Magnitude and Mechanisms of Capital Flight from Angola, Côte d'Ivoire and South Africa

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Abstract

This paper presents an updated methodology for estimation of capital flight, which is applied to the cases of Angola, Côte d'Ivoire and South Africa. The results indicate that the three countries have experienced substantial capital flight over the past four decades, amounting to $60 billion in constant 2015 dollars for Angola (over 1986-2015), $32 billion for Côte d'Ivoire (over 1970-2015), and $198 billion for South Africa (over 1970-2015). An important mechanism of capital flight is misinvoicing of exports and imports, especially in primary commodities. The fact that these outflows have persisted over a long period indicates that they are driven by fundamental structural and institutional factors pertaining to both the source countries and the global financial system. These outflows have led to the accumulation of massive offshore wealth belonging to the economic and political elites from these countries, even as their populations continue to face deprivation in access to basic services. Capital flight is clearly a major obstacle to development financing that needs to be tackled through coordinated strategies at national and international level.

I. Introduction

This paper presents an analysis of the magnitude of capital flight from Angola, Côte d'Ivoire, and South Africa during 1970-2015. It begins with a discussion of the distinction between capital flight and illicit financial flows, two phenomena that are related but different, although the two terms are often used interchangeably in both technical literature and the media.

The measurement of capital flight follows the methodology used by Ndikumana and Boyce (2010) and J.S. Henry (2012), in which capital flight is defined as unrecorded capital flows and measured as discrepancies between recorded inflows and outflows of foreign exchange as reported in the country's official Balance of Payments. Net foreign exchange inflows consist mainly of additions to the stock of external debt and capital inflows in the form of foreign direct investment, portfolio investment and other investment. In the absence of capital flight, these inflows should be balanced by the sum of the current account deficit and net additions to foreign exchange reserves.

Net trade misinvoicing – obtained from trading partner data comparisons – is added to this residual to obtain our measure of capital flight. A key innovation in this paper is that it goes beyond national aggregate measures to examine trade misinvoicing at the bilateral and product level in order to shed light on possible conduits of capital flight, focusing on major export commodities for each of these three countries.

In addition to the flow perspective on capital flight, it is important to recognize that a substantial fraction of capital smuggled abroad is invested offshore in income generating assets. The paper therefore presents estimates of stocks of private wealth accumulated offshore, drawing on the work of J.S. Henry (2012) and J.S. Henry (2016). The twin processes of unrecorded capital outflows and the accumulation of hidden offshore private wealth both are facilitated by enabling institutions in the international financial system.

The next section presents the definitions of the key concepts used in the paper and describes the methodology and the data used to estimate capital flight. Sections III, IV and V present the results for South Africa, Côte d'Ivoire and Angola, respectively. Section VI discusses the phenomenon of unrecorded offshore wealth resulting from the outflows of capital from these countries, and Section VII concludes.

II. Definitions, Methodology and Data

II.1. The capital flight subset of illicit financial flows

It is useful to clarify the relationship between capital flight and 'illicit financial flows,' concepts that sometimes have been used interchangeably in the recent literature and policy debates.[1] Capital flight is usually defined as unrecorded capital outflows and measured as the missing residual in the Balance of Payments, after corrections for underreported external borrowing and trade misinvoicing. The definition of capital flight is discussed in detail in the next subsection. The important point is that while all capital flight is illicit, not all illicit financial flows are capital flight. For example, some illicitly acquired funds may be shifted abroad through officially recorded transfer mechanisms, in which case they would not count as capital flight according to the conventional definition.

Capital flight refers to *illicitly transferred financial assets*, capital outflows that are not reported to government authorities. Mechanisms for illicit transfer include the smuggling of bank notes, clandestine wire transfers, and falsification of trade invoices. The motives for illicit cross-border transfers include evasion of judicial scrutiny of the origin of the wealth, evasion of tax on the transaction and subsequent earnings on the assets, and fear of extortion or outright expropriation. In addition to being illicit by virtue of its unrecorded transfer, capital flight often is also illicit by virtue of illegal acquisition and illegal holding abroad. *Illicitly acquired capital* is money obtained through corruption, embezzlement, theft, bribes, extortion, tax evasion, counterfeit, trafficking in illegal goods and services, and other criminal activities. Wealth acquired by these means is often transferred abroad clandestinely in an effort to shield it from legal scrutiny and forfeiture risk. *Illicitly held funds* are external assets that are not declared to national authorities of the owner's country. The concealment of foreign asset holdings may be motivated by the desire to evade prosecution for illicit acquisition or transfer of the funds, or to evade tax payments on asset earnings.

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[1] See **Boyce, James K. and Léonce Ndikumana.** 2015. "Strategies for Addressing Capital Flight," S. I. Ajayi and L. Ndikumana, *Capital Flight from Africa: Causes, Effects and Policy Issues.* Oxford: Oxford University Press, 393-417. for a discussion of the policy implications for the distinction between various forms of illicit financial flows. The edited volume by **Reuter, Peter** ed**.** 2012. *Draining Development? Controlling Flows of Illicit Funds from Developing Countries.* Washington DC: The World Bank. also includes discussions of the composition of illicit financial flows and the role played by safe havens and corporate practices.

The broader universe of illicit financial flows includes not only capital flight but also illicit payments for goods and services as opposed to asset transfers, and asset transfers that are officially recorded but nevertheless illicit by virtue of their mode of acquisition or concealed holding. This wider domain includes payments for smuggled imports, transactions connected with illicit trade in narcotics and other contraband, outflows of illicitly acquired funds that were domestically laundered before flowing overseas through recorded channels, transfer pricing for purposes of tax evasion, and outflows of the proceeds from other illicit practices. These, too, are illicit financial flows, but they are not the same as capital flight.

Private assets held abroad consist of a heterogeneous pool that includes clean capital associated with normal portfolio allocation, laundered capital that was illegally acquired but legally transferred, smuggled capital that was legally acquired but illegally transferred, and dirty capital that was both illegally acquired and illegally transferred. These distinctions are summarized in Table 1. Capital flight comprises the latter two categories. This implies that policies to address capital flight and illicit financial flows more broadly need to be tailored to the nature and type of flows so as to both deter further illicit outflows and to facilitate repatriation of assets held abroad.

Table 1: Private assets held abroad

Transfer \ Acquisition	Legally acquired	Illegally acquired (stolen assets)
Legally transferred	*Clean capital*	*Laundered capital*
Illegally transferred (capital flight)	*Smuggled capital*	*Dirty capital*

Source: James K. Boyce and Léonce Ndikumana (2015).

Capital flight and other illicit financial flows share in common the feature that they all involve cross-border movements of money. They do not include illicit transactions whose proceeds remain within the national boundaries. Illicit financial flows raise concerns because for the economy of

origin they constitute net losses of foreign exchange, tax revenue, and capital. At the same time, these flows are associated with costs as well as benefits to the foreign economies that receive them, where the gains in foreign exchange, tax revenue, and capital are often accompanied by adverse effects resulting from corrosion of the integrity of financial and public institutions. A central theme of this book is that capital flight is enabled by factors and actors both at the origin (here African economies) and in the destination countries. The illicit export of capital from African countries is a manifestation of failures in the international financial system that facilitates and enables it. Former German president Horst Köhler put the matter clearly:

> We cannot ignore the global kleptocratic model of capitalism that is sucking obscene amounts of capital out of Africa… Chief among the beneficiaries of this flight of capital are the European banks where African despots and tax-evading corporations stash their billions. If we finally brought order to the international financial system and allowed the tax havens to wither away, that would be credible! (German Ministry of Education and Research, 2014).[2]

In this sense, capital flight from Africa is a global phenomenon involving shared costs and responsibilities for Africans and the global community. Any analysis of the drivers of capital flight and strategies to prevent it must therefore pay attention to factors and actors at both ends of the flows.

II.2. Capital flight as a Balance of Payments residual

The economics literature defines capital flight as unrecorded outflows of capital from a country. Measuring capital flight is a challenging exercise because it is by nature a hidden activity due to its inherent illicit nature. Thus it can only be measured indirectly. The problem is that the underlying data that can be used for such a detective exercise is also imperfect and fraught with imprecisions. The original approach to measuring capital flight considers it as consisting of discrepancies between recorded inflows of foreign exchange and recorded uses of these resources as reported in the country's Balance of Payments (John T. Cuddington, 1986, 1987, Susanne Erbe,

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[2] See **Köhler, Horst.** 2015. "On the Impossibility of Speaking of Africa: Essay Based on a Speech at the Africa Days of the German Federal Ministry of Education and Research on March 18, 2014." *Africa Journal of Management*, 1(3), 257-63. for an essay based on his speech.

1985, World Bank, 1985).[3] This is referred to as the BoP residual method. J.S. Henry (2012) provides a critical review of the various approaches to measuring capital flight and their limitations.

Two key sources of foreign exchange inflows are considered in the Balance Payment residual method: external borrowing and foreign direct investment inflows. In the wake of the debt crisis of the 1980s, World Bank economists uncovered that external debt flows were underreported in the Balance of Payments. The World Debt Tables (WDT), which were deemed to track debt flows better than the Balance of Payments (BoP), were therefore used as an alternative source of data on external borrowing in the computation of capital flight. The WDT were renamed the Global Finance Development (GDF) database, which was subsequently renamed the International Debt Statistics (IDS).

To obtain an accurate measure of resource inflows through external borrowing, three important adjustments are made to the published debt series. First, given that countries borrow in different currencies and that the stock of debt is reported at the end of the year in a common currency (the US dollar), variations of the exchange rates of the currencies of original denomination of the debt vis-à-vis the US dollar may create biases in the debt inflows obtained as simple year-on-year changes in debt stock. The debt stock is therefore adjusted taking into account the currency composition of long-term debt and the annual change in the exchange rate vis-à-vis the dollar of the respective currencies in which the debt was obtained. Details of the adjustment algorithm are described in Léonce Ndikumana and James K. Boyce (2010) and they are reproduced in Appendix A.1 of this paper.

Second, following Henry (2012), an adjustment is made to correct the bias caused by the fact that in the IDS database, interest arrears are added to the debt stock even though they do not correspond to inflows of foreign exchange. Therefore, net changes in interest arrears are subtracted from the change in debt stock to obtain an accurate measure of annual debt inflows.

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[3] See **Ndikumana, Léonce; James K. Boyce and Ameth S. Ndiaye.** 2015. "Capital Flight from Africa: Measurement and Drivers," S. I. Ajayi and L. Ndikumana, *Capital Flight from Africa: Causes, Effects and Policy Issues.* Oxford: Oxford University Press, 15-54. for a detailed discussion of various definitions of capital flight.

Third, the series are adjusted for debt forgiveness or debt write-offs. Otherwise, the resulting changes in end-of-year debt stocks would give the false impression of a debt repayment and apparent outflow of foreign exchange. This is corrected by adding back the debt write-offs in calculating the annual changes in debt stocks.

Over the past three decades, developing countries have experienced a diversification of capital inflows beyond external borrowing and foreign direct investment. Inflows recorded in the BoP categories of portfolio investment and 'other investments' have increased substantially, especially since the turn of the century. These two flows are added to the sources of funds in the computation of capital flight as a BoP residual.

For each country, the annual base measure of capital flight as a BoP residual is therefore computed as follows:

$$KF = CDEBTADJ + FDI + PI + OI - (CAD + CRES) \tag{1}$$

where CDEBTADJ is the change in debt stock adjusted for exchange rate fluctuations, debt forgiveness, and change in interest arrears; FDI is foreign direct investment, PI is portfolio investment, OI is other investments, CAD is the current account deficit, and CRES is net additions to foreign exchange reserves.

Except for debt,[4] data for the other variables is taken from the Balance of Payments.[5] The transition from edition 5 to edition 6 of the Balance of Payments reporting system introduced changes in the way some elements of the financial account are reported (International Monetary Fund, 2010).[6] Investment flows are recorded in terms of assets and liabilities rather than credit and debit as it was done in the 5th BoP edition format. As a result, a net inflow of FDI, PI, or OI appears with a negative sign (representing a liability) while a net outflow is reported with a positive sign (representing an asset), a reversal of the conventional BoP practice of assigning positive signs to foreign exchange inflows and negative signs to outflows. Therefore, the new series need to be

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[4] For Angola, from 2010 to 2015 the data from the Central Bank (Banco Nacional de Angola) are used in lieu of those from International Debt Statistics as the former show larger amounts of external debt.

[5] Data on foreign direct investment may also be obtained from the UNCTAD statistical database (UNCTAD Data Center, Investment: http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx).

[6] See the *Balance of Payments and International Financial Position Manual 6th Edition*: https://www.imf.org/external/pubs/ft/bop/2007/pdf/bpm6.pdf.

modified by flipping the sign before they are entered in the formula (1) above. The same applies for CRES. The reporting of the current account remains unchanged in the new format of the BOP, so no adjustment is necessary for this variable.

II.3. Adjustment for trade misinvoicing

The data on trade transactions in the BoP may be affected by erroneous or deliberate misinvoicing of the value of imports and exports. Indeed trade misinvoicing has emerged as an important channel of capital flight (Léonce Ndikumana, James K. Boyce and Ameth S. Ndiaye, 2015) and money-laundering (D. Kar and J. Spanjers, 2014, Joseph Spanjers and Matthew Salomon, 2017).[7] Attention to trade misinvoicing dates from the 1960s with the pioneering work of Jagdish Bhagwati (J. Bhagwati, 1967, 1964, J. Bhagwati and Bent Hansen, 1973, J. Bhagwati et al., 1974), and it was revived in the 1980s in the context of the research on capital flight motivated by the debt crisis faced by developing countries (Gulati, 1987).

In addition to serving as a mechanism for capital flight through under-invoicing of exports (allowing foreign exchange receipts to be sequestered abroad) or over-invoicing of imports (allowing foreign exchange outflows in excess of the true cost of imports), misinvoicing may also take the form of import smuggling. In "technical" smuggling, a false invoice is submitted that understates the value of the imported goods and services. In "pure" smuggling, the import is wholly concealed and no invoice is submitted. Of course, imports must be paid for (in foreign exchange) regardless of whether or not truthful invoices are submitted to local authorities. These payments are illicit financial outflows, but since goods and services are received in return for the payments, they are not a transfer of assets and hence not capital flight.

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[7] Also see **UNCTAD.** 2016. "Trade Misinvoicing in Primary Commodities in Developing Countries: The Cases of Chile, Côte D'ivoire, Nigeria, South Africa and Zambia," Geneva: UNCTAD, December, . **Spanjers, Joseph and Matthew Salomon.** 2017. "Illicit Financial Flows to and from Developing Countries: 2005-2014," Washington, DC: Global Financial Integrity, estimate that trade misinvoicing represents up to 87 percent of total illicit financial flows from developing countries from 2005 to 2014. Estimates of the share of trade misinvoicing in illicit financial flows and capital flight vary across studies due to differences in methodology, data and sample.

The accuracy of the residual measure of capital flight can be improved by adjustments for the net impact of trade misinvoicing. The effect on the magnitude of capital flight can go in either direction. If misinvoicing for purposes of capital flight exceeds smuggling, the adjustment adds to the total; if smuggling exceeds misinvoicing for purposes of capital flight, it subtracts from the total, since part of the "missing money" was used to finance unrecorded imports.

Measuring trade misinvoicing

The measurement of trade misinvoicing is based on data from the *Direction of Trade Statistics* (DoTS) database compiled by the IMF,[8] which contains aggregate imports and exports by partner. Trade misinvoicing at a disaggregated level by product can be estimated using the *Comtrade* database compiled by the United Nations Statistics Division.[9] Trade misinvoicing can be estimated at three levels: for all trading partners taken together, by partner individually, and by product. Estimates are based on the simple principle that the value of exports by a country A to partner B, as reported by the exporter, should match the value of imports from country A as reported by country B, after accounting for the cost of insurance and freight (c.i.f.).[10]

When data from trading partners can be considered more reliable than the mirror data reported by African authorities, comparisons of the two can be used to estimate the direction and magnitude of net misinvoicing. In the case of exports, we expect such comparisons to show systematic under-invoicing, since apart from special circumstances (such as export incentive programs) there is little incentive for over-invoicing. In the case of imports, the net impact of misinvoicing could go either way: if smuggling exceeds under-invoicing for capital flight, the value of imports reported by the trading partner exceeds the value of exports reported by the African country (after adding the normal cost of insurance and freight), whereas if under-invoicing dominates, the discrepancy has the opposite sign. The methodology for computing net trade misinvoicing is described below.

For country *i*, product *k* and partner *j* at time *t,* export misinvoicing (*DX*) is calculated as follows:

$$DX_{ij,t}^k = M_{ji,t}^k - \text{cif} * X_{ij,t}^k \tag{2}$$

[8] The *Direction of Trade Statistics* database is available online at http://www.imf.org/en/data.
[9] The *Comtrade* database is available online at https://comtrade.un.org/data/.
[10] This principle was first proposed more than a century ago by **Ferraris, C. F.** 1885. "La Statistica Del Movimento Dei Metalli Preziosi Fra L'italia E L'estero (Rome)," .

X_{ij}^k stands for exports of product k by country i to partner j as recorded in country i's data, M_{ji}^k represents imports of product k by partner j from country i as recorded by partner j, and *cif* is the cost of insurance and freight. A positive value of *DX* indicates export underinvoicing, while a negative value would indicate export overinvoicing.

In a similar fashion, import misinvoicing for a country i, product k and partner j, is calculated as follows:

$$DM_{ij,t}^k = M_{ij,t}^k - \text{cif} * X_{ji,t}^k \qquad (3)$$

M_{ij}^k represents imports of product k by country i from partner j as reported in country i's data, X_{ji}^k stands for exports by partner j to country i as reported in partner j's data, and cif is the cost of insurance and freight. A positive value of *DM* indicates import overinvoicing, while a negative value indicates import underinvoicing, reflecting technical smuggling, pure smuggling, or a combination of the two.

By replacing imports and exports of product k with total imports and total exports, equations (2) and (3) yield total export and import misinvoicing for country i with respect to partner j. Net trade misinvoicing with respect to partner j is obtained as the sum of export misinvoicing and import misinvoicing:

$$MISINV_{ij,t} = DX_{ij,t} + DM_{ij,t} \qquad (4)$$

A positive net trade misinvoicing represents unrecorded outflow of foreign exchange, leading to an increase in capital flight beyond the BoP residual measured in equation (1). A negative net value represents an unrecorded use of foreign exchange, thus a reduction of estimated capital flight.

There are three possible ways to compute total export misinvoicing and import misinvoicing. The first consists of replacing partner country j with the rest of the world in the above equations. The second consists of summing up over individual partners. In principle these two should yield similar results, with the second approach having the advantage of providing insights on dynamics of misinvoicing at bilateral level while the former is less laborious. The third approach is to estimate aggregate misinvoicing by summing up over a subset of partners, such as the industrialized countries (termed 'advanced countries' in the DoTS database), whose trade statistics are considered relatively accurate, and then scaling up this total by the inverse of this group's share in

the country's recorded exports and imports. In this approach, total net trade misinvoicing is computed as follows:

$$MISIN = \frac{DXIC}{ICXS} + \frac{DMIC}{ICMS} \qquad (5)$$

Where *DXIC* and *DMIC* are export and import misinvoicing with respect to industrialized countries as a group; and *ICXS* and *ICMS* are the shares of industrialized countries in the country's total exports and imports. We discuss further below an adjustment to these trade shares due to incomplete reporting of destination of exports and origin of imports.

The latter approach has been extensively used in the literature. It is based on the assumption that developed countries' data are of relatively higher quality than those of developing countries. Therefore, it is expected that this approach will help minimize biases in trade misinvoicing estimates arising from poor quality data. This paper presents estimates using the scaling up approach as well as results for individual trading partners and for major export commodities.

