Quantifying illicit financial flows from Africa through trade mis-pricing and assessing their incidence on African economies

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Simon Mevel, Siope V. 'Ofa and Stephen Karingi[1]

Abstract:

Capital flights from developing countries have increased tremendously in the last decade and a large portion of these flows occurs via illicit means.

Illicit financial flows (IFF) can usually be broken down into three main components: 1) Corruption, which is the proceeds from theft and bribery by government officials; 2) Proceeds from criminal activities, including drug trading, racketeering, counterfeiting, contraband, and terrorist financing; 3) Proceeds from commercial tax evasion mainly through trade mis-pricing and laundered commercial transactions by multinational corporations (MNCs) (UNECA, 2012).

This paper presents a revisited methodology to estimate IFF through trade mis-pricing from Africa at the sector level. Detailed results from the application of the methodology are also provided and discussed. These are complemented by a Computable General Equilibrium analysis aiming at assessing the economic impacts on African economies from a possible return of IFF losses into Africa.

Results indicate that the massive amount of financial resources illegally lost by Africa are in fact highly concentrated in a few countries and sectors –essentially extractive and mining industries– and benefit to a handful of countries. Moreover, losses associated to IFF seem hardly reversible suggesting the adopting of effective frameworks to prevent them in the first place.

Keywords: Illicit financial flows, Trade mis-pricing, Under-invoicing, Over-invoicing, International Income Transfer, Computable General Equilibrium model, African trade policies

[1] Mr. Simon Mevel is an Economic Affairs Officer, African Trade Policy Centre, Regional Integration and Trade Division, UNECA; Mr. Siope V. 'Ofa is an Associate Economic Affairs Officer, African Trade Policy Centre, Regional Integration and Trade Division, UNECA; Mr. Stephen Karingi is the Director, Regional Integration and Trade Division, UNECA. Person contact: Mr. Simon Mevel, Economic Affairs Officer, African Trade Policy Centre, Regional Integration and Trade Division, UN Economic Commission for Africa, P.O. BOX 3001, Addis Ababa, Ethiopia, Tel: +251-11-5445 443, Fax: +251-11-5153005. The views expressed in this paper are the author's own and may not necessarily reflect the position of the United Nations Economic Commission for Africa. Any mistakes or omissions are the sole responsibility of the authors.

1. Introduction

Capital flights from developing countries have increased tremendously in the last decade. A large portion of these flows occurs via illicit means. Kar and Cartwright (2010) estimated such illicit financial flows from Africa to about USD 854 billion, between 1970 and 2008. This cumulative amount is considerable and equivalent to nearly all the official development aid (ODA) received by Africa during the 39 year period Kar and Cartwright (2010). From a different perspective, only one-third of the loss associated with IFF would have been enough to fully cover the continent's external debt that reached USD 279 billion in 2008 (UNECA, 2009).

Illicit financial flows can usually be broken down into three main components: 1) Corruption, which is the proceeds from theft and bribery by government officials; 2) Proceeds from criminal activities, including drug trading, racketeering, counterfeiting, contraband, and terrorist financing; 3) Proceeds from commercial tax evasion mainly through trade mis-pricing and laundered commercial transactions by multinational corporations (MNCs) (UNECA, 2012). If the first component of IFF can be quantified with relative confidence, the challenge is tremendously greater for the other two. As a consequence, available estimates of IFF from Africa may well be underestimated. However, and even if knowing the exact magnitude of total IFF is important, it may be even more critical to identify which specific sectors of the African economies are more affected than others and to whom illicit financial flows out of Africa are benefiting. While, to our knowledge, computations of illicit financial flows from Africa have so far been made at the global or country levels, this paper presents a methodology to quantify illicit financial flows through trade mis-pricing—corresponding to the bulk of IFF via commercial transactions by multinational companies—from African countries at sectoral level and with indication of the destination/origin of the flows. Such approach is essential to raise awareness and inform policy makers on the importance to quickly tackle IFF which may strongly hinder economic growth and development.

More precisely, the methodology developed is inspired from the IMF's DOTS-based Trade Mis-pricing Model, that is to say, using mis-invoicing to compare bilateral data for the same trade flow. In other words, country i's exports of product A to country j are compared with country j's imports of product A from country i. However, both models differ significantly in terms of: 1) Data used and; 2) The way residuals between statistically observed exports (imports) and their import (export) reversals are decomposed and therefore lead to illicit financial flow estimates.

The analysis goes even further as estimated illicit financial flows through trade mis-pricing from Africa are used as inputs into the MIRAGE Computable General Equilibrium (CGE) model in order to assess the economic impacts from IFF on African economies. Simulations undertaken essentially aim at understanding whether past losses from IFF can be reversible or not. In that sense, international income transfers are assumed between countries having benefited from IFF to those which have suffered from it. Additionally, the possibility

for recipient countries from income transfers to use these resources to finance trade facilitation measures is envisaged.

Results indicate that the massive amount of financial resources illegally lost by Africa are in fact highly concentrated in a few countries and sectors –essentially extractive and mining industries– and benefit to a handful of countries. Findings from CGE analysis indicate that it is rather challenging for Africa to fully recover from such losses –even if specific policy reforms (such as the adoption by Africa of trade facilitation measures financed by the rest of the world) could be helpful– and, therefore, illicit financial flows must be combated in the first place by adopting effective frameworks to prevent them.

The paper is comprised of 4 sections in addition to the introduction. Section 2 attempts to unpack the key concepts related to illicit financial flows and their definitions, as well as the different methodologies typically used in quantifying IFF. Section 3 discusses the methodology adopted for the analysis and results from quantifying IFF in Africa, while Section 4 discusses the methodology and findings from economic implications of such losses on African countries based on a CGE assessment. Section 5 concludes and discusses policy implications of IFF losses in Africa.

2. Key concepts and background on Illicit Financial Flows

Terminological clarity surrounding illicit financial flows (IFF) is critical towards the attempt to quantifying IFF at the sectoral level. The definition and concept of IFF remain rather vague and imprecise. The concept of IFF and 'capital flight' will be used interchangeably, although capital flight also contain licit streams of funds going out of the country (Heggstad et al., 2010). Also, it is worth noting that the distinction between what should be defined as illicit and which activities which considered licit flows are not always clear. For example, foreign debt (in the form of public loans) for developing countries has been captured by local and foreign elites and storing those stolen assets in private accounts overseas. This revolving door relationship between acquiring of public funds and the transfer of funds often involve legally questionable practices (Ndikuma and Boyce 2008 and 2011).In particular, by its very nature, IFF is conducted with the intent to avoid any kind of detection by government official financial statistics. In other words, official figures do not capture illegal activities such as gambling, narcotics, smuggling, contraband, and drug trafficking. In addition, the scale of illegal money flows cannot be measured precisely and they must, therefore, be estimated by methods which involve a substantial degree of uncertainty[2] (Norwegian Ministry of Foreign Affairs, 2009).

[2] UNECA (2012) noted that IFF estimates are difficult to compare because the various studies' which attempt to estimate IFF use different methods, assumptions and data even when using the same basic methodology. For example, the report by Global Financial Integrity on IFFs from developing countries states that estimates of IFFs at the regional and country level could differ from those published in its 2010 report due to revisions of the underlying data supplied by member countries.

More refined definitions suggest that IFF should be understood as money that is illegally earned, transferred or used, at its origin, or during movement of use. The flow of money has broken laws and hence is considered illicit (Reuter, 2012 and Kar & Cartwright-smith, 2010). In particular, the characteristics of these funds include that: 1) The transfer itself may be illegal; 2) The funds are proceeds of illegal activities; or/and 3) There is no paper trail which could potential identify the owner, the origin and the activity of the business.

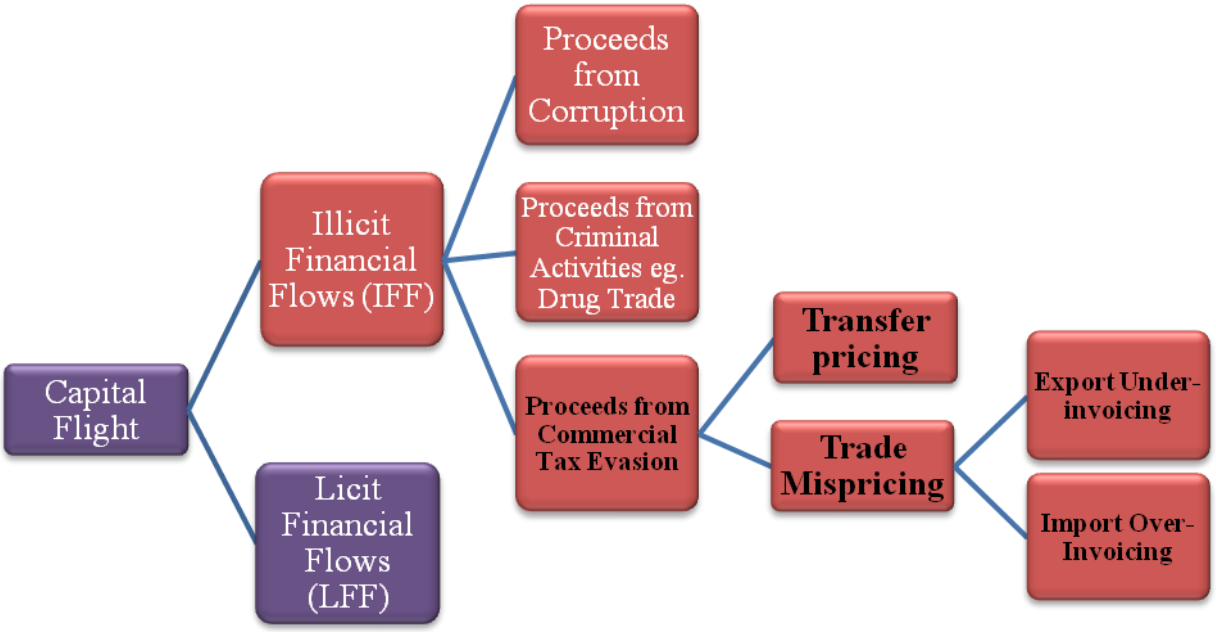
IFF are usually classified into three main broad categories: 1) Corruption, which is the proceeds from theft and bribery by government officials; 2) Proceeds from criminal activities, including drug trading, racketeering, counterfeiting, contraband, and terrorist financing; 3) Proceeds from commercial tax evasion mainly through trade mispricing and laundered commercial transactions by multinational corporations (MNCs) (UNECA, 2012). Baker (2005) quoted in Kar and Cartwright-Smith (2010) noted that corruption accounts for around 5 per cent of global IFF, while proceeds from criminal activities accounted and from commercial tax evasion represent 30 and 65 per cent, respectively. Corruption and proceeds from criminal activities are extremely difficult to measure. However, commercial transaction through MNCs could be estimated with several data sources including Balance of Payments data, trade data and corporate public information on MNCs. This study is to estimate IFF based on the commercial tax evasion by MNCs for two reasons. First, there is more credible data available on this channel compared to corruption and criminal activities, allowing for estimation. Second, majority of IFF (65 per cent) takes place in this channel compared to the other two channels[3].

