

advisors in resilience



A review of the UNCTAD report on trade misinvoicing, with a full counterfactual on South African exports

Final report

5 June 2017

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research

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Ref: A review of the UNCTAD study on trade misinvoicing, with a focus on South Africa's exports – including gold, PGMs, and iron ore

Dear Madam, Sir:

At the request of the South African Chamber of Mines, Eunomix Research has conducted an independent, non-peer reviewed, analysis of the UNCTAD study entitled *Trade Misinvoicing in Primary Commodities in Developing Countries: The cases of Chile, Cote d'Ivoire, Nigeria, South Africa and Zambia*.

The UNCTAD study points towards a systematic practice of mis- and underinvoicing among mining companies in these countries, alleging that the mining industry has been engaging in this practice with the direct objective of avoiding taxes or, at the very least, reducing tax burdens in producing countries. Specifically, the report states that mining and oil companies have misappropriated as much as 67% of the export revenues of the countries studied, most of which would occur out of South Africa.

In response to criticism of its preliminary analysis, UNCTAD released an updated version in December 2016, which looked at new data sources in South Africa. The report's methodology did not change and results for South Africa changed marginally.

In October 2016 the Chamber of Mines of South Africa engaged Eunomix to independently review the UNCTAD report, with a focus on South Africa's exports. We released an initial report in December 2016 focused on gold, and followed with a complementary note in February 2017. The present report provides a comprehensive counterfactual on all South African exports analysed by UNCTAD, based on its December 2016 release.

The Chamber of Mines defined the broad objectives of the study, but provided no guidance on the methodology and data. It did, however, provide its publicly available data. It neither influenced our approach nor the results provided herein. The objectives of the Eunomix report have been to review and critique the UNCTAD study in the following ways:

- Identify theoretical issues, limitations and/or flaws.
- Identify issues, limitations and/or flaws with the methodology and data used.
- Verify the accuracy of the analysis conducted.

In addition, this report:

- Proposes an alternative approach to data collection.
- Provides an explanation of the issues of data-collection discrepancies and commodity classification critical to the UNCTAD methodology.
- Conducts a counterfactual analysis by including an explanation of alternative trade data sources ignored or overlooked in the UNCTAD report.

This report has not been peer reviewed, but was subjected to rigorous internal review. Extensive external comments were made to the version we released in December and, where appropriate, relevant modifications were made as we developed this version. This report reflects the views of Eunomix Research, which takes sole responsibility for its content.

We wish to express our gratitude to the UNCTAD report's authors, Prof. Leonce Ndikumana, Mr. Janvier Nkurunziza and Mr. Samuel Gayi of UNCTAD's Commodity Research and Analysis Section (CRAS), for their cooperation in providing us with their dataset and for participating in a phone-based discussion with the Chamber of Mines and Eunomix in October 2016.

Sincerely,



Claude Baissac, Eunomix Group CEO

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1. In a page

- In July 2016 UNCTAD released a report entitled *Trade Misinvoicing in Primary Commodities in Developing Countries: The cases of Chile, Cote d'Ivoire, Nigeria, South Africa and Zambia*.
- The report stated that mining and oil companies in the countries studied would have misappropriated as much as total 67% of export revenues between 2000 and 2014.
- For South Africa, the report calculated cumulative underinvoicing over the period 2000-2014 to have amounted to USD 102.8 billion (in constant 2014 US dollars): USD 620 million for iron ore; USD 24 billion for silver and platinum; and USD 78.2 billion for gold. The country would represent the bulk of the five countries' misinvoicing.
- The UNCTAD study methodology compared reported exports by product and country of destination with the reported imports of the products by those same countries.
- Its central theoretical tenet is that discrepancies between reported exports from commodities producing countries and imports from their trade counterparts greater than 10 percent are allocated to or are the result of misinvoicing.
- The study was extensively quoted in the press and its findings were reproduced and discussed. It was featured in a Financial Times article in its Tax Evasion and Avoidance section as an article entitled *Misinvoicing of commodities costs billions to developing world*.
- The study followed the *AU/ECA Report of the High Level Panel on Illicit Financial Flows from Africa*, chaired by Thabo Mbeki, and released in March 2014. That report estimated that Africa loses about USD 60 billion a year.
- Crucially, the UA/ECA report and the UNCTAD report used the same methodology, originating from the Washington-based organisation Global Financial Integrity, which has recently estimated that in 2014 alone developing countries would have lost between 2 and 3.5 trillion dollars to IFFs. GFI makes the crucial determination that an **“average of 87 percent of illicit financial outflows were due to the fraudulent misinvoicing of trade.”**
- The counterfactual studies conducted by Eunomix, and focused on South Africa, have easily demonstrated that the UNCTAD study's findings are both theoretically and empirically incorrect:
 - In the case of gold, the trade data discrepancy figure of USD 78.2 billion (in the July 2016 report) or USD 57 billion (in the December 2016 report) was shown to actually be only USD 9.8 billion, according to other reliable data sources in South Africa.
 - In the case of silver and platinum, the trade data discrepancy figure of USD 24 billion was shown to be only USD 15 billion, according to other reliable data sources in South Africa.
 - In the case of iron ore, the trade data discrepancy figure of USD 620 million for iron ore was shown to be lower than the figures compiled by the DMR and DTI.
- Eunomix rejects the UNCTAD study's conclusion that trade misinvoicing is substantial, and that underinvoicing is preponderant in misinvoicing. It is our view that the UNCTAD study mainly, and perhaps exclusively, documented trade data discrepancies rather than actual trade discrepancies:
 - The core proposition $\text{Trade Discrepancy} = \text{Trade Misinvoicing}$ if greater than 10 percent appears false.
 - In reality, Trade Data Discrepancy imperfectly reflects Actual Trade Discrepancy, which may or may not indicate Trade Misinvoicing.

2. Executive summary

The UNCTAD study of July 2016

- In July 2016 UNCTAD released a report entitled *Trade Misinvoicing in Primary Commodities in Developing Countries: The cases of Chile, Cote d'Ivoire, Nigeria, South Africa and Zambia*. The report points towards a systematic practice of mis- and underinvoicing by mining companies operating in these countries.
- The report stated that mining and oil companies in the countries studied would have misappropriated as much as total 67% of export revenues between 2000 and 2014.
- For South Africa, the report calculated cumulative underinvoicing over the period 2000-2014 to have amounted to USD 102.8 billion (expressed in constant 2014 US dollars); USD 620 million for iron ore; USD 24 billion for silver and platinum; and USD 78.2 billion for gold. The country would represent the bulk of the misinvoicing of the five countries examined.
- The UNCTAD study methodology compared reported exports by product and country of destination with the reported imports of the products by those same countries. It did so by using the United Nations Commodity Trade Statistics (UN COMTRADE) database. Illustratively, it compared South Africa's reported iron-ore exports to China with China's reported iron-ore imports from South Africa, converting annual figures into constant 2014 US dollars.
- The UNCTAD study's central theoretical tenet is that discrepancies between reported exports from commodities producing countries and imports from their trade counterparts greater than 10 percent are allocated to misinvoicing. Misinvoicing might be overinvoicing, where the reported exports are greater than the reports imports, or underinvoicing, where imports exceed the value of exports.
- On this basis, the report found substantial and systematic discrepancies between the export values reported by exporting countries and import values reported by importing counties for the same products. In some cases, it found evidence of overinvoicing (e.g. copper from Chile) and of both over- and underinvoicing of the same product in different years (e.g. oil exports from Nigeria, copper from Zambia and silver and platinum from South Africa). But the overwhelming finding was of underinvoicing.
- One of the key conclusions of the report was that misinvoicing is likely to be the result of deliberate illicit action: *"(As regards) the puzzling case of gold exports from South Africa, (...) the country's official statistics report very little gold exports while substantial amounts appear in its leading trading partners' records. This does not appear to be a simple matter of undervaluation of the quantities of gold exported, but rather a case of pure smuggling of gold out of the country. (...)"*¹

Critiques of the July report and the revised UNCTAD study of December 2016

- Widespread criticism followed the publication of the study. Many critics found significant flaws in the theory, methodology and data. Eunomix released a comprehensive review in December 2016.
- Critics pointed out that the report failed to account for the complexities of international trade, for the difference between material and financial trade, for differing reporting standards and capabilities across countries and for the inherent risks of using single databases to document global economic phenomena. For instance, differences in reporting destination country in case of re-exporting, in reporting destination country in case of storage and in reporting destination country due to 'virtual' trading hubs.

¹ UNCTAD. July 2016. *Trade Misinvoicing in Primary Commodities in Developing Countries: The cases of Chile, Cote d'Ivoire, Nigeria, South Africa and Zambia*. Page 31.

- In the case of South Africa, SARS and the Statistician General pointed out egregious inaccuracies in how the report accounted for the country's gold exports and disputed its findings.
- The Eunomix December report provided a comprehensive review of the UNCTAD study and demonstrated flaws in its theory, in its account of the literature on the subject of trade data discrepancies and in its analysis of South Africa's gold exports.
- UNCTAD presented an updated report in December 2016 with the goal of clarifying "...areas of confusion in the interpretation of the results and inadequate understanding of the key concepts used in the analysis." The report notably reiterates the key tenets that: i) discrepancies greater than 10 percent are the product of intentional corporate practices seeking illicit benefits; 2) COMTRADE data is accurate enough to support empirical documentation of misinvoicing.
- Insofar as South Africa's gold exports were concerned, the revised report revisited the methodology to take into account the criticism that UNCTAD had simply used inaccurate data. UNCTAD introduced limited correction by comparing the imports of trading partners to be "non-monetary gold" with South Africa's exports of "non-monetary gold". It excluded the 2011 to 2014 period, thus reducing the misinvoicing amount from USD 78.2 billion to around USD 57 billion for 2000 to 2010. This provides "*prima facie* indication of export misinvoicing". The study's original findings on South Africa's misinvoicing for silver & platinum and iron ore have been maintained.

Significance of the UNCTAD study

- The UNCTAD study's significance arises firstly from its claims of large, systematic trade misinvoicing and its attribution of this misinvoicing to intentional behaviour by mining companies and/or traders. In the case of South Africa, the July report described "a case of pure smuggling of gold out of the country."²
- Its significance also arises from its explicit linkage of trade misinvoicing with illicit financial flows. On 16 July 2016 UNCTAD's Secretary General, Dr. Mukhisa Kituyi, characterised the findings of the study as providing "fresh lines of enquiry to understand the problem of illicit trade flows."³
- Upon its publication, the study was extensively quoted in the press and its findings were reproduced and discussed in the blogosphere. It was featured in a Financial Times story in its Tax Evasion and Avoidance section headlined *Misinvoicing of commodities costs billions to developing world*.⁴
- The study followed the *AU/ECA Report of the High Level Panel on Illicit Financial Flows from Africa*, chaired by Thabo Mbeki and released in March 2014. That report estimated that Africa loses about USD 60 billion a year.
- Crucially, the UA/ECA report and the UNCTAD report used the same methodology, appearing to have originated from work conducted by the Washington-based organisation Global Financial Integrity.⁵ In a report released in April 2017 Global Financial Integrity, using the same methodology, estimate that in 2014 alone developing countries would have lost between USD 2 and 3.5 trillion dollars to IFFs. GFI makes the crucial determination that an "average of 87 percent of illicit financial outflows were due to the fraudulent misinvoicing of trade."⁶

² UNCTAD. July 2016. *Trade Misinvoicing in Primary Commodities in Developing Countries: The cases of Chile, Cote d'Ivoire, Nigeria, South Africa and Zambia*. Page 31.

³ UNCTAD. 16 July 2016. *United Nations: Some countries losing up to 67 per cent of commodity exports earnings due to misinvoicing*. <http://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1277>.

⁴ Financial Times. 16 July 2016. *Misinvoicing of commodities costs billions to developing world*.

⁵ Global Financial Integrity. 2010. *Illicit Financial Flows from Africa: Hidden Resource for Development*.

⁶ *Ibid.*

- These findings are not trifling. They carry very significant implications for the global economy, for the relationships between developing countries and their trading partners, for the management of customs authorities, for the administration of global trade and for the reputations of companies exporting from developing countries.
- Yet, the focus on trade misinvoicing as the most effective approach to measuring IFFs is in itself controversial. Indeed, there is no consensus on there being a link between trade misinvoicing and IFFs. For instance, the World Bank “recommends focusing on flows and activities that have a clear connection with illegality”⁷, where IFFs are made of transactions where “the acts themselves are illegal (e.g., corruption, tax evasion)” or “the funds are the results of illegal acts (e.g., smuggling and trafficking in minerals, wildlife, drugs, and people)”. The IMF cautions “against attempting to measure [illicit flows] by using discrepancies in macroeconomic datasets... official estimates of trade misinvoicing cannot be derived by transforming trade data from the IMF Trade Statistics and/or UN COMTRADE, either by individual country or in aggregate.”⁸

Relevance of the Eunomix project

- However, little attention appears to be paid to these warnings as claims connecting trade misinvoicing and IFFs continue to grow unabated.
- There is increasing evidence that the accusations of extensive misinvoicing are feeding a growing lack of trust between key stakeholders in the mining industry.
- Considering the findings of the UNCTAD, the AU/ECA report and, now, the latest GIF report, and given the controversy around the issues of IFFs, trade misinvoicing, the methodology used by both reports to estimate these and the wide attention garnered, this Eunomix project has acquired particular significance. It is of great relevance to governments, international organisations, civil society, industry and scholars.
- The Eunomix report is thus expected:
 - Firstly, to contribute to the important debate on IFFs and the role of trade misinvoicing in them.
 - Secondly, to benefit the governments of developing countries from an independent examination of the UNCTAD report in order to assess whether the claims made are valid and, on this basis, to improve the determination of the necessity and types of actions required to address the issue.
 - Thirdly, to assist the mining industry, which is currently considered the main source of IFFs in Africa, in addressing the issues raised by these reports, be they of substance or of methodology.

Eunomix review of the UNCTAD study: the theory

- The UNCTAD study’s central theoretical tenet is that discrepancies between reported exports from commodities-producing countries and imports from their trading counterparts greater than 10 percent are allocated to misinvoicing. Misinvoicing might be overinvoicing, where the reported exports are greater than the reported imports, or underinvoicing, where imports exceed the value of exports.
- Crucially, the UNCTAD study advances the concept that misinvoicing is not the product of discrepancies in trade data attributable to variations or errors in data reporting or measurement. UNCTAD’s main argument in support of this hypothesis is that statistical errors over time for a particular data set correct themselves through probabilistic averages. Since trade discrepancies show either persistency or increase, misinvoicing must be the cause.

⁷ <http://www.worldbank.org/en/topic/financialmarketintegrity/brief/illicit-financial-flows-iffs>.

⁸ Cited by Forstater. <https://www.cmi.no/publications/5979-illicit-flows-and-trade-misinvoicing>.

- The UNCTAD study does not provide a discussion of alternative theoretical propositions as regards the practice of trade misinvoicing, its prevalence, its scale and its origins. This leads to the misleading conclusion that the theoretical proposition at the core of the report is undisputed.
- Yet, the subjects of (1) trade misinvoicing, and (2) the relationship between trade misinvoicing and trade discrepancy, have both received widespread attention and have been the foci of significant debates. Contrary to the impression created by the UNCTAD study, the central proposition of the study is NOT the subject of consensus:
 - Firstly, there is no consensus, whether theoretical or empirical, that trade-data discrepancies correlate with trade misinvoicing, much less that trade misinvoicing would be the primary cause of such discrepancies. Connected to this point, while trade misinvoicing is recognised as being a practice, it may not explain, in whole or in part, trade-data discrepancies.
 - Secondly, therefore, there are alternative theoretical and empirical explanations for the existence and resilience of large trade-data discrepancies. This point invalidates the notion that discrepancies caused by data error would be self-correcting.

Empirical review: counterfactual on South Africa's gold, platinum (and silver) and iron-ore exports

- A key finding of the July 2016 UNCTAD report relates to an alleged misinvoicing of USD 78.2 billion in gold, USD 24 billion in silver and platinum, and USD 620 million in iron-ore exports from South Africa between 2000 and 2014. This claim in particular garnered widespread international and national attention because, according to the UNCTAD study, this represented the largest instance of misinvoicing ever documented. In its December report UNCTAD revised the amount to around USD 57 billion.

Gold

- The limited counterfactual produced by Eunomix clearly demonstrates that the UNCTAD study's findings on South Africa's gold exports are in large part invalid, and notably:
 - The loss of gold export revenues amounting to USD 78.2 billion between 2000 and 2014 has been proven incorrect on the basis of alternative, publicly and readily available data. Instead, the amount of discrepancy identified is USD 19.5 billion. If one uses the UNCTAD methodology, where a 10% discrepancy is considered 'regular', given it can be attributed to the cost of freight and insurance, then the misinvoicing discrepancy is USD 9.8 billion.
 - Therefore the total reported loss of gold revenue of USD 78.2 billion is by necessity false by at least USD 68.9 billion.
 - So, too, is the reported loss of gold revenue of USD 57 billion estimated in the December 2016 UNCTAD report.
- The UNCTAD study's observation that "there is a perfect correlation between gold export underinvoicing and the volume of exports as reported by the country's trading partners"⁹ is therefore flawed.
- Furthermore, the presence of a remaining discrepancy in gold exports of USD 19.5 billion does not mean that this amount represents trade misinvoicing. A highly credible explanation is the refining in South Africa of gold from other African countries. There is a high likelihood that this gold is classified as South African gold by importers, whereas it is (correctly) not declared as South African gold exports by customs in South Africa (no export is recorded because it is considered gold that has its origin in another African gold-mining country).

⁹ UNCTAD. July 2016. Page 28.

Silver and platinum

- The report claims that export misinvoicing totals USD 24 billion for silver and platinum exports from South Africa.
- The report notes that there were three years in particular (2000, 2002, 2014) when misinvoicing seems to be significant. There is no attempt, however, to try to understand discrepancies during these years.
- In Eunomix's counterfactual analysis, data gathered from South Africa's Department of Mineral Resources (DMR) and from the Department of Trade and Industry (DTI) show a smaller difference between export statistics of South Africa compared with the trading partners of South Africa. Using the trade statistics provided by the DTI, the trade discrepancy (based on anything more than the 'regular' 10 percent discrepancy margin rate) drops to USD 15 billion. The very large discrepancies between trade values reported in 2000 and 2002 by South Africa, versus those reported by the trading partners, is shown to have been a data-collection issue. Both the DMR and DTI show far higher silver and platinum exports for the years 2000 and 2002. This further advances the argument that trade discrepancies are in many cases caused by data discrepancies, contrary to UNCTAD's claim that this is not an issue.
- A likely explanation for at least some of the remaining discrepancy is that platinum mined in Zimbabwe, but refined in South Africa, is recorded by importers as SA platinum and not Zimbabwean platinum. As with non-SA gold exports, South Africa should not include such exports in its export data. But platinum importers may not make such a distinction resulting in an over-reporting of South African platinum exports by its trading partners.

Iron Ore

- The study claims that export misinvoicing totals USD 600 million for iron-ore exports from South Africa.
- It notes two contrary trends: with respect to South Africa's seven leading export destinations there was export underinvoicing of USD 5.6 billion between 2000–2010, while during the period 2011–2014, there was \$1.3 billion in iron-ore export overinvoicing. Again there is no attempt at an explanation for these discrepancies.
- In Eunomix's counterfactual investigation, the South African export data (both from the DMR and DTI) showed lower figures than those shown on COMTRADE. This demonstrates an even larger trade discrepancy. It is not, however, proof that misinvoicing is occurring. Rather it shows the problems there are with data discrepancies in general.
- The Netherlands and Japan are noted as having particularly large overinvoicing discrepancies. The Netherlands is renowned for being a trans-shipment port. This results in significant confusion and data discrepancies as Rotterdam (the Netherlands) is not the final destination for goods. It is highly likely (and indeed correct in terms of reporting requirements) that South Africa recorded the destination of export as the Netherlands for a large amount of iron ore, even though it ended up in other EU states or was shipped further abroad. It seems like this too is likely the case with Slovenia whose ports are used for iron-ore exports destined for Austria.
- Lastly, there is a significant assumption made by UNCTAD with regards to the Cost, Insurance and Freight (CIF) amount in the equation to calculate the value of misinvoicing. The assumption is that a flat rate of 10% of the value of the export value be assumed for CIF. The equation is laid out as follows: *Country B's imports from country A = Country A's exports to country B + freight and insurance*
- With freight and insurance assumed to be 10% of the export value, the import value is 1.1 times the value of the import. With iron ore being a low-value, heavy (in terms of weight) commodity which is transported large distances, the cost of freight and insurance cannot be assumed to be so low.