Trade-adjusted capital flight (*ADJKF*) is obtained by adding net trade misinvoicing to the BoP residual computed using equation (1), as follows.

$$ADJKF = CDEBTADJ + FDI + PI + OI - (CAD + CRES) + MISINV \qquad (5)$$

Motivations for trade misinvoicing

Trade misinvoicing can occur for a number of reasons. The literature has discussed three main categories of motivations: 1) financial motives; 2) circumventing foreign exchange controls; 3) reducing administrative burdens (Andreas Buehn and Stefan Eichler, 2011, Andreas Buehn and Mohammad Reza Farzanegan, 2012, Ila Patnaik et al., 2012, Cláudia Costa Storti and Paul de Grauwe, 2012).[11]

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[11] See **Kellenberg, Derek and Arik Levinson.** 2016. "Misreporting Trade: Tariff Evasion, Corruption, and Auditing Standards," National Bureau of Economic Research, Working Paper 22593, and **UNCTAD.** 2016. "Trade Misinvoicing in Primary Commodities in Developing Countries: The Cases of Chile, Côte D'ivoire, Nigeria, South Africa and Zambia," Geneva: UNCTAD, December, for further discussions of the motives for trade misinvoicing, with a focus in the latter on primary commodities exports from resource-rich developing countries.

Financial motives: Exporters and importers may engage in trade misinvoicing to maximize profits by minimizing tax liabilities and taking advantage of tax incentives associated with imports and exports. Import underinvoicing enables importers to reduce tariffs, and pure smuggling allows them to avoid them altogether. Import misinvoicing may occur through under-reporting of the value of imports as well as through the misreporting of products types by declaring low-tariff products in lieu of the actual products that may face higher import tariff rates or quotas. J. Bhagwati (1964) noted that import underinvoicing appeared to be prevalent in the case of products facing high tariffs, and subsequent studies have lent support to this proposition (Andreas Buehn and Stefan Eichler, 2011, Manamba Epaphra, 2015, Raymond Fisman and Shang-Jin Wei, 2004).

Similarly, export underinvoicing may result from attempts to avoid export taxes levied on specific products (Donogh C. McDonald (1985). In the presence of tax incentives aimed at promoting exports, exporters may instead resort to overinvoicing, inflating the value of their exports to reap more incentives. If the exporter must surrender the inflated amount of foreign exchange to the central bank, however, export overinvoicing will occur only if the firm expects the gains from extra subsidies to exceed the costs of the premium on foreign exchange on the black market (J. Bhagwati, 1967).

Circumventing exchange controls: Another motive for trade misinvoicing is to avoid currency controls to gain access to foreign exchange or move money abroad. In the presence of strict exchange controls, trade misinvoicing provides a means to acquire foreign exchange out of the control of the authorities that can be held abroad or traded for a profit on the black market. Such an environment is expected to encourage overinvoicing of imports and underinvoicing of exports. Empirical studies have found a positive correlation between the black market premium and the extent of import overinvoicing (see, for example, Mohsen Bahmani-Oskooee and Gour G. Goswami (2003); Richard Clay Barnett (2003); and A. K. Biswas and S. Marjit (2005).

Reducing administrative burdens: Perceived or actual onerous administrative procedures can incite firms to underreport the true value of trade. Bureaucratic and regulatory inefficiencies can create costs to importers and exporters and delay the authorization of relevant transactions. Firms may seek to circumvent these hurdles to speed up inward and outward shipment of merchandise. Such hurdles are most likely to be prevalent in countries with high corruption in the customs service as well as those with low human and technological capacity to process imports and exports.

Such an environment is expected to induce smuggling, a prediction that has been supported by empirical evidence (Raymond Fisman and Shang-Jin Wei (2007); Helge Berger and Volker Nitsch (2012).

Methodological and data issues in the estimation of trade misinvoicing

The estimation of trade misinvoicing faces a number of issues related to methodology as well as data. The first and most general problem is the availability and quality of the data. Some countries do not report national trade data to the IMF, in which case the IMF imputes the numbers from partner data. In such cases, comparisons of mirror trade data cannot detect trade misinvoicing. This is the case for Angola; therefore the Angolan capital flight estimates presented in this paper do not include any adjustment for trade misinvoicing. In the case of South Africa, the series in the electronic DoTS database start only in 1998. The estimate of capital flight for 1970-97 does not include an adjustment for trade misinvoicing.

A second issue is the lack of systematic information on the cost of insurance and freight. For any given country, such costs may vary by partner (market), by product and over time. In a few cases, import data are reported in both f.o.b. and c.i.f. terms, in which case the c.i.f. factor can be derived from their ratio. This is the case for South Africa. In the absence of such information, the conventional practice in the literature is to use a proxy value of 10% for the c.i.f. factor. For South Africa, the derived c.i.f. factor shows an average of 10.5% over the 1970-2014. The average was lower for the 1970s (7.9%) and 1980s (8.8%), and higher in the 1990s (10.8%) and the periods 2000-2009 (12.8%), and 2010-2014 (14.5%). The latter averages are influenced by unusually high c.i.f. factors in 2010-2012 (17.5%- 22.6%) compared to 2013 (5.5%) and 2014 (4.9%). According to Kathy Nicolaou-Manias and Yuchen Wu (2016), however, "work undertaken by SARS [South African Revenue Service] indicated that c.i.f. – for a long-haul destination such as South Africa – was less than 5%." In this study, the country-specific c.i.f. factor is used in the computation of aggregate trade misinvoicing for South Africa, while the 10% rule of thumb is used for Côte d'Ivoire as well as in the estimation of disaggregated misinvoicing at product and partner levels for South Africa as well as Côte d'Ivoire.

A third data issue is incomplete information on the country of origin and destination of imports and exports. In some cases, some exports and imports are recorded under partner categories labeled as *unspecified*, *special categories*, or *others*. In these cases, the 'total world' values of imports or exports in DoTS do not correspond to the sum of the values under the three categories of *advanced economies, developing economies*, and *transition economies*.[12] If the values recorded under these unclassified destinations and origins are large, this can affect the estimates of export and import misinvoicing.

To minimize the bias in the estimate of trade misinvoicing, the scaling up factor is recalculated as the share of advanced countries in the sum of imports or exports from/to classified countries (that is, advanced, developing and transition countries), rather than the share in the country's total imports or exports from/to the world (which includes unclassified partners). The export share of advanced countries is calculated as:

$$ICXS = \frac{XIC}{XIC+XED} \text{ rather than } ICXS = \frac{XIC}{XTOT}$$

Their import share is computed as:

$$ICMS = \frac{MIC}{MIC+MED} \text{ rather than } ICMS = \frac{MIC}{MTOT}$$

XTOT and MTOT are exports to and imports from the rest of the world as reported by the concerned country. XED and MED stand for exports to and imports from emerging and developing countries, respectively. The adjustment for trade misinvoicing presented in the subsequent analysis is obtained using this approach.

An additional data issue relates to classification of products. Accurate estimation of trade misinvoicing requires consistency in product classification across trading partners. The misclassification of products may occur by error or as a result of deliberate actions by importers

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[12] UNCTAD has noted this aggregation issue: *Why does the "Total word" not correspond to the sum of "Developing economies", "Transition economies" and "Developed economies"? World total represents the sum of the figures of the three above-mentioned groups plus the figures of a group of territories and partners not elsewhere classified, whose composition is detailed in classifications. Data of these territories are included in the world total if they have been reported but are not presented individually or in any group, either by geography, economy or trade.* Source: http://unctadstat.unctad.org/EN/FAQ.html.

and exporters seeking to minimize customs levies (e.g., labeling consignments of taxable goods with names of exonerated products) or to take advantage of investment and export incentives (labeling consignments of taxable goods with names of capital goods or inputs that qualify for tax credits or tax exonerations). Such classification inconsistencies will generate biases in estimates of trade misinvoicing at the product level, although their effects on aggregate estimates of trade misinvoicing are not likely to be significant.

A note specific to *Comtrade* data, which are used for product-level misinvoicing estimates, is that for some countries, imports are reported in f.o.b. rather than c.i.f. The countries that use this reporting system are Australia, Brazil, Canada, Dominican Republic, Palau, South Africa and the United States. In these cases, export and import misinvoicing is obtained simply by subtracting partner exports from the concerned country's imports without the c.i.f. adjustment.

The special case of 'trading hubs', transit trade and re-exports

An important feature of globalization is the increasing role of trading hubs in international trade, especially in the case of primary commodities – oil, minerals and agricultural commodities. Trading hubs facilitate transit trade, transshipment, and re-exports (see definitions in Appendix A.2). These phenomena may cause biases in the estimates of trade misinvoicing obtained through comparison of mirror trade data. Given that most of the trading hubs are in advanced economies, when trade misinvoicing is estimated using the group of advanced as the benchmark, the impact on the estimates will depend on whether the goods routed through trading hubs (e.g., Switzerland and the Netherlands) end up in another advanced country or in a country outside of this group. If the goods end up in another advanced country, which reports them properly as imports from the source country, the estimates of export misinvoicing will not be affected. In fact in this scenario, if the trading hubs were removed from the group of advanced countries, this would results in higher estimated trade misinvoicing, thus an overestimated adjusted capital flight. If the goods eventually end up in a country outside of the advanced countries group, the estimates of trade misinvoicing based on advanced countries as a benchmark (including the trading hubs) are also biased downward, tending to show export overinvoicing. In a nutshell, the methodology consisting of using advanced countries as a benchmark is in fact conservative in the sense that it tends to underestimate the amount of trade misinvoicing. See Appendix D for further discussion and an illustration with the case of South Africa (Table D.1).

III. Results for the Case of South Africa

III.1. Capital flight from South Africa

This section presents the estimates of capital flight obtained using the formula displayed in equation 5 over the period 1970-2015. This is followed by more detailed discussion of the estimates of trade misinvoicing at the aggregate level, by partner and for major export products. All estimates are presented in constant 2015 dollars unless otherwise indicated.

The estimates of capital flight from South Africa are summarized in Table 2 and Figure 1 in terms of totals by decade. Along with net capital flight measured as an adjusted BoP residual, the table also presents the various elements that enter into the computation of the residual. This enables us to examine potential sources of discrepancies between the sources and uses of foreign exchange resources in the country. It is important to note that the capital flight estimate presented here does not include an adjustment for trade misinvoicing over the 1970-1997 due to lack of South African data in the electronic DoTS database. Given the observed pattern of trade misinvoicing after 1997, it is most likely that capital flight presented for the 1970-2015 is substantially underestimated. The discontinuity in the adjusted capital flight around 1997-98 due to the missing trade data calls for caution in the use of the results for time series analysis.

Table 2 here

Figure 1 here

Over the 1970-2015 period, South Africa experienced an estimated $198 billion of capital flight. This includes net trade misinvoicing of $52.6 billion over 1998-2015. There are two key features of the trend of capital flight over the past two decades. First is a rapid accumulation of external debt, starting at the end of the Apartheid regime. While external borrowing was minimal prior to 1994, it surged after independence with the end of the international embargo, which ushered the resumption of international economic and political cooperation. External borrowing (measured as

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the change in debt stock) increased from $21 billion in 1980s to $63 billion in 2000-09 and $64 billion over 2000-2015.

Second, South Africa experienced a substantial increase in private capital flows, especially in the form of portfolio investment. This reflects the country's developed and active equity markets that attract foreign investors seeking returns to capital. The sum of private flows (FDI, portfolio investment and other investments) rose from $26.2 billion in the 1990s to $96.3 billion over 2000-2009, and $109.9 billion during the six years up to 2015.

The expansion of recorded resource inflows outpaced recorded uses of resources. The unadjusted BoP residual increased from a decadal total of $26.4 billion in 1990-99 to $71.5 billion over the 2010-2015 period.

III.2.   Trade misinvoicing at the aggregate level

Trade misinvoicing appears to be an important channel of capital flight from South Africa.[13] Over the period 1998-2015, trade misinvoicing contributed $52.6 billion to the country's estimated capital flight (Table 3). This value is obtained by scaling up misinvoicing relative to industrialized countries as described earlier in section II. The most notable phenomenon is export underinvoicing, amounting to a total of $183 billion over the 1998-2015 period. This illustrates large gaps between South Africa's reported exports and the value of imports by the partners as reported by the latter. Figure 2 illustrates these patterns.

The results also show net underinvoicing of imports to the tune of $130 billion over the 1998-2015 period. This indicates that technical smuggling, pure smuggling or a combination of the two exceeded import overinvoicing. The phenomenon is especially pronounced over 2010-2015 with an estimated $91.9 billion of import underinvoicing, or imports which were not accounted for in

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[13] Electronic DOTS data for South Africa start in 1998; therefore, no estimates of trade misinvoicing are computed over 1970-1997.

the country's trade statistics as reported in the DoTS. In contrast, over the same period, export underinvoicing amounted to $52 billion.

It is interesting to note that similar results are obtained when data from the South African Reserve Bank on total imports and exports are directly compared to DOTS data for the world as partner. The results show export underinvoicing of $166 billion and import underinvoicing of $113 billion, hence $53 billion net misinvoicing. This suggests that the estimates of trade misinvoicing are not significantly affected by any possible biases in the methodology that uses industrialized countries data as a benchmark.

Figure 2 here

Special data and reporting issues

The estimates of aggregate trade misinvoicing presented above are obtained using a c.i.f. factor that is specific to South Africa, obtained as the ratio of imports at c.i.f. to imports at f.o.b. as reported in the International Financial Statistics and the SARB import series. It has been sometimes claimed that the rule-of-thumb ratio of 10% for the c.i.f. factor used in the literature is too high. Figure B1 depicts the trend of the derived country-specific c.i.f. relative to the proxy of 10%. We explored the impact of using various values for the c.i.f. factor on estimated trade misinvoicing for South Africa by considering 5%, 10%, and the South Africa-specific factor. The results are presented in Table 3. The South Africa-specific factor is noticeably higher than 10% in several years, especially from 1994. As expected, using a lower value for the c.i.f. factor yields a higher estimate for export underinvoicing. It produces higher import overinvoicing or, equivalently, lower import underinvoicing. The use of the relatively high South Africa-specific c.i.f. factor derived from official published trade data is therefore conservative in the sense that it yields lower trade misinvoicing, given that the dominant phenomenon is export underinvoicing.

Table 3 here

Another issue with South African trade data is the incomplete reporting of the destination of exports and origin of imports. The DoTS tables show substantial amounts of exports to undisclosed destinations. The problem is less pronounced for imports. We used data from printed DOTS reports over 1970-97 to investigate this phenomenon. The reports show that over the 1970-2015 period,

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exports to unspecified destinations amounted to $498 billion. By comparison, the cumulative amount of imports from unspecified origins amounted to $99 billion over the same period. Figure B.2 shows the level and trend of the share of imports and exports that are registered under unspecified destinations and origins. This phenomenon ended in 1995 for imports, but it has persisted for exports up to today, albeit at a lower rate since the mid-2000s. This phenomenon is worth exploring further by examining data at partner and product levels.

III.3.   Trade misinvoicing by partner

This section examines trade misinvoicing by trading partner. For comparative purposes, the analysis uses data from the DoTS and Comtrade over 2000-2014, as South Africa data in Comtrade starts in 2000. One important difference between the two databases which is particularly relevant for South Africa is that, as noted above, some countries including South Africa report their imports at f.o.b. in Comtrade and at c.i.f. in DoTS. This means that no c.i.f. adjustment is made in the estimation of import misinvoicing when using data from Comtrade. The results for major trading partners are presented in Table 4 and the estimates for all trading partners are reported in the Appendix in Tables C1 (using DoTS data) and C2 (using Comtrade data).

Table 4 here

The results exhibit substantial variation across countries with regard to the extent of trade misinvoicing. The most prominent phenomenon is export underinvoicing as was observed in aggregate results, while net import misinvoicing is less pronounced. As might be expected, the leading partners in terms of volume of trade are also at the top of the list in terms of trade misinvoicing. Mainland China is South Africa's leading trading partner, accounting for 8 percent of its recorded exports and 16 percent of its partners' recorded imports. The large gap between these two percentages is already indicative of trade misinvoicing and/or data recording issues. China-South Africa trade exhibits substantial export underinvoicing, amounting to $147 billion over the period 2000-2014 using DoTS and $151 billion using Comtrade data. This is equivalent to about 63 percent of China's imports from South Africa as recorded by the former in the DoTS database.

There are several other countries whose trade with South Africa exhibits high export underinvoicing, equivalent to more than 45 percent of their imports from South Africa. These are India, Italy, Thailand, Turkey and United Kingdom. One possible explanation may be that South Africa did not record the destination of these exports, whereas the recipients did record the goods as originating from South Africa. The analysis by product in the next section points in that direction for certain key products, the extreme being the case of non-monetary gold.

The analysis by partner reveals a few peculiar cases with substantial volumes of apparent export overinvoicing. The two prominent cases are the Netherlands and Switzerland. It appears that large fractions of South Africa's exports to these countries are not recorded or are under-recorded in the these partners' trade statistics. This may be related to the fact that these two countries are major trading hubs, hosting multinational corporations involved in global trading of primary commodities. Goods registered in South Africa as exported to Dutch or Swiss companies may not dock in the Netherlands or Switzerland, but rather end up in other countries where the firms have affiliated corporations or independent clients. The goods may also be traded during shipment to the Netherlands or Switzerland, in which case they would be recorded as imports in the final buyer's country. Such transactions create discrepancies in mirror trade data that yield apparent export overinvoicing vis-à-vis the Netherlands and Switzerland.

Overall, the analysis of misinvoicing in bilateral trade shows pervasive export underinvoicing. Over the 2000-2014 period, total export misinvoicing summed over individual countries amounted to $314 billion using DOTS data and $385 using Comtrade data. In particular, China takes the lion's share of the volume of both export misinvoicing (over $147 billion) and total trade (over $153 billion).

The analysis by trading partner also shows that while there is general consistency in the data between DoTS and Comtrade for most countries, some exhibit substantial disparities between the values reported in the two databases. These disparities yield substantial differences in estimated misinvoicing, to the point where for some partners the signs of the estimates are reversed. In some cases, there are marked disparities in import data as reported by partners. This is the case for France and Germany throughout the entire period and for Hong Kong and Zimbabwe starting around 2010. This is depicted in Figure B.3 in the Appendix (panels A and B). In other cases, the

discrepancies are in partner export data. This is the case of the UAE and the UK over the entire period and Sweden starting in 2010 (Figure B.3, panels C and D). There also are a few cases of extremely poorly recorded data, where values are missing in one of the two databases and reported in another. This is the case of Saudi Arabia and Iran.

III.4. Trade misinvoicing by product

To shed further light on the mechanisms and extent of trade misinvoicing, the analysis is undertaken at the product level. For a middle-income country with a diversified economy like South Africa, it would be rather onerous to analyze every single product. The analysis therefore focuses on major export products, based on their shares in total exports using data from Comtrade for the period 2000-2014. The top export products in South Africa are primary commodities: the silver and platinum group, iron ore, and non-monetary gold. The respective shares of the country's top 15 export products are presented in Figure 3. The silver-platinum group leads with 9 percent of total exports.[14]

While the South African economy is highly diversified in terms of number of export products, its exports exhibit high concentration in terms of destination. For silver, the top three partners account for 78 percent of total exports, led by India (31.5%), followed by China (28.8%) and the United Kingdom (18%). China is the main importer of iron ore (59%), followed at a distance by Japan (13%). The latter country is the main buyer of South Africa's platinum, accounting for 30.5 percent of total exports, followed by the United States (23.9%) and China (11%). These statistics are presented in Table C.3 in the Appendix.

Estimates of trade misinvoicing for these leading products are presented in Table 5 (panels 5A-5D). Note that, for any given year, export misinvoicing is calculated only when both South Africa and its partner report their respective data. The misinvoicing estimate is set to zero when data for either partner is missing. Therefore, the sums in Table 5 do not necessarily match those in Table C.3 due to inconsistent reporting of mirror trade data.

Table 5 here

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[14] The shares are calculated using average annual exports over the 2000-2014 period.

