BNR Economic Review 19(1): 40-58, 2022.

Financial Flows Volatility and Economic Growth in SSA Countries: Extended case of Rwanda

Patrick Mugenzi* Wilberforce Nuwagira† Annie Uwimana‡

May, 2022

Abstract

Previous research has documented a positive relationship between financial flows and economic growth, but the volatility of financial flows, a common feature of financial flows, has not attracted similar attention. This paper examines the effect of the volatility in financial flows on economic growth for 23 Sub-Saharan African (SSA) countries in general and for Rwanda in particular. The paper uses annual data covering the period 2000-2019, transformed into non-overlapping 3-year averages for the case of SSA, while quarterly data covering the period 2000Q1 to 2019Q4 is used for the case of Rwanda. Our empirical estimations begin with the construction of the financial flows volatility indicator using the Z-score metric. The generated financial flows volatility measure is then incorporated into the growth regression, along with other growth determinants. For the SSA case, we estimate the dynamic panel growth model relying on the Bias-Corrected Least Squares Dummy Variable (BC-LSDV) estimator. The empirical findings show that financial flows accelerate growth, a result that is consistent with those reported in the empirical literature. However, despite the fact that financial flows volatility appears negative, it is not statistically significant, implying that financial flow volatility does not seem to affect economic growth in SSA countries. For the case of Rwanda, we employed single equation cointegration based estimators such as Dynamic Ordinary Least Squares (DOLS), Fully Modified Ordinary Least Squares (FMOLS), and Canonical Cointegration Regression (CCR) as complementary models to estimate the long-run effect of financial flows volatility on economic growth. All the disaggregated capital flows and the control variables such as investment share to GDP and government expenditure to GDP are positive and statistically significant. Financial volatility measure negatively affects economic growth in Rwanda. In as much as financial flow volatility does not affect economic growth in the case of SSA, the negative effect is evident for Rwanda, suggesting that capital flows management policies limit potential financial flow volatility that would emanate from excessive and short-term capital flows should be pursued.

Keywords: Economic growth, financial flows, Volatility

JEL classification: F43, F21, 047

*Economist, Monetary Analysis Division, Monetary Policy Department, National Bank of Rwanda.
†Senior Principal Economist,Research Department, National Bank of Rwanda.
‡Senior Statistician, Statistics Department, National Bank of Rwanda.

1 Introduction

In the new global economy, financial flows have substantially contributed to economic growth and development through technology transfer, remittances, and foreign aid from developed to developing countries. However, the patterns and cycle of financial flows have received considerable critical attention by both researchers and policymakers since they can potentially distort the economic growth trend. Over the recent past, a considerable body of literature around the theme of the effect of the financial flow on economic growth has sprung up, especially after the global financial crisis that occurred in 2008. It has been documented that the crisis led to high volatility in short-term loans and portfolio investment, with sudden reversals or stops, in low-income countries (Massa, 2016). However, the level of capital inflows to sub-Saharan African (SSA) countries has increased over time, with the magnitude of external financial flows to SSA expanding from 2% of GDP in 1990 to about 6% of GDP in 2017 driven primarily by private capital flows such as Foreign Direct Investment and portfolio investment (Ndiweni & Lumengo, 2021). Although there has been a considerable increase in private capital flows, there are significant variations in the growth of its various components (Agbloyor, et al., 2014).

Financial flows are in different forms, and their effects are distinctly heterogeneous. Financial flows[1] include Foreign Direct Investment (FDI), Foreign aid (Aid), Remittances, Portfolio investment, and other investments that contribute to the increase in the households' savings, taxes and boost the countries' production, which ultimately improves the exports of the country. In contrast, external borrowing, which is also a component of financial flows, appears in the form of countries' liability, but there is no prior fact that this type has an adverse effect on growth. There has been little agreement to date on whether financial flows affect positively or negatively the economic growth of a country. Needless to say, volatility stands out as the underlying feature in these components of financial flows. As such, the effects of this volatility on economic growth have increasingly gained attention and have been studied by researchers. Several studies have documented that volatile flows and economic growth have a negative relationship (Milesi-Ferretti & Tille, 2011).

While some research has been carried out on the relationship between financial flows and economic growth in both developed and developing countries (Aizenman et al., 2013; Agbloyor et al., 2014; Nyang'oro, 2017; Combes et al., 2019; Mowlaei, 2018), there has been very few studies that have investigated the effects of volatile financial flows on economic growth. The few studies on the volatility of capital flows and economic growth largely concentrated on developed countries and some emerging economies (Neanidis, 2019). Due to economic, political, and institutional differences between those economies and less developed economies, policy recommendations from these studies are less relevant for the SSA countries. This paper seeks to investigate the relationship between volatility of capital flows and economic growth in Sub-Saharan African countries for the period of 2000 to 2019, an area that remains unexplored in the literature. Our analysis is extended to the case of Rwanda to understand the country-specific effects of capital flows volatility.

Evidently, this matter is worth investigating since it would bring forth the level of financial instability for the recipient economies given the nature of financial flows: an upsurge in capital flows leads to a currency appreciation, an improved balance sheet of borrowers, easier credit conditions, an increase in non-tradable prices and overall inflation, thus generating a financial risk of a sudden stop and inciting financial instability in recipient countries (IMF, 2017).

The effect of financial flows on economic growth is particularly relevant in the African context since private capital flows are largely viewed by African policymakers and development partners as an important investment vessel for addressing the continent's growth challenges. Generally, the financial flows in Sub-Saharan African (SSA) countries have for long been largely dominated by foreign aid and grants from advanced countries.

[1]Note that the terms financial flows and capital flows are used interchangeably in this study.

As a result, shocks in rich countries, such as the global financial crisis of 2008/2009 and the 2011-12 European sovereign debt crisis, had detrimental effects on capital inflows to SSA. Similarly, global shocks such as the 2014 plunge in international oil prices and the recent global COVID-19 pandemic have also reshaped the composition of capital inflows and the structure of financing in SSA countries. As a result, the goal of this research is to look at the consequences of volatile financial flows on the economic growth of Sub-Saharan African countries, and then a particular investigation on Rwanda is further explored.

Furthermore, examining the growth and volatility of different components of financial flows could give useful information in the design of capital flow management policies for SSA countries, but also in Rwanda's case. Consequently, we first performed baseline analysis to examine the effect of financial inflows and their volatility on economic growth and then extended the analysis by exploring individual effects of financial flows components such as Foreign Direct Investment (FDI), Foreign aid (Aid), Remittances, Portfolio investment, and other investment.

The novelty of this paper also lies in using the Bias-Corrected Least Squares Dummy Variable (BC-LSDV) estimator developed by Kiviet (1995), which iteratively corrects the bias until unbiased estimates of the true parameters are obtained as opposed to using GMM estimators, which provide a suitable econometric strategy to estimate the effects of financial flows on economic growth but suffer from small sample bias. System GMM (SGMM) deals with endogeneity, but its efficiency depends on (1) the absence of higher-order serial correlation; (2) the availability of large samples; (3) the absence of dynamic panel data bias (Nickel bias). The BC-LSDV estimator deals with Nickel-bias and is also more efficient in small samples. Indeed, Bun (2005), using monte Carlo simulation, indicates that in small samples, BC-LSDV outperforms SGMM, given that it has the lowest root mean square error (RMSE). Furthermore, BC-LSDV is insensitive to a serial correlation, endogeneity, heteroskedasticity, and nickel bias.

