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# Global and Regional Capital Mobilities in Sub-Saharan African Economies: Complement or Substitute?

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**Abstract**

This study examines the complementarity or substitutability of regional capital mobility to global capital mobility within the Sub-Saharan African (SSA) economies. With a re-specified inter-temporal consumption framework, the savings-investment correlation of the Feldstein-Horioka (hereinafter FH) hypothesis was revisited for a panel of eighteen (18) countries. The period of investigation spanned the period 1995 – 2016 and a battery of conventional and extended cum robust estimations tests and techniques were employed. The long-run correlation of savings and investments were investigated with the use of robust Pedroni and Westlund Cointegration tests while the short-run dynamics was examined with the Panel ARDL-ECM technique. With a confirmation of the long-run co-movement among the variables, the results obtained suggest that domestic investments in SSA economies are significantly and substantially financed by global savings. This implies that global integration has increased in the sub-region and that the FH hypothesis is validated. More so, the complementarity of regional capital mobility in the sub-region was evident. In fact, these results were found robust to a barrage of panel estimations techniques employed. However, both the level of financial development and the legal/political guidelines on capital mobility were found negligible to the level of domestic investment in the sub-region.

**Key Words:** Savings, Investment, Economic Integration, Long-Term Capital Movement
**JEL Classification:** E21, E22, F15, F21.

## 1. Introduction

The Feldstein-Horioka (1980) hypothesis centres on international capital mobility across economies of the world and has remained a cardinal threshold in examining the globalization of financial resources. The underlying proposition of this hypothesis is that the precondition for capital mobility across countries is for the correlation between domestic savings and domestic investment to be very low; depending on how perfect capital moves freely across borders. Against the apriori expectation, Feldstein and Horioka (1980) found a very high correlation coefficient between saving and investment portfolios of many European

economies. This creates a puzzle as to what drives mobility of capital across borders; if not openness and financial liberalization – which these European economies rightly possess. This puzzle has implication for the African continent in general and for the SSA countries, in particular. This is because they have been found to be relatively more open to global economies. Specifically, global foreign direct investment in Africa have more than doubled in 2014 to reach about US$130Billion from US$54.2Billion in 2013. The African continent is reported to be the world's second fastest destination of FDI, just behind the Asia-Pacific region. The top three sectors which received the largest portion of FDI are financial (19 percent), telecommunications (18 percent) and consumer (15 percent). African economies constitute the top ten (10) economies of FDI recipients and accounts for less than 20 percent of the global FDI flows. More so, while global FDI flows declined by 18 percent; FDI flows of African economies increased by 5 percent in 2014[1].

Disturbingly, savings ratio is abysmally low in Africa owing to low income and institutional rigidities; bordering on underdeveloped financial sector, poor infrastructural development, political instability and low literacy level[2]. While there have been many tremendous efforts to globalize and many are still under way, efforts on regional financial integration in Africa have not recorded substantial success. The question that this study seeks to answer is that what implication for regional financial integration does the Feldstein-Horioka puzzle holds for sub-Saharan African economies? Hence, this study seeks to investigate whether regional capital mobility matters as a substitute or serves as a complement to global capital mobility in the SSA economies. While many studies have investigated the Feldstein-Horioka (1980) hypothesis for international mobility of capital and have provided various justifications for its inconsistency with conventional wisdom on the saving-investment nexus, this study will be the first to employ an integrated analytical framework to address the dearth of empirical investigations on the complementarity or substitutability of regional integration for international capital mobility. In addition to this introductory section, this study will further be divided into four other sections. Section 2.0 considers the review of theoretical and empirical literature while section 3.0 provides analytical framework for empirical investigation. Section 4.0 detailed the estimations and in Section 5.0, conclusions were made and valuable suggestions were recommended for policy direction.

## 2. Literature Review

The relationship between saving and investment is well rooted in the theoretical literature. There are basically two conflicting theoretical linkages. The first is enshrined in the closed economy framework of McKinnon (1973) & Shaw's (1973) complementarity hypothesis and the second, the inter-temporal theory of current account enunciated by Obstfeld and Rogoff (1995). Couched under a simple national income identity formation for a closed economy, the complementarity hypothesis presupposes that domestic saving is part of income not consumed which, when aggregated, feeds in to finance domestic investment and that in such a scenario, national savings would equate ex-post level of domestic investment (see Obstfeld & Rogoff, 1995; Schmidt – Hebbel, Serven & Solimano, 1994; 1996). On the other hand, the inter-temporal theory of current account is an open economy thesis where domestic savings crave for highest returns throughout the global economies. Basically, the measures of international capital mobility are generally categorized into two[3]. The first is the use of

[1] See Aloko, E. (2016). White Paper for Professional Investors.
[2] See European Investment Bank (2015).
[3] See Nagayasu (2012) for an extensive review

macroeconomic variables such as the investment-saving correlation as seminally done in the pioneer study of Feldstein & Horioka (1980) and the consumption correlation approach promoted by Obstfeld (1994).

The second category is the use of the interest parity conditions; which is further classified into three major categories such as the real interest parity condition, uncovered interest parity condition and the covered interest parity condition. In a perfect capital market, the drivers for the variables of saving and investment differ. Saving is considered to depend on income and wealth while investment largely depends on profitability and risk. The FH hypothesis which found a high saving retention ratio – implying a low capital mobility – among sixteen (16) OECD economies; that are in all respect, considered open economies; posed an empirical question to these two theoretical propositions.

Since the seminal study conducted by Feldstein and Horioka (1980) on the saving-investment correlation, many empirical investigations have followed up to adduce different justifications to support or various extensions to challenge the FH puzzle. Without prejudice to review of extant literature carried out by Apergis and Tsoumas (2009), the empirical literature on the FH hypothesis can generally be categorized into four major strands. The first three strands hinged on empirical and/or measurement issues while the fourth strand centered on the methodological distinctions of international capital mobility. Although, still largely latent in the literature, an additional strand has been recently added to the literature where the implications of regional integration for international capital mobility were investigated. The first strand suggests that asymmetric information and abnormal as well as volatile business activities could be a causal factor for the low correlation between savings and investment (see Kim, Kim & Wang, 2007; etc) and that a low saving retention ratio does not necessarily translates to high capital mobility of economies. The second strand examined the potency of financial markets in the financial intermediation process during normal times and for episodes of financial crisis (see Adeniyi & Egwaikhide, 2013; Javed, 2007; Payne & Kumazawa, 2005; Li, 2010; among others) while the last strand of empirical literature indicates that non-financial factors constitute binding constraints to domestic investment (see for example, Ndikumana, 2014; Ndikumana & Blackson, 2015; Ferraira & Miguel, 2011) and that low correlation does not imply high capital mobility as envisaged by the FH hypothesis.

The fourth strand suggests that the correlation method of the Feldstein & Horioka (1980) was grossly fraught in error due to the technique of analysis adopted. Primarily, this strand of the literature revolved around the measurement issues and theoretical basis of investigation. Studies in this area posited that the baseline correlation method adopted by FH (1980) was atheoretical and the introduction of sound theoretical frameworks opened a vista of methodological innovations in the investigations of international capital mobility. It was consequent upon the foregoing that the studies of Wang (2016) employed a spatial econometric estimation; Javed (2007) and Payne & Kumazawa (2005) used panel estimation techniques together with instrumental variable approach to correct for heterogeneity and endogeneity. Nindi & Odhiambo (2014) used the ARDL bounds test to investigate dynamic causal relationship between saving and investment for the case of Malawi while Ketenchi (2015) considered structural breaks for the level of capital mobility in Russia. Agbetsiafa (2002) considered six emerging economies in Africa as a surrogate for the SSA countries and use the cointegration tests and causality tests based on error correction model.