Figure 3 here

Silver export misinvoicing

The results for silver exports are presented in panel A of Table 5. The results from the analysis show a predominance of export underinvoicing. For trade with India, the leading trading partner, the results show $66 billion of export underinvoicing out of a total of $164 billion of India's silver imports from South Africa.[15] There is relatively low export misinvoicing in silver trade with the United Kingdom: about $13 billion of estimated export misinvoicing out of a total of $105 billion of imports over the 2000-2014 period. Considering the top five partners, export underinvoicing amounts to $26 billion over the 2000-2014 period.

Surprisingly, Comtrade contains no data on exports of silver to China, even though the latter is the second leading partner (behind India) with 28.8% of total world silver imports. Consequently, the extent of misinvoicing of silver exports to China cannot be estimated.

Peculiar reporting is also noted in the case of trade with Switzerland. Swiss data shows very little silver imports from South Africa. Over the 2000-2014 period, South Africa reported $90 billion of silver exports to Switzerland, but the latter reported importing only $1 billion. Considering only the years in which both countries report data, there is an estimated $44 billion in export overinvoicing.

Export overinvoicing of primary commodities may reflect situations where exports nominally recorded as heading to Switzerland (or another partner) are rerouted to other destinations. If, for example, the commodities end up in another country such as China, and China records the imports as coming from South Africa, whereas Switzerland records some of the goods as transit trade destined to China, this will result in a mismatch between South African data and those of China and Switzerland.

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[15] The overall total silver imports by India is $184 billion, including years where no South Africa data is reported in Comtrade (Table C.3.A).

These results provide some insight into why there is a substantial amount of exports recorded under unclassified "other areas" in South Africa's aggregate trade statistics. This practice is especially predominant in the case of non-monetary gold, as discussed further below.

Platinum export misinvoicing

Estimates for export misinvoicing of platinum are reported in Table 5, panel 5.B. Platinum exports are also heavily concentrated by partner, with the two leading partners, Japan and the United States, accounting for over 50 percent of total exports (Table C.3.B in the Appendix). There is evidence of export underinvoicing, especially in platinum trade with China. While South Africa reported less than $2 billion of platinum exports to China, the latter recorded about $16 billion. Trade with the major partners as a group shows overall export underinvoicing of $7.7 billion, which represents a relatively low percentage (6.6%) of their total platinum imports, when we only count years where both South Africa and its partner report data in Comtrade.

Similar to silver, the results show export overinvoicing vis-à-vis Switzerland. The apparent export overinvoicing vis-à-vis Hong Kong could reflect re-exports of platinum initially exported to Hong Kong that end up in China. The export overinvoicing relative to the United Kingdom is peculiar; the mechanisms behind it need further investigation.

Iron ore export misinvoicing

Table 5, panel 5.C reports the estimates of export misinvoicing for iron ore. China is the leading partner, buying 62 percent of South Africa's iron ore exports of this product (Table C.3.C in the Appendix). The analysis shows relatively low levels of export misinvoicing. Total export misinvoicing over the 2000-2014 period amounted to $5.3 billion for the four leading trading partners (China, Germany, Japan and Korea), out of $43.2 billion of exports to the group (and $52.8 billion of imports by the group).

The complex case of non-monetary gold

Gold exports are typically classified into two categories: monetary gold and non-monetary gold. The results presented in Table 5.D are for non-monetary gold exports only (also see Table C.3.D). The evidence reveals three key features: (i) export underinvoicing, (ii) inadequate reporting of

destinations of gold exports, and (iii) inconsistencies in classification of gold exports. Like other products, non-monetary gold exports are characterized by substantial underinvoicing vis-à-vis most individual partners. The phenomenon is most pronounced in the case of exports to Hong Kong and the United Kingdom. While Hong Kong records about $20 billion of total imports of non-monetary gold from South Africa, South Africa's data show less than $2 billion worth of exports to Hong Kong. Similarly, only $250 million of non-monetary gold exports to the United Kingdom appear in South Africa's data compared to about $14 billion of imports in the UK's data. The cumulative amount of export misinvoicing vis-à-vis major partners over 2000-2014 is $52 billion. As can be seen in Table 5.D, most of the non-monetary gold exports recorded in South Africa's data are reported under *non-specified areas*: $31 billion against a total of $34 billion.

In addition to the lack of information on the individual destinations of non-monetary gold exports, the data also shows inconsistencies in the distinction between monetary gold and non-monetary gold. While government statistics traditionally distinguished between the two series as do its trading partners, they have been merged since 2010.[16] The country's statistics also exhibit inconsistency between the values of non-monetary gold recorded in Comtrade and those recorded in the Balance of Payments.[17] Unfortunately, the BoP cannot be used for estimation of export misinvoicing at the partner level, because it does not contain data on the destination of non-monetary gold exports from South Africa.

<div align="center">Table 5 here</div>

IV. Results for the Case of Côte d'Ivoire

This section presents the results for the case of Côte d'Ivoire. Following an analysis of the levels and trends of capital flight from 1970 to 2015, it discusses the evidence on trade misinvoicing at the aggregate, partner and product levels.

IV.1.   Capital flight from Côte d'Ivoire

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[16] The data by the Department of Trade and Industry are available online at:
http://tradestats.thedti.gov.za/ReportFolders/reportFolders.aspx
[17] Non-monetary gold is reported in the Current Account under "Goods".

Estimates of capital flight from Côte d'Ivoire are summarized in Table 6 and a graphical illustration of the cumulative flows by decade is provided in Figure 4. Over the 1970-2015 period, capital flight as measured by the Balance of Payments residual amounts to a total of $30.9 billion. An adjustment for trade misinvoicing of $1.1 billion brings the total to $32 billion.

Analysis of the results reveals two distinct phases. During the first three decades, from 1970 to 2000, the country experienced substantial capital flight. The adjusted capital flight reached a cumulative total of $19 billion in the 1970s. This increased to $24 billion in the 1980s, but decreased to $11.7 billion in the 1990s, marking a shift toward a phase of capital reversals starting in the 2000s.

The capital flight reversal since the turn of the century is associated with a decline in net external debt inflows, especially during the 2000-2009 period. The period also witnessed net outflows of private capital as recorded in the Balance of Payments under 'other investments,' amounting to $5 billion, and these accelerated, reaching $15.8 billion during 2010-2015. The capital flight reversal was accompanied by changes in trade misinvoicing, especially in the form of export overinvoicing. Cumulative net trade misinvoicing turned from a net outflow of $4.3 billion over the 1990-99 period to a net inflow of $4.2 billion over 2000-09 and $8.3 billion over 2010-15. The phenomenon of trade misinvoicing is further discussed in detail in the next section.

Table 6 here

Figure 4 here

IV.2.   Trade misinvoicing at the aggregate level

This section presents estimates of trade misinvoicing at the aggregate level; i.e., vis-à-vis the rest of the world obtained using data from the DoTS over the period 1970-2015. Estimates at the partner level and product level are presented in subsequent sections.

The trend of export and import misinvoicing is depicted in Figure 5. The results show cumulative net trade misinvoicing amounting to $1.1 billion over 1970-2015. During this period, the country experienced export underinvoicing to the tune of $2.6 billion and import underinvoicing of $1.5 billion. Overall, aggregate trade misinvoicing accounts for a small share in total capital flight from Côte d'Ivoire over the four and a half decades.

Figure 5 here

IV.3.   Trade misinvoicing by partner

Trade misinvoicing at the partner level is investigated to shed further light on the results at the aggregate level. Table 7, panel 7.A presents the results for top partners among developed countries, while panel 7.B contains the results for leading partners among developing and transition countries. There are substantial differences in patterns of misinvoicing between the two groups. For partners among developed countries, the predominant phenomenon is export underinvoicing, resulting in net unrecorded outflow of capital from Côte d'Ivoire . The two major exceptions are the Netherlands and France, where the results show export overinvoicing as well as import underinvoicing. Trade with Belgium also entails import underinvoicing and, to a lesser extent, some export overinvoicing. Trade with the top ten developed countries as a group exhibits cumulative export underinvoicing and import underinvoicing of nearly equal amounts (about $2.6 billion each), resulting in a minor net misinvoicing adjustment to capital flight (-$43 million) over the 2000-2014 period.

In the case of Côte d'Ivoire's top trading partners among developing and transition countries, the prevalent phenomena are export overinvoicing and import underinvoicing with cumulative amounts of $11 billion and $1.4 billion, respectively. The net trade misinvoicing adjustment vis-à-vis this group implies a net unrecorded inflow of capital and/or goods worth $12.5 billion over the 2000-2014.

The results raise the question of how to explain the unusual phenomenon of export overinvoicing vis-à-vis most key trading partners among developing countries and in the special cases of the Netherlands, France and Belgium that stand out among developed countries. In the case of these exceptions among developed countries, the results could reflect third-party trade whereby companies registered in these countries buy Ivorian goods, but on-sell them to another country that records it as an import from Côte d'Ivoire. This scenario is less likely in the case of developing and transition countries that do not host major trading hubs.

Another possible explanation for apparent export overinvoicing is import underinvoicing on the part of Côte d'Ivoire's partner. This could entail technical smuggling where the declared value of

the imported goods is artificially understated in the partners' records. Yet another possibility is simply poor reporting of trade data on either or both sides of the transaction regarding the actual destinations of exports and the actual origins of imports.

Table 7 here

IV.4.   Trade misinvoicing by product

This section presents an analysis at the product-partner level to further explore the mechanisms and patterns of trade misinvoicing in Côte d'Ivoire. The data are drawn from Comtrade using 3-digit SITC codes. As can be seen in Figure 6, Côte d'Ivoire's exports are quite concentrated by product. The analysis of export misinvoicing therefore focuses on the country's key export products: cocoa, which account for 32 percent of total exports (average over 2000-2014), the group of petroleum oils (SITC 333 and 334) which make up 22% of exports, and rubber with 6%. Estimates of export misinvoicing for these commodities are presented in Tables 8.A-8.C.

Cocoa export misinvoicing

The data show heavy concentration of cocoa exports by destination, with the Netherlands and the United States accounting for half of the total (31% and 19%, respectively; Table C.4.A in the Appendix). The case of the Netherlands stands out from other partners. The value of cocoa imports as declared by the Netherlands is substantially lower than the value of cocoa exports as declared by Côte d'Ivoire, even after accounting for the cost of insurance and freight, thus the apparent export overinvoicing. This overinvoicing of cocoa accounts for much of the observed aggregate overinvoicing of exports from Côte d'Ivoire as shown earlier. Exports to Estonia also appear to be overinvoiced and the amount of overinvoicing represents a large fraction of total exports to this country, at more than half the value of exports as declared by Côte d'Ivoire.

For other partners, the most predominant phenomenon is export underinvoicing. The amount of underinvoicing is especially high for Germany: $3.7 billion, which represents 57 percent of the country's total imports from Côte d'Ivoire over the 2000-2014 period. Exports to France and the USA were underinvoiced by $1.3 billion each. For the group of the nine leading export destinations, cocoa exports are underinvoiced by $2.4 billion over the 2000-2014 period.

Petroleum export misinvoicing

Exports of petroleum oils (SITC 333 + SITC 334) are less concentrated by destination than cocoa exports. The top 10 largest partners account for 68% of Côte d'Ivoire's total exports of petroleum oils (Table C.4.B in the Appendix). Contrary to the case of cocoa, export overinvoicing is predominant. For the group of eleven top trading partners, total export overinvoicing amounts to $4.4 billion out of a total of $18.9 billion of exports. Total exports as declared by Côte d'Ivoire over the 2000-2014 period amounted to $22.7 billion when all years are included (even when data of one the partners is missing).

There is substantial overinvoicing of exports to The Netherlands ($1.2 billion) as was the case for cocoa exports. Exports to France were cumulatively over-invoiced by $1.4 billion, out of a total of $1.8 billion of exports as declared by Côte d'Ivoire. The overinvoicing of exports to Togo ($416 million) and Benin ($479.7 million) is small in absolute terms but large in relative terms. For Togo, the amount of export misinvoicing represents more than half the reported partner's imports and it exceeds the amount of exports as declared by Côte d'Ivoire ($385 million). Here again, the question is what factors account for the overinvoicing of exports. Unless there are substantial fiscal incentives aimed at promoting exports, such discrepancies may be due to either third party trade (also unlikely), underinvoicing of imports by the trading partners, or incorrect reporting of the destination of petroleum exports.

Natural rubber export misinvoicing

Rubber exports are also relatively diversified like those of petroleum oils (Table C.4.C in the Appendix). Export underinvoicing is the most prevalent phenomenon, with the exception of exports to the Netherlands and South Africa (and to a lesser extent Belgium and Malaysia) that exhibit export overinvoicing. While the absolute amounts involved may be small, they represent a substantial share of total exports by Côte d'Ivoire.

Summary

The evidence presented above indicates substantial export overinvoicing and export underinvoicing in Côte d'Ivoire's key primary commodity exports – cocoa, petroleum oils and natural rubber. The case of the Netherlands stands out, as the values of exports declared by Côte

d'Ivoire are substantially larger than the amounts of imports reported by the Netherlands. This may be due to the fact that the latter is a major trading hub, suggesting that some of the goods recorded as headed there are in fact only transiting in 'bonded warehouses', then traded subsequently. Goods may also be traded during shipment and rerouted to another final destination. In contrast, the apparent overinvoicing of exports to developing countries is unlikely to be due to third party trade. It is more likely to be a result of either import misinvoicing or smuggling at the partner level or incorrect recording of the destination of exports in Côte d'Ivoire's statistics.

The analysis by partner and product helps shed light on the observed pattern of export overinvoicing at the aggregate level. The results suggest that this partly arises from overinvoicing of exports of major products in a subset of the leading partners, notably the Netherlands. The evidence hints to a problem of recording of exports. Following internationally agreed reporting standards, Côte d'Ivoire, or South Africa as seen earlier in the chapter, would not record the Netherlands as the importer of their products if the goods are in fact destined to a third country. In a fully transparent setting, the African countries would record the final destination of the goods, the Netherlands would at most record the goods as being in transit, and the final country would record the goods as imported from Côte d'Ivoire and South Africa, respectively. It is puzzling why these global data reporting conventions are not followed systematically when the concerned countries have endorsed them as members of the United Nations system.

Table 8 here

Figure 6 here

V. Results for the Case of Angola

The analysis of capital flight from Angola covers a shorter period than the case of Côte d'Ivoire and South Africa, starting only in 1986 due to lack of data on relevant indicators. Moreover, unlike the other two countries, lack of adequate data prevents an analysis of trade misinvoicing. The Angola export and import data published in the DOTS are reconstructed from partner data. Therefore, they cannot be used to calculate trade misinvoicing. As a result, the analysis leaves out an important potential channel of capital flight from Angola.

V.1.   Capital flight from Angola

Angola has experienced substantial capital flight over the period from 1986 to 2015 as illustrated in Table 9 and Figure 7. Over this period, the country witnessed cumulative net outflows of unrecorded capital of $60.9 billion. This estimate is not adjusted for trade misinvoicing due to lack of data as indicated above.

A number of features emerge from the analysis of the trends and patterns of capital flight from Angola. The first is massive accumulation of current account surpluses, mainly driven by oil exports. The second is a reversal in net private capital flows since the past decade. From 2000 to 2015, net foreign direct investment outflows totaled a staggering $28 billion. The cumulative net inflows of FDI from 1986 to 2009 was $18.9 billion. Portfolio investment also generated net outflows amounting to $6.7 billion from 2000. Similarly, the BoP line *other investment* recorded a net outflow in the 1990s and 2000s of $13 billion, but this was partially offset by net inflows in the subsequent period of 2010-2015.

The key question is what lies behind the massive net outflows of private capital from Angola over the past one and a half decades. For FDI, the outflows may arise from foreign firms' repatriation of profits to their home countries. These outflows may also include investments by Angolan residents abroad as well. In any case, it would be worth investigating the motivation for such large outward investments. In the case of portfolio investment, these net outflows may be driven by speculation by private investors seeking to maximize risk-adjusted returns. They could also reflect portfolio adjustments by firms facing excess cash balances that they seek to invest or simply hold abroad. The various net outflows could include repayment of external debts by private firms. However, given the observed high volumes of outflows, this scenario would imply that commensurate volumes of borrowing took place in previous periods. The data shows no evidence in support of this scenario. This issue is therefore worth investigating further.

Table 9 here

Figure 7 here

V.2.   Trade data limitations in the case of Angola

As indicated earlier, lack of adequate bilateral data prevents exploration of the potential contribution of trade misinvoicing to capital flight from Angola. This is an important limitation in the analysis of capital flight from Angola, especially given the predominance of the natural resource sector (mainly oil), as the extractive industries tend to be highly exposed to trade misinvoicing as a mechanism of capital flight and other practices that generate illicit financial flows such as transfer pricing. The data show heavy dependence of the Angolan economy on petroleum oils and related products, which account for over 95 percent of total exports.[18] The next product group in line, pearls, precious and semi-precious stones accounts for only 2 percent of total exports. Angola's exports are also heavily concentrated by destination. The top 5 partners account for 80 percent of petroleum oils exports (SITC 333) and 97% of total exports of pearls, precious and semi-precious stones (Table 10).

Using the limited data for the case of petroleum as reported in Comtrade over the period 2009-2014, mirror partner data comparison shows minimal discrepancies between the two sets of series. This can be seen in Table 11, which shows results for the top trading partners. When Angola does not supply its own data systematically, its series are constructed using partner data. Given the importance of the oil sector in Angola, it is worth further investigating the extent to which trade misinvoicing may contribute to capital flight from this country. As the oil sector is the primary destination for foreign investment, it is also an important avenue for investigating the factors behind the net outflows of private capital over the past one and a half decades. It would be worth exploring the contribution of corporate practices such as profit repatriation, reverse foreign investment, intra-firm lending and borrowing, and pure speculation as sources of these net private capital outflows.

Table 10 here

Table 11 here

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[18] Petroleum oils, oils from bitumin materials, crude (SITC 333) accounts for 95% of exports (average over 2000-2014). Adding the other petroleum related categories (SITC 334, 342, 343) brings the share to about 97%. Source: UNCTAD Statistics Database (UNCTAD*STAT).*

VI. From unrecorded outflows to unrecorded offshore wealth

VI.1. Relevance of the analysis of unrecorded offshore wealth

Thus far, we have focused on measuring and analyzing unrecorded capital outflows from the three African countries. The evidence has demonstrated that all the three countries experienced high volumes of capital flight over the past four decades. The fact that these outflows have persisted over time suggests that they are driven by fundamental structural and institutional factors in both the source countries and the global financial system. They cannot be explained simply as a result of portfolio management decisions by savers seeking to maximize the return to investment. With the low market interest rates in destination countries, it is not clear that returns are higher there than in African countries. It is clear that capital flight is driven by medium and long-term considerations. In other words, it is flight with intention to stay. As James Henry (2012: p. 23) puts it, "since net outflows from developing countries have continued over sustained periods of time, and since little offshore wealth or the earnings that it produces have been repatriated, the most important factors driving it are not those that drive 'hot money', but long-term de-capitalization." In addition to measuring the flows of capital flight, therefore, it is important to assess the corresponding accumulation of private wealth deriving from the capital that remains abroad. The story of capital flight does not end with illicit crossing of national borders.

The concealment of private wealth accumulated from unrecorded capital outflows is facilitated by services offered by offshore financial centers. The domiciliation and concealment of this wealth is facilitated by the special services that these centers offer. The term "offshore" here refers "not so much to the actual physical location of private assets or liabilities, but to nominal, hyper-portable, multi-jurisdictional, often quite temporary locations of networks of legal and quasi-legal entities and arrangements that manage and control private wealth – always in the interests of those who manage it, supposedly in the interests of its beneficial owners, and often in indifference or outright defiance of the interests and laws of multiple nation states" (J.S. Henry, 2012). African private wealth held offshore has a number of deleterious effects on the source countries and their people. Here we highlight the most important.

