Capital Flight from Africa: New Estimates, 1950-1970

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Abstract

Given ongoing discussion in the literature concerning capital flight from developing countries to developed countries, this paper studies whether African countries had noticeable capital flight already in the post-WWII period, and if that was the case, how capital flight was related to taxation of the countries. Firstly, it presents new estimates of capital flight from 22 African countries for the period 1950-1970 using three measures; net errors and omissions in the balance of payment statistics, the "Hot Money" approach, and the trade misinvoicing approach. Then, using pooled OLS and panel fixed effects model, it examines the relationship between the size of capital flight and government tax revenue, and conducts a case study for selected countries who show distinctive features in the development of capital flight during the sample period. Overall results indicate that capital flight did exist in Africa in the pre-1970 period, and higher taxation is significantly associated with larger capital flight, given colonial rule and external borrowing of the countries.

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1 Introduction

This paper studies whether African countries had noticeable capital flight already in the post-WWII period, and if that was the case, how capital flight was related to taxation of the countries. It presents new estimates of capital flight from 22 African countries for the period 1950-1970 using three standard measures used in the literature; net errors and omissions in the balance of payment statistics, the "Hot Money" approach, and the trade misinvoicing approach. Having estimated the size of capital flight, using pooled Ordinary Least Squares (OLS) and panel fixed effect model, this paper also examines the relationship between capital flight and taxation, given colonial rule and external borrowing of the countries. In order to understand the background of capital flight and its connection with taxation in each country, case studies are conducted with respect to selected countries who show distinctive features in the development of capital flight during the sample period.

Capital flight from Africa has been recognized as a serious problem for the past decades because the continent is believed to lose sizable wealth as unrecorded capital outflow, while it has been substantially financed by public external borrowing at the same time. Moreover, existing studies estimate that Africa is the region that has the largest capital flight compared to other developing countries, given the size of its economy. For example, Henry (2012) argues that 39.5% of Africa's GDP was lost due to capital flight as of 2010, whereas Ajayi and Ndikumana (2015) show that the accumulated capital flight of 18 African countries by 2010 exceeded their combined GDP. Evidence by recent studies further suggest that African countries would have been able to grow faster if the capital had been invested domestically and not fled abroad (see AfDB et al. (2012)). Nonetheless, most studies on capital flight from Africa have focused on the period since 1970 and not explored enough why and when this problem has first begun to what extent. In other words, given that there was already a significant amount of capital flight from Africa in the 1970s, little has been studied on the background of capital flight which could be hinted by investigating capital flow of the region before the year 1970. This is the first paper, to my knowledge, to estimate capital flight from African countries and to study its drivers in the pre-1970 period. The hypothesis of the study is that, given the restrictions on financial flows before 1970, capital flight from Africa was real but still a controllable problem immediately after the Second World War.

The main reason why existing studies investigate this issue for the period only after the 1970s would be that, capital flow data is not available for many African countries for that period, even if it exists, quality of the data is questionable. Given the challenges, this study employs the simplest methodology of calculating capital flight to minimize the risk of under- (or over-)estimating capital flight from Africa and uses official data combined from different

international and national sources. This paper finds that capital flight did not seem to exist in 22 African countries when it is proxied by the net errors and omissions in the balance of payments statistics, while a sizable amount of unreported capital outflow is detected using the trade misinvoicing approach, which suggests that trade misinvoicing was likely to be the main source of capital flight. In the meantime, the econometric analysis shows that higher national taxation, increased external debt, and decolonization are associated with larger capital flight.

The rest of the paper is organized as follows. Section 2 provides a literature review on capital fight from developing countries and its determinants. Section 3 explains three alternative measures of capital flight and how they are related to each other based on the concept of Balance of Payments Identity. Section 4 and 5 present econometric model and data, respectively. Section 6 discusses results and Section 7 conducts a case study for three countries who show increasing volume of capital flight and tax revenue over time. Section 8 concludes.

2   Literature Review

There have been a number of studies conducted on the magnitude of capital flight from developing countries using various measures. Among them, Ndikumana et al. (2015) is one of the most recent studies that extensively investigate capital flight from 39 African countries for the period 1970- 2010. They use the residual measure of capital flight that adjusts trade misinvoicing as well as discrepancy in remittance inflow, and find evidence that Africa is a "net creditor" to the rest of the world in the sense that its assets abroad through capital flight exceed its liabilities. Also, they find that capital flight is strongly associated with external borrowing and the size of capital flight in the past. However, no other domestic factors turn out to be a key driver in their result. Meanwhile, Ali and Walters (2011) estimates capital flight from 37 African countries from 1980 to 2005, using the residual measure, and argues that the capital flight is explained by policy distortions, relative riskiness, and poor profitability of investments. Fedderke and Liu (2002) is the closest paper to mine as they look at capital flight from South Africa for the period 1960-1995. However, these studies commonly cover a long period, more than three decades, thus examine long term determinants of capital flight. Furthermore, not only their focus was not on the origin of unrecorded capital outflow from Africa, but also taxation was not considered or found to be one of the main determinants of capital flight.

This paper is not the first one that studies South-North capital flight before the year 1970. For example, Host-Madsen (1965) presents the statistics of capital outflow from

Latin America from 1953 to 1963 concluding that there is no evidence of systematic massive capital flow from developing to developed countries, whereas Diamond (1967) analyzes the pattern of private capital flows of the world by looking at the changes in long-term and short-term flows in the IMF's Balance of Payments statistics. Although these studies look at a similar period as this paper does, they do not specifically consider Africa as a source country, and furthermore, none of the studies attempt to actually measure the size of capital flight. Overall, this study contributes to the literature by using different alternative approaches and providing new estimates of capital flight from the region for the period that has not been studied yet. Given the period and the region, it is certainly difficult to provide accurate estimates, nonetheless, this paper tries to shed light on the birth of capital flight from Africa by examining a large dataset that combines a number of different official sources and also by qualitatively studying the estimates of selected countries, given their economic and political situation between 1950-1970.