Within the channel of commercial tax evasion, there are two main types of activities[4] that MNCs could pursue. The first activity is transfer pricing. This method takes place when two related companies—usually a parent company and a subsidiary—in two different countries trade with each other. The trade normally involves manipulation of price of goods by the parent company (usually adjusting excessively higher than normal market price), of which the subsidiary branch will pay for such good, thereby repatriating excessive amount of money to its parent company (at the same time avoiding tax in the subsidiary's country). In many cases, it looks like a normal legitimate transaction, although it can appear unethical. Trade mis-pricing (also known as trade mis-invoicing) is another potential activity from MNCs leading to commercial tax evasion. The IFF channels described are illustrated in Figure 1.

[3] It should be noted though that there is no clear distinction between these three channels, and in some case, IFF could take place due to a combination of two or all of these components.

[4] There are other activities including investment-related transactions and transfers of funds to offshore financial and banking centres and tax havens, although extremely difficult to trace and also to distinguish if such investment or transfers are 'normal' transfers in response to market forces.

Figure 1: Illicit Financial Flows Channels



Source: Author's consolidation of different concepts, 2013.

Unfortunately, this is a shady area of which some operators may claim that it is perfectly legitimate business deals. In fact, most trading occurs in this manner with a foreign account in a third-party country for legitimate reasons. However, when exporters falsely understate the value or quantity of the goods for exports, the funds from such operation should therefore be considered as IFF. Distinguishing such practices in the business world is quite challenging. Symmetrically, importers could over-invoice imported products in order to obtain extra foreign currency from banking authorities, and stashing the difference abroad in private accounts (Boyce and Ndikumana, 2012). The assumption is that an importer can shift money abroad illicitly by over-invoicing imports—implying that the paying more than the normal price abroad—or under-invoicing exports—implying declaration to authorities of payment below normal price while the difference is invested abroad. On the other hand, imports may be under-invoiced or not even recorded at all to avoid custom duties. In addition, over-invoicing of exports could also take place for the same purpose. Bottom line, over-invoicing and under-invoicing collectively contribute to trade mis-pricing (or mis-invoicing).

Most recent studies have found that IFF from developing countries including Africa occurs in unprecedented amounts. Table 1 below provide a glimpse of the recent estimates.

Table 1: Estimates of IFF in Developing Countries

Study and Year	Estimated Amount (USD billion)	Countries	Cumulative Years	Methods Used*
Kar & Freitas (2012)	$379	China	2000-2011	Adjusted Trade Mis-pricing Methods
Ndikumana & Bouyce (2012)	$814	33 SSA Countries	1970-2010	Trade Mis-pricing and Residual Methods
Kar & Freitas (2011)	$775-$903	Developing Countries	2000-2009	Change in External Debt (CED) plus Gross Excluding Reversals (GER) Methods
UNDP (2011)	$26.30	48 LDCs	2008	Residual adjusted for Trade Mis-pricing Methods
Kar & Cartwright-Smith (2010)	$854	Africa	1970-2008	Resdual Adjusted Method
Boyce & Ndikumana (2012)	$450	Algeria, Morocco, Egypt and Tunisia	1970-2010	Residual & Trade Mis-pricing Methods
Claessens and Naude (1993)	$500	84 Developing Countries	1971-1991	Residual & Dolley Methods

Note: * - Most of the studies introduce minor adjustments or combinations of the main methodologies.

Sources: Full listing in References.

Most of the recent studies have highlighted four interesting evidences for Africa worthy of note. First, it is a paradox that Africa is a net creditor of IFF (mostly back to developed or emerging economies), when at the same time it requires substantial funds for its developmental need. Ndikumana and Boyce (2008) found that for every dollar of external borrowing by an Sub-Saharan African (SSA) country in a given year, on average, roughly 80 per cents left the country as capital flight. This phenomenon is known in the literature as the 'revolving door' problem. Second, the amount of IFF from Africa is substantial that if those amount where retained in the continent, Africa would be able to settle all its international debt and still retain some funds for its developmental needs. Ndikumana and Boyce (2012) estimated that 33 SSA countries had lost USD 814 billion from 1970 to 2010, exceeding the amount of official development aid (USD 659 billion) or foreign direct investment (USD 306 billion) received by these countries over the period. Third, there is evidence that capital flight may burden African countries (IFF as percentage of GDP) more significantly compared to other major regions of the world. For example, Hermes and Lensink (2000) found that although smaller in amount compared to Latin America, the burden was higher for African countries at around 61 per cent compared to 22 per cent for Latin America.

Several factors have been cited in the literature for driving IFF. One factor is governance—corruption and weak regulatory systems—fuelling underground economy and driving IFF (Kar and Freitas 2012 and UNDP 2011). Ndikumana and Boyce (2012) argued that excessive IFF over the period 1970-2010 in Algeria (USD 267 billion), Morocco (USD 88 billion), Egypt (USD 66 billion) and Tunisia (USD 39 billion) is strongly linked to the regimes that ruled these countries. For example, Ndikumana and Boyce (2012) noted that as the regime collapsed, the media was flooded by reports of large amount of money held

abroad by Tunisia's Ben Ali, Libya's Qaddafi, Egypt's Mubarak and their families. More specifically, Qaddafi was estimated to hold USD 55 billion in the US, UK and several European Countries. Another factor is the role of some financial institutions and tax havens in facilitating IFF. For example, the Norwegian Ministry of Foreign Affairs (2009) noted that an investigation into the UBS case in the US shows that 95 per cent of the UBS clients who opened an account in a tax haven failed to declare the existences of this account to the tax authorities. Similarly, it was reported that a major UK bank with almost 10,000 British depositors, only 3.5 per cent provided account information to the tax authorities (Norwegian Ministry of Foreign Affairs, 2009).

Moreover, excessive external borrowing has been found to be strongly correlated with capital flight. Ndikumana and Boyce (2011) found statistically significant and economically large effect of external borrowing on capital flight. This is, the estimated coefficient on change in debt implies that up to 67 cents out of each dollar borrowed abroad between 1970 and 2004 has left Sub-Saharan African in capital flight. The authors also noted that the causal relationships between capital flight and external debt can run both ways; this is, foreign borrowing can cause capital flight, while at the same time capital flight can lead to more external borrowing. Other macroeconomic variables found to contribute to IFF includes the overvaluation of domestic currency (making foreign assets relatively cheap and lead to the anticipation of devaluation); heavy progressive taxation on income which brings real interest rates to a negative level particularly in an inflationary environment; high and persistent budgetary deficits. Based on a study of 45 developing countries, Le and Zak (2006) found that political instability—unconstitutional government change and internal uprising—accelerate capital flight. Similar studies on the link between political stability have been found by Fatehi (1994) for Latin America and Hermes and Lensink (1992) for 6 SSA countries. Moreover, development aid could also be linked to increased capital flight due to corruption (Collier et al, 2004). External debt (assumed or guaranteed by the government) has a direct impact on IFF. In terms of the relationship between FDI and IFF, Kant (1996) found a negative correlation between FDI and capital flight in all developing regions including SSA. Even financial institutions such as the banking system could play a role on facilitating capital flights, although legal channels could be used for illicit purposes (Heggstad et al., 2010).

3. Quantifying illicit financial flows from Africa: methodology and results

Before presenting estimates of illicit financial flows through trade mis-pricing from Africa, it is essential to clearly describe the methodology used for computations. A brief look at methods commonly used in the literature is also important to better understand innovations brought to the methodology developed and presented in this paper.

3.1. Methodology overview

3.1.1. Methodologies commonly used in the literature

There are four common methodologies used in recent literatures towards estimating IFF. First, the World Bank's residual model uses the balance of payment figures to compare a country's source of funds with its recorded use of funds. Hence, whenever a country's source of funds exceeds its recorded use of funds, this implies that the unaccounted-for-capital has leaked out of the country's external account. This residual or gap between recorded source of funds and use funds amounts to an unrecorded outward capital from the country (UNDP, 2011, Kar and Cartwright-Smith, 2008 and Norwegian Ministry of Foreign Affairs, 2009). Therefore, IFF is the result of the combined two main sources of funds for a country which are external debt contracted and net inflows of foreign direct investments, minus the sum of current account deficit (shortfall of exports over imports) and foreign exchange reserve assets. Hence, if source of funds is greater than use of funds, IFF is assumed to have taken place from the country[5].

Second, the Dooley Method relies on the privately held foreign assets reported in the balance of payments that do not generate investment income[6]. Third, the Hot Money method uses the balance of payment statistics with the assumption that the residual item of net errors and omissions in the balance of payments is an expression of capital flight (Norwegian Ministry of Foreign Affairs, 2009). Therefore, the balance of payments measures a country's income surplus and net wealth against other countries. In principle, changes in net wealth should roughly correspond to the income surplus. If income surplus is greater than growth in net wealth, it is assumed that the assets could have been transferred outside the country, without proper recording with domestic authority.

Last, is the Trade Mis-invoicing Model which used the IMF Direction of Trade Statistics (DOTS). The assumption is that IFF could take place when over-invoicing imports as well as when under-invoicing exports on customs documents, illicit funds could be transferred abroad. Using bilateral export and import statistics, trade mis-invoicing is estimated by comparing the difference between a developing country's exports/imports to the world (or another bilateral partner) to what the world (or bilateral partner) reports as having imported/exported from that country. The difference is assumed as illicit financial flows after adjusting for insurance and freight[7].

3.1.2. Revisited approach to estimate illicit financial flows through trade mis-pricing from Africa

The methodology presented in this paper builds on the IMF's DOTS-based trade mis-pricing model in the sense that it looks at trade mis-invoicing (or mis-pricing) accounting for both under-invoicing exports and over-invoicing imports.

[5] For more information on residual method, see Claessens and Naude (1993).
[6] For more information on Dooley method, see Dooley (1986).
[7] See Kar and Cartwright-Smith (2010), for further discussion and use of this model.

However, both models differ significantly in terms of: 1) Data used and; 2) The way residuals between statistically observed exports (imports) and their import (export) reversals are decomposed and therefore lead to illicit financial flow estimates.

First, the method presented in this paper relies on the UN COMTRADE dataset which provides bilateral trade information for more than 200 countries—including all African[8] countries—and 5,000 products that is to say at the Harmonized System 6-digit (HS6) level of products. The IMF's DOTS-based trade mis-pricing model, however, uses only information at the country level.