For the case of Rwanda, we employ DOLS to estimate the effect of financial flows volatility on economic growth. This method is used along with its complementary models, such as fully modified ordinary least squares (FMOLS) and canonical cointegration regression (CCR), to check for robustness. The application of the DOLS estimator is motivated by the fact that it controls for the endogeneity and is efficient in small samples.

The remainder of this paper is structured as follows: Section 2 highlights the extant literature on volatile financial flows and economic growth, Section 3 details the methodology employed in the empirical analysis, in Section 4 we present the results from the empirical estimations, and finally, in Section 5, we conclude the paper.

2 Literature Review

Generally, Capital flows are evaluated based on the Solow growth model and its extensions. According to these models, capital flows are driven by capital productivity, where capital flows come from developed countries to developing countries. Capital flow is widely considered as an utmost important component of economic growth in both developing and developed countries. As a result, various studies have been conducted to investigate capital flow due to its composite effect on economic growth (Kapingura, 2017; Combes et al., 2019; Aizenman et al., 2013; Tamajai, 2000; Leblebicioğlu & Madariaga, 2015; Agbloyor et al., 2014; Agbloyor et al., 2020).

Several theories support the view that private capital flows increase domestic capital for economic growth. Some focus on private capital flows and economic growth, others on the nexus between the volatility of the capital flows and economic growth. Alley (2015) studied the relationship between private capital flows and economic growth in Sub-Saharan African countries and found that private capital flows do not merely have

a positive effect on economic output and growth but also that the effects of private capital flows shocks are negative, however, and are thus culpable for poor response of the region's economic performance to inflows of private capital (Alley, 2015).

Some authors have also suggested that private capital flows have a negative impact on economic growth. For example, the study by Elikplimi et al. (2020), after decomposing private capital flows into relevant components, found that foreign direct investment, foreign equity portfolio investment, and private debt flows all have a negative impact on economic growth in Africa.

They then suggested that strong financial markets are needed for private capital flows to impact economic growth positively. The study, which accounts for potential endogeneity of the explanatory variables in a dynamic panel data and controls for country-specific effects, found that capital inflows promote higher economic growth, independent of any effects on the investment rate, but only in economies where the banking sector has reached a certain level of development (Bailliu, 2000).

Several methods have been used in the study of the link between capital flows and economic growth. One method employed by Soto (2000) is a dynamic panel with yearly data estimated during the 1986-1997 period. He came up with two conclusions. First, FDI and portfolio capital flows have a robust positive association with growth. Second, portfolio bond flows are not significantly correlated with economic growth. He also found that in economies with undercapitalized banking systems, bank-related inflows are negatively correlated with the growth rate.

Remarkable contributions have been made by Opperman & Adjasi (2017), who examined the underlying factors of volatility patterns for FDI, portfolio capital, and cross-border bank lending inflows for sub-Saharan Africa using a panel framework with data from 1990 to 2011. Their findings were that global liquidity lowers FDI volatility while private sector credit increases volatility, global liquidity increases portfolio equity volatility with the growth and quality of macroeconomic policies, which are seen as major pull factors in reducing volatility; and the quality of macroeconomic policies and openness of trade are important pull factors to reduce the volatility of bank cross-border lending, while financial openness increases volatility.

Pagliari & Hannan (2017) studied the capital flow volatility and constructed three measures of volatility for total capital flows and some key instruments but also shed light on the determinants of volatility. They discovered that gross inflows in Emerging Markets and Developing Economies (EMDEs) show that portfolios and other investments are two and four times more volatile than FDI, respectively, using three metrics of volatility such as rolling window standard deviation, GARCH (1,1), conditional variance and ARIMA (1,1,0) to track its change over time. Their results suggest that push factors can be more important than pull factors in explaining volatility and that the characteristics of volatility can be different from those of the flows levels.

Prior research such as Yoon & Kim (2015) investigated the cost of foreign capital flows in developing market economies. Only in the event of a crisis, they discovered that volatility in all four forms of foreign capital flows (i.e., FDI, foreign equity investment, bank loans, and foreign bond investment?) is positively associated with stock market volatility.

Foreign exchange market volatility is amplified during a crisis by higher volatility in foreign direct investment, foreign equity investment, and bank loans, whereas it is mitigated during non-crisis periods. However, in the event of a crisis, the volatility of foreign bond investments has the biggest beneficial effect on foreign exchange rate volatility but has no effect in non-crisis periods.

They continue by stating that the potential costs of foreign capital flows in emerging market economies should encourage policymakers to implement capital flow management or macroprudential measures to safeguard both macroeconomic and financial stability.

Even though many researchers studied capital flows, a closer look at the literature, however, reveals a number of gaps and shortcomings as far as the effect of capital flow volatility on economic growth is concerned. Carp (2014) examined how financial globalization and capital flows volatility affect economic growth. He focused on how financial globalization can cause a rise in capital flows volatility, which can have disturbing effects on economic growth. The results showed that, in times of macroeconomic imbalances, financial globalization is not a blessing for the economy because it stimulates capital flow volatility and negatively influences the economic development of the countries in Central and Eastern Europe.

Previous studies can only be viewed as a beginning step toward a better understanding of the impact of capital flow volatility on economic growth, which has yet to be thoroughly investigated. The few studies on the volatility of capital flows and economic growth largely concentrated on developed countries and some emerging economies (Neanidis, 2019). Due to economic, political, and institutional differences between those economies and less developed economies, policy recommendations from these studies are less relevant for the SSA countries. This paper addresses the need for a study on the relationship between volatility of capital flows and economic growth in Sub-Saharan African countries for the period of 2000 to 2019, which is so far lacking in the literature.

3 Methodology

3.1 Theoretical Growth Model

The theoretical model underpinning our methodology is based on the endogenous growth model, which is crucial in explaining the role of capital flows in economic growth. The model builds on the two-factor neo-classical model propounded by Solow (1956) and is extended to incorporate the role of technological change. The endogenous growth model takes the form of a Cobb-Douglas function specified as:

$$y_t = A^{\lambda} k_t^{\alpha} l_t^{\beta} \tag{1}$$

Where y_t is Total output, k_t is Capital input, l_t is Labour input, and A is Total factor productivity while α and β are output elasticities for capital and labour, respectively. The responsiveness of output to changes in the amount of labor or capital utilized in production is measured by output elasticity and λ allows for factors changing the efficiency of the production process. In the context of this study, our focus is the output responsiveness to changes in capital flows.

