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# THE NEXUS BETWEEN CAPITAL FLIGHT AND INCOME INEQUALITY IN DEVELOPING COUNTRIES

FRANCOIS XAVIER NGAH OBAMA [a], HANS TINO MPENYA AYAMENA [b] AND FRANCIS MENJO BAYE [a]

[a] *University of Yaoundé II, Yaounde, Cameroon*
[b] *University of Douala, Douala, Cameroon*

This study examines the relationship between capital flight and income inequality in 49 developing countries from 2000 to 2014. The study applies the bias-corrected method of moments and the method of moments quantile regression. We find that capital flight associates positively and significantly with income inequality. These results are heterogeneous across the conditional quantile distribution of income inequality. The quantile-specific results show that the income inequality increasing effect of capital flight is limited between the 10th and the 40th percentiles. These findings suggest that policy actions that mitigate capital flight would be effective in reducing income inequality, as well as other forms of inequality.

*Keywords*: Capital Flight; Income Inequality; Developing Countries
*JEL Classification*: D63; F10; F21; G11

## 1. INTRODUCTION

Despite the belief that capital flight is likely to generate additional income inequalities, empirical evidence supporting this idea is severely lacking in the literature. Thus, an analysis of the factors that influence income inequality, with a focus on capital flight, would be of considerable importance when debating and addressing redistributive policies in developing countries. Previous approaches to this issue have focused mainly on theoretical explanations of the link between capital flight and income inequality. This paper attempts to fill this gap by providing a comprehensive empirical investigation of the relationship between capital flight and income inequality in 49 developing countries with consistent data.

Capital flight, which surged after the Latin American debt crisis of the 1980s (Pastor, 1990) and increased significantly with the natural resource boom of the 2000s

(Ndikumana and Boyce, 2018), is believed to have generated income inequality in developing countries. Distributional policies in these countries typically focus on the labour market, human capital, and fiscal redistribution, yet evidence on the impact of illicit activities on income inequality is crucial for policy debates. From a global perspective, capital flight is closely linked to the process of "accumulation by dispossession" or "new imperialism" described in a number of studies (Batou, 2015; Cope, 2019; Hickel et al., 2021; Hickel et al., 2022), which was earlier theorized as a process of unequal exchange by Arghiri (1972), Amin (1978), and Bunker (1988). Accordingly, there is an interdependence between the wealth of high-income countries and the processes of appropriation of various forms of resources from the global South[1] (Cope, 2019; Hickel et al., 2021; Hickel et al., 2022).

As noted in Ndikumana and Boyce (2022), capital flight occurs and persists largely because of the presence of facilitators who benefit from this practice. In this regard, capital flight and the accumulation of hidden offshore private wealth are facilitated by institutional actors within transnational networks and the international financial system (Ndikumana and Boyce, 2022). Some reports on capital flight show the remarkable scope of the phenomenon. For example, Ndikumana and Boyce (2021) illustrated that 30 African countries lost $2 trillion to capital flight between 1970 and 2018. The average annual capital flight from Africa is estimated at $88.6 billion, exacerbating the region's financing gap (UNCTAD, 2020). According to Global Financial Integrity (2017), illicit financial flows from developing countries reached an estimated level of between $620 billion and $970 billion in 2014. According to the report, sub-Saharan Africa experienced the highest illicit outflows (from 5.3 percent to 9.9 percent of total trade in 2014). Developing countries in the Western Hemisphere, such as those in Latin America, also experienced relatively high levels of outflows in 2014 (from $129 billion to $200 billion, see Global Financial Integrity, 2017).

Concurrently, reports on income inequality underscore the compelling necessity for focused attention. For example, Chancel et al. (2022) show that in developing regions such as SSA, LAC, and MENA, the richest 10 percent of the population owns more than 50 percent of total income, while the bottom 50 percent of the population owns less than 10 percent of total income (Chancel et al., 2022). According to this report, the income gap between the top 10 percent and the bottom 50 percent is narrower in more developed regions such as Europe and North America[2]. Similarly, UNDP (2017) notes that despite the remarkable progress observed in SSA in terms of economic performance, achieving SDG 10: Reduced inequalities remains an inherent challenge for the sub region. In this context, analysing the phenomena of capital flight and income inequality, particularly in

[1] The flight of capital from the Global South to offshore financial centers generates interest for the host countries, sometimes returning in the form of debt or overseas development aid. International plundering networks use measures such as banking secrecy to perpetuate capital flight in the South.

[2] The income share of the top 10 percent is around 36 percent in Europe, while it reaches 58 percent in MENA.

developing countries, seems imperative.

The United Nations' SDG 10: Reduced inequalities was formulated to address global forms of inequalities both within and between countries. Among these various inequalities, the goals focus on gender, race, religion, opportunity, development, and income inequality. These inequalities appear to be interrelated; for example, inequality of opportunity appears to play a role in the impact of income inequality (see Aiyar and Ebeke, 2020). Raimi and Phiri (2024) show that there is a link between gender and income inequality, while Jianu et al. (2021) show the role of social inclusion policies for income inequality. While all these forms of inequality are harmful, our study focuses on income inequality, based on SDG 10: Reduced inequalities. The literature on income inequality recognizes that it is undesirable, at least beyond a certain level (Aiyar and Ebeke, 2020; Çepni et al., 2020; Amponsah et al., 2023). Therefore, it is important to explore all potential factors that can generate income inequality to mitigate this phenomenon.