First, the accumulation of unrecorded private wealth in offshore financial centers erodes the source country's tax base. In addition to initial losses in income tax when private savings are concealed and exported abroad, subsequent losses are incurred due to untaxed income from the hidden wealth. This is especially problematic for African countries, which generally have very low tax revenue/GDP ratios and face large and growing financial gaps. It has been estimated that globally the lost revenue from unrecorded income from wealth stashed offshore is more than twice the total aid from OECD countries (J.S. Henry, 2012). This substantially changes the debate on financing for development. Rather than focusing on increasing foreign aid, as is typical in international discourse, the focus should be on helping African countries reduce the tax losses due to base erosion resulting from unrecorded offshore wealth.

Second, accumulation of unrecorded offshore wealth changes the picture of wealth inequality both within African countries and between Africa and the rest of the world. Because unrecorded offshore wealth generally belongs to political and economic elites, measures of national wealth inequality in Africa based on recorded assets are biased downward. At the same time, the wealth gap between African countries and the rich countries where this wealth is domiciled is lower than official statistics may suggest. In short, African countries may be wealthier than we think, but this wealth is grossly unequally distributed.

Third, the accumulation of offshore wealth by the African elites depresses public service delivery, again increasing inequality. The lost tax revenue implies suboptimal provision of public health, education and infrastructure, services on which the poor depend most heavily. The poor in Africa cannot 'vote with their feet' in protest against poor public service delivery; unlike the rich they cannot afford education and health care for their families in the West. At the same time, as the elites do not suffer from poor public service delivery, they have little incentives to improve it.

Finally, the accumulation of offshore wealth undermines institutions of accountability and the regulatory system. The political and economic elites who hold offshore wealth do not have incentives for developing the type of institutions needed to stem capital flight, induce wealth repatriation and combat tax evasion; quite the contrary. Thus they are unlikely to promote capital controls, anti-money laundering measures, customs reforms, and policies against trade misinvoicing and the abuse of transfer pricing rules, etc. Ultimately, capital flight and offshore

wealth accumulation persist because of the incentive structures that make them possible in the first place.

VI.2. Measurement of hidden offshore wealth

There are various approaches to measuring private offshore wealth. One approach consists of estimating unrecorded private wealth accumulated from historical capital flight flows, on the assumption that some fraction of these flows is saved. A second approach consists of measuring 'missing wealth' as a discrepancy between recorded liabilities and assets as reported in international financial statistics. This approach can be found in the work by Gabriel Zucman (2013). In a third approach, total private wealth is estimated directly using the offshore assets held by global private banks (J.S. Henry, 2012).

a. Wealth Accumulation from Capital Flight

The most elaborate method for estimating offshore wealth accumulated from capital flight was developed by James Henry in his work for the Tax Justice Network (J.S. Henry, 2012), updated in J.S. Henry (2016).[19] The key premise in this approach is that unrecorded capital flight is held abroad for long-term purposes, therefore accumulating wealth that also is not recorded. This wealth earns interest income and capital gains that often are not taxed. The main challenge is that given that this wealth is unrecorded, it is difficult to know its precise amount and asset composition. For example, it is difficult to know how much of the wealth is held in liquid versus illiquid assets such as real estate, art objects and other valuables. Moreover, some of the capital flight finances consumption, including the extravagant lifestyles often profiled in investigative reports on prominent economic and political figures.[20]

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[19] The results are available online at "Global Haven Industry": http://globalhavenindustry.com/.
[20] For examples, see **Ndikumana, Léonce and James K. Boyce.** 2012. "Rich Presidents of Poor Nations: Capital Flight from Resource-Rich Countries in Africa." *ACAS Bulletin*, 87, 2-7., **Boyce, James K. and Léonce Ndikumana.** 2012a. "Elites Loot Africa as Foreign Debts Mount," N. Chanda and S. Froetschel, *A World Connected: Globalization in the 21st Century. Yaleglobal Online Ebook.* 44-47. and **____.** 2012b. "How Capital Flight Drains Africa: Stolen Money and Lost Lives," N. Pons-Vignon and P. Ncube, *Confronting Finance: Mobilizing the 99% for Economic and Social Progress. .* Geneva: International Labour Office, 31-34..

James Henry (2012) proposed some working assumptions to address these challenges, based on information from bank industry analysis as well as interviews with operators and informed observers of the offshore banking industry. The first assumption is that about 50-75 percent of capital flight is invested offshore in financial interest-generating vehicles and physical assets. The second is that the earnings on these offshore investments are not taxed, as they are not reported to the tax authorities of source countries. The third is that offshore wealth earns a modest market interest rate, proxied by the 6-month CD rate. On this basis, Henry capitalizes past capital flight to arrive at a measure of unrecorded private offshore wealth. Worldwide, Henry finds that the sample of 139 countries examined over 1970-2010 have accumulated $7.3 to $9.3 trillion of unrecorded wealth as of 2010. In the case of Sub-Saharan Africa, unrecorded stock of private capital stood at $683 billion in 2010 and it rose to $709 billion by 2014. Table 12 presents estimates of the stock of offshore wealth for the three case study countries as well as regional totals.

James Henry's estimates of offshore wealth indicate that, contrary to commonly held beliefs, African countries are not heavily indebted vis-à-vis the rest of the world; they are instead 'net creditors' (a phenomenon pointed out by James K. Boyce and Léonce Ndikumana (2001)) in the sense that the stock of wealth stashed abroad vastly exceed their external liabilities as measured by the stock of external debt (Henry 2012, 2016). The problem is that offshore wealth does not contribute to Africa's development.

b. Missing External Assets

A second approach to measuring offshore wealth starts with anomalies in the IMF data on international investment positions (IIP), which report external liabilities and external assets – that is, on stocks of capital, rather than the flows reported in the BoP, for the countries of the world. Implausibly, these data purport to show that the world as a whole is a 'net debtor': the world's total external liabilities exceed its total external assets (Philip R. Lane and Gian Maria Milesi-Ferretti, 2007). That is, the total amount of financial securities and bank deposits recorded as being held by foreigners (liabilities) exceeds the total amount recorded as being held in foreign countries. 'There is a "hole",' observes Gabriel Zucman (2015, p. 37), who uses this discrepancy to estimate hidden wealth: 'if we look at the world balance sheet, more financial assets are recorded as liabilities than as assets, as if planet Earth were in part held by Mars.'

In 2013, this discrepancy amounted to $7.6 trillion (Zucman 2014). Because the IIP data only refer to financial wealth, other types of hidden wealth are missing from this number. As Zucman (2015, pp. 44-45) explains:

My method says nothing about the amount on non-financial wealth in tax havens. This includes yachts registered in the Cayman Islands, as well as works of art, jewelry, and gold stashed freeports – warehouses that serve as repositories for valuables. Geneva, Luxembourg, and Singapore all have one: in these places, great paintings can be kept and traded tax-free – no customs duty or value-added tax is owed – and anonymously, without ever seeing the light of day. High-net-worth individuals also own real estate in foreign countries: islands in the Seychelles, chalets in Gstaad, and so on. Registry data show that a large chunk of London's luxury real estate is held through shell companies, largely domiciled in the British Virgin Islands, a scheme that enables owners to remain anonymous and to exploit tax loopholes. Unfortunately, there is no way yet to estimate the value of such real assets held abroad.

Zucman nonetheless reckons that his method captures the bulk of hidden wealth:

At the top of the wealth distribution – that is, for fortunes of dozens of millions of dollars and more – on average most of the wealth takes the form of financial securities. It is rare than someone invests all of his wealth in a yacht. It is one the great rules of capitalism that the higher one rises on the ladder of wealth, the greater the share of financial securities in one's portfolio.

He concludes that his estimate that hidden wealth amounts to about 8% of total personal financial wealth worldwide is on the right order of magnitude, although that 'one might imagine that the true figure, all wealth combined, is 10% or 11%.' This would suggest that hidden non-financial assets amounted to another $2-3 trillion as of 2013, bringing total hidden assets to around $10 trillion.

There are reasons to suspect, however, that even this figure errs on the low side. High net-worth individuals who conceal their wealth behind veils of anonymity may not follow the unwritten rules of capitalism with regard to portfolio allocation, any more than they obey its written rules.

Box 1

Hidden Real Estate

Evidence from the world's 'supercities' – global centers like New York, London, Paris, Hong Kong and Singapore – suggest that anonymous real estate holdings account for a substantial amount of hidden wealth.

The Financial Action Task Force, an intergovernmental body that combats money laundering, reported in 2013 that 'real estate accounted for up to 30% of criminal assets confiscated in the last two years, demonstrating this as a clear area of vulnerability' (FATF 2013, p. 24).

The *Financial Times,* announcing that 'London has become a center for dirty money,' reported in 2014 that at least £122 billion (about $200 billion) worth of property in England and Wales is held by shell companies registered in offshore tax havens, most of them in the British Virgin Islands and Channel Islands (O'Murchu 2014).

Shell companies accounted for 54% of luxury real estate purchases in Manhattan in 2014, 51% in Los Angeles, and 48% in San Francisco in 2014 (*New York Times* 2015). The total value of residential property in Manhattan is estimated at $733 billion (Metrocosm 2015), and luxury properties (those sold for $4 million and up) accounted for about 37% of residential sales in 2014 (City Realty 2017). Together these figures suggest that the value of hidden residential properties in Manhattan alone exceeds $100 billion.*

'The real estate market has long provided a way for individuals to secretly launder or invest stolen money and other illicitly gained funds,' observes a recent study by Transparency International (2017, p. 5). 'Not only do expensive apartments in New York, London or Paris raise the social status of their owners and enhance their luxurious lifestyles, but they are also an easy and convenient place to hide hundreds of millions of dollars from criminal investigators, tax authorities or others.'

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* Calculated as follows: $733 billion x 0.37 x 0.54 = $146 billion. Note that this excludes non-residential property holdings as well as residential properties valued at less than $4 million.

Apart from the non-financial assets mentioned by Zucman – art, yachts, gold, jewelry and real estate – a considerable amount of hidden wealth takes the form of cash. One hundred dollar bills, though not widely used in day-to-day transactions, account for 78% of the $1.5 trillion value of U.S. banknotes in circulation. The €500 note accounts for 30% of the total value of Euros, and the 1000 Swiss franc note – which is especially handy for carrying in a briefcase, being worth more than 20 times its weight in gold – accounts for 92% of the total value of the Swiss currency (Sands 2016). 'Rather than being a way of paying for things,' the *Economist* (2016) remarks, large-denomination notes serve as a 'convenient store of value' – convenient, above all, for wealth holders who prize anonymity.

Furthermore, not all of the world's wealth that is hidden in the form of financial assets shows up in the IIP discrepancy. To understand why, consider Zucman's (2015, p. 37) explanation for the discrepancy:

> *Let's imagine a British person who holds in her Swiss bank account a portfolio of American securities – for example, stock in Google. What information is recorded in each country's balance sheet? In the United States, a liability: American institutions see that foreigners hold US equities. In Switzerland, nothing at all, and for a reason: the Swiss statisticians see some Google stock deposited in a Swiss bank, but they see that the stock belongs to a UK resident – and so they are neither assets nor liabilities for Switzerland. In the United Kingdom, nothing is registered, either, but wrongly this time: the Office for National Statistics should record an asset for the United Kingdom, but it can't, because it has no way of knowing that the British person has Google stock in her Geneva account. (Zucman 2015, p. 37).*

Now imagine that the same person has Google stock in a bank account in the United States, which is 'by some measures, the world's single most important tax haven' (Shaxson 2011, p. 18). The U.S. ranks second in the world in the latest edition of the Financial Secrecy Index, which measures the volume of foreign deposits and the laxity of transparency rules, between #1 Switzerland and #3 Cayman Islands (Tax Justice Network 2018). In this case, the United States would not record a liability, and the hidden asset would not lead to a discrepancy in the IIP accounts. Similarly, if capital flight from Africa is routed through a shell company incorporated in Delaware and then invested in US equities, there is no discrepancy to be found.

Moreover, apart from unrecorded assets there also may be misrecorded assets – external assets recorded in the IIP as belonging to country A, but whose beneficial owners are really from country B. This is particularly likely if country A is a secrecy jurisdiction. Mauritius, for example, is a haven for capital from African countries, including South Africa and Angola (Fitzgibbon 2017). With a population of only 1.3 million, the country recorded a whopping $423 billion in recorded external assets in the IIP data in 2015, more than $300,000 per person, about 15 times the country's per capita income. By way of comparison, Poland and Turkey, with similar per capita incomes, recorded external assets amounting to about $6000 and $3000 per person, respectively.

For these reasons, while Zucman may be correct that the IIP discrepancy gives the right order of magnitude for the world's total hidden wealth – meaning that it's closer to $7.6 trillion than to

either $760 billion or $76 trillion – the total amount may be considerably larger, perhaps by a multiple or two.

The IIP discrepancy provides a lower-bound estimate of total hidden wealth, but cannot tell us how hidden wealth is distributed by source regions or countries. To estimate Africa's hidden wealth, we must rely on other data sources. Zucman (2013, 2015) used data on financial assets in Swiss banks. Since 1998, the Swiss National Bank (SNB – Switzerland's central bank) has reported data on foreign-owned assets held in Swiss banks. These assets amounted to $2.3 trillion in spring 2015. About 60% of these assets were held by shell corporations, trusts, and foundations, meaning that the nationality of their beneficial owners was unknown. The SNB data do, however, report nationality for the remaining assets, and Zucman (2015, pp. 31-32) uses on this information to impute ownership of the assets held by shell corporations:

> *To know who really owns wealth in Switzerland, we need to make some assumptions about who is behind these shell entities. After examining the available evidence, the assumption I retain is that the wealth held through shell companies belongs to American, British, or German citizens in the same proportion as the directly held wealth does, with a correction to take into account that since 2005 Europeans have had greater incentives to use shell companies and Gulf countries have less incentive to do so.*

On this basis he concludes that Africa accounted for $150 billion of the non-resident bank accounts in Switzerland, about 6.5% of the total. More than half belonged to Europeans, with Germany, France and Italy, the three countries that share a border with Switzerland, leading the way, together accounting for $640 billion.

Africa likewise accounts for 6.5% ($500 billion) in Zucman's estimate of the distribution by source countries of the $7.6 trillion in hidden wealth revealed by the IIP discrepancy. In other words, Africa's share of hidden financial wealth worldwide is the same as its share of directly held wealth deposited in Swiss bank accounts.

Is it reasonable to assume that the distribution of wealth held by shell companies in Swiss banks mirrors that of directly held assets? Do Germans and Angolans, for example, have exactly the same incentives to channel funds through anonymous offshore entities, incurring the attendant transaction costs, as opposed to opening Swiss bank accounts in their own names? Or does the incentive to use shell entities vary, depending on the provenance of the funds?

If the motive for a British person to put money in a Swiss bank is simply to avoid UK taxes, she may deem it sufficient to open an account in her own name. If the UK government somehow were to learn of the ruse, the most she would face are tax penalties. But if the motive is to conceal wealth that was acquired by fraudulent or questionable means – if the wealth is the proceeds of what's called in 'predicate crime' in anti-money laundering legislation – she may decide that more elaborate precautions, including routing the money through a shell company, or a web of shell companies, is worth the extra expense. For in this case, the penalty for being caught could be forfeiture of the entire amount and criminal prosecution.

Law professor Cass Sunstein (2016), in a review of Zucman's book, alludes to this important point when he writes that 'all uses of tax havens are not the same.' Noting that Zucman's estimates imply that half of Russia's financial wealth is held offshore, Sunstein suggests that 'the extraordinarily high figure for Russia might be best understood as involving money corruptly acquired or invested.' The same may be true of Africa: Zucman estimates that 30% of the region's financial wealth is offshore, compared to 10% for Europe and 4% for the U.S. (Zucman 2015, p. 53).

In sum, estimates of missing external assets based on the global IIP anomalies do not provide a reliable measure of the magnitude or timing of capital flight from individual African countries. For this purpose, we start instead with discrepancies in the country's balance of payments, corrected as described above for external borrowing and trade misinvoicing. When recorded inflows of foreign exchange systematically exceed recorded outflows, we can safely assume that most of the missing money is not sitting under mattresses in Johannesburg, Luanda or Abidjan. It is leaving Africa, although its departure is not registered in official statistics.

To be sure, there is uncertainty as to how much of the flight capital is accumulated as offshore wealth and how much is dissipated in consumption. Mapping from flows to wealth stocks requires strong assumptions, too. In terms of capital flight's cost to source countries, however, it matters little whether the missing money winds up being saved or consumed. From the standpoint of ordinary people in the Democratic Republic of Congo, for example, what matters is not how frugal Mobutu was with his stolen money, but the simple fact that he stole it.

VII. Conclusion

This paper applied an updated methodology and data from 1970 to 2015 to estimate capital flight from Angola, Côte d'Ivoire, and South Africa, three African countries that feature prominently in the volume of capital flight from the continent. The paper also delved into a key mechanism of capital flight, trade misinvoicing, including an analysis at the bilateral and product level with a focus the main primary commodity exports. The results show that these three countries have suffered substantial loss of capital over the past four decades amounting to $198 billion for South Africa, $60 billion for Angola and $30 billion for Côte d'Ivoire. For South Africa, trade misinvoicing over the period of 1998-2015 contributed about $53 billion to capital flight, most of it occurring through export underinvoicing especially in primary commodities.

The chronic nature of capital flight from these countries suggests that the phenomenon is driven by structural and institutional factors in both the source country and the global and financial systems that facilitate it. These outflows result in accumulation of private offshore wealth, some of which is financed by embezzlement of public resources including externally borrowed funds. The results imply that, like many other African countries, these three countries are 'net creditors' to the rest of the world in the sense that the assets held offshore exceed the stock of their external debts. The difference is that the debts are a liability on the shoulders of the entire population while the offshore wealth is private. It follows that strategies to combat capital flight must involve both

measures to curtail new outflows and measures to repatriate the wealth hidden in offshore financial centers.

The analysis reveals a number of limitations and some areas of potentially fruitful further investigation. For Angola, the lack of adequate trade data does not allow researchers to estimate capital flight occurring through trade misinvoicing. This is an important limitation given the predominance of oil in the country's economy, a sector known to be subject to misinvoicing in other resource-rich countries. The paper also uncovered important methodological shortcomings in reporting of exports and imports, which is a handicap to the analysis of trade misinvoicing. The evidence calls for scaling up efforts by governments to improve transparency and consistency in the reporting of trade statistics in line with established international rules and conventions. To understand fully the mechanisms of capital flight, it is important to examine in detail the respective roles of domestic and international factors, including the actors, conduits and enablers of these outflows. In this perspective, detailed country studies are a highly fruitful avenue for research on capital flight.

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Table 2: Capital flight from South Africa, totals by decade (constant 2015 $, million)

	1970-1979	1980-1989	1990-1999	2000-2009	2010-2015	**1970-2015**
CDEBTADJ	3.7	21.4	10.1	63.3	64.1	**162.6**
FDI	2.4	-4.4	-6.5	42.0	6.4	**39.8**
PI	0.0	-3.4	43.0	31.8	68.3	**139.7**
OI	1.0	-9.9	-10.2	22.5	35.2	**38.5**
CA	-23.3	10.5	-1.0	-77.1	-90.9	**-181.9**
CRES	5.8	-5.9	-8.8	-32.3	-11.6	**-52.8**
BoP Residual	**-10.5**	**8.2**	**26.4**	**50.2**	**71.5**	**145.8**
Trade misinvoicing			19.1	73.4	-39.8	**52.6**
Adjusted capital flight	**-10.5**	**8.2**	**45.5**	**123.7**	**31.6**	**198.5**
Memorandum: total private capital flows						
FDI + PI + OI	3.3	-17.8	26.2	96.3	109.9	218.0

Source: Authors' computation

Table 3: South Africa – Trade misinvoicing estimates using various c.i.f. factors, 1998-2015 (constant 2015 $, billion)

Scenario	Export misinvoicing	Import misinvoicing	Net misinvoicing
1: using South Africa-specific c.i.f. factor	183.3	-130.6	52.6
2: using cif/fob =10%	216.0	-93.0	123.0
3: using cif/fob = 5%	271.0	-26.8	244.2

Source: Authors' computations.

