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Capital Flight from Africa: New Estimates, 1950–1970

Given ongoing discussion in the literature concerning capital flight from developing to developed countries, this study examines whether African countries experienced noticeable capital flight in the post-WWII period, and if that was the case, how it was related to taxation of the countries. First, it presents new estimates of capital flight from 22 African countries for the period 1950–1970 using three methods; net errors and omissions in balance of payments statistics, the 'Hot Money' approach, and the trade misinvoicing approach. Then, I statistically examine the relationship between the size of capital flight and government tax revenue. The findings suggest that the relationship between capital flight and taxation is highly heterogeneous among countries; the absolute size of capital flight is positively associated with tax revenue, but the result is reversed once country-specific factors are considered in the analysis.

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 based on three standard measures used in the literature: net errors and omissions in the balance of payments 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 standard determinants of capital flight such as external debt, GDP growth, and political stability. 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.

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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 simultaneously being substantially financed by public external borrowing. 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[1] argues that 39.5% of Africa's GDP was lost due to capital flight as of 2010, whereas Ndikumana, Boyce and Ndiaye[2] show that the accumulated capital flight of 18 African countries by 2010 exceeded their combined GDP. Evidence in recent studies further suggests that African countries would have been able to grow faster if the capital had been invested domestically and had not fled abroad.[3] Nonetheless, most studies on capital flight from Africa have focused on the period since 1970 and have not adequately explored why and when this problem first began and 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 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 a real but still controllable problem immediately after the Second World War, and that tax evasion may have been one of the main motivations for capital flight during that period, if any.

In the literature, there have been a number of studies conducted on the size of capital flight from developing countries using various measures. Among them, Ndikumana et al.[4] is one of the most recent studies to 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 discrepancies 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 emerge as key drivers in their results. Meanwhile, Ali and Walters[5] estimates capital flight from 37 African countries from 1980 to 2005, using the residual measure, and argues that capital flight is explained by policy distortions, relative riskiness, and poor profitability of

1 J. W. Henry, The Price of Offshore Revisited. Technical report, Tax Justice Network 2012.

2 L. Ndikumana, J. K. Boyce and A. S. Ndiaye, Capital Flight from Africa. Measurement and Drivers, in: S. I. Ajayi and L. Ndikumana (ed.), Capital Flight from Africa. Causes, Effects, and Policy Issues, Oxford 2015.

3 AfDB, OECD, UNECA, and UNDP, African Economic Outlook, Paris 2012.

4 Ndikumana et al. (see note 2)

5 A. Ali and B. Walters, On the Causes of Capital Flight from Sub-Saharan Africa (Working paper), University of Manchester 2011.

investments. Fedderke and Liu[6] is the closest paper to this one, in that 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 examining long-term determinants of capital flight. Furthermore, not only was their focus not on the origins of capital flight from Africa, but also taxation was not considered or found to be one of the determinants of capital flight.

Nonetheless, this paper is not the first to study South-North capital flight before 1970. For example, Host-Madsen[7] presents the statistics for capital outflow from Latin America between 1953 and 1963, concluding that there is no evidence of systematic massive capital flow from developing to developed countries, whereas Diamond[8] analyses the pattern of private capital flows for the world by looking at the changes in long-term and short-term flows in the International Monetary Fund (IMF)'s Balance of Payments (BoP) statistics. Although these studies look at a similar period as this paper, 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. Therefore, almost none of the studies attempt to estimate the size of capital flight from Africa before 1970, let alone look at the relationship with the standard determinants of capital flight since the 1970s.

The main reason why existing studies in the literature on capital flight from Africa usually investigate the period from the 1970s is simply that it is hard to obtain capital flow data for many African countries for the period before 1970, and even if the data exist, the quality of the data is often 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 national and international sources. Also, it uses the most basic econometric model to examine the relationship between the variable of interest in this study, national taxation, and the size of capital flight. In a sense, it conducts a very similar analysis to Ndikumana et al.,[9] but only changes the sample period from the post-1970s to the pre-1970s.

Overall, this paper contributes to the literature by providing new estimates of capital flight from Africa using different approaches for a period that has not yet been studied. This study, however, largely limits itself to the quantitative analysis, estimating the size of capital flight and investigating a statistical relationship between tax revenue

6 J. W. Fedderke and W. Liu, Modelling the Determinants of Capital Flows and Capital Flight. With an Application to South African Data from 1960 to 1995, in: Economic Modelling 19/3, 2002, pp. 419–444.

7 P. Host-Madsen, How Much Capital Flight from Developing Countries?, in: Fund and Bank Review 2/1, 1965, pp. 25–33.

8 M. Diamond, Trends in the Flow of International Private Capital, 1957–65, in: Staff Papers, International Monetary Fund 01/14, 1967, pp. 1–42.

9 Ndikumana et al. (see note 2).

and capital flight, since it is risky to derive an argument on tax evasion as the main motive for capital flight from African countries in the pre-1970s, specifically because 1) there is always a data quality issue for African countries in the 1950s and 1960s, which affects the econometric analysis, and 2) as the panel regression results suggest, there is a high level of heterogeneity among African countries, which means that each country is very likely to have country-specific determinants of capital flight that can be statistically examined only when country-level time-series data are available. Rather, this study aims to shed light on the birth of capital flight from Africa by presenting new estimates of capital flight as well as its relationship with national taxation that are produced by careful and conservative methodologies possible.

The rest of the paper is organized as follows: Section 2 briefly elaborates on the background of this study. 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 describes data and related issues, and Section 5 presents the estimates of capital flight as well as the econometric results on the relationship between national taxation and capital flight. Section 6 concludes.

Background

Since the global financial crisis in 2007, the economic damage caused by international tax evasion has received much attention both from policy and academia. Consequently, the financial crisis has pushed another related issue – the illicit flight of capital from poor to rich countries – into the background, but that is just as essential in terms of international taxation and cross-border capital flows. The starting point of this paper is to renew the analysis on capital flight and international tax evasion from developing countries. As mentioned in the previous section, capital flight from developing countries and its relationship with international tax evasion in the pre-1970s period has yet to be the subject of extensive examination. A series of economic analyses such as Cobham, Jansky and Prats,[10] Reuter,[11] Lessard and Williamson[12] have quantified capital flight and the resulting tax losses for non-Western countries in the medium term. However, most studies focusing on capital flight begin with the financial liberalization in the 1970s and 1980s, without looking at the previous decades. This shortcoming reinforces the notion that capital flight is a recent issue, which derives from the fact that discussions

10 A. Cobham, P. Jansky and A. Prats, Estimating illicit Flows of Capital via Trade Mispricing. A Forensic Analysis of Data on Switzerland, (Working Papers 350), Center for Global Development 2014.