3 Measures of Capital Flight

3.1 Balance of Payments Identity

Today's Balance of Payment (BoP) statistics consist of current account, capital account, and financial account. Current account (CA) represents the value of country's international trade and current transfers such as donations. Capital account shows the value of physical assets held by a country, and financial account describes private capital flows as well as reserve accumulation by a central bank. Although the items reported under financial account have changed over time, they generally include the following types of capital flow - private long term investment (PLI), private short term investment (PSI), direct investment (DI), Other investment (OI) and reserve accumulation (RES). Due to the double-entry bookkeeping system of balance of payments, each component of the BoP statistics should sum up to zero, and this is called the Balance of Payment Identity. To explain more in detail, capital transactions are presented either as credit or as debit in the BoP, in which credit means decreased assets (or increased liabilities) and debit means increased assets (or decreased liabilities). For example, when an investor in country A buys portfolio investment asset in country B, it makes a debit entry of country A's BoP statistics since it means asset of country A's citizen is increased (increased asset of country A). In the meantime, the investor pays the price of the asset to country B, therefore the "ownership" of country A's currency of the same value now belongs to country B (increased liability of country A), which appears in a credit entry in the BoP. Therefore, by a construction, the net sum of BoP should be zero. However, due to a number of reasons, from inaccurate transaction

records to valuation effects, there is always a discrepancy between net capital flows. In order to balance out the discrepancy from current and financial account, the net errors and omissions (NEO) are introduced in the BoP statistics. Thus, if the total net sum of capital transactions of country B is 100 US dollars, the NEO is automatically -100 US dollar, and then one can know that country B had unrecorded capital outflow of 100 US dollar in that year. The measures of capital flight used in this paper are based on this identity, and in fact, all measures introduced in the literature starts from finding the missing value in the BoP identity. The measures of capital flight are well reviewed in Claessens and Naude (1993) in which the authors not only explain various measures of capital flight but also compare the estimates of capital flight produced by the different measures. They conclude that although the alternative methodologies may differ in their approaches, the final estimates are very close to each other.

Since the BoP statistics in the earlier period did not have capital account category, the BoP identity for this study can be represented as follows.

$$\underbrace{CA}_{\text{current account}} + \underbrace{PLI + PSI + DI + OI + RES}_{\text{financial account}} + \underbrace{NEO}_{\text{net errors and omissions}} = 0 \tag{1}$$

3.2   Net Errors and Omissions (Residual approach)

The first measure of capital flight is straightforward. It sees NEO itself as unrecorded capital flow; negative NEO would mean that there is a credit entry which is not corresponded by a debit entry. In other words, there is a record in the BoP of country A that money has sent from country A to country B, but there is no corresponding record indicating that country A's claim has increased. Therefore, there is unreported capital outflow, which is defined as capital flight in this study. As briefly mentioned aboe, by definition, NEO represents capital flows that are missing in official statistics for a number of reasons, and this approach considers that NEO mostly consists of unreported capital flows with purpose, rather than errors in producing statistics. This is certainly an arguable assumption, nonetheless, all capital flight measures in the literature consider the residual of the BoP statistics as a core of capital flight, and additionally include other discrepancies such as missing values in trade statistics or in remittance flows. In that sense, one can say that using NEO is one of the least controversial ways available to estimate unrecorded capital flow. By rearranging the BoP identity in (1), NEO can be derived as follows.

$$NEO = -(PLI + PSI + OI + DI + CA + RES) \tag{2}$$

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Equation (2) implies the well-known measure of capital flight, the residual approach. As the term "residual" suggests, the residual approach and NEO are fundamentally based on the same concept. Instead of directly taking NEO from the BoP statistics, many researchers in existing studies have indirectly calculated the residuals using the BoP identity. The reason for this is that external debt in the IMF's BoP statistics is believed to be severely underreported, and therefore, NEO is correspondingly biased. Thus, researchers alternatively have used debt stock data sourced by the World Bank to derive the missing value that is corresponding to NEO in the BoP statistics. Equation (3) and (4) show how NEO and the residual approach are connected to each other, where $\Delta DEBT$, CAD, ΔRES represent change in external debt stock, current account deficit, and change in reserve stock, respectively. To explain more in detail, change in external debt stock means newly added net foreign capital flow excluding foreign direct investment, thus it equals to the sum of net private long and short term investment as well as net of other investment. CA deficit means negative CA, and change in reserve stock means spending of capital in newly bought foreign reserves, thus it is same as the negative of reserve flows. Therefore, what equation (4) says is that capital flight is a discrepancy between the inflow of foreign exchange and the use of it. In other words, the residual approach is essentially estimating NEO in an indirect way by investigating the changes in stocks instead of flows.[1]

$$NEO = -(PLI + PSI + OI + DI - (-CA - RES)) \tag{3}$$

$$= -(\underbrace{\Delta DEBT + DI}_{\text{foreign capital inflow}} - (\underbrace{CAD + \Delta RES}_{\text{use of foreign capital}})) \tag{4}$$

Certainly, the residual approach is a more sophisticated way to recover the missing value in capital flow than directly taking NEO from the BoP, and therefore it would produce more accurate estimate of capital flight than the other. However, given the circumstance that even the BoP statistics is not available for some countries in the sample, it would be risky to apply the residual approach in this study that requires four other variables.[2]

Thus, the first approach of capital flight in this study can be presented such that

$$KF_{i,t}^{NEO} = NEO_{i,t} \tag{5}$$

$KF_{i,t}^{NEO}$ represents capital flight defined as NEO for country i at given year t. Negative

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[1]In order to have a consistent notation, I rearranged the terms so that a negative value of NEO indicates unrecorded capital outflow.

[2]Applying the residual approach can be risky in the sense that it is difficult to calculate the change in external debt outstanding that is adjusted for exchange fluctuations for the period 1950-1970.

value of KF means unrecorded capital outflow, capital flight, and positive value means unrecorded capital inflow to a country.

3.3 "Hot Money" approach

In the "Hot Money" approach, not only NEO but also net private short term capital flow is considered as capital flight. Using the BoP identity, capital flight defined in the Hot Money approach can be presented as follows.

$$NEO + PSI = -(CA + PLI + OI + DI + RES) \tag{6}$$

The Hot Money approach was first introduced by Cuddington (1987) and it pays an additional attention to private short term capital outflow. Therefore, capital fight defined in this approach is not "unrecorded" capital outflow, rather, it is a mix of missing capital flow (NEO) and any speculative, therefore short-term, private capital outflow reported in the BoP. PSI in equation (6) is net private short term capital flow, which is the sum of net private short term inflow and outflow. According to Claessens and Naude (1993), the measure of private short term capital varies; some studies only include short term asset flows, while others include the net of short term flows. In this study, the latter measure is used mainly because majority of the countries in the sample do not have separated categories of capital flow, such as short term asset flow and liability flow, in the BoP statistics during the period 1950-1970. Considering that private capital flow was severely restricted, and there was only limited number of individuals who were able to invest abroad in African countries before the 1970s, it is expected that there is no significant difference between the size capital flight measured by NEO and the Hot Money approach.

The Hot Money approach can be presented such that

$$KF_{i,t}^{HM} = NEO_{i,t} + PSI_{i,t} \tag{7}$$

in which $PSI_{i,t}$ represents the net of private short term capital flow in the BoP.