Summary assessment of the UNCTAD study

- The counterfactual studies conducted by Eunomix, and focused on South Africa, have easily demonstrated that the UNCTAD study's findings are both theoretically and empirically incorrect:
 - In the case of gold, the trade-data discrepancy figure of USD 78.2 billion (in the July 2016 report) or USD 57 billion (in the December 2016 report) was shown actually to be only USD 9.8 billion, according to other reliable data sources in South Africa.
 - In the case of silver & platinum, the trade-data discrepancy figure of USD 24 billion was shown actually to be only USD 15 billion, according to other reliable data sources in South Africa.
 - In the case of iron ore, the trade-data discrepancy figure of USD 620 million for iron ore was shown to be lower than the figures compiled by the DMR and DTI.
- Eunomix rejects the UNCTAD study's conclusion that trade misinvoicing is substantial and that underinvoicing is preponderant in misinvoicing.
- It is our view that the UNCTAD study mainly, and perhaps exclusively, documented trade-data discrepancies rather than actual trade discrepancies:
 - The core proposition Trade Discrepancy = Trade Misinvoicing if greater than 10 percent appears false.
 - In reality, Trade Data Discrepancy imperfectly reflects Actual Trade Discrepancy, which may or may not indicate Trade Misinvoicing.
- Accordingly, it is likely that trade data analysis at the aggregate data level does not permit positive identification of trade misinvoicing. At best it identifies data discrepancies. These may or may not be the product of misinvoicing.
- By implication, the conclusion that large discrepancies are the product of deliberate action by economic operators wilfully engaged in illicit financial flows is incorrect. By not having documented trade misinvoicing, the UNCTAD study had therefore not documented illicit financial flows.
- Given the global attention the UNCTAD report attracted, and given its reputational implications for all concerned, the study should have provided a comprehensive account of the different schools of thoughts on the relationship between trade discrepancies and trade misinvoicing. It should have heeded the calls for prudence in trade-data analysis emitted by, *inter alia*, UNStats (COMTRADE's custodian), the IMF, the OECD and the World Bank. It should have entertained different hypotheses where it found meaningful persistent discrepancies. It should have interrogated the contradictions between hypothesis and results when these appeared. It should have approached the relevant authorities and implicated parties for comment before releasing the study. Had this been done, the basic and mutually reinforcing errors committed in the study might have been at least partly mitigated.
- As a further demonstration of its deep theoretical flaws, the study argued that primary commodities dominate the exports of the countries surveyed. This is patently circular in argument since the very reason why these countries were studied in the first place was because of their being characterised as countries whose commodity exports were economically dominant.
- In addition to justifying questions on the scientific validity of the UNCTAD study, the lack of effort to find alternative data sources and the lack of alternative hypotheses render acceptable questions about the motives of the report. Indeed, the conclusion that the report sought to prove a tenuous hypothesis by excluding alternative perspectives and approaches and by its focusing on a one-dimensional, self-reinforcing, empirical analysis without alternative hypotheses and data sources is not unreasonable.

3. Introduction

3.1. Context of project, relevance and evolving debate

3.1.1. UNCTAD's July 2016 report on trade misinvoicing

In July 2016 UNCTAD released a report entitled *Trade Misinvoicing in Primary Commodities in Developing Countries: The cases of Chile, Cote d'Ivoire, Nigeria, South Africa and Zambia*. The report points towards a systematic practice of mis- and underinvoicing among mining companies in these countries, alleging that the mining industry has been engaging in this practice with the direct objective of avoiding taxes or, at the very least, of reducing tax burdens in producing countries. Specifically, the report stated that mining and oil companies would have misappropriated as much as 67% of the export revenues of the countries studied between 2000 and 2014.

The implication of that report has been that South African miners in the commodities surveyed would have been committing systematic deliberate fraud to pay no tax on these illegal exports, or to bypass South Africa's foreign-exchange regulations. As a result, it is claimed, South Africa has lost a significant amount of the foreign currency earned from gold, platinum and iron-ore sales.

The UNCTAD study – and particularly its findings on South Africa's gold exports – has been exposed to criticism in a number of articles in the media. These include responses by the South African Chamber of Mines, by the South African Revenue Service, the country's Statistician General¹⁰ and a handful of economists. It has been pointed out that the UNCTAD study failed to recognise that because of gold's historical monetary role, South Africa does not report gold exports by country of destination. This flaw has neither been acknowledged nor corrected by UNCTAD. Critics have also explained that the multiple nature of copper trading globally complicates the reporting of country of destination, as this often changes when the cargo is already en route.

UNCTAD, through its website, initially acknowledged some of these responses, but maintained its claim that the results of the analysis were valid. Its online response dating August 2016 noted that: “these challenges do little to reassure about the lack of transparency in the trade of commodities from developing countries. As we have highlighted, this misinvoicing – a word that we use in its most technical sense, without attaching value or even accusation – means that some countries may be losing as much as 67 percent of their commodity exports.”¹¹

3.1.2. Relevance and significance of this project

The UNCTAD study attracted much attention through its findings of systematic trade misinvoicing, and particularly so in the case of South Africa's gold exports, as it represented the largest claim of misinvoicing. Here, the study explicitly made an accusation of malpractice:

(As regards) the puzzling case of gold exports from South Africa, (...) the country's official statistics report very little gold exports while substantial amounts appear in its leading trading partners' records. This does not appear to be a simple matter of undervaluation of the quantities of gold exported, but rather a case of pure smuggling of gold out of the country.¹²

The study established a direct link between trade misinvoicing and illicit financial flows (IFFs). In its press release announcing the publication of the study, UNCTAD stated that:

¹⁰ Van Rensburg, D. 1 August 2016. *How wrong the UN was on SA's "smuggling"*. In City Press.

¹¹ UNCTAD. 2 August 2016. *UNCTAD welcomes discussion, transparency on commodities and misinvoicing. UNCTAD welcomes the comments on its commodities paper, which was published earlier this month.* <http://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1309>.

¹² UNCTAD. July 2016. Page 31.

Trade misinvoicing is thought to be one of the largest drivers of illicit financial flows from developing countries, so that the countries lose precious foreign exchange earnings, tax and income that might otherwise be spent on development¹³

On 16 July 2016 UNCTAD's Secretary General, Dr. Mukhisa Kituyi, characterised the findings of the study as providing "fresh lines of enquiry to understand the problem of illicit trade flows"¹⁴ and invited countries and companies to join efforts to improve transparency and partner with UNCTAD on developing further research on the issue. At the 2017 Mining Indaba in Cape Town, South Africa, Dr Kituyi stated that:

In the case of SA and some others there is a large difference between the declared export and the final product at the destination. The mistake in the analysis of the UNCTAD report was to blankly generalise that the difference between the exports and arrivals represented misinvoicing. In the global system it could have been rerouted to a better market place. So, the absence of tracking statistics should not mean misinvoicing. It means we need more cooperation between importers and exporters.¹⁵

In an interview with the UNCTAD press office published in 17 July, the report author, Prof. Leonce Ndikumana, of the University of Massachusetts, explained that:

Trade misinvoicing consists of manipulations of exports and imports invoices by operators seeking to either secure foreign exchange advantages not reported to the relevant authorities, such as a central bank, and/or to avoid taxation or customs duties. (...) On the export side, exporters, both firms or individuals report an amount which is less than the true value of the goods exported, so as to keep the difference abroad. On the import side, importers exaggerate the cost of the goods to be purchased abroad so as to obtain extra foreign exchange from the central bank. The extra foreign exchange is invested or spent abroad. In both cases, the country incurs a loss in foreign exchange, hence capital flight. Imports may be "underinvoiced" to minimise customs duties. Imports may also simply not be reported at all -- which is basically smuggling.¹⁶

Upon its publication the study was extensively quoted in the press and its findings were reproduced and discussed in the blogosphere. It was featured in a Financial Times story in its Tax Evasion and Avoidance section as an article entitled *Misinvoicing of commodities costs billions to developing world*.¹⁷

Besides the significance of its findings, the study has contributed to the increased focus on IFFs that followed the *AU/ECA Report of the High Level Panel on Illicit Financial Flows from Africa*, chaired by Thabo Mbeki, and released in March 2014. That report estimated that Africa loses about USD 60 billion a year.

Crucially, the UA/ECA report and the UNCTAD report used the same methodology, appearing to have originated from work conducted by the Washington-based organisation Global Financial Integrity.¹⁸ The UA/ECA report explains that focus on trade misinvoicing to document IFFs:

(...) was informed mainly by reasons of availability of data and the fact that United Nations Comtrade data enable the use of detailed trade data and accordingly for a more nuanced

¹³ UNCTAD. 16 July 2016. *United Nations: Some countries losing up to 67 per cent of commodity exports earnings due to misinvoicing*. <http://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1277>.

¹⁴ *Ibid.*

¹⁵ Smith, C. 9 February 2017. *Unctad chief sets record straight on SA gold mis-invoicing*. In Fin24.

¹⁶ UNCTAD. 17 July 2016. *Q&A with Leonce. Ndikumana. A new UNCTAD study reveals staggering revenue losses to developing countries from commodity trade mispricing. We speak to the author*. <http://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1280>.

¹⁷ Financial Times. 16 July 2016. *Misinvoicing of commodities costs billions to developing world*.

¹⁸ Global Financial Integrity. 2010. *Illicit Financial Flows from Africa: Hidden Resource for Development*.

approach. The results of the study undertaken by ECA (see annex III) show that in 2001–2010 African countries lost up to \$407 billion from trade mispricing alone.¹⁹

In a report released in April 2017 Global Financial Integrity, using the same methodology, estimated that in 2014 alone developing countries would have lost between USD 2 and 3.5 trillion dollars to IFFs:

Consistent with its reports, GFI finds that IFFs remain persistently high. The study finds that over the period between 2005 and 2014, IFFs are likely to have accounted for between about 14.1 percent and 24.0 percent of total developing-country trade, on average, with outflows estimated at 4.6 percent to 7.2 percent of total trade and inflows between 9.5 percent to 16.8 percent.²⁰

GFI makes the crucial determination that an “average of 87 percent of illicit financial outflows were due to the fraudulent misinvoicing of trade.”²¹

These findings are not trivial. They carry very significant implications for the global economy, for the relationship between developing countries and their trading partners, for the management of customs authorities, for the administration of global trade, and for the reputation of companies exporting from developing countries.

Yet, the focus on trade misinvoicing as the most effective approach to measuring IFFs is in itself controversial. Indeed, there is no consensus on the link between trade misinvoicing and IFFs.

The OECD defines IFFs as “financial flows (...) generated by methods, practices and crimes aiming to transfer financial capital out of a country in contravention of national or international laws.”²²

The World Bank “recommends focusing on flows and activities that have a clear connection with illegality”²³, where IFFs are made of transactions where “the acts themselves are illegal (e.g., corruption, tax evasion)” or “the funds are the results of illegal acts (e.g., smuggling and trafficking in minerals, wildlife, drugs, and people)”.

The AU/ECA report defines IFFs as “money illegally earned, transferred or used”, and explains that “these flows of money are in violation of laws in their origin, or during their movement or use, and are therefore considered illicit.” This is in line with the OECD and World Bank definitions. But the report elaborates on this:

We placed emphasis on illegality across any stages of such outflows to show that a legal act in one geographical location does not nullify the intent and purpose of such outflows, which is to hide money even if legitimately earned. We also felt that the term “illicit” is a fair description of activities that, while not strictly illegal in all cases, go against established rules and norms, including avoiding legal obligations to pay tax.²⁴

Taking a wider definition of the term illicit, the Panel includes activities that are generally considered legal. As in the case of the UNCTAD study, this is critically material to how the report measures IFFs, and how this has impacted the ensuing debates and measures proposed to combat IFFs. For instance, the AU/ECA Report categorises IFFs as consisting of commercial activities, criminal activities and corruption, with “commercial activities as accounting for 65 per cent of IFFs, criminal activities for 30 per cent and corruption for around 5 per cent.”²⁵

¹⁹ AU/ECA. March 2014. *Report of the High Level Panel on Illicit Financial Flows from Africa*. Page 33.

²⁰ Global Financial Integrity. 2017. *Illicit Financial Flows to and from Developing Countries: 2005-2014*. Page vii.

²¹ *Ibid.*

²² OECD. 2014. *Illicit Financial Flows from Developing Countries: Measuring OECD Responses*. Page 16.

²³ <http://www.worldbank.org/en/topic/financialmarketintegrity/brief/illicit-financial-flows-iffs>.

²⁴ AU/ECA. March 2014. Page 23.

²⁵ *Op. cit.* Page 24.

It is on the basis of these definitional and methodological choices that determination has been made by both the AU/ECA and the UNCTAD studies that the vast majority of documented IFFs out of Africa would originate from mining in Southern Africa.

Yet, as the IMF states:

We caution against attempting to measure [illicit flows] by using discrepancies in macroeconomic datasets... official estimates of trade misinvoicing cannot be derived by transforming trade data from the IMF Trade Statistics and/or UN COMTRADE, either by individual country or in aggregate.²⁶

However, these warnings do not seem to be paid much attention as claims connecting trade misinvoicing and IFFs continue to grow unabated. There is increasing evidence that the accusations of large misinvoicing are feeding a growing lack of trust between key stakeholders in the mining industry.

Considering the findings of the UNCTAD, the AU/ECA report, and now the latest GIF report, and given the controversy around the issues of IFFs, trade misinvoicing, the methodology used in both reports to estimate these and the wide attention garnered, this project has taken particular significance, and is of great relevance to governments, international organisations, civil society, industry and scholars.

In terms of this report:

- Firstly, it is expected that our independent examination of the UNCTAD report, including an in-depth review and discussion of the methodology, will contribute to the important debate on IFFs and the role of trade misinvoicing in them.
- Secondly, governments of developing countries will benefit from an independent examination of the UNCTAD report in order to assess whether the claims made are valid and, on this basis, improve the determination of the necessity and types of actions required to address the issue.
- Thirdly, the mining industry, which is currently considered to be the main source of IFFs in Africa, will need to address the issues raised by the reports, whether they be issues of substance or of methodology.

3.1.3. *The Eunomix findings on South African gold exports*

In September 2016, the South African Chamber of Mines commissioned Eunomix to provide an independent review of the UNCTAD study, given its implications for the industry. The objectives of the research were to:

1. Review and discuss the study's theoretical and empirical tenets, building on the critiques levelled at it by third parties like Forstater,²⁷ the South African Revenue Service, the South African Statistician General²⁸, and Worstall.²⁹
2. Conduct a limited counterfactual analysis focused on the report's largest and most disputed claim of misinvoicing, South Africa's gold exports for the period 2000-2014, including an explanation of alternative trade-data sources and an explanation of the issues of commodity classification.

The Eunomix report, entitled *A Review of the UNCTAD Trade Misinvoicing Report, with a Focus on South Africa's Gold Exports*, was released in December 2016. Its main findings were that:

1. The UNCTAD study's most significant finding, that South Africa's gold exports for the period 2000-2014 were underinvoiced by USD 78.2 billion (in constant 2014 dollars) was substantially wrong. Using alternative data, we found a discrepancy between exports and imports of USD 19.5 billion. If one uses

²⁶ Cited by Forstater. <https://www.cmi.no/publications/5979-illicit-flows-and-trade-misinvoicing>.

²⁷ Forstater, M. July 20, 2016. *Misinvoicing or misunderstanding?* Independently published.

²⁸ Van Rensburg, D. August 2016. *How wrong the UN was on SA's "smuggling"*. In City Press.

²⁹ Worstall, T. July 18, 2016. *Countries Are Losing 67% Of Export Revenue Due To Misinvoicing - UNCTAD Needs To Get A Clue*. In Forbes.

the UNCTAD methodology, where a 10% discrepancy is considered ‘regular’, given it can be attributed to the cost of freight and insurance, then the misinvoicing discrepancy is USD 9.8 billion (the USD 78.2 billion figures was developed on the basis of this methodology). This discrepancy was addressed in a subsequent Eunomix report released in February 2017.³⁰

2. The UNCTAD study suffered from serious theoretical and methodological flaws, which resulted not just in the empirical mistake regarding South Africa’s gold exports but in the entire premise of the report. The UNCTAD study rests on the proposition that discrepancies between exports from commodities-producing countries and imports from their trade counterparts greater than 10 percent is the result of deliberate misinvoicing by either the exporter, the importer, or both. Eunomix argued that this proposition is flawed and is largely disputed in the literature.

3. As our December report stated then and was confirmed by our February report:

The gold case validates the school of thought that does not posit a connection between trade discrepancies and misinvoicing. It also reaffirms the call for prudence in trade-data analysis using one database emitted by numerous authors and institutions – COMTRADE’s custodian included (UNStats). As concerning with the UNCTAD study is the fact that alternative sources of data which would have proven the findings to be incorrect – insofar at least as South Africa’s gold exports were concerned – are readily and publicly available. The UNCTAD study, it appears, made no effort to verify whether such data existed.³¹

3.1.4. The UNCTAD December 2016 review

In December 2016, UNCTAD issued a revised version of its study. It noted that “the reactions to the report also revealed some areas of confusion in the interpretation of the results and inadequate understanding of the key concepts used in the analysis. The revised report provides a more detailed exposition of the methodology and the concepts used while further stressing the main messages from the analysis.”³²

While it provides some useful precision, the report maintains its overall position of the validity of the theory and the data for the countries covered in the study. Its central tenet is that discrepancies between reported exports from commodities-producing countries and imports from their trade counterparts greater than 10 percent are allocated to misinvoicing. Misinvoicing might be overinvoicing, where the reported exports are greater than the reports imports, or underinvoicing, where imports exceed the value of exports.

Insofar as South African gold exports, the December report acknowledges mistakes in the methodology of the July report, while leaving unchanged its results for the country’s other measured discrepancies (platinum and iron ore), and for the other countries studied (Chile, Cote d’Ivoire, Nigeria and Zambia).

It distinguishes between reported non-monetary and non-monetary gold exports from South Africa for the period 2000-2010. It assumes that only the non-monetary gold is relevant for comparison with trading partners’ data. Non-monetary gold is considered to be a separate product from monetary gold and presumably would have had to be reported elsewhere in trading partners’ data.

This appears wrong: South Africa trade data did not distinguish between monetary and non-monetary gold on the basis of gold’s intended use. The “monetary gold” in South Africa’s data was not going into countries’ gold reserves and only “non-monetary gold” into jewellery. Rather, the reporting was done that way because gold as a product was defined in trade-reporting guidelines as money. It was therefore mainly reported by South Africa as monetary, even if it was intended to be used by the buyers for non-monetary purposes. What this means is that South African gold exports continue to be massively underreported by UNCTAD, as only

³⁰ Eunomix. February 2017. *Further findings on SA’s gold exports in response to the Unctad trade misinvoicing study of July 2016*. <http://www.eunomix.com/research.php>.

³¹ Eunomix. December 2016. *A Review of the UNCTAD Trade Misinvoicing Report, with a Focus on South Africa’s Gold Exports*. Page 7. <http://www.eunomix.com/research.php>.

³² UNCTAD. December 2016. *Trade Misinvoicing in Primary Commodities in Developing Countries: The Cases of Chile, Cote d’Ivoire, Nigeria, South Africa and Zambia*. Page 1.

reported non-monetary gold is compared with that imported by the country's trading partners. If monetary gold is included then reported annual exports mostly exceed the reported imports of our trading partners.

In a blog published on 6 January 2017 on the website of the Center for Global Development, Forstater³³ demonstrated in a useful chart that under the new UNCTAD estimates a staggering 96 percent of the gold exported by South Africa (non-monetary) would be underinvoiced. Stated differently, only 4 percent of SA's non-monetary gold would be properly invoiced. This is clearly wrong.