11 P. Reuter, Draining Development? Controlling Flows of Illicit Funds from Developing Countries, World Bank 2012.

12 D. R. Lessard and J. Williamson, The Problem and Policy Responses, in: D. R. Lessard and J. Williamson (ed.), Capital Flight and Third World Debt, Washington 1987.

on tax evasion in developing countries are often correlated with the question of the fairness of Third World debt, a debate that came to the fore with the onset of the 1982 financial crisis in Chile. On a practical level, this chronological limitation is the result of easy online access to trade and financial statistics for the past four decades provided by international organizations. In other words, it is hard to obtain reliable financial statistics on developing countries, especially African countries, during the 1950s–1960s, unless one goes through the archives of international organizations, which are not available online in most cases. Furthermore, the correlation between tax policies in developing countries and capital flight is studied to an even lesser degree, while the tax losses resulting from the outflow of wealth are discussed in the literature. In short, from a macroeconomic point of view, while international tax evasion in developing countries remains an understudied field of inquiry overall, the birth of the problem in the immediate post-war period is a completely unexplored subject.

Measures of Capital Flight

Balance of Payments Identity

Today's BoP statistics published by the IMF largely consist of current account, capital account, and financial account. Current account (CA) represents the value of a 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 payments identity. To explain in more 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 this

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 dollars, and then one can know that country B had unrecorded capital outflow of 100 US dollars 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 did not have a capital account category in the earlier period that I am interested in, the BoP identity for this study can be represented as follows:

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

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 without a corresponding debit entry. In other words, there is a record in the BoP of country A that money has been 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 described above, by definition, NEO represents capital flows that are missing in official statistics for a number of reasons, and the NEO approach considers that NEO mostly consists of intentionally unreported capital flows, rather than simple 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. In that sense, one can say that using NEO is one of the least controversial ways available in the literature to estimate unrecorded capital flow. By rearranging the BoP identity in (1), NEO can be calculated as follows:

$$NEO = -(PLI+PSI+OI+DI+CA+RES) \quad (2)$$

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 is that, as reviewed in Lessard and Williamson[13] and

13 Lessard et al. (see note 12).

Ndikumana et al.,[14] 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 corresponds to NEO in the BoP statistics. Equation (3) and (4) show how NEO and the residual approach are connected to each other, where ΔDEBT, CAD, ΔRES represent change in external debt stock, current account deficit, and change in reserve stock respectively. To explain in more detail, change in external debt stock means newly added net foreign capital flow excluding foreign direct investment, thus it equals 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.[15]

$$NEO = -\big(PLI + PSI + OI + DI - (-CA - RES)\big) \quad (3)$$

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

Certainly, the residual approach is a more sophisticated way to recover the missing value in capital flow than directly taking NEO from the BoP. On the other hand, however, NEO is believed to 'underreport' the external borrowing, therefore, using NEO as a proxy for capital flight will produce the minimum level of estimated capital flight compared to the estimates calculated by other measures.

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

$$KF_{it}^{NEO} = NEO_{it} \quad (5)$$

where KF_{it}^{NEO} represents capital flight defined as NEO for country i at given year t. Negative value of KF means capital flight, and positive value means unrecorded capital inflow to a country.

'Hot Money' Approach

In the 'Hot Money' approach, not only NEO, but also net private short-term capital flow is considered as capital flight. The Hot Money approach was first introduced by Cuddington[16] and it pays additional attention to private short-term capital outflow. Therefore, capital fight defined in this approach is not 'unrecorded' capital outflow,

14 Ndikumana et al. (see note 2).

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

16 J. Y. Cuddington, Macroeconomic Determinants of Capital Flight. An Econometric Investigation, in: D. R. Lessard and J. Williamson (ed.), Capital Flight and Third World Debt, Washington 1987, pp. 85–100.

rather, it is a mix of missing capital flow (NEO) and any speculative, therefore short-term, private capital outflow reported in the BoP. According to Claessens and Naude,[17] 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 the majority of the countries in the sample do not have detailed categories of capital flow in the BoP statistics during the period 1950–1970. Private capital flow was severely restricted and only a limited number of individuals were able to invest abroad in African countries before the 1970s.I It is therefore expected that there would be no significant difference between the size of capital flight measured by NEO and the Hot Money approach. If indeed there is a considerable difference between the two estimates, it is likely that wealthy individuals or private firms actively participated in the process of capital flight by investing in assets abroad.

The Hot Money approach can be presented such that

$$KF_{it}^{HM} = NEO_{it} + PSI_{it} \quad (6)$$

where PSI_{it} represents the net of private short-term capital flow in the BoP.

Trade Misinvoicing Approach

Finally, following Ndikumana et al.,[18] I employ a trade misinvoicing (TM) approach, which is a modified version of NEO. The TM approach considers not only NEO, but also trade misinvoicing as a part of capital flight. 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 the partner country's statistics. As a partner country, the industrialized countries group is used because they were the main trade partners of African countries in the pre and post-colonial periods. Since industrialized 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 under (or over) reported the value of export (or import) which enables us to conjecture whether there was capital flight from Africa or not. For instance, if the value of export from an African country to the industrialized country group reported by that African country is lower than the value of import reported by the industrialized country group, it means the African country underreported the value received for export. Thus, one can conjecture that the missing value is sent somewhere abroad, which means capital flight from the African country. By analogy, the overreported value of import by an African country in comparison to the export statistics reported by

17 S. Claessens and D. Naude, Recent Estimates of Capital Flight (Policy Research Working Paper Series 1186), World Bank 1993.

18 Ndikumana et al. (see note 2).

the industrialized country 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 industrialized country group – should be accurate. That is to say, there should be no statistical errors and omissions in the trade statistics simply caused by a 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.[19] If capital flight measured by the TM approach turns out to be considerably larger than NEO, it would indicate that African exporters (or importers) under (or over) reported significant values of their trade in order to secretly keep them abroad. One can thus focus on whether African countries had any major change in their trade-related regulations to find a potential cause of capital flight. In the later part of paper, I show that this might indeed be the case for some African countries.

The TM approach is presented such that

$$KF_{it}^{TM} = NEO_{it} + TM_{it} \quad (7)$$

where TM_{it} is the sum of export and import misinvoicing for each African country i in year t, given the share of industrialized countries in African country's total export and import. TM_{it} is constructed following Ndikumana et al.[20] and the detail is shown in the appendix.

Data

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 BoP statistics. Although there is a large variation among countries in terms of data availability, for those that did not go through colonization (or dissolution), the BoP data cover the whole sample period of 20 years, while for the others, the data coverage is minimum 2 to maximum 15 years.[21] The BoP yearbooks are

19 Credibility of international trade data has been questioned for decades. O. Morgenstern, On the Accuracy of Economic Observations. Foreign Trade Statistics, in: J. N. Bhagwati (ed.), Illegal Transactions in International Trade, Amsterdam 1974 is a pioneering study that analyses dependencies in country-pair official trade statistics before the 1930s. Limitations in data quality are separately discussed in section 4.2.

20 Ndikumana et al. (see note 2).

21 Ethiopia, Libya, South Africa, and Sudan are the countries examined for the whole sample period. The period covered for each country is shown in Table 1 in the next section.

presented in local currencies from 1950 to 1961 and in current US dollars (USD) from 1962 to 1970. In order to present the values in constant USD, local currency values are converted into current USD 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).[22]

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 standards.[23] I therefore also try BoP data from alternative sources whenever possible to see whether there is a major difference between the IMF data and the alternative ones. In the sample, 11 countries have alternative data, taken mostly from individual country reports published by the International Bank for Reconstruction and Development (IBRD)[24] and some from works done by individual researchers. The alternative data sources and country list are presented in the appendix.