From the theoretical foundations of profit-maximization, capital and labour are the shares of GDP that they receive in a perfectly competitive market equilibrium such that the marginal revenue product of capital (MPK) equals the rental price (R) and the marginal product of labour (MPK) equals the wage (W). Marginal products of capital and labour are derived by differentiating equation (1) with respect to capital and labour, respectively. These are then multiplied by unit price (P) to obtain MRP_L (equation 1) and MRP_K (equation 2) as below.

$$MRP_L = P\beta A^{\lambda} K^{\alpha} L^{\beta-1} = W \tag{2}$$

$$MRP_K = P\alpha A^{\lambda} K^{\alpha-1} L^{\beta} = R \tag{3}$$

Solving this system simultaneously for L allows us to eliminate labour from the equation for output in equation 1. This results in the equation 4 below.

$$y_t = A^{\lambda}\Big(\frac{\alpha k_t}{\alpha}\Big|\frac{R}{w}\Big)\alpha k_t^{\alpha} \tag{4}$$

Taking natural logarithms, we obtain equation 5.

$$lny_t = \alpha_0 + \alpha_1 lnA + \alpha_2 lnk_t \tag{5}$$

3.2 Empirical growth regressions

3.2.1 Panel data model specification for SSA

To empirically estimate the effect of financial flows on economic growth in SSA, we adopt dynamic panel data techniques. Our specification is based on previous empirical studies (Barro, 1991; Mankiw et al., 1992; Levine & Renelt, 1992; Barro & Sala-i-Martin, 2004). To estimate the effect of net financial flows on economic growth, we specify a dynamic specification given the potential inertia associated with economic growth. We specify two growth regressions. In the first equation, we disaggregate financial flows into various components and estimate along with other control variables as independent variables and GDP per capita growth as the dependent variable, constituting our main model, and in the second equation, we lump together all the financial flows as one indicator, and this constitutes an alternative model to investigate whether the growth regression is robust to the use of total flows. The models are thus specified as:

$$y_{i,t} = \beta_0 + \beta_1 y_{i,t-1} + \beta_2 totalflowsvol_{i,t} + \beta_3 fdi_{i,t} + \beta_4 pi_{i,t} + \beta_5 aid_{i,t} + \beta_6 remit_{i,t} + \beta_7 \acute{\chi}_{i,t} + \eta_i + \varpi_t + \varepsilon_{i,t} \tag{6}$$

$$y_{i,t} = \alpha + \alpha_1 y_{i,t-1} + \alpha_2 totalflows_{i,t} + \alpha_3 totalflowsvol_{i,t} + \alpha_4 \acute{X}_{i,t} + \mu_i + \lambda_t + \varepsilon_{i,t} \tag{7}$$

Where in equation 7, $i = 1, ..., N$ and $t = 1, ..., T$ denote country and year, respectively. $y_{i,t}$ is the real GDP per capita growth, $y_{i,t-1}$ is the lagged value of real GDP per capita growth, $totalflows_{i,t}$ lumps together different financial flows components, including Foreign Direct Investment ($fdi_{i,t}$), Foreign aid ($aid_{i,t}$), Remittances ($remit_{i,t}$), and Portfolio investment ($pi_{i,t}$), $totalflowsvol_{i,t}$ is the generated financial flows volatility, $\acute{X}$ is a vector of control variables, including trade openness, terms of trade, population growth, investment share to GDP, and government consumption as a share of GDP. μ_i are country fixed effects to control for unobserved heterogeneity, λ_t are the time effects to capture shocks that are common to all sampled countries, $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ are coefficients to be estimated, and $\varepsilon_{i,t}$ is the error term. In equation 6, $fdi_{i,t}$ is foreign direct investment in the country i at a time t, $pi_{i,t}$ is portfolio investment, $aid_{i,t}$ is the aid grants, and $remit_{i,t}$ stands for remittances, $\acute{X}_{i,t}$ is a set of control variables. β_i where $(i = 0, ..., 7)$ are coefficients to be estimated, η_i are country fixed effects to control for unobserved heterogeneity, are the time effects to capture shocks that are common to all sampled countries, and $\varepsilon_{i,t}$ is the error term.

3.2.2 Time series model specification for Rwanda

In the case of Rwanda, we use a single equation cointegration-based estimator, especially the dynamic ordinary least squares model (DOLS) by Stock and Watson (1993). Their approach improves the OLS estimator by coping with small sample and dynamic sources of bias, given that it corrects for endogeneity in explanatory variables by including leads and lags of first differences of the regressors and for serially correlated errors by a generalized least squares (GLS) procedure. We specify our model as follows.

$$y_t = X_t M' + \sum_{i=p}^{i=q} \Delta X_{t-1} + \varepsilon_t \tag{8}$$

Where y_t is the per capita GDP growth used as a dependent variable. X_t is a vector explanatory variables, including foreign direct investment, openness, remittances, official development assistance, investment as a percentage of GDP, government expenditure as a percentage of GDP, portfolio investment, population growth, and financial volatility. M is parameters to be estimated $(\beta = 0, ..., 9)$. $\sum_{i=p}^{i=q} \Delta X_{t-1}$ denotes leads and lags of the first differences of the explanatory variables. p and q denote the length of leads and lags, respectively. ε_t is the error term.

3.2.3 Estimation Methods for SSA

In this subsection, we describe the econometric technique used to estimate the effect of financial flows and economic growth. We begin model estimation with static panel techniques such as pooled ordinary least squares, random effects, and fixed effects estimators as baseline models. However, due to a number of issues associated with these estimators, such as the presence of unobserved time and country-specific effects, these techniques are challenged. This is often mitigated by allowing into the baseline model time dummies and country-specific effects. However, the methods used to account for country-specific effects, or difference estimators, tend not to be appropriate owing to the dynamic nature of the regression (Loayza, et al., 2005). Besides, most of the explanatory variables, including financial flows tend to be endogenous to economic growth in the sense that higher capital flows may increase investment and boost economic growth, but sustained economic growth in the recipient country is likely to send out positive signals about the country's macroeconomic stability and attract more capital inflows, and thus, we need to control for reverse causality.

Cognizant of the fact that the presence of endogeneity could lead to biased results, we use dynamic panel techniques by Arellano & Bond (1991); Arellano & Bover (1995), and Blundell & Bond (1998) to account for endogeneity emanating from reverse causality and Nickell (1981) bias due to initial income variable, $y_{i,t-1}$.

Dynamic panel estimators such as difference generalized methods of moments (DGMM), generalized methods of moments (GMM), and system generalized methods of moments (SGMM) control for endogeneity. Despite the fact that SGMM developed by Arellano & Bover (1995) and Blundell & Bond (1998) is used with an additional set of moments, combining the first difference equation using lagged levels as instruments with an additional equation in levels, using lagged first differences as instruments, instruments proliferation is likely to lead to the loss of efficiency given that it leads to over-fitting of endogenous variables and less precise estimates of the optimal weighting matrix[2]. Roodman (2009) underscores the effect of instruments proliferation on the Hansen test of joint validity, which tests the exogeneity of the instruments based on the J statistics of the Sargan-Hansen test. The null hypothesis implies the joint validity of the instruments. In other words, a null hypothesis rejection shows that the instruments are not exogenous, and hence the GMM estimator is inconsistent.