3.1.5. *The Eunomix February report final finding on South Africa's gold exports*

In February 2017 Eunomix released the final findings of its gold counterfactual, and determined that most of the USD 19.5 billion discrepancy can very likely be attributed to errors in the reported gold imports of South Africa's trading partners, not in South Africa's reported (monetary and non-monetary) gold exports. This likely occurred through the fact that SA refines large amounts of gold for certain African gold-producing countries such as Ghana or Mali (currently standing at approximately 50 percent of total gold refined in South Africa), which is reported by some importers as South African gold instead of coming from its real origin.

3.2. Objective, methodology and structure of this report

The objective of this report is to test the validity and strength of the methodology, data and conclusions drawn from the UNCTAD study. This report includes a comprehensive review of the UNCTAD study, as well as the counterfactuals analysis for all three commodities exported by South Africa and analysed by the UNCTAD study. Our report maintains its original focus on the first UNCTAD study, as it was the one that received the most public attention, and the one whose key findings remain in the public domain. Where substantive variations have been introduced in the second study, we note and discuss them.

The approach used for this report has been to **first** conduct an in-depth review and discussion of the UNCTAD study focused on understanding its theoretical tenets and its methodology (Part A). We have reviewed the literature used in the study, and sought to determine whether that literature is complete, given the highly contested nature of the UNCTAD study, notably its claims as regards the direct, causal link between trade discrepancies, beyond a 10% variation (known as trade misinvoicing), and illicit behaviour (by companies and/or governments) (Part B).

In a **second step**, we have sought to test the empirical results for South Africa's exports (gold in Part C, silver & platinum and iron ore in Part D), given the numerous criticisms levelled at the study. This test was conducted in the following way:

- First, we reconstituted the UNCTAD analysis through data provided to us by the report's author and retrieving original COMTRADE data.
- Then, we identified alternative trade-data sources to determine if UNCTAD's findings were correct, and to provide, where applicable, differing estimates of trade discrepancies/trade misinvoicing.
- Finally, where discrepancies remained we sought to find an explanation of the data collection issues and commodity classification, affecting the commodities exported by South Africa (examined in the UNCTAD study).

To make sure that we have been faithful to the UNCTAD study we have quoted it extensively in our review.

We have then, in a **third step**, provided an assessment of the report based on the two above steps (Part E).

The report is organised as follows:

1. Part A – Summary of the UNCTAD study
2. Part B – Discussion of the UNCTAD study's methodology

³³http://www.cgdev.org/blog/gaps-trade-data-criminal-money-laundering?utm_source=170110&utm_medium=cgd_email&utm_campaign=cgd_weekly&utm_&&&

3. Part C – Counterfactual analysis: South African gold exports
4. Part D – Counterfactual analysis: South African silver & platinum and iron-ore exports
5. Part E – Assessment of the UNCTAD study

3.3. Project team

- Claude Baissac is the CEO of Eunomix. A doctoral scholar in Political Science (Northern Arizona University), he holds an MPhil in Social Sciences and an MA in Geography (Université de la Reunion). Claude is an established expert on the relationship between economic growth, sustainable development and commodities in developing countries. He is a leading international specialist on economic diversification, particularly through special economic zones. He has significantly worked on mineral beneficiation. He advises the mining industry on improving its socio-economic contribution. He started his consulting career with UNCTAD in 1995, and has, since then, worked extensively with the AfDB, the EU, the IFC, the UN and the World Bank. He is a published and quoted author and regularly consults with the media.
- Gavin Keeton is Associate Professor of Economics at Rhodes University, South Africa. He holds a PhD in Economics from Rhodes University. He worked as an economist at the Development Bank of Southern Africa and then at Standard Bank Investment Corporation before joining the economics office of Anglo American. As Chief Economist he was responsible for advising the Anglo American group on developments in the global economy and in financial markets and their implications for the mining industry. In 2009 he returned to Rhodes University. He has written widely on issues affecting mining and the South African economy. He writes a fortnightly column in South Africa's leading business publication, Business Day.
- JP van der Merwe is a political economist and senior project consultant at Eunomix, with in-depth expertise in the mining sector in South Africa as well as in trade analysis. He has worked on more than 15 projects across Africa in economic development, including extensive work in the mining sector, spatial development, trade analysis, and comparative benchmarking. His project work has included work for the World Bank, the African Development Bank, the Department of Trade and Industry (South Africa), and two large mining companies in South Africa.
- Ferdinand Maubrey is a political economist and project consultant specialising in natural resource governance, economic diversification and investment promotion in Africa. He has conducted a number of studies on mineral beneficiation in Southern Africa, including an impact assessment of Zimbabwe's beneficiation strategy. He has worked on special economic zones, recently completing a seminal report for the AfDB on the topic with Claude Baissac. Prior to joining Eunomix he was a consultant for the World Bank and IFC on investment promotion and 'fragile states' in Africa.

3.4. Important notice

The Chamber of Mines defined the broad objectives of the study. It provided no guidance to Eunomix on the methodology and data used for the study. It did, however, provide its publicly available data. The Chamber of Mines neither influenced the approach nor the results provided herein.

This report has not been peer reviewed, but was subjected to rigorous internal review.

The report reflects the views of Eunomix Research, which takes sole responsibility for its content.

4. Part A – Summary of the UNCTAD study

4.1. Objectives of UNCTAD study

The original UNCTAD study's objective was simply stated as to:

contribute to research and policy debates by providing empirical evidence on the magnitude of trade misinvoicing in the particular case of primary commodity exports from five natural-resource-rich developing countries: Chile, Côte d'Ivoire, Nigeria, South Africa and Zambia.³⁴

The focus on trade misinvoicing was explained in the report's introduction as being the product of widespread capital flight and illicit financial flows affecting developing countries:

The problem of trade misinvoicing has generated increasing attention in the research and policy communities. It is an issue that has gained particular traction through the current debates on illicit financial flows, since trade misinvoicing continues to be used as a key mechanism of capital flight and illicit financial flows from developing countries.³⁵

The December report provides a more comprehensive context of the significance of trade misinvoicing:

Trade in primary commodities is a key driver of growth in many developing countries. However, for the commodity-led growth to be sustainable and more generally for globalization to be more inclusive, it is important to ensure that producing countries are able to capture their legitimate share of the gains from international trade in terms of foreign exchange earnings and fiscal revenue collected from customs and other trade levies. At the same time, features of the regulatory environment, notably tariffs, customs, export subsidies, exchange controls, coupled with imperfect monitoring and poor enforcement of regulations, may create incentives for trade misinvoicing by agents seeking to maximize profits and other gains such as access to foreign exchange out of control of the regulating authority, thus undermining developing countries' gains from commodity trade.³⁶

Reflecting the criticism that the July 2016 study lacked a sufficient discussion of the literature, the introduction sets out the initial literature contribution to the issue.

4.2. Methodology

4.2.1. Theoretical tenet

The UNCTAD study's central theoretical tenet is that discrepancies between reported exports from commodities-producing countries and imports by their trade counterparts greater than 10 percent are allocated to misinvoicing. Misinvoicing might be overinvoicing, where the reported exports are greater than the reported imports, or underinvoicing, where imports exceed the value of exports.

The analysis is conducted using trade data. As explained in the July 2016 report, this follows claimed established practice in the study of trade misinvoicing:

Estimates of trade misinvoicing have been based, traditionally and primarily, on bilateral trade data published in the Direction of Trade Statistics (DOTS) of the International Monetary Fund (IMF), which provides aggregate values of imports and exports between a country and its trading partners. More recently, there has been growing interest in investigating trade misinvoicing at more-disaggregated levels, at sector and product levels and by trading partner. This interest is motivated by two major factors. First is the presumption that some products may be more prone to trade misinvoicing than others based on their idiosyncratic

³⁴ UNCTAD. July 2016. Page 3.

³⁵ *Ibid.*

³⁶ UNCTAD. December 2016. Page 5.

characteristics. Second, there may be variations among trading partners with regard to transparency and enforcement of trade-recording rules that may generate differences in trade misinvoicing across partners.³⁷

As the report further explained:

Trade between two countries A and B is said to exhibit export misinvoicing when the value of exports from country A to its trading partner country B, as reported by country A, is significantly different from the value of imports by country B from country A, as reported in country B's data.³⁸

The report allowed for the differences in value represented by freight and insurance up to a value of 10 percent. It defined trade misinvoicing as the result of systematic discrepancy between the terms of the following equation:

Country B's imports from country A = Country A's exports to country B + freight and insurance

Crucially, the UNCTAD July 2016 report proposed that misinvoicing is not the product of discrepancies in trade data attributable to variations or errors in data reporting. It advanced a number of explanations for this:

While it is possible that recorded import and export data might be affected by statistical errors, these errors would not persist and have a trend over time. The series of the errors would be zero-mean-reverting.³⁹

Stated differently, statistical errors over time for a particular data set correct themselves through probabilistic averages.

For the report, rather than being zero-mean-reverting, trade discrepancies show persistency or increase, demonstrating misinvoicing:

Empirical evidence shows not only large values, but also persistent, and in some cases upward trending levels of trade misinvoicing. A number of recent studies (e.g., Ndikumana et al. (2015), and Baker et al. (2014)) have provided evidence of large and persistent trade misinvoicing in African countries. And a recent study for India shows a clear upward trend in trade misinvoicing since 2000 (Jha and Truong, 2014). A similar phenomenon is found in other Asian countries (Beja, 2006, 2007; Kar, 2010).⁴⁰

The report dismissed the notion that reporting delays may account for discrepancies:

delays in reporting of trade statistics would not be so systematic as to generate persistent trade misinvoicing, particularly given that most studies have used annual data. The impact of periodic recording delays is likely to be minimal on annual series; and the estimated effect of these delays on cumulative trade misinvoicing over a long time period is likely to be even smaller.⁴¹

The report acknowledged, based on a body of literature, that trade discrepancies are more likely to originate from imperfections in data from developing countries. To counter this effect, the report states that:

It is for these reasons that the estimation of trade misinvoicing typically considers trade with developed countries as a benchmark, based on the assumption that developed countries' data are less prone to substantial measurement and recording errors. Thus total misinvoicing is obtained by scaling up the volume of trade misinvoicing with developed countries with the

³⁷ UNCTAD. July 2016. Page 3.

³⁸ *Op cit.*, page 12.

³⁹ *Op cit.*, page 7.

⁴⁰ *Ibid.*

⁴¹ *Ibid.*

inverse of the share of this group in the particular developing country's total trade. (See Ndikumana and Boyce (2010), for an elaborate description of the methodology).⁴²

The “developing countries trade data distortive effect” is dealt with in the report by focusing on the trade between the exporting countries under study and their developed country trading partners.

The December 2016 report introduces some changes to the explanation of the origins and forms of trade misinvoicing. It clarifies in the literature the origin of the concept of trade discrepancies, and the methodologies applies to distinguish between “normal discrepancies”, “excessive normal discrepancies”, and “perverse discrepancies”:

Comparison of bilateral trade statistics is based on the simple principle proposed by Ferraris (1885) that the value of exports of a country A to a country B as reported by country A should agree with the value of country B's imports from country A as reported by country B. *Normal discrepancies* should represent the cost of freight, insurance and duties. In practice, however, two possible scenarios may arise (Bhagwati, 1967). The first is the situation where comparison of partner data reveals discrepancies in the “perverse” direction; i.e., where the value of a country's c.i.f. import is less than the value of the corresponding f.o.b. exports of its trading partner. Such ‘perverse’ discrepancies suggest either overinvoiced exports or underinvoiced imports or both (Bhagwati, 1967, p. 69). The second scenario is when there are “excessive normal” discrepancies, where the difference is in the right direction but exceeds reasonable values of the costs of freight, insurance and duties. These situations provide *prima facie* indication of either underinvoicing of exports or overinvoicing of imports. The literature on trade misinvoicing provides evidence on these potential scenarios through partner data comparisons. This study uses this well-established concept of trade misinvoicing and follows this long-standing line of inquiry with an application to the case of commodity dependent developing countries.⁴³

These clarifications do not alter the study's thesis and methodology:

Trade misinvoicing consists of either perverse discrepancies or excessive normal discrepancies in partner trade statistics derived from the comparison of the value of exports as reported by the exporter to the value of imports as reported by the importer.⁴⁴

In relation to the motives of misinvoicing, the study identifies two forms of smuggling. It defines them in relation to import misinvoicing, and not export misinvoicing. However, it differentiated between the two forms in the section on findings:

The first is technical smuggling, whereby the value of imports is deliberately underestimated, possibly to avoid import duties and taxation, as discussed in section 2 earlier in the paper. The second scenario is pure smuggling, whereby imported goods are simply not recorded at all at entry into the country. Empirically, it is difficult to distinguish between these two scenarios by looking at the aggregate trade data.⁴⁵

4.2.2. Empirical process

The UNCTAD study uses the United Nations Commodity Trade Statistics (UN COMTRADE) database. It compares reported exports by product and country of destination with the reported imports of the products by those same countries. So, for example, it compares within the UN COMTRADE database South Africa's reported iron-ore exports to China with China's reported iron-ore imports from South Africa. It does this annually for the period 2000 to 2014. Annual differences are then converted into constant 2014 US dollars.

⁴² *Ibid.*

⁴³ UNCTAD. December 2016. Page 5.

⁴⁴ *Op cit.*, page 3.

⁴⁵ *Op cit.*, page 12.

Insofar as South Africa is concerned, the COMTRADE database uses information from the South African Revenue Service in compiling the data on imports and exports. In the case of other countries, COMTRADE gathers data either from a similar national revenue agency or from statistics agencies.

In terms of the detailed empirical steps undertaken, the report uses the following methodology:

- Step 1: To determine the main export commodities that are the subject of the export misinvoicing estimation, the first step consists of extracting and downloading exports of all commodities to the world (as trading partner). The leading products are determined using the product's share in cumulative exports over the period reported in UN COMTRADE. In this study, the average shares over the period 2010–2014 are used to determine the leading export products.
- Step 2: Once the leading products are determined, the next step is to extract series for exports of these products by the country under study to all its trading partners over the sample period. The partners (importers from the country under study) are then ranked based on average shares in cumulative exports over the investigation period. The aim is to assemble a sample of trading partners that represents a high proportion of total exports from the country under study, preferably over 90 per cent. Only partners with a meaningful length of time series are included in the sample.
- Step 3: Next, export series for the identified products to the identified leading trading partners for the period reported in UN COMTRADE are extracted.
- Step 4: Import data by the identified leading partners of the country under study are then extracted. These series are compared to the country's exports to estimate export misinvoicing. A margin of 10% is considered a 'regular' and acceptable level of trade discrepancy due to the cost of freight and insurance for the export of products (which is assumed to be carried by the importer – therefore making the value of the imported product slightly higher than the export value of the product).
- Step 5: The last step is to organise the data so as to compare exporter data and partner data for the computation of trade misinvoicing. This requires generating a panel that combines exporter data and partner data. This step is labour-intensive as it involves filling gaps with missing cells where no data are reported. This is because when there are no reported exports or imports in a particular year, this particular year-country observation does not appear in UN COMTRADE. This is a particular inconvenience in the use of UN COMTRADE. In other databases such as the DOTS, the year-country observation would be reported with a missing value for the particular variable, which makes it possible to generate time series and panel data sets without any manual manipulations of the original data. Note that any manual manipulation of the original data runs the risk of contamination of the data due to possible mistakes by the researcher.⁴⁶

The December 2016 report introduced change to the methodology and data for South Africa's gold exports as follows:

- It included data from the Department of Trade & Industry (DTI) instead of the initial data from COMTRADE, which was collected from the South African Revenue Service (SARS).
- It compared South Africa's exports of "non-monetary" gold with partner import data. The report does not examine "monetary" gold, despite the large discrepancies between 2010 and 2011 in reporting of "monetary" and "non-monetary" gold.
- The methodology for South Africa's other commodities and the other country case studies was unchanged from the July 2016 report.

4.3. Findings and recommendations

The report finds substantial and systematic discrepancies between the export values reported by exporting countries and import values reported by importing countries for the same products. In some cases, it finds evidence of overinvoicing (e.g. copper from Chile) and of both over- and underinvoicing of the same product

⁴⁶ *Op cit.*, page 9.

in different years (e.g. oil exports from Nigeria, copper from Zambia and silver and platinum from South Africa). But the overwhelming finding is of underinvoicing (iron ore and gold from South Africa). This is attributed in the report to deliberate fraud by exporters with the goal of facilitating capital flight and avoiding paying tax. Key findings from the UNCTAD study are quoted below for each of the countries studied.

4.3.1. Key findings

Chile

Both versions of the study find misinvoicing:

The results show export overinvoicing (negative values) for all trading partners except France, Germany and Spain. Whereas trade with Germany exhibits substantial export underinvoicing worth \$9.4 billion in net terms, the values are small for France and Spain. Therefore, it is reasonable to conclude that export overinvoicing is the most predominant phenomenon in Chile's copper trade.⁴⁷

The second report seeks to provide some additional granularity to these findings:

One of the possible reasons for the extremely large “perverse” (negative) and “excessive normal” (positive) discrepancies in partner-by-partner data may be inconsistencies in the recording of the actual destination of exports. So, in the case of The Netherlands, the products may be purchased by a buyer registered in The Netherlands while they are actually offloaded and registered as imports in another country. However, so long as Chile's copper exports are registered as imports in only one country, the aggregate values should not be affected. Thus large estimated discrepancies with respect to the rest of the world suggest export misinvoicing.⁴⁸

Zambia

The results for Zambia (see table 4 and figure 2), a country that is also heavily dependent on copper exports, differ drastically from those of Chile. In contrast to widespread export overinvoicing in Chile, Zambia's results show copper export underinvoicing, with the notable exceptions of trade with Switzerland and the United Kingdom which exhibit export overinvoicing of \$31.8 billion and \$4.4 billion, respectively. Trade with Singapore, South Africa and the United Republic of Tanzania, also exhibits export overinvoicing, albeit a relatively smaller proportion compared to Switzerland.⁴⁹

The December report seeks to address some of the critiques levelled at the findings:

For China, the second leading trading partner, the results indicate export underinvoicing with a total of USD 5.6 billion, representing 61 percent of total exports to this partner. The results for trade with Italy show USD 2 billion of copper export underinvoicing compared to only USD 16 million of exports reported in Zambia's data. The respective values for trade with the Republic of Korea are USD 3.9 billion in export underinvoicing and USD 358 million of declared exports. It appears that a large fraction of the copper exports to these countries are not recorded in Zambia's official statistics. This raises the important question of why Zambia would record a transit destination rather than the final destination. The other question is why the actual destination of the products is not registered in Zambia's records and if such a practice generates any gains to the buyer who is on the books in Zambia's records. Knowing the full information on the transactions at all the nodes of trade from Zambia to the final destination is essential for ascertaining whether Zambia is getting the fair share of the value of its copper exports.

⁴⁷ Op cit., page 14.

⁴⁸ UNCTAD. December 2016. Page 15.

⁴⁹ UNCTAD. July 2016. Page 16.

Nigeria

The pattern of oil export misinvoicing changed over time, switching from a regime of export underinvoicing over the 1996–2003 period to export overinvoicing from 2006 to 2014 (figure 5). This leads to the finding that not only was there a switch in the direction of export misinvoicing but also that the relative intensity of misinvoicing diminished in the second period. Nonetheless, export overinvoicing remains an important issue for the Government of Nigeria which it needs to address as part of a broader strategy to manage its oil wealth.⁵⁰

Cote d'Ivoire

Cocoa exports by Côte d'Ivoire exhibit heavy geographical concentration, with the top two partners accounting for nearly 50 per cent of the country's total exports: The Netherlands with 31.3 per cent and the United States with 18.3 per cent. (...)

The trade misinvoicing estimations (table 8 and figure 6) show systematic cocoa export underinvoicing, occurring in trade with 10 partners over the period 1995–2014.⁵¹

South Africa

The July 2016 report found that, for South Africa, cumulative underinvoicing over the period 2000–2014 is reported in the UNCTAD study (in 2014 constant US dollars) for silver and platinum to have amounted to USD 24 billion, iron ore to USD 620 million, and gold to USD 78.2 billion. In total, underinvoicing for South Africa over the nearly 15-year period is stated by the UNCTAD study to have amounted to USD 102.8 billion (2014 US dollars).

