Review of "South Africa: Potential Revenue Losses Associated with Trade Misinvoicing", Global Financial Integrity, November 2018

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Summary

Global Financial Integrity (GFI) has published a report providing estimates of trade misinvoicing in South Africa, with a particular focus on potential revenue losses[2]. GFI estimates potential revenue losses in South Africa of $7.5 billion in an average recent year. However, despite some evolution in methods, the techniques it uses still produce estimates that should be seen only as "indicators of risk of trade misinvoicing" and also – by their construction – overstate the extent of potential revenue losses.

This note below sets out relevant considerations, building on an equally recently published report[3] from the World Customs Organisation (WCO). Part 1 covers the ways GFI makes trade misinvoicing estimates and Part 2 focuses on GFI's estimates of trade misinvoicing and potential revenue losses for South Africa.

In its South Africa report, GFI presents estimates of trade misinvoicing and, in line with three other GFI country reports in 2018 on Uganda, Kenya and Nigeria[4], orients the focus towards estimates of potential revenue losses and taking action to prevent such misinvoicing.

Even accepting GFI's estimates for trade misinvoicing (which should be treated with caution), its estimates of potential revenue losses are overstated by not including potential revenue gains as an offset. Were gains netted from losses, the GFI estimates of potential revenue losses in South Africa of some $7.5 billion per year could decline to under $400 million (and even less if trade misinvoicing has been overestimated).

South Africa would be better off to take up the WCO report's recommendations for all countries to:

- treat such estimates only as an ***indication of risk*** of possible trade misinvoicing warranting further investigation; and

- have Customs or, alternatively, the Financial Intelligence Unit (FIU), or a Customs/FIU task force, ***match individual flows of trade***, being <u>both</u> the Custom's declarations <u>and</u> the records of money flows in respect of that trade[5] to gain better-focused insight into trade misinvoicing and trade/tax evasion activities.

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[2] GFI. 2018d. South Africa: Potential Revenue Losses Associated with Trade Misinvoicing. November.

[3] WCO. 2018. Illicit Financial Flows via Trade Mis-invoicing Study Report 2018. November. See especially the Executive Summary, Chapter 5 (Cross-reference of PFM and PCM: Analysis of South African TM Risks – Imports, 2010-15) by Matthew Salomon and Chapter 7 (Cross-reference of PFM and PCM: 3 case studies) by Yeon Soo Choi, Etim Ibok and Frank Kalizinje.

[4] GFI. 2018a. A Scoping Study of Illicit Financial Flows Impacting Uganda. September. GFI. 2018b. Kenya: Potential Revenue Losses Associated with Trade Misinvoicing. October. GFI. 2018c. Nigeria: Potential Revenue Losses Associated with Trade Misinvoicing. October.

[5] Emphasis of the author in ***bold***.

Part 1: The ways GFI makes trade misinvoicing estimates

Recent evolution in GFI's methods in analysing trade misinvoicing

GFI continues to evolve its approach to estimating trade invoicing and the presentation of the estimates.

- In 2018 GFI has focused more on making and publicising estimates of "potential revenue losses" to developing countries from trade misinvoicing, which may impact the country's budget and capacity to spend. These are taxes not paid which GFI says result from deliberate trade misinvoicing, covering VAT/GST, company tax and tariffs and royalties (see analysis in Part 2).

- As a result, perhaps temporarily, GFI has focussed less on publicising estimates of amounts lost or gained by developing countries from illicit financial flows (an aggregation by GFI of data mismatches and errors and omissions it sees as trade misinvoicing[6] and other illicit flows across a developing country's balance of payments).

In the South Africa study, it has also begun to use a new method – for GFI – for analysing trade misinvoicing, the so-called Price Filter Method (PFM), in addition to its habitually preferred Partner Country Method (PCM). The two methods and how they are being used by GFI are outlined below.

The Partner Country Method (PCM)

The PCM (or "mirror" data analysis) is a technique to measure discrepancies in bilateral trade records between trade partners, usually using one of the international trade databases (either IMF DOTS[7] or UN COMTRADE[8]). The "mirror mismatches" have typically been as estimates of the extent of under-pricing of exports and over-pricing of imports and – in turn – the loss of funds unfairly/illegally channelled out of a developing country, which in turn lead to tariffs/taxes etc evaded/avoided. This in marked contrast to the original use of PCM in the 1960s to show the inadvisability of severe import tariffs/taxes and exchange controls in developing countries, as such severity would very likely drive import underinvoicing[9].