Secondly, much as GMM estimators provide a suitable econometric strategy to estimate the effects of financial flows on economic growth, its estimators suffer from small sample bias; this is particularly the case in macro panels, thereby producing biased and inaccurate estimates.

To correct the bias, we implement bias correction methods for dynamic panel data; specifically, the bias-corrected least squares dummy variable estimator (BC-LSDV) developed by Kiviet (1995), which iteratively corrects the bias until unbiased estimates of the true parameters are obtained. Recent research has followed this approach to correct for the bias in fixed effects. (Kiviet, 1998; Bun & Kiviet, 2003; Bruno, 2005; Bun & Carree, 2006) extend this estimator to cases with heteroscedasticity and unbalanced panels. Judson & Owen (1999) strongly support BC-LSDV when N is small, as in most macro panels. Indeed, Bun & Kiviet (2003), using Monte-Carlo simulation, indicate that in small samples, the BC-LSDV estimator outperforms consistent IV-GMM estimators such as Anderson-Hisao (AH), Arrellano and Bond (AB), and Blundell and Bond (BB) estimators given that it has the lowest mean square error. Accordingly, this paper employs bias corrected least squares dummy variable estimator.

[2] Barajas, et al.(2013) suggest that the number of instruments should be less or equal to the number of cross-sections in the regressions to avoid over-identification of instruments. However, literature is not clear on the determination of the maximum number of instruments to be used in each case. Roodman (2009) proposes lag limits options based on a relatively arbitrary rule of thumb, that instruments should not be higher than individual units in the panel.

3.2.4 Estimation Method for Rwanda

Given the fact that the OLS estimator is known to yield biased and less consistent results, a number of estimators have been proposed, especially DOLS. Kao and Chiang (2000) contend that DOLS performs better in small samples, a result that is corroborated by Rahman (2017) using monte Carlo simulation. In the context of this study, we employ DOLS to estimate the effect of financial flows volatility on economic growth in Rwanda. This method is used along with its complementary models, such as fully modified ordinary least squares (FMOLS) and canonical cointegration regression (CCR), to check for robustness.

3.2.5 Data

The variables presented in models 6 and 7 are constructed as follows. Total flows cover all the net financial flows included in our specification and are given by $totalflows = fdi + pi + aid + remit$. The total flows volatility is based on the Z_score score metric, which indicates how financial flows deviate from the mean. Real gross domestic product per capita is real gross domestic product divided by population.

$$Z\_score = \frac{x - \mu}{\sigma} \tag{9}$$

Investment is measured as the share of GDP for each of the countries included in our sample. fdi is the net foreign direct investment, including equity, reinvested earnings, and debts from affiliates, measured in USD. pi is the net portfolio investment measured in USD. aid is aid flows including budgetary grants, non-budgetary grants, and project grants. $remit$ is the inbound remittances measured in USD. Trade openness is measured as the sum of exports and imports divided by real gross domestic product.

Government expenditure is the total government expenditure, including recurrent and capital spending of each individual country divided by GDP. For population, we consider the population growth rates of each of the countries included in our sample.

Terms of trade (tot) is the ratio of export prices to import prices. All the series are transformed into natural logarithms except for the variables expressed as shares of GDP. We do not control for education like most growth regressions because data on education is not available for many countries included in our sample, and interpolation still leads to a severe loss of observations.

We use annual data spanning the period 2000-2019 for 23 countries, divided into non-overlapping 3-year periods, where variables are three-year averages of annual data to eliminate short-term fluctuations[3]. The sample selection is based on the availability of data. Thus, the included countries are those for which data on the relevant variables are available. Data is sourced from World Bank's world development indicators (WDI), the International Monetary Fund's world economic outlook (WEO), and the National Bank of Rwanda (BNR).

For Rwanda, Data was obtained from different sources, including world development indicators, the BNR database, especially annual and quarterly balance of payments statistics output tables; some series were interpolated from annual series to quarterly series. We used data series from 2000Q1-2019Q4. We used quarterly to have sufficient data points for a country-specific regression.

4 Empirical Results and Discussion

This section highlights the underlying features of variables in the data description with the results summarized in Table 1, and the findings from empirical estimation are reported in subsection 2.

[3]The countries included in our sample are: Angola, Botswana, Burkina Faso, Burundi, Democratic Republic of Congo, Kenya, Mozambique, Rwanda, Tanzania, Uganda, Zambia, Ghana, Guinea Bissau, Guinea, Madagascar, Mauritius, Mali, Namibia, Niger, Nigeria, Senegal, South Africa and Togo.

4.1 Data Analysis

Table 1 below summarizes the statistical description of the variables. Turning our attention to the volatility of financial flow variables and other control variables in the sample, we strongly argue that the variables are generally not that much volatile as witnessed by the standard deviations (also look up figure 2). However, a few variables, such as net foreign direct investment (fdi_gdp) and terms of trade (tot), show a relatively high deviation from the countries' average, and that indicates high variability of these variables across countries.

Note that the variables in table 1 are defined as: $rgdppc\_gr$ is growth in GDP per Capita; $Ltflows$ is the natural log of total financial flows; fin_vol is a measure of financial flows volatility; fdi_gdp is FDI to GDP ratio; $Lremit$ is the natural log of remittances; $Loda$ is the natural log of official development assistance, used as foreign aid; pi is net portfolio investment ; gov_gdp is government expenditure to GDP ratio; inv_gdp is investment to GDP ratio; $Ltot$ is the natural log of terms of trade; $Lopen$ is the natural log of trade openness; $Lpop\_gr$ is population growth, measured as in log difference.

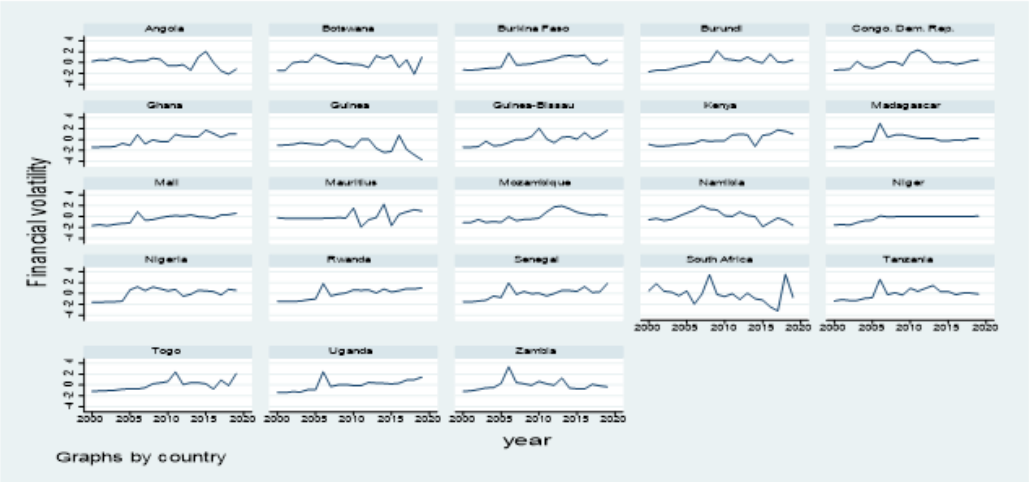
Table 1: Descriptive statistics of the variables