In addition to the BoP statistics, the TM approach requires international trade statistics. Following Ndikumana et al.,[25] I calculate discrepancies in the bilateral trade statistics reported by African countries and the industrialized country group using the IMF's Direction of Trade Statistics (DOTS). Full details of the data construction are described in the appendix. For explanatory variables in the econometric analysis, external debt outstanding is obtained mostly from the IBRD external public debt report and government tax revenue data from individual country reports.[26] Local currency values are initially converted into current USD using the exchange rate provided by the sources of respective data, and then converted again to 2010 USD to be consistent with the estimates of capital flight.

Limitations on Data

Although I use alternative data sources to complement the statistics from the IMF and the IBRD whenever possible, the quality of data can always be questioned. Robust-

22 In the case of Ghana, when data is sourced somewhere other than the IMF, its exchange rate follows T. Killick, Development Economics in Action. A Study of Economic Policies in Ghana, Routledge 2010.

23 Poor quality of the IMF's BoP data is discussed in Ndikumana et al. (see note 2). 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 are severely underreported in the IMF's BoP.

24 IBRD, External pubic debt. Estimated service and principal amounts (Technical Report EC-115), International Bank for Reconstruction and Development 1963 and IBRD, External public debt past and projected amounts of outstanding, transactions and payments: 1963–1977 (Technical Report EC-167), International Bank for Reconstruction and Development 1969.

25 Ndikumana et al. (see note 2).

26 Specifically, external debt outstanding data for the period 1955–1962 is from IBRD, 1963 (see note 24) and Dragoslay Avramovic et al., Economic Growth and External Debt, The World Bank 1964; and for 1963–1967 is from IBRD, 1969 (see note 24). Tax revenue for Ghana is taken from D. Rimmer, Staying Poor. Ghana's Political Economy, 1950–1990, Oxford 1992.

ness and timeliness of economic statistics of African countries have been a subject of concern by many researchers, and notably Jerven[27] argues that economic statistics of sub-Saharan African countries fail to deliver the actual state of affairs, therefore making it hard for any development policy based on official statistics to be successful. Certainly, there must be non-negligible measurement errors in African statistics from previous periods. However, until better quality historical data are discovered, working with existing statistics to study the African economy in the past is inevitable.

One of the main concerns about studying African economies in the post-colonial period – although it is not the case for all countries – is that there was a huge gap between the 'official' exchange rate and the parallel market rate. The internal value of local currency dropped significantly, therefore it is possible that there was an incentive for wealthy people to (secretly) send their money abroad for wealth management. If that is the case, it would be hard to tell to what extent capital flight is driven by high taxation and by a depreciated exchange rate, simply because the parallel exchange rate from the post-colonial period is available only for a limited number of countries, if any. Nonetheless, this study does not directly consider changes in the exchange rate as one of the determinants of capital flight, not only because data are unavailable, but also, more importantly, because the years between 1950 and 1970 are not exactly the period when a parallel market prevailed in African economies. For example, in Ghana, high inflation and low currency value only emerged as the main economic troubles from the early 1970s.[28] Therefore, this study instead tries to examine how national taxation was related to unreported capital outflow, given a political change from colonization to independence.

Meanwhile, the reliability of international trade statistics has also long been questioned. Morgenstern[29] shows that correspondences in bilateral trade statistics of gold shipments among advanced economies until the 1930s are very poor, therefore, it is doubtful whether data can be used to prove any theoretical points of international trade. He reviews various possible reasons for discrepancies in statistics such as false declarations, lags in recording time, and differences in clarifications, but a capital flight motive is not considered in his paper. By contrast, Federico and Tena[30] argues that the reliability of foreign trade statistics in the pre-World War II improves substantially when the statistics are considered in aggregation. In a similar vein, this paper views the discrepancies in international trade statistics as an intentional gap that is systematically created through trade misinvoicing for capital flight, rather than

27 M. Jerven, Poor Numbers. How We Are Misled by African Development Statistics and What to Do about It, Ithaca 2013.

28 Rimmer (see note 26).

29 Morgenstern (see note 19).

30 G. Federico and A. Tena, On the Accuracy of Foreign Trade Statistics (1909–1935). Morgenstern revisited, in: Exploration in Economic History 28, 1991, pp. 259–273.

poor quality statistics. The TM approach has frequently been used in the literature of capital flight, but no study has applied it to African countries in the period covering the 1950s and 1960s.

Results

Since the purpose of this paper is to estimate the approximate size of capital flight from Africa as well as its statistical relationship with national taxation, I first calculate the size of capital flight from each African country in the sample, using the three approaches elaborated in the previous section, and then conduct a simple econometric analysis to investigate how capital flight is associated with taxation in these countries. To estimate the size of capital flight, 22 African countries are examined for a maximum of 20 years, whereas the econometric analysis is conducted based on data for 12 countries due to lack of data availability on taxation, external debt, and GDP, which are key explanatory variables in the regression model.

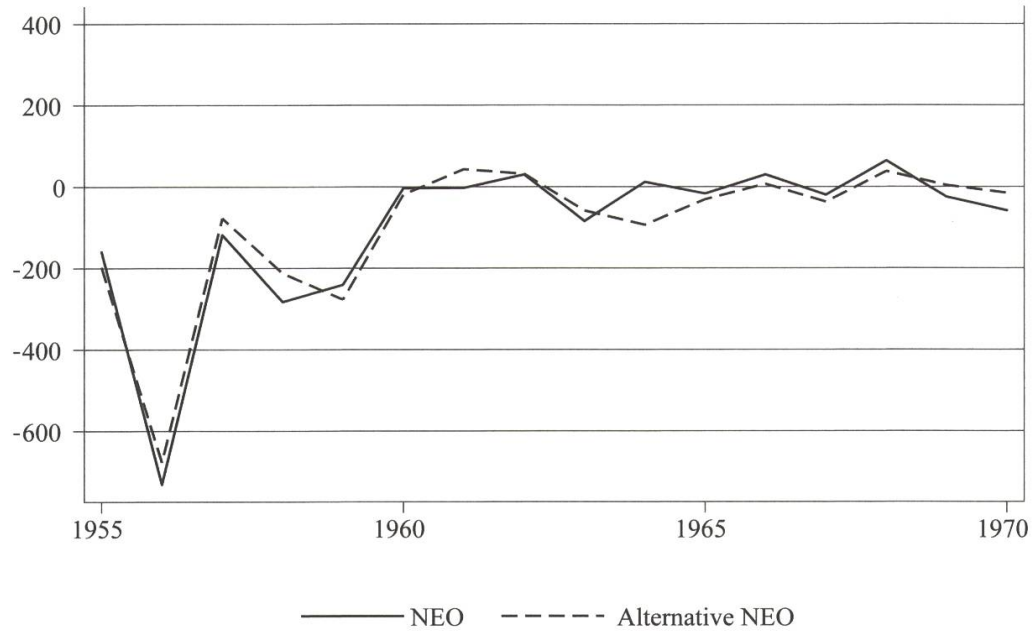
Estimates of Capital Flight

In order to get a sense of the extent to which the IMF's BoP statistics are reliable, I first compare NEO reported by the IMF and by alternative sources for those countries whose alternative BoP data are available. I found alternative sources, mostly the IBRD reports, for a half of the sample.[31] Figure 1 presents two NEO series (unweighted simple average per year) of 11 countries; the solid line represents the average NEO taken from the IMF's BoP and the dashed line from the alternative sources. The series highly overlap each other with a correlation of 0.72. The high correlation may suggest that the IMF and the IBRD simply used the same national sources for their data construction. Nevertheless, the purpose of this comparison is to show that, for the given period, it seems unlikely that we will find BoP data for African countries which differ significantly from IMF data.

