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The Effects of Sociopolitical Instability, and Macroeconomic Uncertainty on Private Investment: Evidence from Sub Saharan African Countries

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Addis Ababa, Ethiopia

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A Thesis Submitted to the Department of Economics School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Economics (Economic Policy Analysis)

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Abstract

This study attempts to examine the effects of sociopolitical instability, and macroeconomic volatility on private investment, for a panel of 26 SSA countries for the period 1986-15. To uncover robust results this study exploited the within group, forward orthogonal deviation (FOD) and system GMM estimators. Results from the three dynamic panel models estimation shows that, sociopolitical instability is found to have pronounced significant positive effects on private investment compared to macroeconomic volatility and standard macroeconomic culprits. Moreover, macroeconomic uncertainty captured by unconditional standard deviations of exchange rate turns out with deleterious effect on private investment in SSA, and significant in all models. However, the unconditional standard deviation of inflation rate seems insignificant in explaining private investment fluctuations in the region. Corroborating the accelerator effects of output, real GDP showed positive and significant impact on private investment in SSA, while credit to the private sector, public investment, and external debt service found to have insignificant effects in SSA and the results are persistent across all the three models. We argued that sociopolitical stability mainly characterized by: stable government, abetment of conflicts (internal, external, ethnic and religious), improved socioeconomic conditions and investment profile, lesser corruption, and heightening of institutional and bureaucracy quality promotes private investment in SSA. Further, our empirical finding asserts limited production capacity associated with heavy dependency on imported intermediate and capital goods signifies the deterring effects of exchange rate volatility. And thus SSA should promote strategies on the diversification of production activities and thereby make them less dependent to imported investment goods.

Key words: *Private investment, sociopolitical stability, macroeconomic uncertainty, SSA countries, within fixed effect estimator, FOD and system GMM*

Declaration

This is to certify that a Thesis prepared by Buzayehu Debebe, entitled "**The Effects of Sociopolitical Instability, and Macroeconomic Uncertainty on Private Investment: Evidence from Sub Saharan African Countries**" and submitted in partial fulfillment of the requirements for the Degree of Master of Science in Economics (Economic Policy Analysis) complies with the regulations of the university and meets the accepted standards with respect to originality and quality.

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Chair of Department or Graduate Program Coordinator

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Finally, I dedicate this thesis work to my Grandmother:

TERFE BEGASHAW

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Chapter One

Introduction

1.1. Background to the study

In explaining the growth performance differences across countries, the empirical fact reveals the robustness of investment (capital accumulation) in the process (see Ross & Renelt, 1992). Growth theories [Harrod (1939), The Solow model (Solow, 1957), and New Growth Theories (Romer, 1986)] with different underlying assumption, discussed the key role played by investment (capital accumulation). Harrod (1939) noted given fixed capital to output ratio, larger physical capital accumulation (investment) as a prerequisite for higher growth rate. Solow, (1957) on the other hand pointed that rich countries are rich due to larger capital (per person), albeit at a steady state increment in investment rate yields insignificant (zero or short lived) effect on per capita income growth. Rather, the long run per capita growth is exclusively determined by exogenous technological progress. Further, by incorporating human capital (skills, knowledge and experiences) and technology in the capital concept new growth theorists discussed that investment in new equipments and machinery enhances learning by doing (with spillover effects) and thus long run relationship between per capita growth and investment can established.

Despite its tremendous resource endowments, Sub Saharan Africa (SSA), which adds up to 46 of the 54 African Countries, remains the poorest region in the world with a GDP per capita of $1585 (WB 2019). Most Sub Saharan African countries have been experiencing erratic growth rates and particularly for the past fifteen years an average growth rate ranging from 0.1 to 7.4 percent, with an exception of Ethiopia which is 10 percent (WB, 2020). Compared to countries with the same level of economic development, Sub Saharan Africa is characterized by low private investment-GDP ratio. Moreover heterogeneity prevails within the region, with private investment as a share of GDP for Oil exporting, non-resource intensive and resource intensive countries being 14, 15 and 17 percent respectively for the year 2010-16. In comparison to Asia's developing economies (22 percent), Europe (18 percent), Latin America (17 percent) and the Middle East and North Africa countries (MENA) (16 percent), private investment to GDP ratio in Sub Saharan Africa averaged 15 percent during 2010-16. After a pronounced growth rate

experience in the early 2000's (14 percent per year), Private investment growth showed a decline for the period 2010-14 to 5 percent and further contracted 4 percent during 2015-16. The decline in commodity prices, regional spillover effect and idiosyncratic shocks are responsible for the downturn in Private investment in the region[1]. (IMF 2018)