3.4 Trade Misinvoicing approach

Finally, following Ndikumana et al. (2015), I employ a modified version of NEO in which trade misinvoicing (TM) is also considered.

$$NEO + TM = -(CA + PLI + PSI + DI + OI + RES) + TM \tag{8}$$

Trade misinvoicing means discrepancies between the value of export (or import) reported in African country's trade statistics and the corresponding value of import (or export) reported in partner country's statistics. For a partner country, the industrial countries group is used because they were the main trade parters of African countries in the pre- and the post-colonial period. Since industrial countries are expected to have more credible historical records of trade flows, by comparing reported trade flows between the two, one can see whether the African country underreported or overreported the value of export/import which enables us to conjecture whether there was capital flight from Africa or not. For instance, if the value of export from African country to the industrial group reported by African country is lower than the value of import reported by the industrial group, it means African country underreported the value they received for export. Thus, one can conjecture that the missing value is sent somewhere abroad, which means capital fight from African country. By analogy, overreported value of import by African country in comparison to the export statistics reported by the industrial group also indicates the existence of unrecorded capital outflow from Africa.

However, in order to claim that the discrepancies indicate capital flight, there is a necessary assumption to be made; trade statistics reported by the two groups, African countries and the industrial group, should be accurate. That is to say, there should be no statistical errors and omissions in the trade statistics simply caused by poor measurement system. Unfortunately, it is highly likely that trade statistics of African countries suffer from statistical errors, although indeed one cannot exclude the possibility of intentional under(or over)- invoicing. Therefore, the estimates should be interpreted with caution.[3] The trade misinvoicing approach is presented such that

$$KF_{i,t}^{TM} = NEO_{i,t} + TM_{i,t} \qquad (9)$$

in which $TM_{i,t}$ is the sum of export and import misinvoicing for each African country i in year t, given the share of industrial countries in African country's total export and import. $TM_{i,t}$ is constructed following Ndikumana et al. (2015) and the detail is shown in appendix.

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[3]Credibility of international trade data has been questioned for decades. Morgenstern (1974) is a pioneering study that analyzes dependencies in country-pair official trade statistics before the 1930s. Limitations in data quality is separately discussed in section 5.2.

4 Econometric Model

Since the purpose of the paper is to know the size of capital flight from Africa as well as its relation with taxation, after estimating the size of each African country's capital flight, the econometric analysis is conducted for the period 1950-1970. Due to lack of data availability of explanatory variables, I run a simple model to see a big picture on how the variables are related to each other. Firstly, I run pooled OLS as a baseline model, and then compare its result to that of country and year fixed effect model. Any significant difference between the two results may provide a partial explanation on what is the most relevant variable to capital flight and how it works. Formal expressions of the regression model are as follows, in which (10) presents the OLS model and (11) presents the panel fixed effect model.

$$KF_{i,t} = \beta_0 + \beta_1 \Delta DEBT_{i,t} + \beta_2 TAX_{i,t-1} + \beta_3 COL_{i,t} + \varepsilon_{i,t} \tag{10}$$

$$KF_{i,t} = \beta_0 + \beta_1 \Delta DEBT_{i,t} + \beta_2 TAX_{i,t-1} + \beta_3 COL_{i,t} + \alpha_i + \xi_t + \varepsilon_{i,t} \tag{11}$$

KF is estimated size of capital flight - KF^{NEO} and KF^{TM}.[4] $\Delta DEBT$ and TAX represent change in external debt outstanding and government tax revenue, respectively. Change in external debt is the difference in external borrowing between year t and $t-1$ and captures officially recorded capital inflow to African country i. The debt inflow is one of the standard explanatory variables in the analysis of determinants of capital flight since many studies have shown that capital flight tends to be fueled by external borrowing, which is so called "revolving door". Since the negative value of KF means capital flight, if the result supports the existing studies, expected sign of $\Delta DEBT$ is negative as increased external borrowing would be associated with larger capital flight. Meanwhile, tax revenue proxies a level of taxation of the country, and it is included in the model to see how the size of capital flight is affected by taxation of the country. If the relationship turns out to be significant, then the result may indirectly indicate capital flight motivated by tax evasion. I use one-year lagged tax variable in order to minimize reverse causality problems. If contemporaneous tax revenue is included, it can be the case that higher capital flight leads to lower tax revenue, which is a negative causality directed from capital flight to tax revenue. By including one year lagged tax revenue, the model only examines the effect of last year's taxation on this year's capital flight. To account for political change, colony dummy is included since it is the most available information on a political situation of all countries in the sample. COL takes value 1 when country is under colonization at given year t and otherwise takes value 0. It aims to capture not only the effect of being under

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[4]KF^{HM} is not considered because strictly speaking it cannot be seen as "capital flight" and also because the series closely follows KF^{NEO} in any case.

colonial rule on capital flight but also that of moving from colonization to independence. Although it is desirable to represent money variables as a GDP ratio to understand the relations among variables given the size of the economy, since GDP data is available only for some countries, the variables are represented as they are in USD. α_i and ξ_t represent country and year fixed effect, respectively, and $\varepsilon_{i,t}$ is the usual error term. Fixed effects detect any country-invariable or time-invariable characteristics in the explanatory variables

5   Data

5.1   Data sources

The three estimation approaches introduced in section 3 are constructed based on annual data of disaggregated capital flows as well as net errors and omissions taken from the IMF's Balance of Payments statistics (BoP). Although there is a large variation among countries in terms of data availability, for those who did not go through dissolution or formation of an entity the BoP data covers the whole sample period of 20 years, while for the others data is available for minimum 2 to maximum 15 years.[5] The BoP yearbooks are presented in local currencies from 1950 to 1961 and in current US dollars from 1962 to 1970. In order to present the values in constant US dollars, local currency values are converted into current US dollars using the exchange rate reported in the BoP yearbook for the given years, and again converted to real values using the US producer price index (base 2010=100).[6]

   Given the period and the region this study explores, credibility of data can always be an issue, let alone data availability, even though data collected by the IMF would have met their own standard in the 1950s and 1960s.[7] Thus, I also try alternative balance of payment data whenever possible, to see whether there is a notable difference between the IMF data and the alternative one. 11 countries in the sample have the alternative data which is taken mostly from individual country reports published by the International Bank for Reconstruction and Development (IBRD) and some from works done by individual researchers. The alternative data sources and country list are presented in appendix.

   In addition to the BoP statistics, the trade misinvoicing approach requires international trade statistics. Following Ndikumana et al. (2015), I use the IMF's Direction of Trade

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[5]Ethiopia, Libya, South Africa, and Sudan are the countries who are examined for the whole sample period. Covered period for each country is shown in Table 1 in the next section.

[6]In the case of Ghana, when data is sourced other than the IMF, its exchange rate follows Killick (2010). Until 1965 exchange rate of the Ghana pound (£G) was £G=US $2.8. The new unit of currency introduced in 1965 Summer, the cedi (¢), exchanged at ¢1 = $1.17, but it devalued to ¢1 = $0.98 in 1967.

[7]Poor quality of the IMF's BoP data is discussed in Ndikumana et al. (2015). As introduced in section 3.2, the standard method of estimating capital flight is the residual approach which uses the external debt data from the World Bank since the debt data is severely underreported in the IMF's BoP.