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 to not report trade data in the DOTS during the sample period, therefore only KF^{NEO} and KF^{HM} estimates are shown. There are 9 countries – Democratic Republic of Congo (D.R. Congo), Egypt, Ethiopia, Ghana, Libya, Morocco, Somalia, South Africa, and Sudan – whose capital flight is estimated for (almost) the whole sample period. The rest of the sample is covered mainly for the 1960s. In general, the estimates produced by KF^{NEO} and KF^{HM} are close to each other, which indicates that reported private

31 Ghana is the only country with an alternative source other than the IBRD, which is Rimmer (see note 26).

Figure 1: BoP Data from the IMF and Alternative Sources.
Average Net Errors and Omissions (million, constant 2010 $)



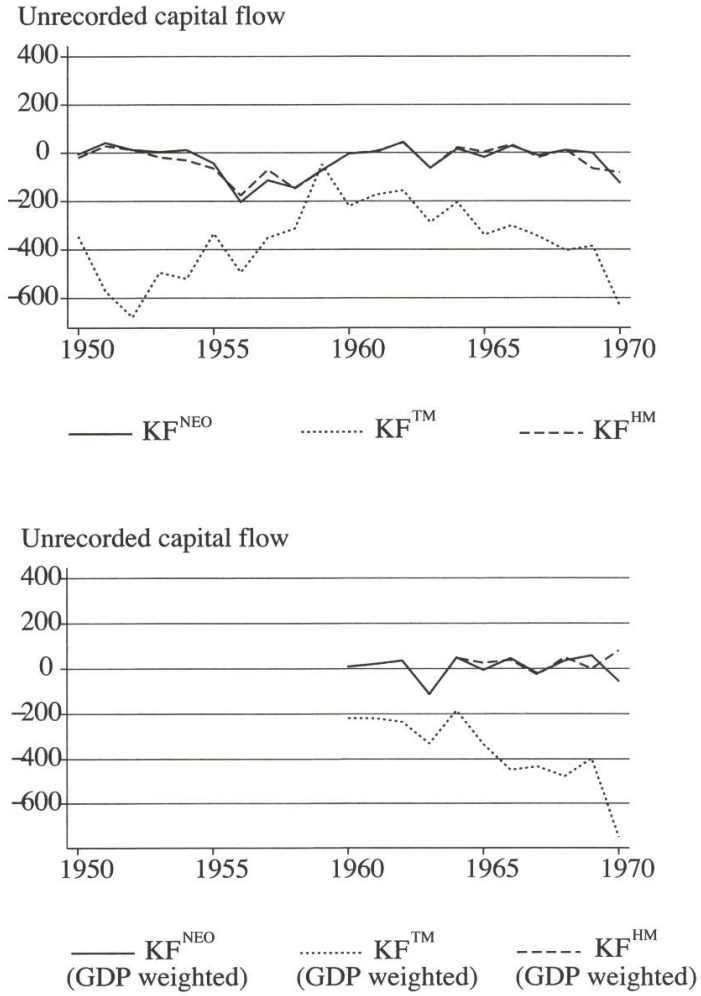
short-term investment did not seem to play a big role in capital outflow from most African countries before 1970. D.R. Congo is the only country whose sign of KF^{NEO} and KF^{HM} are different from each other. On average, 9.6 million USD of unrecorded capital inflow to the D.R. Congo is estimated by KF^{NEO}, whereas according to KF^{HM}, 16.6 million USD is detected as capital flight from the country, which suggests that there was a large amount of private short-term capital outflow from the D.R. Congo. On the other hand, the estimates by KF^{TM} indicate that the majority of countries in the sample had capital flight, and the size of capital flight was particularly large for some countries. Considering that the TM approach captures the discrepancies between trade statistics reported by African countries and their trading partners, these huge negative values mean that either the quality of African trade statistics is terribly poor compared to the statistics of their partner countries or there was indeed a significant amount of unrecorded capital outflow through trade misinvoicing, or also very possibly both. Liberia and Tanzania are the only two countries who did not show any evidence of capital flight measured by the TM approach. Overall, the correlation between KF^{NEO} and KF^{TM} is 0.47 for the whole sample period, while the correlation for the 1950s and the 1960s is 0.66 and 0.37 respectively. This noticeable change in correlation between the two periods implies that trade misinvoicing played a bigger role in capital flight in the later period.

The average estimates of capital flight are visualized in Figure 2. The figure on the left shows a simple average of each estimate per year, while the figure on the right shows a GDP weighted average, which is available only for the 1960s. In both fig-

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	15.1	11.53	-893.32	60.43	46.14	-3573.27	(-)15.80
Benin	1965–68	17.2	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	-262.6	(-)12.04
Congo, Dem. Rep.	1950–59, 1965–69	11.25	-7.6	-892.39	146.29	-98.84	-11601.05	(-)47.93
Egypt	1950–59, 1966–70	-4.3	-4.57	-588.48	-55.95	-59.4	-7650.2	(-)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	11.7	4.79	-174.67	93.63	38.36	-1397.34	(-)18.74
Liberia	1953–59, 1964–67	-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	-7.5	-1.99	-144.92	-45.05	-11.96	-869.54	(-)64.38
Morocco	1952–70	-202.94	-210.2	-780.45	-3247.08	-3363.21	-12487.25	(-)67.88
Nigeria	1954–70	56.2	126.63	-522.4	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	-70.6	-72.97	100.47	-635.4	-656.7	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	-1485.2	(-)25.36
Zambia	1964–70	-159.79	-335.94	-498.68	-1118.5	-2351.55	-3490.77	(-)41.97

Figure 2: Average Capital Flight from 22 African Countries ($ million, 2010)



ures, according to KF^{NEO} and KF^{HM}, capital flight hardly seems to be a problem for African countries in the aggregated level as the solid and the dashed lines only move around zero throughout the whole sample period.[32]

By contrast, capital flow measured by KF^{TM} (the dotted line) clearly indicates that there had been large and consistent capital flight from Africa, and furthermore, the average size of capital flight had increased over the 1960s. As mentioned earlier, in this approach, the huge negative value of the estimates may also simply suggest poor statistical institutions in African countries compared to industrialized countries, rather than intentional trade misinvoicing to keep money abroad. However, if poor institutional quality in Africa is the true explanation for the large discrepancy in trade