As far as Social and Economic development of Sub Saharan Africa is Concerned, Increasing private Investment is necessary, and in order to boost private investment sustainably, a favorable macroeconomic and institutional environment is mandatory[2] (IMF 2018). Thus scrutinizing the determining factors of Private investment both at regional and country level are crucial as it is a critical aspect of Economic Development that will enable policy makers to draw policies related to matters of facts.

Existing empirical literature suggests that macroeconomic policy environment, macroeconomic instability, External shocks, Human Capital and Regional Spillover effects, and an Institutional and political uncertainty as a broad category of variables determining Economic Development, Growth and Private investment. (Serven, 1998; Bleaney and Greenway, 2000; Feng, 2001; Pal et al, 2011. Faced with new realism and pragmatism, there has been a growing recognition by African countries, that boosting investment and promoting private sector development could play a significant role in economic development. (Khan & Reinhart, 1990), asserted that private sector led growth has more contribution to economic growth and development as compared to the public sector because of its relative efficiency and low association with corruption.

As pointed out by (Niklaus, 2005), an enhancement in the levels of productivity, diffusion of industrial technology, competitiveness, Entrepreneurship development and downscaling of poverty are the channels through which private investment affects economic development. And

[1] IMF (2018) pointed out the major factors for the downturn in private investment in SSA mainly for the year 2015-16 as decline in commodity prices especially in oil exporter countries of Cameron, Gabon and Nigeria. And also the Sociopolitical and policy uncertainty South Africa coupled with downturn in economic activities in Angola, South Africa and Nigeria which accounts 50 percent of the regions GDP. And further the economic downturn manifested itself as a spillover effect to the other countries of SSA. (IMF 2018)

[2] By macroeconomic side it implies macroeconomic stability, ameliorating current and prospect economic activity, building efficient public infrastructure, sound financial sector policy and opening to international trade. On the institutional side it is related to judicial, regulatory and insolvency framework (IMF 2018)

in order to realize the stated socio-economic outcomes, a thriving private investment is the utmost important requisite (Niklaus, 2005).

Studies by (Khan & Reinhart, 1990); (Mitiku, 1996); (Servén, 1998); (Ghura & Goodwin, 2000); (Admasu, 2002); (Le, 2004); (Kazeem, 2012); (Escaleras & Kottaridi, 2014), pointed out that, Private investment is highly determined by availability of finance, real exchange rate, investment policy, policy uncertainty, political freedom, macroeconomic imbalances, sociopolitical factors, stock of external debt, public investment, growth rate real GDP, real interest rate, reform dummy, lack of infrastructure, bureaucratic procedures, and other culprits.

Despite the serious problems faced by the private sector [private investment] in Sub Saharan Africa, few studies, that focus on the standard economic determinants of private investment have been conducted, and do not examine the effects of macroeconomic uncertainty, and sociopolitical culprits (sociopolitical instability) systematically. In this regard, this study scrutinized the determining factors of Private investment with an emphasis on macroeconomic uncertainty and sociopolitical instability.

1.2. Statement of the problem

Economists define investment as the source of production of goods that will be used to produce other goods, and they further developed common opinion on the constructive effects of sustainable investment on economic growth and development. Moreover, investment-sustainability largely depends on the existing Investment climate. Investment climate in general refers to the macroeconomic, institutional, policy and political status quo. (UNIDO, 2009) Further, Investment climate, explained as provision of basic physical infrastructure (i.e. Electricity, water, road and telephone), business regulation, access to information and advisory services, trade facilitation service and availability of affordable urban land. (UNIDO, 2009)

Compared with countries with similar levels, private investment is low in Sub Saharan Africa, and thus constraining the region's effort to improve Socio-economic outcomes by impending labor productivity and the resulting gains in real wages and household income (IMF 2018). For instance, private investment as a percentage of GDP in SSA averaged at 9.7% and 15% for the period 1986 -15 and 2010-16 respectively. And this figure tells the very low performance of the region compared to Africa Development Bank’s (2013) recommendation of “African countries

should increase domestic investment to 35% of GDP and particularly private investment to at least 23% of GDP."