Second, the IMF's DOTS-based trade mis-pricing model estimates illicit financial flows as a residual after comparing exports (imports) and their import (export) reversals only following adjustments for price differences. Indeed, exports are usually expressed free on board (f.o.b.), while imports are given inclusive of cost, insurance and freight (c.i.f.). In that sense, before being compared exports and imports must be expressed in the same unit. The IMF's DOTS-based trade mis-pricing model uses a fixed coefficient equal to 1.1[9], dividing imports c.i.f. by this coefficient to convert them in imports f.o.b. Once both exports and imports are given f.o.b., exports (imports) and reversal imports (exports) are being compared and the residual is assumed to be an estimate of illicit financial flows. At least two major criticisms can be formulated towards this methodology: a) Using a fixed coefficient to convert import values from c.i.f. to f.o.b. is highly unrealistic[10] and can only add unsatisfactory distortion between export and import statistics resulting in biased values for illicit financial flows; b) Assuming illicit financial flows to be the sole residual between export and import values after converting those in the same unit is certainly inappropriate. In addition to potential statistical errors which are—as most studies admit—rather difficult to assess, there are other reasons such as time lags in export/import processes that can explain why export and import statistics do not match.

The methodology presented in this paper tries to address some of the above limitations. To that end, imports are not converted from c.i.f. to f.o.b. but rather imports already expressed in f.o.b. are used. Whereas UN COMTRADE also provides exports expressed f.o.b. and imports in c.i.f., it was decided to consider exports from UN COMTRADE and use BACI dataset for imports. BACI dataset relies on UN COMTRADE data (also at the HS6 level of products) but provides adjusted and equal values for both exports and their reversal imports in f.o.b. prices. In BACI, reversal flows are reconciled using an econometric analysis based on estimations of transport costs. In complement a variance analysis to assess reliability of country reporting is also undertaken thereby limiting potential data errors in BACI[11].

[8] That is to say 53 African countries as the recent independence of South Sudan is not reflected in the data used.
[9] As per IMF DOTS practice, refer to UNDP (2011) for further information.
[10] The fixed coefficient does not vary over time or among trading partners. In practice, however, c.i.f.–f.o.b. ratios in international trade statistics often lie outside a reasonable range of variation, Nitsch (2012).
[11] See Gaulier and Zignago (2010), for full details on BACI dataset.

Despite having exports and their reversal imports expressed in the same unit (i.e. f.o.b.) and also potentially freerer of trade reporting mistakes, the revisited methodology to estimate IFF goes further than simply adjusting for price differences by also taking into account time lags in export/import processes. Indeed, a good cleared by customs of the exporting country a certain year may not be reported by the customs of the importing country in the same year leading to statistical export and reversal import values' gaps for a particular year. This can easily be explained by the time it may take for a good to be delivered from one country to another.

As a consequence, exports (imports) and reversal import (export) values are reduced by computed amounts equivalent to delivery time in exporting/importing a specific good between two defined countries. Monetary values of the costs associated to time delays in trade are obtained by multiplying trade values expressed in f.o.b with ad valorem (i.e. in percent) trade time costs. These ad valorem costs are estimated by crossing two sets of information: a) Average time to export/import in days by a country; b) Import/export weighted average time costs by sector, exporting and importing countries. Note that prior to combining this information, it is necessary to aggregate trade data from UN COMTRADE and BACI at the level of sectors and countries/regions in conformity with the Global Trade Analysis Project (GTAP) database; the reason being that information on trade weighted average time costs is only available for GTAP sectors and regions. Once trade data are aggregated at the GTAP level, average time to export and import are also aggregate at the same level of countries/regions. Yearly data of average number of days to import and export by country come from the World Bank Doing Business Project on Trading Across Borders[12]. These account for the average number of days for customs processing, port handling and inland transport in either the import or export process. Average time for document preparation also available in the Trading Across Borders statistics is not accounted for in this study as it can be done in parallel to other trading activities and therefore should not be added to the total delivery time of the exported or imported good. Data on import/export weighted average time costs given at GTAP levels sector, exporting and importing countries come from Minor and Hummels (2011)[13]. These import (export) weighted averages time costs by sector, exporting region and importing region are then multiplied by the average time in days to import (export) of each corresponding country/region such as ad valorem trade time costs can be estimated as follow:

$$\begin{aligned} AdVCOST\_EXP_{i,j,k,t} &= Wgt.av.time\_COST_{i,j,k} * (Av.days\_EXP_{i,t} + Av.days\_IMP_{j,t}) \\ &= AdVCOST\_IMP\_j,i,k,t \end{aligned} \quad (1)$$

and,

[12] In this study data from World Bank Doing Business 2006 to 2011 reports are used (that is to say data for years 2005 to 2010; prior to 2005, 2005 information is used due to unavailability of data for those years). Data are aggregate from available countries to GTAP countries/regions taking average times of countries belonging to the same GTAP region. For a few missing data, the same approach is used that is to say the average for the region to which the country belongs to is applied.

[13] See Minor and Hummels (2011) for full details on the methodology.

$$AdVCOST\_EXP\ j,i,k,t = Wgt.av.time\_COST\ j,i,k * (Av.days\_EXP\ j,t + Av.days\_IMP\ i,t) = AdVCOST\_IMP\_i,j,k,t \quad (2)$$

with,

AdVCOST_EXP i,j,k,t = Ad valorem time cost for country i to export product k to country j in year t;
Wgt.av.time_COST i,j,k = Weighted average time cost for country i to export product to country j;
Av.days_EXP i,t = Average number of days for country i to export in year t;
Av.days_IMP j,t = Average number of days for country j to import in year t;
AdVCOST_IMP j,i,k,t = Ad valorem time cost for country j to import product k from country i in year t;

AdVCOST_EXP j,i,k,t = Ad valorem time cost for country j to export product k to country i in year t;
Wgt.av.time_COST j,i,k = Weighted average time cost for country j to export product k to country i;
Av.days_EXP j,t = Average number of days for country j to export in year t;
Av.days_IMP i,t = Average number of days for country i to import in year t;
AdVTCOST_IMP i,j,k,t = Ad valorem time cost for country i to import product k from country j in year t.

Now that export and import values are both expressed and compared in the same unit (i.e. f.o.b.) and that potential delays in export/import reporting process are estimated, then it is possible to deduct illicit financial flows through trade mis-pricing from Africa as a residual between Africa's exports (imports) and their import (export) reversals all corrected for time lags. As already indicated in the previous section, illicit financial flows through trade mis-pricing from Africa take place when Africa under-invoices its exports or over-invoices its imports, such as:

$$IFFMISINV\ i,j,k,t = UNDERINV\_EXP\ i,j,k,t + OVERINV\_IMP\ i,j,k,t > 0 \quad (3)$$

with,

i = any African country[14];
j = any GTAP country/region (including African countries/regions);
k = any GTAP product;
t = any year from 2001 to 2010.

[14] While we indicated that all country data are aggregated at the GTAP level of country/region, this is not the case for African countries for which we wish to have more detailed information than available in GTAP (note that in GTAP version 7 used for the analysis Africa is aggregated into 21 singled countries and 6 regions). It is therefore important to note that as import/export weighted average time costs by sector, exporting and importing countries are given at GTAP levels of sector and country/region we apply the same weight to all African countries belonging to the same GTAP region; however, trade time costs are different for every African country (even if belonging to a same GTAP region) as long as average number of days to import and export (available at the country level) are different.

Therefore if ***IFFMISINV i,j,k,t*** > 0 then illicit financial flows through trade mis-invoicing occur from any African country i to country j in product k in year t; otherwise (i.e. ***IFFMISINV i,j,k,t*** < 0) illicit financial flows through trade mis-invoicing occur from country j to any African country i in product k in year t.

Decomposing (3) further, we get:

UNDERINV_EXP i,j,k,t = *(1-AdVCOST_EXP i,j,k,t)* EXP i,j,k,t (as reported by j)*
- (1-AdVCOST_EXP i,j,k,t) EXP i,j,k,t (as reported by i)*
*= (1-AdVCOST_IMP j,i,k,t) * IMP j,i,k,t from BACI*
*- (1-AdVCOST_EXP i,j,k,t) * EXP i,j,k,t from UN COMTRADE*
(4)

with,

EXP i,j,k,t = Country i's exports of product k to country j in year t;
IMP j,i,k,t = Country j's imports of product from country i in year t.

As a consequence, if ***UNDERINV_EXP i,j,k,t*** > 0 then any African country i under-invoices its exports to country j in product k in year t; Otherwise (i.e. if ***UNDERINV_EXP i,j,k,t*** < 0) any African country i over-invoices its exports to country j in product k in year t.

And,

OVERINV_IMP i,j,k,t = *(1-AdVCOST_IMP i,j,k,t) * IMP i,j,k,t (as reported by i)*
*- (1-AdVCOST_IMP i,j,k,t) * IMP i,j,k,t (as reported by j)*
*= (1-AdVCOST_IMP i,j,k,t) * IMP i,j,k,t from BACI*
*- (1-AdVCOST_EXP j,i,k,t) * EXP j,i,k,t from UN COMTRADE*
(5)

with,

IMP i,j,k,t = Country i's imports of product from country j in year t;
EXP j,i,k,t = Country j's exports of product k to country i in year t;

As a consequence, if ***OVERINV_IMP i,j,k,t*** > 0 then any African country i over-invoices its imports from country j in product k; Otherwise (i.e. if ***OVERINV_IMP i,j,k,t*** < 0) any African country i under-invoices its imports from country j in product k.

Thanks to this methodology, illicit financial flows through trade mis-pricing from Africa can then be aggregated along any dimension: country of origin (i), country of destination (j), sector (k) as well as the time (t), such as:

$\sum$i */and/or* $\sum$j *and/or* $\sum$k *and/or* $\sum$t (IFFMISINV i,j,k,t)
= $\sum$i *and/or* $\sum$j *and/or* $\sum$k *and/or* $\sum$t (UNDERINV_EXP i,j,k,t)
+ $\sum$i *and/or* $\sum$j *and/or* $\sum$k *and/or* $\sum$t (OVERINV_IMP i,j,k,t)

Therefore, using this methodology, it is possible to estimate any combination of illicit financial flows through trade mis-pricing: *from* as aggregated information as cumulative IFF from the Africa continent over the total period 2001-2010 *to* as disaggregated information as IFF from any African country i to any country/region j in any product k for any year t.

In addition, from the equations above, it appears clearly that the methodology developed and presented here does not restrict the sign of illicit financial flows with ***IFFMISINV i,j,k,t*** that can potentially be positive (i.e. any African country i registering illicit financial outflows) or negative (i.e. any African country i registering illicit financial inflows). Traditional approaches for using trade mis-pricing to measure IFFs also usually net out IFFs (i.e. allowing for either positive or negative signs; see Ndikumana and Boyce, 2008) but others prefer to use the gross excluding reversals (GER) method (i.e. allowing only a positive sign with any negative value set to zero; Kar and Cartwright-Smith (2010)). If it is important to admit that the net method may improperly capture reversals in countries subject to political and economic instabilities it is, however, a necessity to net flows when conversions from c.i.f. to f.o.b. trade values are not assumed with always positive and fixed coefficients as well as to maintain consistency whenever aggregating IFF across different dimensions (time, countries, sectors). In that sense, the GER method shows critical limitations and it is for this reason that it was not favoured for this analysis.