32 Note that the solid line in the left figure represents the same average of NEO as in Figure 1. However, the magnitude is slightly different from each other because Figure 1 only includes 11 countries whose alternative BoP data are available, while Figure 2 includes all countries in the sample except for South Africa.

statistics, it should be the case that the discrepancy decreases, or at least stays at a similar level, throughout the sample period, based on the assumption that institutional quality is supposed to improve over time in these countries.[33]

However, Figure 2 seems to suggest a different story. After some decreases in average capital flight during the 1950s, it increases again until it finally reaches more than 600 million USD in 1970. In other words, if we assume that there was institutional improvement or at least no deterioration in statistical quality in African countries during the 1960s, the result suggests that there might indeed have been a noticeable and increasing amount of capital flight since the 1960s. Countries with the largest capital flight include Morocco, D.R. Congo, Egypt, Ethiopia, and Nigeria, whose cumulative size of capital flight between 1950 and 1970 is estimated to be over 5 billion USD. These estimates seem to be consistent with the findings by Ndikumana and Boyce (2003), who examine capital flight from Africa for the period 1970–1996 using the TM approach. Of the countries in my sample, 11 are also investigated in Ndikumana and Boyce (2003), and in both studies D.R. Congo, Nigeria, and Zambia emerge as the top three countries with the highest capital flight, whereas Kenya, Ghana, and Malawi are the countries with only a limited size of capital flight.[34] This consistency in the results suggests that countries with high (or low) capital flight in the 1950s–1960s tend to keep a high (or low) level of capital flight in the 1970s–1990s, which supports the argument of high persistence in capital flight in the literature, for instance, "a habit-forming" effect as described in Ndikumana and Boyce (2003).

Drivers of Capital Flight

This subsection provides results of the pooled OLS and the country fixed effect regression model to see how capital flight is associated with national taxation. Ndikumana et al. (2015) uses a dynamic regression model without a country fixed effect; however, I also use the fixed effect model for comparison purposes since it seems there is substantial heterogeneity among African countries. Due to lack of available data on taxation and external debt, the number of total observations is quite small, between 34 to 72. I therefore limit the number of explanatory variables to two in every regression model.[35]

33 For example, by comparing international trade statistics between advanced countries for the periods from 1900 to 1913 and 1931 to 1936, Morgenstern (see note 19) finds that discrepancies in the statistics are much smaller for the later period.

34 In Ndikumana, L. and J. K. Boyce, Public Debts and Private Assets. Explaining Capital Flight from Sub-Saharan African Countries. World Development 31/1, 2003, pp. 107– 130, all countries are studied for more than 20 years, whereas in this paper, the period covered varies among countries. Therefore, the cumulative sum of capital flight does not always give much insight. Instead, I use the order of countries with the highest average capital flight in my study to compare with the highest cumulative capital flight in Ndikumana and Boyce.

35 12 countries – Ethiopia, Kenya, Malawi, Morocco, Nigeria, Sierra Leone, Somalia, Sudan, Tanzania, Tunisia, Uganda, and Zambia – are included from the full sample.

Although there are several potential determinants of capital flight that are confirmed in the existing studies, such as change in debt, lagged value of capital flight, inflation, GDP growth, and political stability, this study focuses on the explanatory power of national tax revenue on capital flight, given another key determinant of capital flight. Thus, the dependent variable is the size of capital flight estimated in the previous subsection, and the explanatory variables include tax revenue, stock of external debt, growth in external debt, GDP growth, and the Polity index, while tax revenue is the only fixed explanatory variable and each of the other variables are used one by one as a covariate in each regression. In order to minimize reverse causality, one-year lagged tax revenue and stock of external debt are used. Capital flow, tax revenue, external debt, and GDP are shown as 2010 USD in million, unless otherwise stated. Note that for convenience of interpretation, a negative value of capital flow is transformed into a positive value, so that a positive coefficient indicates larger capital flight associated with one unit increase in the given explanatory variable. The econometric model and detailed description on the variables are presented in the appendix.

Table 2 compares the result of pooled OLS (in panel A) and country fixed effect model (in panel B) when capital flight, tax revenue, and stock of external debt are presented as a share of GDP. By presenting the key variables as a share of GDP, it aims to account for the effect of taxation on capital flight, given each country's economic size. The dependent variable is capital flight measured by KF^{NEO} (col (1)–(3)) and by KF^{TM} (col (4)–(6)). What is most noticeable is that the explanatory variables are only statistically significant in the fixed effect model, when capital flight is measured by KF^{TM}. This indicates that there is a high level of heterogeneity in the relative size of capital flight in African countries, and that the statistically significant relationship between the explanatory variables and capital flight is only detected when unobserved country-specific characteristics are removed in the fixed effect model. For example, some countries traditionally might have had a high level of tax revenue as well as capital flight relative to GDP for a number of potential reasons. The results in col (4)–(6) in panel B indicate that, considering such country-specific characteristics, countries with a high level of tax revenue as a share of GDP in the previous year had a relatively smaller level of capital flight through trade misinvoicing as a share of GDP this year. Stock of external debt shows an expected positive relationship with the size of capital flight; however, it is not statistically significant. Column (6) in panel B suggests that more politically stable countries tend to have less capital flight, and the significant negative relationship between tax revenue and capital flight still survives, given political stability of a country. Meanwhile, in panel A, none of the models seem to adequately explain the determinants of capital flight, although column (1) indicates that countries with higher taxation also have a higher level of capital flight.

Table 2: Capital Flight, Tax Revenue, External Debt: Share of GDP

Panel A. Pooled OLS	(1) KF^{NEO}	(2) KF^{NEO}	(3) KF^{NEO}	(4) KF^{TM}	(5) KF^{TM}	(6) KF^{TM}
Tax revenue (-1)	0.0988*	0.0743	0.0619	-0.303	-0.0594	-0.147
	(0.04)	(0.05)	(0.04)	(0.23)	(0.19)	(0.18)
External debt (-1)	-0.0336			0.211		
	(0.02)			(0.12)		
Debt growth		-0.00568			0.279	
		(0.07)			(0.21)	
Polity			0.00139			-0.0246
			(0.00)			(0.02)
Constant	-0.641*	-0.909	-0.785	3.957	4.471	5.629*
	(0.34)	(0.65)	(0.47)	(2.24)	(3.05)	(3.03)
Observations	38	34	48	38	34	48
R2	0.126	0.082	0.073	0.181	0.048	0.046
Panel B. Fixed Effect						
Tax revenue (-1)	0.114	0.111	0.0627	-0.362***	-0.441**	-0.251**
	(0.09)	(0.08)	(0.06)	(0.09)	(0.16)	(0.10)
External debt (-1)	-0.0334			0.00821		
	(0.07)			(0.14)		
Debt growth		0.0658			0.139	
		(0.08)			(0.22)	
Polity			0.00146			-0.0336***
			(0.00)			(0.00)
Constant	-0.815	-1.383	-0.793	8.235**	8.806***	6.772***
	(1.56)	(0.90)	(0.74)	(3.07)	(1.60)	(1.12)
Observations	38	34	48	38	34	48
Number of countries	10	9	10	10	9	10
R2	0.038	0.057	0.02	0.063	0.096	0.158