GFI's approach has habitually been to compare the export or import data of a country with the "mirror" data of its trading partners (after adjustment to remove what might be cost insurance and freight (c.i.f.) from the data on imports) and attribute the discrepancy in the adjusted free on board (f.o.b.) trade values to deliberate trade misinvoicing, as in GFI 2017[10], GFI 2015 and earlier publications in that series. GFI's PCM methods have been much criticised[11].

GFI's application of the PCM has evolved, including for its all-developing-countries study (GFI 2017), with some changes carried over into in its single-country studies of Uganda, Kenya and Nigeria. GFI has been making changes to improve its estimation process, for instance at times by filtering out some

[6] In its Uganda report (GFI 2018a) GFI also qualified its trade misinvoicing estimates as "potential trade misinvoicing", acknowledging "remaining uncertainty in the estimates".
[7] The International Monetary Fund (IMF) Direction of Trade Statistics (DOTS).
[8] The United Nations (UN) International Trade Statistics (COMTRADE).
[9] See Bhagwati 1964.
[10] GFI's application of PCM to developing countries in its main publications differs depending on the extent of bilateral goods trade data in multi-country global databases, e.g. in IMF DOTS or UN COMTRADE.
[11] See Nitsch 2010, UNCTAD/Carrère and Grigoriou 2014 and Erskine 2018 (including its Annex).

"unmatched" bilateral trade records[12] (sorting them between "orphaned" and "lost")[13] and making adjustments reflecting available data on the Swiss gold trade, transshipments/Hong Kong reexports, trade involving Zambia and South African Customs Union (SACU) Countries and transport margins (the latter leading to some discretionary changes to GFI's contentious c.i.f./f.o.b. assumption).

The Price Filter Method (PFM)

The Price Filter Method (or unit price analysis) is a technique deployed to measure the value of trade transactions for which the unit price is considered abnormal. [14] The PFM uses import and export data of the country under review, rather than data from its bilateral trading partners, so does not require a c.i.f./f.o.b. adjustment, and often the country data is more detailed.

However, what is considered abnormal pricing is arbitrary.[15] As is outlined below, the parameters used automatically assume half of all trade is abnormally priced. There are other ways used to judge errant pricing, for instance as developed internationally for proving allegations of "dumping".[16]

Considering the statistical distribution of unit prices of goods recorded in transaction level trade data in a period for as narrow a product category as possible (e.g. using a Harmonized Commodity Description and Coding Systems (HS) code such as HS6, HS8 or HS10 digit code), half the unit prices will be above the median and half below. The PFM requires setting a lower bound and upper bound as a cut-off for what is fair/usual pricing. Trade transactions which have unit prices outside the lower and upper bounds in the time period are regarded as indications of trade mis-invoicing. For each suspicious trade transaction, the difference between its unit price and the lower (or upper) bound multiplied by the quantity is the estimated value of the under- (or over-) invoicing.

In GFI 2018d, on South Africa, GFI for the first time used both the PCM approach and also the PFM approach in a country report. The PCM-based estimates were based on UN COMTRADE data for 2010-2014. Unusually, GFI gives no details of the PCM method and parameters used.[17]

The PFM process is more fully described. It drew on detailed trade data provided by the South African Revenue Service for 2010-2015[18], which enabled GFI to focus more closely on suspected import under-invoicing. GFI used a lower bound of the 25th percentile and an upper bound of the 75th percentile to