In terms of theoretical framework, the atheoretical approach adopted by the FH to examine the correlation between savings and investment has been well criticized in the literature. As such, authors have investigated international capital mobility with founded theoretical approaches. Authors have adopted an intertemporal consumption-based model and real

interest rate parity approach as the alternative analytical frameworks. Wang (2016) extended the baseline FH framework and computed the Moran's I index for the investment and savings rates for 28 provinces in China. Aizenman, Pinto and Radziwill (2007) provided a self-financing measure of capital mobility with a value of 1 corresponding to an entirely self-financed capital stock while self-financing ratio below 1 implied reliance on foreign saving. Also, Kim (2014) developed a multi-country; multi-factor production-based model based on producer's cost minimization problems with familiar Cobb-Douglas cost function. Predicated on the permanent income hypothesis of Hall (1978), the consumption-based correlation framework has received huge patronage from authors. Following the lead studies of Campbell and Mankiw (1990) and Shibata and Shintani (1998), the studies of Dzhumashev and Cooray (2017) and Lai, McNelis and Yan (2013) adopted a quadratic utility function while Nagayasu (2012) employed a Constant Relative Risk Aversion (CRRA) consumption function.

From the foregoing methodological differences, the study of Kim (2014) found theoretically implausible results which showed that world capital markets, even for industrialized countries, are not fully integrated. This contrast sharply with the study of Wang (2016) which found that consumption growth was more highly correlated with domestic resources than world economic consumption trends. Disturbingly, Aizenman et. al., (2007) found a stable average 90 percent of the stock of capital in developing countries to be self-financed and that greater financial market integration throughout the 1990s did not changed the dispersion of self-financing rates. More so, the authors posited that countries that self-financed grew significantly faster than those with low self-financing ratios. Altogether, these findings contrasted with those obtained from the studies of Kumar (2015), Chan et. al., (2011), among others, that international capital mobility has increased for the countries investigated.

As most of the studies are cross-country, empirical investigations of international capital mobility have been largely investigated with the use of panel models. The topical discussions in the use of panel estimation techniques are homogeneity issue, endogeneity problems and cross-sectional dependence biasness (see Jamilov, 2013; Boubakri, Couharde and Guillaumin, 2012; Chan, Dang, Lai and Yan, 2011; Li, 2010; Wang, 2016). Authors of these studies have controlled for these econometric issues through the use of robust methods such as the Westlund (2007) cointegration test, Pesaran (2004) cross-sectional dependence test and the improved panel unit-root tests such as Breitung (2000) and Harris-Tzavalis (1999) tests. Also, studies have employed a battery of other estimation techniques such as the fully-modified OLS, Dynamic OLS. In fact, Lai et. al., (2013) employed a panel time-varying coefficient model and Generalized Method of Moment Instrumental Variable (GMM-IV) and Jamilov (2013) complemented the Westlund (2007) error-correlation cointegration test with the fully-modified and Dynamic OLS. Given all these robustness, the results in empirical estimations are still less than agreed. At one hand, studies have found evidence for the FH puzzle and, at the other hand; the puzzle has been refuted owing to biasness and methodological inadequacies.

For the recent strand of literature, the study of Kim, Kim and Choi (2014) found that global savings did not finance domestic investment of emerging East Asian countries but regional (East Asia) capital market contributed hugely in financing domestic investment; with Japanese saving, being the most potent investment financier in the region. Also, the study of Kumar, Sen and Srivastava (2014) obtained robust results that showed that international capital mobility has only slightly increased in African countries due to slow and poorly implemented regional agreements in Africa. More so, Kumar (2015) found that international capital mobility has increased for a panel of forty-four (44) countries assigned to six (6) regional credit agreements (AFTA, EU, EFTA, CARTAGENA, MERCOSUR, NAFTA) and

that regional integration enhanced financial intermediation process of the regional blocs. In fact, Volosovych (2011) puts it succinctly that financial market integration in the twentieth century has experienced J-shaped trend. It is prominently imperative that robust investigation should be conducted to properly situate how regional integrations within the sub-Saharan African economies have enhances or impede international capital mobility of countries in the sub-region.

## 3. Methodology

### 3.1 Research Design

This study seeks to formally test for the Feldstein-Horioka hypothesis in SSA economies and, then, makes a case for regional capital mobility in the sub-region. The analytical procedure for this investigation will be undertaken systematically and scientifically. It is a study involving secondary data analysis and the estimations procedure would follow three stages. The first is to identify the various pre-estimation tests. This would include data cleaning procedure and data stability exercise; involving stationarity as well as non-unit root tests. In addition, various atheoretical tests such as trends and descriptive statistics would be carried out in order to obtain the statistical properties of the data for appropriate technique of estimations and analysis. Stage two will centre on empirical investigations where specified model would be estimated to verify or refute FH puzzle. The appropriate technique of estimations and analysis would largely rest on the properties suggested by the procedure undertaken in stage one. Stage three is to conduct robustness checks and diagnostics tests. With robustness checks, alternative estimations would be conducted for reliability while diagnostic tests would ensure validity of models specified and the estimates obtained therefrom. With these, various factors that could interfere with the reliability and validity of the findings for this study would have been put under control (see Burns & Grove, 2001; Drew & Hardman, 1985; Kerlinger, 1986).

### 3.2 Theoretical Framework and Model Specification

The theoretical framework for this study is the inter-temporal theory of current account popularized by Obstfeld and Rogoff (1995); which is anchored on an open economy arrangement with free capital mobility. The formal derivation of the theoretical framework is obtained thus;

Consider a state of autarky;

$$Y_t = C_t + I_t + G_t \tag{1}$$

Where; $Y_t - I_t - G_t = X_t$ (Net Output) (2)

$$\therefore Y_t - C_t - I_t - G_t = X_t - C_t \tag{3}$$

For an open economy; foreign assets are included such that;

$$GNP_t = GDP_t + FIFA_{N_t} \tag{4}$$

Where; $FIFA_{N_t}$ is the net factor income from abroad at the current period;

$$\therefore FIFA_{N_t} = GNP_t - GDP_t \tag{5}$$

$$Y_{F_t} - C_t - I_t - G_t = FIFA_{N_t} + X_t - C_t \tag{6}$$

Where; $Y_F$ is the Gross National Product.

For inter-temporal current account; the future level of foreign assets is given as;

$$FIFA_{N_{(t+1)}} = (1+r)FIFA_{N_t} + X_t - C_t \quad (7)$$

$$FIFA_{N_{(t+1)}} = FIFA_{N_t} + rFIFA_{N_t} + X_t - C_t \quad (8)$$

$$FIFA_{N_{(t+1)}} - FIFA_{N_t} = rFIFA_{N_t} + X_t - C_t \quad (9)$$

$\Delta FIFA_{N_t} = FIFA_{N_{(t+1)}} - FIFA_{N_t} = CA$; Where; $CA$ is the current account balance. (10)

$$\Delta FIFA_{N_t} = CA = rFIFA_{N_t} + X_t - C_t \quad (11)$$

Invoking the proposition that current account balance is the balance of savings-investment gap and substituting equations (2) into (7) gives;

$$FIFA_{N_{(t+1)}} = (1+r)FIFA_{N_t} + Y_t - I_t - G_t - C_t \quad (12)$$

$$(C_t + I_t) = (Y_t - G_t) + (1+r)FIFA_{N_t} \quad (13)$$

$$\therefore C_t = (Y_t - G_t - I_t) + (1+r)FIFA_{N_t} \quad (14)$$

Letting $A = FIFA_{N_t}$;

$$C_t = (Y_t - G_t - I_t) + (1+r)A_t \quad (15)$$

Equation (15) is the consumption-correlation framework popularly adopted by most writers (see Dzhumashev and Cooray, 2017; Lai, McNelis and Yan, 2013; Nagayasu, 2012) as the alternative to the investment-saving framework introduced by Feldstein and Horioka (1980) and later adopted and extended by later writers (see Kim, Kim & Wang, 2007). The major criticism of the FH framework is that it was atheoretical. In this study, however, an integrated approach is adopted where the investment-savings correlation of FH is obtained within the consumption-correlation framework. Employing this integrated modeling framework avoid the criticisms that always characterized the consumption functions adopted in the literature. Prominently, authors have used both the quadratic utility function and the constant relative risk aversion utility function. The former consumption model presupposes that consumption is not affected by uncertainties. In developing African economies, however, there are uncertainties about future consumption and income levels (see Lai et. al., 2013). The CRRA consumption function is considered under-parameterized and further imposes strong restriction on consumer preferences (see Pignalosa, undated). This suggests that a saving-investment framework structurally derived would be valid for the investigation of global capital mobility.