The results for South Africa vary substantially by commodity.⁵²

In summary, gold export underinvoicing is pervasive both over time and across trading partners. Unlike other commodities, there is no export overinvoicing vis-à-vis any of South Africa's trading partners (table 11). The gold sector deserves close scrutiny to identify the factors that may explain systematic export underinvoicing.⁵³

(For silver and platinum) The data show systematic export underinvoicing throughout the period. However, the amounts of misinvoicing are relatively small, representing generally less than 10 per cent of total exports.⁵⁴ (...)

South Africa's iron-ore exports, which rose steadily and rapidly until 2010, were accompanied by an equally rapid increase in export underinvoicing (table 10 and figure 8). But there was a drastic change in the pattern after 2010, from systematic export underinvoicing to systematic export overinvoicing.⁵⁵ (...)

Table 1: UNCTAD findings of misinvoicing in South Africa (in USD million of 2014 constant USD), 2000–2014

Commodity	Exports (South African data)	Exports (partner's data)	Export underinvoicing
Silver and platinum	103,738	138,122.2	24,010.4
Iron ore	51,733	57,527.1	620.8
Gold	34,507.5	116,197.7	78,239.5

Source: UNCTAD, 2016, using UN COMTRADE data

⁵⁰ Op cit., page 19.

⁵¹ Op cit., page 23.

⁵² Op cit., page 25.

⁵³ Op cit., page 29.

⁵⁴ Op cit., page 25.

⁵⁵ Op cit., page 27.

The findings on gold were by far the largest of any product examined in the report and are reproduced by country in Appendix 1. Massive underinvoicing of gold exports was found for all of South Africa's major trading partners. The larger the trade, the greater the claimed underinvoicing. The July 2016 report observed that:

there is a perfect correlation between gold export underinvoicing and the volume of exports as reported by the country's trading partners.

Gold traded with the leading partners also exhibits the highest amount of underinvoicing: India (USD 40 billion), Germany (USD 18.4 billion), Italy (USD 15.5 billion) and the United Kingdom (USD 13.7 billion).⁵⁶

That report thus concluded that the cumulative value of South Africa's reported gold exports over the period 2000-2014 was USD 34.5 billion in 2014 constant dollars, while reported imports of South African gold was "more than three times higher"⁵⁷ at USD 116.2 billion. By these calculations, 70% of South Africa's gold exports – USD 78.2 billion – are unreported.

The December 2016 report revises the gold estimates while keeping the other commodity findings unchanged. It explained, in light of the numerous critiques issued, that:

To ensure that the results are not driven by any errors in recording data from government official statistics into COMTRADE, the analysis also explores the statistics compiled by the Department of Trade and Industry (DTI), which are publicly available online.⁷ The comparison is based on the Harmonized Commodity Description and Coding system (HS), which is used to report trade data in DTI database. Exports are reported in DTI database in nominal Rand. For comparison with Comtrade series, the DTI series are converted into dollars using the average annual exchange rate between the Rand and the US dollar, and into real values (constant 2014 dollars) using the US GDP deflator.⁵⁸

It takes into account the fact that South Africa's gold was until 2011 either classified as monetary or non-monetary gold. On this basis, the December 2016 report distinguishes between the 2000-2010 and 2011-2014 periods for comparability.

On the basis of the new calculations the report estimates the resulting discrepancies as follows:

If we apply the same methodology to estimate export misinvoicing for non-monetary gold, this would yield large amounts of excessive 'normal' discrepancies, which is *prima facie* indication of export underinvoicing (Figure 9). The results over 2000-2010 period would be comparable whether the estimation is based on South African trade data as reported by the DTI (USD56.6 billion) or South Africa's export data as reported in COMTRADE (USD57.1 billion). The comparison is not possible over the 2011-2014 period due to the merging of monetary gold exports and non-monetary gold exports as shown in the DTI database in Table 12.

Given these peculiarities, the question is what part of the observed 'excessive normal' and 'perverse' discrepancies is due to errors in product classification or in recording of destination and what part reflects misinvoicing of gold exports. The analysis calls for improvements in trade-data reporting, especially with regard to consistency of classification of the type of gold (monetary vs. non-monetary gold). The merging of monetary and non-monetary gold exports in DTI appears to be a step backwards in terms of consistency and transparency of gold export trade data.⁵⁹

These conclusions are far less affirmative than those of the July 2016 report, which stated that:

⁵⁶ *Op cit.*, page 28.

⁵⁷ *Ibid.*

⁵⁸ UNCTAD. December 2016. Page 25.

⁵⁹ *Op cit.*, page 27.

In summary, gold export underinvoicing is pervasive both over time and across trading partners. Unlike other commodities, there is no export overinvoicing vis-à-vis any of South Africa's trading partners (table 11). The gold sector deserves close scrutiny to identify the factors that may explain systematic export underinvoicing.⁶⁰

4.3.2. Conclusions and recommendations

The July 2016 report made a number of key empirical conclusions, derived from the analysis and its findings. It then extrapolates from these conclusions a number of key behaviour/intent hypotheses, from which it derives a number of policy recommendations. Some of these conclusions are revisited in the December 2016 report, notably those relating to South Africa's gold exports and the direct accusations of smuggling.

Empirical conclusions

The UNCTAD study makes a number of key conclusions, quoted here:

Conclusion 1: primary commodities dominate exports of the countries in the study

The analysis of the data confirms the widely known dominance of primary commodities in these countries' exports.⁶¹

Conclusion 2: exports are concentrated to a few trading partner countries

But it also highlights another important dimension of concentration, namely that a few trading partners account for a large share of total primary commodity exports of each of the sample countries studied.⁶²

Conclusion 3: trade misinvoicing is substantial, and underinvoicing is preponderant

The results show substantial export misinvoicing – both underinvoicing and overinvoicing – in all the five countries, with a clear preponderance of export underinvoicing, except for copper exports from Chile.⁶³

Conclusion 4: trade misinvoicing is likely to be the result of deliberate illicit action

(In the case of Nigeria's oil) there appears to be systematic smuggling of oil out of the country. (...)

(In the case of all case studies except Chile) It is therefore clear that export misinvoicing could be an important channel of capital flight from these countries. (...)

(As regards) the puzzling case of gold exports from South Africa, (...) the country's official statistics report very little gold exports while substantial amounts appear in its leading trading partners' records. This does not appear to be a simple matter of undervaluation of the quantities of gold exported, but rather a case of pure smuggling of gold out of the country. (...)

Puzzling results also emerge at the trading-partner level. Trade with the Netherlands presents a peculiar case, with systematic and substantial export overinvoicing. It appears that primary commodities exported to the Netherlands never dock in the Netherlands. This is also the case for copper exports from Chile and Zambia to Switzerland. The question is whether this is the outcome of smuggling or incorrect reporting of the residence of the buyers. Answering this question may require an investigation at the company level.⁶⁴

⁶⁰ UNCTAD. July 2016. Page 29.

⁶¹ *Op cit.*, p.31.

⁶² *Ibid.*

⁶³ *Ibid.*

⁶⁴ *Ibid.*

Conclusion 5: trade misinvoicing correlates with trade concentration, which may be causal to the former

There is a close correlation between concentration of trade and concentration of trade misinvoicing suggesting that trade misinvoicing is a systemic problem in these countries.⁶⁵

Intent/behaviour hypothesis

Hypothesis 1: tax evasion is a possible motive for misinvoicing

Tax evasion is a possible motive for the large degree of export overinvoicing observed in most countries in the sample (except Chile). It is also possible that in some cases of export overinvoicing (as in trade with the Netherlands and Switzerland) products may end up in other destinations than the ones listed in official records as a result of transit trade.⁶⁶

Hypothesis 2: tax incentives are a possible motive for overinvoicing

Export overinvoicing could also be motivated by the attempt of exporters to take advantage of tax incentives aimed at promoting export-oriented activities.⁶⁷

Hypothesis 3: foreign-exchange and capital controls as a motive for misinvoicing

Foreign-exchange and capital account controls could also be a motive for trade misinvoicing.⁶⁸

Policy recommendations

Recommendation 1: governments should investigate trade misinvoicing by scrutinising exports

First, the fact that exports of primary commodities are concentrated by product and market could be a blessing in disguise. Export concentration implies that policy efforts could be focused on a limited number of products and partners to increase the effectiveness of reforms. In each country, the government and its development partners should be able to identify which products and export destinations need to be scrutinised when investigating trade misinvoicing.⁶⁹

Recommendation 2: trade statistics should be substantially improved

In particular, improvements are urgently needed in data gathering at the product and partner levels, and there should be coordination between national statistics and international statistical databases such as UN COMTRADE and the IMF's DOTS. This will require scaling up both financial and technical assistance to developing countries to help improve human capacity as well as the infrastructure for the compilation and management of trade statistics.⁷⁰

Recommendation 3: transnationals and jurisdictions involved in misinvoicing should be investigated

Third, the results from this study highlight the need for an investigation into the role of Trans-National Companies (TNCs) involved in the exploitation, export and import of commodities, as well as the role of secrecy jurisdictions in facilitating trade misinvoicing. Such an investigation may shed light on the mechanisms of export overinvoicing and import underinvoicing. Enhanced transparency in global trade is indispensable, especially through coordinated enforcement of the rules on country-by-country reporting by TNCs at the global level.⁷¹

⁶⁵ *Ibid.*

⁶⁶ *Ibid.*

⁶⁷ *Ibid.*

⁶⁸ *Op cit.*, page 32.

⁶⁹ *Ibid.*

⁷⁰ *Ibid.*

⁷¹ *Ibid.*

5. Part B – Discussion of the UNCTAD study’s theoretical and methodological framework

5.1. Third-party critiques of the report

Since its release, the UNCTAD study has received significant attention, and its findings have been widely reproduced in the general and economic press.

Criticism has focused both on its theoretical approach and methodology. For instance:

- **Complexity of reporting destination country in case of re-exporting:** a commodity shipped from a producer country may be warehoused, split, combined with others, or repacked before being re-exported from an intermediary country or regional trading hub before being delivered to its ultimate destination. The final destination might be recorded as the home base of a commodity company or the first port of consignment, even though it would not be reported as an import there.⁷²
- **Complexity of reporting destination country in case of storage:** additionally, there are cases in which produced commodities do not directly go to end users around the world, but will end up in storage in bonded warehouses. Seeing as though these warehouses are bonded, they would not be recorded in the import statistics of any country, as they have not entered a country in the legal sense. This could explain the discrepancies shown in the UNCTAD report between Chile and Netherlands as this country is a centre for bonded warehouses.⁷³
- **Complexity of reporting destination country due to ‘virtual’ trading hubs:** making matters even more complex, at times, *virtual* trading hubs exist, where the physical product never actually arrives, but is directly shipped to buyers in other countries. Clough of the international group Global Financial Integrity uses Zambian copper ‘exports’ to Switzerland as an example: Zambian copper, although reported by Zambian customs authorities of going to Switzerland, never arrives physically in Switzerland, but is directly shipped to other buyers by the Swiss mining company Glencore, which also owns the Zambian copper mine.⁷⁴

These observations provide initial alternative explanations other than misinvoicing for the trade discrepancies shown in the UNCTAD study. The following sections will go into more detail on how the UNCTAD study could have been more robust in its findings and conclusions.

5.2. Trade misinvoicing and export/import discrepancies

5.2.1. *The report’s central theoretical tenet and its support in the literature*

The UNCTAD study’s central theoretical tenet is that discrepancies between reported exports from commodities-producing countries and imports from their trade counterparts greater than 10 percent are caused by trade misinvoicing. Empirically, this is demonstrated by comparing trade data between exporters and importers, allowing for the marginal differences between price of exports and costs of imports represented by transport and insurance. Indeed, exports are priced free-on-board (FOB) and imports are priced at cost-insurance-freight (CIF).

⁷² Forstater, M. July 20, 2016. *Misinvoicing or misunderstanding?* Independent.

⁷³ Worstall, T. July 18, 2016. *Countries Are Losing 67% Of Export Revenue Due To Misinvoicing - UNCTAD Needs To Get A Clue.* In Forbes.

⁷⁴ Financial Times. July 17, 2016. *Misinvoicing of commodities costs billions to developing world.* Forstater, M. July 21, 2016. *Misgivings over report on commodities invoicing.* In: Financial Times.

This central theoretical proposition is supported through a brief literature review which first names early authors who documented the existence of systematic discrepancies in bilateral trade data starting in the 1960s.⁷⁵ Bhagwati (1964) pointed out substantial trade misinvoicing in the case of Turkey. Naya and Morgan (1969) provided similar evidence of export misinvoicing in the case of South-East Asian countries.⁷⁶

The study states that specific focus on misinvoicing developed in the 1980s and cites Lessard and Williamson (1987) as providing work that identified “the practice (...) as a major mechanism through which developing countries lose valuable capital.”⁷⁷

The study quotes a number of authors who have provided additional evidence in support of the theoretical proposition: Ndikumana et al. (2015), Beja, (2006, 2007), Jha and Truong (2014), Kar (2010), Kar and Cartwright-Smith (2010), Kar and LeBlanc (2013), Kar and Spanjers, (2014).

5.2.2. Literature review

The UNCTAD study does not provide a discussion of alternative theoretical propositions as regards the practice of trade misinvoicing, its prevalence, scale and origins. This leads to the conclusion that the theoretical proposition at the core of the report is undisputed.

Yet, the subjects of (1) trade misinvoicing, and (2) the relationship between trade misinvoicing and trade discrepancy, have both received meaningful attention beyond the authors cited in the UNCTAD study and have been the subject of significant debates.

A more comprehensive review of the literature shows that at least three schools of thoughts exist:

- **Trade discrepancies correlate with and are caused by misinvoicing:** the UNCTAD study belongs to a school of thought that supports the notion that systematic trade discrepancies are caused by misinvoicing. For most of the authors belonging to this school of thought there is a foundational *assumption* (i.e., hypothesis) that trade discrepancies automatically indicate misinvoicing. Empirical work therefore focuses on correlations and patterns within the data to determine the scope, scale and duration of misinvoicing.
- **Trade misinvoicing exists but may not correlate with trade discrepancies:** other authors interested in misinvoicing have explicitly admitted that it is difficult to find empirical evidence for misinvoicing. Part of the literature on misinvoicing does not claim to provide empirical evidence for misinvoicing. Instead, these authors assume illegal trade exists and are more interested in the *theoretical* explanations for the phenomenon.
- **Trade discrepancies are not necessarily the product of misinvoicing:** there is also literature providing evidence that trade discrepancies identified are *not* necessarily explained by misinvoicing, either as a primary or subsidiary causal explanation. Indeed, a stream of literature focusing on bilateral trade discrepancies has found a plethora of reasons – other than misinvoicing – for why such discrepancies arise.

Trade discrepancies correlate with and are caused by misinvoicing

In addition to the authors quoted in the UNCTAD study, authors like Yeats (1990), Fisman and Wei (2004), and others have provided evidence in support of misinvoicing.

Yeats (1990) uses the fact that reported ‘free-on-board’ exports frequently exceed matched reported ‘cost, insurance, and freight’ imports to suggest that smuggling is widespread in trade among African countries or that importers are intentionally underinvoicing to avoid high tariffs or quotas. Fisman and Wei (2004) find that trade discrepancies negatively correlate with tax rates on closely related products, suggesting that evasion takes place through misclassification of imports from higher-taxed categories to lower-taxed ones.

⁷⁵ The December 2016 report introduces the work of Ferraris (1885) as the earliest documentation of discrepancies.

⁷⁶ UNCTAD. February 2016. Page 5.

⁷⁷ *Ibid.*

They also show that trade discrepancies are larger when measured in values rather than quantity, suggesting that evasion takes the form of underreporting. Several authors have also found that trade discrepancies are highly positively correlated with corruption (Fisman and Wei, 2007; Berger and Nitsch, 2008). Biswas and Marjit (2007) use partner trade statistics to find a positive (negative) correlation between the ‘black-market premium and export (import) underinvoicing since illegal traders sell (buy) the foreign exchange of unreported transactions on the black market.

Trade misinvoicing exists but may not correlate with trade discrepancies

Some authors interested in misinvoicing have explicitly admitted that it is difficult to find empirical proof for misinvoicing, which is why they must rely on descriptive analysis. In one seminal paper Fisman and Wei (2004) admit that tax evasion, “by its very nature, is difficult to observe.” Farzanegan (2008) also sees illicit trade as “an unobservable variable.”

Several authors provide evidence that trade discrepancies may not necessarily indicate misinvoicing. McDonald (1985) concludes that there is “mediocre statistical evidence” that smuggling incentives, such as the ‘black market premium’⁷⁸ and export taxes, explain variations in trade discrepancies and that great caution should be exercised in using trade-data discrepancies to infer a scale of smuggling activity.

Furthermore, the majority of literature on misinvoicing does not claim to provide empirical evidence for misinvoicing. Instead, it is assumed that illegal trade exists and focus on *potential* incentives for the phenomenon. For instance, Bhagwati and Hansen’s seminal 1973 paper – also cited by the UNCTAD study – focuses on the *theoretical* ways in which illegal trade arises. Farzanegan (2008) focuses on tariffs, fines, and the unemployment rate as *hypothesized* determinants of illegal trade. Barnett (2003) also does not focus on empirical evidence for misinvoicing itself, but rather on foreign currency restrictions and the black-market premium as key incentives for the theoretical practice. Smuggling has also been viewed as another source of deviations of the exchange rate from purchasing power parity (Bahmani-Oskooee and Goswami, 2003).

Trade discrepancies are not necessarily the product of misinvoicing

Importantly, a large stream of literature focusing on bilateral trade discrepancies has found a plethora of reasons – not just misinvoicing – for why such discrepancies arise.

Martin (2016) explains data discrepancies that arise because of differing definitions of exports and imports, differing definitions of territory, timing, declarations of country of origin, exchange rates, and intermediation, in addition to underinvoicing. Hangzhou (2009) finds attribution of imports to country of origin, attribution of exports to country of last-known destination, and different valuations, as key reasons for the unusually large and growing statistical discrepancies in bilateral trade between China and the United States. He also mentions conceptual and methodological differences in data collection, differences in statistical territory definitions, timing, and re-exports. Ferrantino and Wang (2007) find robust correlations between discrepancies and tariff costs, valuation issues, and re-exports. Ajayi (1998) also notes diversion en route to the final destination, re-exports, reporting lags, currency conversions, and exchange-rate variations as potential reasons beyond misinvoicing. He further writes that, “in Sub-Saharan Africa, one of the basic causes of trade discrepancy stems from the routing process for trade transactions.”⁷⁹

The COMTRADE website itself notes that:

Imports reported by one country do not coincide with exports reported by its trading partner. Differences are due to various factors including valuation (imports CIF, exports FOB), differences in inclusions/ exclusions of particular commodities, timing etc⁸⁰.

The UN’s International Merchandise Trade Statistics: Compilers Manual also notes the following:

⁷⁸ The black market premium on the exchange rate is the difference between the value of currency on the black market (= illegal system) and its official exchange rate (= value) in relation to another currency.

⁷⁹ Ajayi, S. 1998. *Adjusting for International ‘Trade-Faking’*. In “Trade Reform and Regional Integration in Africa.” eds. Iqbal, Z. and Khan, S.

⁸⁰ <https://comtrade.un.org/labs/bis-trade-in-goods/pages/about.html>.

Reasons for differences in data: Even where both partners comply with United Nations guidelines for trade statistics, there can be differences between partner data. In fact, some of the discrepancies are a direct result of following those guidelines (...) In order to identify conceptual reasons for discrepancies the following areas should be reviewed: (a) coverage; (b) trade system applied; (c) time of recording; (d) interpretation and application of the commodity classification; (e) valuation; (f) partner country attribution; and (g) other sources of discrepancy.⁸¹

Thus, the UN Statistics methodology confirms the conclusions by earlier authors on which potential reasons may account for data discrepancies beyond misinvoicing.