Standard errors in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Capital Flight, Tax Revenue, External Debt: Level

Panel A. Pooled OLS	(1) KF^{NEO}	(2) KF^{NEO}	(3) KF^{NEO}	(4) KF^{NEO}	(5) KF^{TM}	(6) KF^{TM}	(7) KF^{TM}	(8) KF^{TM}
Tax revenue (-1)	0.0374	-0.0219	-0.0201	-0.0657	0.326**	0.263***	0.194***	0.163*
	(0.04)	(0.03)	(0.02)	(0.06)	(0.14)	(0.06)	(0.04)	(0.09)
External debt (-1)	-0.0512				-0.0379			
	(0.03)				(0.11)			
Debt growth		0.0158				0.164		
		(0.07)				(0.10)		
GDP growth			-0.318				3.272	
			(1.07)				(4.81)	
Polity				0.44				-2.626
				(0.37)				(1.50)
Constant	25.07	16.8	7.611	103.4	-0.256	-18.04	76.42	148.5
	(17.72)	(16.85)	(9.80)	(91.38)	(71.66)	(69.11)	(50.57)	(157.40)
Observations	53	48	47	72	53	48	46	71
R2	0.048	0.007	0.009	0.028	0.297	0.308	0.211	0.081
Panel B. Fixed Effect								
Tax revenue (-1)	0.148	0.0201	-0.0309	-0.336**	0.274	0.157	-0.0997*	-0.286*
	(0.09)	(0.12)	(0.07)	(0.15)	(0.46)	(0.23)	(0.05)	(0.15)
External debt (-1)	-0.0678				-0.11			
	(0.08)				(0.15)			
Debt growth		0.0853**				0.0186		
		(0.04)				(0.12)		
GDP growth			-0.0411				1.771	
			(1.36)				(5.43)	
Polity				1.841*				-0.621
				(1.00)				(0.89)
Constant	-54.08	-29.67	17.63	355.6**	137.3	95.82	401.3***	583.2***
	(55.41)	(102.10)	(66.40)	(139.80)	(239.90)	(198.00)	(55.89)	(139.30)
Observations	53	48	47	72	53	48	46	71
Number of countries	13	12	10	13	13	12	10	13
R2	0.033	0.016	0.003	0.246	0.033	0.015	0.023	0.117

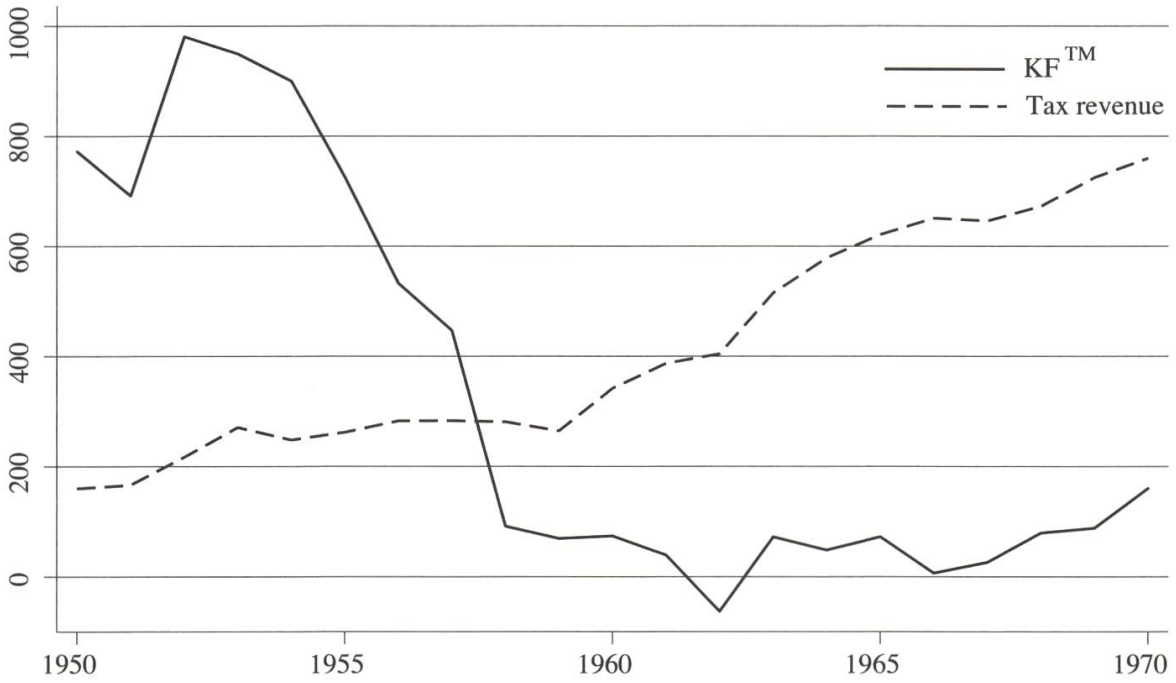
Standard errors in parentheses: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

For comparison purposes, I next run the same regression model in Table 3, but in the level of the variables rather than its share of GDP. The level of capital flight is also used as a dependent variable in Ndikumana and Boyce.[36] By looking at the level of capital flight, Table 3 shows how each explanatory variable is associated with the absolute size of capital flight, rather than its size relative to GDP. Nonetheless, GDP growth is included in columns (3) and (7) as a covariate, to examine whether tax revenue plays any role in capital flight, even if a country's economic growth is considered as a determinant of capital flight. First of all, col (5)–(8) in panel A show a positive coefficient for tax revenue that is statistically significant in all columns, which suggests that countries with a higher absolute size of tax revenue also have a larger absolute size of capital flight. However, in panel B of col (7)–(8), the coefficients for tax revenue are negative and significant, which is the opposite to the results in panel A. These opposing results between the two models seem to suggest that the effect of taxation on capital flight is highly country-specific, and therefore heterogenous among African countries.

Some consistent findings in Table 2 and 3 are as follows. First, lagged value of tax revenue is significantly associated with the size of capital flight, thus there seems to be a statistical relationship between the two variables, although it is difficult to figure out a causal direction. Second, the pooled OLS model and the country fixed effect model produce qualitatively different – opposing – results, which indicates that country-specific effects play an important role in explaining capital flight from each country. If we focus on the absolute size of capital flight, regardless of country-specific characteristics, high taxation is indeed related to high capital flight through trade misinvoicing, as shown in Table 3. However, this is not the case if we are more interested in capital flight as a share of GDP. Even if the absolute size of capital flight is large and significantly affected by taxation, often its share relative to GDP is not large enough or not significantly associated with taxation to be picked by the regression model in Table 2. Once country-specific effects are considered in the regression model, then both in Tables 2 and 3 (panel B) the coefficients for tax revenue become significantly negative, which means that given the mean level of tax revenue and capital flight of each country, increased (or decreased) tax revenue actually related to decreased (increased) capital fight. One of the possible interpretations of the negative relationship between tax revenue and capital flight in the fixed effect model would be that if both tax revenue and capital flight are persistent variables, the one-year lagged value of tax revenue is not enough to tackle the reverse causality between taxation and capital flight. The ideal econometric model for the persistence issue would be a dynamic panel model, as in Ndikumana and Boyce.[37] However,

36 Ndikumana et al. (see note 34).
37 Ibid.

Figure 3: Time Series of Capital Flight and Tax Revenue ($ millions, 2010): Ethiopia



it could not be employed in this study due to the numbers of observations being too small. Finally, there is evidence that political stability is associated with lower capital flight levels through trade misinvoicing, but when capital flight is measured by NEO, there is a positive relationship between political stability and capital flight at the 10% significance level.