With regard to the determining factors of private investment, several studies ranging from cross-regional to country-specific have been conducted. On a cross-regional (in the context of developing countries) basis: [(Greene & Villanueva, 1991); (Aizenman & Marion, 1995); (Pastor Jr & Ho, 1995); (Servén, 1998); (Bleaney & Greenaway, 2000); (Feng, 2001); Le, (2004); (Erden & Holcombe, 2006); (Wai & Wong, 2007); (Pal, Dutta, & Roy, 2011); (Escaleras & Kottaridi, 2014)] analyzed investment fluctuations by incorporating standard macroeconomic determinants, macroeconomic uncertainty, sociopolitical instability, and regime types for different samples of developing countries. For instance, (Greene & Villanueva, 1991), for a sample of 23 developing countries confirmed the existence of the complementary relationship between public and private investment, while inflation and real interest rate deters private investment. In their analysis of volatility-investment nexus, (Aizenman & Marion, 1995), for a sample of 50 developing countries, asserted that volatility measures such as volatility of government consumption expenditure as a ratio of GDP, volatility of budget deficits, volatility of nominal money supply growth, exchange rate volatility, percentage change in terms of trade and volatility of per capita GDP growth negatively impacted private investment.

Further, (Servén, 1998), found that the variation of real exchange which is a proxy for macroeconomic volatility deters private investment and also credit availability and real output growth were observed to have a positive effects, while real interest rates effect on private investment was insignificant implying that diversity of the financial market across developing. (Feng, 2001), on the other hand examined the political determinants of private investment by isolating three political factors as political instability, political freedom and policy uncertainty. And the finding reveals that both political freedoms have promoted private investment, while measures of policy uncertainty (relative political extraction) found to have a negative impact.

In the analysis of political and economic determinants of private investment for a sample of 25 developing countries, (Le, 2004), identified three political risk types as sociopolitical instability, policy uncertainty and regime change instability. Sociopolitical instability captured by non-violent protests fosters private investment, whereas violent-uprisings impend. On the other hand, constitutional government change (proxy for regime change instability) turns out with positive

effect on private investment, whereas unconstitutional government change deters. Furthermore, variation in government political capacity used as a proxy for policy uncertainty hindered private investment. Moreover, (Pal, Dutta, & Roy, 2011), analyzed the sociopolitical determinants of private investment for a panel of developing countries and found that sociopolitical stability promotes investment and sociopolitical stability measures were ethnic tension, internal conflict, external conflict, government stability, law and order, military in politics, and religious tensions. Thus (Pal, Dutta, & Roy, 2011), forwarded that unstable business environment impends not only foreign investment, but also leads to capital flight.

Despite the consideration made to incorporate a wide ranges of variables (economic, uncertainty, sociopolitical and institutional), the generalization hardly fits for Africa due to the fact that Africa is hardly represented in the sample (missing observations). To the extreme case, for instance Wai and Wong, (2007) excluded Africa in their sample, and also in, Pastor Jr. and Sung, (1995) study to represent Africa, only Kenya was included in their sample.

Much of the Empirical literatures in the African context were limited to the analysis of macroeconomic determinants of private investment. In this regard, studies: Oshikoya, (1994); Ndikumana, (2000); Ghura and Goodwin, (2000); (Fowowe, 2011); (Misati & Nyamongo, 2011); Chuku et al, (2015); Ouedraogo et al, (2019); Asongu et al, (2020), examined culprits explaining investment fluctuations for a panel of different African countries. (Oshikoya, 1994), analyzed the macroeconomic determinants of domestic private investment for seven African countries, and found that real GDP, public investment, and credit availability have had promoted private investment, whereas external debt burden found to have deterring effect. And further, the proxies for macroeconomic uncertainty (coefficients of variations of real GDP, money supply and real exchange rate) negatively affected private investment. (Oshikoya, 1994).

In analyzing the financial determinants of domestic investment for a panel of 30 Sub Saharan Africa countries (Ndikumana, 2000), asserted that, total liquid liabilities of the financial system as a ratio of GDP, total private sector credit provided by banks as a share of GDP, total domestic credit availed by banks as a percentage of GDP, a composite of financial development index, real GDP growth, and trade openness were positive and significantly in explaining domestic investment fluctuations, whereas credit to the public sector found to have a financial crowding out effect. Another line of study by Bleaney and Greenway, (2000), examining the impacts of

volatility of real exchange rate and terms of trade on investment using GARCH (1,1) to estimate the volatility's of real exchange rate and terms of trade, and found that the effects lagged private investment as a ratio of GDP, terms of trade and real GDP were positive and significant, while real exchange rate volatility found to have a negative and significant effect on private investment.