By analogy, the inter-temporal current account equation in (15) can be re-specified such that savings is defined as the part of income that is not consumed;

$$I_t = (Y_t - C_t) - G_t + (1+r)A_t \quad (16)$$

The theoretical model becomes;

$$I_t = S_t - G_t + (1+r)A_t \quad (17)$$

Since government is involved, the inclusion of the foreign asset can be captured as the presence of legal as well as political guidelines attributable to the flow of foreign asset in the economy. Here, the Chinn & Ito (2006) index of legal/political factors on capital mobility is employed.

$$I_t = S_t + k_t + \eta_t \tag{18}$$

Where; $\eta$ captures the control variables such as the level of financial development – measured as the ratio of broad money to the GDP. There is an empirical consensus beginning from the investigation conducted by Feldstein and Horioka (1980) that the gross savings to GDP and gross fixed capital formation (an indicator for level of investment) to GDP are preferred to their net values as the former measures are free from yield differential of tax rate and computed depreciation complications.

Scaling down all the variables with GDP therefore gives the empirical model thus;

$$\frac{inv}{gdp} = \beta_1 + \beta_2 \frac{sav}{gdp} + \beta_3 \frac{m2}{gdp} + \varepsilon \tag{19}$$

Also, an extension to this baseline model is sought for this study in order to examine whether regional capital mobility serves to complement or substitute for international capital mobility of the SSA economies within the FH framework.

Equation (19) becomes;

$$\frac{inv}{gdp} = \beta_1 + \beta_2 \frac{sav}{gdp} + \beta_3 \frac{m2}{gdp} + \beta_4 mval\_index + \varepsilon \tag{20}$$

Regional integration is measured with the use of import value index; which serves as a proxy for relative trade intensity index. Bensidoun & Chevallier (1998) came up with five major indicators of regionalization. These indicators include relative trade intensity index, degree of currency anchor, intra-industry index (using the Aquino coefficient), North's share in South trade (or vice versa) and similarity of South-North trade with South-Rest of the world. This study subscribes to the use of relative trade intensity index as it pertains more to mobility of capital than the other indicators for sub-Saharan African economies. Also, the inclusion of the import value index as an indicator for regional integration sets this study apart from others as it addresses the biasness due to overlap in regional trade agreements evident in other indicators and proxies used by other writers (see Kumar et. al., 2014; Kumar, 2015).

From the foregoing, the methodological model to address the cross-sectional properties and the time-series behavior of saving-investment correlation for the SSA economies; alongside the inclusion of other control variables, is given as;

$$\left(\frac{inv}{gdp}\right)_{it} = \alpha + \beta_1 \left(\frac{sav}{gdp}\right)_{it} + \beta_2 \left(\frac{m2}{gdp}\right)_{it} + \beta_3 mval\_index_{it} + \varepsilon_{it} \tag{21}$$

Equation (21) is the panel model that assumes that all coefficients are constant across sections and are time-invariant. This is the simplest of the panel model and it is referred to as the pooled panel model. However, the assumption of homogenous individual differences is too simplistic as individual specific factors matter within a cross-sectional set-up.

$$\left(\frac{inv}{gdp}\right)_{it} = \alpha_i + \beta_1\left(\frac{sav}{gdp}\right)_{it} + \beta_2\left(\frac{m2}{gdp}\right)_{it} + \beta_3 mval\_index_{it} + \varepsilon_{it} \quad (22)$$

Equation (22) is the static panel model which suggests that the variable slopes ( $\beta_1, \beta_2$ and $\beta_3$) are considered constant across cross-section and time while the intercept ( $\alpha_i$ ) indicates individual heterogeneity that is time-invariant. In order to show whether $\alpha_i$ is correlated or distributed independently of the regressors, both fixed-effect and random effect static models would be estimated. Note that for fixed effect, the constant parameter in equation (21) and the omitted variables that are considered to affect the dependent variable constitute the $\alpha_i$ and taken as "unrelated effect" (i.e. fixed effect) while for the random effect, the $\alpha_i$ is taken as a "related effect" (i.e. random effect) and has the specification of the form;

$$\left(\frac{inv}{gdp}\right)_{it} = \beta_1\left(\frac{sav}{gdp}\right)_{it} + \beta_2\left(\frac{m2}{gdp}\right)_{it} + \beta_3 mval\_index_{it} + (\alpha_i + \varepsilon_{it}) \quad (23)$$

$$\left(\frac{inv}{gdp}\right)_{it} = \beta_1\left(\frac{sav}{gdp}\right)_{it} + \beta_2\left(\frac{m2}{gdp}\right)_{it} + \beta_3 mval\_index_{it} + v_{it} \quad (24)$$

Equation (22) is the fixed effect model while equation (24) is the random effect static model; otherwise known as the error component model.

This study includes a collection of eighteen (18) SSA countries from four sub-regional blocs of West Africa (6); Central Africa (3); East Africa (4) and Southern Africa (5). The justification for the choice of these countries is predicated on their size in relation to the total countries that constitute the SSA region. More so, it is informed by the level of cross-border transactions. This indicates that the SSA economies are well represented such that the conclusion reached for this study is far-reaching and reliable. The period of investigation would span 1995 – 2016. The justification for this period is well informed by the fact that structural adjustment programmes (SAP) that birthed the thinking of various economic restructuring; such as liberalization, occurs across most developing countries in the mid-80s; including SSA economies. The period of investigation spanned 1995 – 2016 and the data were sourced from the World Development Indicators (2017). A three-year moving average is employed to address a few missing observations for some countries with incomplete data points.

Prior to empirical estimations, series of tests would be conducted. The descriptive statistics of the series included in the model would be obtained. These provide the statistical properties of the variables. Also, the data stability conditions of these variables were examined with the use of the conventional and extended panel unit-root tests. The extended tests, such as the Hadri (2000) and Harris-Tzavalis (1999), addressed issues of heterogeneity, simultaneity bias and cross-sectional dependence problems. Overall, there are tests with the null hypothesis as stationarity and others, as unit-root.