In theory, capital flight is likely to increase income inequality since only those who engage in trade misinvoicing or divert and transfer public funds abroad can benefit from these practices (see Nkurunziza, 2014). Very often, it is a narrow segment of the population (usually the economic and political elites, see Boyce and Ndikumana, 2012) that gets richer at the expense of the middle and poorer segments of the population. Capital flight creates an opportunity cost that hampers redistributive policies and leads to an inflow of wealth to the rich rather than to those with lower incomes. This contradicts the Pigou-Dalton transfer principle, which states that income should be transferred from the wealthy to the less well-off to reduce income inequality. This study aims to test this hypothesis by assessing the influence of capital flight on income inequality in 49 developing countries. To the best of our knowledge, the present endeavour aims to contribute to the few empirical analyses in this area in the literature.

In this paper, we estimate capital flight following the methods of Ndikumana and Boyce (2018, 2021) and use the SWIID of Solt (2019) for the Gini index of income inequality. While it is essential to consider complementary measures of income inequality such as the Palma ratio, the Atkinson index and the Entropy class of inequality measures to capture the complex nature of inequality, the Gini index is arguably the most widely used. This observation is attributable to several enviable characteristics of the Gini index, among which are: (1) the fact that it ranges from zero (perfect equality) to one (perfect inequality), making it intuitive and easy to understand and (2) it can be calculated for many countries, facilitating international comparisons (Fellman, 2018). A major setback of the Gini coefficient is its sensitivity to middle-class changes, thereby masking inequality within groups (see Fellman, 2018; Solt, 2019).

Capital flight is calculated by analysing the difference in the balance of payments. This difference is determined by comparing the documented inflow of foreign exchange with its recorded use, resulting in a residual value. We then adjust this value for trade misinvoicing, which is estimated by comparing the country's export and import declarations with those of its trading partners. The empirical framework uses the

bias-corrected method of moments of Breitung et al. (2022) and the method of moments quantile regression proposed by Machado and Silva (2019). The remainder of the paper is organized as follows: Section 2 covers the literature review and knowledge gaps, Section 3 discusses the methodology, Section 4 presents the results, and finally Section 5 provides the conclusion.

## 2. CAPITAL FLIGHT AND INCOME INEQUALITY: THEORETICAL UNDERPINNING, LITERATURE REVIEW AND KNOWLEDGE GAP

### 2.1. Theoretical Underpinning

The phenomenon of capital flight is likely to affect income inequality through several mechanisms in line with the Pigou-Dalton transfer principle. The Pigou-Dalton transfer principle (Pigou, 1912; Dalton, 1920) is a fundamental axiom in the field of welfare economics and in the measurement of inequality. It postulates that the redistribution of income from a wealthy to a less wealthy individual (while the former maintains a higher income level than the latter) should lead to a more egalitarian distribution of income and, consequently, a reduction in the observed inequality (see Costa and Pérez-Duarte, 2019). It is reasonable to assume that the occurrence of capital flight will lead to an increase in income inequality, as it will hinder the transfer of income to the most economically disadvantaged.

Capital flight is often perpetrated by economic and political elites who use their positions to embezzle and transfer public funds abroad (Boyce and Ndikumana, 2012; Nkurunziza, 2014). As Nkurunziza (2014) notes, some citizens lack the capacity to engage in trade misinvoicing or loot public resources for the purpose of capital flight. As a result, these practitioners benefit the most from these illicit activities, which are likely to further exacerbate income inequality between them and other citizens. Even when capital flight is considered in the context of portfolio choice, the wealthy continue to benefit disproportionately, taking advantage of their greater access to foreign investment instruments than citizens of less affluent classes (Nkurunziza, 2014). The embezzlement of public funds and their concealment abroad contribute to exacerbating income inequality between political and economic elites and the general population, especially those most dependent on public services. These practices run counter to the requirements for reducing income inequality as set forth in the Pigou-Dalton transfer principle. Indeed, in such contexts of capital flight, there is a net transfer of additional income to the rich, who become richer at the expense of the middle class and the poor.

The phenomenon of capital flight has the potential to exacerbate income inequality due to the opportunity costs involved. These capital outflows represent a significant loss of opportunity that is borne disproportionately by lower-income groups. The

process involves a reduction in domestic investment, constraints on job creation and wage growth, and the loss of future tax revenues that constrain social programs (see Boyce and Ndikumana, 2012; Nkurunziza, 2014; Ndikumana, 2014; Moulemvo, 2016). As noted by Boyce and Ndikumana (2012), capital flight contributes to a regressive tax incidence, whereby wealthy residents are subject to relatively lower tax obligations than would otherwise be the case. Indeed, the illicit transfer of private wealth represents a loss of tax revenue, as it is not subject to taxation (Nkurunziza, 2014). This, in turn, favours the wealthy and in some ways hinders the transfer or redistribution of income to those with lower incomes. In line with the transfer principle mentioned above, this could potentially lead to an increase in income inequality.

Similarly, capital flight can lead to a debt trap through the phenomenon of the financial revolving door, as discussed by Boyce (1992) and Ndikumana and Boyce (2011). The revolving door in the capital flight literature refers to a situation in which foreign debt and capital flight flow in and out of a country in a cyclical manner, as if through a revolving door. Indeed, the same capital flows through the revolving door in both directions (see Boyce, 1992). However, these debts are often considered odious (Boyce, 1992; Ndikumana and Boyce, 2011; Nkurunziza, 2014; Ndikumana and Boyce, 2018). While the assets transferred abroad through capital flight are private, the resulting debt is a collective liability incurred by the entire population of the country (Ndikumana and Boyce, 2018). Repayment of these odious debts diverts resources that could otherwise be invested in health, education, infrastructure, and other projects that could reduce inequality and poverty (Nkurunziza, 2014).