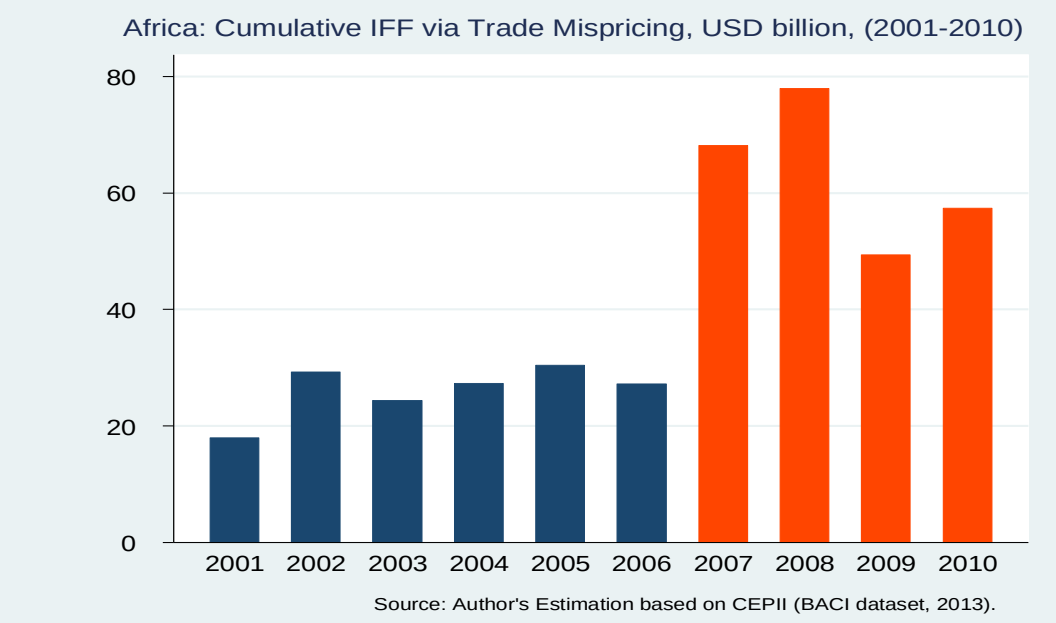
However, whatever the methodology used to measure illicit financial flows through trade mis-pricing, it should be stated that the magnitude of the flows is strongly influenced by the reliability of trade statistics. The use of such methodology can therefore be questioned, especially when applied to African countries for which statistics quality and availability are often an issue. Nevertheless, and despite these important limitations, estimations of IFF through trade mis-pricing should certainly not be overlooked as they clearly tend to unanimously present developing countries[15], and here in particular African countries, as net creditors of illicit financial flows with strongly increasing trends over the past few years.

3.2. Results

It is estimated that Africa lost USD409 billion via IFF from trade mispricing between 2001 and 2010. About 92.5 per cent of this cumulative total IFF was due to export under-invoicing while 7.5 per cent was import-overinvoicing. While IFF has increased over the decade studied, the last five years has witnessed a significant increase in IFF—totalling USD280 billion between 2006 to 2010—compared to USD129 billion between 2001 and 2005 (see Figure 2). The significant increased in IFF in recent years could be attributable to the recent global increase in the values of primary commodities of which Africa export the most and has revealed comparative advantage on.

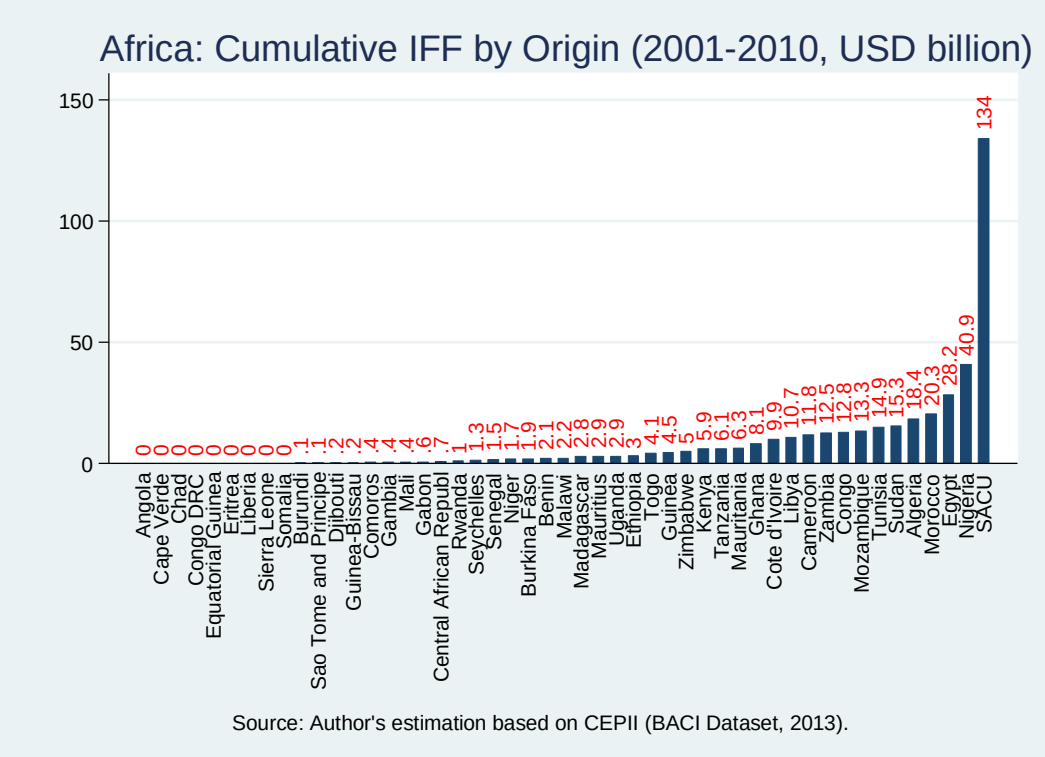
Figure 2:

[15] Please refer to Leonce & Kar (2010).



In terms of IFF loss by origin (African economies), we found that Southern Africa Customs Union (SACU)—totalling USD134 billion within the studied decade—was the destination with the biggest IFF loss, followed by Nigeria (USD40 billion), Egypt (USD 28 billion), Morocco (USD20 billion), and Algeria (USD18 billion). Most of these African economies export primary commodities (oil, food and agriculture or minerals and precious stones). Please refer to Figure 3 for the rest of African economies.

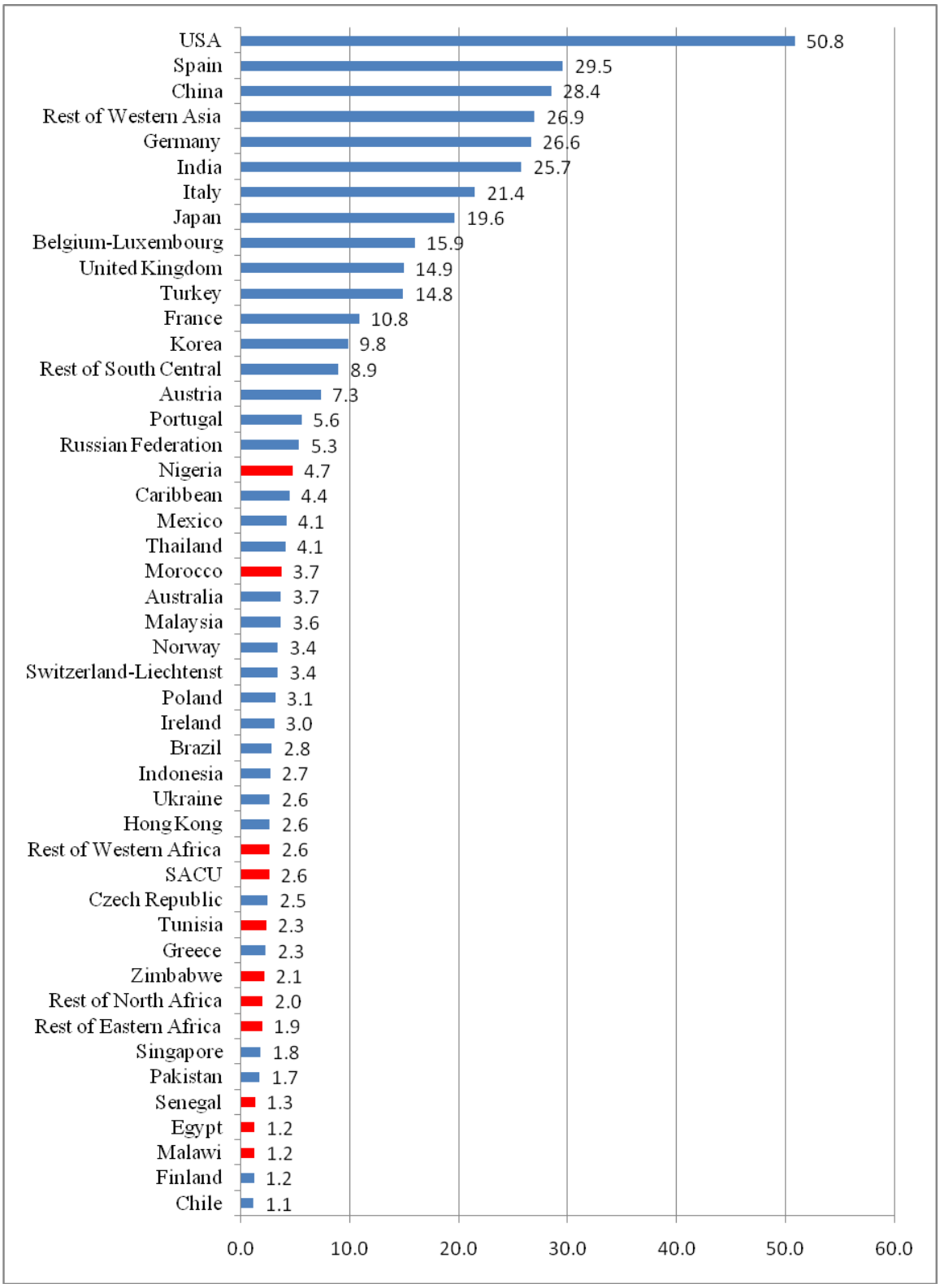
Figure 3:



Developed countries together with some emerging economies are the biggest recipient of IFF under trade mispricing from Africa with the United States recording the highest around

USD50.8 billion between 2001 and 2010. See Figure 4 for destinations receiving more than USD1 billion during the decade studied.

Figure 4: Cumulative IFF by Destinations (>1 USD billion), 2001-2010, USD billion.