VARIABLES	(1) N	(2) Mean	(3) p50	(4) Sd	(5) min	(6) Max
rgdppc_gr	460	2.13	2.40	3.08	-15.04	12.46
Ltflows	434	0.22	0.30	1.27	-5.64	3.46
fin_vol	460	-0.09	-0.03	1.03	-3.71	3.57
fdi_gdp	460	3.48	2.51	4.59	-6.37	39.46
Lremit	435	-2.04	-2.00	2.21	-11.38	3.19
Loda	460	-0.91	-0.71	1.23	-4.67	2.43
pi	460	-0.32	0.00	2.76	-19.63	14.30
gov_gdp	459	2.62	2.69	0.43	-0.05	3.33
inv_gdp	460	3.06	3.05	0.38	1.63	3.99
Ltot	460	4.76	4.71	0.31	3.06	5.52
Lopen	460	-0.76	-0.78	0.45	-2.05	0.82
Lpop_gr	460	0.86	1.00	0.57	-3.43	1.72

Source: Authors' Estimations

Looking at the trends in the figure below, it is clear that there is no evidence of financial flow volatility in the selected Sub-Saharan African countries; this calls for a further empirical investigation to ascertain whether financial flows volatility affects economic growth.

Figure 1: Financial flows Volatility

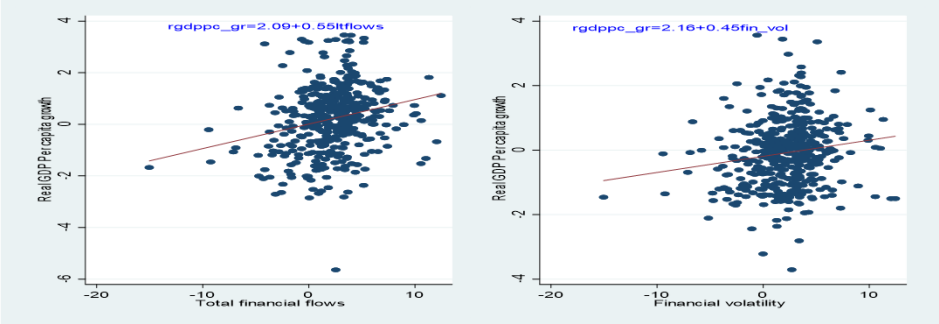


Source: Authors' Estimations

In this subsection, we first assess cross-country correlations between financial flows and economic growth and financial flows volatility and economic growth as presented in figure 2, respectively.

The scatter plots in figure 2 describe, which is the baseline of our analysis, financial flows appear to be positively correlated with economic growth; however, the volatility of these flows diminishes the weight of positive influence on the growth, as it is evidenced by somewhat less inclined line in the scatterplot. In addition, the regression equation shows an insignificant positive relationship between financial flows volatility and economic growth.

Figure 2: Financial volatility and growth



Source: Authors' Estimations

4.2 Empirical Results

This subsection presents the empirical results for both the selected SSA countries and the specific case of Rwanda. The results are arranged in general to a specific manner. We first present results for SSA countries, followed by results for Rwanda.

4.2.1 Main Results for SSA

Table 2 reports the ordinary least squares (OLS), fixed effects (FE), and Bias-corrected least squares dummy variable estimators on the effect of financial flows volatility on economic growth. The results are presented in columns (1)-(3). OLS and FE are used as baseline regressions; thus, we emphasize on the BC-LSDV estimator for the interpretation of results. We begin our analysis by evaluating the effect of the disaggregated financial flows on economic growth. The results indicate that the lagged dependent variable is positive and statistically significant across all the estimators, suggesting that past observations of economic growth are key in determining the present and future growth trajectory.

This is in line with the theory of cumulative causation in economic growth developed by Myrdal (1957) and Kaldor (1970), who contend that initial conditions determine economic growth in a self-sustained and incremental way. Turning to the variable of interest, which is financial flows volatility, its coefficient appears with the correct sign, but it is statistically insignificant. The coefficients on terms of trade, official development assistance (ODA and aid flows are used interchangeably) are positive and statistically significant at a 5 percent level, while foreign direct investment as a share of GDP is positive and statistically significant at 10%, suggesting that it has a positive impact on growth.

The coefficient of openness is positive and statistically significant at a 10 percent level of significance, implying that openness matters for growth, given that as economies get more liberalized, the more it fosters growth. On the other hand, population growth depresses economic growth, and investment as a share of GDP emerges with a negative sign and is statistically significant, which is trivial.

Table 2: Growth and disaggregated capital flows

VARIABLES	(1) OLS	(2) FE	(3) BC-LSDVC
Dependent variable: GDP per Capita Growth			
Lagged GDP per capita growth	0.272***	0.210**	0.351***
	(0.086)	(0.086)	(3.115)
Government expenditure	-0.020	-0.053	-0.068
	(0.046)	(0.086)	(-0.824)
Openness	0.892*	1.704*	1.894*
	(0.479)	(0.868)	(1.663)
Terms of Trade	1.103**	4.044***	3.693***
	(0.448)	(0.884)	(2.800)
Investment	-0.003	-0.094*	-0.101**
	(0.026)	(0.049)	(-2.233)
Population growth	-0.859***	0.405	0.342
	(0.230)	(0.866)	(0.286)
Financial Volatility	0.194	-0.121	-0.122
	(0.329)	(0.407)	(-0.349)
Remittances	0.126	0.231	0.210
	(0.153)	(0.287)	(0.817)
ODA	0.522**	2.158***	2.235***
	(0.194)	(0.704)	(3.540)
FDI	0.034	0.162**	0.162*
	(0.040)	(0.074)	(1.662)
Portfolio investment	0.192**	0.222	0.186
	(0.081)	(0.157)	(1.238)
Constant	-0.882	-9.287**	
	(2.270)	(4.429)	
Observations	136	136	136

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

4.2.2 Robustness Checks for SSA

To investigate whether the relationship between financial flows volatility is robust to different model specifications, our empirical analysis further probed to find out the effect of aggregated financial flows on economic growth, and the results are summarized in table 3. OLS and FE remain baseline estimators, while BC-LSDV is the main estimator. Similar to our main results, the coefficient of the lagged dependent variable, which is economic growth, is positive and statistically significant across all the estimators, confirming the presence of persistence in economic growth. The coefficient of the variable of interest does not seem robust to changes in model specification, given that in the last two decades, financial volatility appears to be quite low in most of the countries studied. The coefficient of total flows is positive and marginally significant, implying that total flows stimulate economic growth. Terms of trade and trade openness emerge with positive and statistically significant coefficients, suggesting that both terms of trade and trade openness matter for growth.