Basically, the cross-sectional dependence statistic is defined as;

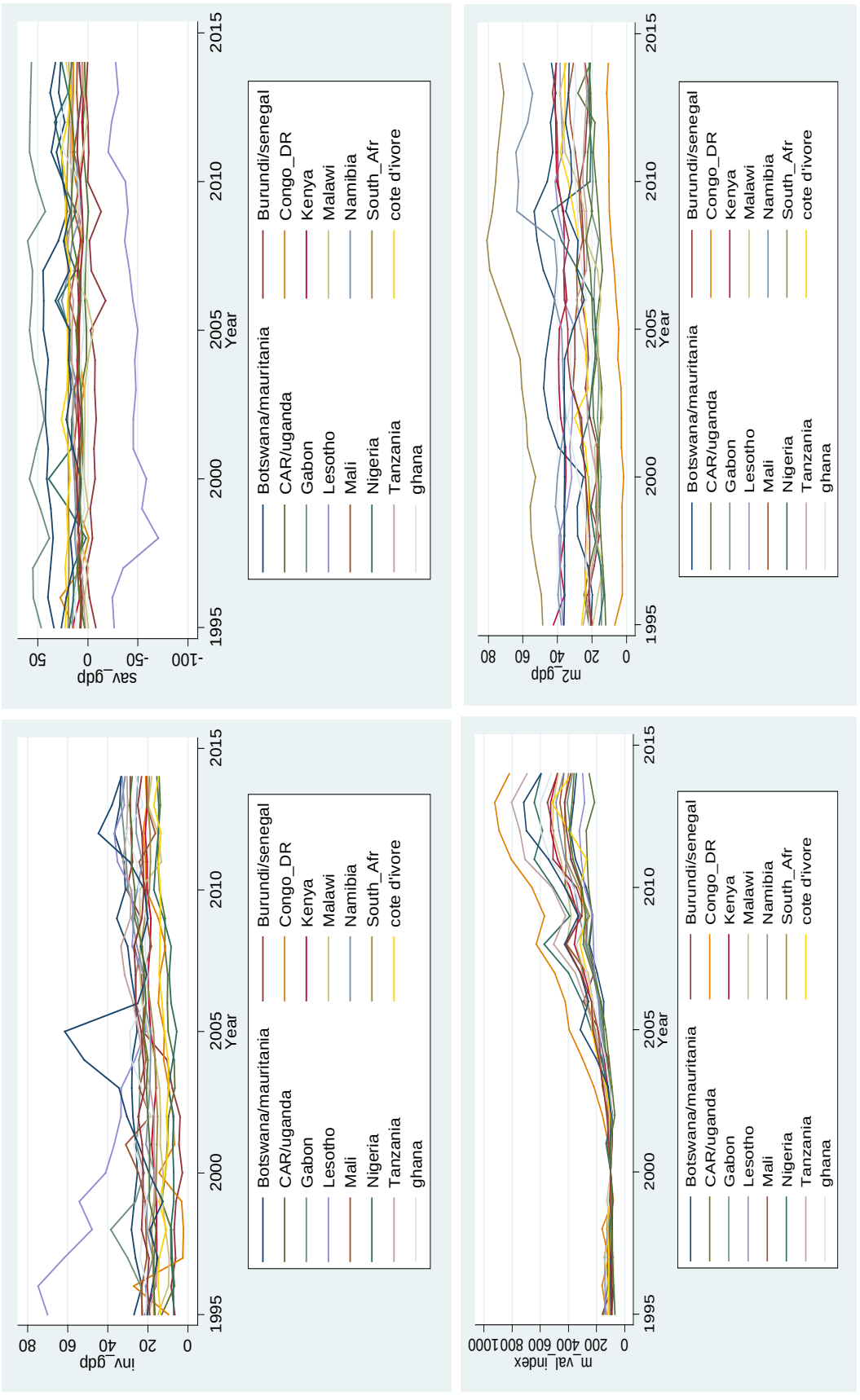
$$CD = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=1}^{N}\sum_{j=i+1}^{N}\rho_{ij}\right) \sim N(0,1)$$

The presence of cross-sectional dependence biased the traditional panel estimation techniques and the estimates obtained became unreliable (see Eslamloueyen and Jafari, 2014). As a result, a robust estimation technique such as the Pedroni (2004) and Westlund (2007) Cointegration tests were employed.

## 4. Estimations and Analyses

This section begins by considering the trend analyses of the variables included in the model. The ratio of savings to GDP (indicated as sav_gdp), the ratio of investment to GDP (indicated as inv_gdp), the level of financial development (that is, m2_gdp) and the degree of regional integration (indicated as m_val_index) are depicted in the figure 1 below. The graph indicates that regional integration becomes a trending phenomenon for sub-Saharan African economies since the year 2000. Prior to this period, especially in the late 1990s, integration was at the lowest ebb. Regarding the level of financial development, there are two outlier countries within the sub-region. South Africa is the most financially developed while Congo Democratic Republic is the least financially developed; other countries tapper together in terms of the degree of financial development. The level of saving for the SSA economies is relatively higher than her level of investment. Lesotho has the least saving ratio with the highest for the sub-region being 50 percent. Generally, the sub-region has low investment hovering around 0 to 40 percent of GDP.

**Figure 1: Trend Analyses of Savings, Investment, Regional Integration and Financial Development in SSA Economies**




Source: Authors

The statistical properties of the variables included for model estimations are presented in Table 1. These include both the summary statistics such as the mean, standard deviation and skewness. Also, formal statistics of kurtosis and Jarcque-bera tests were conducted. As obtained, the ratio of gross saving to the GDP (proxied as sav_gdp) averaged 12.41 percent for the period 1995 to 2016 for the selected SSA economies while the ratio of investment to the GDP for the same period averaged 21.12 percent. The implication is that there is a saving gap of 8.71 percent. This suggests that unless the sub-Saharan African economies open its borders to allow for free flow of international capital from other economies of the world, its investment yearnings would not be solely met by its domestic savings. This submission is more evident by the fact that the savings ratio is negative at -70.46 average values for the period while the lowest of investment ratio is still positive at 2.10 for the same period. This suggests that lowest 70.46 percentile dis-savings corresponds to lowest investment of 2.1 percentile for the sub-region. More so, the standard deviation for these two variables implies that the savings ratio dispersed largely from expectation twice that of the investment ratio with 18.55 and 9.28 values respectively.

**Table 1: Statistical Properties of Savings, Investment, Financial Development and Regional Integration in SSA Economies**

| Variables | sav_gdp | inv_gdp | m2_gdp | m_val_index | Kaopen |
|---|---|---|---|---|---|
| Mean | 12.41 | 21.12 | 29.27 | 262.99 | 0.27 |
| Maximum | 60.12 | 74.82 | 80.80 | 922.67 | 1.00 |
| Minimum | -70.46 | 2.10 | 1.62 | 64.14 | 0.00 |
| Std. Dev. | 18.55 | 9.28 | 14.12 | 182.52 | 0.26 |
| Skewness | -0.67 | 1.44 | 1.08 | 1.13 | 1.87 |
| Kurtosis | 6.41 | 8.85 | 4.77 | 3.82 | 5.25 |
| Jarque-Bera | 221.56 | 701.57 | 129.18 | 95.26 | 313.03 |
| Probability | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Observations | 396 | 396 | 396 | 396 | 396 |

Source: E-Views Output

However, the formal statistical properties of kurtosis show that both variables of saving and investment ratios are leptokurtic in nature. That is they are highly peaked with a very fat tale. These variables with 6.41 and 8.85 values are larger than the expected threshold value of 3.0. However, a formal test of normality shows highly significant Jarcque-bera statistics values of 221.56 and 701.57 for the variables respectively. In these cases, the null hypothesis that the data for both saving and investment ratios are not normally distributed have been rejected; even at the 1 percent level with probability values of 0.00 for each.

Besides, the level of financial development; which is indicated as the ratio of broad money to the GDP (proxied as m2_gdp) is averaged 29.27 percent while the degree of legal/political factors on capital transactions within the SSA economies; as computed by Chinn-Ito (2006; as updated) – proxied as kaopen averaged 27 percent for the period under investigation. The Chinn-Ito index ranged between 0 and 1. A higher ratio towards 1 suggests high level of legal and political constraints towards capital transactions across the borders while a lower value towards zero indicates low level of legal and political constraints. The value of 0.27 index for kaopen suggests barriers to movement of capital has been substantially relaxed within the sub-region. This is further reinforced by the fact that the standard deviation for kaopen is 0.26

which implies that the level of legal/political impediments has not deviates substantially from the expectation. The implication of this is that openness on capital account transactions has been sequenced to align with the pace of development in the sub-Saharan African economies.