Statistics (DOTS) and calculate discrepancies in the bilateral trade statistics reported by African countries and the industrial country group. Full details of the data construction is described in the appendix. For explanatory variables in the econometric analysis, external debt outstanding and government tax revenue data are obtained mostly from the IBRD external public debt report and individual country reports, respectively.[8] Local currency values are converted into current US dollars using exchange rate provided by the same source as the respective data, and then the values are again converted to 2010 US dollars to be consistent with the estimates of capital flight.

5.2   Limitations on data

Although I compare IMF's BoP data to alternative BoP data, whenever possible, to see how the series are similar (or different) to each other, the quality of data can be always questioned. Robustness and timeliness of economic statistics of African countries have been concerned by many researchers, notably Jerven (2013), who argues that economic statistics of sub-Saharan African countries fail to deliver the actual state of affairs, and thus, any development policy based on official statistics is hard to be successful. It is no question that there must be non-negligible measurement error in African statistics from the 1950s and 1960s. However, unless better-quality historical data is discovered, which is usually unlikely, it is inevitable to work with existing statistics to study African economy in the past.

One of the main concerns regarding African economies in the post-colonial period, although the countries are largely heterogeneous, is that there was a huge gap between "official" exchange rate and parallel market rate. The internal value of local currency had dropped significantly, therefore it provided people incentives to smuggle and even to (secretly) send their money abroad for wealth management, which is capital flight this study is interested in. If that is the case, it is indeed hard to statistically distinguish whether capital flight is driven by taxation of by deprecated exchange rate, simply because parallel exchange rate from that period is available only for limited number of countries, if any. Nonetheless, this study does not directly consider changes in exchange rate as one of the determinants of capital flight, not only because data is unavailable, but also because the years between 1950 and 1970 are not exactly the period when parallel market was serious in African economies. For example, high inflation and low currency value emerged as the main problem in Ghana since the early 1970s (Rimmer (1992)). I rather try to examine

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[8]Specifically, external debt outstanding data for the period 1955-1962 is from IBRD (1963) and Dragoslav Avramovic (1964) and for 1963-1967 is from IBRD (1969). Tax revenue of Ghana is taken from Rimmer (1992)

how taxation was related to unreported capital outflow, given political situation - a change from colonization to independence, which in a big picture implies macroeconomic change in the countries. Nevertheless, it would be desirable to include black market exchange rate in the econometric analysis, if reliable dataset is discovered.

Meanwhile, international trade statistics also has been questioned about its reliability. Morgenstern (1974) shows that correspondences in bilateral trade statistics of gold shipments among advanced economies until the 1930s are very poor, and therefore, it is doubtful whether data can be used to prove theoretical points of international trade. In his study, various explanations on the reason why such discrepancies occur are reviewed, such as false declarations, recording time lags, and differences in clarifications. However, intentional trade misinvoicing motivated for capital flight is not considered. On the contrary, Federico and Tena (1991) argues that reliability of pre-World War II foreign trade statistics improves quite a lot when it is considered in aggregation. This paper exactly uses the same dependencies in international trade statistics, however, views it not as poor quality statistics, but as an intentional gap in statistics that is systematically created through trade misinvoicing. The trade misinvoicng approach has been used in literature of capital flight, but no study applied it to African countries in the 1950s to 1960s. Considering that there is a possibility of errors in trade statistics, I try to be as cautious as possible when I interpret capital flight estimated by trade misinvoicing in the next section.

6 Results

This section provides the estimates of capital flight as well as the results of regression model, and tries to interpret the results of selected countries based on their political situation in the period 1950-1970. 22 African countries for maximum 20 years are examined to estimate the size of capital flight, whereas econometric analysis is conducted based on data of 12 countries due to lack of data availability on taxation and external debt.

6.1 Estimates of capital flight

First of all, in order to get a sense to what extent the IMF's BoP statistics is reliable, I compare NEO reported by the IMF and that by alternative sources for those whose alternative balance of payment data is available. I found alternative sources, mostly the IBRD reports, for a half of the sample.[9] In Figure 1, two NEO series (unweighted average per year) of 11 countries are presented; the blue line represents the average NEO taken

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[9]The only country that has alternative source other than the IBRD is Ghana. The source for Ghana is Rimmer (1992).
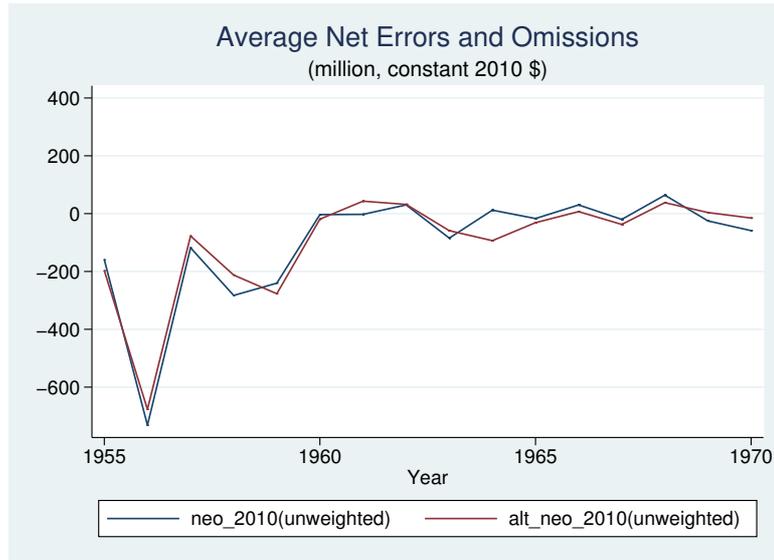
Figure 1: Comparison between the IMF's BoP and BoP from alternative sources

from the IMF's BoP and the red line from alternative sources. Between 1955 and 1970, the series highly overlap each other and correlation between the two is 0.72. Although this correlation might imply that the IMF and the IBRD used the same national sources for their data collection, that is not the case certainly for all countries. The purpose of this comparison is to show that, for the given period, it seems unlikely to find BoP data that is significantly different from the IMF's BoP yearbook.

Table 1 presents estimates of the average and the cumulative sum of capital flight from each country for the period 1950-1970. South Africa is the only country that does not report trade data in the DOTS during the sample period, therefore only KF^{NEO} and KF^{HM} estimates are shown. There are nine countries - Democratic Republic of Congo (D.R. Congo), Egypt, Ethiopia, Ghana, Libya, Morocco, Somalia, South Africa, and Sudan - whose capital flight is estimated throughout (almost) the whole sample period, from the early 1950s to 1970, and the rest of the sample is covered mainly for the 1960s. In most cases, the estimates produced by KF^{NEO} and KF^{HM} are close to each other as expected, which indicates that private short term investment did not seem to play a big role, at least judged by official statistics, in capital outflow from African countries before 1970. Almost half of the countries in the sample, 12 out of 22, show negative NEO, therefore there was capital flight. D.R. Congo is the only country whose sign of KF^{NEO} and KF^{HM} are different from each other; on average, there was 9.6 million USD of unrecorded capital inflow estimated by KF^{NEO} but 16.6 million USD of capital flight by KF^{HM}, which means there was a large amount of private capital outflow from D.R. Congo.