Regarding the opportunity cost it represents, capital flight significantly limits the implementation of policies aimed at reducing income inequality and poverty (Nkurunziza, 2014). As Piketty (2014) notes, capital mobility constrains the ability of governments to implement progressive taxation, which is essential for redistribution. In this regard, capital flight can undermine the effectiveness of redistributive policies. Indeed, significant illicit capital outflows limit the availability of resources for investment in education and health, both of which are essential for reducing poverty and inequality (Nkurunziza, 2014; Moulemvo, 2016; Ndikumana and Boyce, 2018). The repatriation of capital flight from developing countries could be invested in vocational training for the poor, which would create jobs and thus reduce income inequality.

The above arguments illustrate, from a theoretical point of view, how capital flight can contribute to income inequality by concentrating additional wealth among the more affluent, while at the same time reducing opportunities and impeding the equitable redistribution of income to the less affluent. Indeed, capital flight violates the Pigou-Dalton principle of reducing inequality, which requires that income should move from the rich to the poor. Instead, it facilitates resource transfers in the opposite direction, from the poor to the rich.

### 2.2. Empirical Literature and Knowledge Gaps

There is very little empirical literature on the relationship between capital flight and income inequality. However, there is some evidence on how capital flows in general can affect income inequality.

Adams and Klobodu (2017) focused on 21 SSA countries from 1984 to 2013 using a panel vector autoregressive method and found that foreign direct investment (FDI) has a slightly positive effect on income inequality, while remittances, external debt, and aid flows do not. As for Song et al. (2021), they conducted an empirical analysis on income inequality in 20 top remittance-receiving developing countries using a heterogeneous approach and found a long-run equilibrium relationship with FDI inflows positively affecting inequality. Ofori et al. (2022) found that remittances significantly increase income inequality in Africa due to inefficiencies in the financial system using the generalized method of moments (GMM). On the other hand, Liu et al. (2023) conducted a study on the relationship between short-term capital flow movements and income inequality in 128 advanced and emerging economies. Using the instrumental variables method, they found that an increase in capital inflows leads to an increase in income inequality, while an increase in outflows reduces it.

There is other empirical evidence in the literature highlighting the link between certain capital flows and income inequality. However, most of these studies have only considered normal flows, without analysing the link with abnormal or illicit flows, such as trade misinvoicing or capital flight. It is precisely this gap that the present study seeks to fill as a matter of priority.

## 3. METHODOLOGY

### 3.1. Empirical Model and Estimation Strategy

The purpose of this analysis is to estimate the extent to which capital flight affects income inequality. Since wealth or income inequality appears in the literature as a self-sustaining phenomenon, we adopt a dynamic configuration and formulate our model to be estimated as follows:

$$Inequality_{it} = \alpha + \lambda Inequality_{it-1} + \beta_1 Capital\ flight_{it} + \delta X_{it} + \varepsilon_{it}, \qquad (1)$$

where $Inequality_{it}$ is the Gini index of income inequality for country $i$ in year $t$ (the dependent variable); $Inequality_{it-1}$ is the lagged dependent variable; $Capital\ flight_{it}$ is the net real capital flight from country $i$ in year $t$; and $X_{it}$ is the vector of control variables included in the analysis. $\varepsilon_{it}$ represents the error term, which has a component structure as: $\varepsilon_{i,t} = \eta_i + \mu_{it}$; $\eta_i$ represents the unobserved specific effect for country $i$, while $\mu_{it}$ corresponds to a random disturbance that represents the

rest of the idiosyncratic errors.

The model will be estimated using the bias-corrected method of moments proposed by Breitung et al. (2022). This method allows for individual-specific heteroscedasticity in a dynamic panel framework with large individual and short time settings (Breitung et al., 2022). To correct for the potential bias of the fixed-effects method in dynamic panels, the Breitung et al. (2022) method proposes cluster-robust panel-corrected standard errors that account for cross-sectional dependence. The method is more attractive than the classical GMM because it does not suffer from the weak instrument problem. The method relies on nonlinear moment conditions that are easily solved using standard numerical methods to estimate the parameters (see Breitung et al., 2022).

Subsequently, to account for potential heterogeneity, we use the method of moment-quantile regression (MM-QR) of Machado and Silva (2019). This procedure is used to assess unobserved heterogeneity and distributional effects. The standard quantile regression originally introduced by Koenker and Bassett (1978) does not consider unobserved heterogeneity, albeit it does allow for the presence of persistent outliers. The MM-QR extends this original method by incorporating individual-specific effects for panel structures. This method is well suited when the individual effects dominate the model. Machado and Silva (2019) consider the following location scale model:

$$y_{it} = \alpha_i + X'_{it}\beta + (\delta_i + Z'_{it}\gamma)U_{it}. \quad (2)$$

In our case, $y_{it}$ denotes our dependent variable, namely the Gini index of inequality; $X'_{it}$ is a vector of our explanatory variables, including real capital flight, and control variables; $Z'_{it}$ stands for a vector of the same dimension as $X'$, composed of known differentiable transformations of the elements of $X'$. $U_{it}$ is an independent and identically distributed process for time ($t$) and countries ($i$), and independent of $X'$. $\alpha_i$ and $\delta_i$ denote country fixed effects. According to Machado and Silva (2019), equation (2) verifies: $\Pr\{\delta_i + Z'_{it}\gamma > 0\} = 1$. From the location scale model, Machado and Silva (2019) derive:

$$Q_y(\tau|X_{it}) = \left(\alpha_i + \delta_i q(\tau)\right) + X'_{it}\beta + Z'_{it}\gamma q(\tau), \quad (3)$$

where $\alpha_i(\tau) \equiv \left(\alpha_i + \delta_i q(\tau)\right)$ is a scalar representing country $i$ fixed effect at quantile $\tau$, or equivalently the distributional country effect at $\tau$. $Q_y(\tau|X_{it})$ represents the quantile distribution of the explained variable (income inequality), conditional on the explanatory variables. $q(\tau) = F_U^{-1}(\tau)$ and we have $Pr\left(U < q(\tau)\right) = \tau$. Under certain moment conditions, model (3) allows the sequential use of GMM estimation of the parameters[3] (see Machado and Silva, 2019). The coefficients obtained from the

[3] The procedure is to first regress the location scale model after subtracting the individual means to remove the unobserved individual fixed effects, to get $\hat{\beta}$. Next, $\hat{\alpha}_i$ is estimated and the residuals $\hat{R}_{it}$ are

estimation of Equation (3) represent the marginal effect of an explanatory variable on the conditional quantile of the explained variable.