Country-Specific Discussion

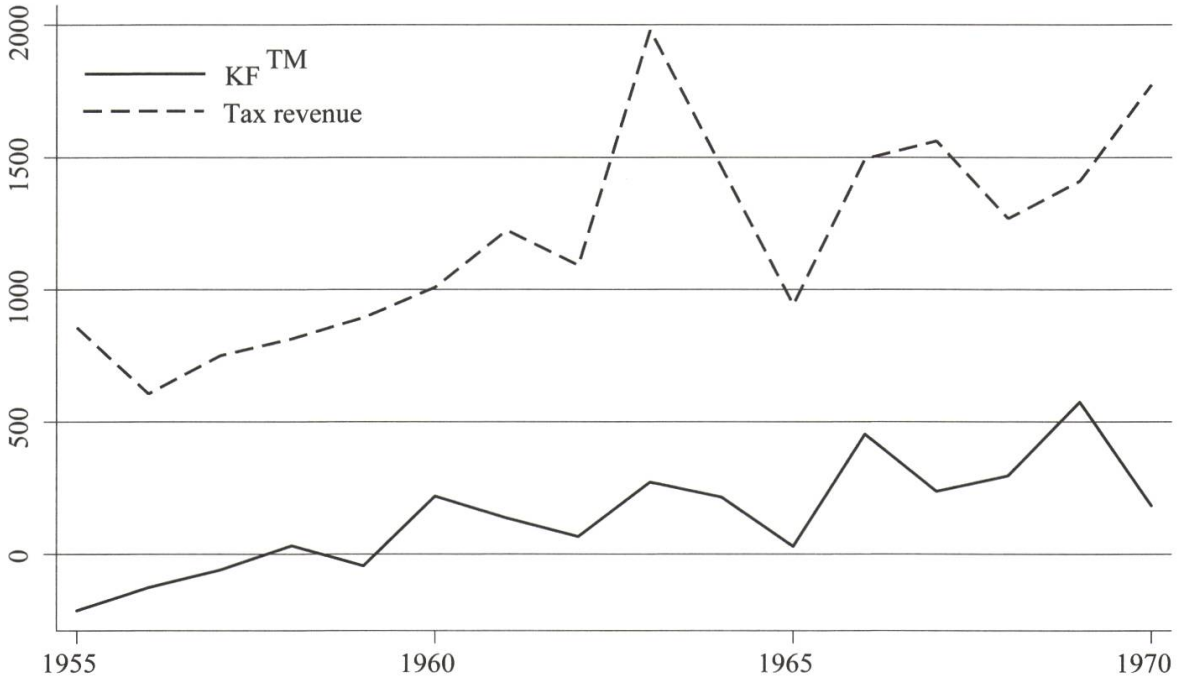
In this subsection, I briefly discuss how the panel regression results, which tell the overall relationship among the variables across the countries, can be interpreted in a country-specific way, by selecting countries with long enough time series data on capital flight (KF^{TM}) and tax revenue in the sample. There are only a few countries who meet the requirement. For example, among the top five countries with the largest size of cumulative capital flight – Morocco, D.R. Congo, Egypt, Ethiopia, and Nigeria – no reliable tax data can be found for D.R. Congo or Egypt, whereas Morocco and Nigeria neither show noticeable relationship between taxation and capital flight nor have a sufficiently long period of tax revenue data. Ethiopia and Ghana are finally chosen for the discussion, not because these countries show the clearest relationship between tax revenue and capital flight, but because they have data on the two variables that are covered for the longest period, almost the whole sample period, and therefore play a bigger role in producing the regression results than other countries do. The aim of a

country-specific discussion is to see how the selected countries fit into the regression results, rather than uncovering the country-specific motives of capital flight from selected countries, which is beyond the scope of this paper, since finding statistical evidence of potentially various country-specific determinants of capital flight requires econometric analysis with sufficiently long enough time series data at country level.
Time series plots of capital flight and tax revenue in Ethiopia and Ghana are presented in Figure 3 and 4 respectively. A positive value of KF^{TM} means there was capital flight, while a negative value means there was an unrecorded capital inflow to the country.

Ethiopia
Ethiopia is one of few countries to have both the estimate of capital flight and tax revenue data for the whole sample period. In the 1950s, Ethiopia had huge unrecorded capital outflows; however, its magnitude had rapidly decreased between 1955 and 1960, although it seems the size of capital flight was slightly increased again in the late 1960s. Meanwhile, tax revenue had consistently increased over time in Ethiopia, but this increase does not seem to be particularly related to the size of capital flight as tax revenue had been increasing regardless of a change in capital flight. Compared to other African countries, the size of capital flight seems to be relatively stable in the 1960s. Overall, the figure suggests a negative relationship between capital flight and tax revenue, at least clearly in the 1950s. This indicates that Ethiopia can be a typical example of the result by the fixed effect regression model (panel B in Table 2 and 3), which shows that, given average values of capital fight and tax revenue of each country, increased tax revenue in the previous year is related to decreased capital flight this year. In the meantime, the relatively stable movement in capital flight in the 1960s might be related to the fact that, unlike other African countries in the sample, Ethiopia did not go through a major political change. Indeed, Ethiopia was not under colonial rule during the sample period, and furthermore, it was under the same leader, Emperor Haile Selassie I, who ruled the country from 1930 to 1974. This interpretation seems to be supported by the regression result as well. The Polity variable, which is a score for political stability, shows that politically stable country has a smaller size of capital flight (panel B in Table 2).

Ghana
Ghana is a country that shows a clearly positive correlation between tax revenue and unrecorded capital flow; tax revenue and capital flight had increased simultaneously over time. Contrary to Ethiopia, the size of capital flight was increasing between 1955 and 1970, it is therefore likely that Ghana had indeed 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. Although capital flight seems to be real in Ghana in the 1960s, its absolute size is much smaller than the others. Ndikumana

Figure 4: Time Series of Capital Flight and Tax Revenue ($ millions, 2010): Ghana



and Boyce[38] 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. Given these observations, Ghana can be an example of the result produced by the pooled OLS model (panel A in Table 3), which estimates that there is a positive relationship between tax revenue and capital flight. Since there is no huge jump (or decline) in the size of unrecorded capital flow, unlike Ethiopia, the positive relationship between the two variables no longer holds (or is no longer statistically significant) when the fixed effect model is employed, which removes the mean value of each variable when estimating the relationship between the variables. In any case, according to data, there is evidence that tax revenue did move together with the size of capital flight in Ghana in the pre-1970s.