Another a concrete study worthy of discussing is by (Sioum, 2002) which examined private investment and public policy, for a panel of 33 Sub Saharan Africa countries. The findings shows lagged per capita GDP, growth of per capita GDP, private sector credit, debt to GDP ratio, and export (a measure of import capacity) turns out positive and significant in explaining investment fluctuations in Sub Saharan Africa. (Sioum, 2002), Farther discussed that, measures of macroeconomic instability which is terms of trade variability and real exchange variability turns out with deterring effect, while public investment, credit to the government. The Interesting observation from (Sioum, 2002) work is that the estimated coefficients of measures of sociopolitical instability were a negative, but insignificant, and this could be due to missing observations for instance Somalia, Republic of Congo, Sierra Leon and Liberia were absent in the selected sample because of unavailability of data for the selected proxy variables to measure sociopolitical instability. (Sioum, 2002)

A more recent study by (Asongu, Nnanna, & Tchamyou, 2020), examined financial and institutional determinants of private investment for a panel of 53 African countries,[3] and discussed that all the governance indicators were statistically significant and positively linked to private investment, while financial depth insignificant in explaining investment fluctuation. On the other hand, trade openness, inflation, and economic growth were significant in explaining private investment fluctuations in Africa (except inflation all with positive sign).

[3] Since there is a possibility of correlation among the governance indicators, Asongu et al, (2020), used principal component analysis (PCA) and constructed components into; political components (encompassing political governance, and voice and accountability), economic components (incorporating regulatory quality and government effectiveness), and institutional components (rule of law and control of corruption). Principal components analysis (PCA) is a statistical approach usually used in applied econometrics to minimize a large set of correlated indicators into smaller component variables called principal components. Asongu et al. (2020)

Notwithstanding, the majority of existing literatures on African [Sub Saharan Africa] countries, substantially emphasized on the economic determinants of private investment, but there are a limited number of studies that included political climate in their models. For instance Admasu, (2002), deviating from the common opinion opted to incorporate uncertainty in terms of macroeconomic uncertainty and sociopolitical instability. And Interestingly the estimated coefficients of measures of sociopolitical instability were negative, but insignificant, and this could be due to missing observations for instance Somalia, Republic of Congo, Sierra Leon and Liberia were absent in the selected sample because of unavailability of data for the selected proxy variables to measure sociopolitical instability. But nowadays, economists developed a common opinion on the adverse effects of institutional failures on economic growth. Hence, if investment is the driver of sustained economic growth and development, thus jointly examining the Sociopolitical-economic dynamics that determines private investment in Sub Saharan African is mandatory. In this regard, this study goes beyond the existing literatures and attempts to fill the gap by examining the effects of macroeconomic uncertainty, and sociopolitical culprits (sociopolitical stability) on private investment in Sub Saharan Africa, and moreover, analyzing the impacts of uncertainty captured by, macroeconomic uncertainty, and socio-political instability on private investment is central to this study.

1.3. Objective of the study

The general objective of this study is to analyze the effect of uncertainty on private investment in Sub Saharan Africa. The specific objectives are:

1. To examine the effects of major macroeconomic uncertainty captured by exchange rate volatility and inflation rate volatility on private investment in Sub Saharan Africa (SSA).

2. To analyze the effects of socio-political instability on private investment in SSA.

3. Finally, to forward some policy implications.

1.4. Hypothesis

Based on the existing empirical literature on private investment and the determining factors in developing countries in general and Sub Saharan Africa in Particular, the study proposes the following working hypothesis:

H_1: Macroeconomic Uncertainty captured by exchange and inflation rate volatility has a significant negative impact on private investment.

H_1 Sociopolitical stability measured by government stability, investment profile, socioeconomic conditions, bureaucracy quality, ethnic tension, corruption, democratic accountability, internal conflict, external conflict, law and order, military in politics, and religious tensions has a negative effect on private investment[4].