Also, the level of regional integration is considered another important factor to international capital mobility in the SSA economies. The indicator for this is the relative trade intensity index which is proxied in this study as import value index (m_val_index). The standard deviation for this variable is 182.52. It has the largest dispersion away from the expected value. The skewness indicates that this dispersion is positive with a marginal value of 1.13. This implies that economic activities within the sub-region are regionally integrated. To what extent this degree of regional integration has precludes or contributes to international capital mobility within the sub-Saharan African economies remains an empirical question for which this study set out to answer.

Before estimations are carried out, various tests are conducted to further reveal the data stability condition of the variables included in the empirical models. This study considers both the conventional and extended stationarity and unit-root tests for robustness (see Guillaumin, 2009). For the conventional unit-root tests; the Levin, Lin & Chu (LLC) and the Im, Pesaran & Shin (IPS) tests were considered. The former test assumes homogenous individual differences while the latter assumes heterogenous individual differences (see Table 2). In order to correct for problems of cross-sectional dependence, heteroscedasticity, problem of non-stationary regressors and problems of simultaneity biases, the Hadri (2000) stationarity and Harris-Tzavalis (1999) unit-root tests were considered (see Table 3). The statistics obtained indicates that the investments and saving ratios are consistently stationary as well as non-unit-root at levels under the two conventional tests.

**Table 2: Conventional Panel Unit-Root Test**

| **LLC (Homogenous) and IPS (Heterogenous) Panel Unit Root Tests** | | | | | | |
|---|---|---|---|---|---|---|
| | **LLC** | | | **IPS** | | |
| | **I(0)** | **I(1)** | $H_i : \rho < 0$ | **I(0)** | **I(1)** | $H_i : \beta_i < 0$ |
| inv_gdp | -3.04* | - | I(0) | -1.52*** | - | I(0) |
| sav_gdp | -3.26* | - | I(0) | -3.89* | - | I(0) |
| m2_gdp | 0.93 | -7.36* | I(1) | 0.08 | -8.52* | I(1) |
| m_val_index | 1.00 | -8.50* | I(1) | 4.96 | -7.68* | I(1) |
| Kaopen | -8.54* | - | I(0) | -1.2E+15* | - | I(0) |
| Residual | -15.103* | - | I(0) | -12.660* | - | I(0) |

Note: The test equation for unit-root test is at the individual intercept and lag length is an automatic selection based on the Schwarz Information Criterion. (*, **,***) imply that the series is non-unit root at 1%, 5% and 10% level. $H_i : \rho < 0$ is the alternative hypothesis for the presence of stationarity in the Levin, Lin & Chu (LLC) test of homogeneity of individual differences; $H_i : \beta_i < 0$ is the alternative hypothesis for the presence of stationarity in the Im, Pesaran and Shin (IPS) test of heterogeneity of individual differences.

The non-unit-root of these two variables remains robust to the extended tests. The statistics values of -3.04 and -3.26 for investment and savings ratios respectively under the LLC

suggests that the null hypothesis of unit-root is rejected at the 5 percent level; hence the alternative hypothesis, $H_i : \rho < 0$, of no-unit-root is accepted. Similarly, the statistics value of –1.52 and -3.89 for the investment and savings ratios under the IPS test conform to non-unit-root of the series at the 10 percent and 1 percent level respectively. The null hypothesis that none of the individual differences is unit-root is rejected. Hence, its alternative counterpart that none of the individual differences are non-unit-root is accepted. Also, the LLC and IPS tests reject unit-root for the legal/political index (indicated as kaopen). However, both tests; whether with the assumption of individual homogeneity or individual heterogeneity, rejects unit-root for the level of financial development (indicated as m2_gdp) and the relative trade intensity index as a measure of regional integration (indicated as m_val_index) at the 1 percent level. Stationarity is obtained for these variables when integrated at order 1. Hence, the variables for the estimated model is a mix of both I(0) and I(1) series.

This would have suggested that the long-run cointegration can only be investigated through the use of the Autoregressive Distributed Lag Model (ARDL) and that the short-run dynamics would be undertaken through a re-parameterization to the ARDL-ECM model framework. But, the non-unit-root status of the residual suggests that even though the series as well as variables are individually unit-root, their residual is non-unit-root at levels. This lends credence to the fact that the long-run equilibrium condition can still be investigated through the use of vector cointegration tests (see Table 4 below). More so, the extended stationarity and unit-root tests reinforces this assertion; especially when various econometric problems are corrected for in order to obtain a robust data stability outcomes. When the problems of cross-sectional dependence, simultaneity biasness and heterogeneity issues were altogether addressed through the extended tests, all the variables are levels stationary at the 1 percent significant levels (see Table 3).

**Table 3: Extended Panel Stationarity and Unit-Root Tests**

| **Hadri Panel Stationarity and Harris-Tzavalis Panel Unit-Root Tests** | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Hadri Panel Stationarity Test** | | | **Harris-Tzavalis Panel Unit-Root Test** | | | |
| | **Z-Statistics** | **P-value** | $H_i : z < 0$ | **Z-Statistics** | $\rho$ | **P-value** | $H_i : z < 0$<br>$H_i : \rho < 0$ |
| inv_gdp | -0.74 | 0.77 | I(0) | -15.61 | -0.14 | 0.00 | I(0) |
| sav_gdp | 0.17 | 0.43 | I(0) | -16.30 | -0.17 | 0.00 | I(0) |
| m2_gdp | -0.45 | 0.67 | I(0) | -16.96 | -0.21 | 0.00 | I(0) |
| m_val_index | -0.58 | 0.72 | I(0) | -16.05 | -0.16 | 0.00 | I(0) |
| Kaopen | -0.62 | 0.73 | I(0) | -19.80 | -0.35 | 0.00 | I(0) |

Note: The test equation for unit-root test is at the individual intercept and lag length is an automatic selection based on the Schwarz Information Criterion. (*, **,***) imply that the series is stationary or non-unit root at 1%, 5% and 10% level respectively.

Under this framework, the Pedroni Residual Cointegation and the Johansen Fisher's Residual Cointegration tests were generally considered. With the null hypothesis that there is no cointegration, estimates detailed in Panel 4(a) with probabilities values of 0.00, 0.000, 0.000 and 0.000 for the panel PP statistics, panel ADF statistics, group PP statistics and group ADF statistics respectively. These indicate that the null hypothesis of no cointegration is rejected at the 1 percent level of significance for all tests of cointegration. For robustness sake, estimates for the Johansen Fisher's cointegration test were obtained. The test has both trace and

maximum eigen-value statistics and as tabulated in panel 4(b), there are at least two (i.e. 3) cointegrating equations. The implications of all these estimates point to the conclusion that there appears to be long-run equilibrium conditions among the variables that keep them together into the long-run situation. Essentially, this suggests that there is a long-run equilibrium relationship between investment and savings in sub-Saharan African economies. More so, this is an indication for the complementarity, rather than the substitutability of global and regional capital mobility within the sub-region.