In sum, *in addition to misinvoicing*, authors have shown that the following elements could potentially explain trade-data discrepancies:

- Differing definitions of exports and imports
- Differing definitions of territory
- Timing
- Declarations of country of origin
- Exchange rates / currency conversion issues
- Intermediation / diversion en route to the final destination
- Valuation issues
- Re-exports of goods
- Differences in statistical territory definitions
- Shipping, tariff and insurance costs and
- Product classifications
- Partner country attribution and treatment of processing trade
- Differences in data collection / reporting lags

5.2.3. *Observations from the methodological and literature review*

The study's main theoretical contention is that trade discrepancies greater than 10 percent are attributable to trade misinvoicing. Yet, contrary to the impression created by the UNCTAD study, its central proposition is not the subject of consensus. As made clear in the summary literature review produced here:

- Firstly, there is no consensus, whether theoretical or empirical, that trade data discrepancies correlate with actual trade discrepancies, much less than trade misinvoicing. There is also no consensus that trade misinvoicing would be the primary cause of trade discrepancies. Connected to this point, while trade misinvoicing is recognised as being a practice, it may not explain, in whole or in part, trade discrepancies and trade-data discrepancies.
- Secondly, there are alternative theoretical and empirical explanations for the existence and resilience of large trade-data discrepancies. This point invalidates the notion advanced by the UNCTAD study, without literature or empirical support, that discrepancies caused by data error would be self-correcting.

The counterfactuals in this report's parts C and D below provide the second step in our review.

⁸¹ *Ibid.*

6. Part C – Counterfactual analysis: South African gold exports

On the basis of the above observations and of the criticisms that have been levelled at the UNCTAD study as regards its analysis, findings and conclusions on South Africa’s exports of gold, this section of the report seeks to provide a more in-depth examination of the empirical validity of the UNCTAD study.

As noted earlier, one of the key findings of the UNCTAD study related to an alleged underinvoicing of about USD 80 billion in gold exports from South Africa between 2000 and 2014. This claim in particular has garnered widespread international and national attention because, according to the UNCTAD study, this represents the largest instance of misinvoicing documented.

Determining whether this finding is correct is therefore material for a number of reasons:

- Firstly, it is material to the South African government, which, if the report is correct, would have been exposed to massive revenue losses. As discussed previously, SARS has publicly counteracted the UNCTAD study’s findings.
- Secondly, it is material to the South African mining industry, which has been tarnished by the report’s findings and their wide distribution and reproduction.
- Thirdly, it is material to the credibility of the UNCTAD study itself, its author and this important international organisation.

6.1. Alternative explanations for discrepancies in SA gold discrepancies

In addition to the broader potential alternative explanations mentioned above, the following summarises the main methodological criticisms for that particular claim:

- **South African gold’s classification as ‘monetary’:** up until 2010 the vast majority of South African gold exports were classified as ‘monetary’ and consequently not captured in the COMTRADE database. Also, even after 2010 the vast majority of South African gold exports are recorded, but the destination countries are not reported due to historic practices of South African tax and customs authorities. Thus, in COMTRADE the 2011-2014 gold exports are all reflected as ‘unallocated’ but were ignored in the original UNCTAD report.⁸²
- **South African gold reported as ‘Origin of Goods Unknown’:** the South African Trade Law Centre (Tralac) explains that gold exports are treated both as a good and as a country and reported under a special code ‘Origin of Goods Unknown’. The South African Reserve Bank and SARS do not report details of where the nation’s gold exports go. Thus, the data would not show up on COMTRADE.⁸³
- **Trade statistics reported under UN Special Trade System:** A further methodological problem in the UNCTAD study, SARS warns, is that South African export statistics “specifically exclude non-domestic gold refined and exported from South Africa”⁸⁴. This is because South Africa reports its trade statistics according to the UN Special Trade System. If the importing country reports according to the General Trade System it will include all gold imported from South Africa, including substantial amounts of non-domestic gold refined at the Rand Refinery.
- **Non-South African gold mined in other African countries but refined in South Africa is therefore most likely recorded as South African gold by importers.** Contrary to the assumption that developed countries have better reporting systems for trade data, there is a high likelihood that gold

⁸² Van Rensburg, D. August 2016. *How wrong the UN was on SA’s “smuggling”*. In City Press.

⁸³ Forstater, M. July 2016.

⁸⁴ Van Rensburg, D. August 2016.

refined in South Africa (but mined in other African countries) is recorded as being South African gold by developed- and developing-country importers, while South African companies and the customs authorities will not record this as a South African export.

Since most of these claims have come in the form of opinion pieces and articles, the following section provides a limited empirical counterfactual using alternative sources of data.

6.2. Counterfactual on South Africa’s gold figures used in the July 2016 UNCTAD report

The July 2016 UNCTAD report makes the implicit assertion that because South Africa does not report gold exports by country of origin to COMTRADE this means the total value of South Africa’s gold exports is not reported. This implicit assertion is invalid. As a matter of fact, gold exports are appropriately and comprehensively reported elsewhere. And the total value of such exports is known by producers and to both the South African tax and customs and excise authorities. It is also known to the relevant statistical authorities.

Indeed, several alternative ways of recording gold export data are publicly available in South Africa. An examination of some of these different data sources demonstrates that the national revenue and banking authorities in South Africa have a firm grasp on the value of SA gold exports.

Three different sources of gold export data are analysed in the following sections:

- **Statistics South Africa (StatsSA)** produces monthly statistics of South Africa’s mining production. The source of this data, according to StatsSA, is the Department of Mineral Resources.
- **The South African Reserve Bank (SARB)** publishes South Africa’s balance of payments statistics with the rest of the world on a quarterly basis. Because of gold’s importance to South Africa, the balance of payments statistics contain a specific line item entitled “net gold exports”.
- **The Chamber of Mines of South Africa** produces quarterly gold production statistics compiled by the South African Chamber of Mines. This report is of the volume of gold produced (in kilograms).

The following table provides a summary of the annual production/export figures across those three sources. The Chamber of Mines data has been converted into value terms using the monthly average London gold price published by the SARB.

Table 2: South African annual gold production/exports by source, in USD million

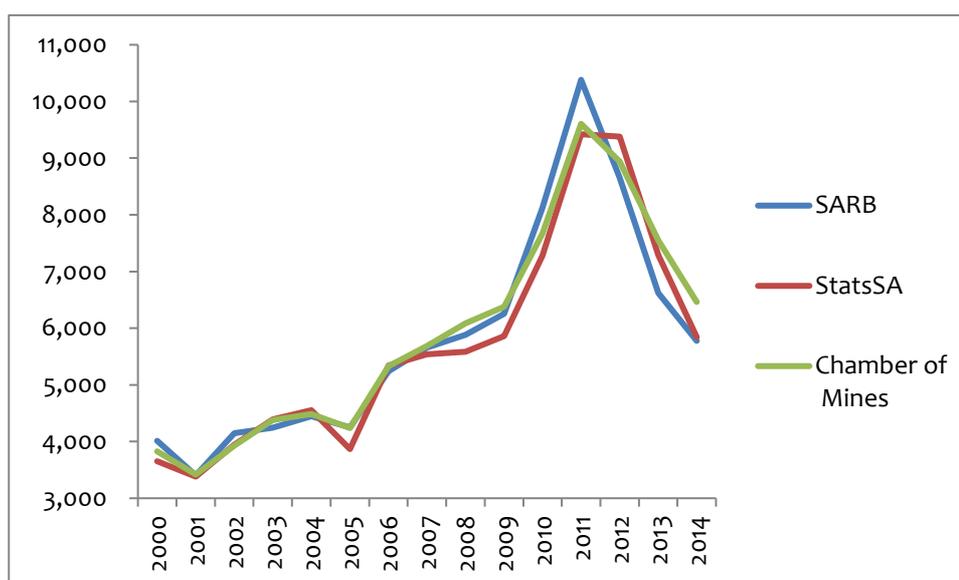
Year	SARB (exports)	StatsSA (production)	Chamber of Mines (production)
2000	4,014	3,651	3,829
2001	3,403	3,381	3,419
2002	4,150	3,947	3,928
2003	4,244	4,391	4,380
2004	4,449	4,557	4,487
2005	4,248	3,869	4,239
2006	5,241	5,341	5,330
2007	5,656	5,537	5,687
2008	5,882	5,587	6,085
2009	6,255	5,858	6,377
2010	8,126	7,278	7,668
2011	10,381	9,422	9,606
2012	8,654	9,379	8,941
2013	6,620	7,290	7,551
2014	5,778	5,846	6,464
Total	87,102	85,332	87,990

Source: SARB, StatsSA, Chamber of Mines of South Africa

6.2.1. Analysis

Table 2 shows that total production/export figures are largely consistent across all three sources. The total value of gold exports between 2000 and 2014 is USD 87.1 billion according to the SARB, while the total value of gold produced over that same time period is USD 85.3 billion according to StatsSA and USD 88 billion according to the Chamber of Mines. The SARB figure is only 2% higher than the StatsSA figure. On average, the Chamber of Mines values are 1.6% per annum higher than the Reserve Bank values in both Rand and Dollar terms and 3.5% higher than the StatsSA values in Rand terms and 3.3% in Dollar terms. The following Figure charts the three sources annually.

Figure 1: South African annual gold production/exports by source, in USD million



Source: SARB, StatsSA, Chamber of Mines of South Africa

The graph shows that the total values and the yearly values largely correspond. Thus, it is quite likely that the Chamber of Mines' official position that virtually all of South Africa's gold production is exported, stands true. Thus, in addition to the SARB gold export figures, the gold production figures provided by StatsSA and the Chamber of Mines provide a valuable indication of the value of gold exported during the timeframe investigated by the UNCTAD study.

The slight differences in reported values can be explained by the volatility in the exchange rate and gold price as well as different timing of reporting. For instance, it is likely that the timing of actual exports will differ from the date of production. Monthly changes in the rand gold price over the period 2000-2014 were highly volatile. On one occasion the monthly price increase was 19%. On another, the monthly fall was 13%. Monthly changes were greater than 2% (up or down) in 60% of the months under consideration. The period was mainly one of rising prices and a weakening rand exchange rate. Monthly prices increased 60% of the time. The value of gold produced in a particular month would be measured by StatsSA using that month's Rand gold price. But if physical export occurred only the following month, the Reserve Bank would value the gold in its balance of payments statistics at the price that was actually received. The difference would be positive 60% of the time, inflating the value of the Reserve Bank's exports relative to the StatsSA data. In a market where the gold price and exchange rate can be very volatile, differences in reported values are therefore unsurprising.

The difference between the Chamber of Mines statistics and the other two sources is equally unsurprising, as annual production statistics applied to an average annual price cannot fully take into account monthly differences in the production of a commodity or its highly volatile price. Importantly, most but not all gold produced in South Africa is exported. Thus, it is to be expected that the Chamber of Mines production value will slightly exceed the export values of the Reserve Bank. The volatility of monthly prices and output

discussed above will inevitably create differences between the annual averages of the Chamber of Mines calculation and the monthly values reported by StatsSA.⁸⁵

The Chamber of Mines's statement from July 2016 that it "is confident that the South African gold export statistics reported by the companies over the past few decades match the average rand gold prices and production numbers,"⁸⁶ can therefore be broadly affirmed by the above calculations.

In order to compare these values to the UNCTAD study, the production and export values were converted into constant 2014 USD, the value used by the authors of the UNCTAD study. The results are shown in Table 3 below.

Table 3: South African annual gold production/exports by source, in constant 2014 USD million

Year	SARB (exports)	StatsSA (production)	Chamber of Mines (production)	Average, SARB, StatsSA, CoM	UNCTAD (exports) (SA data)	UNCTAD (exports) (partner data)
2000	5,335	4,852	5,088	5,092	28	4,018
2001	4,422	4,393	4,442	4,419	6	3,915
2002	5,311	5,050	5,027	5,129	32	5,387
2003	5,325	5,509	5,496	5,443	232	5,090
2004	5,433	5,564	5,479	5,492	394	4,607
2005	5,025	4,577	5,015	4,873	392	5,402
2006	6,016	6,130	6,118	6,088	191	4,684
2007	6,323	6,191	6,359	6,291	418	6,599
2008	6,449	6,126	6,672	6,416	202	8,444
2009	6,807	6,375	6,940	6,707	218	5,091
2010	8,736	7,824	8,244	8,268	247	6,525
2011	10,936	9,925	10,119	10,326	11,188	12,867
2012	8,951	9,701	9,247	9,300	9,166	14,254
2013	6,739	7,421	7,687	7,282	6,925	16,649
2014	5,778	5,846	6,464	6,029	4,866	13,123
Total	97,586	95,485	98,396	97,156	34,505	116,654

Source: SARB, StatsSA, Chamber of Mines of South Africa, UNCTAD using COMTRADE data

Table 3 shows that the gold export data sourced by UNCTAD from South Africa differs widely from the largely consistent three other sources. The total value of South African gold exports in constant 2014 USD between 2000 and 2014 is lower than the average value provided by the three alternative sources by a staggering USD 62.7 billion. Yearly UNCTAD values labelled as 'SA data' were off by up to USD 8 billion (in 2010). Furthermore, the trend captured by the COMTRADE SA data does not reflect the export trend shown by the three alternative data sources.

The broad convergence of the COMTRADE data and the alternative three data sources from 2011 to 2014 confirms one of the earlier-mentioned alternative explanations for data discrepancies: up until 2010, the vast majority of South African gold exports were classified as 'monetary' and consequently not captured in the COMTRADE database. UNCTAD failed to recognise this in their first report.

Given their broad convergence, it can thus be assumed that the export data supplied by SARB, StatsSA, and the South African Chamber of Mines provide a more accurate indication of the true value of gold exported from South Africa between 2000 and 2014 than do the figures calculated by COMTRADE. If this is the case, South Africa's gold exports are in fact much higher than reported in the UNCTAD study, thus significantly closing the gap UNCTAD explained by supposed underinvoicing. Indeed, the misinvoicing discrepancy in gold

⁸⁵ It is also unsurprising that this methodology might over-report the value of gold exports because some major gold exporters sold gold forward in the 1990s and early-2000s to capture the higher forward price at a time when the gold price was very low. When the gold price rose rapidly from 2005-06 these producers were forced to sell the gold they had sold forward at prices substantially lower than the prevailing market price. The forward sales were subsequently unwound and the full extent of their impact on the value of South Africa's gold exports is unknown.

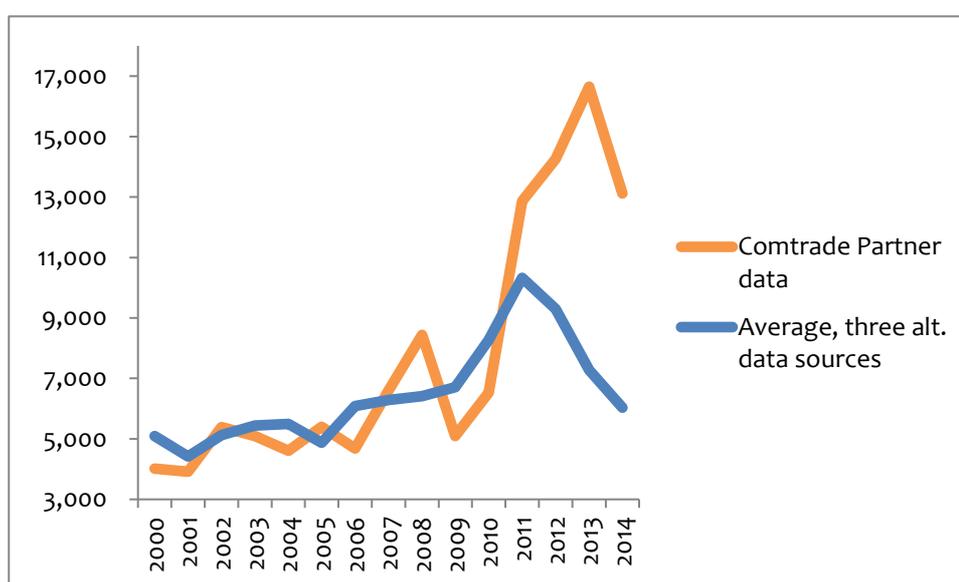
⁸⁶ Chamber of Mines. 25 July 2016. Media statement. Trade mis-invoicing. Chamber response to UNCTAD-sponsored report.

exports between partner country data and the average across the three alternative data sources shrinks from the initially alleged USD 78.2 billion to USD 9.8 billion after allowing for the ‘regular’ 10% discrepancy margin rate in terms of UNCTAD’s methodology (although the overall discrepancy is USD 19.5 billion – in constant 2014 USD).

This observation, in return, puts into question the overall conclusion of the report, which is that the sheer size of the reporting gap must indicate underinvoicing. The smaller the data discrepancy, the less likely it is that smuggling is the true cause for these divergences. Rather, a smaller data discrepancy makes it more likely that some of the other factors mentioned earlier may have contributed to differences in data.

Such a claim, however, requires a more in-depth counter-factual that should more closely investigate the remaining discrepancies. Of note in that regard is not only the total remaining reporting gap of USD 9.8 billion (in constant 2014 USD), but also the diverging trends between the annual export figures provided by the three alternative sources and the COMTRADE partner data, as visualised in Figure 2 below.

Figure 2: South African annual gold production/exports by source, in constant 2014 USD million



Source: SARB, StatsSA, Chamber of Mines of South Africa, UNCTAD using COMTRADE data

A follow-up counterfactual would have to closely investigate these differences and particularly the significant spike reported by COMTRADE partner data after 2011. The sharp rise in the COMTRADE partner data does not make sense given the substantial fall in South Africa’s gold production over the period. One initial explanation may be that partner statistics have included non-South African exports if the partner country reports according to the General Trade System. In other words, much of the discrepancy could be explained by the inclusion of non-South African gold refined at the Rand Refinery in partner data. The other alternative explanations listed earlier would also have to be examined before a definite rebuttal of the claim of smuggling can be made.

6.3. Response to UNCTAD’s December 2016 report

The December 2016 report incorporates DTI trade data for gold exports, instead of the COMTRADE data (which is based on SARS data). The revised report purports to take on board the exposed weaknesses of its methodology by looking at the imports of SA’s trading partners to be “non-monetary gold” and comparing these with South Africa’s exports of “non-monetary gold”. It excluded the 2011 to 2014 period, thus reducing the supposed misinvoicing amount from USD 78.2 billion to around USD 57 billion for 2000 to 2010. The now-reduced differences, it concludes, still provide “*prima facie* indication of export misinvoicing”. However, UNCTAD makes no attempt to compare South Africa’s “monetary gold” export data with reported imports by its trading partners. It also does not attempt to understand why there is a huge discrepancy between data for the two different gold categories between 2010 and 2011.

By adopting this approach UNCTAD seems to fail to accept that prior to 2011 what South Africa reported as either “non-monetary” or “monetary gold” were in fact both recorded by its trading partners as “non-monetary gold”. This was because the distinction between “monetary” and “non-monetary” reflects the use of different trade reporting standards rather than the nature or use of the product.

South Africa prior to 2011 described gold exports as “monetary” not because that gold was destined to be used in countries’ foreign exchange reserves, but because gold was considered to be “money” in terms of the reporting standards used. The trading partners also correctly identified these exact same exports as “non-monetary” because their intended use was indeed non-monetary.

If both types of gold exports are combined prior to 2011 the discrepancy between exports reported by South Africa and by major trading partners largely disappears.

The continued logical faults of the second UNCTAD report regarding South Africa’s gold production are clearly exposed when the consequences of their new methodology are examined:

The UNCTAD study claims the true measure of South African “non-monetary gold” is the reported measure of its trading partners. It accepts that the country also exported “monetary gold” but claims this is separate from what the trading partners measured. So, the actual value of South Africa’s gold production implied by the study’s conclusions is the trading partner “non-monetary gold” plus South Africa’s “monetary gold”. When these values are combined the implied value of gold exports from 2000-2014 is \$202 billion. This amount and the implied tonnages of gold produced are more than double gold production over the period.

The reality is that the UNCTAD study is double-counting by arguing that South Africa’s “monetary gold exports” are not the same thing as the trading partners’ “non-monetary gold”. In addition, some non-South African gold processed on behalf of other African countries at the Rand Refinery is being captured in trading partner data.