To further check for the sensitivity of our baseline model, we also applied the heterogenous panel data estimators such as mean group, pooled mean group, and dynamic fixed effects estimators, a class of estimators that were proposed by (Pesaran & Smith, 1995) and further developed by (Pesaran, et al., 1999); (Pesaran, 2006); (Chudik & Pesaran, 2013) and applied by (Eberhardt & Presbitero, 2015) The estimated results reported in (Appendix A) do not seem to provide plausible results. The coefficient of financial volatility is positive in the long-run under pooled mean group estimator and dynamic fixed effects, a result that is trivial, and this could be due to the fact these estimators are more suitable for large T and large N, yet our sample is small, with only 20 time periods and 23 cross-sections. To sum up, our empirical results support the popular view that foreign aid and FDI flows are associated with a positive effect on economic growth. Remarkably, Foreign aid has a higher positive coefficient than other financial flows, which confirms a greater contribution to the economic development of Sub-Saharan African countries (SSA countries).

As a matter of fact, the budget of many countries in SSA relies heavily on foreign aid, with over 36% of government expenditure on average in 2017-2019[4], and thus higher inflows of this type undoubtedly support

[4]These statistics were calculated by the authors using World Bank data, where 30 SSA countries were considered. We considered only these countries based on the fact that they have updated numbers at least for the period 2017 to 2019. Though

economic growth. Despite the fact that the coefficient of financial flows volatility is statistically insignificant, it appears with a negative sign under fixed effect and BC-LSDVC specifications, implying that financial volatility is considered as a push factor for negative economic growth as per results reported in Table 2. Other control variables such as terms of trade, foreign direct investment, and trade openness appear to be strong contributors to growth in the SSA countries' economic growth.

Table 3: Growth and total capital flows

VARIABLES	(1) OLS	(2) FE	(3) BC-LSDVC
Lagged GDP per capita growth	0.083**	0.178*	0.351***
	(0.032)	(0.092)	(3.693)
Total flows	0.069	0.867	0.985*
	(0.059)	(0.634)	(1.817)
Government expenditure	0.004	0.526	0.557
	(0.184)	(1.090)	(0.472)
Terms of Trade	0.298	3.534***	3.105***
	(0.271)	(1.040)	(2.645)
Openness	0.201	2.419*	2.608***
	(0.144)	(1.273)	(2.709)
Financial volatility	0.093	0.209	0.142
	(0.115)	(0.403)	(0.432)
Population growth	-0.107**	0.292	0.468
	(0.040)	(1.074)	(0.438)
Investment	-0.122	-0.591	-0.740
	(0.202)	(0.982)	(-0.670)
Constant	0.202	-11.440**	
	(1.424)	(5.390)	
Observations	126	134	134

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.

4.2.3 Estimation Results for Rwanda

Table 4 reports the results of DOLS, FMOLS, and CCR estimators in columns (1)-(3). Given that financial flows as regressors are inclined to simultaneity bias in the model, we rely on the DOLS estimator for interpretation of results since it is robust in the presence of simultaneity as well as small sample bias compared to other alternative estimators (Stock & Watson, 1993). The findings are more encouraging for the Rwandan case since they present a significant effect for most of the variables. To be more precise, FDI, Openness, remittances, investment, government expenditure, portfolio investment, and financial volatility are positively associated with economic growth. The results are consistent with that of Combes et al. (2019). Variable of interest, which is financial volatility, is negative and statistically significant, suggesting that financial flows' volatility depresses economic growth in Rwanda but becomes insignificant in the alternative specifications.

The coefficient of population growth is positive and statistically significant in alternative. Nevertheless, model estimators in columns 2 and 3 showed. A credible reason for this could be that the alternative estimators fail to adjust simultaneity bias.

Somalia has updated number, we have decided to remove it while calculating the average percentage Net ODA in government expenditure for it appeared to be an outlier in the dataset.

Table 4: Results of capital flows and Rwanda's growth

VARIABLES	(1) DOLS	(2) FMOLS	(3) CCR
FDI	0.055***	0.112***	0.106***
	(0.011)	(0.017)	(0.024)
Openness	0.327***	0.341***	0.340***
	(0.042)	(0.060)	(0.055)
Remittances	0.164***	0.070***	0.074***
	(0.015)	(0.020)	(0.027)
ODA	0.153***	-0.056	-0.052
	(0.033)	(0.040)	(0.053)
Portifolio Investment	0.603***	0.112	0.122
	(0.051)	(0.072)	(0.083)
Population growth	0.003	0.048*	0.056**
	(0.017)	(0.025)	(0.028)
Investment	0.027***	0.026***	0.027***
	(0.002)	(0.004)	(0.005)
Government expenditure	0.027***	0.012	0.013
	(0.004)	(0.007)	(0.008)
Financial Volatility	-0.052***	0.037	0.035
	(0.020)	(0.026)	(0.032)
Constant	4.314***	5.658***	5.581***
	(0.226)	(0.338)	(0.424)
R-squared	0.997	0.977	0.981

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

4.2.4 Robustness Checks for Rwanda

To establish whether the effect of financial flows' volatility on economic growth in Rwanda is robust to aggregating the financial flows, we estimated the model by including the total financial flows but excluding the individual components that make up this variable. Table 5 reports the results of the aggregated financial flows and economic growth.

The coefficient of total capital flows is positive and statistically significant, implying that an increase in the total capital flows induces economic growth in Rwanda. The coefficient of financial volatility turns out to be positive and statistically in the DOLS specification but insignificant in alternative specifications. Control variables such as investment, government expenditure, degree of openness, and population growth are positive and significant in line with economic theory. Generally, financial flows volatility is less robust than aggregating capital flows.

Table 5: Growth and Total Capital Flows in Rwanda

VARIABLES	(1) DOLS	(2) FMOLS	(3) CCR
Total flows	0.205***	0.179***	0.175***
	(0.009)	(0.019)	(0.021)
Openness	0.068**	0.308***	0.290***
	(0.028)	(0.078)	(0.065)
Population	0.005	0.073**	0.082***
	(0.014)	(0.029)	(0.024)
Investment	0.600***	0.659***	0.709***
	(0.055)	(0.119)	(0.134)
Government expenditure	0.233***	0.405***	0.422***
	(0.029)	(0.094)	(0.102)
Financial Volatility	0.051***	0.012	0.013
	(0.007)	(0.014)	(0.016)
Constant	3.145***	2.844***	2.631***
	(0.182)	(0.464)	(0.512)
R-squared	0.994	0.985	0.988

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

5 Conclusion

The main objective of this paper is to empirically assess the effect of financial flows volatility on economic growth in a panel of 23 SSA countries, spanning the period 2000-2019, converted into non-overlapping 3-year averages, and extend the analysis to the specific case of Rwanda. The empirical analysis begins with the construction of a financial flows volatility indicator using the Z-score metric. The generated financial flows volatility is incorporated in the growth regression, together with a number of control variables. To estimate the growth regression, we apply dynamic panel data techniques, particularly the BC-LSDV estimator as our main model, while OLS and FE estimators as the baseline regressions. The main results indicate that the financial flows accelerate economic growth in SSA. However, financial flows volatility is negative but statistically insignificant, implying that financial flows volatility does not seem to affect economic growth. To that end, the fact could be that the portfolio investment that has been found to be much more volatile than FDI in low-income countries (LICs) is insignificant. This could be due to the fact portfolio investment is a small component of financial flows. Control variables such as terms of trade, trade openness, and foreign direct investment emerged as positive and statistically significant. Our results are less robust to the aggregation of financial flows.