[12] This is broadly in line with some analysis in UNCTAD/Carrère and Grigoriou 2014.
[13] An import (export) record might be designated as "orphaned" if the corresponding partner country export (import) is missing. Or, an import (export) might be designated as "lost" if the importing (exporting) country's report is missing while the exporting (importing) country's side of the transaction is recorded.
[14] See Pak and Zdanowicz 1994 and subsequent articles, such as de Boyrie *et al* 2001. The PFM technique developed in the 1990s and 2000s remains largely unchanged.
[15] de Boyrie *et al* 2001 explains that the inter-quartile range used as the benchmark for abnormality was chosen because a United States Internal Revenue Service transfer pricing regulation in 1994 stipulated an inter-quartile price range should be used to determine the validity of transfer prices in international trade.
[16] "Dumping" occurs when goods exported to a country are priced lower than their "normal value" which is usually the comparable price in the ordinary course of trade in the exporter's domestic market. "Normal value" may also be determined using either comparable prices to a third country or the cost of production plus selling, general and administrative expenses and profit. Dumping is not prohibited under the WTO international agreement. But in many countries anti-dumping duties may be imposed when dumping causes, or threatens to cause, material injury to an industry in the importing country.
[17] Though the GFI study of South Africa (GFI 2018d) does not refer to it, there may be some guidance on the PCM methods it used in WCO 2018. Chapter 3 (Estimating IFFs/TM: Partner Country Method) and – most relevantly – Chapter 5 (Cross-reference of PFM and PCM: Analysis of South African TM Risks – Imports, 2010-15) are both contributed by Matthew Salomon, GFI's senior economist.
[18] The full data set involved approximately 7.4 million trade transactions which included more than 8,200 commodity types for the period 2010-2015.

estimate the extent of abnormal pricing in the time period under review (which presumably are 12-month periods).

One main finding in GFI 2018d, using either the PCM or PFM approaches, is that some types of imports and especially some from China and India are significantly under-priced, relative to the extent of under-pricing seen in some other types or sources of imports.

The World Customs Organisation (WCO) views on methods used for estimating trade misinvoicing

The World Customs Organisation (WCO) has thoroughly reviewed both methods, including as used by GFI. The WCO's report was prepared in response to a G20 request for advice on trade misinvoicing.

In the Executive Summary to its report the WCO urges caution when looking at research on trade misinvoicing based on either the Partner Country Method (PCM) or the Price Filter Method (PFM).

> "The high estimates of IFFs/TM which feature prominently in current literature, research and even media outlets, should not be understood as a reliable quantitative measurement of the scale of IFFs/TM, but rather as a risk indicator, which can be useful in comparing the risk of IFFs/TM across commodities, countries and over a longer time period".

In a review in the body of the report, that chapter's authors (Choi *et al*)[19] note several limitations in the two methods being used to estimate trade misinvoicing in their article, including that:

- for the Partner Country Method (PCM), "trade discrepancies could arise simply from logistics and statistical reasons. Empirical research on bilateral trade discrepancy presented that up to 85% were explained by the different attribution of trade partners (due to transit or indirect trade), trade recording system (Customs free zone), CIF/FOB valuation, time-lag, currency conversion, confidential trade, etc"; and
- for the Price Filter Method (PFM), the setting of lower and upper bounds for normal unit price is "somewhat arbitrary", and in case of products with highly heterogeneous sub-categories or products which prices are sensitive to natural/business environments, PFM may wrongly identify trade misinvoicing.

Overall, the WCO assessment of PCM and PFM is clear. If – as researchers for WCO say – 85% of some PCM-identified trade discrepancies can be explained by factors that have nothing to do with trade misinvoicing, and PFM-identified estimates are based on parameters that are arbitrary and unrealistically assume product homogeneity, GFI's estimates of trade misinvoicing using PCM and PFM (and the estimates of potential revenue loss that depend on them) need to be treated with caution.