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Table 1: Capital flight from 22 African countries, 1950-1970 (million, constant 2010 $)

Country	Period	Average			Cumulative			% of GDP (1970)
		KF^{NEO}	KF^{HM}	KF^{TM}	KF^{NEO}	KF^{HM}	KF^{TM}	KF^{TM}
Algeria	1967-70	15.10	11.53	-893.32	60.43	46.14	-3573.27	(-)15.80
Benin	1965-68	17.20	25.78	-16.59	68.79	103.14	-66.36	(-)4.08
Chad	1961-70	28.59	28.15	-87.53	85.77	84.45	-262.60	(-)12.04
Congo, Dem. Rep.	1950-59, 65-69	11.25	-7.60	-892.39	146.29	-98.84	-11601.05	(-)47.93
Egypt	1950-59, 66-70	-4.30	-4.57	-588.48	-55.95	-59.40	-7650.20	(-)21.42
Ethiopia	1950-70	-11.25	-13.85	-322.08	-236.34	-290.94	-6763.66	NA
Gabon	1964-70	-1.57	-13.52	-271.23	-4.72	-40.56	-813.69	(-)54.05
Ghana	1950-70	15.72	29.18	-142.19	251.48	466.87	-2275.03	(-)22.09
Kenya	1959-70	11.70	4.79	-174.67	93.63	38.36	-1397.34	(-)18.74
Liberia	1953-59, 64-67	-38.38	-38.38	927.99	-268.69	-268.69	927.99	NA
Libya	1950-70	-73.45	-66	-340.64	-1175.25	-1055.87	-5450.24	NA
Malawi	1964-70	-7.50	-1.99	-144.92	-45.05	-11.96	-869.54	(-)64.38
Morocco	1952-70	-202.94	-210.20	-780.45	-3247.08	-3363.21	-12487.25	(-)67.88
Nigeria	1954-70	56.20	126.63	-522.40	618.17	1392.98	-5746.39	(-)9.85
Sierra Leone	1959-70	7.86	21.03	-232.29	62.89	168.21	-1858.29	(-)92
Somalia	1951-70	-6	-4.43	-95.11	-47.96	-35.47	-760.85	NA
South Africa	1950-70	210.02	233.77	NA	4410.49	4909.26	NA	NA
Sudan	1950-70	6.56	19.94	-191.27	137.75	418.74	-4016.66	(-)41.13
Tanzania	1961-70	-70.60	-72.97	100.47	-635.40	-656.70	904.02	NA
Tunisia	1957-70	-71.87	-59.78	-322.19	-1006.13	-836.91	-4510.73	(-)67.41
Uganda	1962-70	-4.76	-5.65	-297.04	-23.82	-28.27	-1485.20	(-)25.36
Zambia	1964-70	-159.79	-335.94	-498.68	-1118.5	-2351.55	-3490.77	(-)41.97

Notes: Negatives denote outflows, positives inflows.

On the other hand, KF^{TM} suggests that most of countries had capital flight, and for some countries the size of capital flight was particularly large. Given that the idea of using trade misinvoicing approach is to see the discrepancies between trade statistics reported by industrial and African countries, these huge negative values mean that either the quality of African trade statistics is terribly poor or there was indeed significant unrecorded capital outflow by means of trade misinvoicing, or also highly possibly both. On average, Liberia and Tanzania are the only two countries who did not seem to have capital flight measured by the trade misinvoicing approach, whereas sizable capital flight is captured NEO and the hot money approach. Overall, the correlation between KF^{NEO} and KF^{TM} is 0.47 for the whole sample period, while KF^{NEO} and KF^{HM} are nearly perfectly correlated, especially in the 1950s. Changes in correlation between the 1950s and 1960s imply that the role of trade misinvoicing in capital flight significantly emerged in the later period.

The average movements of unreported capital flow are visualized in Figure 2. The left figure shows a simple unweighted average of each estimates per year, while the right one shows GDP weighted averages which are only available for the 1960s. In both figures, according to NEO and the hot money approach, capital flight hardly seems to be a problem for African countries in the aggregated level as the blue and the red lines are around zero

Table 2: Correlation matrix

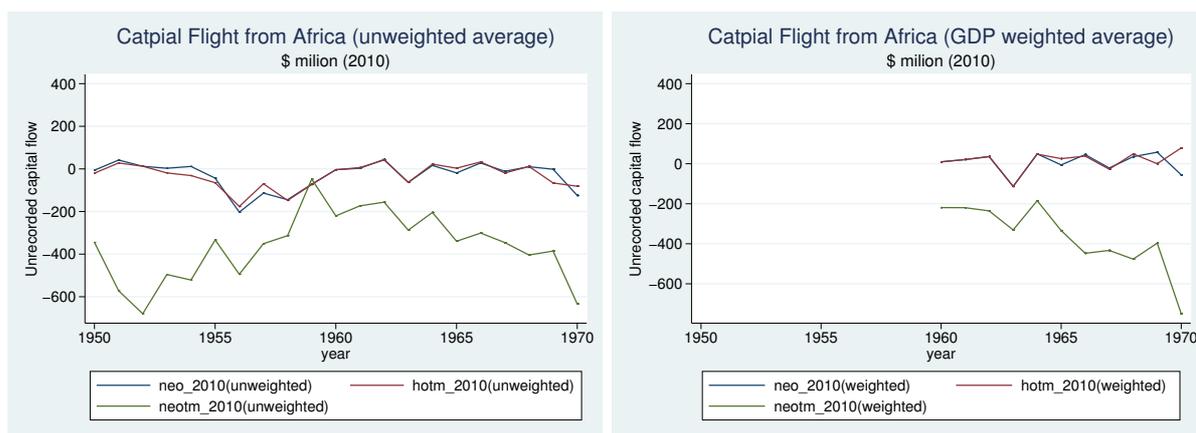| | 1950-1970 | | | 1950s | | | 1960s | | |
	KF^{NEO}	KF^{HM}	KF^{TM}	KF^{NEO}	KF^{HM}	KF^{TM}	KF^{NEO}	KF^{HM}	KF^{TM}
KF^{NEO}	1			1			1		
KF^{HM}	0.90	1		0.97	1		0.86	1	
KF^{TM}	0.47	0.41	1	0.66	0.66	1	0.37	0.29	1

Figure 2: Average capital flight from 22 African countries

throughout the sample period, except between 1955 and 1960.[10] In the appendix, country-specific figures are presented for selected countries .