Table 4: South Africa: Trade misinvoicing vis-à-vis major trading partners, 2000-2014 (constant 2014 $, billion)

Country	SA data (exports)		Partner data (imports)		Share in exports (percent)		Trade misinvoicing: DOTS			Trade misinvoicing: Comtrade		
	Comtrade	DOTS	Comtrade	DOTS	SA data (exports)	Partner data (imports)	Export misinvoicing	Import misinvoicing	Net misinvoicing	Export misinvoicing	Import misinvoicing	Net misinvoicing
Australia	15.4	15.4	15.5	15.8	1.6	1.1	-1.2	-3.8	-5.0	0.1	-2.2	-2.1
Belgium	25.5	25.6	33.0	32.6	2.7	2.3	4.5	-10.2	-5.6	4.9	-9.0	-4.1
Canada	6.6	6.9	10.5	11.2	0.7	0.8	3.5	4.6	8.1	3.9	1.0	5.0
China, Hong Kong	13.3	13.4	31.5	11.4	1.4	0.8	-3.3	-7.5	-10.8	17.0	-6.8	10.2
China, Mainland	77.0	77.0	235.8	231.9	8.0	16.1	147.2	6.2	153.4	151.0	7.1	158.2
France	16.1	15.7	20.2	16.6	1.6	1.2	-0.7	-0.6	-1.4	2.5	2.0	4.5
Germany	63.2	65.2	85.8	73.9	6.8	5.1	2.2	-15.2	-13.0	16.3	-11.4	4.9
Ghana	4.6	4.6	4.1	4.4	0.5	0.3	-0.7	-27.2	-27.8	-0.6	-21.1	-21.7
India	28.6	28.6	70.9	71.0	3.0	4.9	39.5	-6.8	32.7	39.5	-5.5	33.9
Italy	20.0	20.1	43.1	43.1	2.1	3.0	21.0	0.4	21.4	21.1	1.9	22.9
Japan	81.4	80.0	95.4	95.4	8.3	6.6	7.5	5.3	12.8	5.8	7.0	12.8
Korea, Rep.	18.0	18.0	24.9	24.9	1.9	1.7	5.1	-1.0	4.1	5.1	-0.2	5.0
Mali	1.0	1.0	1.2	1.8	0.1	0.1	0.6	-11.1	-10.5	0.4	-9.2	-8.9
Mozambique	24.5	24.5	21.1	21.7	2.6	1.5	-5.2	0.1	-5.1	-5.9	0.4	-5.5
Netherlands	38.1	38.5	25.7	40.6	4.0	2.8	-1.8	-15.9	-17.7	-16.1	-11.2	-27.4
Spain	18.3	18.3	22.0	21.6	1.9	1.5	1.5	7.1	8.6	1.9	0.6	2.5
Switzerland	23.6	24.7	16.9	17.5	2.6	1.2	-9.7	2.1	-7.5	-9.0	2.3	-6.7
Thailand	5.6	5.6	12.0	12.2	0.6	0.8	6.0	-0.2	5.9	5.8	0.2	6.1
Turkey	5.6	5.7	18.4	18.4	0.6	1.3	12.2	-1.4	10.7	12.3	-1.1	11.2
United Arab Emirates	10.4	10.6	16.4	16.4	1.1	1.1	4.7	-0.4	4.3	4.9	5.5	10.4
United Kingdom	62.7	62.4	145.0	134.1	6.5	9.3	65.5	-10.6	54.9	76.0	-13.9	62.1
United States	94.5	93.5	120.0	119.7	9.7	8.3	16.8	3.4	20.2	25.4	6.6	32.1

Zimbabwe	24.4	24.6	29.5	24.2	2.6	1.7	-2.9	-13.7	-16.5	4.9	-12.8	-7.9
Total (all countries)*	**953**	**959**	**1433.0**	**1438**	**100**	**100**	**314.8**	**-118.7**	**196.1**	**385.1**	**9.2**	**394.4**

Source: Authors' computation

Notes: * Total excluding SACU countries (Botswana, Lesotho, Namibia, Swaziland) and "Asia other areas"

Table 5: Export misinvoicing of major primary commodities in South Africa, 2000-2014 (constant 2014 $, billion)

Panel 5.A: Silver

Partner	Export misinvoicing	South African exports	Partner imports
Germany	-4.8	7.9	4.0
India	65.7	89.7	164.3
Switzerland	-44.0	40.9	1.0
Turkey	-4.0	44.1	44.6
United Kingdom	13.0	83.8	105.1
Total	**26.0**	**266.4**	**319.0**

Panel 5.B: Platinum

Partner	Export misinvoicing	South African exports	Partner imports
China, Mainland	13.6	1.9	15.7
China, Hong Kong SAR	-1.8	3.7	2.2
Germany	1.4	8.1	10.3
Japan	0.3	35.1	38.9
Switzerland	-6.6	15.6	10.6
United Kingdom	-4.9	12.3	8.7
USA*	5.7	23.7	29.4
Total	**7.7**	**100.4**	**115.8**

*Note: USA imports are in f.o.b

Panel 5.C: Iron ore

Partner	Export misinvoicing	South African exports	Partner imports
China	3.0	31.9	38.1
Germany	0.3	2.6	3.2
Japan	1.0	6.7	8.4
Korea, Rep.	1.0	1.9	3.0
Total	**5.3**	**43.2**	**52.8**

Panel 5.D: Non-monetary gold

Partner	Export misinvoicing	South African exports	Partner imports
China, Hong Kong SAR	18.0	1.6	19.8
India	7.6	0.2	7.9
Italy	7.8	0.0	7.8
Switzerland	1.7	0.4	2.1
Turkey	2.6	0.04	2.6
United Kingdom	13.7	0.2	14.0
Other Areas, nes*	-34.4	31.3	0.02
Total w/o other areas nes	**51.5**	**2.5**	**54.2**
Total with other areas, nes	**17.1**	**33.8**	**54.2**

Source: Authors' computation

Note: "Other areas, nes" represents: "Areas, nes" in SA exports and "Other Asia, nes" in partner imports

Table 6: Capital flight from Côte d'Ivoire, total by decade (constant 2014 $, million)

	1970-79	1980-89	1990-99	2000-09	2010-15	1970-2015
CDEBTADJ	13.3	20.2	7.5	0.4	1.8	43.2
FDI	1.5	1.0	3.3	3.7	2.3	11.8
PI	-0.1	0.0	0.0	0.2	2.9	2.9
OI	8.3	17.8	6.3	-5.2	-15.8	11.4
CA	-11.1	-18.0	-8.4	4.0	0.9	-32.7
CRES	0.1	0.4	-1.2	-2.2	-2.7	-5.7
BoP Residual	12.0	21.3	7.4	0.8	-10.6	30.9
Net misinvoicing	7.2	2.7	4.3	-4.2	-8.9	1.1
Adjusted capital flight	19.2	24.0	11.7	-3.4	-19.5	32.0
Memorandum: Total private capital flows						
FDI+PI+OI	9.8	18.7	9.6	-1.4	-10.6	26.0

Source: Authors' computation

Table 7: Trade misinvoicing in Côte d'Ivoire's trade with major partners 1970-2014 (constant 2014 $, million)

Panel 7.A: Developed countries

Partner	Export misinvoicing	Import misinvoicing	Net misinvoicing	Share in CIV's exports (%)	Share in CIV's imports (%)
Belgium	-137.6	-1200.1	-1337.7	3.3	1.3
Canada	1695.5	147.8	1843.3	1.6	0.4
France	-2543.2	-2723.5	-5266.7	12.9	18.9
Germany	9301.3	1158.2	10459.5	4.4	2.7
Italy	3862.6	-303.3	3559.3	3.3	2.5
Netherlands	-15212.7	-973.7	-16186.4	11.9	2.4
Spain	1989.4	372.1	2361.5	2.9	2.1
Switzerland	16.3	-150.9	-134.6	1.1	0.6
United Kingdom	244.8	395.6	640.4	2.4	2.3
United States	3368.4	650.2	4018.6	8.9	2.9
Top 10 partners	**2584.7**	**-2627.6**	**-42.9**	**52.7**	**36.2**

Panel 7.B: Developing countries

Partner	Export misinvoicing	Import misinvoicing	Net misinvoicing	Share in CIV's exports (%)	Share in CIV's imports (%)
Burkina Faso	-1903.1	-1267.8	-3170.8	3.4	0.1
Estonia	-1774.2	2.1	-1772.1	1.5	0.0
Ghana	-516.0	-91.7	-607.6	4.2	0.4
Guinea	211.8	18.7	230.5	0.8	0.2
India	635.3	-210.8	424.5	2.2	2.1
Mali	-940.2	-734.0	-1674.2	3.0	0.0
Nigeria	-1747.0	991.5	-755.5	6.1	22.4
Senegal	-731.1	-0.5	-731.6	1.5	0.8
South Africa	-2489.0	-8.4	-2497.4	1.5	1.2
Togo	-1856.5	-126.8	-1983.3	1.4	0.1
Top 10 partners	**-11109.9**	**-1427.8**	**-12537.7**	**25.6**	**27.3**

Source: Authors' computation

Table 8: Export misinvoicing for Côte d'Ivoire's major products, 2000-2014 (constant 2014 $, million)

Panel 8.A: Cocoa (SITC 072)

Partner	Export misinvoicing	CIV exports (fob)	Partner imports (cif)*
Belgium	291.1	2263.2	2780.6
Estonia	-847.2	1600.1	912.9
France	1327.2	3837.4	5548.3
Germany	3703.1	2538.3	6495.3
Italy	189.9	1381.7	1709.8
Netherlands	-3692.9	13577.4	11242.2
Spain	-38.1	1264.6	1353.0
United Kingdom	73.0	1233.8	1430.3
USA*	1353.8	8469.2	9823.0
Total	**2360.1**	**36165.6**	**41295.3**

* Note: USA's imports are in f.o.b.

Panel 8.B: **Petroleum (SITC 333 & 3334)**

Partner	Export misinvoicing	CIV exports (fob)	Partner imports (cif)*
Benin	-479.7	943.2	557.9
Burkina Faso	336.2	1186.5	1641.3
Canada*	-66.2	1983.7	1917.5
France	-1422.2	1838.6	600.3
Germany	1886.8	2830.2	5000.1
Mali	262.7	970.6	1330.4
Netherlands	-1169.7	1711.2	712.5

Nigeria	-3638.0	3460.0	168.0
Spain	-96.5	447.5	395.8
Togo	-416.0	727.9	384.7
USA	379.5	2874.1	3253.6
Total	**-4423.1**	**18973.6**	**15962.1**

* Note: Imports are in f.o.b. for Canada and USA.

Panel 8.C: **Natural Rubber (SITC 231)**

Partner	Export misinvoicing	CIV exports (fob)	Partner imports (cif)*
Belgium	-74.8	241.6	191.1
France	115.8	634.5	813.8
Germany	233.2	814.2	1128.9
Italy	6.5	406.3	453.4
Malaysia	-1.6	781.5	858.0
Netherlands	-289.2	328.1	71.7
Poland	209.0	339.1	582.0
South Africa*	-240.1	299.2	59.1
Spain	54.9	920.3	1067.2
USA*	84.3	575.0	659.3
Total	**98.1**	**5339.9**	**5884.6**

Source: Authors' computation

* Note: Imports are in f.o.b. for South Africa and USA.

CIV = Côte d'Ivoire

Table 9: Capital flight from Angola (constant 2014 $, billion)

	1986-89	1990-99	2000-09	2010-15	**1970-2015**
CDEBTADJ*	8.7	9.5	8.3	22.4	48.9
FDI	1.2	8.1	9.6	-28.2	-9.2
PI	0.0	0.0	-8.0	1.2	-6.7
OI	3.1	-1.1	-12.2	10.8	0.7
CA	-0.8	-5.9	29.1	32.9	55.2
CRES	0.0	-0.7	-14.8	-12.4	-27.9
BoP Residual	12.2	10.0	12.0	26.7	60.9
Net misinvoicing	NA	NA	NA	NA	NA
Adjusted capital flight	12.2	10.0	12.0	26.7	60.9
Memorandum: total private capital flows					
FDI + PI + OI	4.4	7.1	-10.5	-16.2	-15.3

Source: Authors' computation

*Note: From 2010 to 2015 the data from the Central Bank (BNA) are used rather than those from International Debt Statistics as the former show larger amounts of external debt.

Table 10: Angola's major partners for key export commodities: share in total partners' imports from Angola (%)

[SITC 333] Petroleum oils, oils from bitumin. materials, crude		[SITC 334] Petroleum oils or bituminous minerals > 70 % oil		[SITC 667] Pearls, precious & semi-precious stones	
China	45.9	United States	71.2	United Arab Emirates	53.4
United States	14.3	Belgium	7.4	Belgium	33.7
India	9.8	Sao Tome and Principe	4.7	United States	10.6
China, Taiwan Province of	6.0	Germany	4.7	India	9.4
Spain	3.4	Netherlands	4.1	China	4.3
Total	**79.7**	**Total**	**92.7**	**Total**	**96.5**

Source: UNCTAD*STAT*

Table 11: Petroleum [SITC 333] export misinvoicing vis-à-vis Angola's major partners, 2009-2015 (constant 2015 $, billion)

	Export misinvoicing	Angola exports (f.o.b.)	Partner imports (c.i.f.)*	Share in Angola's exports (%)
China	-11.5	175.8	182.0	44.6
France	-1.6	14.0	13.8	3.6
India	-3.0	38.3	39.1	9.7
Portugal	-0.3	11.2	12.0	2.8
South Africa*	-0.1	13.5	13.4	3.4
Spain	-1.5	12.5	12.3	3.2
USA*	13.4	50.1	63.5	12.7
Total major partners	**-4.6**	**315.5**		**80.0**

Source: Authors' computation

* Note: Imports are reported at f.o.b. value for South Africa and USA.

Table 12: Estimates of offshore wealth as stock of capital flight ($ billion)

Country or Region	Stock accumulated over 1970-2014
Angola	70.4
Côte d'Ivoire	14.0
South Africa	113.5
Top 5 SSA	639.6
SSA	709.8
East Asia (excl. China)	2524.0
Latin America and Caribbean	1969.8

Source: Estimates are obtained from The Global Haven Industry database (http://globalhavenindustry.com/) for 1970-2014 (Henry 2016). See Henry (2012) for estimates over 1970-2010.

Note: The estimates of the flows of capital flight constructed by Henry (2016) as a basis for deriving the accumulated stock do not include adjustment for trade misinvoicing.

Figure 1: Capital flight from South Africa, total by decade (constant 2015 $, billion)
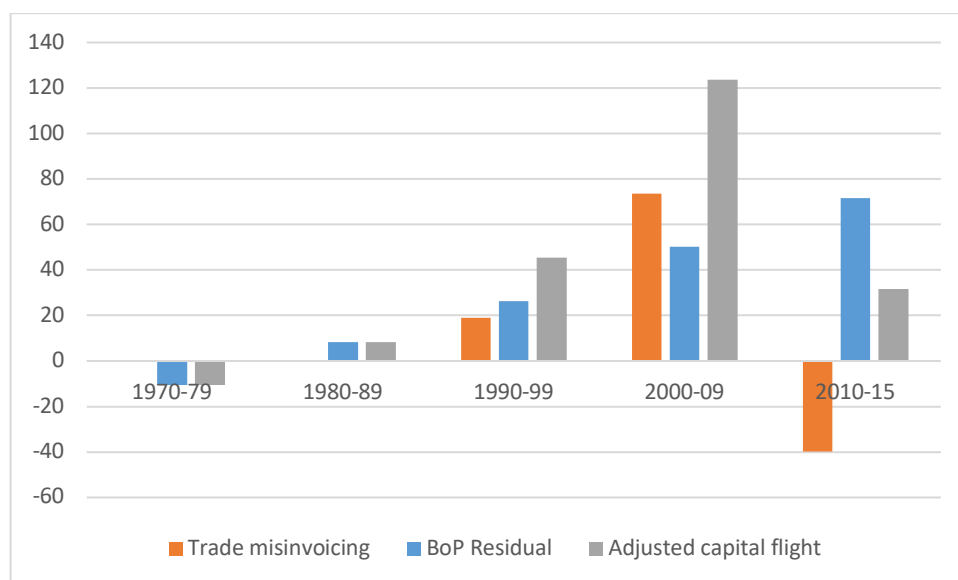
Source: Authors' computation

Note: No trade adjustment is made for 1970-1997 due to lack of data.

Figure 2: South Africa: Estimated export and import misinvoicing, 1998-2015 (constant 2015 $, million)
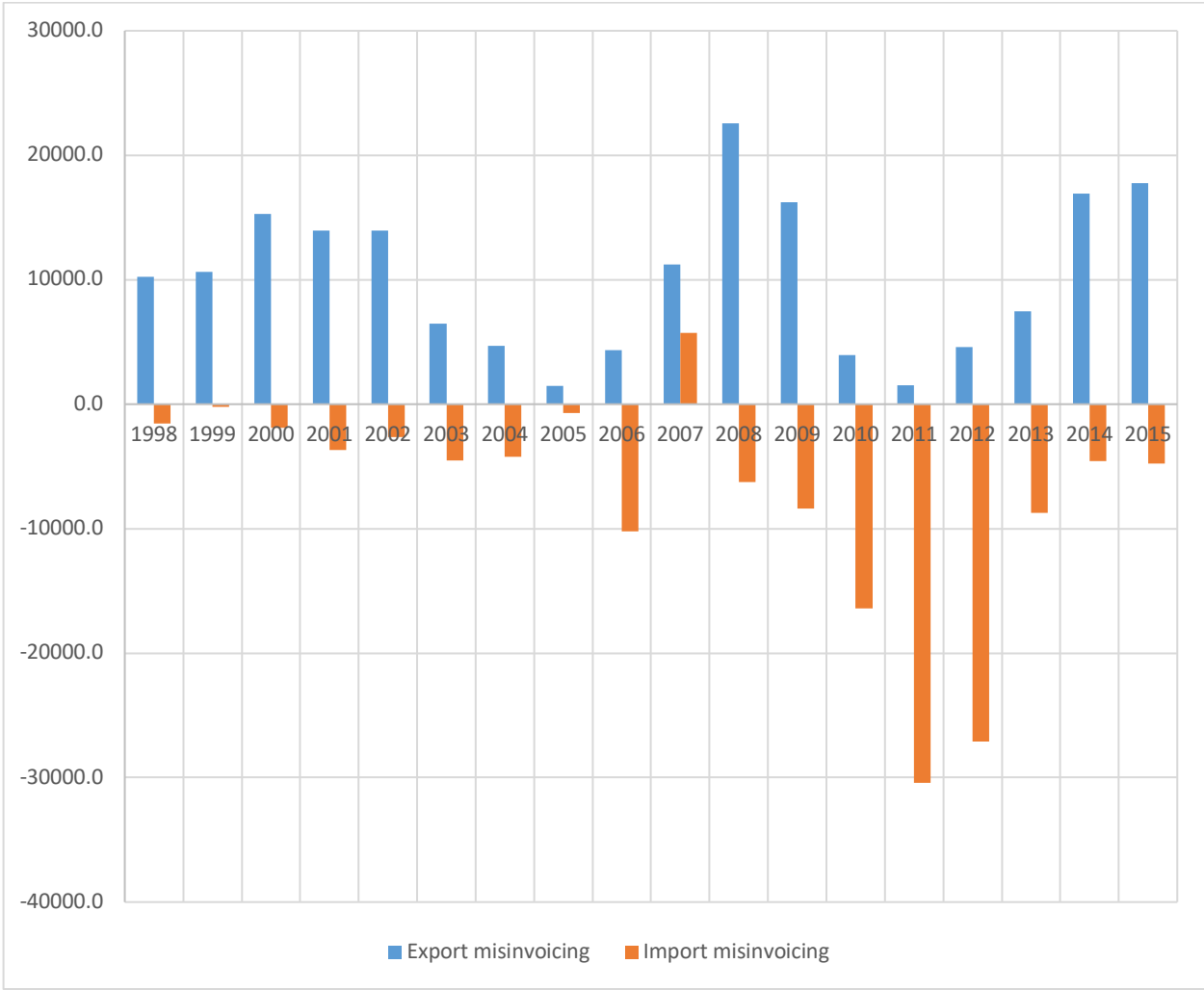
Figure 3: South Africa's top 15 export product groups: Share in total exports (%)
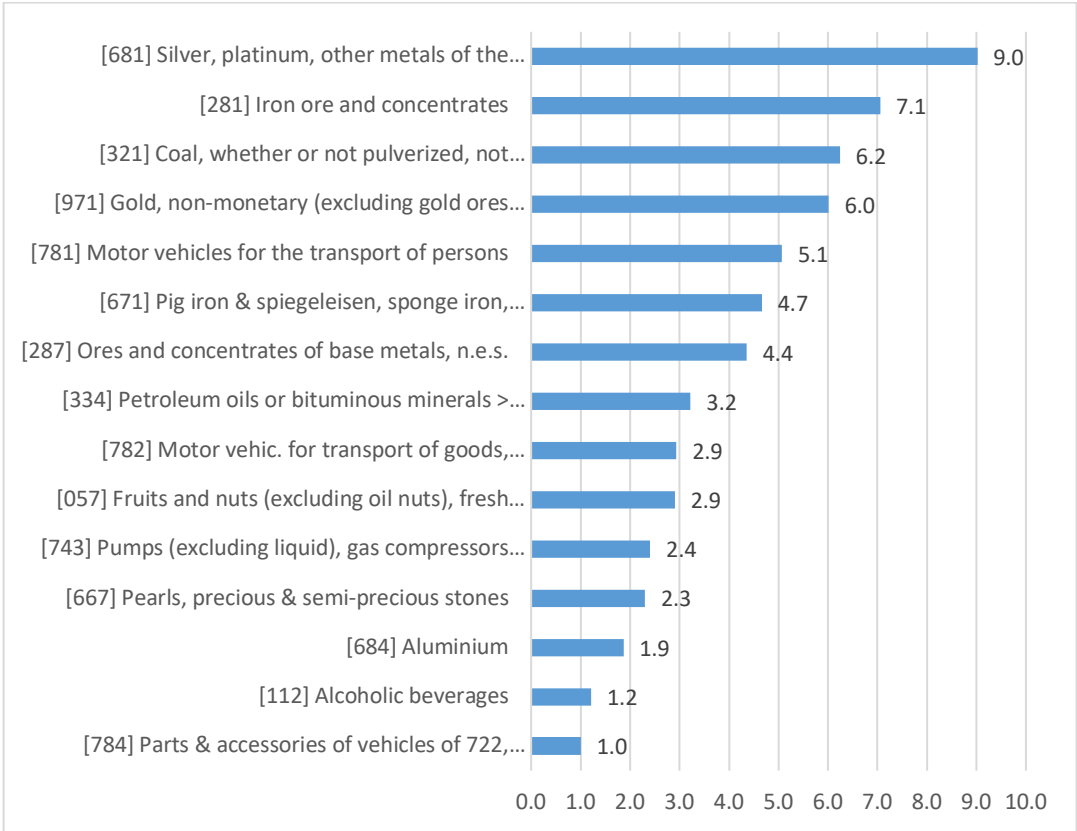
Source: UNCTAD Statistical Database (online). Figures in brackets are SITC codes.