1.5. Scope and Significance of the study

This study centered at examining the effect of macroeconomic uncertainty and socio-political instability on private investment for a panel of 26 Sub Saharan Africa countries using a set of panel data for the period spanning from 1986 to 2015. Although, several studies have been conducted on the standard economic determinants of private investment in Sub Saharan Africa, empirical evidence on the effects of uncertainty captured by macroeconomic uncertainty and socio-political instability is limited. Therefore, including macroeconomic uncertainty and socio-political stability in the model will contribute to the investment literature. Furthermore, from a policy making perspective, understanding the effects of macroeconomic uncertainty socio-political instability, and democracy is of a paramount importance for sound macroeconomic policy making.

[4] Following, Pal et al. (2011), we utilized sociopolitical stability index from ICRG risk rating based on twelve sociopolitical variables: government stability, investment profile, socioeconomic conditions, bureaucracy quality, ethnic tension, corruption, democratic accountability, internal conflict, external conflict, law and order, military in politics, and religious tensions has a negative effect on private investment a proxy for instability due to religious wars and suppressions.

1.6. Organization of the study

The structure of this study is organized as follows: Chapter two presents the review of theoretical and empirical literature related to the topic. Chapter three presents model specification, data source and type, and the estimation techniques. Under Chapter four discussions of the empirical analysis and findings of the study are presented. And the final part, chapter five forwards conclusions and policy implications.

Chapter Two

Theoretical Framework and Empirical Evidence

2.1. Basic Investment Theories

In economic behavior analysis, investment decision is a central subject mainly due to its effect on productive capacity and future growth path of economies. In an economy, investment has been identified as the most volatile component creating interests and challenges in theoretical explanation of investment behavior. Various theoretical explanations on investment volatility has been forwarded, and the most familiar theoretical explanation came from the neoclassialists user cost model in which firms' maximizes profit (market value) by adjusting their stock of capital till marginal value product of capital equalized to prevailing market interest rate. Convex production function with diminishing marginal product of capital (implying the inverse relationship between demand for investment good and the interest rate) underpins this theory. Further extension of the theory incorporated fiscal incentives in the form of investment tax credit and profit taxes to fit the real world.

However, little or nothing is discussed on the culprits determining marginal value of product of capital in the user cost theory. Arguably its uncertainty which surrounds expected profitability the main factor linked to investment volatility and that is why expectations are thought as a contentious issue in the economics literature. Formally, the economic fundamentals shifting investors' expectations are observed shifts in consumer demand, technology, opinion surveys and others. They could also possibly occur for unexplainable optimism or pessimism attitudes exerting influence on economic agents within the economy, and this is what Keynes (1936) has discussed, i.e. Investment fluctuations are due to investors' nature of "animal spirits". (Sioum, 2002)

Another theoretical explanation for investment volatility arises from the accelerator model. In its simplest version the accelerator model assumed fixed capital-output ratio implying that change in the capital stock (investment) is demand induced, i.e. investment prevails if aggregate demand is expected to rise and remain at the new level. Notwithstanding the various critiques presented on

the accelerator model mainly because of the issues of profitability and the cost capital are neglected in the discussion, it still explains investment patterns better than sophisticated models.

On the other hand Neoclassicalist (suggested by Jorgenson (1967)) incorporating the accelerator effect and the user cost of capital (price of capital goods, interest rate and depreciation) explained investment behavior. It is assumed that firms' in the neoclassical model operates under perfect competition, both in the factor and product market implying the non-existence of liquidity constraints and prevalence of full employment in the economy in a general equilibrium situation. Further, subject to costs and lags in the adjustment of capital stock, firms realize only part of the desired stock of capital in the current period.

Another popular investment theory is Tobin's q theory suggested by Tobin, (1969) relating market value of the firm to its replacement cost as the major guide in investors' decision to invest. The theory posits investment will be worthwhile if and only if market value of the firm (in the stock market) is greater than the replacement cost (cost of acquiring the firm such as equipments and plants in the product market)

In the following sub-section detailed discussion of theories highlighted above is presented