### 3.2. The Variables of the Model

This study covers 49 developing countries from 2000 to 2014 (due to data availability constraints).

#### *3.2.1. The Dependent Variable*

Our dependent variable in this study is income inequality, proxied by the Gini index (Gini, 1912), which is obtained from the SWIID of Solt (2019). The Gini index is the most widely used indicator of inequality (see Fellman, 2018). This index corresponds to the double of area between the Lorenz curve and the line of perfect equality (45-degree line). The Gini index ranges from 0, perfect income equality, to 1, extreme inequality.

The Gini coefficient is consistent with important principles such as the Pigou-Dalton transfer principle, which states that income transfers from the wealthy to the less wealthy reduce inequality. Other measures, such as the Pietra index (Pietra, 1915), do not verify the strict Pigou-Dalton transfer principle. This lends credibility to the Gini index with respect to such measures. Other measures, such as the Theil index (Theil, 1967) and the Atkinson index (Atkinson, 1970), are highly desirable for their decomposability; however, they present certain challenges in their practical use. For example, the Theil index ranges from 0, representing perfect equality, to the log of the population, representing perfect inequality (Heshmati, 2004). Consequently, unlike the Gini index, the Theil index is sensitive to the size of the population. This makes it difficult to make cross-country comparisons of inequality. As for the Atkinson index, its value is based on a coefficient of aversion to inequality that ranges from 0 to $+\infty$ (see Atkinson, 1970). Consequently, the value of this measure of income inequality is affected by different values of this risk aversion coefficient, making it somewhat less intuitive than the Gini index. These considerations underlie our decision to use the Gini index to measure income inequality.

#### *3.2.2. The Explanatory Variable*

Our explanatory variable of interest, real capital flight, is estimated following the algorithms presented in Ndikumana and Boyce (2021, 2018). These methods estimate capital flight as a residual in the balance of payments, which consists of discrepancies

predicted for the location scale model. Subsequently, the method regresses the demeaned residuals $|\hat{R}_{it}|$ on $(Z_{it} - \sum_t Z_{it}/T)$ to estimate $\hat{\gamma}$. From this, it estimates $\hat{\delta}_i$. Lastly, it estimates $q(\tau)$ by $\hat{q}$, which is the solution of the optimization program as follows: $\min_q \sum_i \sum_t \rho_\tau(\hat{R}_{it} - (\hat{\delta}_i + Z'_{i,t}\hat{\gamma})q)$; where $\rho_\tau(A) = (\tau - 1)AI\{A \leq 0\} + \tau AI\{A > 0\}$ is the check function (Machado and Silva, 2019).

between recorded foreign exchange inflows and their recorded uses (Ndikumana and Boyce, 2018). This residual is then adjusted for trade misinvoicing, which is an important component of capital flight. The formula for estimating capital flight is as follows:

$$Capital\ flight_{it} = ACDEBT_{it} + FDI_{it} + PIF_{it} + OI_{it} - (CA_{it} + CRES_{it}) + MISINV_{it}, \quad (4)$$

where $ACDEBT_{it}$ is the net change in the exchange rate-adjusted debt stock, $FDI_{it}$ is net foreign direct investment, $PIF_{it}$ is portfolio investment and $OI_{it}$ is other investment. $CA_{it}$ and $CRES_{it}$ are the current account deficit and the net accumulation of international reserves, respectively. $MISINV_{it}$ is the trade misinvoicing estimated by comparing the country's export and import declarations with those of its trading partners. The data for this calculation come from the IMF, WDI and UNCTAD. $i$ and $t$ represent country and time indices, respectively.

### *3.2.3. The Control Variables*

Following the literature on factors explaining income inequality (Baye and Epo, 2015; Lee and Lee, 2018; Artige and Cavenaile, 2023), we include the following control variables: (a) human capital: proxied by the UNCTAD human capital index, (b) unemployment rate: obtained from the ILO database, (c) natural capital: assessed by an index from UNCTAD, (d) annual population growth: from UNCTAD, (e) ICT: captured by an index constructed by UNCTAD, and (f) quality of institutions: measured by an index constructed by UNCTAD.

## 4. EMPIRICAL RESULTS

Table 1 shows the effect of capital flight on income inequality using the bias-corrected method of moments of Breitung et al. (2022). The results of the analysis show that capital flight is significantly associated with an increase in income inequality in our set of developing countries. This effect is estimated to range between 1.6 and 2.7 percentage points for a one percent increase in capital flight, at the 1% level of significance. This result is consistent with the theoretical thoughts of Nkurunziza (2014) and Ndikumana (2015), suggesting that capital flight is likely to engender adverse distributional effects. On the other hand, this result runs counter to that of Liu et al. (2023), who find that capital outflows reduce income inequality. This is likely related to the nature of the capital flows included in the analysis. Given the illicit nature of capital flight, it seems natural that the effects would be different. This finding suggests the need to address capital flight as part of the agenda to address income inequality in developing

countries.

Furthermore, the results suggest that income inequality is affected by its past level, implying that the phenomenon may be persistent over time. Moreover, the evidence shows that unemployment has a positive and significant effect on income inequality. On the other hand, human and natural capital appear to have a negative effect on income inequality in our sample. This implies the importance of promoting health and education in this group of countries to mitigate the phenomenon of income inequality.