6.4. Conclusions on the counterfactual analysis on gold

The counterfactual produced here clearly demonstrates that the UNCTAD study’s findings on South Africa’s gold exports are in large part invalid:

- The July 2016 report finding that the country experienced a loss of gold export revenues amounting to USD 78.2 billion between 2000 and 2014 has been proven incorrect on the basis of alternative, publicly and readily available data. Instead, the amount of discrepancy initially identified⁸⁷ by us was of USD 19.5 billion, and the technical misinvoicing (after the ‘regular’ 10% discrepancy margin rate) was actually only USD 9.8 billion. We subsequently⁸⁸ demonstrated that the USD 19.5 billion discrepancy can very likely be attributed to errors in the reported gold imports of South Africa’s trading partners, not in South Africa’s reported gold exports. This likely occurs through the fact that SA refines large amounts of gold for certain African (e.g. Ghana or Mali) gold-producing countries (currently standing at approximately 50 percent of total refined gold), which is reported by some trading partners as South African gold, instead of from its real origin.
- In the December 2016 report, based on the DTI data, the figures noted represent only “non-monetary” gold, and fail to recognise the different trade reporting standards used.

The UNCTAD July 2016 report claims that “the puzzling case of gold exports from South Africa” “does not appear to be a simple matter of undervaluation of the quantities of gold exported, but rather a case of pure smuggling of gold out of the country.”⁸⁹ This appears to be a baseless accusation. This direct attribution of smuggling was corrected in the second report.

⁸⁷ Eunomix. December 2016. *A Review of the UNCTAD Trade Misinvoicing Report, with a Focus on South Africa’s Gold Exports*. Page 7. <http://www.eunomix.com/research.php>.

⁸⁸ Eunomix. February 2017. *Further findings on SA’s gold exports in response to the Unctad trade misinvoicing study of July 2016*. <http://www.eunomix.com/research.php>.

⁸⁹ UNCTAD. July 2016. Page 31.

The UNCTAD findings are all the more improbable when consideration is given to South Africa's important auditing, accounting, and legislative barriers that exist to prevent the deliberate corporate misbehaviour described in the UNCTAD study.

In theory, the misinvoicing claimed by the UNCTAD study would mostly occur in the form of transfer pricing, a practice by which earnings from one geography are transferred to an entity of the same group resident in a lower-tax regime, while the funds involved remain within the company.

However, South Africa is recognised for its stringent regulatory and tax-enforcement regime. South African authorities helped develop the OECD Transfer Pricing Guidelines for Multinational and Tax Administration, which are, according to the Income Tax Act, applied by South African tax authorities. Furthermore, SARS also applies the UN's Practical Manual on Transfer Pricing.

In 2015, the Chamber of Mines commissioned consulting firm Deloitte to conduct research into South Africa's transfer-pricing regime and how it measures up to international standards. The Deloitte report notes that South Africa has adopted the best international standards of the time since the mid-1990s: "The administration of the legislation requires a high level of disclosure by multinational enterprises operating in SA in respect of their transfer pricing practices,"⁹⁰ the report says.

A recent review of South Africa's tax-policy framework by the government-commissioned Davis Tax Committee reached a similar conclusion. Furthermore, a SARS official told Parliament in 2015 that SARS had recovered ZAR 5 billion in additional tax since 2012, which involved transfer pricing of more than ZAR 20 billion, 40% of which involved mining companies. This indicates that the policy is working.

Furthermore, because most major South African gold producers are publicly listed on the Johannesburg Stock Exchange (JSE), the International Financial Reporting Standards (IFRS) apply to these companies. The Companies Act also requires public companies to have audited financial statements and that they adhere to all required reporting standards. Lastly, the 2009 King Report on Corporate Governance (King III) requires publicly listed companies in South Africa to produce integrated reports. The Public Finance Management Act and the Promotion of Access to Information Act also encapsulate these principles. A transfer to a company's offshore subsidiary or bank account would appear as such in the company's audited financial statements.

Thus, it seems very unlikely that South African gold producers could transfer funds to an offshore entity. Seeing as though the holding companies are almost all South African, they must report the worldwide earnings of all their operations. Fraud on the scale UNCTAD suggests, involving multiple producers and all of their gold mines, would therefore be quickly exposed in companies' accounts.

⁹⁰ Deloitte. 2015.

7. Part D – Counterfactual analysis: South African platinum, silver and iron ore exports

7.1. Silver and platinum

The UNCTAD study claims that export misinvoicing totals USD 24 billion for silver and platinum exports from South Africa. No changes to this finding were made in the December 2016 report. The study notes that there are three years in particular (2000, 2002 and 2014) when misinvoicing seems to be significant:

The estimation results show systematic export underinvoicing throughout the period. However, the amounts of export misinvoicing are relatively small, representing generally less than 10 per cent of total exports. Two years stand out as peculiar exceptions: in 2000 and 2002, underinvoicing of silver and platinum exports to South Africa's top nine trading partners amounted to 97 per cent and 98 per cent of total exports respectively. Another year that recorded substantial export underinvoicing was 2014, at 17 per cent of total exports. Except for these three years, export misinvoicing was low compared with total exports.⁹¹

It is noteworthy that the December 2016 report removed the following sentence:

Nonetheless, the cumulative amount of \$19 billion in export underinvoicing is significant. Thus, efforts should be made to reduce trade misinvoicing in the silver and platinum sector.⁹²

For Eunomix's counterfactual we identified that alternative sources of data on silver and platinum exports are publicly available. This, data gathered from South Africa's Department of Mineral Resources (DMR) and from the Department of Trade and Industry (DTI) show a smaller difference between export statistics of South Africa compared with those of the country's trading partners of South Africa than the COMTRADE data used by UNCTAD (see table below). Using the trade statistics provided by the DTI, the trade discrepancy drops from USD 24 billion to USD 15 billion (based on anything more than the 'regular' 10 percent discrepancy margin rate).

Table 4: SA silver & platinum exports - SA COMTRADE data v partner data v other SA data

Year	SA data (COMTRADE data)	Partner data (COMTRADE data)	DMR export sales data in constant 2014 USD millions	DTI data in constant 2014 USD millions
2000	55.0	5641.0	4701.3	4646.5
2001	4360.4	5021.3	4510.4	4303.9
2002	26.0	4182.6	3725.1	3558.1
2003	4018.2	4927.5	4259.6	3994.5
2004	5668.2	6758.7	5605.9	5647.5
2005	6362.6	7670.1	6208.0	6379.5
2006	9200.4	10932.4	9023.7	9283.7
2007	10989.6	13547.0	10420.0	11043.4
2008	10751.5	15680.1	10601.4	10661.7
2009	7357.7	8939.1	7021.3	7339.7
2010	10038.4	11306.9	9712.0	10001.0
2011	11626.8	13895.3	10677.4	11638.1
2012	8192.1	10194.7	7650.2	8186.8
2013	8581.2	10495.9	7927.0	8586.2

⁹¹ UNCTAD. December 2016. Page 22.

⁹² UNCTAD. July 2016. Page 25.

2014	6509.8	8929.5	6148.7	6512.3
Total	103738.0	138122.2	108192.0	111782.9

Source: COMTRADE, DMR and DTI data, using author's calculations for exchange rate & GDP deflator

The very large discrepancies between COMTRADE trade values reported in 2000 and 2002 by South Africa versus those reported by its trading partners, which the UNCTAD study notes as “amounting to 97 per cent and 98 per cent of total exports respectively”⁹³ and directly ascribes to misinvoicing are, at face value, unrealistic. Indeed, compared with the following years’ data (2001 and 2003) the COMTRADE figures are 1.3 percent and 0.6 percent of each. Such large anomalies should have alerted the author to the possibility of data discrepancies for these years. Yet this was not the case.

However, readily available data, accessible to the public in the form of the DMR and DTI data we obtained show far higher silver and platinum exports for the years 2000 and 2002 (compared with the COMTRADE data): i) USD 4,701.3 million (DMR) and USD 4,646.5 million (DTI) for 2000 instead of USD 55 million, versus USD 5,641.0 million for COMTRADE partner data; and, ii) USD 3,725.1 million (DMR) and USD 3,558.1 (DTI) for 2002, instead of USD 26.0 versus USD 4,182.6 for COMTRADE partner data.

This further advances the argument that trade discrepancies are in many cases caused by data discrepancies, contrary to UNCTAD’s claim.

Table 5: Zimbabwe’s platinum exports

Year	Production ('000 ounces)	Price (USD/ounce)	Value (USD millions)	Value (constant 2014 USD millions)
2000	0	542.92		
2001	0	527.44		
2002	0	538.77		
2003	0	691.06		
2004	0	844.26		
2005	155	895.75	138.8	164.3
2006	165	1139.82	188.1	215.9
2007	170	1304.21	221.7	247.9
2008	180	1571.13	282.8	310.1
2009	230	1205.93	277.4	301.8
2010	280	1610.67	451.0	484.9
2011	340	1716.09	583.5	614.6
2012	337	1549.96	522.3	540.3
2013	410	1484.02	608.4	619.3
2014	401	1380.27	553.5	553.5
Total		13857.9	3827.5	4052.5

Source: Johnson Matthey PGM Market report, SA Reserve Bank using author's calculations for GDP deflator

Using DTI data, the trade-data discrepancy falls to about 20 percent, or twice the “normal” trade discrepancy allowed for by the UNCTAD’s study theory. Yet this remaining possible discrepancy may not include misinvoicing at all. A viable hypothesis is that platinum group metals (PGMs) mined in Zimbabwe are refined at platinum refineries in South Africa prior to export. As with the case of exports of non-South African gold from the Rand Refinery, this platinum would not be considered an export by the South African authorities. But this distinction might not be made by South Africa’s trading partners reporting according to the General

⁹³ UNCTAD. December 2016. Page 22.

Trade System. This conclusion is supported by an examination of South Africa’s trading partners’ data and Zimbabwean platinum production data by Eunomix. The above Table estimates the value of Zimbabwe’s platinum exports from 2000-14 to be USD 4.1 billion. Yet the large buyers of South Africa platinum report very little purchases of platinum from Zimbabwe – purchase that are highly unlikely to be the case in reality.

Similarly, as mentioned with gold, the platinum mining companies in South Africa (or with operations in South Africa but headquartered in the United Kingdom, Canada and Australia) were equally subject to stringent tax, customs and corporate governance laws and would find it very difficult to engage in the scale of purposeful misinvoicing or ‘smuggling’ that the UNCTAD July 2016 report suggests.

7.2. Iron ore

The UNCTAD study states that South Africa’s iron ore misinvoicing totalled USD 620 million between 2000 and 2014. This was stated as being underinvoicing. The study states that there was a strange occurrence of first underinvoicing between 2000 and 2010 and then overinvoicing between 2011 and 2014:

With respect to South Africa’s seven leading export destinations, there was a cumulative amount of export underinvoicing of \$5.6 billion over the period 2000–2010, or \$512 million per annum. In contrast, over the period 2011–2014, the country recorded \$1.3 billion in iron ore export overinvoicing or \$338 million per annum. This pattern was driven primarily by trade with the Netherlands and Japan which exhibited substantial export overinvoicing during the period 2011–2014.⁹⁴

The peculiar cases of the Netherlands and Japan are not, however, further investigated. As with the cases of gold and silver & platinum, the reason for misinvoicing is assumed to be purposeful, rather than being possibly the result of an issue of data collection.

Table 6: SA Iron Ore exports - SA COMTRADE data v partner data v other SA data

Year	SA data (COMTRADE)	Partner data (COMTRADE)	DMR data	DTI data in constant 2014 USD millions
2000	430.9	678.0	472.1	434.48
2001	528.5	700.0	519.0	523.06
2002	534.5	715.2	526.3	535.95
2003	594.2	807.3	521.7	588.32
2004	697.2	1421.9	656.4	673.69
2005	1,114.2	1,686.9	1,154.2	1,075.05
2006	1,334.0	1,968.2	1,441.8	1,220.69
2007	1,786.1	2,649.2	1,866.3	1,732.12
2008	2,623.7	3,955.8	2,668.7	2,568.35
2009	3,407.6	4,209.5	3,248.7	3,394.87
2010	5,864.6	6,243.3	5,938.4	5,842.80
2011	9,475.0	9,238.4	8,515.9	9,484.30
2012	8,006.5	7,944.2	6,091.7	8,003.56
2013	8,597.4	8,320.8	6,048.6	8,605.48
2014	6,738.7	6,988.4	4,889.3	6,886.42
Total	51,733.0	57,527.1	44,559.1	51,569.13

Source: COMTRADE, DMR and DTI data, using author’s calculations for exchange rate & GDP deflator

⁹⁴ UNCTAD. July 2016. Page 27.

Table 7: SA Iron Ore exports – Discrepancies between COMTRADE data (SA and partners), COMTRADE (partners data) and DMR and COMTRADE and DTI data

Year	Comtrade discrepancy	DMR discrepancy	DTI Discrepancy
2000	247.10	205.90	243.52
2001	171.50	181.00	176.94
2002	180.70	188.90	179.25
2003	213.10	285.60	218.98
2004	724.70	765.50	748.21
2005	572.70	532.70	611.85
2006	634.20	526.40	747.51
2007	863.10	782.90	917.08
2008	1,332.10	1,287.10	1,387.45
2009	801.90	960.80	814.63
2010	378.70	304.90	400.50
2011	(236.60)	722.50	(245.90)
2012	(62.30)	1,852.50	(59.36)
2013	(276.60)	2,272.20	(284.68)
2014	249.70	2,099.10	101.98
Total	5,794.00	12,968.00	5,957.96

In Eunomix’s counterfactual investigation alternative public information on South African export data (both from the DMR and DTI) showed lower exports figures than those shown on COMTRADE. Importantly, there is a wide discrepancy between DMR and DTI data, which demonstrate even larger discrepancies than provided by COMTRADE South African export data (Table 6 above).

Insofar as the Netherlands and Japan cases are concerned, and assuming that the data is correct, an alternative hypothesis to underinvoicing exists.

The Netherlands, and specifically the port of Rotterdam, is renowned for being a trans-shipment port for bulk commodities, where thousands of tons of goods are unloaded and reloaded onto other ships or forms of transport, destined for other destinations in Europe and further abroad. This results in significant confusion and data discrepancies as Rotterdam (the Netherlands) is not the final destination for goods but is, rather, a middle point between exporter and importer. The December UNCTAD report acknowledges this possibility but chooses not to include it as a possible explanation in this case. It is highly likely that South Africa recorded the destination of export as the Netherlands for a large amount of iron ore, even though it ended up in other European Union states or was shipped further abroad. It seems likely that this too is the case with Slovenia.

Eunomix conducted an interview with a large South African iron-ore exporter. The company confirmed that Slovenia has also become a trans-shipment port for South African iron ore sold into other European countries. Using 2011 as an example year, Slovenia recorded iron ore imports of USD 54,640 from South Africa, while South Africa recorded USD 101,348,404 exports to Slovenia (see appendix 4). This large discrepancy is likely a result of data-recording discrepancies rather than purposeful misinvoicing to try to purposefully circumvent the customs authority.

With regards to another important issue, there is a significant assumption made with regards to the Cost, Insurance and Freight (CIF) amount in the equation to calculate the misinvoicing amount. The assumption is that a flat rate of 10% of the value of the export value be assumed for CIF. The equation is laid out as follows:

Country B’s imports from country A = Country A’s exports to country B + freight and insurance

The UNCTAD study has defined the normal discrepancy at 10% of the export value, the import value being 1.1 times the value of the export. Yet this is simply a theoretical assumption, applied across all commodities irrespective of the actual (historical) average CIF costs for specific commodities.

With iron ore being a lowvalue, heavy (in terms of weight) commodity being transported over large distances, the cost of freight and insurance should not be assumed to be so low. In fact, in the interview conducted by Eunomix with the iron-ore exporter, it was pointed out that CIF for iron ore has fluctuated significantly, currently sitting at about 13% of the value of the export, but having previously been as high as 50% of the value of the export. The high fluctuation of the relative value of CIF for iron ore reflects the high fluctuations in the price of iron ore itself as well as of the price of shipping, particularly during the course of the past 15 years or, where these have been affected by dramatic swings reflecting sharp economic ups and downs. This is another important 'idiosyncratic' point to note in explaining the complexity of correctly analysing trade discrepancies. It is ignored in UNCTAD's analysis of the data.

In the same interview it was also explained that, under instructions from SARS, SA iron-ore exporters had switched to reporting exports CIF instead of FOB. This switch, rather than behavioural changes of exporters may explain the change to overinvoicing claimed by UNCTAD for 2011-14, even assuming that this 'overinvoicing' occurred in the first place.

Lastly, as mentioned with gold and platinum, iron-ore mining companies in South Africa (or with operations in South Africa but headquartered in other countries) were equally subject to stringent tax, customs and corporate governance laws and would find it very difficult to engage in purposeful misinvoicing or 'smuggling' that the UNCTAD report suggests.

Given the issues noted with the UNCTAD theory and analysis, we do not take this as proof that misinvoicing is happening. It is not even clear that a trade discrepancy occurred. Indeed, as is illustrated by the large discrepancy that exists between DMR and DTI data, it is unclear whether a trade discrepancy (the existence of a real difference between the value of a commodity exported and the value of that commodity imported) or simply a discrepancy in data has occurred. We do not have data to provide an answer. What we can advance with confidence is that the case of South African iron-ore exports adds itself to the implausibility of the UNCTAD's theory and findings.

8. Part E - Assessment of the UNCTAD study

8.1. Assessment of theory and methodology

8.1.1. Discussion

1. The UNCTAD study's core theoretical proposition is that discrepancies between exports from commodities producing countries and imports from their trade counterparts greater than 10 percent are allocated to misinvoicing. The Eunomix report has demonstrated this to be incorrect at both the theoretical and empirical levels – insofar as South Africa's commodity exports are concerned. While the counterargument to this is likely to be that South Africa is the proverbial exception that proves the rule, the South Africa case represented the vast majority of evidence of misinvoicing in the UNCTAD study. Rather, the South African case is the proverbial canary in the mine, and suggest that the study's entire set of findings may be wrong.
2. From a theoretical standpoint, a more comprehensive review of the literature on the issue of trade misinvoicing shows that at least three schools of thoughts exist on the relationship between trade discrepancy and misinvoicing, marking a clear absence of consensus. This lack of consensus and the problems we have identified with data discrepancies as regards South Africa's case nullify the UNCTAD study's positing a 1 to 1 mechanical relationship between the two, with misinvoicing being the sole and unmediated cause of discrepancies. Yet the UNCTAD study systematically fails to accept any existing alternative explanations for the persistence of trade discrepancies in the data used, rejecting these explanations off-hand through contestable arguments.
3. The lack of inclusion of alternative perspectives in the UNCTAD study has had the effect of *de facto* presenting theoretical proposition, methodology, data sets and findings as the only valid explanation for persistent large trade discrepancies. As shown in our case study the issue of data is significant, and is in some case so significant that the existence of discrepancies in trade may not exist at all, and may rather be exclusively caused by discrepancy in data collection and reporting.
4. Our findings are sufficient to nullify the claim made in the UNCTAD study (July 2016) that systematic large trade discrepancies can only be caused by trade misinvoicing and not by data errors because data errors are zero-mean-reverting over time. Clearly, in the case of South Africa's exports the error has not self-corrected despite being large and consistent over time. This is because this was not the product of random statistical errors which would have corrected themselves through the laws of probability. It is an issue of data classification between the South African government and COMTRADE. And it is one which the UNCTAD study originally appeared not to be unaware. Even in the December 2016 report the failure to acknowledge the different trade-reporting standards used by different countries (and specifically by South Africa), particularly with regards to "monetary" versus "non-monetary" gold, means that plausible explanations for the trade discrepancies continued to be ignored.
5. For instance, the UNCTAD study posits that the analysis by product type that the report provided is needed because of the "idiosyncratic characteristics" of some products and because "variation among trading partners... of trade recording rules that may generate differences in trade misinvoicing across partners."⁹⁵ Yet in the empirical analysis conducted in the study these differences are automatically attributed to misinvoicing. "Idiosyncracies" (such as the well-known "Rotterdam effect") or differences in trade recording (such as South African gold) are not considered.
6. Yet some of the study's findings should have alerted UNCTAD to contradictions and incoherence between theory and data: thus the contradiction between the fact that international commodity producers operating in Chile overinvoice copper imports, but underinvoice copper exports from Zambia. The UNCTAD study gives both findings equal weight. This cannot be so: there can be no illegal motive for exporters to overinvoice their sales. The UNCTAD study here speculates that "overinvoicing could also be motivated by the attempt of exporters to take advantage of tax incentives aimed at promoting

⁹⁵ UNCTAD. July 2016. Page 3.

export-oriented activities.”⁹⁶ How, too, could some products reveal large underinvoicing in one year and equally large overinvoicing in the next, or overinvoicing with some countries and underinvoicing with others? In some years exporters would be motivated by illegal gains from exports, and in others by tax-incentive abuses? The answer must lie in faulty methodology or data, or product “idiosyncrasies”. In its December report UNCTAD acknowledges possible problems with copper export data for Zambia, but concludes:

Knowing the full information on the transactions at all the nodes of trade from Zambia to the final destination is essential for asserting whether Zambia is getting the fair share of the value of its copper exports.⁹⁷

This is correct. But nowhere does the UNCTAD study, acknowledging that it does not have full information, change its implication that Zambia is not getting its fair share of the value of its exports.