Figure 4: Capital flight from Cote d'Ivoire, total by decade (constant 2015 $, million)
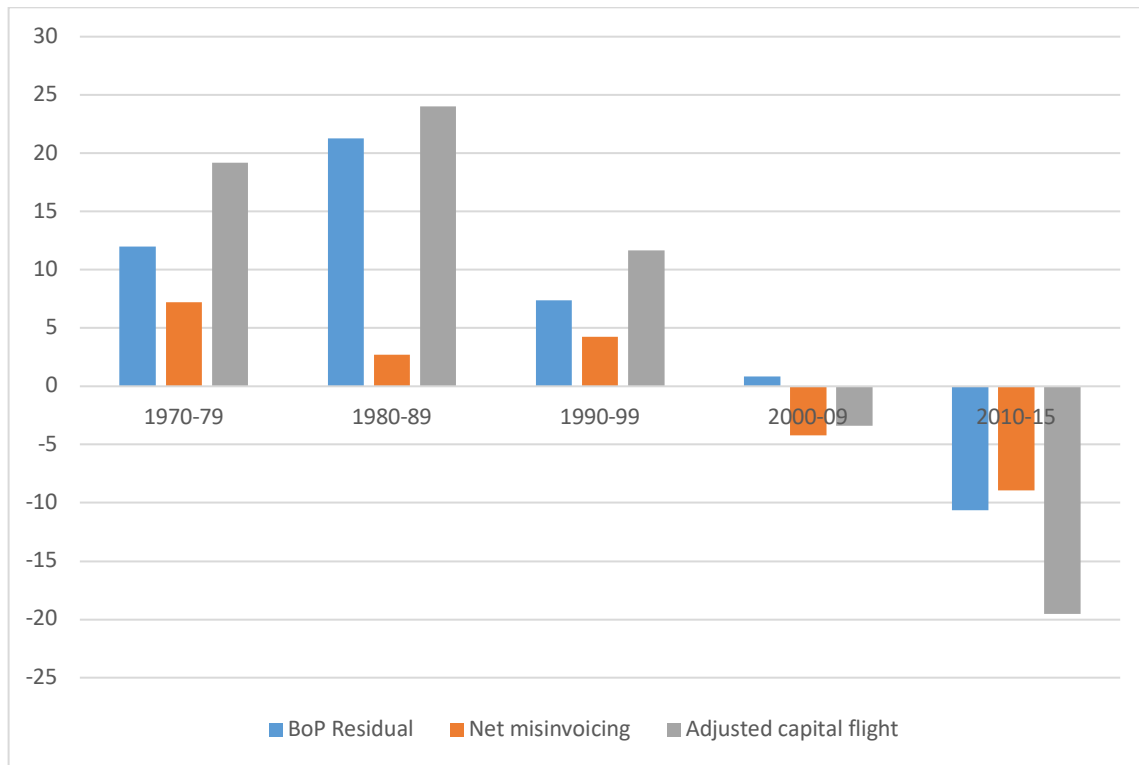

Source: Authors' computation

Figure 5: Trade misinvoicing in Côte d'Ivoire (constant 2015 $, million)
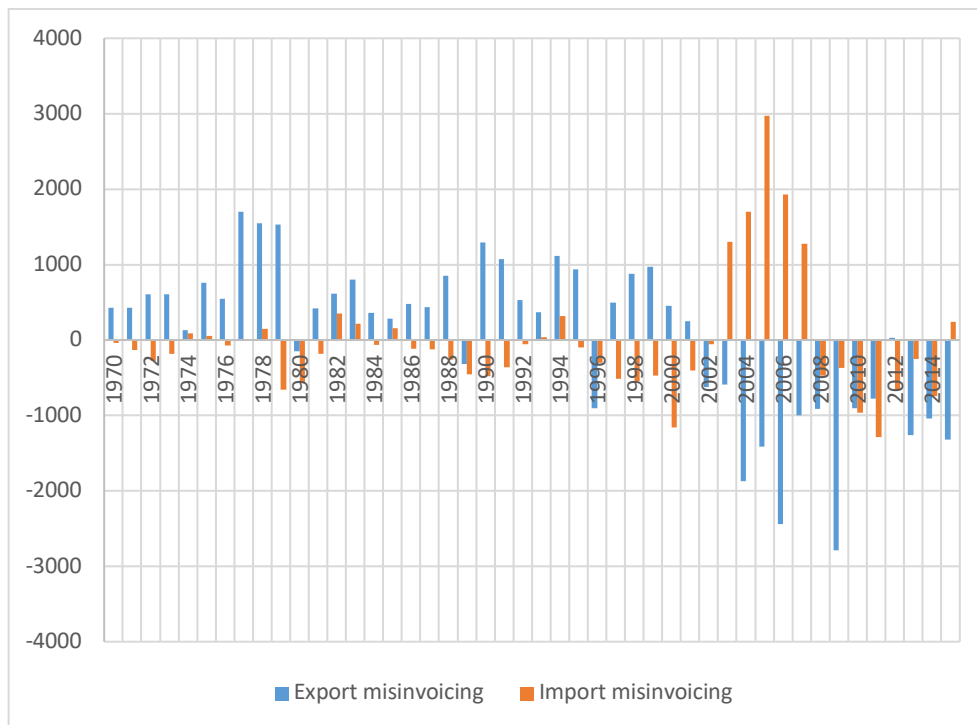
Source: Authors' computation

Figure 6: Cote d'Ivoire's top 15 export product groups: share in total exports, average over 2010-2016 (percent)
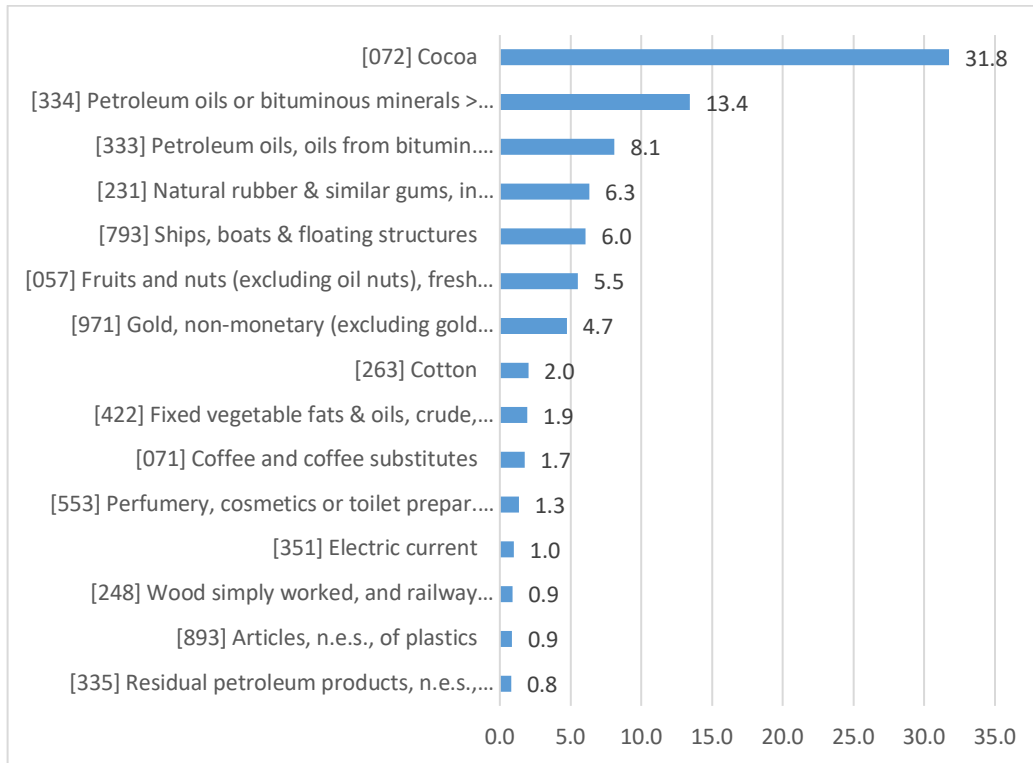
Source: UNCTAD Online database; indicator = "Merchandise trade matrix – detailed products, exports in thousands of dollars, annual, 1995-2016". Numbers in parentheses are SITC codes.

Figure 7: Capital flight from Angola, total by decade (constant 2015 $, billion)
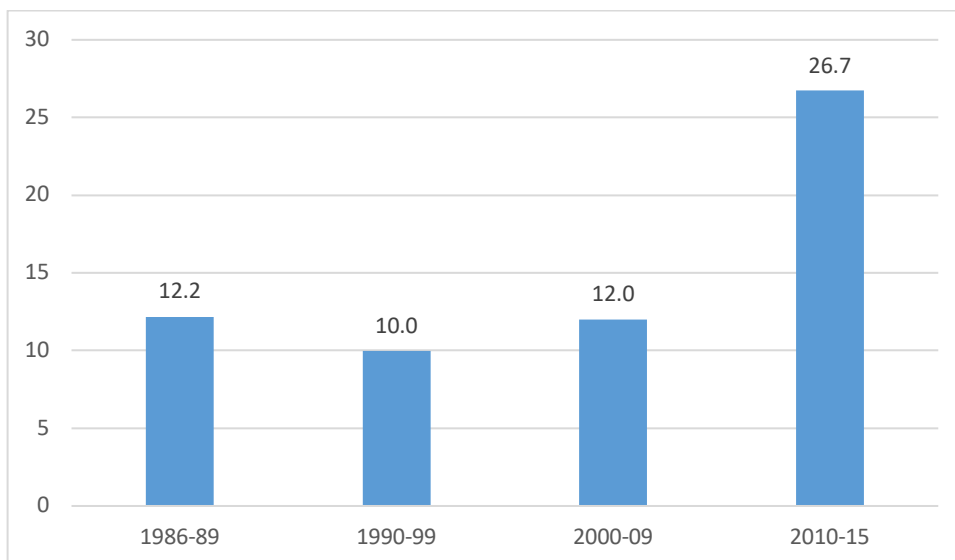
Source: Authors' computation

Appendix A.1: Change in debt adjusted for exchange rate fluctuations

Step 1: Recalculate the beginning-of-year stock of debt in US dollars taking into account the currency composition of long-term debt as follows:

$$COMPDEBT_{i,t-1} = \sum_{j=1}^{7} (\alpha_{ij,t-1} * LTDEBT_{i,t-1}) + IMFCR_{i,t-1} + LTOTHER_{i,t-1}$$
$$+ LTMULT_{i,t-1} + LTUSD_{i,t-1} + STDEBT_{i,t-1}$$

LTDEBT is the total long-term debt; α_{ij} is the proportion of long-term debt held in currency *j*, for each of the seven non-US currencies;[22] *IMFCR* is the use of IMF credit; *LTOTHER* is long-term debt denominated in other unspecified currencies; *LTMULT* is long-term debt denominated in multiple currencies; *LTUSD* is long-term debt denominated in US dollars; and STDEBT is short-term debt.

Step 2: Recalculate US dollar value of the beginning-of-year stock of debt in terms of the end-of-year exchange rates:

$$ADJCOMPDEBT_{i,t-1} = \sum_{j=1}^{7} (\alpha_{ij,t-1} * LTDEBT_{i,t-1})/(EX_{jt} / EX_{j,t-1}) +$$
$$IMFCR_{i,t-1}/(EX_{SDR,t} / EX_{SDR,t-1}) + LTOTHER_{i,t-1} + LTMULT_{i,t-1} + LTUSD_{i,t-1} + STDEBT_{i,t-1}$$

EX is the end-of-year exchange rate of the currency of denomination against the dollar (expressed as units of currency per US dollar)

Step 3: Calculate the exchange rate adjustment:

$$ERADJ_t = ADJCOMPDEBT_{t-1} - COMPDEBT_{t-1}$$

Step 4: Calculate the adjusted change in debt:

$$CDEBTADJ_t = (TOTDEBT_t - TOTDEBT_{t-1}) - ERADJ_t$$

---

[22] The seven currencies are the British pound, the euro (from 2000), the French franc and the Deutsche mark (up to 2000), the SDR, the Swiss franc, and the Yen.

Appendix A.2. Definitions of some special trade transactions

Re-exports: Re-exports of foreign goods, in the same state as previously imported, from the free circulation area, premises for inward processing or industrial free zones, directly to the rest of the world;

Re-exports of foreign goods, in the same state as previously imported, from premises for customs warehousing or commercial free zones, to the rest of the world.

Re-exports are to be included in the country exports. They are also recommended to be recorded separately for analytical purposes, which may require the use of supplementary sources of information in order to determine the origin of re-exports, i.e., to determine that the goods in question are indeed re-exports rather than the export of goods that have acquired domestic origin through processing.

Goods in transit: Goods entering and leaving a country with the exclusive purpose of reaching a third country are excluded, since they do not add to or subtract from the stock of material resources of the country through which they pass.

Trans-shipment: The customs procedure under which goods are transferred under customs control from the importing means of transport to the exporting means of transport within the area of one customs office which is the office of both importation and exportation... [This procedure] does not apply to goods which on arrival in the customs territory of a country are already under a customs procedure (such as customs transit) and are transferred from one means of transport to another during the course of that procedure, such transfer being dealt with by the customs under the procedure already in operation. Nor does [it] ... apply to goods carried by post or in travelers' baggage. (Kyoto Convention, annex E.2, pp. 5 and 6).

Source: United Nations (1998).

Figure B.1: South Africa c.i.f. factor
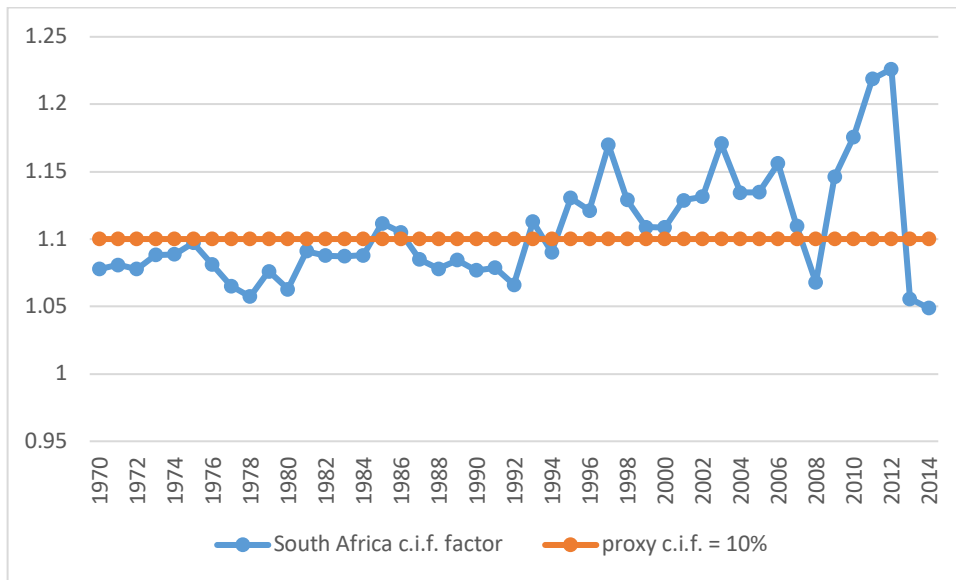
Source: South Africa c.i.f. factor calculated using IFS data

**Figure B.2: South Africa's exports to and imports from unspecified partners (% of total)**
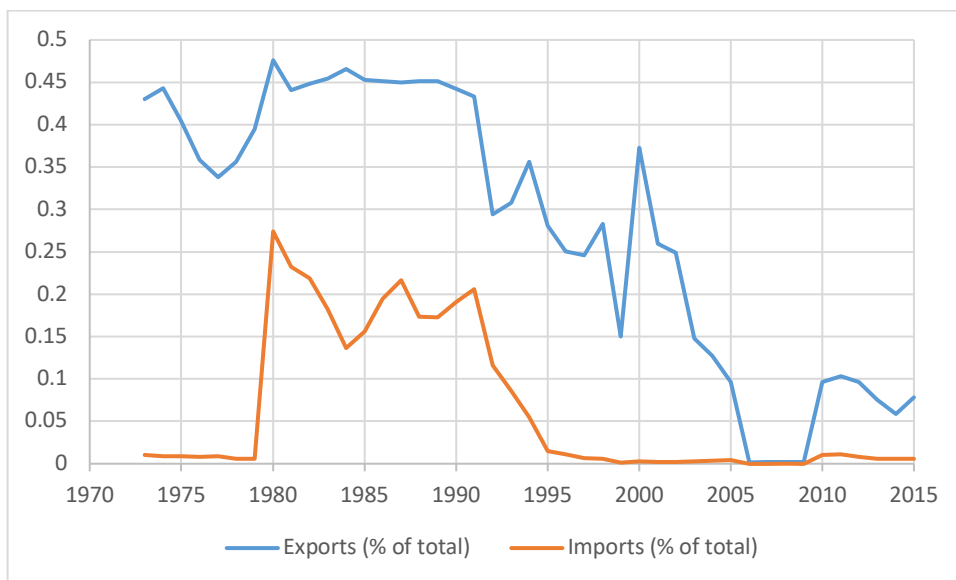
Source: DOTS