**Table 4: Long-Run Equilibrium Conditions and Impacts Estimates**

| **Panel 4(a): Pedroni Residual Cointegration Test** | | | | |
|---|---|---|---|---|
| **Variables** | **Statistics** | | **Probabilities** | |
| Panel PP statistics | -3.73 | | 0.000 | |
| Panel ADF statistics | -5.06 | | 0.000 | |
| Group PP statistics | -5.69 | | 0.000 | |
| Group ADF statistics | -2.87 | | 0.000 | |
| **Panel 4(b): Johansen Fisher Residual Cointegration Test** | | | | |
| **No of CE(s)** | **Fisher's Trace Statistics** | | **Fisher's Maximum Eigen Value** | |
| | **Statistics** | **Prob.** | **Statistics** | **Prob.** |
| None* | 119.0* | 0.00 | 81.65* | 0.000 |
| At most 1* | 67.03* | 0.00 | 36.75* | 0.003 |
| At most 2* | 41.18* | 0.00 | 30.33* | 0.007 |
| At most 3 | 22.11 | 0.08 | 20.58 | 0.11 |
| At most 4 | 20.10. | 0.13 | 20.10 | 0.13 |

Note: The Null Hypotheses for both the Pedroni Residual Cointegration and Kao Residual Cointegration tests are that there is cointegration. The optimal lag length is automatically selected using the Schwarz Bayesian Information Criterion (SBIC)

The existence of long-run equilibrium conditions further reinforces the need to investigate the short-run dynamics of the FH hypothesis for the SSA economies. For robustness, the Pedroni and Westlund (2007) cointegration tests were also conducted (see Table 5). These robustness tests address the problem of cross-sectional dependence among the variables and further suggest that the variables have equilibrium conditions that keep them together into the long-run situation. As tabulated in Panels 5A of Table 5, the null hypotheses for no cointegration for the Pedroni cointrgration tests are rejected at the 1 percent level of significance. For the Westlund cointegration test, however, the null hypothesis of no cointegration is only rejected at the 5 percent level of significance; especially when the panel means are included. With the inclusion of the panel means, the null hypothesis is only rejected at the 10 percent level of significance (see Table 5B).

**Table 5: Robust Cointegration Tests of Pedroni and Westlund**

| **Panel 5A: Pedroni Cointegration Test** | | |
|---|---|---|
| | **Statistics** | **P values** |
| Modified PP test | 4.108 | 0.000 |
| PP test | -6.410 | 0.000 |
| Adjusted DF test | -6.745 | 0.000 |
| **Panel 5B: Westlund Cointegration Test** | | |
| Variance Ratio (Panel means excluded) | -1.467 | 0.07 |
| Variance Ratio (Panel means included) | -1.837 | 0.03 |

Source: STATA Output

**Table 6: Short-run Dynamics of the Feldstein-Horioka (FH) Hypothesis for the SSA Economies at the Optimal Lag Length (-2, -2, 0, -2, -1).**

| **Variables** | **Coefficient** | **T-statistics** | **Probability Value** |
|---|---|---|---|
| C | -9.019 | -1.86 | 0.06 |
| ECT(-1) | -0.796 | -2.24 | 0.03 |
| D(inv_gdp(-1)) | 1.537 | 4.29 | 0.00 |
| D(inv_gdp(-2)) | 0.109 | 2.28 | 0.02 |
| D(sav_gdp) | 0.08 | 2.49 | 0.01 |
| D(sav_gdp(-2)) | -0.03 | -1.00 | 0.32 |
| m2_gdp | -0.10 | -1.79 | 0.07 |
| Kaopen | -2.30 | -1.44 | 0.15 |
| m_val_index | 0.019 | 4.65 | 0.00 |
| m_val_index(-1) | -0.03 | -4.63 | 0.00 |
| R-squared | 0.815 | | |
| Adj. R-squared | 0.81 | | |
| F-statistics | 170.82 | | |
| DW Statistics | 1.91 | | |

Source: E-views Output. Dependent Variable is the ratio of investment to the gross domestic product ( inv_gdp)

Altogether, these cointegration tests lend credence to the estimations of the short-run dynamics of the Feldstein-Horioka (1980) hypothesis. As detailed in Table 6, the error correction term (ECT) is rightly signed and significant too. The ECT has a value of -0.796 and absolute T-statistics value of 2.24 with 0.03 probability value. This indicates that the speed of economic recovery when affected by shocks from international as well as global capital mobility is 79.6 percent annually. This implies that it will take the economy 1 year and barely 3months to fully recover when affected by global capital shocks (see Table 6).

This suggests a period of 5 (five) quarters is required for the economy to go back to previous level of equilibrium when affected by global shocks. While this might not imply that the sub-Saharan African economies are immune to the vagaries of the global dynamics, it might suggest that these economies are virile for spontaneous economic recovery. This is evident in the leading economies in this sub-region such as those of Nigeria and South Africa which recover spontaneously from recession within the shortest possible time. Nigeria recovered in five (5) quarters in the second quarter of 2017 while South Africa recovered barely in one (1) quarter by the third quarter of 2018.

The coefficient for the constant is -9.019 with T-statistics value of -1.86 and 0.06 probability value. It suggests that without the effect of savings ratio of gross domestic product (sav_gdp) and other explanatory variables such as the level of financial development (m2_gdp), the legal/policy measures of financial openness and the spate of regional integration in the SSA economies (indicated as the relative trade intensity index (m_value_index); the level of investment in the SSA economies would be insignificant at the 5 percent level. This lends credence to the importance of all these explanatory variables in explaining the goodness of fit of the specified model for empirical investigation. The goodness of fit of the model is not in doubt as the Durbin-Watson Statistics of 1.91 and F-statistics ratio of 170.82 rightly indicate. More so, the lag effects of period 1 and 2 investment levels positively affects the current level of investment significantly; even at the 5 percent level. This suggests that previous investment levels in the SSA economies are enhances the current investment level in these economies. However, the legal/policy framework in SSA economies is detrimental to the level of investment in this sub-region; although, insignificantly. The Feldstein-Horioka (FH) hypothesis is validated with a 0.08 coefficient value for the ratio of current savings to the gross domestic product (sav_gdp) with absolute T-statistics value of 2.28. This lower coefficient value implies that investment in the SSA economies is being financed more by international capital. This is so in that the coefficient for the indicator of regional capital mobility; relative trade intensity index (m_value_index), is also positively related with 0.019 coefficient and 4.65 absolute T-statistics value. But, the previous level of regional integration is detrimental to domestic investment within the sub-region. Also, the level of financial development (m2_gdp) with -0.10 coefficients and absolute 1.79 T-statistics value and 0.07 sprobability value suggests that financial development in sub-Saharan Africa dampens investment drive in the sub-region. Furthermore, this study seeks for additional evidence; for robustness purposes, using a battery of other techniques of panel estimations method (see Table 7). The results for the panel estimations; especially for the Panel Fixed-effect and Random-effect panel estimations are generally unanimous. The savings retention ratio (indicated as sav_gdp) and regional capital mobility (indicated as m_val_index) were found to impact significantly positive on the level of investment (indicated as inv_gdp) in the sub-region. The diagnostic test suggests that the result of the Panel Least Square is not reliable as the F-statistics value for the panel fixed effect is 33.34 and 0.000 probability value. More so, the Hausman test lends credence to the use of the results of the random-effect panel method. The level of financial development (indicated as m2_gdp) is positive but insignificantly related to the level of investment (indicated as inv_gdp) in the sub-region, hence, negligible. Also, the legal cum political factors on capital mobility (indicated as kaopen) in Sub-Saharan African economies is negligible with insignificant negative relationship (see Table 7).

The implication is that an increase in each of domestic savings and regional integration within the sub-region would stimulate further investment in the sub-Saharan African economy and this would be facilitated by global savings. The fact that the degree of regional integration further enhances the pace of regional investment in sub-Saharan Africa and the evidence that domestic savings is significantly uncorrelated to the level of investment suggest

the sub-Saharan African economies can only finance its domestic investment through global savings; thereby increasing the pace of global capital mobility for the sub-region (see Table 7). This suggests that regional capital mobility enhanced international mobility of capital across the SSA economies. In other words, the result suggests that regional capital mobility is a complement and not a substitute to international capital mobility in the SSA economies.