**Table 1.** Estimates of the Effects of Capital Flight on Income Inequality

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| Dep. Variable | Inequality | | | |
| Lagged inequality | 0.994*** | 0.998*** | 0.996*** | 0.990*** |
| | (0.018) | (0.015) | (0.017) | (0.022) |
| Capital flight | 0.017*** | 0.027*** | 0.018*** | 0.016*** |
| | (0.004) | (0.006) | (0.004) | (0.005) |
| Human capital | -0.023 | -0.056** | -0.018 | -0.019 |
| | (0.019) | (0.024) | (0.025) | (0.026) |
| Unemployment | 0.066** | 0.103*** | 0.064** | |
| | (0.030) | (0.034) | (0.031) | |
| Natural capital | | -0.055* | | -0.033 |
| | | (0.030) | | (0.029) |
| ICT | -0.038 | 0.002 | -0.040 | -0.044 |
| | (0.064) | (0.058) | (0.067) | (0.075) |
| Population growth | | | 0.044 | 0.053 |
| | | | (0.163) | (0.149) |
| Constant | 0.004 | 0.039 | 0.001 | 0.026 |
| | (0.011) | (0.024) | (0.012) | (0.025) |
| Observations | 686 | 686 | 686 | 686 |
| Number of countries | 49 | 49 | 49 | 49 |
| P-value for AR(1) | 0.000 | 0.000 | 0.000 | 0.000 |
| P-value for AR(2) | 0.279 | 0.275 | 0.277 | 0.279 |
| Hansen P-value | 0.500 | 0.577 | 0.576 | 0.284 |

*Source*: Computed by the authors.

*Notes*: Standard errors in parentheses. ***, **, and * represent 1%, 5%, and 10% levels of significance, respectively. Capital flight and Gini index of inequality are standardized (between 0 and 1). The estimation technique used is the bias-corrected method of moments. This method provides parameters with panel-corrected standard errors that account for cross-sectional dependence to correct the bias and improve the accuracy of the estimates. The results display the AR(1) and AR(2) tests for serial correlation in the residuals and the Hansen test for overidentification restrictions validity.

**Table 2.** Estimates of the Heterogeneous Effects of Capital Flight on Income Inequality

| | Quantiles (τ) | | | | | | | | | Scale parameters | Location parameters |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | | |
| Dep. Variable | Inequality | | | | | | | | | | |
| **Capital flight** | **0.252**** | **0.216**** | **0.173**** | **0.134*** | **0.092** | **0.046** | **0.010** | **-0.033** | **-0.085** | **-0.111***** | **0.088***** |
| | (0.123) | (0.105) | (0.087) | (0.076) | (0.073) | (0.080) | (0.092) | (0.112) | (0.139) | (0.013) | (0.028) |
| Human capital | 0.234 | 0.217 | 0.198 | 0.180 | 0.161 | 0.140 | 0.124 | 0.104 | 0.080 | -0.050 | 0.159 |
| | (0.202) | (0.172) | (0.143) | (0.124) | (0.118) | (0.130) | (0.150) | (0.183) | (0.227) | (0.067) | (0.302) |
| Unemployment | 0.011*** | 0.011*** | 0.011*** | 0.010*** | 0.010*** | 0.010*** | 0.010*** | 0.010*** | 0.009*** | -0.0002 | 0.010*** |
| | (0.002) | (0.002) | (0.001) | (0.001) | (0.001) | (0.001) | (0.001) | (0.002) | (0.002) | (0.001) | (0.002) |
| Natural capital | -1.034*** | -1.037*** | -1.041*** | -1.045*** | -1.049*** | -1.054*** | -1.057*** | -1.061*** | -1.067*** | -0.010 | -1.049*** |
| | (0.312) | (0.266) | (0.221) | (0.192) | (0.183) | (0.201) | (0.232) | (0.283) | (0.352) | (0.082) | (0.335) |
| ICT | -1.199*** | -1.148*** | -1.087*** | -1.031*** | -0.971*** | -0.905*** | -0.854*** | -0.790*** | -0.716** | 0.160 | -0.965** |
| | (0.272) | (0.232) | (0.193) | (0.168) | (0.161) | (0.176) | (0.203) | (0.247) | (0.307) | (0.102) | (0.464) |
| Population growth | 0.016** | 0.015** | 0.014*** | 0.013** | 0.012*** | 0.011** | 0.010* | 0.009 | 0.007 | -0.002* | 0.012*** |
| | (0.007) | (0.006) | (0.005) | (0.004) | (0.004) | (0.004) | (0.005) | (0.006) | (0.008) | (0.001) | (0.004) |
| Institutions | 0.094 | 0.112 | 0.134 | 0.153* | 0.174** | 0.197** | 0.215** | 0.237** | 0.263* | 0.056 | 0.176 |
| | (0.133) | (0.114) | (0.094) | (0.082) | (0.078) | (0.086) | (0.099) | (0.121) | (0.150) | (0.051) | (0.186) |
| Constant | | | | | | | | | | 0.059 | 0.821*** |
| | | | | | | | | | | (0.051) | (0.243) |
| Observations | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 | 735 |

*Source*: Computed by the authors.

*Notes*: Standard errors in parentheses. ***, **, and * represent 1%, 5%, and 10% levels of significance, respectively. Capital flight and Gini index of inequality are standardized. The estimation technique used is the MM-QR. Location parameters represent the average effect of an explanatory variable on the dependent variable. Scale parameters represent the effect of the explanatory variables on the dispersion of the dependent variable. The quantile parameters represent quantile-specific effects that combine location and scale effects to capture heterogeneity across quantiles.