7. In a press release issued a few days after the July report, UNCTAD dismissed most of the initial criticisms of the study.⁹⁸ There, UNCTAD made the point that as regards the occurrence of non-recording of country of destination (importer) in the country of origin (exporter) for some commodities:

(...) we do not see any practical or moral reason why the destination country should not be recorded. Transparent documentation should make it possible to identify clearly the source country of any cargo, no matter how many times the cargo is sold or traded between source and destination countries. We agree with those traders who say that they should be free to do whatever they want with their cargoes, but we also think the traders should report to whom they sell their cargoes in order to ensure full transparency between the source and destination countries.

The importance of this transparency and traceability is that, first, full transparency on the export and trade of commodities is a necessary (if not sufficient) condition for the citizens of resource rich countries to benefit from their countries' natural resources. Second, it allows an importer to determine that its imports have no connection, for example, to human rights abuses. This is as true for gold exports from Eastern Congo as it is for blood diamonds. Third, if some companies are benefitting from tax incentives based on how much they have exported from a given country, then they should be able to identify the destination country too.⁹⁹ (underlined by Eunomix)

The underlined point indicates a surprising confusion between trade statistics as recorded by the respective trading partners on the one hand, and actual revenues on the other. UNCTAD seems to hold that a discrepancy in customs declarations between the exporting country and the importing country results in revenue loss. If this is not explicitly stated it certainly is implied. This confusion is puzzling, as trade between countries is not settled by governments but by the trading parties themselves. Irrespective of what is recorded in official statistics, and that purchases are paid for.

8. Moreover, the generalisation of the notion that trade discrepancies greater than 10 percent should be attributed to misinvoicing appears to have questionable theoretical and empirical validity. We found no solid justification for this, and the UNCTAD study appears simply to apply a rule of thumb. We found

⁹⁶ UNCTAD. July 2016. Page 31.

⁹⁷ UNCTAD. December 2016. Page 17.

⁹⁸ UNCTAD. 2 August 2016:

Challenges to our paper have fallen broadly into two specific camps. First, some argue that UNCTAD has over-interpreted - or misinterpreted - the data with its finding that some commodity dependent developing countries are losing as much as 67 percent of their exports worth billions of dollars to trade misinvoicing. A second line of argument is that when Zambia says it exports its copper to Switzerland, it actually means that a Swiss-based company is exporting the copper, and therefore we should not take import and export data seriously when the copper does not arrive in Switzerland. (...)

⁹⁹ *Ibid.*

some evidence that shipping costs may account for more than 10 percent for bulk commodities CIF cost. This point merits further research.

9. Beyond the theory, the counterfactual studies conducted by Eunomix, and focused on South Africa, have easily demonstrated that the UNCTAD study's findings are both theoretically and empirically incorrect:
 - In the case of gold, the trade-data discrepancy figure of USD 78.2 billion (in the July 2016 report) or USD 57 billion (in the December 2016 report) was shown to be in fact only USD 9.8 billion, according to other reliable data sources in South Africa.
 - In the case of silver & platinum, the trade-data discrepancy figure of USD 24 billion was shown to be actually only USD 15 billion, according to other reliable data sources in South Africa.
 - In the case of iron ore, the trade-data discrepancy figure of USD 620 million for iron ore was shown to be lower than the figures compiled by the DMR and DTI.

8.1.2. Assessment

10. Given the global attention it garnered, and given its reputational implications for all concerned, the study should have provided a comprehensive account of the different schools of thought on the relationship between trade discrepancies and trade misinvoicing. It should have heeded the calls for prudence in tradedata analysis emitted by, *inter alia*, UNStats (COMTRADE's custodian), the IMF, the OECD and the World Bank. It should have entertained different hypotheses where it found meaningful persistent discrepancies. It should have interrogated the contradictions between hypothesis and results when these appeared. It should have approached the relevant authorities and implicated parties for comment before releasing the study. Had this been done, the basic but mutually reinforcing errors committed in the study might have been at least partly mitigated.
11. In addition to justifying questions on the scientific validity of the UNCTAD study, the lack of effort to find alternative data sources and the lack of alternative hypotheses render acceptable questions about the motives of the report. Indeed, the conclusion that the report sought to prove a tenuous hypothesis by excluding alternative perspectives and approaches, and focusing on a one-dimensional, self-reinforcing, empirical analysis without alternative hypotheses and data sources is not unreasonable.
12. Further demonstration of its deep theoretical flaws, the study argued that primary commodities dominate the exports of the countries surveyed. This is patently circular in argument since the very reason why these countries were studied in the first place was because of their characterisation as countries where commodity exports were economically dominant.

8.1.3. Conclusions on theory and methodology

13. **Eunomix rejects the UNCTAD study's conclusion that trade misinvoicing is substantial, and underinvoicing is preponderant in misinvoicing.**
14. **It is our view that the UNCTAD study mainly, and perhaps exclusively, documented trade-data discrepancies rather than actual trade discrepancies:**
 - The core proposition Trade Discrepancy = Trade Misinvoicing if > greater than 10 percent appears false.
 - In reality, Trade-Data Discrepancy imperfectly reflects Actual Trade Discrepancy, which may or may not indicate Trade Misinvoicing.
15. **Accordingly, it is likely that trade-data analysis at the aggregate data level does not permit positive identification of trade misinvoicing. At best it identifies data discrepancies. These may or may not be the product of misinvoicing.**
16. **By implication, the conclusion that large discrepancies are the product of deliberate action by economic operators wilfully engaged in illicit financial flows is incorrect. Not having documented trade misinvoicing, the UNCTAD study had therefore not documented illicit financial flows.**

8.2. Apportioning blame – the evidence

17. The July 2016 report concluded that trade misinvoicing is likely to be the result of deliberate illicit action. If the theoretical premise of the UNCTAD study and part of its empirical demonstration are incorrect, then so is the accusation that trade misinvoicing is the result of deliberate illicit action. This direct accusation and the recommendations that ensued were watered down in the December 2016 report, though the implications of deliberate illicit action remained. Misinvoicing is an action with intent committed by specific individual actors, be they corporate executives, government officials or both. If trade misinvoicing continues to occur, as argued in the December report, then illicit action is its cause.
18. Eunomix does not question whether misinvoicing occurs or not. Trade misinvoicing occurs, and when it does it is likely either to have illicit intent or to be illicit in practice. As stated in point 13 above, the UNCTAD study did not document trade misinvoicing. It documented trade-data discrepancies.
19. Yet, the UNCTAD study is explicit about the intent/behaviour behind its findings of misinvoicing. In the July 2016 report the word “smuggling” appeared over twenty times in the main text. It appears about twelve times in the December 2016 report. The study explicitly assigns blame, directly and indirectly. The July report stated that:

(In the case of Nigeria’s oil) there appears to be systematic smuggling of oil out of the country. (...)

(In the case of all case studies except Chile) It is therefore clear that export misinvoicing could be an important channel of capital flight from these countries. (...)

(As regards) the puzzling case of gold exports from South Africa, (...) the country’s official statistics report very little gold exports while substantial amounts appear in its leading trading partners’ records. This does not appear to be a simple matter of undervaluation of the quantities of gold exported, but rather a case of pure smuggling of gold out of the country. (...)

Puzzling results also emerge at the trading partner level. Trade with the Netherlands presents a peculiar case, with systematic and substantial export overinvoicing. It appears that primary commodities exported to the Netherlands never dock in the Netherlands. This is also the case for copper exports from Chile and Zambia to Switzerland. The question is whether this is the outcome of smuggling or incorrect reporting of the residence of the buyers. Answering this question may require an investigation at the company level.¹⁰⁰ (underlined by Eunomix)

20. Following the many reactions to the July 2016 report, UNCTAD immediately sought to dispel the notion that the report was accusatory or assigned blame in a follow-up press release on 2 August 2016 and titled, *UNCTAD welcomes discussion, transparency on commodities and misinvoicing*.¹⁰¹ There, UNCTAD claimed that the report “identified clear and consistent patterns of misinvoicing, a term we use without attributing blame or making any specific accusations.”¹⁰² But, as regards South Africa the July report explicitly stated that “This does not appear to be a simple matter of undervaluation of the quantities of gold exported, but rather a case of pure smuggling of gold out of the country.”¹⁰³ And pure smuggling has a precisely-defined technical meaning:

The first is technical smuggling, where the value of imports is deliberately underestimated, possibly to avoid import duties and other official levies. The second case

¹⁰⁰ UNCTAD. July 2016. Page 31.

¹⁰¹ UNCTAD. 2 August 2016.

¹⁰² *Ibid.*

¹⁰³ UNCTAD. July 2016. Page 31.

is pure smuggling, whereby some of the imported goods are simply not recorded at all at entry into the country.¹⁰⁴ (underlined by Eunomix)

The UNCTAD report clearly stated that data on South Africa's exports of gold indicated a case of pure smuggling. Applying the study's own definition of pure smuggling, some or all of these exports would "simply not (have been) recorded at all". Since the definition given by UNCTAD applied only to imports we assume, based on the UNCTAD methodology and findings that for exports out of South Africa, pure smuggling would have taken the form of the non-recording of exports from the country, but full recording in importing countries. Hence the discrepancy between South Africa's declared exports and its trading partners' declared imports, interpreted by the UNCTAD study as evidence of underinvoicing.

Interestingly, the UNCTAD study's accusation of pure smuggling for South African gold exports stands in contradiction with the statement in the same study that:

Empirically, it is difficult to distinguish between these two scenarios by looking at the aggregate trade data.¹⁰⁵

The UNCTAD study did just that, introducing another methodological incoherence to the study's flawed approach.

21. The connection between this behaviour and illicit financial flows is made explicit by UNCTAD's Secretary General, Dr. Mukhisa Kituyi, who, on 16 July 2016, characterised the findings of the study as providing "fresh lines of enquiry to understand the problem of illicit trade flows"¹⁰⁶ and invited countries and companies to join efforts to improve transparency and partner with UNCTAD on developing further research on the issue. In a 9 February 2017 statement Dr Kituyi was even more explicit about the connection between misinvoicing, illicit behaviour and South African exporters of minerals:

Until there is sufficient cooperation between exporters and importers in tracking the declared prices and values of SA exports, Unctad cannot provide a fair assessment of the extent of mis-invoicing. Greater transparency and minerals observance is needed to smoke out those not complying.

(...)

At the same time there is an increasing push globally to smoke out money laundering. On the back of this trend developing countries must ensure they get their rightful taxes so that it can be put back in communities and create a consumer base. Therefore, mining enterprises should be more under pressure to comply.¹⁰⁷

22. In an interview with the UNCTAD press office published in 17 July 2016, the report's author, Prof. Leonce Ndikumana, of the University of Massachusetts, explained that:

Trade misinvoicing consists of manipulations of exports and imports invoices by operators seeking to either secure foreign exchange advantages not reported to the relevant authorities, such as a central bank, and/or to avoid taxation or customs duties. (...) On the export side, exporters, both firms or individuals report an amount which is less than the true value of the goods exported, so as to keep the difference abroad. On the import side, importers exaggerate the cost of the goods to be purchased abroad so as to obtain extra foreign exchange from the central bank. The extra foreign exchange is invested or spent abroad. In both cases, the country incurs a loss in foreign exchange, hence capital flight. Imports may be "underinvoiced" to minimize customs duties.

¹⁰⁴ UNCTAD. December 2016. Page 12.

¹⁰⁵ *Ibid.*

¹⁰⁶ UNCTAD. 16 July 2016. *United Nations: Some countries losing up to 67 per cent of commodity exports earnings due to misinvoicing.* <http://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1277>.

¹⁰⁷ Smith, C. 9 February 2017. *Unctad chief sets record straight on SA gold mis-invoicing.* In Fin24.

Imports may also simply not be reported at all -- which is basically smuggling.¹⁰⁸
(underlined by Eunomix)

The connection between trade misinvoicing and deliberate illicit intent and behaviour, and in some case criminal, could not be more explicit.

23. The UNCTAD-issued press release of 2 August 2016 claimed that:

In summary, these challenges do little to reassure about the lack of transparency in the trade of commodities from developing countries. As we have highlighted, this misinvoicing – a word that we use in its most technical sense, without attaching value or even accusation – means that some countries may be losing as much as 67 percent of their commodity exports.¹⁰⁹

Yet, as the UNCTAD study unmistakably explains, and as the author of the study clarifies in his UNCTAD interview, misinvoicing is the product either of “technical smuggling” or of “pure smuggling”, both resulting from deliberate, illicit action that needs to result in investigation at the company level. UNCTAD’ Secretary General has repeatedly made and stated this connection.

8.3. Implications on UNCTAD study’s recommendations

24. As a result of our review, the UNCTAD study’s main policy recommendations are by necessity significantly weakened, and notably:

- Recommendation 1: governments should investigate trade misinvoicing by scrutinising exports.
- Recommendation 3: transnationals and jurisdictions involved in misinvoicing should be investigated.

The objectives of these recommendations are to identify actual instances of misinvoicing by actual operators based on the results of the UNCTAD study and the accusation of technical and pure smuggling. These recommendations are for the forensic investigation of misinvoicing. Given that the study has not documented (as we have shown for South Africa) actual systematic and persistent misinvoicing, and thus smuggling, such investigations could prove misguided if not supported by better *prima facie* evidence.

In this regard, it is credible that the UNCTAD study’s misdiagnosis has created a damaging confusion, with reputational damage, trust destruction and wasteful expenditure.

25. Our report validates the UNCTAD study’s second recommendation:

- Recommendation 2: In particular, improvements are urgently needed in data gathering at the product and partner levels, and there should be coordination between national statistics and international statistical databases such as UN COMTRADE and the IMF’s DOTS. This will require scaling up both financial and technical assistance to developing countries to help improve human capacity as well as the infrastructure for the compilation and management of trade statistics.¹¹⁰

However, we note the caveat that the kind of research conducted in the UNCTAD study should, as a matter of principle, seek to identify independent data sets for verification of data validity. As shown in the South African counterfactual, data often already exist. What is required is better research based on established criteria of scientific accuracy.

8.4. The matter of ownership of the report and its findings

26. Ownership of the UNCTAD report and its findings has been the subject of controversy:

¹⁰⁸ UNCTAD. 17 July 2016. Q&A with Leonce. Ndikumana. A new UNCTAD study reveals staggering revenue losses to developing countries from commodity trade mispricing. We speak to the author. <http://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=1280>.

¹⁰⁹ Ibid.

¹¹⁰ Ibid.

- On the one hand, the report comes with a clear indication that the study was prepared by a consultant under supervision by UNCTAD personnel: “This paper was prepared by a consultant, Professor Léonce Ndikumana of the University of Massachusetts at Amherst. The work was supervised by Janvier Nkurunziza, Chief, Commodity Research and Analysis Section (CRAS), Special Unit on Commodities, under the general guidance of Samuel Gayi, Head, Special Unit on Commodities.”¹¹¹

The report also issues a clear disclaimer that “The material in this paper represents the personal views of the author only, and not the views of the UNCTAD secretariat or its member States.”¹¹²

- On the other hand, UNCTAD has validated the study, as indicated by the fact that the work was supervised by the organisation and that it had to broadly support the report’s findings to allow publication.

Moreover, UNCTAD explicitly also supported these reports conclusions through various press releases and statements made between July 2016 and February 2017, in some instances presenting the study as its own. For instance, in its 2 August 2016:

Challenges to our paper have fallen broadly into two specific camps. First, some argue that UNCTAD has over-interpreted - or misinterpreted - the data with its finding that some commodity dependent developing countries are losing as much as 67 percent of their exports worth billions of dollars to trade misinvoicing.

(...)

To reply to the first argument, this is what our data has shown us. We do not see a convincing challenge to the source of our data (Comtrade), the data itself, or even the methodology used to arrive at the figures for misinvoicing, a term that we try to use without any implicit judgement or bias.¹¹³

¹¹¹ UNCTAD. December 2016. Page 3.

¹¹² *Ibid.*

¹¹³ UNCTAD. 2 August 2016.

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10. Appendices

10.1. Appendix 1: SA gold exports by trade partner

Table 11: South Africa: Gold exports and export misinvoicing (Millions of constant 2014 dollars) and partners' share in South Africa's total exports (Per cent), 2000-2014

Country	Gold exports (by volume) and export misinvoicing (Millions of constant 2014 dollars)			Shares of partner's (per cent)		
	Exports (SA data)	Exports (Partner data)	Export misinvoicing	Exports (SA data)	Exports (Partner data)	Mis-invoicing
Australia	0.0	102.9	102.8	0.0	0.1	0.1
Belgium	36.3	109.9	70.0	0.1	0.1	0.1
Germany	606.8	1 244.3	576.9	1.8	1.1	0.7
Hong Kong (China)	1 579.0	20 150.0	18 413.2	4.6	17.3	23.5
India	202.3	40 248.9	40 026.4	0.6	34.6	51.2
Italy	17.5	15 541.8	15 522.5	0.1	13.4	19.8
Saudi Arabia	0.0	1 466.9	1 466.9	0.0	1.3	1.9
Switzerland	386.0	2 949.5	2 524.9	1.1	2.5	3.2
Thailand	0.0	4 748.5	4 748.5	0.0	4.1	6.1
Turkey	42.9	10 033.7	9 986.5	0.1	8.6	12.8
United States	8.4	584.3	575.1	0.0	0.5	0.7
United Arab Emirates	37.5	2 930.2	2 889.0	0.1	2.5	3.7
United Kingdom	251.3	14 019.5	13 743.1	0.7	12.1	17.6
Zimbabwe	0.0	2 991.4	2 991.3	0.0	2.6	3.8
Partners	3 167.9	117 121.7	113 637.0	9.2	100.8	145.2
World	34 507.5	116 197.7	78 239.5	100	100	100

Source: Author's computation using UN Comtrade data.

10.2. Appendix 2: UN COMTRADE Disclaimer

Coverage

The United Nations Commodity Trade Statistics Database (UN COMTRADE) contains detailed imports and exports statistics reported by statistical authorities of close to 200 countries or areas. It concerns annual trade data from 1962 to the most recent year. UN COMTRADE is considered the most comprehensive trade database available with more than 1 billion records. A typical record is – for instance – the exports of cars from Germany to the United States in 2004 in terms of value (US dollars), weight and supplementary quantity (number of cars). The database is continuously updated. Whenever trade data are received from the national authorities, they are standardized by the UN Statistics Division and then added to UN COMTRADE.

Limitations

UN COMTRADE is available to the general public and should be used with good knowledge of its limitations. Please read the following points very carefully before extracting and using data:

1. The values of the reported detailed commodity data do not necessarily sum up to the total trade value for a given country dataset. Due to confidentiality, countries may not report some of its detailed trade. This trade will - however - be included at the higher commodity level and in the total trade value. For instance, trade data not reported for a specific 6-digit HS code will be included in the total trade and may be included in the 2-digit HS chapter. Similar situations could occur for other commodity classifications. Detailed data processed after 1. January 2006 and published in HS will sum up to the respective totals due to the introduction of adjustment items with commodity code 9999 and 999999.
2. Countries (or areas) do not necessarily report their trade statistics for each and every year. This means that aggregations of data into groups of countries may involve countries with no reported data for a specific year. UN COMTRADE does not contain estimates for missing data. Therefore, trade of a country group could be understated due to unavailability of some country data.
3. Data are made available in several commodity classifications, but not all countries necessarily report in the most recent commodity classification. Again, UN COMTRADE does not contain estimates for data of countries which do not report in the most recent classification.
4. When data are converted from a more recent to an older classification it may occur that some of the converted commodity codes contain more (or less) products than what is implied by the official commodity heading. No adjustments are made for these cases.
5. Imports reported by one country do not coincide with exports reported by its trading partner. Differences are due to various factors including valuation (imports CIF, exports FOB), differences in inclusions/ exclusions of particular commodities, timing etc. The recommendations for international merchandise trade statistics can be found in the International Merchandise Trade Statistics: Compilers Manual). Additional methodological information can be found on the same web page.
6. Almost all countries report as partner country for imports the country of origin (see Metadata & References > Explanatory Notes) which is determined by the rules of origin established by each country (see International Merchandise Trade Statistics, Concepts and Definitions, Rev.2, para. 139 and 140). Hence, the term 'partner country' in the case of imports does not necessarily imply any direct trading relationship.