2.1.1. The Accelerator Theory

In its simplest version, the acceleration principle is associated with the Keynesians approach mainly due to the assumption that price variables are fixed. Clark (1917) was the first who suggested the acceleration principle, and is well known by Samuelson (1939) for its application to business cycle. The theory states that in order to increase the rate of output, proportionate increment in the stock of capital is required .i.e. Firms hold a stock of inventories which proportional to the level of output. The acceleration principle is merely a special case of neoclassical investment model in which price variables are reduced to constant. In principle, the accelerator model can be derived from the user cost model. (Eklund, 2013). Given a Cobb-Douglas production function, the equilibrium condition for investment is:

$$\frac{R}{P} = MPK = \alpha A \left(\frac{L}{K}\right)^{1-\alpha} \gg \frac{\alpha Y}{K} = \frac{R}{P} \quad \ldots\ldots\ldots\ldots (2.1)$$

Equation (2.1) can be rearranged to give us:

$K = \frac{\alpha Y}{R/P} \gg K = \beta Y$ [5]…… (2.2)

$I_t = \Delta K_{\boldsymbol{t}} = \beta \Delta Y_t$ ……..... (2.3)

Based on the assumption of fixed capital-output ratio (β being fixed), the desired or optimal capital stock is a constant proportion of output in any period t will be $K_t = \beta Y$, where $\beta$is the accelerator coefficient. Thus according to the accelerator principle growth of output or demand determines investment .i.e. $I_t = \Delta K_{\boldsymbol{t}} = \beta \Delta Y_t$ (Mankiw, 2010; Eklund, 2013)

In its simplest version, the accelerator theory faces a number of criticisms. For instance, the assumption of discrepancies between the actual and desired capital stock is ruled out within a single period is far from the reality. Further, the assumption of fixed capital-output ratio is unrealistic because most firms substitute labor for capital for at least in a limited range, and thus other factors such as interest rates need to be considered by firms. Furthermore, firms will invest in new plant and equipment in response to an increase in aggregate demand only if demand is expected to remain at the new level. [Mankiw, 2010; Eklund, 2013]

In the accelerator modeling mechanism, the more appropriate discussion is to take the lagged effects into account and this is the core idea in the discussion of the Flexible-accelerator model. Thus the flexible accelerator model assumes that not only the current change in output, but earlier changes determine investment. The main idea behind this model is that the discrepancy between the actual capital stock and the optimal or desired capital stock is eliminated not in a single period, rather over a number of periods. Thus firms plan to invest (add to the existing capital stock per period) to make only partial adjustments in order to fill up the discrepancy between the actual and desired capital stock level. According to the flexible accelerator model firms to make partial adjustment they decide to undertake investment in each period to be λ (which is fraction of the total discrepancy between actual and desired capital stock) .i.e. It follows that:

$K_t = K_{t-1} + \lambda(K_t - K_{t-1}) \gg I_t = \Delta K_t = \lambda(K_t - K_{t-1})$ …… (2.4)

[5] Where β is $(\frac{\alpha}{R/P})$

$K_t = \lambda K_t + (1-\lambda)K_{t-1} \gg K_t = \lambda\beta Y_t + (1-\lambda)K_{t-1}$ …… (2.5)

$I_t = \Delta K_t = \lambda\beta\Delta Y_t + (1-\lambda)I_{t-1}$…….... (2.6)

Equation (6) depicts the partial and gradual adjustments of stock of capital through investment to reach the desired or optimal level over time, and as shown in the flexible accelerator model only part of the desired change in the capital stock is filled in each period by investment. Furthermore, the flexible accelerator model is modified to incorporate changes in the speed with which investment is carried out i.e. In fact 'λ'is the choice variable for firms which is influenced by culprits such as credit availability, interest rate, corporate tax rate, investment tax credit and other factors. [Mankiw, 2010; Eklund, 2013]

Generally, the accelerator model is based on the assumption of fixed capital output ratio, and stresses planed investment as demand induced i.e. demand for new machinery and plant arises from the demand for final goods and services. If the expected demand (output) is greater than the existing capacity, then new more plant and equipment are required and thus investment is a function of change in national income. The accelerator theory identifies GDP (output) as the main variable determining investment. Furthermore, the model considers other factors that determine investment as internal funds and external cost of financing investment. In SSA variation in private investment is caused by the above listed and other factors.