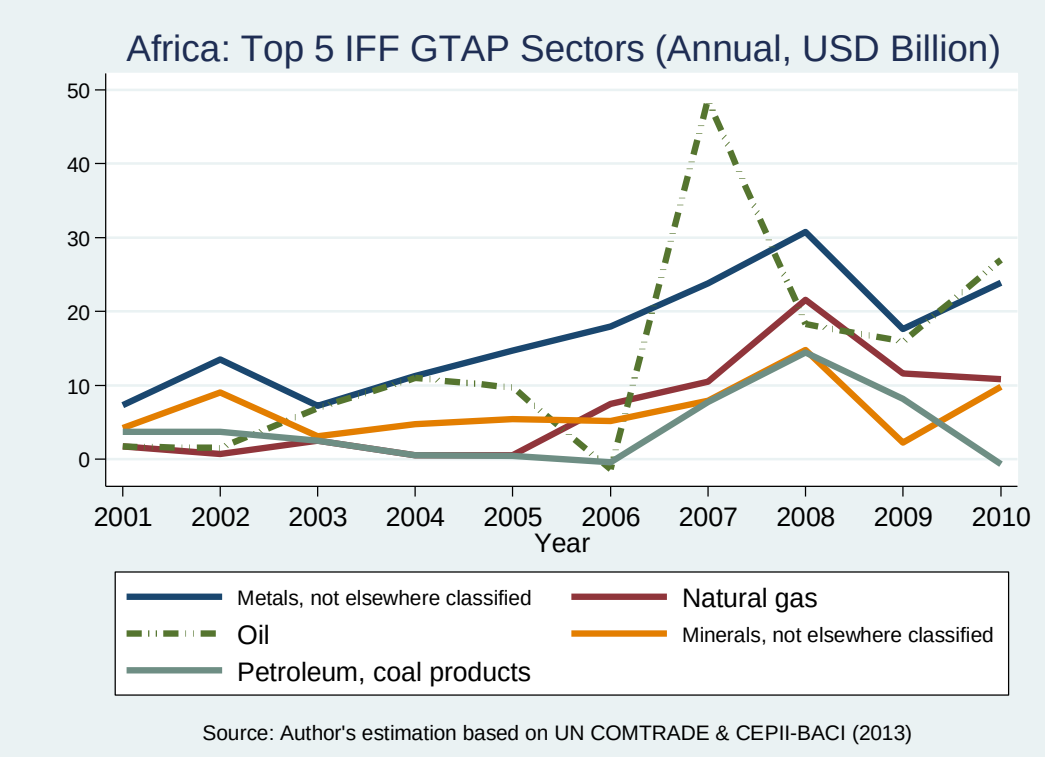
Source: Author's estimation based on CEPII (BACI Dataset), 2013.

There are two trends worth mentioning. First, emerging economies such as China (third highest recipient), Rest of Western Asia, India and Japan are among the top eight

recipient destinations of IFF from African. This reflects the growing share of Africa's trade with emerging economies from the South in primary commodities, particularly China and India. The share of Chinese mineral and fuel imports from Africa grew from less than 5 per cent in 1995 to almost 25 per cent in 2010 (ECA & AU, 2012). Second, we found Africa is not only losing IFF outside the continent, but also within African economies. For example, Nigeria registered USD 4.7 billion IFF loss from Africa during the studied decade. There are several other African economies whom were recipient of IFF funds. This finding has important policy implications in terms of attempts within Africa to curbing a portion of the IFF.

Africa is losing the most of IFF from primary produces. The highest loss on IFF was recorded from Metals not elsewhere classified (Copper and other non ferrous metals) over the ten year period amounting to USD84 billion, followed by oil (USD 69 billion) and natural gas (USD 34 billion). See Annex 1 for GTAP sectors and IFF values. Over the 10 years period (2001-2010), IFF on Copper has continued to increase with the acceptation of 2003 and 2009. The later year is obviously due to the global financial crisis which affected all trade commodities. Furthermore, the IFF values on oil has been fluctuating in the last five years (2006-2010) with a big hike in 2007—IFF value surpassing all other commodities for that year—dropped dramatically in the following year but returning to highest IFF commodity in 2010[16] (see Figure 5).

Figure 5:

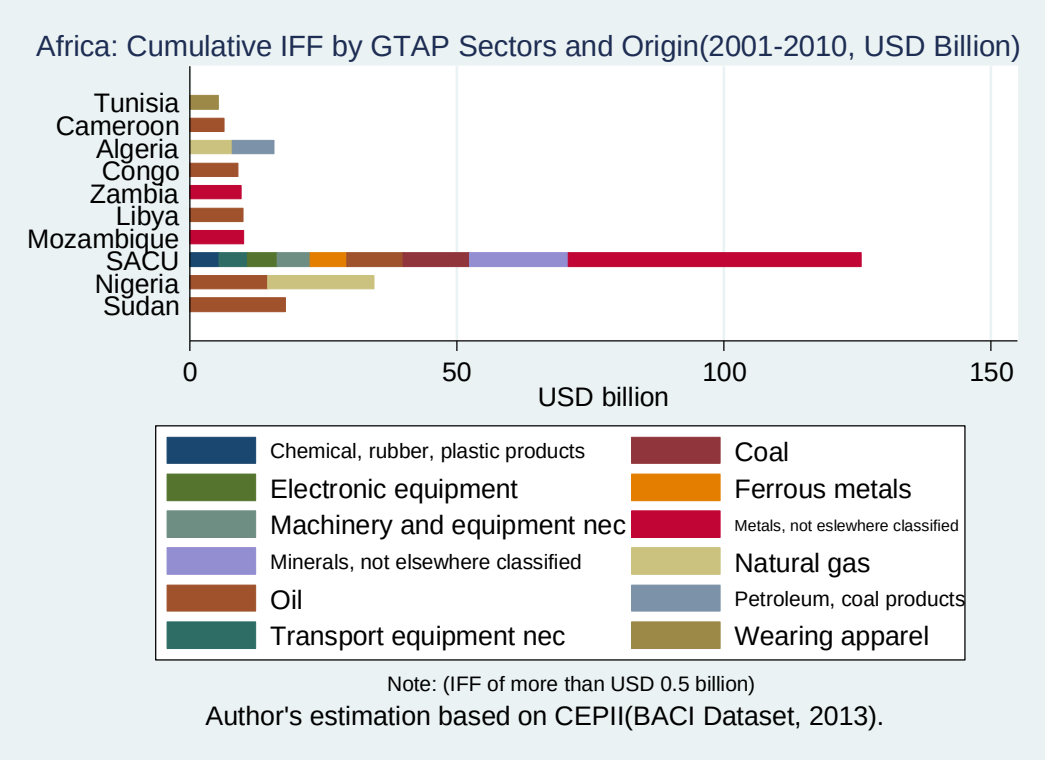


Source: Author's estimation based on UN COMTRADE & CEPII-BACI (2013)

[16] In addition, the global prices on primary commodities have continued to increase over the period which also tends to influence the increasing amount of IFF loss from each primary commodity.

When looking at the coverage of IFF by GTAP sectors (top 10) for African countries, we find that oil (6 out of 10 countries) and copper (3 out of 10) dominated the GTAP sectors with highest IFF from the top 10 African countries (see Figure 6).

Figure 6:



Among the top 30 destinations by GTAP sectors, the oil sector dominates (17 years out of 30 years), totalling USD48.5 billion or 58 per cent of the total of USD83.6 billion. All of the top GTAP sectors are primary commodities going to destinations such as United States, Spain, India, Japan. Please see Annex 2.

In terms of bilateral trading partners, and in specific GTAP sectors using the latest year (2010) available, we found that oil from Nigeria to the United States totalling USD3.2 billion was the highest IFF. This was followed with Copper and other non ferrous metals from SACU to India (USD3.2 billion) and oil from Congo (Republic of) and United States (USD 2.2 billion). Please see Annex 3 for the top 15 in 2010.

To sum up this section, the figures shows that IFF from Africa increased sharply in the last five years (2006-2010), compared to the earlier five years. SACU followed by Nigeria were the two African economies with highest IFF, while the United States and Spain were the two highest recipients of IFF over studied period. The top IFF by GTAP sector was in Copper and other non ferrous metals (Metals nec) totalling USD84 billion followed by oil (USD 69.6 billion).

4. Incidence of illicit financial flows on African economies: methodology and findings

Estimates of illicit financial flows through trade mis-pricing from Africa appear to be extremely large for the continent as a whole and for some African countries and sectors in particular. This trend has been strongly increasing overtime, and especially over the last 5 years for which data are available, that is to say from 2006 to 2010, with cumulated global illicit financial outflows from Africa nearly equal USD 300 billion, that is to say about three quarter of cumulated IFF for the period 2001-2010.

In this context it is essential to try assessing the economic impacts of such losses on African countries in terms of real income and trade. To that end a Computable General Equilibrium (CGE) analysis is undertaken. The analysis examines the possibility for indirect recovery assuming income transfers between country of destination and country of origin of the illicit financial flows out of Africa between 2006 and 2010.

4.1. Methodology

4.1.1. CGE model and data used for the analysis

The analysis is undertaken using the Modeling International Relationships in Applied General Equilibrium (MIRAGE) CGE multi-country multi-sector dynamic model[17]. The dynamic is recursive such as equilibriums or successively and sequentially solved from one year to another.

In each region, a single representative agent allocating its income between savings (as a fixed income share) and consumption of goods is assumed. Agent's preferences across sectors are represented using a Linear Expenditure System–Constant Elasticity of Substitution (LES–CES) function. Vertical (quality) as well as horizontal (variety) differentiations in goods is allowed. The Armington hypothesis drives trade in the model, that is to say geographical origin of goods matters such the consumer has a preference for domestically produced goods over foreign ones. In addition, goods produced by developed countries are assumed to be from a higher quality range than those produced by developing countries.

Perfect complementarity between intermediate consumption and value added is assumed on the supply side, thanks to a Leontief function. Unskilled labor, skilled labor, capital, land, and natural resources are the five factors of production that contribute to the value added in the model. Additionally, skilled labor and capital are considered to be more substitutable between themselves than with other factors of production. Factor endowments

[17] See Decreux and Valin (2007) for full details on model technical description and assumptions.

are assumed to be fully employed[18]. Unskilled labor is imperfectly mobile between agricultural and non-agricultural sectors but perfectly mobile among each of these two groups of sectors. Skilled labor, however, is perfectly mobile between sectors. Labor's rates of variation are exogenously set based on demographic forecast using World Bank data. There is imperfect mobility of land assumed between sectors. Capital and natural resources are both sector-specific but natural resources are constant while capital is accumulative. Investment is the adjustment variable for capital stock; capital stock for the current year is expressed as the capital stock from the previous year that has depreciated plus the investment made for the current year.

The current account of each region is assumed to be constant and fixed to its initial value in order to ensure the model's macroeconomic closure. In that sense, any possible disequilibrium of the current account is offset by variations of the real exchange rates. The mechanisms is such as when a policy reform impacting trade is undertaken, then the real exchange rates appreciate if exports increase more than the imports or depreciate when the exports increase less than the imports.

GTAP database is used as global social accounting matrix (SAM) for the model. In its version 7 –utilized here– GTAP database provides detailed information on international trade, production, intermediate and final consumption of goods and services, for 57 sectors, 113 countries/regions and for the year 2004[19].

Due to technical and solver[20] limitations it is necessary to aggregate further sectors and countries/regions. Considering the focus of the study on illicit financial flows from African countries it was decided to preserve as much as possible sectors and countries/region of destination for which estimates illicit financial flows are the highest as well as all African countries/regions available into the database.