For Rwanda, all the disaggregated capital flows and the control variables such as investment share to GDP and government expenditure to GDP are positive and statistically significant. However, the financial volatility measure depresses economic growth in Rwanda. The empirical results point to important policy implications. For the case of Rwanda, the coefficient on financial flows volatility is negative and significant, implying hurts economic growth if not well managed, suggesting that there is a need to pursue capital flows management policies to limit potential financial flows volatility to avoid their adverse effect on economic growth. Building good macro-policies and strong institutions tend to attract less volatile types of capital and are less vulnerable to large swings in capital flows. In terms of future areas for research, exploring other financial flows volatility measures would provide a different perspective to this study.

References

Agbloyor, E. K., Abor, J. Y., Adjasi, C. K. D. & Yawson, A., 2014. Private capital flows and economic growth in Africa: The role of domestic financial markets. Journal of International Financial Markets, Institutions, and Money, Volume 30, pp. 137–152.

Agbloyor, E. K., Yawson, A. & Opperman, P., 2020. Private capital flows and economic growth. In: Contemporary Issues in Development Finance. s.l.:Routledge, pp. 73-103.

Aizenman, J., Jinjarak, Y. & Park, D., 2013. Capital flows and economic growth in the era of financial integration and crisis, 1990–2010. Open Economies Review, Volume 24, pp. 371-396. Alley, I., 2015. Private capital flows and economic growth of sub-Saharan Africa. African Development Review, p. 469–483.

Arellano, M. & Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. The review of economic studies, 58(2), pp. 277-297.

Arellano, M. & Bover, O., 1995. Another look at the instrumental variable estimation of error components models. Journal of econometrics, 68(1), pp. 29-51.

Bailliu, J. N., 2000. Private capital flows, financial development, and economic growth in developing countries. Bank of Canada Working Paper 2000-15.

Barajas, M. A., Chami, M. R. & Yousefi, M. R., 2013. The finance and growth nexus re-examined: Do all countries benefit equally?, s.l.: International Monetary Fund, Working Paper 13/130.

Barro, R. J., 1991. Economic growth in a cross-section of countries. The Quarterly Journal of Economics, 106(2), pp. 407-443.

Barro, R. & Sala-i-Martin, X., 2004. Economic growth second edition. s.l.: Cambridge MA.: The MIT Press.

Blundell, R. & Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. Journal of econometrics, 87(1), pp. 115-143.

Bruno, G. S., 2005. Approximating the bias of the LSDV estimator for dynamic unbalanced panel data models. Economics Letters, 87(3), pp. 361-366.

Bun, M. J. & Carree, M. A., 2006. Bias-corrected estimation in dynamic panel data models with heteroscedasticity. Economics Letters, 92(2), pp. 220-227.

Bun, M. J. & Kiviet, J. F., 2003. On the diminishing returns of higher-order terms in asymptotic expansions of bias. Economics Letters, 79(2), pp. 145-152.

Carp, L., 2014. Financial globalization and capital flows volatility effects on economic growth. Procedia Economics and Finance, pp. 350-356.

Chudik, A. & Pesaran, M., 2013. Common Correlated Effects Estimation of Heterogeneous Dynamic Panel Data Models with Weakly Exogenous Regressors. Federal Reserve Bank of Dallas, Globalization and Monetary Policy Institute, Working Paper No.146.

Combes, J.-L., Kinda, T., Ouedraogo, R. & Plane, P., 2019. Financial flows and economic growth in developing countries. Economic Modelling, Volume 83, pp. 195-209.

Eberhardt, M. & Presbitero, A., 2015. Public debt and growth: Heterogeneity and Non-linearity. Journal of International Economics. IMF, 2017. Increasing resilience to large and volatile capital flows The role of macroprudential policies, s.l.: IMF Policy Paper. Washington D.C.

Judson, R. A. & Owen, A. L., 1999. Estimating dynamic panel data models: A guide for macroeconomists. Economics Letters, 65(1), pp. 9-15.

Kaldor, N., 1970. The new monetarism, s.l.: Lloyds Bank Review. Agbloyor, E. K., Abor, J. Y., Adjasi, C. K. D. & Yawson, A., 2014.

Private capital flows and economic growth in Africa: The role of domestic financial markets. Journal of International Financial Markets, Institutions, and Money, Volume 30, pp. 137–152.

Agbloyor, E. K., Yawson, A. & Opperman, P., 2020. Private capital flows and economic growth. In: Contemporary Issues in Development Finance. s.l.:Routledge, pp. 73-103.

Aizenman, J., Jinjarak, Y. & Park, D., 2013. Capital flows and economic growth in the era of financial integration and crisis, 1990–2010. Open Economies Review, Volume 24, pp. 371-396.

Alley, I., 2015. Private capital flows and economic growth of sub-Saharan Africa. African Development Review, p. 469–483.

Arellano, M. & Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. The review of economic studies, 58(2), pp. 277-297.

Arellano, M. & Bover, O., 1995. Another look at the instrumental variable estimation of error components models. Journal of econometrics, 68(1), pp. 29-51.

Bailliu, J. N., 2000. Private capital flows, financial development, and economic growth in developing countries. Bank of Canada Working Paper 2000-15.

Barajas, M. A., Chami, M. R. & Yousefi, M. R., 2013. The finance and growth nexus re-examined: Do all countries benefit equally?, s.l.: International Monetary Fund, Working Paper 13/130.

Barro, R. J., 1991. Economic growth in a cross-section of countries. The Quarterly Journal of Economics, 106(2), pp. 407-443.

Barro, R. & Sala-i-Martin, X., 2004. Economic growth second edition. s.l.: Cambridge MA.: The MIT Press.

Blundell, R. & Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. Journal of econometrics, 87(1), pp. 115-143.

Bruno, G. S., 2005. Approximating the bias of the LSDV estimator for dynamic unbalanced panel data models. Economics Letters, 87(3), pp. 361-366.

Bun, M. J. & Carree, M. A., 2006. Bias-corrected estimation in dynamic panel data models with heteroscedasticity. Economics Letters, 92(2), pp. 220-227.

Bun, M. J. & Kiviet, J. F., 2003. On the diminishing returns of higher-order terms in asymptotic expansions of bias. Economics Letters, 79(2), pp. 145-152.

Carp, L., 2014. Financial globalization and capital flows volatility effects on economic growth. Procedia Economics and Finance, pp. 350-356.

Chudik, A. & Pesaran, M., 2013. Common Correlated Effects Estimation of Heterogeneous Dynamic Panel Data Models with Weakly Exogenous Regressors. Federal Reserve Bank of Dallas, Globalization and Monetary Policy Institute, Working Paper No.146.