The AR (1), AR (2), and Hansen test conditions are satisfied by all regressions. The AR(1) test suggests that first-order serial correlation appears to exist, while there is no second-order serial correlation with respect to the AR(2) test. Furthermore, the overidentification restrictions are valid as shown by the Hansen test.

After this baseline analysis, we control for unobserved heterogeneity and the presence of certain persistent outliers using the MM-QR of Machado and Silva (2019). The results of this estimation are shown in Table 2. The table shows that, on average, capital flight significantly increases income inequality in our sample at the 1% significance level (with respect to the location parameter). The quantile-specific parameters show that the effect of capital flight on inequality varies in sign and significance. Indeed, for quantiles 0.1, 0.2, 0.3 and 0.4, capital flight has a positive effect on income inequality that is significant at least at the 5% level. Note that the scale parameters indicate a negative contribution of capital flight to the conditional distribution of income inequality. Therefore, quantiles 0.1 through 0.4 correspond to higher levels of capital flight than the other quantiles. The estimated effect of capital flight remains positive but insignificant for quantiles 0.5, 0.6 and 0.7, and becomes negative but insignificant for quantiles 0.8 and 0.9. This shows that the effect of capital flight on income inequality is heterogeneous across the distribution of income inequality, although it tends to be positive overall.

These results suggest that the effect of capital flight on income inequality is not homogeneous in our sample. Indeed, while the results show that capital flight increases income inequality overall, it also remains true, given the heterogeneous analysis conducted, that capital flight does not increase inequality at specific points on the conditional distribution of income inequality in our sample. Thus, deeper, country-specific analyses are needed for this sample of developing countries to elucidate the idiosyncratic effects of capital flight on income inequality.

The heterogeneous effect obtained by MM-QR can be observed graphically as shown in Figure A3 in the Appendix. This figure shows how the effect of the explanatory variables varies across the quantile distribution of inequality and compares this effect with a homogeneous effect obtained by ordinary least squares. Nevertheless, it is suggested that these countries implement policies to limit capital flight, mindful of the opportunity cost it represents (Nkurunziza, 2014) and the baseline results showing its positive effect on income inequality.

## 5. CONCLUSION

This study attempted to assess the extent to which capital flight affects income inequality in 49 developing countries from 2000 to 2014. The empirical strategy included the bias-corrected method of moments to generate baseline results and the method of moments quantile regression to account for outliers and unobserved heterogeneity. The baseline results showed that capital flight associates significantly with worsening income inequality. Heterogeneity checks revealed that this finding holds

only for certain percentiles (10th to 40th). Beyond these quantiles, the respective effects were not statistically significant, although, on average, the location parameters showed a significant positive effect of capital flight on income inequality. These heterogeneous findings suggest that more in-depth investigations on sub regional or country-specific basis are needed to more accurately assess the relationship between the two constructs to better inform public policy.

Overall, the results indicate that unsanctioned transfer of resources from developing countries to safe-havens would exacerbate income inequality. Since income inequality is deeply interconnected with other forms of inequality, addressing the capital flight problem would require a more holistic approach that encompasses economic, social, political and financial measures. In essence, policy implications emanating from our baseline findings are consistent with strategies that seek to reduce inflation, stabilize exchange rates, strengthen financial regulations, improve banking sector stability, reduce currency restrictions, enhance anti-money laundering, develop financial inclusion, improve investment climate, diversify the economy, intensify trade monitoring, foster economic cooperation, and promote domestic social and capital investments. In this way, understanding the implications of capital flight for income inequality and redistribution would be a significant step forward for this group of countries to achieve SDG 10: Reduced inequalities.

Beyond the study's scientific contributions, it should be acknowledged that the period it covers (2000 to 2014 due to data limitations) is outdated. This may limit the relevance of the findings to current policies. Therefore, future analyses should extend beyond this period to draw on more recent data, which would be more relevant to current policies. Additionally, the study employs a capital flight measure based on Boyce and Ndikumana (2018, 2021) approach, which considers capital flight to be a missing residual in the balance of payments. This residual consists of discrepancies between recorded foreign exchange inflows and their recorded uses. The authors consider trade misinvoicing an essential component and adjust this residual to account for it. However, like all other measures, this one is not fully accurate due to the illicit and clandestine nature of capital flight. Indeed, measuring capital flight is quite challenging, so it is important to acknowledge that the measurement method may be subject to inaccuracies that could potentially mislead analyses. Actually, the various methods proposed in the literature are only approximate and are subject to measurement errors, underestimation, or overestimation.

# APPENDIX

**Table A1.** Description of Variables

| Variables | Descriptions | Sources | Expected signs |
|---|---|---|---|
| Income inequality | Income inequality is measured by the Gini index. The index measures the inequality of income or wealth within a population. It ranges from 0 to 1, with 0 being perfect equality and 1 being perfect inequality. The index is calculated using the Lorenz curve, which plots the cumulative income share against the cumulative population share. This index is equal to the area between the Lorenz curve and the line of perfect equality (45-degree line) divided by the area below the Lorenz curve. | SWIID, Solt (2019) | |
| Capital flight | Real net capital flight represents discrepancies between recorded inflows of foreign exchange and their recorded uses. This residual is adjusted to trade misinvoicing which is the difference between a country's export and import declarations with those of its trading partners. | Calculated | + |
| Human capital | This is a composite index that takes into account health, education, skills, the overall integration of research and development into society, and fertility rates. | UNCTAD | - |
| Unemployment | This refers to the share of the labour force that is not employed but is available and looking for work. | ILO | + |
| Natural capital | This variable is proxied by an index that measures the availability of agricultural and extractive resources and the rents derived from their use, after deducting the costs of extracting the resources. | UNCTAD | - |
| ICT | This variable is measured by an index that estimates the access and inclusion of communication systems in the population. The index covers fixed and mobile phone usage, internet access and security of servers. | UNCTAD | - |
| Population growth | Population growth is captured by a rate, which indicates the increase in the number of individuals in a population. | UNCTAD | + |
| Institutions | This variable is measured by an index that captures control of corruption, government effectiveness, political stability and absence of violence/terrorism, rule of law, regulatory quality, and voice and accountability. | UNCTAD | - |