Table 2: Geographic decomposition

[18] This assumption may appear unsatisfactory considering the high unemployment rates in African economies. However, such hypothesis can be justified for several reasons. Firstly, the poor availability and reliability of unemployment data for African economies can lead to strongly distorted outcomes. Secondly, instead of assuming fixed unemployment rates and variable nominal or real wages in CGE models, nominal or real wages fixed and variable unemployment rates could be considered. However, the latter assumption ignores the wage determination process in developing countries which is also not satisfactory (see Ben Hammouda and Osakwe, 2006). Thirdly, the full employment assumption is coherent with the medium to long term effects resulting from shocks analyzed with CGE models (see Bouët et al., 2010).

[19] See Narayanan, et al. (2008) for exhautive information on the GTAP version 7 database.

[20] The GAMS software is used to run simulations of the MIRAGE CGE model.

#	Country/*Region*	Africa/Non-Africa
1	Egypt	Africa
2	Morocco	Africa
3	Tunisia	Africa
4	*Rest of North Africa*	Africa
5	Nigeria	Africa
6	*Rest of Western Africa*	Africa
7	*Central Africa*	Africa
8	Ethiopia	Africa
9	Madagascar	Africa
10	Malawi	Africa
11	Mauritius	Africa
12	Mozambique	Africa
13	Tanzania	Africa
14	Uganda	Africa
15	Zambia	Africa
16	Zimbabwe	Africa
17	*Rest of Eastern Africa*	Africa
18	*South African Customs Union*	Africa
19	*United States*	Non-Africa
20	*Rest of North and Central America, Caribbean*	Non-Africa
21	*South America*	Non-Africa
22	*European Union*	Non-Africa
23	*Rest of Europe*	Non-Africa
24	*Turkey*	Non-Africa
25	*Rest of Central Asia and Middle East*	Non-Africa
26	*Korea*	Non-Africa
27	*Japan*	Non-Africa
28	*China*	Non-Africa
29	*India*	Non-Africa
30	*Rest of Developing Asia*	Non-Africa
31	*Oceania*	Non-Africa

Therefore, a total of 31 countries/regions and 20 sectors are selected for the analysis. The geographical decomposition comprises 14 African countries and 5 African regions in addition to 13 non-African countries or regions (see Table 5). In terms of sectoral decomposition, 8 agricultural, 2 primary, 8 industrial and 2 services' sectors are considered (see Table 6).

Table 3: Sectoral decomposition

#	Sector	Category
1	Paddy and processed rice	Agriculture
2	Cereals	Agriculture
3	Vegetable & fruit & nuts	Agriculture
4	Other agricultural products	Agriculture
5	Live animals and animal products	Agriculture
6	Milk and dairy products	Agriculture
7	Sugar	Agriculture
8	Other food products	Agriculture
9	Fossil fuels	Primary
10	Precious minerals	Primaty
11	Forestry	Industry
12	Fishing	Industry
13	Textile wearing apparel and leather products	Industry
14	Chemicals & Rubbers & Plastics	Industry
15	Iron & Steel & other metal products	Industry
16	Non-Ferrous metal	Industry
17	Electronic machinery and transport equip	Industry
18	Other manufactured products	Industry
19	Transport services	Services
20	Other services	Services

Estimates of illicit financial flows from Africa over the period 2006-2010 and presented in section 3.2 are used as inputs to the model after aggregating them at the sector and country/region levels as indicated in tables 2 and 3. The next section describes into details how these data are used for CGE simulations.

4.1.2. Modelling of illicit financial flows' reforms

Illicit financial flows from Africa appear to have been growing overtime and in particular in recent years. Over the period 2006-2010 (for which latest data are available) the cumulative IFF through trade mis-pricing from Africa are estimated to nearly USD 300 billion. These considerable flows out of Africa have certainly negatively impacted Africa economies although it should be kept in mind that such flows are often diverted from the continent as a result of tacit agreements between exporters and importers.

Explicitly two scenarios, consisting in a forward looking analysis by estimating potential economic recoveries associated to a hypothetical return of initially lost illicit financial flows through trade mis-pricing from Africa, are envisaged.

The first scenario assumes progressive return of initially lost IFF from Africa over the period 2006-2010 between today (i.e. 2013) and 2017 through international income transfers. These transfers are modelled such as countries/regions having benefited from IFF over the period 2006-2010 see their national/regional incomes progressively reduced between 2013 and 2017; while countries/regions having initially lost from IFF (i.e. Africa) see their national/regional income progressively increased over the same period. In order to comply with CGE modelling rules these international income transfers must be neutral from a global perspective, that is to say: total income reduction must be strictly equal to total income increase.

A second scenario inspired from the previous one is also modelled. This time, international income transfers are constrained in the recipient countries. In other words, whereas countries/regions having benefited from IFF over the period 2006-2010 see their national/regional incomes progressively reduced between 2013 and 2017, governments of countries/regions having initially registered losses from IFF are now constrained to spend the additional income received towards improving trade facilitation measures. In the model, this is assumed to take place through a progressive reduction of global trade costs associated to customs procedures, port handling as well as inland transport over the period 2013-2017 in equivalent amounts than the total income increases suggested by estimated IFF at the bilateral and sector levels.

4.2. Findings

4.2.1. The effects of non-constrained international income transfers on African economies

Based on computations of illicit financial flows through trade mis-pricing from Africa between 2006 and 2010 -presented in section 3- and netting flows out and in of each country/region, equivalent amounts of incomes to be redistributed via international income transfers are established (see Table 9).

Table 4: International income redistribution by country/region

Donor countries	Income transfer given (USD billion)
European Union	92.3
United States	33.3
Rest of Central Asia and Middle East	22.4
China	18.4
India	18.2
Japan	13.0
Rest of Europe	12.4
Rest of Developing Asia	12.1
Turkey	10.6
Rest of North and Central America, Carribean	6.6
Korea	5.6
South America	5.1
Oceania	2.0
Total donor countries	**252.1**
Recipient countries	**Income transfer received (USD billion)**
Southern African Customs Union	79.3
Nigeria	31.4
Egypt	26.5
Rest of Western Africa	25.3
Rest of North Africa	22.3
Morocco	10.9
Rest of Eastern Africa	9.9
Mozambique	9.7
Zambia	9.6
Central Africa	8.2
Tunisia	8.0
Tanzania	3.4
Uganda	2.1
Ethiopia	1.6
Zimbabwe	1.5
Mauritius	1.2
Madagascar	1.1
Malawi	0.1
Total recipient countries	**252.1**

Source: Authors' calculations based on the UN COMTRADE and BACI

As explained in section 4.1.2., world total income given plus world total income received must be equal to zero so that the reform is neutral at the global level from an income perspective, of course with some countries having higher national/regional incomes while others have lower national/regional incomes. Also, additional incomes received by each recipient country may come from more than one donor country with no precise identification of each bilateral relationship. In other words, there is a pool of donations (from which donors contribute in specific proportions based on IFF computations) that feeds a pool of receipts (from which recipients receive in specific proportions based on IFF computations).

If IFF equivalent incomes from the period 2006-2010 are progressively returned to economies having initially suffered from IFF losses (i.e. African economies) as indicated in Table 5 between 2013 and 2017, then Africa's real income would be boosted, increasing by 21.2% (or USD 25.6 billion) in 2017, as compared to the baseline scenario. However, such reform would have a strong and negative effect on Africa's exports which would be reduced by 19.3% (or USD 101.8 billion) compared to the reference case. At the same time, Africa's imports would increase in higher magnitude than the decrease observed for its exports. Indeed, Africa's imports would be enhanced by 33.1% (or USD 167.4) following international income transfer to Africa, compared to the baseline in 2017.

Table 5: Trade and real income changes following international income transfers as compared to the baseline scenario – By main regions – 2017 – Percent and USD billion

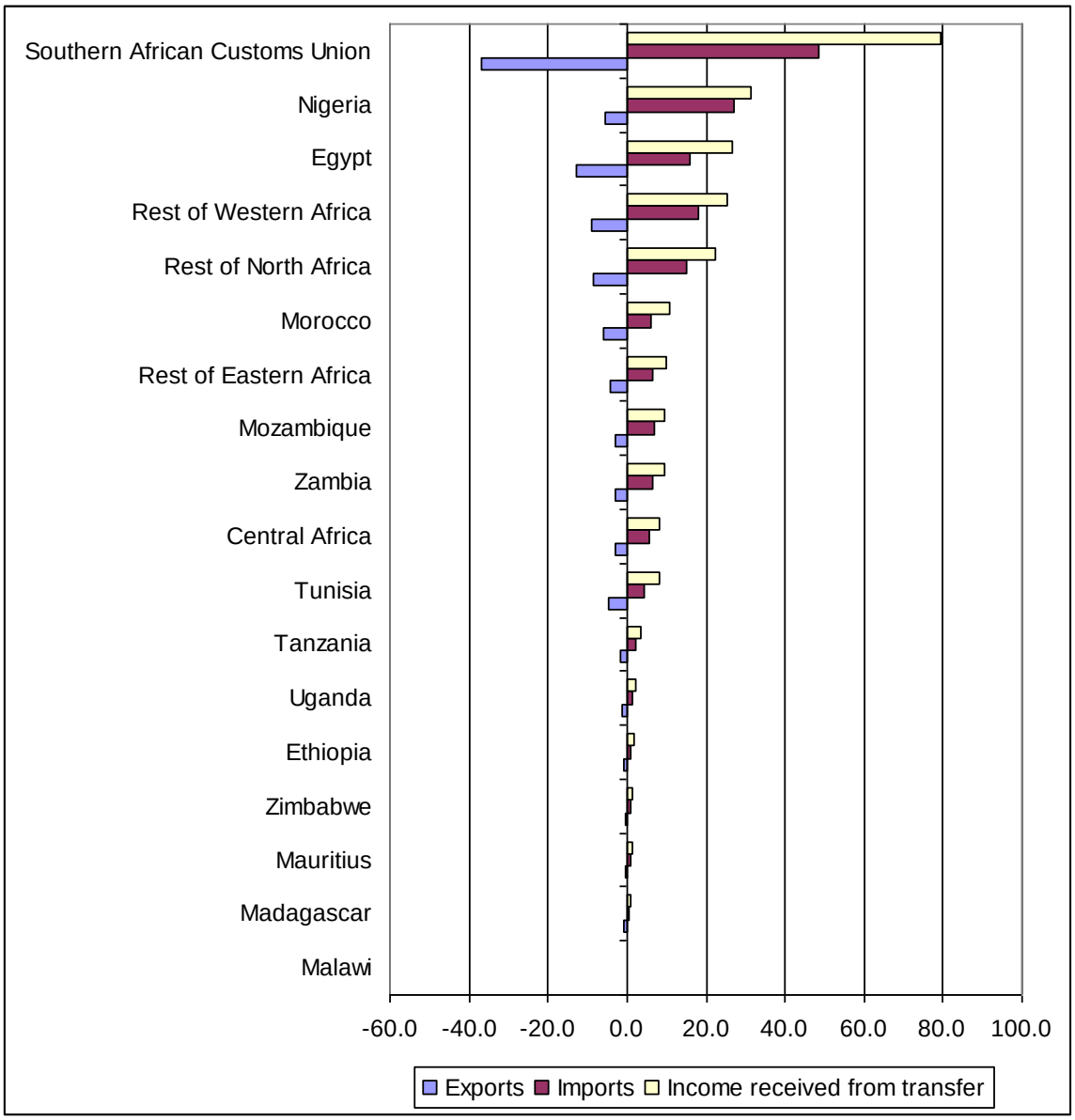
	Exports		Imports		Real Income	
	%	USD billion	%	USD billion	%	USD billion
African Countries	**-19.3**	**-101.8**	**33.1**	**167.4**	**21.2**	**25.6**
Rest of Developing Countries	**1.0**	**58.2**	**-0.7**	**-34.2**	**-0.8**	**-8.3**
Developed Countries	**1.6**	**115.7**	**-0.7**	**-60.9**	**-0.4**	**-16.4**