**Figure B.3: Comparison of Comtrade and DOTS import and export data: South African vs. Partner data**

Panel B.3.A

Partner imports, DOTS vs. Comtrade

China, Hong Kong SAR / Zimbabwe

real_partnerimports_com — real_partnerimports_dots

Panel B.3.B

Partner imports: DOTS vs. Comtrade

France / Germany

real_partnerimports_com — real_partnerimports_dots

Panel B.3.C

Partner exports to South Africa: DOTS vs. Comtrade

Panel B.3.D

Partner exports to South Africa: DOTS vs. Comtrade
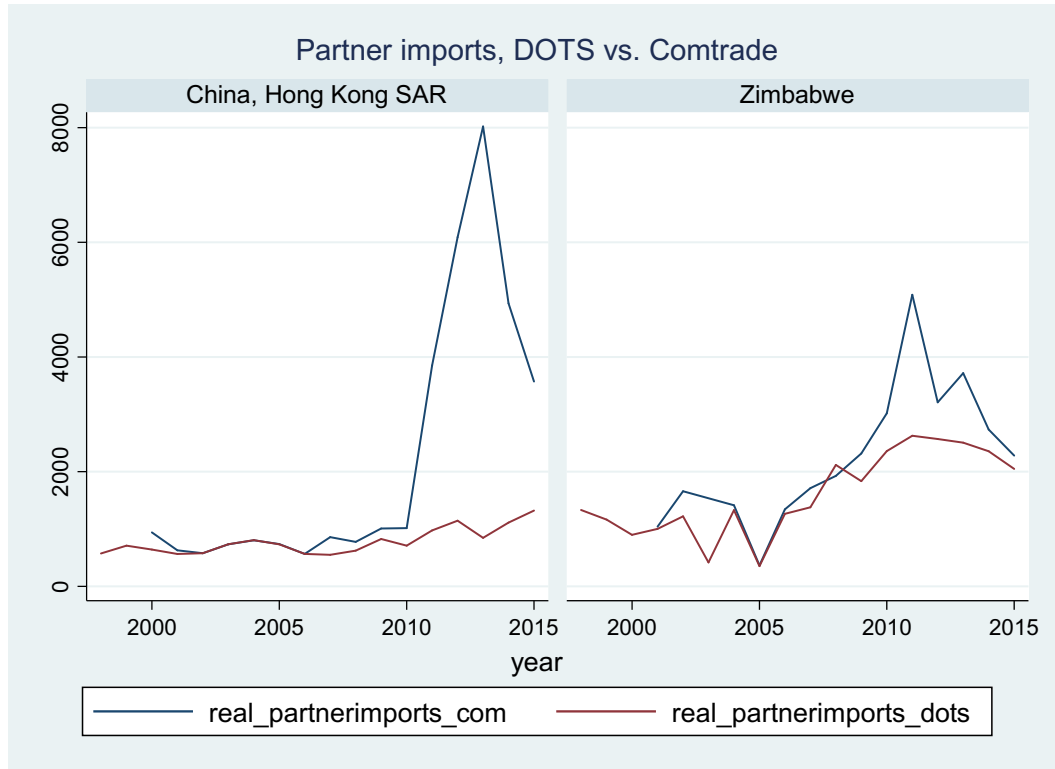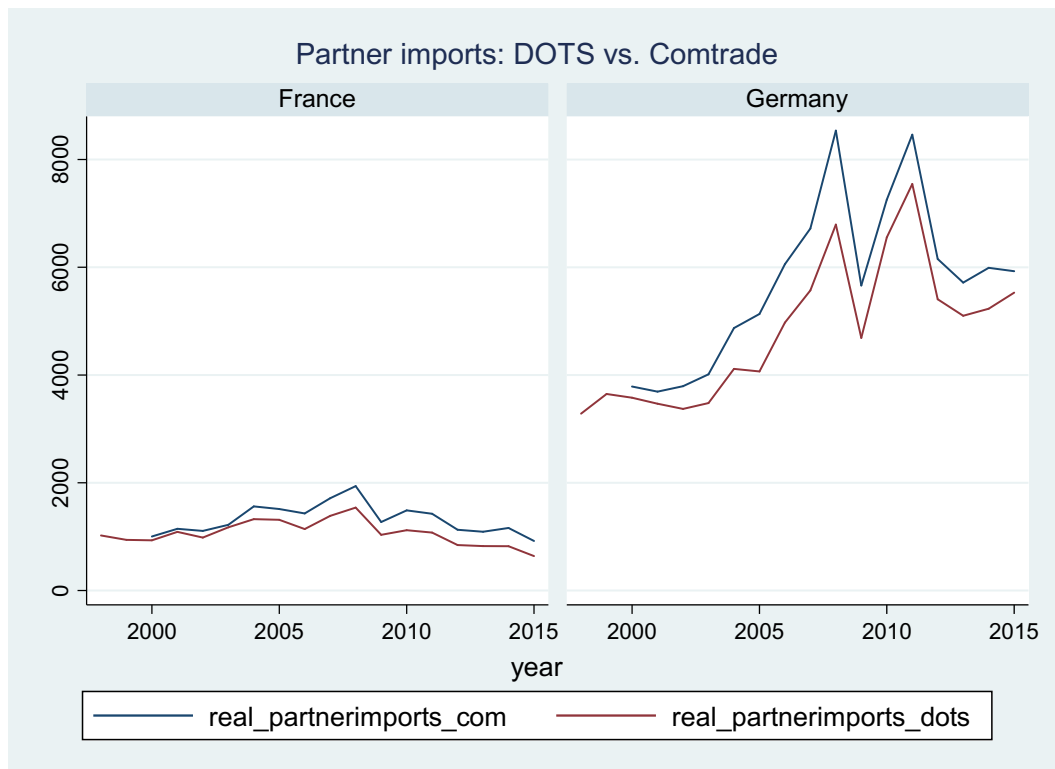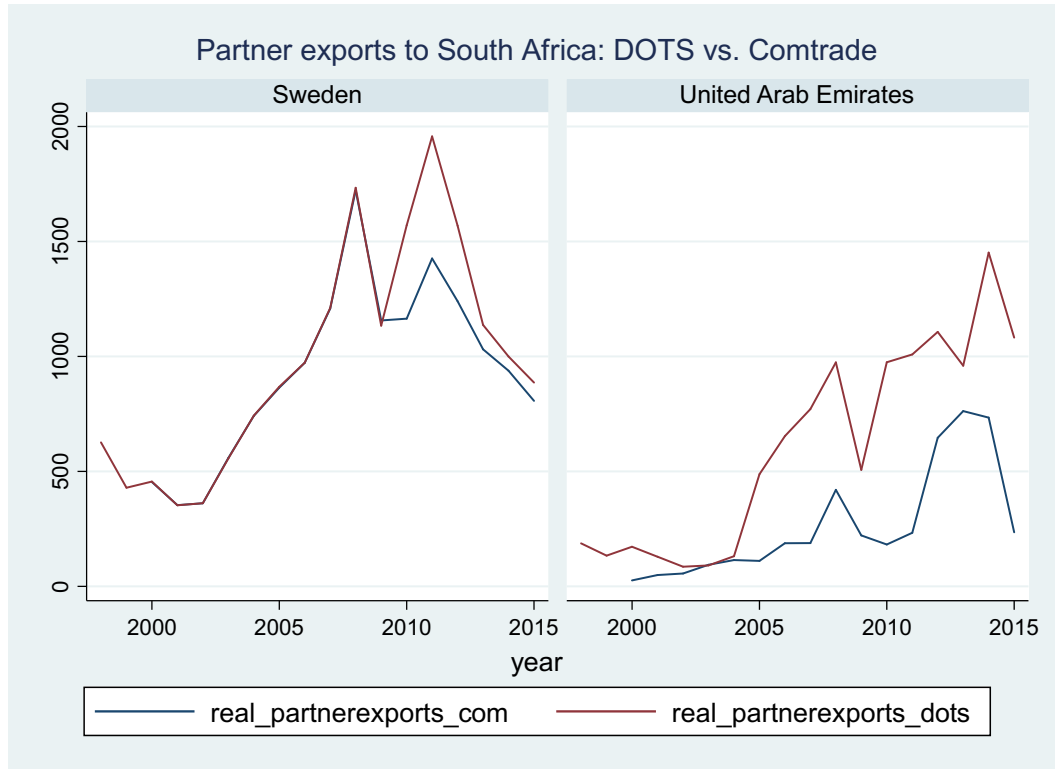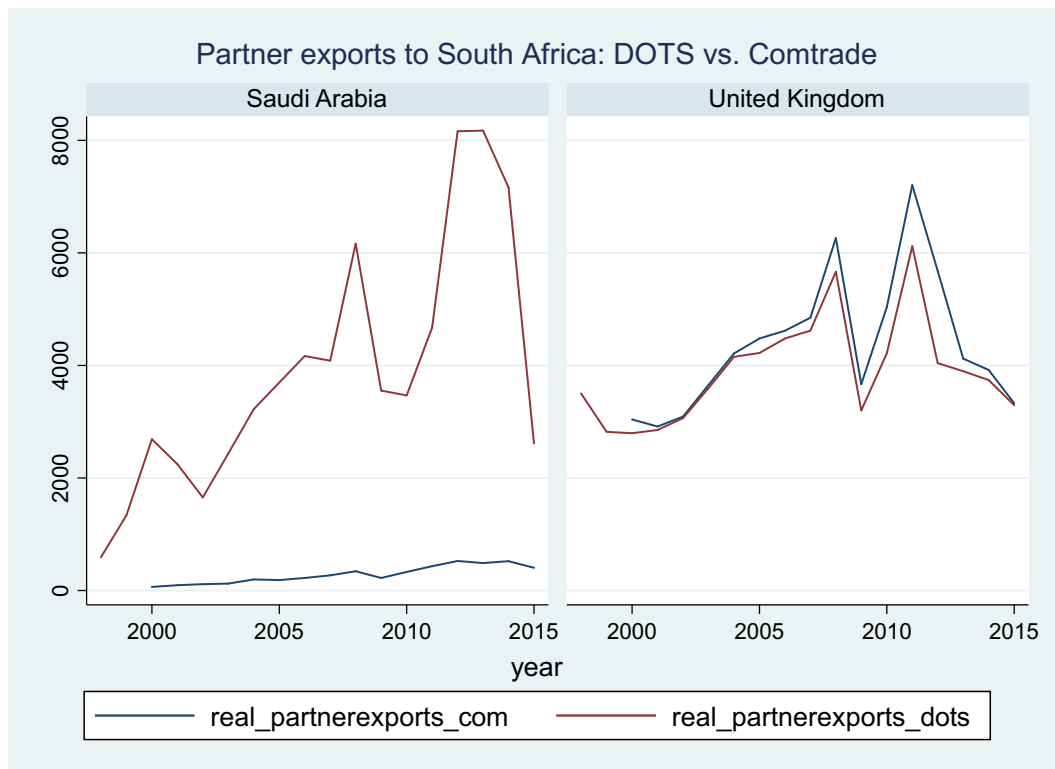
Appendix C: Tables

Table C.1: South Africa: Trade misinvoicing by partner using DOTS data, 2000-2014 (constant 2014 $, million)

Country	Export misinvoicing	Import misinvoicing	Net misinvoicing
Afghanistan	-48.7	0.0	-48.8
Albania	-5.3	2.7	-2.6
Algeria	-455.5	13.7	-441.8
American Samoa	-0.2	-0.2	-0.4
Angola	393.7	-361.7	32.0
Antigua and Barbuda	-36.0	0.9	-35.1
Argentina	210.0	423.8	633.8
Armenia	84.6	0.4	85.0
Aruba	-0.1	44.3	44.2
Australia	-1188.6	-3828.1	-5016.7
Austria	2194.2	-1277.1	917.1
Azerbaijan	62.1	2.0	64.1
Bahamas	-97.8	142.7	44.9
Bahrain	150.4	2227.8	2378.2
Bangladesh	-44.6	136.4	91.8
Barbados	-9.5	3.2	-6.3
Belarus	75.9	-130.0	-54.1
Belgium	4504.8	-10150.5	-5645.6
Belgium-Luxembourg	0.0	0.0	0.0
Belize	-7.9	1.0	-6.9
Benin	-143.1	38.8	-104.2
Bermuda	-221.0	-3.5	-224.5
Bhutan	0.2	0.0	0.2
Bolivia	55.5	26.3	81.8
Bosnia and Herzegovina	30.8	22.1	52.9
Botswana	-1773.8	-2236.1	-4009.9
Brazil	504.2	-1135.7	-631.4
Brunei Darussalam	-8.5	0.0	-8.5
Bulgaria	36.6	-356.8	-320.2
Burkina Faso	222.4	-1107.0	-884.5
Burundi	81.0	4.0	85.0
Cambodia	-3.6	8.6	4.9
Cameroon	317.6	-129.2	188.4
Canada	3548.9	4590.6	8139.5
Cape Verde	6.0	0.2	6.2
Central African Republic	-4.1	-5.4	-9.5
Chad	-4.2	0.0	-4.2
Chile	218.9	-43.0	175.9

China, P.R.: Hong Kong	-3343.7	-7501.1	-10844.8
China, P.R.: Macao	214.2	44.5	258.7
China, P.R.: Mainland	147202.8	6221.4	153424.2
Colombia	226.0	120.2	346.1
Comoros	-84.5	2.8	-81.6
Congo, Dem. Rep.	-434.1	-5.1	-439.1
Congo, Rep.	811.2	-308.5	502.8
Costa Rica	-15.2	435.8	420.6
Cote d'Ivoire	16.8	-2511.7	-2495.0
Croatia	182.9	27.4	210.4
Cuba	9.8	6.4	16.2
Cyprus	-8.2	15.6	7.3
Czech Republic	-75.4	1020.0	944.7
Denmark	477.2	-70.3	406.9
Djibouti	-260.5	-0.2	-260.7
Dominica	-5.1	0.7	-4.4
Dominican Republic	-0.7	88.3	87.6
Eastern Germany	0.0	0.0	0.0
Ecuador	-154.9	2801.6	2646.6
Egypt	-299.0	-2176.1	-2475.1
El Salvador	14.7	8.9	23.6
Equatorial Guinea	-8.4	-30.1	-38.5
Eritrea	43.7	-0.5	43.2
Estonia	-117.7	147.7	29.9
Ethiopia	284.5	-108.5	175.9
Falkland Islands	0.0	-0.7	-0.7
Faroe Islands	2.4	-0.6	1.8
Fiji	-17.1	-11.9	-29.0
Finland	179.9	-204.9	-25.0
France	-712.1	-646.9	-1359.0
Gabon	-13.5	14.6	1.0
Gambia, The	-88.4	4.8	-83.6
Georgia	-41.1	7.5	-33.6
Germany	2207.1	-15238.1	-13031.0
Ghana	-650.8	-27175.5	-27826.3
Gibraltar	-4.1	-0.2	-4.3
Greece	-64.4	-151.8	-216.2
Greenland	1.3	-0.3	1.1
Grenada	0.5	0.0	0.5
Guadeloupe	0.0	0.0	0.0
Guam	0.4	0.0	0.4
Guatemala	4.5	11.3	15.9
Guinea	-80.8	-5.1	-85.9

Guinea-Bissau	-0.9	0.0	-0.9
Guyana	-550.3	-0.8	-551.1
Haiti	-3.5	0.0	-3.5
Honduras	7.3	11.0	18.4
Hungary	70.7	559.3	630.1
Iceland	-73.8	28.0	-45.8
India	39502.3	-6759.7	32742.6
Indonesia	85.2	-2196.2	-2111.0
Iran	-658.8	-1315.8	-1974.6
Iraq	-18.9	-54.5	-73.4
Ireland	-228.4	3261.7	3033.3
Israel	-8874.1	-895.5	-9769.6
Italy	21008.8	440.7	21449.4
Jamaica	-49.6	72.8	23.2
Japan	7469.1	5296.0	12765.1
Jordan	11.0	-2.0	9.0
Kazakhstan	198.4	48.0	246.4
Kenya	-1603.1	-89.8	-1692.9
Kiribati	-0.6	0.0	-0.6
Korea, DPR	-33.2	-1.2	-34.4
Korea, Rep.	5127.1	-1049.5	4077.6
Kuwait	23.1	-41.5	-18.4
Kyrgyz Republic	-2.9	4.6	1.7
Lao, PDR	-1.3	-0.1	-1.4
Latvia	-43.0	135.7	92.7
Lebanon	28.3	-2929.1	-2900.8
Lesotho	-1755.9	-464.7	-2220.5
Liberia	-9.0	-18.7	-27.7
Libya	44.5	0.0	44.5
Lithuania	0.9	98.9	99.7
Luxembourg	-267.0	-261.8	-528.7
Macedonia, FYR	130.7	-5.0	125.7
Madagascar	-171.3	15.8	-155.5
Malawi	1406.6	-442.9	963.7
Malaysia	318.1	2612.9	2931.0
Maldives	-10.6	3.5	-7.1
Mali	612.3	-11136.5	-10524.2
Malta	-83.9	141.8	57.9
Mauritania	-195.0	-46.3	-241.3
Mauritius	-309.2	-177.7	-486.9
Mexico	0.0	0.0	0.0
Moldova	20.7	1.2	21.9
Mongolia	34.9	-3.4	31.5

Montenegro	1.6	1.4	3.0
Morocco	798.6	64.1	862.7
Mozambique	-5213.3	120.0	-5093.3
Myanmar	-15.9	-269.4	-285.4
Namibia	546.4	-4132.5	-3586.1
Nauru	0.0	-0.4	-0.4
Nepal	37.4	4.2	41.7
Netherlands	-1816.0	-15916.0	-17732.0
Netherlands Antilles	-58.3	10.4	-47.9
New Caledonia	34.8	136.5	171.3
New Zealand	181.4	-113.0	68.3
Nicaragua	-167.4	3.3	-164.1
Niger	50.5	10.4	60.9
Nigeria	-1186.8	-2146.2	-3333.1
Norway	1184.2	-284.0	900.1
Oman	-54.2	1879.2	1824.9
Pakistan	364.4	-1346.0	-981.5
Palau	0.0	0.0	0.0
Panama	-389.2	104.9	-284.3
Papua New Guinea	2.5	2.2	4.7
Paraguay	-11.5	-85.2	-96.7
Peru	74.5	-262.4	-187.9
Philippines	-51.4	407.3	355.9
Poland	-142.7	537.8	395.1
Portugal	858.9	226.9	1085.8
Qatar	278.8	-1872.5	-1593.6
Reunion	0.0	0.0	0.0
Romania	18.0	362.7	380.7
Russian Federation	1813.5	2154.6	3968.2
Rwanda	148.7	-25.9	122.8
Saint Helena	0.0	0.0	0.0
Saint Pierre and Miquelon	0.0	0.0	0.0
Samoa	-6.9	0.1	-6.9
Sao Tome and Principe	-8.1	0.0	-8.1
Saudi Arabia	2378.3	-2474.2	-95.9
Senegal	16.9	-4.3	12.6
Serbia	41.7	-3.9	37.7
Seychelles	-63.1	13.5	-49.5
Sierra Leone	-234.8	25.9	-208.9
Singapore	-1296.5	-2769.1	-4065.6
Slovak Republic	104.4	263.9	368.2
Slovenia	-548.9	5.3	-543.6
Solomon Islands	0.1	-0.6	-0.4

Somalia	-1.0	-0.1	-1.1
Spain	1480.8	7138.0	8618.8
Sri Lanka	-90.8	7.6	-83.2
St. Kitts and Nevis	-3.5	-0.1	-3.6
St. Lucia	0.4	-0.5	-0.1
St. Vincent and the Grenadines	-6.2	2.1	-4.2
Sudan	-109.1	-16.1	-125.2
Suriname	-5.9	4.3	-1.6
Swaziland	4540.9	-5280.5	-739.6
Sweden	741.0	-563.7	177.2
Switzerland	-9670.5	2127.4	-7543.0
Syria	200.4	-7.7	192.7
Taiwan	0.0	0.0	0.0
Tajikistan	-0.8	0.1	-0.7
Tanzania	1719.2	-5285.2	-3566.1
Thailand	6030.1	-158.7	5871.4
Timor-Leste	5.2	0.0	5.2
Togo	-121.5	135.3	13.7
Tonga	-13.9	0.0	-13.9
Trinidad and Tobago	57.4	12.3	69.7
Tunisia	33.6	106.8	140.3
Turkey	12159.0	-1421.5	10737.4
Turkmenistan	-0.1	0.0	-0.1
Tuvalu	-0.3	0.0	-0.3
Uganda	801.2	-191.8	609.4
Ukraine	521.8	185.8	707.6
United Arab Emirates	4727.1	-380.1	4347.0
United Kingdom	65490.9	-10612.5	54878.4
United States	16795.5	3363.2	20158.6
Uruguay	-338.0	-46.2	-384.3
Uzbekistan	-0.7	-0.2	-0.9
Vanuatu	-1.9	0.0	-1.9
Venezuela	-49.9	216.2	166.3
Vietnam	108.4	-1660.6	-1552.2
Yemen, Republic of	67.1	1102.3	1169.5
Yugoslavia not specified	0.0	0.0	0.0
Zambia	1250.9	-5580.5	-4329.6
Zimbabwe	-2863.9	-13651.3	-16515.2
Total export misinvoicing	**316337.9**	**-129231.2**	**187106.8**
Without SACU countries*	**314780.3**	**-118675.1**	**196105.1**

Source: Authors' computation

Note: * SACU countries are Botswana, Lesotho, Namibia, and Swaziland.