**Table 7: Panel Estimations Results**

| **Panel 7A: Panel Least Square Results** | | | |
|---|---|---|---|
| **Variables** | **Coefficients** | **T-Statistics** | **Probability Values** |
| Cons | 13.362 | 10.69 | 0.000 |
| Sav_gdp | -0.046 | -1.88 | 0.061 |
| M2_gdp | 0.146 | 4.64 | 0.000 |
| Kaopen | 4.055 | 2.34 | 0.020 |
| M_val_index | 0.011 | 4.58 | 0.000 |
| **Panel 7B: Fixed Effect Panel Results** | | | |
| **Variables** | **Coefficients** | **T-Statistics** | **Probability Values** |
| Cons | 13.990 | 8.135 | 0.000 |
| Sav_gdp | 0.123 | 2.366 | 0.019 |
| M2_gdp | 0.061 | 1.059 | 0.290 |
| Kaopen | -0.107 | -0.037 | 0.970 |
| M_val_index | 0.015 | 7.134 | 0.000 |
| **Panel 7C: Random Effect Panel Results** | | | |
| **Variables** | **Coefficients** | **T-Statistics** | **Probability Values** |
| Cons | 14.056 | 5.967 | 0.000 |
| Sav_gdp | 0.089 | 1.921 | 0.055 |
| M2_gdp | 0.071 | 1.354 | 0.176 |
| Kaopen | 0.091 | 0.034 | 0.973 |
| M_val_index | 0.015 | 7.418 | 0.000 |

Source: STATA Output

These results support the results found in the studies of Kim et. al., (2014) and Kumar (2015) where it was found that international capital mobility has increased for the countries investigated.

In order to reliably conclude on the evidence obtained for these estimates, however, some diagnostics are required. In Table 8, the results for these diagnostics are presented. Panel 8A indicates that there is absence of heteroscedasticity problem for the Panel Least Square estimations as the null hypothesis of constant variance cannot be rejected. However, the presence of a more robust estimation in the fixed effect model negates this merit. But, there is evidence of herescedasticity problem for the Fixed-Effect panel estimation as the null hypothesis of homoscedasticity is rejected at the 1 percent level of significance. This implies

that the estimates obtained from this fixed-effect panel estimation cannot also be considered reliable.

**Table 8: Diagnostics for Panel Estimations**

| **Panel 8A: Diagnostics for Panel Least Square: Heteroscedasticity Test** | |
|---|---|
| Ho: Constant Variance | |
| $Chi^2(1)$ | 0.17 |
| Prob.>$Chi^2$ | 0.68 |
| **Panel 8B: Diagnostics for Fixed Effect Panel: F-Test** | |
| Ho: Effects are not statistically Significant | |
| F(21, 370) | 33.34 |
| Prob. > F | 0.000 |
| **Panel 8C: Heteroscedasticity Test for Fixed Effect Model with** $H_o = \delta_i^2 = \delta^2 \forall i$ | |
| $Chi^2(22)$ | 136.62 |
| Prob.>$Chi^2$ | 0.000 |
| **Panel 8D: Cross-Sectional Dependence Test with Breusch-Pagan LM Test** | |
| Ho: Residuals across entities are not correlated | |
| $Chi^2(231)$ | 1786.69 |
| Prob.>$Chi^2$ | 0.000 |

Source: STATA Output

Also, the results of the presence of cross-sectional dependence cannot be rejected. This is because the null hypothesis that residuals across entities are not correlated is strongly and significantly rejected at the 1 percent level (see Table 8). As such, the test comparing between the fixed-effect and random-effect model (the Hausman test) indicates that we cannot reject the null hypothesis that the preferred model is random effect at the 5 percent level. The Hausman test, with a Chi-square distribution has a computed value of 3.25 with probability value of 0.311 (see Table 9). Therefore, the basis of interpretation for these three models is the random-effect model.

**Table 9: Hausman Tests on Fixed and Random-Effects Panel Models**

| **Test Statistics/P-values** | **Test Statistics** | **P-Values** |
|---|---|---|
| Chi-Square | 3.25 | 0.311 |

Source: STATA Output

For the reliability of the estimates obtained, a set of residual tests were conducted. These tests serve as diagnostics of the specified in terms of non-serial correlation of the error term and absence of ARCH effects for the residuals (see Table 10). As detailed in Table 10, the null hypothesis of no serial correlation and the absence of ARCH effects respectively cannot be rejected at the 5 percent level of significance as the attributed probabilities are greater than 0.05; being the threshold level for significance. By implication, this suggests that the

estimates obtained from the model are well suited for conclusion and policy recommendations

**Table 10: Diagnostic Tests.**

| S/N | Test Statistics | | Statistics (Prob. Values) |
|---|---|---|---|
| 1 | $x^2_{SERIAL}$ | Lag_12 | 22.17 (0.71) |
| | | Lag_15 | 21.82 (0.65) |
| | | Lag_20 | 25.04 (0.52) |
| 2 | $x^2_{ARCH}$ | Lag_12 | 274.44 (0.45) |
| | | Lag_15 | 324.48 (0.78) |
| | | Lag_20 | 399.93 (0.99) |

Source: E-views Output. The null hypotheses for these test statistics are – $H_{0ARCH}$ : Absence of ARCH effect; $H_{0SERIAL}$ : Residuals are serially uncorrelated.

## 5. Conclusion and Policy Suggestions

This study investigated whether regional capital mobility in SSA substitutes for or complements international capital mobility in the sub-region. The study re-specified and modified the inter-temporal current account framework of Obstfeld and Rogoff (1995) to account for the saving-investment correlation model popularized by Feldstein-Horioka (1980). It is evident that there exists a long-run equilibrium conditions among the variables; including both savings and investments in the sub-Saharan African economies. More so, the short-run dynamics and the panel estimation results support increasing global mobility in the SSA sub-region. With regional integration that enhanced global capital mobility, the negligible impacts of both the levels of financial development and degree of capital openness suggest that the SSA economies are characterized with under-developed financial markets and relative capital autarky. Despite these defects, the findings suggest that the sub-region has improved global capital mobility. These results validated the FH puzzle. While the debates on the FH puzzle still rage on, the following suggestions are recommended for policy direction.

- Capital openness in the SSA economies should be sequenced to align with regional integration in the sub-region. Complete capital openness should not be practiced.
- The level of financial development should be made inclusive so as not to reverse the successes recorded in global capital mobility. Financial deepening measures should be preferred to financial widening arrangements in the sub-region.
- Regional integration within the sub-region should be promoted to enter the next phase of monetary union as this will further enhance the depth of global capital mobility of the sub-region.
- The role of government should be reduced in order that distortions could be drastically reduced.
- Consequently, attention should be devoted to the market-based measures of capital mobility as the legal/policy guidelines were found negligible. One possible reason is that these policies have been circumvented due to lack of sound institutional arrangements in these economies.

**References**


Adeniyi, O. & Egwakhide, F., 2013. Saving-Investment Nexus in Developing Countries: Does Financial Development Matter? *Journal of Economic Development, 38(2),* pp. 119 – 140.

Agbetsiafa, D.K., 2002. Capital Mobility, Saving and Investment Link: Evidence from sub-Saharan Africa. *Journal of African Finance and Economic Development, 5(2).*

Aizenman, J., Pinto, B., & Radziwill, A., 2007. Sources of Financing Domestic Capital – Is Foreign Saving a Viable Option for Developing Countries? *Journal of International Money and Finance, 26,* pp. 682 – 702.

Aloko, E., 2016. White Paper for Professional Investors. ROBECO, the Investment Engineer.

Apergis, N., & Tsoumas, C., 2009. A Survey of the Feldstein-Horioka Puzzle: What has been done and Where We Stand? *Research in Economics, 63,* pp. 64 – 76.