In contrast, the trade misinvoicing approach, the green line, clearly indicates that there had been large and consistent capital flight from these countries. Furthermore, it is worth discussing changes of the green line over time. As mentioned earlier, in this approach huge negative value of the estimates might also simply indicate poorer statistical measurements and institutions in African countries compared to industrialized countries, rather than intentional trade misinvoicing to keep money abroad. If poor institutional quality in Africa was the main driver of the large discrepancy in trade statistics, it should be the case that the discrepancy decreases over time, or at least stays at the similar level, as the institutional quality is supposed to improve in these countries. Although it does not look at exactly the same period, Morgenstern (1974) finds that, by comparing international trade statistics between advanced countries for the periods from 1900 to 1913 and 1931 to 1936, discrepancies in the statistics are much smaller for the later period. However, Figure 2 seems to tell a different story. After some decreases in the average capital flight during the

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[10]Note that the red line in the left figure represents the same unweighted average of NEO as in Figure 1. However, the magnitude of them are slightly different from each other because in Figure 1 only 11 countries who have both IMF's BoP and alternative balance of payment data are considered, whereas in Figure 2, all countries in the sample except for South Africa are included.

1950s, it increases again until finally reaches more than 600 million USD in 1970. In other words, if we assume that there was institutional improvement, or at least no deteriorated statistical quality, in Africa during the 1960s, the result suggests that there indeed might have been a noticeable and increasing amount of unrecorded capital outflow from African countries since the 1960s. Overall, countries who had the largest KF^{TM} between 1950 to 1970 include Morocco, D.R. Congo, Egypt, Ethiopia, and Nigeria, whose cumulative size of capital flight is estimated to be over 5 billion USD (base=2010).

The estimates seem to be consistent with the estimates by Ndikumana and Boyce (2002b) which are done for the period 1970-1996 using the trade misinvoicing approach that is constructed in the same way as in this study. 11 countries in my sample are examined in their study as well, and among them D.R. Congo, Nigeria, and Zambia turn out to be the top three countries who had the highest KF^{TM} both in this study and in Ndikumana and Boyce (2002b).[11] Also, the last three countries who had only limited size of capital flight are commonly reported to be Kenya, Ghana, and Malawi in both studies. This result implies that countries who had high (or low) capital flight in the 1950s-1960s tend to keep a high (or low) level of capital flight in the 1970s-1990s. Therefore, the comparison seems to support the argument of high persistence in capital flight, which is referred to as "habit formation" in the literature.

6.2 Drivers of capital flight

This section provides a result of pooled OLS and fixed effect regression model introduced in section 4 to see how the size of capital flight is associated with national taxation. Out of the full sample, only 12 countries - Ethiopia, Kenya, Malawi, Morocco, Nigeria, Sierra Leone, Somalia, Sudan, Tanzania, Tunisia, Uganda, and Zambia - are used in the econometric part due to lack of available data on taxation and external debt. Nevertheless, the result shows some interesting indication on the relationship among tax revenue, external debt, colonization, and capital flight. Note that since negative value of the dependent variable means capital flight, a coefficient with negative sign indicates larger capital flight associated with one unit increase in the given explanatory variable. Standard errors are clustered at the country level.

Table 3 compares the result of pooled OLS and country fixed effect model. Firstly, the most noticeable finding is that colony dummy consistently shows the opposite effect on two

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[11]In Ndikumana and Boyce (2002b), all countries are equally examined more than 20 years, whereas in this study the covered period varies among countries, and therefore the cumulative sum of capital flight does not always give much insights. Thus, I use the order of countries with highest average capital flight in my study to compare with the order of countries with highest cumulative capital flight in Ndikumana and Boyce (2002b).

Table 3: Capital flight determinants - Pooled OLS vs. FE

	(1)NEO	(2)NEO	(3)NEO	(4)TM	(5)TM	(6)TM
Tax revenue	0.00651	-0.0340	-0.0936	-0.231***	-0.144	-0.396**
	(0.0362)	(0.105)	(0.168)	(0.0412)	(0.190)	(0.178)
Debt change	-0.00383	-0.0338	-0.0816	-0.138*	-0.101	-0.160
	(0.0439)	(0.0469)	(0.0640)	(0.0683)	(0.0636)	(0.106)
Colony	-281.2***	-240.8***	-309.6***	301.3***	270.4***	169.5
	(18.44)	(31.98)	(97.99)	(46.14)	(53.83)	(145.8)
Constant	-9.801	25.57	9.019	-44.81	-117.9	-563.3***
	(18.29)	(84.04)	(89.70)	(47.11)	(151.9)	(77.73)
Year fixed effects	No	No	Yes	No	No	Yes
Country fixed effects	No	Yes	Yes	No	Yes	Yes
Observations	64	64	64	64	64	64
R^2	0.0800	0.0642	0.258	0.274	0.0413	0.299

Standard errors in parentheses

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

different estimates of capital flight; it is significantly negative when the dependent variable is KF^{NEO} and positive when it is KF^{TM}. Considering that colony dummy represents whether African country was under colonial rule or not in a given year, the result can be interpreted such that countries under colonialism had larger negative NEO, while African countries who became independent had bigger capital flight through trade misinvoicing. The effect remains significant when a country fixed effect is introduced in col (2),(4),(6),(8), which means that the colony effect is not something country-specific, as most countries in the sample had a colonial period, and rather the effect may be commonly related to African countries' post-independence economic and political system.

In the meantime, one year lagged tax revenue shows a negative coefficient in all regression models except for col (1), in which capital flight is proxied by NEO in the pooled OLS model. Especially, the effect is significantly associated with KF^{TM}, which means that African countries who had higher tax revenue in the previous year had larger capital flight through trade misinvoicing. The effect remains significant when country and year fixed effects are considered in col (6), therefore one can interpret the result such that the relationship between high taxation and larger capital flight in African countries is not driven by any unvarying characteristics, and furthermore it indirectly supports the hypothesis that there might be a causal relationship between tax evasion and capital flight. However, surely

more observations and correspondingly more sophisticated econometric analysis should be conducted to argue a causality between capital flight and tax evasion. Change in external debt outstanding also shows an expected sign, although the coefficient is only significant in col (4) at the 10 percent level. The result is in line with existing studies arguing that higher external borrowing triggers larger capital flight.

To summarize, the two parts of the analysis have found the following observations about capital flight during the period 1950-1970. Firstly, capital flight is not particularly noticed when it is proxied by NEO, but as soon as the trade misinvoicing measure is employed, there seems to be clear unreported capital outflows whose size is sufficiently great for some countries. Secondly, independence from colonial rule, higher taxation and external borrowing are significantly associated with larger capital flight through trade misinvoicing. However, external borrowing loses its significant effect when fixed effects are considered in the regression, thus it is likely that the "revolving door" effect is limited to certain countries or time periods.