2.1.2. The Neoclassical Model (User Cost Model)

The neoclassical model is based on firms profit maximization conditions. It is the standard model for business fixed investment and was postulated by Jorgenson (1997) and examines firms' costs and benefits owning capital goods. The model depicts how the level of investment (the addition to existing level of capital stock) is related to the interest rate, the marginal product of capital (MPK), and also the tax rules that affects firms' decisions. In developing the theoretical model the assumption of classifying firms into production and rental firm is made. Goods and services are produced by production firms by employing capital that they rent from rental firms. On the other hand, rental firms buy capital and they rent it out to the production firms. But in the real world both functions are performed by firms' .i.e. they produce goods and services and perform the task of investing in capital for production purposes. [Mankiw, 2010; Eklund, 2013]

2.1.2(a). The Rental Price of Capital (for the producer firm)

In this case the production firm decides the amount of capital to rent based on the associated costs and benefits of each units of capital. In this regard, the rental rate the firm pays is R and sells its output at a price P, and the real cost of capital (real rental price) for the production firm is$\frac{R}{P}$. Marginal product of capital (MPK) implies the real benefit from employing an additional capital and it decreases as more and more of capital is employed. In order to maximize profits firms use capital until MPK equals the real cost of capital ($\frac{R}{P}$). Thus MPK is taken as the demand curve for capital. Further, at any point in time the supply of capital is fixed, thus it is the real rental price of capital adjusts to equilibrate supply and demand for capital. To identify variables influencing equilibrium level of real rental price neoclassicalists considered the Cobb-Douglas production function as a good approximation to the actual economy in which capital and labor are the two factor inputs used in production. And it is given as follows

$Y = AK^{\alpha}L^{1-\alpha}$ ……. (2.7)

Where Y is output, K-capital, L-labor, A-parameter measuring technology level and α measures the share of capital in output. And the marginal product of capital (MPK) will be:

$MPK = \alpha A(\frac{L}{K})^{1-\alpha}$ ……. (2.8)

And at equilibrium the real rental price ($\frac{R}{P}$) equals to the marginal product of capital (see equation 2.1). From equation (2.1) variables influencing equilibrium level real rental price are identified. Negative relationship between stock of capital and real rental price can e established. Further, the higher the level of labor employed the greater will be the real rental price and also better technological advancement is associated with higher level of real rental price. Neoclassicalists concluded that incidents that reduces capital stock (earthquake), higher employment (a rise in aggregate demand) or advancement in the state of technology induces higher equilibrium real rental price. [Mankiw, 2010; Eklund, 2013]

2.1.2.(b). The Cost of Capital

Rental firms merely buy capital goods and rent it out. The benefit from owning capital is the revenue obtained from renting to production firms, i.e., the rental firm receives real rental price of $\frac{R}{P}$ from a unit of capital that it owns and rent it out. On the other hand the cost of owning capital takes three forms; first, when the rental firm buys capital losses interest rate that would have obtained by depositing the capital, i.e., if P_k is the price of capital, the associated interest cost is iP_k, where i is the nominal interest rate. Secondly, while renting out, the price of capital can change and thus there could be capital gain or loss (ΔP_k). And again the capital suffers wear and tear (depreciation) and the cost of this depreciation is given by δP_k and thus the total cost of renting a unit of capital will be:

$$C = iP_k - \Delta P_k + \delta P_k = P_k(i - \frac{\Delta P_k}{P_k} + \delta) = P_k(r + \delta)$$ [6]..... (2.10)

From equation (2.10) the real cost of capital is $\frac{C}{P} = {}^{P_k}/_{P}\,(r + \delta)$. From the above formulation, the decision to rise or reduce the capital stock by the rental firm depends on the benefit (revenue), real rental price and the real cost of capital. Therefore profit rate (PR) can be given as:

$$PR = MPK - ({}^{P_k}/_{P}\,(r + \delta))$$ ..... (2.11)

Neoclasicalists deduced that economic incentives to invest mainly depends on the difference between Marginal product of capital (MPK) and real cost of capital (${}^{P_k}/_{P}\,(r + \delta)$). For instance if MPK is greater than the real cost of capital, then investment will take place (ΔK_t will be positive), and there will be capital shrink ($-\Delta K_t$) if MPK is less than real cost of capital. And thus at equilibrium ΔK_t will be zero.