Combes, J.-L., Kinda, T., Ouedraogo, R. & Plane, P., 2019. Financial flows and economic growth in developing countries. Economic Modelling, Volume 83, pp. 195-209.

Eberhardt, M. & Presbitero, A., 2015. Public debt and growth: Heterogeneity and Non-linearity. Journal of International Economics.

IMF, 2017. Increasing resilience to large and volatile capital flows The role of macroprudential policies, s.l.: IMF Policy Paper. Washington D.C.

Judson, R. A. & Owen, A. L., 1999. Estimating dynamic panel data models: A guide for macroeconomists. Economics Letters, 65(1), pp. 9-15.

Kaldor, N., 1970. The new monetarism, s.l.: Lloyds Bank Review. Kapingura, F. M., 2017. External financial flows and economic growth in the SADC region: An application of the granger causality test in the panel data model. The Journal of Developing Areas, Volume 51, pp. 81-93.

Kiviet, J. F., 1995. On bias, inconsistency, and efficiency of various estimators in dynamic panel data models. Journal of Econometrics, Volume 68, pp. 53-78.

Kiviet, J. F., 1998. Expectations of expansions for estimators in a dynamic panel data model; some results for weakly-exogeneous regressors. Discussion paper-Tinbergen Institute.

Leblebicioğlu, A. & Madariaga, J., 2015. Financial flows, the composition of capital, and growth, s.l.: IMF Economic Review.

Levine, R. & Renelt, D., 1992. A sensitivity analysis of cross-country growth regressions. The American economic review, pp. 942-963.

Loayza, N., Fajnzylber, P. & others, 2005. Economic growth in Latin America and the Caribbean: Stylized facts, explanations, and forecasts. s.l.:World Bank Publications.

Mankiw, N. G., Romer, D. & Weil, D. N., 1992. A contribution to the empirics of economic growth. The quarterly journal of economics, 107(2), pp. 407-437.

Massa, I., 2016. Literature survey on capital account management in low-income countries. Achieving Financial Stability and Growth in Africa, pp. 62-76.

Milesi-Ferretti, G.-M. & Tille, C., 2011. The great retrenchment: International capital flows during the global financial crisis. Economic policy, Volume 26, pp. 289-346.

Mowlaei, M., 2018. The impact of foreign capital inflows on economic growth in selected African coun-

tries. African Journal of Economic and Management Studies.

Myrdal, G., 1957. Economic nationalism and internationalism: The dyason lectures, 1957. Australian Outlook, 11(4), pp. 3-50.

Ndiweni, Z. L. & Lumengo, B.-B., 2021. Capital inflows and economic growth nexus in Sub-Saharan Africa: evidence on the role of institutions.

Neanidis, K. C., 2019. Volatile capital flows and economic growth: The role of banking supervision. Journal of Financial Stability, Volume 40, pp. 77-93.

Nickell, S., 1981. Biases in dynamic models with fixed effects. Econometrica: Journal of the econometric society, pp. 1417-1426.

Nyang'oro, O., 2017. Capital inflows and economic growth in sub-Saharan African countries, s.l.: African Development Bank Abidjan, Cote d'Ivoire, Working Paper No.285.

Opperman, P. & Adjasi, C. K. D., 2017. The determinants of private capital flow volatility in sub-Saharan. Research in International Business and Finance, pp. 312-320.

Pagliari, M. S. & Hannan, S. A., 2017. The volatility of capital flows in emerging markets: Measures and determinants, s.l.: International Monetary Fund, Working Paper.

Pesaran, M., 2006. Estimation and Inference in Large Heterogeneous Panels with Cross Section Dependence. Econometrica, 74(4), pp. 967-1012.

Pesaran, M., Shin, Y. & Smith, R., 1999. Pooled Estimation of Long-Run Relationships in Dynamic Heterogeneous Panels. Journal of the American Statistical Association, Volume 94, pp. 621-634.

Pesaran, M. & Smith, R., 1995. Estimating long-run relationships from dynamic heterogeneous panels. Journal of Econometrics, 68(1), pp. 79-113.

Roodman, D., 2009. A note on the theme of too many instruments. Oxford Bulletin of Economics and Statistics, 71(1), pp. 135-158.

Solow, R. M., 1956. A contribution to the theory of economic growth. The quarterly journal of economics, 70(1), pp. 65-94.

Soto, M., 2000. Capital flows and growth in developing countries: Recent empirical evidence. OECD Development Centre Working Papers, No. 160, OECD Publishing, Paris, https://doi.org/10.1787/633871307443.

Stock, J. H. & Watson, M. W., 1993. A simple estimator of cointegrating vectors in higher order integrated systems. Econometrica: Journal of the Econometric Society, pp. 783-820.

Sy, A. & Rakotondrazaka, F. M., 2015. Private capital flows, official development assistance, and remittances to Africa: Who gets what. Policy Paper, Volume 2.

Tamajai, A., 2000. The impact of capital inflows on Asian economic growth. s.l.: Fordham University.

Yoon, K. & Kim, J., 2015. Costs of foreign capital flows in emerging market economies: Unexpected economic growth and increased financial market volatility, s.l.: Bank of Korea WP.

Appendix A

VARIABLES	(1) PMG	(2) PMG	(3) DFE	(4) DFE	(5) MG
Dependent variable: GDP per capita Growth					
Short-Run Results					
Error correction term		-0.089***		-0.142***	
		(0.027)		(0.015)	
ODA		-0.040		-0.039***	
		(0.050)		(0.015)	
Openness		-0.200***		-0.129***	
		(0.055)		(0.036)	
Terms of Trade		-0.076		-0.032	
		(0.098)		(0.045)	
Investment		0.158***		-0.005	
		(0.061)		(0.036)	
Government Expenditure		-0.179**		-0.099***	
		(0.070)		(0.038)	
Portfolio Investment		-0.039		0.003	
		(0.240)		(0.003)	
Remittances		0.636***		0.018**	
		(0.241)		(0.009)	
FDI		-0.010		-0.001	
		(0.011)		(0.002)	
Financial Volatility		0.132*		-0.009	
		(0.079)		(0.010)	
Long-Run Results					
ODA	0.619***		0.409***		0.045
	(0.060)		(0.097)		(0.091)
Openness	0.476***		-0.214		-0.212*
	(0.125)		(0.197)		(0.125)
Terms of Trade	-0.167		0.744***		0.314
	(0.205)		(0.232)		(0.200)
Investment	-0.777***		0.038		0.324***
	(0.173)		(0.213)		(0.122)
Government Expenditure	-0.020		-0.067		0.021
	(0.191)		(0.224)		(0.179)
Portifolio Investment	-0.033***		-0.024		-0.002
	(0.003)		(0.027)		(0.299)
Remittances	0.101**		-0.043		1.569***
	(0.045)		(0.032)		(0.580)
FDI	-0.133***		-0.005		-0.017
	(0.009)		(0.016)		(0.017)
Financial Volatility	0.177***		0.152*		0.566
	(0.017)		(0.081)		(0.495)
Constant		0.743***		-0.018	-0.222
		(0.244)		(0.199)	(1.382)