7   Country-specific discussion

In this section, I conduct a case study with selected countries to investigate possible justifications that might be connected to the results found in this study. In order to choose the sample countries, I plot KF^{TM} and tax revenue over the sample period, and then select countries who are covered for the longest possible period, have sufficiently long enough time-series data on tax revenue, and show increasing amount of capital flight simultaneously with increasing tax revenue. There are only a few countries who meet all the requirements. For example, among the top five countries with highest cumulative capital flight - Morocco, D.R. Congo, Egypt, Ethiopia, and Nigeria - D.R. Congo and Egypt have no tax data for any period at all, whereas Morocco and Nigeria either shows no noticeable relationship between taxation and capital flight over time or has no sufficiently long period of tax data. Finally, I pick Ethiopia, Ghana, and Tanzania for a case study, which can show heterogeneity in unrecorded capital flows from African countries. Time series plots of these countries in Figure 3-5 present a clear negative association of unrecorded capital flow and government tax revenue.[12]

7.1   Ethiopia

Ethiopia is one of the few countries who have both capital flight estimate and tax revenue data for the whole sample period. In the 1950s, Ethiopia had huge unrecorded capital

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[12]Plots for other countries are shown in appendix.

Figure 3: Times series of capital flight and tax revenue: Ethiopia

outflows, however, its magnitude had rapidly decreased between 1955 and 1960, although it seems there was slightly increased unrecorded capital outflow in the late 1960s. Meanwhile, tax revenue had consistently increased over time in Ethiopia, but this increase does not seem to be related to the size of capital flight. Overall, compared to other African countries, although Ethiopia shows high cumulative sum of capital flight, it shows a stable and little movement in unrecorded capital flow in the 1960s. This might be related to the fact that, unlike other African countries in the sample, Ethiopia was not under a colonial rule during the sample period and therefore did not experience decolonization, and also it was under the same leader, Emperor Haile Selassie I, who ruled the country from 1930 to 1974.

7.2 Ghana

Ghana is a country that shows a clear and consistently increasing divergence between tax revenue and unrecorded capital flow; as tax revenue increased, capital flight also increased. Contrary to Ethiopia, unrecorded capital flow keeps going further negative between 1955 and 1970, therefore, it is likely that Ghana indeed had some degree of capital flight before 1970. However, it is important to notice that the magnitude of capital flight is different from that of Ethiopia and Tanzania. Although capital flight seems to be real in Ghana in the 1960s, its absolute size is much smaller than the others. Ndikumana and Boyce (2002b) also estimate that Ghana is a country that had relatively little capital flight in the period 1970-1996, whose cumulative capital flight by 1996 takes "only" 4.2 % of its GDP in 1996. In the 1960s, Kwame Nkrumah was in power in Ghana, who was the first president of Ghana
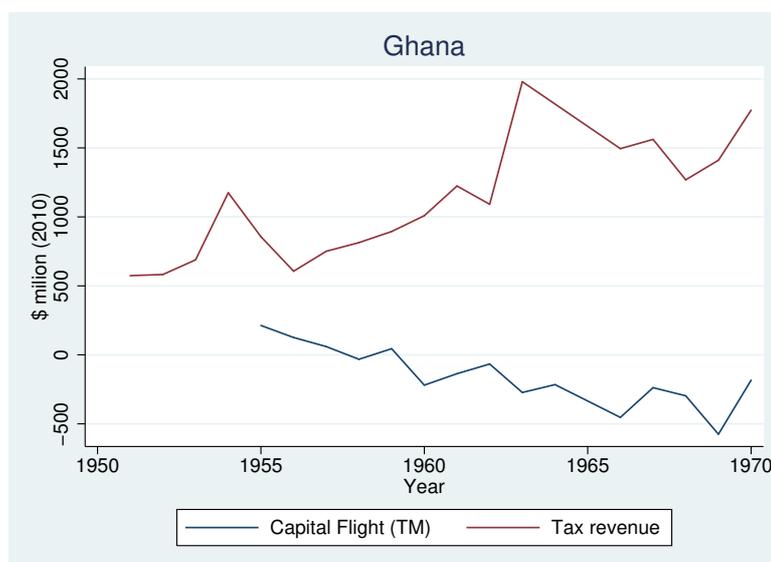
Figure 4: Times series of capital flight and tax revenue: Ghana

after its independence from Great Britain in 1957. During the period, especially between 1961 and 1965, taxation in Ghana was high by the standards of developing countries since Nkrumah, as a socialist leader, had a skeptical view on foreign investment inflow (Rimmer (1992)). In other words, Ghana depended more on national tax rather than on foreign capital in that period, thus, increasing taxation and overall small size of capital flow that are shown in the plot are consistent with historical records. Given that, there are two possible reasons that could explain increased capital flight from Ghana. The first reason is that during the period Ghana had import licensing system, which generated lots of abuse and corruption, and the second is that Nkrumah himself was reported to accumulate personal wealth abroad. According to a national report on Nkrumah's wealth, Nkrumah possessed about 265,862 British pounds abroad by the year 1966, which included properties in Cairo and Morocco as well as bank accounts in the Midland bank in South Kensington and the Swiss Bank Incorporated in Zürich (Ghana (1966)). It is highly unlikely that Nkrumah's private wealth management abroad was actually recorded in the official BoP statistics or in trade statistics, however, one can presume that it could be easy to send money abroad without a report for a group of people who had some power, even if that was import license, because licensees got access to foreign exchange at lower prices than a market rate.
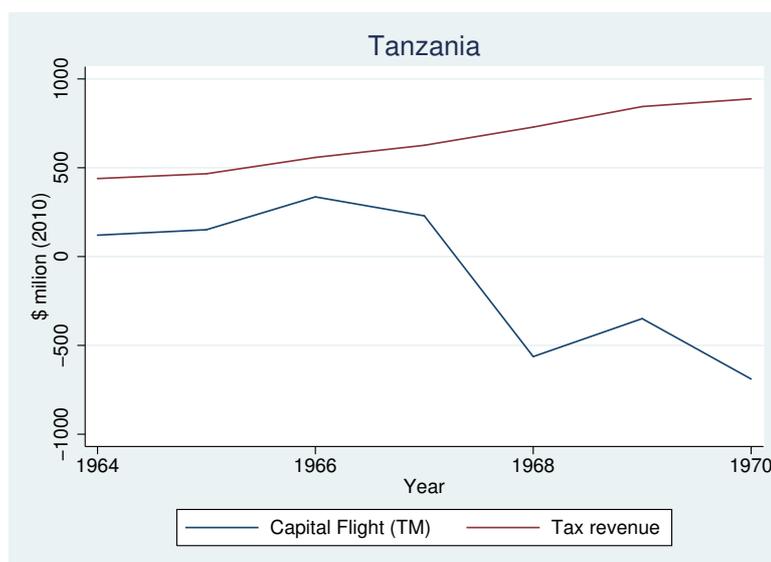
Figure 5: Times series of capital flight and tax revenue: Tanzania