Source: Authors' calculation based on the MIRAGE model

This can be explained by the impact such transfer could have on terms of trade of both donor and recipient countries. Donor's incomes would be reduced following the transfer resulting in a reduction of its expenses. Symmetrically, recipients would be capable to expand theirs expenditures, thanks to additional income received. Such change in the world relative demand would imply a modification of the terms of trade as only incomes (and not any physical resources) are being transferred. As a result, Africa would import relatively cheaper and more but exports at relatively higher prices and less. Additional Africa's imports would be sourced by the rest of the world which would symmetrically register a progression in its exports (+1.0% (or $ 58.2 billion) and +1.6% ($ 115.7 billion) for non-African developing countries and developed countries, respectively) as consumption of domestic consumers would be contracted following income transfers to African economies. In fact, foreign production would tend to shift from domestically produced good to exported goods. In other words, such international income transfers seem to potentially favor exports of donor countries having worsened terms of trade following the reform. This could be understood as a subsidy given to foreign consumers (i.e. consumers from the African continent) which would allow them to buy more of imported goods from the rest of the world that have become relatively cheaper.

At the country level, correlation between additional income received by African countries and increase in their imports while their exports decrease remains very consistent (see Figure 6).

Figure 6: Income received from transfer and trade changes following international income transfers as compared to the baseline scenario – By main regions – 2017 – Percent and USD billion



Source: Authors' calculation based on the MIRAGE model

While such observed phenomenon in which donors' exports benefit from international income transfer could appear surprising at first, it is in fact aligned with the income transfer paradox first explained by Samuelson (1947).

4.2.2. The effects of constrained international income transfers on African economies

It is now assumed that African countries are constrained in the use of the additional income they receive from the rest of the world by specifically devoting this additional money

to financing trade facilitation measures aiming at reducing good spend in customs, at African port and transiting within countries.

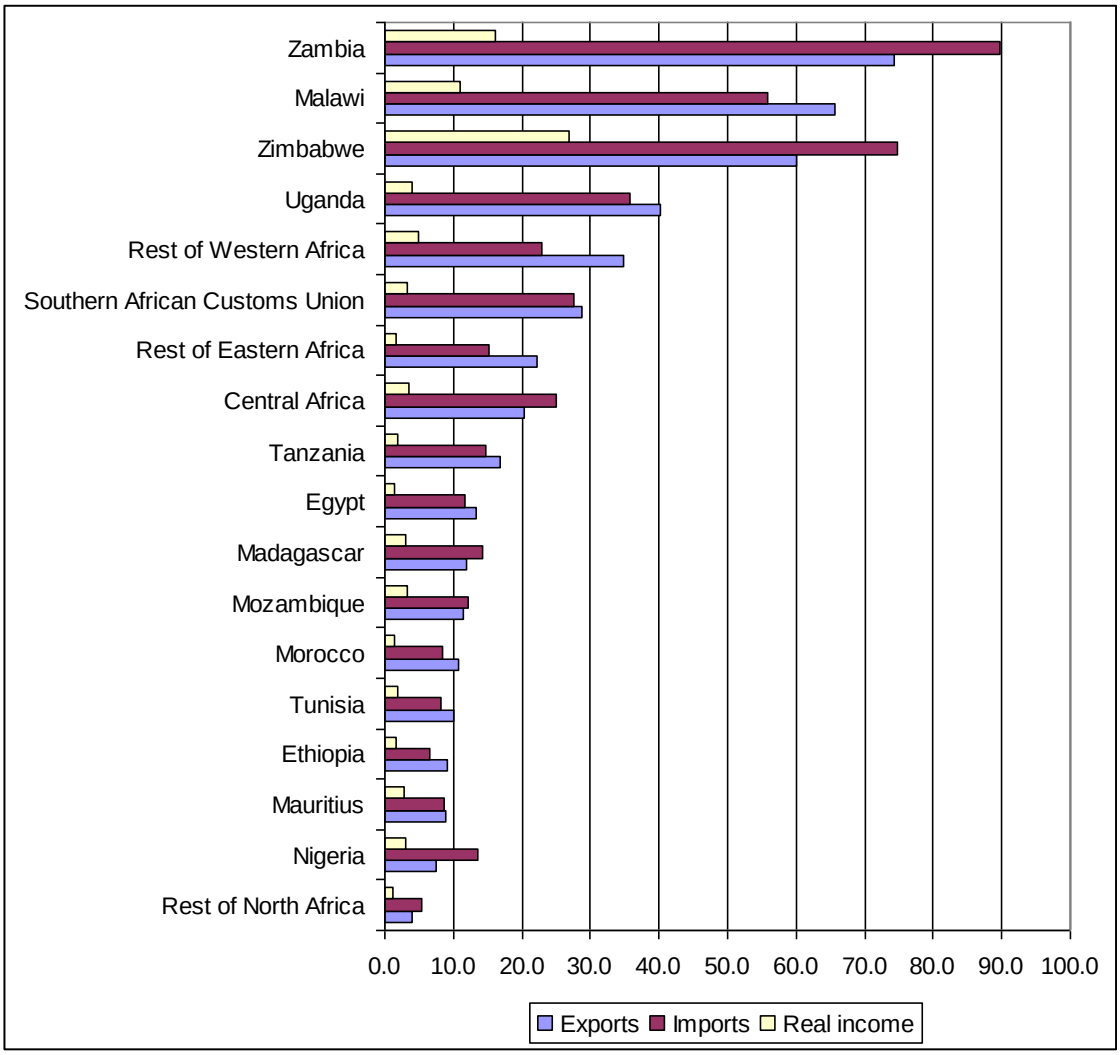
Table 6: Trade and real income changes following international income transfers constrained by financing of trade facilitation measures in recipient country, as compared to the baseline scenario – By main regions – 2017 – Percent and USD billion

	Exports		Imports		Real Income	
	%	USD billion	%	USD billion	%	USD billion
African Countries	17.7	93.1	17.9	90.4	2.7	3.3
Rest of Developing Countries	1.2	65.2	-0.6	-29.6	-0.8	-8.6
Developed Countries	-0.6	-42.7	0.8	64.3	-0.3	-10.6

Source: Authors' calculation based on the MIRAGE model

In such scenario, Africa's exports would be preserved even if Africa's real income would not increase as much as if income transfer was not constrained; African consumers paying a higher price for imported goods. Indeed, both Africa's exports and imports would this time increase considerably by 17.7% (or $93.1 billion) and 17.9% (or $90.4 billion), respectively, compared to the reference in 2017. Moreover, real income would augment by 2.7% (or $3.3 billion). This would be true whatever the country (see Figure 7). It is worth noting that all donors -expect the United States- would also see their exports slightly increasing (in percent terms) when Africa is implementing measures to improve trade across borders. The United States would be victim of the higher competition on developed and emerging markets. This can be explained by the fact that African countries would be able to compete with the rest of the world thanks to easier and faster conditions to export and import for African nations. Africa would not be the only one competing with the rest of the world but non-African nations would also take advantage of the improved conditions when exporting to or importing from Africa, thanks to improved trade across border.

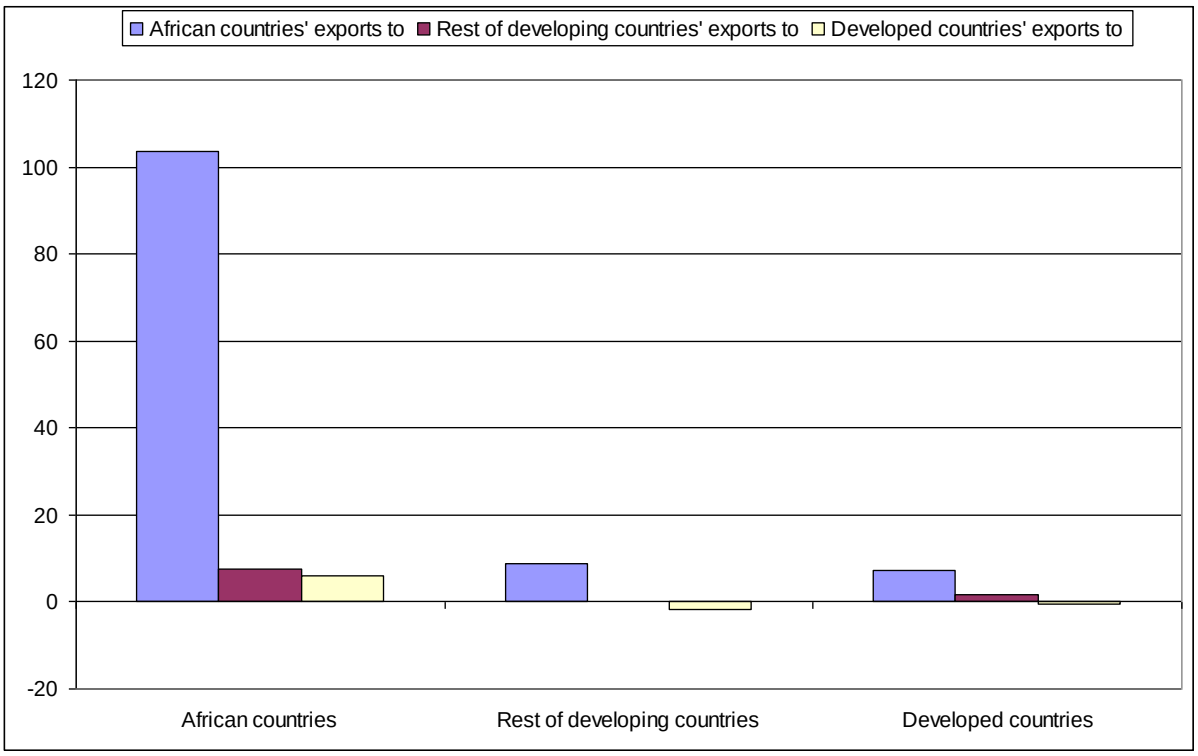
Figure 7: Trade and real income changes following international income transfers constrained by financing of trade facilitation measures in recipient country, as compared to the baseline scenario – African countries – 2017 – Percent



Source: Authors' calculation based on the MIRAGE model

Whereas African countries' exports would increase towards all main destinations (developed countries, developing countries, African countries), they would increase the most towards Africa (see Figure 8). This is critical as it implies that if Africa is capable of getting back some of the financial resources initially illicitly lost -assuming that countries having benefiting from these flows accept to transfer back some of the resources to Africa and at the same time African governments are constrained to spend it towards the improvement of trade facilitation measures- then intra-African trade would be strongly enhanced. It is also worth noting that both developed (including the United States) and developing countries would be able to export more towards Africa, thanks to an easier trading environment with adoption of trade facilitation measures by African countries.