In the 1960s, Kwame Nkrumah was in power in Ghana and was the first president of Ghana after its independence from the UK in 1957. During this period, especially between 1961 and 1965, taxation in Ghana was high by the standards of developing countries, because Nkrumah, as a socialist leader, had a skeptical view on foreign investment inflow.[39] Ghana relied more on national tax rather than foreign capital, thus increasing taxation and a relatively small size of capital flow shown in the figure

38 Ndikumana et al. (see note 34).

39 Rimmer (see note 26).

are consistent with historical records. During the same period, Ghana introduced an import licensing system, which generated a great deal of abuse and corruption. Therefore, one possible explanation of the positive relationship between tax revenue and capital flight through trade misinvoicing in Ghana would be that, given the high taxation under Nkrumah's national strategy, a group of people with superior economic status and political power, irrespective of import licensing, could have more readily sent money abroad without a report because licensees got access to foreign exchange at lower prices than the market rate. Furthermore, considering that Ghana is a country estimated to have no capital flight when trade misinvoicing is not considered (KF^{NEO} in Table 1), the connection between the import licensing system and capital flight may be an interesting avenue to explore in future studies.

Conclusion

This paper presents new estimates of capital flight in the period between 1950 and 1970 using three approaches in the literature and finds that capital flight seems to be presented in some African countries such as Morocco, D.R. Congo, Egypt, Ethiopia, and Nigeria through trade misinvoicing in the pre-1970s. One can argue that discrepancies in bilateral trade statistics between African countries and advanced countries, which is the main idea of the TM approach to estimating capital flight, may simply mean statistical errors rather than an attempt of capital flight. However, if a country shows consistently increasing statistical discrepancies over time, it is more convincing to believe that there are more than simple statistical errors, and that it actually may indicate the existence of capital flight. After estimating the size of capital flight for each country, I examine if national tax revenue has an explanatory power over the estimated size of capital flight using panel regression models. This study finds that there is a statistically significant relationship between taxation and capital flight, but the relationship seems to depend largely on country-specific characteristics. Overall, when country-specific effects are not considered in the regression, a high level of tax revenue is significantly associated with a higher level of capital flight, which indicates that there is a possibility of a causal relationship between taxation and capital flight. However, when the fixed effect model is used, the result indicates that increased tax revenue actually related negatively to capital flight, given heterogeneity among African countries not only in terms of the size of capital flight, but also as regards political and economic backgrounds.

It is important to point out that findings in this study do not argue that tax evasion was one of the main motivations of capital flight in Africa during the 1950s and 1960s. As the two different regression models suggest, although the positive relationship between taxation and capital flight is detected, it is not robust once the analysis

considers country-specific characteristics. In that sense, the findings suggest that a single country level analysis, rather than a panel analysis, which is often used in the literature, may be a more suitable approach to investigate the relationship between taxation and capital flight. Owing to lack of data, there are many questions not addressed in this study. The ideal setting to quantitatively uncover the effect of taxation on capital flight would require sufficiently long time series data on key variables, as well as a better proxy for taxation such as a tax rate, which is hard to obtain for African countries for the pre-1970s. A more detailed individual country level analysis on the relationship between taxation and unrecorded capital flows is an important area for future study.

A Data Description

Table 4: Variables: Definitions and Sources

Variable	*Definition*	*Source*
Net errors and omissions		
NEO	Net errors and omissions	IMF BoP
NEO^A	Net errors omissions (alternative)	IBRD reports
'Hot Money' approach		
PSI	Net private short-term investment	IMF BoP
NEO	Net errors and omissions	IMF BoP
Trade misinvoicing		
XIC	Exports to advanced countries reported by African country	IMF DOTS
PXIC	Exports to advanced countries reported by advanced country	IMF DOTS
MIC	Imports from advanced countries reported by African country	IMF DOTS
PMIC	Imports from advanced countries reported by advanced country	IMF DOTS
CIF	CIF/FOD factor	IMF DOTS
Econometric analysis		
External debt	External public debt outstanding	IBRD reports
Tax revenue	Sum of direct and indirect tax revenue	IBRD reports
GDP growth	Annual % change in GDP	UN
Polity	Annual Polity score	Polity Project

Annual data are used. The variables are converted into USD (2016) using the CPI inflation calculator available at https://www.bls.gov/data/inflation_calculator.htm.

Table 5: Summary Statistics

Variable	Mean	Std.Dev.	Min.	Max.	N
KF^{NEO}	293.46	3743.78	-1442.25	56556.63	279
KF^{HM}	-6.16	243.14	-1442.87	966.34	245
KF^{TM}	-353.73	447.88	-2410.08	927.98	209
Tax revenue	858.82	581.30	67.24	2538.61	119
External debt	1157.51	909.28	49.52	3974.24	84
GDP growth	4.25	5.66	-15.74	25.00	105
Polity	-8.08	16.71	-88	8	186

B Data Construction: TM Approach

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

$$TM_{it} = \frac{DXIC_{it}}{ICXS_{it}} + \frac{DMIC_{it}}{ICMS_{it}} \quad (8)$$

$$DXIC_{it} = (XIC_{it} * CIF_t) - PXIC_{it} \quad (9)$$

$$DMIC_{it} = (PMIC_{it} * CIF_t) - MIC_{it} \quad (10)$$

where negative value represents unrecorded capital outflow from African countries.

$DXIC_{it}$: export discrepancies with industrialized countries

$PXIC_{it}$: value of imports from African country as reported by industrialized trading partners

XIC_{it}: African country's exports to industrialized countries as reported by African country

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

$DMIC_{it}$: import discrepancies with industrialized countries

MIC_{it}: African country's imports from industrialized countries as reported by African country

$PMIC_{it}$: value of exports from industrialized countries as reported by industrialized trading partners

$ICXS_{it}$: share of advanced economies in country's total exports

$ICMS_{it}$: share of advanced economies in country's total imports

Table 6: 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

C Econometric Model

Formal expressions of the regression model are as follows, in which (11) presents the OLS model and (12) presents the panel country fixed effect model:

$$KF_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 TAX_{it-1} + \varepsilon_{it} \quad (11)$$

$$KF_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 TAX_{it-1} + \alpha_i + \varepsilon_{it} \quad (12)$$

KF is the estimated size of capital flight, KF^{NEO} and KF^{TM}. KF^{HM} is not considered in the econometric analysis since the series very closely follows KF^{NEO} for most countries. Since KF variables are transformed into a positive value, a positive sign of the coefficient indicates that increased value of explanatory variable is associated with increased size of capital flight. X is a standard determinant of capital flight that is confirmed in existing studies, which includes stock of external debt, external debt growth, GDP growth, and the Polity index. The Polity index is a score for political stability provided by the Polity Project, and a higher score indicates a stable political situation of a country. Since the number of observations is small, I use them one by one in the regression in order to save the degrees of freedom. TAX is government tax revenue, the main variable of interest in the regression. It 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 a one-year lagged tax variable in order to minimize reverse causality problems. If contemporaneous tax revenue is included, it may 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. α_i in equation (12) is a country fixed effect, which will remove any country-invariable characteristics in each variable in the regression model. ε_{it} is the usual error term. The standard errors are clustered at country level.