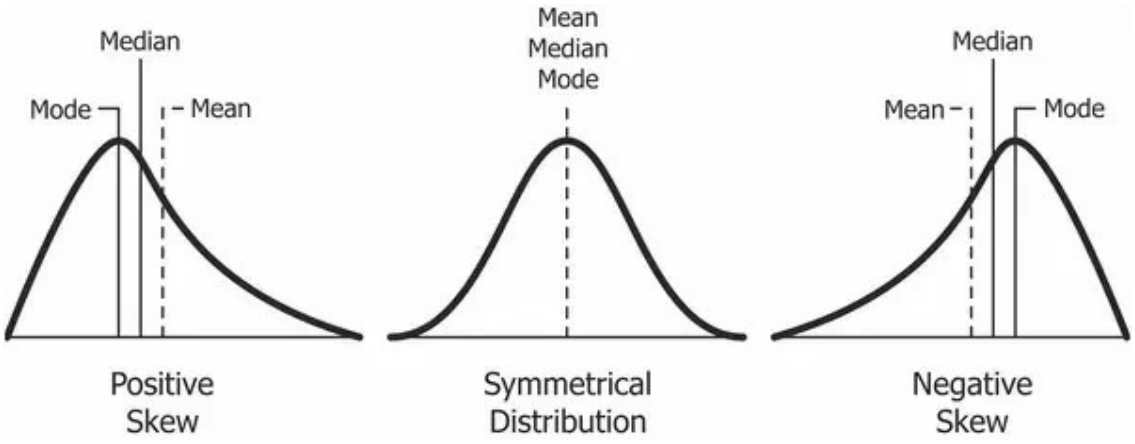
[19] Cross-reference of PFM and PCM: 3 case studies. Chapter 7 in WCO 2018.

Box on abnormal prices: GFI's use of PFM overstates the extent of abnormal pricing

Underlying philosophy: Underpinning PFM is a hard application to imports of every category/type of goods into a country of the economic law of one price: identical goods should have identical prices if there are competitive markets, no transaction costs and no trade barriers. In that case, any price difference is abnormal. In real life trade prices vary for any category/type of goods. But Bhagwati's original insight remains correct: high tariffs counterproductively drive under-pricing of imports.

How abnormal is "abnormal"? GFI says only half of any type of imports are appropriately priced. No matter how tightly priced a type of imports is, half will always be judged deliberately mis-priced. If prices are "normally distributed" (as seems to be the case in the middle illustration in Figure 1 below), the 25th percentile would be less than 1 standard deviation below the average and the 75th percentile would be less than 1 standard deviation above the average, i.e. not really very abnormal.

Figure 1. Distributions and averages



Source: Fabian van den Berg https://www.quora.com/What-does-SKEWED-DISTRIBUTION-mean

Were prices "normally distributed" and a wider range set, as would seem more reasonable, e.g. 2 standard deviations, the testing points would then be around the 2.5th percentile and the 97.5th percentile, and very many fewer imports would be judged under- or over-priced.

Homogeneity matters: GFI's use of PFM assumes every category/type of imports is homogenous (i.e. same quality, fully substitutable). But the apparent under-pricing of imports (e.g. from China and India, or of particular types of imports) may arise from quality or other differences (i.e. the category is not homogenous but heterogenous), and not from a deliberate effort to evade taxes. No one would expect a Porsche to be priced the same as a Chinese Geely or an Indian Tata. By comparing prices of Chinese-, Indian- and German-sourced imports with average import prices, it is not surprising that the Chinese or Indian imports seem under-priced or German imports over-priced.

Time matters: GFI uses 12 months as the price data period. A year gives considerable scope for the price of a type of import to change – either to trend or to fluctuate. Just because a price is above or below average need not indicate deliberate mis-pricing. If the data time period were a day, not a year, each period would have few transactions and fewer possibly would be deemed abnormal.

Part 2: GFI's estimates of trade misinvoicing and potential revenue losses for South Africa

Estimates of trade misinvoicing

GFI has made many estimates of trade misinvoicing for South Africa over the years in different reports. Note that comparing GFI's estimates of trade misinvoicing in different reports is difficult: each report uses different methods, parameters and time periods and seems almost always to present its summary published estimates in different ways. Table 1 presents some recent results as annual averages for the period under review. The estimates, even in GFI 2018d) are all made using the PCM approach (GFI 2018d uses the PFM approach only to identify countries and categories of imports that appeared mis-priced).

