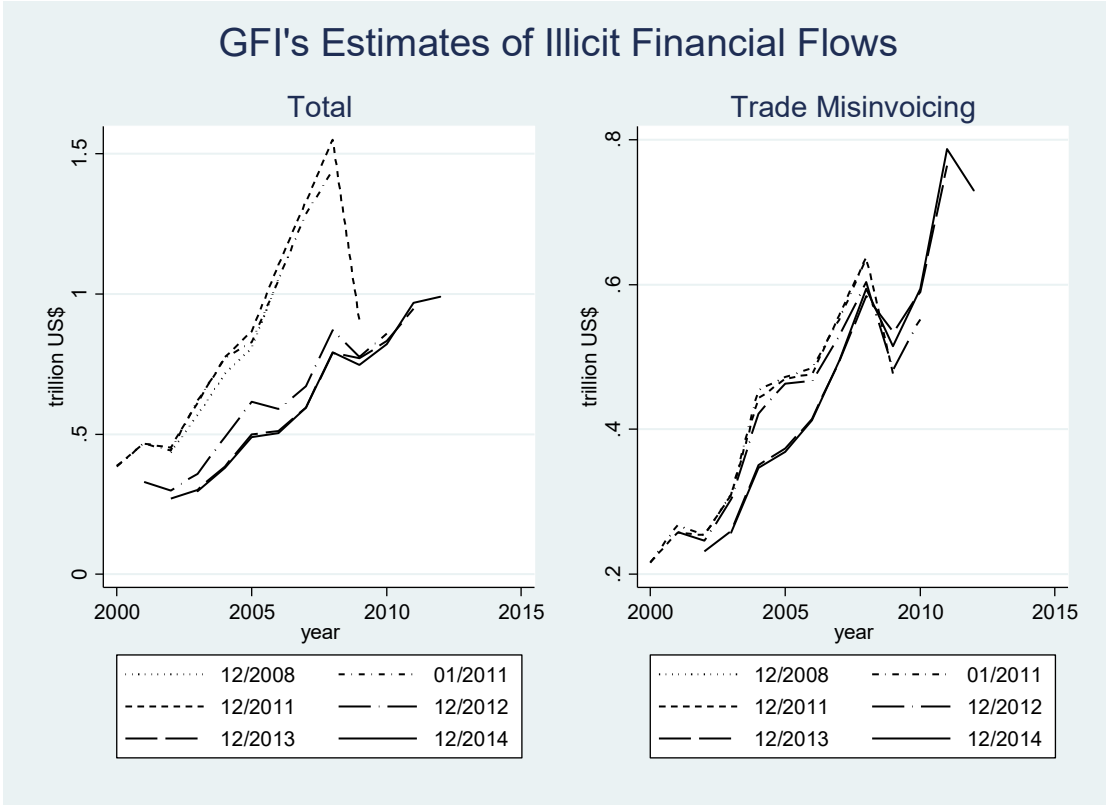
The most comprehensive assessment of trade misinvoicing practices of countries around the world is provided by the Washington, DC-based advisory organization Global Financial Integrity (GFI) which regularly publishes a report in which various techniques are applied, including an empirical analysis of trade misinvoicing, to quantify the magnitude of illicit financial flows from developing countries. GFI's estimates forcefully illustrate the difficulties of applying a very general approach on aggregate trade data to quantify trade misinvoicing.

For instance, 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 1 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 1 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).⁵ 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.

⁵ 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 1. Estimates of Illicit Financial Flows



Notes: Longer line patterns mark estimates obtained from more recent publications.

Source: All estimates are compiled from various GFI publications.

Table 1 examines the stability in the GFI’s estimates for individual countries. GFI has revised the methodology for the estimation of trade misinvoicing, 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 1 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 1. 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.⁶

4.2 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

⁶ 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. Conclusion

In recent years, there has been a growing interest in the understanding of trade misinvoicing practices, both among policy-makers and economists. This paper discusses selected issues in the analysis of trade misinvoicing. Examining various motives for the misdeclaration of trade activities, it is argued that the broad range of incentives to fake customs declarations provides an important challenge for the empirical assessment of the extent of trade misinvoicing. After analyzing the costs and benefits of different empirical approaches to quantify trade misinvoicing, the accuracy and reliability of estimation results reported in the literature are reviewed.

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