**Table A2.** List of Developing Countries Included in the Study

| | | | | | | |
|---|---|---|---|---|---|---|
| Angola | Cameroon | Egypt | Mauritania | Paraguay | Russia | Tunisia |
| Argentina | Cape Verde | Jordan | Pakistan | Indonesia | Rwanda | Turkey |
| Benin | China | Nicaragua | Guatemala | Morocco | Serbia | Uganda |
| Bolivia | Colombia | El Salvador | Mauritius | Peru | Sierra Leone | Venezuela |
| Botswana | Costa Rica | Malawi | Panama | Jamaica | South Africa | Yemen |
| Brazil | Côte d'Ivoire | Niger | Honduras | Mozambique | Sri Lanka | Zambia |
| Burkina Faso | Ecuador | Ghana | Mexico | Philippines | Thailand | Zimbabwe |

**Table A3.** Descriptive Statistics

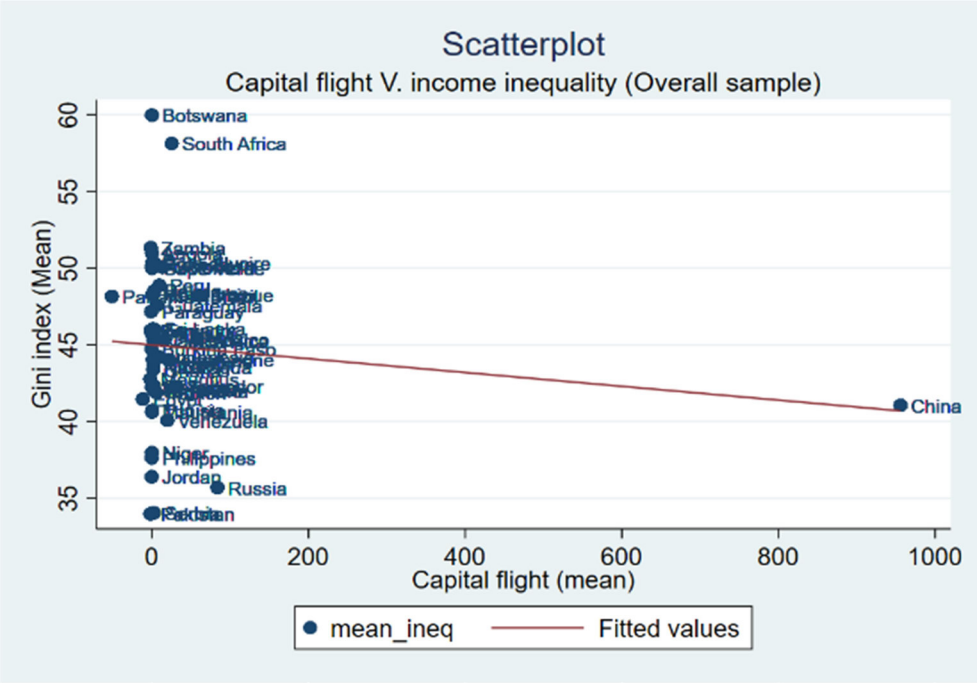
| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Income inequality (Gini) | 735 | 44.874 | 5.518 | 32.195 | 61.006 |
| Real capital flight | 735 | 26.094 | 150.903 | -352.498 | 1587.439 |
| Human capital | 735 | 0.416 | 0.092 | 0.187 | 0.593 |
| Unemployment | 735 | 5.32 | 3.867 | 0.124 | 21.637 |
| Natural capital | 735 | 0.538 | 0.063 | 0.416 | 0.758 |
| ICT | 735 | 0.062 | 0.029 | 0.028 | 0.162 |
| Population growth | 735 | 1.792 | 1.089 | -0.866 | 11.794 |
| Institutions | 735 | 0.465 | 0.112 | 0.178 | 0.75 |

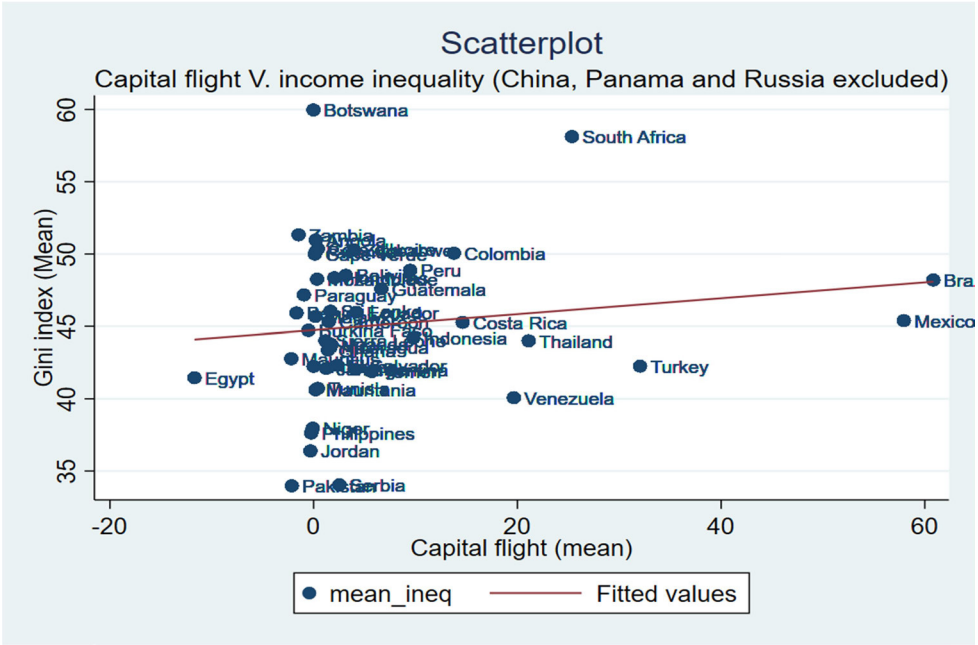
*Source*: Computed by the authors.