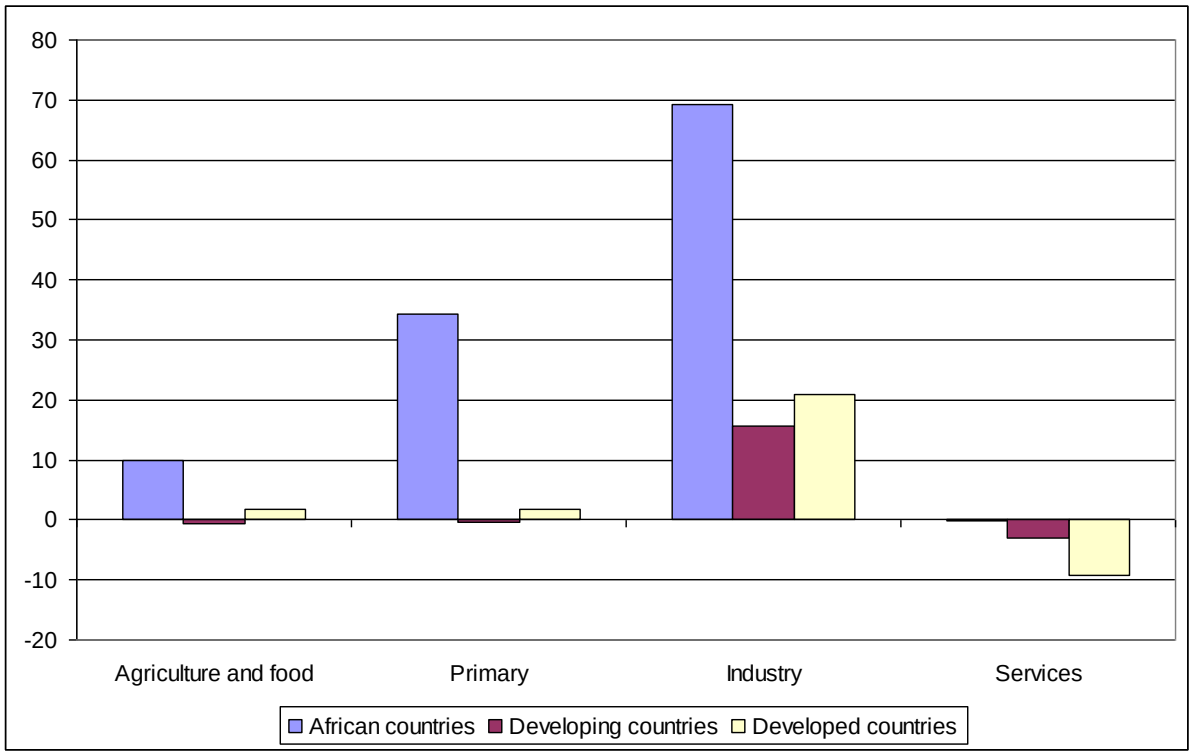
Figure 8: Changes in exports from main regions of origin to main regions of destination – 2017 – Percent



Source: Authors' calculation based on the MIRAGE model

Furthermore, when looking at the change of strictly Africa's exports broken down by main destinations and main sectors, it is clear that if Africa can get back some of the IFF losses to specifically finance trade facilitation measures, then Africa's exports would increase the most in industrial products, and especially in the case of intra-African trade (see Figure 9).

Figure 9: Changes in exports from African countries to African partners (intra-African trade) – Broken down by main sectors – 2017 – USD Billion



Source: Authors' calculation based on the MIRAGE model

As a consequence, a re-injection into African economies of illicit financial flows out of Africa having already occurred through international income transfers would indeed help enhancing Africa's real income, Africa's trade, and in particular intra-African trade and its industrialization but only if Africa's governments use these resources to finance specific reforms such as trade facilitation measures. However, it also appears considering the magnitude of recent losses of IFF from Africa that such losses would not be fully recovered by African economies as trade and income gains from envisaged scenarios would still be lower than amounts of IFF lost over the period 2006-2010.

5. Conclusions and Policy Implications

Illicit financial flows through trade mis-pricing can occur from under-invoicing of exports or/and over-invoicing of imports. As far as Africa is concerned, estimates show that the continent has been a net creditor of illicit financial flows over the period 2001-2010 with as much as USD 378.6 billion of exports being under-invoiced and USD 30.8 billion of imports being over-invoiced, leading to a total cumulated amount of illicit financial flows out of Africa of USD 409.4 billion.

However, these illicit financial outflows from Africa are highly concentrated in a few countries/regions (especially SACU, Nigeria, Egypt and Morocco) and a few sectors (all primary products—such as Copper and other non ferrous metals, crude and refined oil, precious metal and mineral). Even the destinations of IFF loss from Africa are concentrated to a few countries such as the United States, several European Union, China and India.

It is worth noting that these flows have substantially increased lately with 68.5% of total IFF between 2001 and 2010 having been registered over the last 5 years of the period. Using a Computable General Equilibrium model, trade and real income impacts on African economies from possible returns of initially lost IFF from Africa over the period 2006-2010 are assessed. Findings indicate that unless this money back is used by African government towards specific reforms such as improving trade facilitation measures then it would be ineffective in terms of stimulating Africa's trade. Indeed. non-constrained international income transfers to Africa would actually benefit exports of donor countries. Nevertheless, if Africa uses the income received through international transfers to specifically finance measures aiming at speeding up customs procedures, port handling and inland transport then African countries would see their trade and real income conditions quite substantially improved. Moreover, this could help enhancing intra-African trade and the industrialization of Africa's exports. However, potential gains from a return to Africa of financial resources initially lost through IFF would still be relatively limited compared to the initial losses implied by IFF.

Therefore, considering the huge costs involved by illicit financial flows to African economies, and the fact that future recoveries from such losses look insufficient it is critical to limit IFF in the first place.

Three policy measures are worth deliberating upon. First, regulatory policies on negotiating agreements between national governments and extractive industries in Africa must be transparent to ensure that the interest of the general public is protected. This will avoid the chance for rent seeking from any of the two parties involved. Second, the role of industrial policies in regulating industrial development is crucial. Such policy must strike a balance between pro-development for the extractive industries and also protecting the general public interest in terms of sustainability. Third, MNC behaviours and practice must be given greater attention in each country. This includes the review of taxation policy and ensuring that MNC adheres to the economic policies of a country.

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Annex 1

Cumulative IFF from Africa by GTAP Sector, 2001-2010.	
GTAP Sector	**USD Billion**
Metals nec	84.00
Oil	69.59
Natural gas	33.99
Minerals nec	33.08
Petroleum, coal products	19.98
Crops nec	17.06
Food products nec	16.86
Machinery and equipment nec	16.82
Wearing apparel	14.00
Ferrous metals	13.15
Chemical, rubber, plastic products	13.01
Vegetables, fruit, nuts	12.76
Coal	12.58
Electronic equipment	10.84
Transport equipment nec	9.37
Textiles	6.07
Wood products	5.33
Forestry	4.21
Plant-based fibers	3.16
Paper products, publishing	2.97
Metal products	2.96
Manufactures nec	2.80
Mineral products nec	2.28
Sugar	2.20
Vegetable oils and fats	1.42
Beverages and tobacco products	1.27
Wheat	1.20
Animal products nec	1.18
Electricity	0.99
Fishing	0.84
Bovine cattle, sheep and goat, horse meat prods	0.68
Oil seeds	0.67
Leather products	0.65
Processed rice	0.35
Dairy products	0.34
Wool, silk-worm cocoons	0.17
Bovine cattle, sheep and goats, horses	0.14
Meat products nec	0.13
Paddy rice	0.07
Sugar cane, sugar beet	0.00
Gas distribution	-0.00
Cereal grains nec	-0.09
Motor vehicles and parts	-9.76
Total	**409.35**
Source: Author's estimation based on UNCOMTRADE, 2013.	

Annex 2

Top 30 Destinations by GTAP Sector, Annual IFF Total, USD billion.			
Year	**GTAP Sector**	**Destination**	**USD billion**
2010	Oil	USA	5.4
2007	Oil	USA	4.6
2008	Copper and other non ferrous metals (Metals nec)	Rest of Western Asia	4.4
2008	Natural gas	Spain	4.3
2009	Oil	USA	3.6
2008	Oil	Germany	3.5
2008	Oil	USA	3.4
2010	Copper and other non ferrous metals (Metals nec)	India	3.1
2007	Oil	Spain	3
2008	Oil	Japan	2.7
2007	Natural gas	Spain	2.6
2007	Oil	India	2.6
2008	Oil	Rest of South Central	2.6
2008	Copper and other non ferrous metals (Metals nec)	India	2.5
2009	Copper and other non ferrous metals (Metals nec)	India	2.5
2002	Minerals nec	United Kingdom	2.5
2008	Copper and other non ferrous metals (Metals nec)	Italy	2.5
2007	Copper and other non ferrous metals (Metals nec)	Italy	2.5
2010	Oil	Germany	2.4
2007	Oil	Germany	2.4
2008	Petroleum, coal products	Rest of Western Asia	2.3
2005	Oil	China	2.3
2006	Oil	Japan	2.3
2010	Copper and other non ferrous metals (Metals nec)	China	2
2009	Oil	Germany	2
2010	Oil	Rest of South Central	2
2006	Oil	Germany	2
2007	Oil	Italy	2
2008	Natural gas	Japan	2
2008	Minerals nec	China	1.9
		Total	**83.6**
Source: Author's estimation based on CEPII (BACI Dataset) and UN COMTRADE, 2013.			

Annex 3

Top 15 GTAP, by Origin and Destinations, 2010, USD billion			
GTAP Sector	**Origin**	**Destination**	**USD billion**
Oil	Nigeria	USA	3.2
Copper and other non ferrous metals	SACU	India	3.1
Oil	Congo	USA	2.2
Oil	SACU	Rest of South Central	2
Oil	Nigeria	Germany	1.6
Natural gas	Nigeria	Spain	1.5
Copper and other non ferrous metals	Zambia	China	1.5
Oil	Congo	China	1.1
Copper and other non ferrous metals	SACU	Italy	1.1
Natural gas	Algeria	Italy	0.9
Oil	Nigeria	Spain	0.7
Metals nec	Mozambique	Belgium-Luxembourg	0.7
Minerals nec	SACU	China	0.6
Minerals nec	SACU	Japan	0.6
Natural gas	Nigeria	France	0.6
		Total	**21.3**
Source: Author's estimation based on UNCOMTRADE, 2013.			