Table 1. Recent GFI estimates of trade misinvoicing in South Africa (average year in period, US$ million)

Report	Period	Exports		Imports	
		Underinvoicing	**Overinvoicing**	**Overinvoicing**	**Underinvoicing**
GFI 2018d	2010-2014	Based on av total trade 180,197 with exports 88,145 and imports 92,052			
		11,598	8,584	9,833	16,308
GFI 2017	2005-2014	Based on av total trade 170,954			
		Low 6,838 High 11,967	Low 0 High 1,710	Low 1,710 High 1,710	Low 0 High 1,710
GFI 2015	2004-2013	No data on total trade or exports or imports			
		13,608	5,039	6,305	6,818

Source: Global Financial Integrity (GFI 2015, 2017 and 2018d) and the author

The main features seen in Table 1 are the differences and variability in trade misinvoicing estimates in the three reports. In GFI 2018d (i.e. the recent South-Africa-specific report), the estimate of export underinvoicing is broadly consistent with previous reports whereas all other estimates of categories of trade misinvoicing (export overinvoicing, and import overinvoicing and underinvoicing) are found to be higher than in previous reports. The most prominent type of trade misinvoicing in the previous reports was export underinvoicing, in the latest report it is import underinvoicing.

The differences and variability, though doubtless due to changes in methods and parameters as well as changes in trade data over time, bolster the veracity of the WCO view that estimates of trade misinvoicing should be viewed with caution and seen (only) as indicators of risk of trade misinvoicing warranting further investigation.

Estimates of potential revenue losses

GFI estimates potential revenue losses in an average year (2010-2014) as $7,473 million, see Table 2 below. GFI describes its estimates of "potential revenue losses" as conservative and implies that the monies would be available for government spending if the misinvoicing did not occur and could help lift the poor out of poverty.

The potential revenue losses arise from VAT and Customs duties not paid due to import underinvoicing, company tax not paid due to import overinvoicing and export underinvoicing (GFI assumes the pass-through from misinvoiced trading to taxable company income is 1:1) and royalties not paid due to export underinvoicing.

However, GFI's approach involves a sleight of hand: it only includes the potential increases in tax revenues that would be collected if the trade misinvoicing had not occurred and does not include the increases in tax revenues that would have been collected because the trade misinvoicing has occurred.

Table 2 also presents an alternative view (in yellow), based on GFI's trade misinvoicing estimates but netting out the extra revenues that flow to the South African budget if the trade misinvoicing behaviours are as GFI estimates. (The extra taxes deemed collectable are a ***negative*** potential revenue loss.)

Table 2. Alternative portrayals of potential revenue impact of trade misinvoicing in South Africa (average year, 2010-2014, US$ million)

	Memo: GFI estimate	Potential revenue loss					
		VAT (12.7%)	**Customs duty** (3.7%)	**Royalties** (1%)	**Company tax** (21.7%)	**GFI total**	**Net total**
Import underinvoicing	16,308	2,110	596	0	-3,539	2,706	-833
Import overinvoicing	9,833	-1,249	-364	0	2,134	2,134	521
Export underinvoicing	11,598	0	0	116	2,517	2,633	2,633
Export overinvoicing	8,584	0	0	-86	-1,863	0	-1,949
GFI total		2,110	596	116	4,651	7,473	
Net total		861	232	30	-751		372

Source: GFI 2018d (Table 1 and text) and the author.

GFI estimates potential revenue losses in an average year as $7,473 million, amounting to $37 billion over the five years. But, as in Table 2, the net potential revenue loss in an average year would be much less, "only" $372 million, if the potential extra revenue from trade misinvoicing behaviours were included. The net potential revenue loss is reduced for all taxes, especially company tax, which becomes a potential gain.

Were GFI's trade misinvoicing estimates deflated to as little as 15%, as suggested in Choi *et al* in WCO 2018, GFI's estimate of a potential revenue loss of $7,473 million in an average year would decline to $1,121 million, and the estimated net potential revenue loss of $372 million would decline to $56 million.

Summary assessment of Part 1 and Part 2

The GFI estimates of trade misinvoicing must be treated with caution (as only an "indication of risk of trade misinvoicing", as the WCO suggests) and some balance introduced into the interpretation of their impact on tax revenues ("potential revenue losses") by netting out the implied positive revenue impacts of the alleged misinvoicing behaviours.

In addition, a WCO recommendation that more progress could be made in identifying trade misinvoicing if Customs or, alternatively, the Financial Intelligence Unit (FIU), or a Customs/FIU task force, were asked to ***match individual flows of trade***, being both the Custom's declarations and the records of money flows in respect of that trade should be pursued. That matching would achieve more effective and operational insight into trade misinvoicing and trade/tax evasion activities.

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