**Table A4.** Matrix of Correlations

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| (1) Inequality | 1 | | | | | | | |
| (2) Capital flight | -0.093 | 1 | | | | | | |
| (3) Human capital | -0.180 | 0.216 | 1 | | | | | |
| (4) Unemployment | 0.170 | -0.049 | 0.294 | 1 | | | | |
| (5) Natural capital | 0.012 | 0.043 | -0.492 | 0.207 | 1 | | | |
| (6) ICT | -0.252 | 0.126 | 0.785 | 0.232 | -0.351 | 1 | | |
| (7) Population growth | 0.119 | -0.176 | -0.694 | -0.220 | 0.338 | -0.524 | 1 | |
| (8) Institutions | 0.176 | -0.036 | 0.419 | 0.279 | -0.146 | 0.331 | -0.273 | 1 |

*Source*: Computed by the authors.




*Source*: Authors' construction.

**Figure A1**. Relationship between Capital Flight and Income Inequality

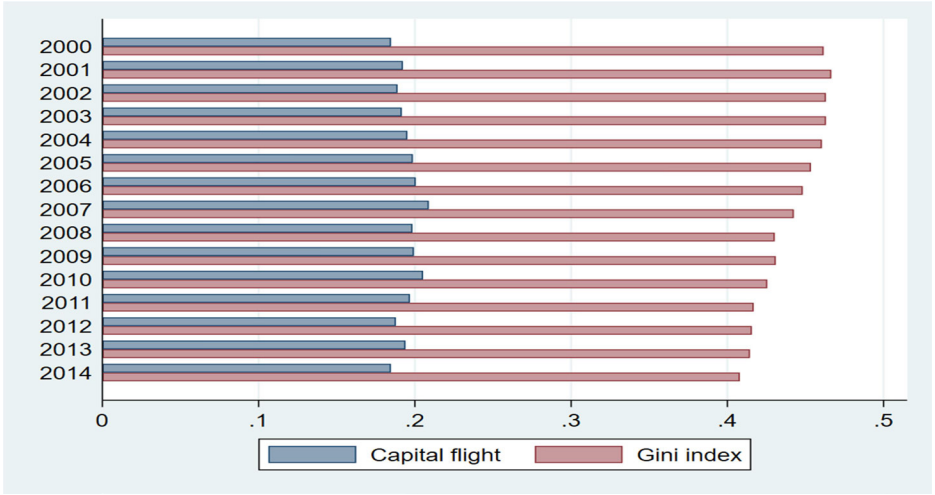
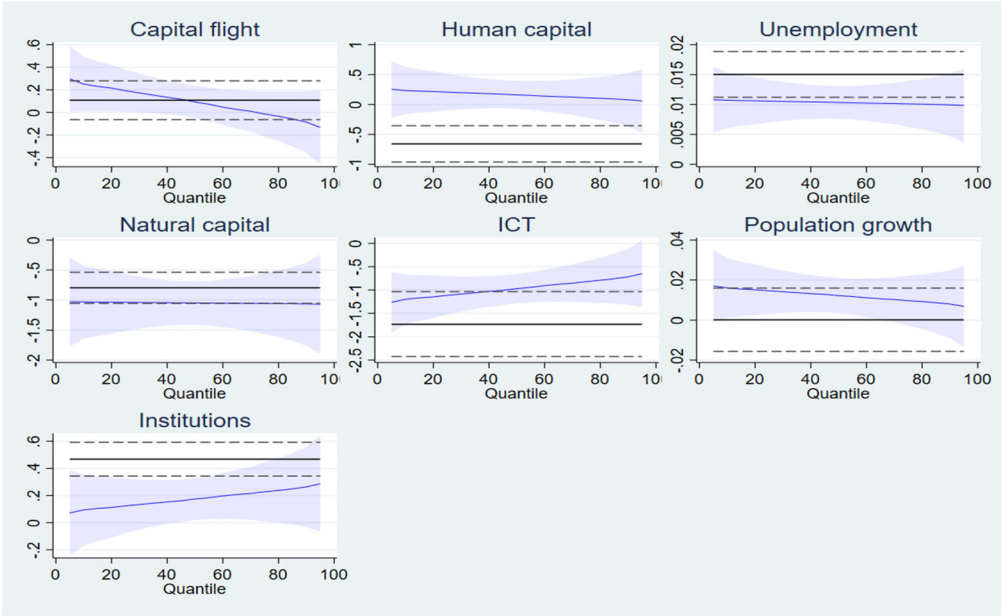



**Figure A2**. Average Annual Levels of Capital Flight and Income Inequality




*Notes*: The figure examines the heterogeneity of the effect of the explanatory variables on income inequality along quantiles (MM-QR results). The quantile-specific effect (shown by the blue line) is compared with the homogeneous OLS effect (black line). The light purple area and the dashed lines represent the confidence intervals for the MM-QR and OLS coefficients, respectively.

**Figure A3**. Quantile-specific Effect of Regressors on Income Inequality

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*Mailing Address: F. X. Ngah Obama, Department of economics, University of Yaoundé II, Yaoundé, Cameroon, E-mail: francoisfx2@gmail.com.*

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