7.3 Tanzania

Tanzania is an interesting case because during the initial few years after the independence in 1961, there was actually unrecorded capital "inflow" to the country, therefore, capital flight was not an issue in Tanzania until 1967. Indeed, between 1961 and 1967 is considered as the period with overall macroeconomic stability (Bigsten and Danielsson (1999)). The year 1967, however, became a watershed in Tanzania history due to the Arusha Declaration launched by the President Julius Nyerere, who believed in "African socialism". As a result, similarly to other African countries in the post-colonial period, Tanzania as well tried to reduce external dependency and achieve economic growth through central planning. Furthermore, ideas of development economics that emphasized creating and protecting infant industries were prevailed in the country. Therefore, high taxation on the agricultural sector was used to finance infant industries which were supposed to lead the country to rapid industrial development. The result was the emergence of a privileged political-economic elite - industrial workers, technocrats, managers, and economic planners - and later on the emergence of a parallel economy, which involved large numbers of public officials (Lofchie (2014)). Although Nyerere was strongly against corruption, it seems his economic policy, which transferred resources from the majority of poor farmers to industrial workers, helped create a possibility of capital flight that appeared after the Arusha Declaration.

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8 Conclusion

This paper finds that capital flight existed in the pre-1970 period (1950-1970) in some African countries, notably Morocco, D.R. Congo, Egypt, Ethiopia, and Nigeria, according to the order of highest cumulative capital flight through trade misinvoicing. Although one can argue that discrepancies in bilateral trade statistics, which is what the trade misinvoicing approach captures, might actually mean statistical errors due to different trade recording rules rather than intentional unreported capital flow, if a country presents significantly increased discrepancies over time, it is worth investigating the background and the possible reasons of it. In this study, Ghana, Tanzania, and Zambia are such countries whose size of capital flight got significantly larger in 1970 compared to that in the early 1960s. Meanwhile, econometric analysis supports the hypothesis that African countries who had higher national taxation and external borrowing also had larger capital flight.

Given these two sets of results, I look at Ethiopia, Ghana, and Tanzania more in detail to understand economic and political situation of the countries in the period 1950-1970 and to see how they can be connected to the results of this study. One common phenomenon in the post-colonial Africa was that country leaders pursued economic growth within African socialism, which is in favor of afrocentric economic model as opposed to an dependence on external aid. Therefore, the countries seek more internal way, which is taxation, rather than Western capital to finance economic growth. Consequently, African socialism combined with policies oriented by development economics generated "wrong" distribution in wealth, which contributed to the emergence of parallel economy in the later period in the 1970s. Overall, there is a significant relationship between taxation and capital flight, although it is not sufficient to claim that tax evasion was the cause of capital flight in Africa during the pre-1970s. It can be the case either that tax payers turned to tax avoiders due to high taxation, or that people who attempted capital flight are only a few privileged industrial workers rather than ordinary tax payers engaged in agricultural sector. Although findings in this study should be interpreted with caution as quality of statistics on African countries can always be questioned, they also open a new question on tax payers and new elite class in decolonized Africa.

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A   Data description

Table 4: Variables: definitions and sources

Variable	Definition	Source
Net errors and omissions		
NEO	Net errors and omissions	BoP, IMF
NEO^A	Net errors and omissions (alternative)	Reports, IBRD
"Hot Money" approach		
PSI	Net private short term investment	BoP, IMF
NEO	Net errors and omissions	BoP, IMF
Trade misinvoicing		
XIC	Exports to ADV countries reported by AFR country	DOTS, IMF
PXIC	Exports to ADV countries reported by ADV country	DOTS, IMF
MIC	Imports from ADV countries reported by AFR country	DOTS, IMF
PMIC	Imports from ADV countries reported by ADV country	DOTS, IMF
CIF	CIF/FOB factor	DOTS, IMF
Econometric analysis		
Δ DEBT	Change in external public debt outstanding	Reports, IBRD
TAX	Sum of direct and indirect tax revenue	Reports, IBRD
COL	Currently under colonial rule=1	

Notes: Data is yearly data. The data is converted into current USD (2016) using CPI inflation calculator available at http://data.bls.gov/cgi-bin/cpicalc.pl.

Table 5: Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
ifs_code	641.876	137.273	199	754	290
ppi2010	18.611	1.438	15.415	21.508	290
gdp_current	2709805585.683	3386348557.583	187300310.22	17907392984.206	140
neo_2010	293.464	3743.787	-1442.254	56556.633	279
alt_neo_2010	605.680	5452.921	-1272.374	56556.633	131
prvs_2010	1.598	104.669	-1038.872	674.834	255
hotm_2010	-6.166	243.145	-1442.877	966.341	245
dxic	-34218771.251	72340299.362	-492820000	153500000	219
icxs	0.73	0.194	0.144	0.997	209
dmic	-7691680.986	44908868.525	-138840000	263700000	219
icms	0.726	0.136	0.34	1	212
tm_2010	-324.39	397.228	-2394.13	994.428	209
neotm_2010	-353.737	447.883	-2410.088	927.986	209
tax_rev_2010	858.827	581.300	67.247	2538.613	119
d_debt_2010	118.552	270.264	-1192.269	1192.543	70
col	0.203	0.403	0	1	290

Notes: gdp_current, dxic, and dmic are represented in US dollar, while the other capital flow variables are in millions of US dollar. icxs and icms are a ratio, and col is a dummy.

B   Data construction: trade misinvoicing approach

Following Ndikumana et al. (2015), trade misinvoicing is constructed such that

$$TM_{i,t} = \frac{DXIC_{i,t}}{ICXS_{i,t}} + \frac{DMIC_{i,t}}{ICMS_{i,t}} \tag{12}$$

$$DXIC_{i,t} = (XIC_{i,t} * CIF_t) - PXIC_{i,t} \tag{13}$$

$$DMIC_{i,t} = (PMIC_{i,t} * CIF_t) - MIC_{i,t} \tag{14}$$

in which negative value represents unrecorded capital outflow from African countries.

- $DXIC_{i,t}$: export discrepancies with the industrialized countries

- $PXIC_{i,t}$: value of imports from the African country as reported by the industrialized trading partners

- $XIC_{i,t}$: African country's exports to industrialized countries as reported by the African country

- CIF_t: costs of freight and insurance (c.i.f/f.o.b factor)

- $DMIC_{i,t}$: import discrepancies with the industrialized countries

- $MIC_{i,t}$: African country's imports from industrialized countries as reported by the African country

- $PMIC_{i,t}$: value of exports from the industrialized countries as reported by the industrialized trading partners

- $ICXS_{i,t}$: share of advanced economies in the country's total exports

- $ICMS_{i,t}$: share of advanced economies in the country's total imports

C   Time-series plot: capital flight and tax revenue

Sudan

Tunisia

Uganda

Zambia