10.3. Appendix 3: UNCTAD note on statistical errors

“It may be argued that trade misinvoicing is merely a reflection of imperfections in export and import data arising from incorrect recording, delays in reporting and/or differences in pricing mechanisms. However, existing empirical evidence demonstrates that the estimated levels of trade misinvoicing do not reflect mere statistical noise in the data. While it is possible that recorded import and export data might be affected by statistical errors, these errors would not persist and have a trend over time. The series of the errors would be zero-mean-reverting. Empirical evidence shows not only large values, but also persistent, and in some cases upward trending levels of trade misinvoicing. A number of recent studies (e.g., Ndikumana et al. (2015), and Baker et al. (2014)) have provided evidence of large and persistent trade misinvoicing in African countries. And a recent study for India shows a clear upward trend in trade misinvoicing since 2000 (Jha and Truong, 2014). A similar phenomenon is found in other Asian countries (Beja, 2006, 2007; Kar, 2010).

Moreover, delays in reporting of trade statistics would not be so systematic as to generate persistent trade misinvoicing, particularly given that most studies have used annual data. The impact of periodic recording delays is likely to be minimal on annual series; and the estimated effect of these delays on cumulative trade misinvoicing over a long time period is likely to be even smaller.

It is nonetheless important to recognize that there is an unavoidable degree of imperfection in trade statistics, as for any macroeconomic data. These imperfections are likely to be more pronounced in developing countries than in developed countries. Therefore, statistical discrepancies may be amplified in trade among developing countries (for evidence on intra-Asian trade, see Naya and Morgan (1969)). It is for these reasons that the estimation of trade misinvoicing typically considers trade with developed countries as a benchmark, based on the assumption that developed countries’ data are less prone to substantial measurement and recording errors. Thus total misinvoicing is obtained by scaling up the volume of trade misinvoicing with developed countries with the inverse of the share of this group in the particular developing country’s total trade. (See Ndikumana and Boyce (2010), for an elaborate description of the methodology).

This study focuses on trade between the selected commodity-exporting countries and their developed-country trading partners. As will become evident, these partners account for the bulk of trade of the developing countries under consideration in this study. However, given the increasing volume of trade of these commodity-exporting countries with some emerging countries, especially Brazil, the Russian Federation, India and China (BRICs), some of these countries are also included in the sample of trading partners, as appropriate. This is especially the case for China, India and the Republic of Korea.”

10.4. Appendix 4: 2011 Iron Ore trade discrepancies between SA and the EU

SITC	Period Desc.	Trade Flow	Reporter	Partner	Commodity Code	Commodity	Trade Value (US\$)
S3	2011	Import	Germany	South Africa	281	IRON ORE, CONCENTRATES	493,732,588
S3	2011	Import	Italy	South Africa	281	IRON ORE, CONCENTRATES	180,577,398
S3	2011	Import	United Kingdom	South Africa	281	IRON ORE, CONCENTRATES	136,678,823
S3	2011	Import	Belgium	South Africa	281	IRON ORE, CONCENTRATES	2,066,488
S3	2011	Import	France	South Africa	281	IRON ORE, CONCENTRATES	417,213
S3	2011	Import	Spain	South Africa	281	IRON ORE, CONCENTRATES	363,049
S3	2011	Import	Sweden	South Africa	281	IRON ORE, CONCENTRATES	127,637
S3	2011	Import	Netherlands	South Africa	281	IRON ORE, CONCENTRATES	111,729
S3	2011	Import	Croatia	South Africa	281	IRON ORE, CONCENTRATES	98,072
S3	2011	Import	Slovenia	South Africa	281	IRON ORE, CONCENTRATES	54,640
							814,227,637
S3	2011	Export	South Africa	Netherlands	281	IRON ORE, CONCENTRATES	479,772,802
S3	2011	Export	South Africa	Germany	281	IRON ORE, CONCENTRATES	260,998,934
S3	2011	Export	South Africa	Italy	281	IRON ORE, CONCENTRATES	200,168,330
S3	2011	Export	South Africa	Slovenia	281	IRON ORE, CONCENTRATES	101,348,404
S3	2011	Export	South Africa	United Kingdom	281	IRON ORE, CONCENTRATES	97,296,149
S3	2011	Export	South Africa	Austria	281	IRON ORE, CONCENTRATES	29,086,916
S3	2011	Export	South Africa	Spain	281	IRON ORE, CONCENTRATES	76,291
S3	2011	Export	South Africa	Sweden	281	IRON ORE, CONCENTRATES	21,117
							1,168,768,943

Source: COMTRADE

10.5. Appendix 5: Bibliographical summary

US International Trade Commission / Ferrantino, Wang. 2007.

“Accounting for Discrepancies in Bilateral Trade: The Case of China, Hong Kong, and the United States”

https://www.usitc.gov/publications/332/ec200704a_001.pdf

- Discrepancy of USD 46 billion in exports from China to the US vs US-reported imports from China in 2005
- Comparisons of detailed customs records from China, Hong, Kong, and the United States shows that direct exports from Chinese ports and Chinese exports through third countries account for much of the discrepancy
- Some robust correlations for the discrepancy relate to valuation issues, U.S. tariffs, and re-exporting through the United States itself.
- Generally, theoretical discrepancies in trade data could be due to timing, shipping and insurance costs, general vs. special trade, goods in transit, re-export, partner country attribution and treatment of processing trade, smuggling, misinvoicing, transfer pricing, or mis-attribution

UN COMTRADE website

“Limitations”

<http://comtrade.un.org/db/help/uReadMeFirst.aspx>

- “Imports reported by one country do not coincide with exports reported by its trading partner. Differences are due to various factors including valuation (imports CIF, exports FOB), differences in inclusions/ exclusions of particular commodities, timing etc.)”

United Nations. 2004.

“International Merchandise Trade Statistics: Compilers Manual”

- “Objectives of reconciliation and basic procedures: A short-term aim may be limited to the identification of major differences in the statistics of the two countries. That process may reveal systematic measurement errors and gaps, which should be corrected immediately.”
- “Reasons for differences in data: Even where both partners comply with United Nations guidelines for trade statistics, there can be differences between partner data. In fact, some of the discrepancies are a direct result of following those guidelines (see footnote 134 to para. 271 above for an example). In order to identify conceptual reasons for discrepancies the following areas should be reviewed: (a) coverage; (b) trade system applied; (c) time of recording; (d) interpretation and application of the commodity classification; (e) valuation; (f) partner country attribution; and (g) other sources of discrepancy.”

Ajayi, S. Ibi. Adjusting for International “Trade-Faking”. 1998.

in “Trade Reform and Regional Integration in Africa.” eds. Iqbal, Z. and Khan, S.

https://books.google.co.za/books?id=VHjOx9aQEjQC&pg=RA1-PA98&lpg=RA1-PA98&dq=are+trade+discrepancies+caused+by+misinvoicing&source=bl&ots=GDn-hTPmao&sig=O5tcWoTQn7dqUC5FbqFhhUkGIsI&hl=en&sa=X&ved=0ahUKEwi7iMG2n_jPAhULLMAKHUceDJEQ6AEIStAl#v=onepage&q=are%20trade%20discrepancies%20caused%20by%20misinvoicing&f=false

- Other reasons than misinvoicing:
 - diversion en route to the final destination
 - re-exports of goods
 - differential lags in reporting

- potential discrepancies arising from the conversion from one currency to another and then to a common currency (usually USD)
- variations in exchange rates (De Wulf, 1981)
- In Sub-Saharan Africa, one of the basic causes of trade discrepancy stems from the routing process for trade transactions. The problem occurs when goods are routed through several countries bordering the exporting or importing country before the final destination is reached.
- The incentive to get involved in misinvoicing also depends on the structure of tariffs and subsidies. Given such situations, there may not only be the underinvoicing of exports and overinvoicing of imports, but other combinations as well.

Hangzhou, P.R.C. 2009. Report on the Statistical Discrepancy of Merchandise Trade between the United States and China.

https://www.census.gov/foreign-trade/aip/recon_china_000406.pdf

- Unusually large and growing statistical discrepancies in the bilateral trade officially published by both countries
- Reasons for discrepancies:
 - Conceptual and methodological differences in the collection and processing of trade data
 - Differences in statistical territory definitions
 - Differences in timing of recording
 - Inclusion of re-exports in export statistics
- More significantly:
 - **Attribution of imports to country of origin:** Discrepancies may occur when goods enter the commerce of the intermediary country or region. New values may be added due to further processing, re-packing, or a simple price markup when the goods are re-sold.
 - **Attribution of exports to country of last known destination:** Goods are recorded to the intermediary country or region by Chinese customs while recorded as imports from China by the US based on the principle of Country of Origin.
 - **Differences in values declared to customs:** China values imports on a basis of cost, insurance, and freight, while the US values exports on a free alongside ship basis

Kar, D. 2009. Are Bilateral Trade Statistics Unreliable? Global Financial Integrity.

<http://www.gfintegrity.org/are-bilateral-trade-statistics-unreliable/>

- Researchers have questioned the use of the trade mispricing model to capture illicit flows. They argue that data issues underlying the recording of partner country exports and imports introduce enough “noise” so that the trade mispricing model is unable to capture illicit flows.
- Reasons why most economists reject such arguments for not studying trade mispricing as a conduit for illicit financial flows from developing countries:
 - If discrepancies between the exports and imports of all trading countries grossed up to the world are supposed to be zero in a perfect statistical world, it stands to reason that deviations away from zero would largely capture underlying statistical issues in measurement. The goods balance (the discrepancies between exports and imports grossed up on a global scale) as a percent of “gross goods transactions” (meaning exports plus imports) fluctuated between 0.2 to 0.6 percent for the period 2002 to 2006 covered in our study. This is not an unacceptably high error term. The global discrepancies simply indicate that there are no systematically large discrepancies between exports and imports that can cast suspicions on the data capturing trade flows between the world’s major trading blocs involving developed and developing countries. Large, systematic discrepancies between these major trading blocs would show up in the global discrepancies and there is just no evidence of that.

- There is no reason to believe that data on international trade are any more problematic than say estimates of national accounts (used in numerous country studies and policy formulations), fiscal stocks and flows, or consumer and producer prices to name a few.
- Efforts to improve transparency require improving data availability and quality in specific data sets, which can be overseen, managed, prioritized, and assisted by relevant international organizations, which are well placed for this task.

Martin, M. 2016. What's the Difference?—Comparing U.S. and Chinese Trade Data. Congressional Research Service.

<https://www.fas.org/sgp/crs/row/RS22640.pdf>

- Technical explanations for discrepancies
 - Official Definitions of Exports and Imports
 - Definition of Territory
 - Timing
 - Declaration of Country of Origin
 - Exchange Rates
- Non-technical explanations
 - Declaration of Country of Origin
 - Underinvoicing (“phantom goods” shipments from China to the United States)
 - Intermediation: The joint China-U.S. study of discrepancies in merchandise trade statistics determined that value differences account for about half of the differences between Chinese and U.S. trade statistics

Buehn, A. and Eichler, S. 2010. Uncovering Smuggling: Worldwide Evidence for Four Types of Trade Misinvoicing.

<http://www.freit.org/WorkingPapers/Papers/Other/FREIT176.pdf>

- Hypothesized determinants of misinvoicing are tested using data on discrepancies in bilateral trade with the US
- Black market premium and tariffs motivate illegal trading activities
- Higher financial penalties act as a deterrent to this crime
- Assumption that trade discrepancies automatically represent misinvoicing and assumption that US authorities report their trade figures honestly while the authorities in other countries do not
- Misinvoicing defined as the difference between reported US exports/imports and other country exports/imports

Bhagwati, Jagdish N., and Bent Hansen. 1973. A theoretical analysis of smuggling.

- Assumption that illegal trade exists; theoretical model of the ways in which illegal trade arises
- Assumption that legal and illegal trade is conducted at the same world market price
- Illegal trade does not improve welfare due to real costs incurred by smuggling

McDonald, Donogh C. 1985. Trade data discrepancies and the incentive to smuggle. IMF Staff paper

- Trade data can have many sources, including poor quality of data
- Methodology: Dependent variable: trade data discrepancy ratio between developing and industrial countries; independent variables: black market premium and export taxes
- Main findings: If discrepancies in trade data are in large part the result of illegal trade, a causal relationship could be expected between the incentive to smuggle and these discrepancies. However, there is mediocre statistical evidence that smuggling incentives, i.e. the black market

premium and export taxes, explain variations in trade discrepancies. It is thus unlikely that the discrepancies are explained by illegal trade. The results are also quite sensitive to the time period chosen for analysis. They therefore suggest that great caution should be exercised in using trade data discrepancies to infer the scale of smuggling activity.

Yeats, J. 1990. On the Accuracy of Economic Observations: Do Sub-Saharan Trade Statistics Mean Anything? World Bank Economic Review

<http://documents.worldbank.org/curated/en/644121468767677708/pdf/multi-page.pdf>

- Descriptive analysis of trade data among African countries and between African and non-African trade partners
- Underreporting of petroleum, coffee, and cocoa to circumvent international quotas; import overinvoicing for high-value and low-volume products (like pearls, precious stones); export underinvoicing for oilseeds and iron ore
- false invoicing and smuggling “apparently” responsible for much of the difference
- “The fact that reported ‘free on board’ exports frequently exceed matched reported ‘cost, insurance, and freight’ imports suggests that smuggling is wide-spread in trade among African countries or that importers are intentionally underinvoicing to avoid high tariffs or quotas.”
- “For high-value, low-volume products like pearls and precious stones, reported imports greatly exceed reported exports, suggesting that smuggling is occurring on a large scale”
- “Large differences in the reported unit values for some products, particularly oilseeds and iron ore, suggest that exporters are purposefully underinvoicing (possibly to avoid government foreign exchange controls or restrictions on foreign asset holdings), or are not receiving full value for these items.” Because export subsidies and similar incentives are not widely used in the subject countries, the excess of reported exports over imports is consistent with underinvoicing by importers or smuggling on a fairly massive scale.”
- Without further analysis it would be difficult to estimate the magnitude of smuggling in African trade from data drawn from partner countries because there is no way to determine quantities and values that are not reported by either the exporter or importer as opposed to (smuggled) trade that is recorded by one of the countries involved.

Fisman, Raymond, and Shang-Jin Wei. 2004. Tax Rates and Tax Evasion: Evidence from “Missing Imports” in China. Journal of Political Economy.

- “Tax evasion, by its very nature, is difficult to observe”
- Analysis of trade discrepancies between Hong Kong and China for 2,043 product categories at the six-digit level; dependent variable: trade discrepancy measures; independent variables: tax rate, tax on similar products, tariff exemption, interaction terms
- Difference in reported exports/imports negatively correlated with tax rates on closely related products, suggesting that evasion takes place partly through misclassification of imports from higher-taxed categories to lower-taxed ones
- Difference in reported exports/imports higher when measured in values rather than quantities, suggesting that evasion takes the form of underreporting
- Underreporting of import values and mislabelling of higher-taxed products as lower-taxed ones are widespread
- A 1 percent tax rate increase yields 3 percent increase in the gap between reported exports and imports; this gap is positively correlated with tax rates; widespread evidence for underreporting and mislabelling of high- taxed to low-taxed products in trade between Hong Kong and China

Fisman, Raymond, and Shang-Jin Wei. 2007. The smuggling of art, and the art of smuggling: Uncovering the illicit trade in cultural property and antiques. NBER Working Paper

- Unbalanced panel for 1996-2005; dependent variable: discrepancies in trade with cultural object and antiques; independent variables: corruption, GDP per capita, dummies
- Highly positive correlation between trade discrepancies and corruption, i.e. more corrupt countries are more likely to misreport their data

Beja, Edsel L. 2008. Estimating trade misinvoicing from China: 2000 – 2005. China & World Economy

- Descriptive analysis of trade discrepancies in the official trade sector
- Also uses discrepancies as proof for trade misinvoicing
- Bulk of Chinese misinvoicing occurs in trade with Hong Kong and the U.S.
- Amount of China's unreported trade between 2000 and 2005 at USD 1.4 trillion

Berger, Helge, and Volker Nitsch. 2008. Gotcha! A profile of smuggling in international trade.

- OLS regressions for imports to the U.S., Germany, China, United Kingdom, Japan; dependent variable: trade discrepancies; independent variables: corruption, GDP per capita, distance measure, dummy variables
- Product-specific trade discrepancies differ widely across importers; export underinvoicing is prevalent in antiques and bulky products; strong association of trade discrepancies with the level of corruption in the source country

Farzanegan, Mohammad R. 2008. Illegal trade in the Iranian economy: Evidence from a structural model

- MIMIC approach, i.e. illicit trade is treated as an unobservable variable; causes: fines, BMP, tariffs, GDP per capita, openness, education; indicators: government revenues, import price index, gasoline consumption
- Illicit trade is positively related to tariffs and negatively to fines and the unemployment rate; illicit trade adversely affects government revenues and the import price index and varies between 6 and 25% of total trade

Pitt, Mark M. 1981. Smuggling and price disparity. Journal of International Economics

- Institutional framework methodology
- Coexistence of legal and illegal trade is a fact
- Firms use legal trade to camouflage illegal trade and the welfare consequences are ambiguous
- Illegal trade responds to the price disparity, defined as the difference between the actual domestic price and the tariff-inclusive world market price. If, for example, the world market price of an exportable good is below its domestic price most of the actual export value is traded illegally because legal export would produce a loss. Consequently, the incentive to underinvoice exports is the higher the higher the price disparity.

Barnett, R. 2003. Smuggling, non-fundamental uncertainty, and parallel market exchange rate volatility. Canadian Journal of Economics

- Smuggling as a means by which the home country can acquire or sell foreign currency as currency restrictions – such as inconvertibility of home currency and portfolio restrictions – prevent them from doing the same at the official exchange rate
- Black market premium as a key incentive

Biswas, Amit K., and Sugata Marjit. 2007. Preferential trade and misinvoicing: Some analytical implications. International Review of Economics & Finance

- Using the well-established concept of partner trade statistics they find a positive (negative) correlation between the 'black market premium' and export (import) underinvoicing since illegal traders sell (buy) the foreign exchange of unreported transactions on the black market

Bahmani-Oskooee, Mohsen and Gour G. Goswami. 2003. Smuggling as another cause of failure of the PPP. Journal of Economic Development

- Smuggling as another source of deviations of the exchange rate from purchasing power parity

"Phantom Goods Disguise Billions in China Illicit Money Flows." Bloomberg. March 9, 2016

<http://www.bloomberg.com/news/articles/2016-03-08/phantom-goods-disguise-billions-in-china-illicit-money-outflows>

- "There has been a huge increase in payments," said Andrew Collier, an independent China analyst in Hong Kong and former president of the Bank of China International USA. "The well-connected Chinese in state and private firms are using any tool in the shed to inflate overseas payments."
- Economists have said they suspect China's December and January trade numbers were also skewed by this activity.
- "Data distortions from hidden capital flows remain a problem," Bloomberg Intelligence economists Tom Orlik and Fielding Chen wrote in a note, adding that the reported \$880 million in imports from Hong Kong in January were "implausible."
- Over-reporting imports is likely the most important illicit channel, according to the Deutsche Bank research, which cited official banking statistics that recorded China paying \$2.2 trillion for goods imported in 2015, while China Customs data only records \$1.7 trillion of imports.

China has acknowledged the problem with fake invoicing in the past. In 2013, the government said export and import figures were overstated due to phony trade in order to bring money into the mainland.



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