Bensidoun, I., Chevallier, A., 1980. Indicators of Regionalisation in North America, Asia, Central & Eastern Europe and the Meditterranean Basin in OECD. *Globalisation, Migration & Development,* pp. 15 – 23.

Boubakri, S., Couharde, C., & Guillaumin, C., 2012. Assessing the Financial Integration of Central and Eastern European Countries with the Euro Area: Evidence from Panel Data Cointegration Tests. *International Economics, 131,* pp. 105 – 120.

Breitung, J., 2000. The Local Power of Some Unit-Root Tests for Panel Data, In: Non-Stationary Panels, Panel Cointegration and Dynamic Panels, Baltagi, B.H. (Ed.), Elsevier, Amstardam, pp. 161 – 177.

Burns, N., & Grove, S., 2001. *The Practice of Nursing Research: Conduct, Critique and Utilization (4th ed.).* W.B. Saunders: Philadephia, Pennsylavania, USA.

Campbell, J. Y. & Mankiw, N.G., 1990. Permanent Income, Current Income and Consumption. *Journal of Business Economics and Statistics, 8,* pp. 265 – 279.

Chan, K.S., Dang, V.Q.T., Lai, J.T., & Yan, I.K.M., 2011. Regional Capital Mobility in China: 1978 – 2006. *Journal of International Money and Finance, 30,* Pp. 1506 – 1515.

Chinn, M.D. & Ito, H., 2006. What Matters for Financial Development? Capital Controls, Institutions and Interactions. *Journal of Development Economics, 81(1),* pp. 163 – 192.

Drew, C.J., & Hardman, M.L., 1985. *Designing and Conducting Behavioural Research.* New York: Pergamon Press (Part II, "Basic Design Considerations").

Dzhumashev, R., & Cooray, A., 2017. The Feldstein-Horioka Hypothesis Revisited. *The B.E. Journal of Macroeconomics, 17(1),* pp. 1 – 30.

EIB, 2015. Recent Trends in Banking in sub-Saharan African: From Financing to Investment. European Investment Bank Annual Report.

Eslamloueyan, K., & Jafari, M., 2014. Financial Crisis and Saving-Investment Dynamics in the Presence of Cross-Sectional Dependence: The Case of East Asia. *China Economic Review, 30,* pp. 209 – 220.

Feldstein, M., & Horioka, C., 1980. Domestic Savings and International Capital Flows. *The Economic Journal, 90(358),* pp. 314 – 329.

Ferraira, M.A. & Miguel, A.F., 2011. The Determinants of Domestic and Foreign Bond Bias. *Journal of Multinational Finance Management, 21,* pp. 279 – 300.

Guillaumin, C., 2009. Financial Integration in East Asia: Evidence from Panel Unit-Root and Panel Cointegration Tests. *Journal of Asia Economics, 20,* pp. 314 – 326.

Hall, R., 1978. Stochastic Implication of the Life-Cycle Permanent Income Hypothesis: Theory and Evidence. *Journal of Political Economy, 86(6),* pp. 971 – 987.

Harris, R.D.F., & Tzavalis, H.E., 1999. Inference for Unit-Roots in Dynamic Panels where the Time Dimension is Fixed. *Journal of Econometrics, 91,* pp. 201 – 226.

Jamilov, R., 2013. Capital Mobility in the Caucasus. *Economic System, 37,* Pp. 155 – 170.

Javed, Y., 2007. Capital Mobility, Foreign Aid and Openness: A Reappraisal. *Economic Bulletin, 6(12),* pp. 1 – 8.

Kerlinger, F.N., 1986. *Foundations of Behavioural Research (3rd ed.).* New York: Holt, Reinhart & Winston.

Ketenchi, N., 2015. Capital Mobility in Russia. *Russian Journal of Economics, 1,* pp. 386– 403.

Kim, H.Y., 2014. International Financial Integration and Risk Sharing Among Countries: A Production-Based Approach. *Journal of the Japanese and International Economics, 31,* pp. 16 – 35.

Kim, S., Kim, S.H., & Choi, Y., 2014. Financing Investment in East Asia: Regional or Global Savings? *Japanese and the World Economy, 31,* pp. 1 – 7.

Kim, S., Kim, S.H. & Wang, Y., 2007. Saving, Investment & International Capital Mobility in East Asia. *Japan and the World Economy, 19,* pp. 279 – 291.

Kumar, S., 2015. Regional Integration, Capital Mobility and Financial Intermediation Revisited: Application of General to Specific Method in Panel Data. *International Financial Markets, Institutions and Money, 36,* pp. 1 – 17.

Lai, J.T., McNeils, P.D., & Yan, I.K.M., 2013. Regional Capital Mobility in China: Economic Reforms with Limited Financial Integration. *Journal of International Money and Finance, 37,* pp. 493 – 503.

Li, C., 2010. Savings, Investment and Capital Mobility in China. *China Economic Review, 21,* pp. 14 – 23.

McKinnon, R. I., 1973. *Money and Capital in Economic Development.* The Brooking Institutions, Washington.

Nagayasu, J., 2012. The Threshold Consumption Correlation-based Approach to International Capital Mobility: Evidence from Advanced and Developed Countries. *Structural Change and Economic Dynamics, 23,* pp. 256 – 263.

Ndikumana, L., & Blackson, T.M., 2015. Financing Domestic Investment in African Countries: Does the Source of Financing Matter? *Journal of African Development, 17(2).*

Ndikumana, L., 2014. *Savings, Capital Flight and African Development.* Political Economic Research Institute, University of Massachussets Amherst Working Paper Series, No. 353. Forthcoming in Monga, Celestin & Justin Y. Lin (Eds). Handbook of African Economics, Oxford University Press.

Nindi, A., & Odhiambo, N.M., 2014. Saving-Investment in Malawi: A Causality Test. *Investment Management and Financial Innovations, 11(4),* pp. 77 – 84.

Obstfeld, M., 1994. Risk-Taking, Global Diversification and Growth. *The American Economic Review, 84(5),* pp. 1310 – 13129.

Obstfeld, M. & Rogoff, K., 1995. The Intertemporal Approach to the Current Account: in Handbook of International Economics, Ch. 34, 3, pp. 1731 – 1799.

Payne, J.E., & Kumazawa, R., 2005. Capital Mobility, Foreign Aid and Openness: Further Panel Data Evidence from SSA. *Journal of Economics and Finance, 29,* pp. 122 – 12.

Pesaran, M. H., 2004. General Diagnostic Tests for Cross-Section Dependence in Panels. Assessed from https://doi.org/10.17863/CAM.5113.

Pignalosa, D., undated. *The Euler Equation Approach and Utility Function: A Critical Review.* University of Rome "La Sapienz"

Schmidt-Hebbel, K., Serven, L. & Solimano, A., 1994. Saving, Investment & Growth in Developing Countries: An Overview. World Bank Policy and Research Working Paper, WPS, 1382.

Shibata, A. & Shintani, M., 1998. Capital Mobility in the World Economy: An Alternative Test. *Journal of International Money and Finance, 17,* pp. 741 – 756.

Shaw, E., 1973. *Financial Deepening in Economic Development.* Oxford University Press, New York.

Volosovych, V., 2011. Measuring Financial Market Integration over the Long-Run: Is there U-shape? *Journal of International Money and Finance, 30,* pp. 1535 – 1561.

Wang, S., 2016. China's Interregional Capital Mobility: A Spatial Econometric Estimation. *China Economic Review,* Available at http://doi.10.1016/j.chieco.2016.09.006.

WDI, 2017. Annual Statistics. World Bank Development Indicator, Washington D.C., USA.

Westlund, J., 2007. Testing for Error Correction in Panel Cointegration. *Oxford Bulletin of Economics and Statistics, 69,* pp. 709 – 748.