Table C2: South Africa: Trade misinvoicing by partner using COMTRADE data, 2000-2014 ($2014 million)

Country	Export misinvoicing	Import misinvoicing	Net misinvoicing
Afghanistan	-114.30	0.00	-114.30
Albania	-4.95	2.58	-2.36
Algeria	-405.95	51.04	-354.91
American Samoa	0.00	0.00	0.00
Andorra	-7.80	0.32	-7.48
Angola	1206.15	37.70	1243.84
Anguilla	0.00	0.00	0.00
Antarctica	0.00	0.00	0.00
Antigua and Barbuda	-27.86	0.86	-27.00
Argentina	178.21	58.33	236.53
Armenia	75.80	0.12	75.92
Aruba	0.00	0.00	0.00
Australia	61.59	-2192.41	-2130.81
Austria	4332.17	-595.55	3736.61
Azerbaijan	66.05	-49.25	16.81
Bahamas	-98.21	133.68	35.47
Bahrain	152.51	2048.85	2201.35
Bangladesh	130.27	-32.58	97.69
Barbados	-9.22	3.11	-6.10
Belarus	108.97	-115.46	-6.48
Belgium	4893.63	-8986.66	-4093.03
Belize	-8.03	0.95	-7.09
Benin	-138.05	40.86	-97.19
Bermuda	-230.09	0.00	-230.09
Bhutan	0.57	0.00	0.57
Bolivia	54.02	23.29	77.31
Bosnia Herzegovina	28.26	20.37	48.63
Botswana	16146.88	-5163.39	10983.49
Brazil	767.48	-285.19	482.29
Brunei Darussalam	0.45	0.00	0.45
Bulgaria	76.80	-332.01	-255.21
Bunkers	0.00	0.00	0.00
Burkina Faso	171.84	-893.16	-721.32
Burundi	74.16	-1.12	73.04
Cabo Verde	5.76	2.76	8.52
Cambodia	-1.37	-8.49	-9.86
Cameroon	228.31	-221.97	6.34
Canada	3939.63	1021.71	4961.34
Cayman Islands	7134.96	0.00	7134.96

Central African Rep.	-3.44	-4.67	-8.11
Chad	0.00	0.00	0.00
Chile	217.73	-2.99	214.74
China, Hong Kong SAR	16951.00	-6782.11	10168.89
China, Macao SAR	177.54	23.54	201.08
China, Mainland	151044.31	7130.65	158174.96
Colombia	196.82	149.67	346.49
Comoros	-83.00	2.76	-80.24
Congo, Dem. Rep.	0.00	0.00	0.00
Congo, Rep.	719.11	-303.76	415.35
Cook Islands	0.00	0.12	0.12
Costa Rica	-13.12	407.20	394.09
Côte d'Ivoire	-788.85	-1904.53	-2693.38
Croatia	178.31	41.98	220.30
Cuba	0.00	0.00	0.00
Cyprus	-0.10	8.58	8.47
Czechoslovakia	1439.43	1094.09	2533.52
Denmark	-854.33	677.57	-176.76
Djibouti	0.00	0.00	0.00
Dominica	-4.97	0.00	-4.97
Dominican Rep.	2.89	84.01	86.90
Ecuador	-143.64	354.50	210.86
Egypt	-288.83	-1955.02	-2243.86
El Salvador	11.87	9.18	21.06
Equatorial Guinea	0.00	0.00	0.00
Eritrea	0.00	0.00	0.00
Estonia	144.33	120.00	264.34
Ethiopia	301.30	-96.21	205.09
Fiji	-16.33	-10.34	-26.66
Finland	759.17	292.01	1051.19
France	2527.26	2015.10	4542.37
French Polynesia	24.62	-0.06	24.56
Gabon	0.00	0.00	0.00
Gambia	-87.95	4.54	-83.41
Georgia	-41.62	7.25	-34.37
Germany	16299.96	-11418.30	4881.66
Ghana	-637.83	-21078.25	-21716.08
Gibraltar	0.00	0.00	0.00
Greece	-69.08	-126.31	-195.39
Greenland	-77.58	0.00	-77.58
Grenada	0.00	0.00	0.00
Guam	0.00	0.00	0.00
Guatemala	5.46	13.05	18.51

Guinea	-54.10	-4.68	-58.78
Guinea-Bissau	0.00	0.00	0.00
Guyana	-588.31	-0.48	-588.79
Haiti	0.00	0.00	0.00
Honduras	1.53	8.56	10.09
Hungary	21.10	599.83	620.94
Iceland	-74.50	29.88	-44.62
India	39457.31	-5534.28	33923.03
Indonesia	100.12	-1663.34	-1563.22
Iran	-182.47	21349.79	21167.32
Iraq	511.68	0.00	511.68
Ireland	74.95	3250.28	3325.24
Israel	-8750.37	-672.51	-9422.89
Italy	21053.88	1881.20	22935.08
Jamaica	-48.33	69.22	20.90
Japan	5797.99	7019.57	12817.55
Jordan	-49.01	-17.30	-66.31
Kazakhstan	198.04	46.98	245.03
Kenya	-651.66	-21.73	-673.38
Kiribati	-0.10	0.00	-0.10
Korea, DPR	0.00	0.00	0.00
Korea, Rep.	5117.56	-158.77	4958.79
Kuwait	121.48	834.34	955.82
Kyrgyzstan	-2.78	3.69	0.91
Lao, PDR	0.00	0.00	0.00
Latvia	-42.21	139.89	97.68
Lebanon	32.28	-2748.25	-2715.97
Lesotho	3458.72	-1652.20	1806.53
Liberia	0.00	0.00	0.00
Libya	0.00	0.00	0.00
Lithuania	0.42	96.81	97.23
Luxembourg	-31.72	58.19	26.47
Macedonia, TFYR	130.02	-7.27	122.75
Madagascar	-182.78	39.79	-142.99
Malawi	1385.40	-348.55	1036.85
Malaysia	348.11	2887.79	3235.90
Maldives	-6.24	3.18	-3.06
Mali	355.98	-9224.71	-8868.73
Malta	-78.92	104.84	25.92
Mauritania	-190.94	-41.89	-232.83
Mauritius	-247.26	-85.95	-333.21
Mexico	1101.89	3036.39	4138.28
Micronesia, FS	25.00	0.00	25.00

Moldova	23.78	1.72	25.50
Mongolia	10.41	-3.00	7.41
Montenegro	0.40	1.77	2.17
Morocco	821.51	40.97	862.47
Mozambique	-5856.77	394.24	-5462.53
Myanmar	0.00	0.00	0.00
Namibia	11668.96	-12737.26	-1068.30
Nauru	0.00	0.00	0.00
Nepal	49.28	-0.68	48.59
Netherlands	-16148.66	-11247.20	-27395.86
New Caledonia	36.39	140.64	177.02
New Zealand	163.12	-31.24	131.88
Nicaragua	-109.59	7.90	-101.69
Niger	72.88	5.42	78.30
Nigeria	-2071.84	-1130.80	-3202.64
Norway	1222.60	-239.26	983.34
Oman	-36.18	1908.31	1872.13
Other Asia, n.e.s.	1439.65	2044.86	3484.51
Pakistan	360.60	-1000.01	-639.40
Palau	-193.54	0.00	-193.54
Panama	-394.98	109.81	-285.17
Papua New Guinea	-0.95	-6.99	-7.94
Paraguay	-10.59	-77.07	-87.66
Peru	44.95	-249.34	-204.38
Philippines	4.69	431.33	436.02
Poland	1119.22	565.49	1684.71
Portugal	871.62	303.67	1175.29
Qatar	213.08	-1779.42	-1566.35
Romania	21.58	156.49	178.07
Russian Federation	1975.97	2092.47	4068.43
Rwanda	112.96	-18.84	94.12
Saint Kitts and Nevis	-2.46	0.00	-2.46
Saint Lucia	0.04	0.00	0.04
Saint Vincent and the Grenadines	-5.27	1.01	-4.26
Samoa	-7.31	0.00	-7.31
Sao Tome and Principe	-8.69	0.45	-8.24
Saudi Arabia	2521.68	61107.65	63629.33
Senegal	38.38	-6.34	32.04
Serbia	58.20	2.86	61.05
Seychelles	-53.87	11.56	-42.32
Sierra Leone	-19.58	2.83	-16.75
Singapore	-1312.75	-2023.19	-3335.94
Slovakia	329.24	280.57	609.81

Slovenia	-475.31	10.59	-464.71
Solomon Islands	-8.90	-0.67	-9.56
Somalia	0.00	0.00	0.00
Spain	1913.64	605.17	2518.81
Sri Lanka	-102.01	16.96	-85.05
State of Palestine	3.30	45.98	49.28
Sudan	-16.72	46.26	29.53
Sudan Fmr	-220.99	-10.56	-231.55
Suriname	-0.43	6.84	6.41
Swaziland	0.00	0.00	0.00
Sweden	482.59	1524.76	2007.35
Switzerland	-9007.29	2340.04	-6667.26
Syria	0.00	0.00	0.00
Tajikistan	0.00	0.00	0.00
Tanzania	1697.24	-4766.12	-3068.88
Thailand	5847.04	242.31	6089.35
Timor-Leste	-0.01	0.20	0.19
Togo	-103.87	63.61	-40.26
Tonga	-12.46	0.00	-12.45
Trinidad and Tobago	0.00	0.00	0.00
Tunisia	32.28	102.70	134.99
Turkey	12250.96	-1080.75	11170.21
Turkmenistan	0.00	0.00	0.00
Tuvalu	0.00	0.00	0.00
Uganda	793.29	-170.52	622.77
Ukraine	581.58	207.75	789.34
United Arab Emirates	4907.03	5480.89	10387.92
United Kingdom	76006.38	-13915.22	62091.17
Uruguay	-101.26	-28.65	-129.91
USA	25440.05	6648.46	32088.51
Uzbekistan	0.00	0.00	0.00
Vanuatu	-2.31	0.72	-1.59
Venezuela	-83.31	202.56	119.24
Viet Nam	109.67	-1342.81	-1233.14
Yemen	156.86	1211.61	1368.47
Zambia	1151.49	-4552.39	-3400.90
Zimbabwe	4877.10	-12826.07	-7948.98
Total	**417854.64**	**-8274.08**	**409580.55**
Total without Asia other areas	**416414.99**	**-10318.94**	**406096.05**

Table C.3: Exports of major commodities according to South Africa data and partner data (billion, constant 2014 $)

Panel .C.3.A: Silver

Partner	SA exports (2014 US$, billion)	Partner imports (2014 US$, billion)	Share in SA exports (%)	Share in world imports (%)
China	0.0	167.9	0.0	28.8
India	89.7	183.9	23.7	31.5
Switzerland	97.1	1.3	25.7	0.2
Turkey	44.1	44.6	11.7	7.6
United Kingdom	83.8	105.1	22.2	18.0
Total major partners	**314.7**	**502.8**	**83.2**	**86.2**
World (All partners)	**378.1**	**583.1**		

Panel C.3.B: Platinum

Partner	SA exports (2014 US$, billion)	Partner imports (2014 US$, billion)	Share in SA exports (%)	Share in world imports (%)
China	1.9	15.8	1.8	11.5
Hong Kong	3.7	2.3	3.6	1.6
Germany	8.1	10.8	7.8	7.8
Japan	35.1	41.9	34.0	30.5
Switzerland	15.6	11.0	15.1	8.0
United Kingdom	12.3	8.7	11.9	6.3
USA	23.7	32.9	22.9	23.9
Total major partners	**100.4**	**123.3**	**97.1**	**89.6**
World (all partners)	**103.4**	**137.6**		

Panel C.3.C: Iron ore

Partner	SA exports (2014 US$, billion)	Partner imports	Share in SA exports (%)	Share in world imports (%)

		(2014 US$, billion)		
China	31.9	38.1	61.7	59.2
Germany	2.6	3.2	5.1	4.9
Japan	6.7	8.4	13.0	13.0
Korea, Rep.	1.9	3.0	3.7	4.7
Total major partners	**43.2**	**52.8**	**83.5**	**81.8**
World (all partners)	**51.7**	**64.5**		

Panel C.3.D: Non-monetary gold

Partner	SA exports (2014 US$, billion)	Partner imports (2014 US$, billion)	Share in SA exports (%)	Share in world imports (%)
Hong Kong	1.6	20.1	4.6	17.3
India	0.2	40.2	0.6	34.5
Italy	0.0	15.5	0.1	13.3
Switzerland	0.4	2.9	1.1	2.5
Thailand	0.0	4.7	0.0	4.1
Turkey	0.0	10.0	0.1	8.6
United Kingdom	0.2	14.0	0.7	12.0
Total major partners	**2.5**	**107.7**		92.3
Other Areas, n.e.s.*	31.3	0.0	90.8	0.0
Total	33.8	107.7	98.0	
World (All partners) - Comtrade	**34.5**	**116.6**		

Source: Authors' computation

Note: "Other areas, n.e.s." represents: "Areas, n.e.s." in South Africa's exports and "Other Asia, n.e.s." in partner imports

Table C.4: Exports of major commodities according to Côte d'Ivoire and partner data, 1995-2014 (million, constant 2014 $)

Panel C.4.A: Cocoa (SITC 072)

Partner	CIV exports (fob)	Partner imports (cif)*	Share in CIV exports (%)
Belgium	2263.2	2780.6	5.1
Estonia	1600.1	1294.4	3.6
France	3837.4	5548.3	8.6
Germany	2538.3	6495.3	5.7
Italy	1381.7	1709.8	3.1
Netherlands	13577.4	11242.2	30.5
Spain	1264.6	1353.0	2.8
United Kingdom	1233.8	1574.1	2.8
USA*	8469.2	9823.0	19.1
Total	**36165.6**	**41820.6**	**81.4**

* Note: USA's imports are in fob

Panel C.4.B: Petroleum (SITC 333 & 3334)

Partner	CIV exports (fob)	Partner imports (cif)*	Share in CIV exports (%)
Benin	943.2	557.9	2.8
Burkina Faso	1338.9	1641.3	4.0
Canada	1991.5	1930.8	6.0
France	1852.9	600.3	5.6
Germany	2832.4	5000.1	8.5
Mali	1333.0	1330.4	4.0
Netherlands	1716.8	712.5	5.2
Nigeria	6527.9	168.0	19.7
Spain	474.2	395.8	1.4
Togo	785.0	384.7	2.4
USA*	2874.1	3253.6	8.7
Total	**22669.9**	**15975.4**	**68.3**

* Note: USA's imports are in fob

Panel C.4.C: Natural Rubber (SITC 231)

Partner	CIV exports (fob)	Partner imports (cif)*	Share in CIV exports (%)
Belgium	241.6	191.1	3.6
France	634.5	813.8	9.5

Germany	814.2	1128.9	12.2
Italy	406.3	453.4	6.1
Malaysia	781.5	858.0	11.7
Netherlands	336.8	71.7	5.0
Poland	339.1	582.0	5.1
South Africa	299.2	59.1	4.5
Spain	920.3	1067.2	13.7
USA	575.0	659.3	8.6

Source: Authors' computation

* Note: USA's imports are in fob

Appendix D: Trade misinvoicing with adjustment for trading hubs

This Appendix describes and illustrates one way of adjusting trade misinvoicing estimation to take into account exports and imports that are routed trough trading hubs, when using advanced countries (ICs) as a benchmark group. Two prominent members of this group that host major trading hubs are The Netherlands and Switzerland. A simple straightforward approach is to remove the imports and exports by the two countries from the advanced countries' totals:

For illustration, consider the case of South Africa as the exporter and importer, and The Netherlands and Switzerland as trading hubs (part of the ICs). The adjustment proceeds as follows:

- Subtract South Africa's exports to the Netherlands and Switzerland from South Africa's exports to ICs
- Subtract South Africa's imports from the Netherlands and Switzerland from South Africa's imports from ICs
- Subtract exports by the Netherlands and Switzerland to South Africa from exports by ICs to South Africa
- Subtract imports by the Netherlands and Switzerland from South Africa from imports by ICs from South Africa

The next step is to use these adjusted amounts to calculate export and import misinvoicing for South Africa relative to industrialized countries without the Netherlands and Switzerland. The obtained discrepancies are scaled up by the inverse of the share of [ICs minus the Netherlands and Switzerland] in South Africa's total exports and imports to/from [ICs minus the Netherlands and Switzerland]

Notations used: X = exports; M = imports; IC = Industrialized/Advanced countries; ZAF = South Africa; NLD = Netherlands; SWI = Switzerland

Flows used to calculate export misinvoicing vis-à-vis ICs (DXIC):

　　　XIC = ZAF's exports to ICs

　　　PXIC = ICs' imports from ZAF

Flows used to calculate import misinvoicing vis-à-vis ICs (DMIC):

　　　MIC = ZAF's imports from ICs

　　　PMIC = ICs' exports to ZAF

Baseline discrepancies (without adjustment)

Export misinvoicing vis-à-vis ICs: DXIC = PXIC – cif*XIC

Import misinvoicing vis-à-vis ICs: DMIC = MIC – cif*PMIC

Adjusted discrepancies

DXIC' = (PXIC – Imports by NLD&SWI from ZAF) – cif*(XIC – ZAF's exports to NLD&SWI)

DMIC' = (MIC – ZAF's imports from NLD&SWI) – cif*(PMIC – NLD&SWI's exports to ZAF)

Scaling up to obtain total misinvoicing

The new IC share in South Africa's total exports and imports are:

- Exports share = (ZAF's exports to ICs– exports to NLD&SWI)/(ZAF's exports to World – exports to NLD&SWI)
- Import share = (ZAF's imports from ICs– imports from NLD&SWI)/(ZAF's imports from World – import from NLD&SWI)

Table D.1: Illustrative results for South Africa, 1998-2015[a] (constant 2015 $, million)

	Export misinvoicing	Import misinvoicing	Net misinvoicing
No adjustment			
Discrepancies vis-à-vis advanced economies	112.5	-68.7	43.8
Scaled up	183.3	-130.6	52.6
With adjustment (subtracting Switzerland and the Netherlands)			
Discrepancies with advanced economies	142.8	-32.0	110.9
Scaled up	246.4	-66.0	180.4

Note: [a] The relevant data for estimating trade misinvoicing are not available in electronic DOTS database before 1998.