Generally, Producer firms in the real world usually buy capital by themselves and investment decision in the neoclassical model can be shown as:

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[6] Where r is the real interest rate and π is inflation rate i.e. $r = i - \pi$

$$\Delta K = Gross\ investment = f\left(MPK - \left({}^{P_k}/_{P}\,(r+\delta)\right) + \delta K\right) \ldots\ldots\ldots (2.12)$$

Neoclassical model of Investment shows the existence of a positive relationship between investment and MPK, while real interest rate (which raises the cost of capital) is inversely related to investment. The conclusion is that in the long run MPK equals real cost of capital, but the speed of adjustment to capital stock depends on how costly it is to build, deliver and install new capital. [Mankiw, 2010; Eklund, 2013]

2.1.3. The Tobin 'Q' Model

The model is based on J.Tobin (1965), which depicted the relationship between Investment and stock market fluctuation. The model explained that stock prices tend to be high in the stock market when firms face many opportunities implying that stock prices show the incentive to invest i.e. stock prices determine investment. It is hypothesized that the ratio of market value of existing stock of capital to its replacement cost ($Q-ratio$) is the major driving force of investment implying that firms will invest if the increase in the market value of an additional unit exceeds the replacement cost. Tobins (1965) proposition was that firms investment decision is based on the following ratio called Tobin $-ratio$:

$$Q = \frac{Market\ \ Value\ \ of\ \ Installed\ \ \ Capit\ al}{Replacement\ \ \ Cost\ of\ \ Installed\ \ \ capital} \ldots\ldots\ldots\ldots (13)$$

Equation (13) shows the numerator is determined by the stock market, while the denominator is influenced by the price of capital. Tobin noted that net investment should depend on $Q-ratio$, whether its value is greater or less than one. $Q>1$, implies the value of installed capital is greater than the replacement cost and thus managers can increase the market value of their firms stock through buying more capital. Conversely, if$Q<1$, managers will not replace as it wears out (depreciates). Generally, the $Q-ratio$ depends on the current and future profitability from installed capital. For instance, if marginal product of capital (MPK) is greater than the cost, then firms gain profit on installed capital and thus these firms now will be more desirable to own (which actually rises the market value of firms stock implying that high value is attached to $'Q'$. In similar manner, if MPK is less than the cost of capital, then low level of market value (and lower value attached to $'Q'$) implying investors pessimism. In conclusion the model presents

interest rate as the main determinant of investment due to the fact that higher interest rate implies higher user cost of capital which negatively affects investment. In Sub Saharan Africa context, interest rates and other factors exert influence on private investment.

2.2. Investment Models for Developing Countries

The Theories discussed above were formulated to examine investment behavior in the context of industrial economies. In the process of understanding the investment behavior in the context of developing countries, direct application of the above stated theories will be difficult at least for two reasons. Firstly, there is a problem of data availability for key variables (for capital stock, stock market prices, wage rates and real interest rate). Secondly, developing countries structural and institutional peculiarities are incompatible with the assumption underlined in the above models (for instance the assumptions of perfect competition, absence of liquidity constraint, little or no government, and others). And these assumptions hardly picture the context in developing countries. (Oshikoya, 1994; Admasu, 2002).

Earlier empirical studies on private investment in the developing world opted to deviate from the standard traditional theories to incorporate the role played by financial sector development. They highlighted the prevalence of financial repression coupled with credit rationing in the financial markets of developing countries constraining the ability of the adjustment in the stock of capital to the desired level. More specifically, firms are forced to mobilize enough real balances due to limited access to credit before they launch investment projects. Mckinnon, (1973) and Shaw, (1973) cited in (Sioum, 2002), provided theoretical and empirical framework for the analysis and forwarded the existence of positive association between interest rate(real) on deposit and private investment (level and quality) in developing countries. And this proposition contradicted neoclassicalists argument, i.e., interest rate in the neoclassical model is expected to affect private investment negatively because it's treated as user cost of capital. Nonetheless, credit availability is also incorporated as a culprit determining private investment instead of giving emphasis only to interest rate. (Sioum, 2002).

The fact that developing countries lack fully-fledged applicable theoretical models, empirical literature examining investment volatility tended to incorporate variables having strong

correlation with investment. The following section discusses assessment of the modified version with relevant variables included.

Developing countries high import content of capital and intermediate goods coupled with devaluation (as part of the adjustment programs), inclusion of real exchange rate as culprit determining private investment is considered. For the reduction of external imbalances, the adjustment program relied on combinations of policies that reduce expenditures, to switch spending towards domestic goods, and devaluation is included in the expenditure switching policies with its substantial impact on investment. Through its effect on relative price of capital goods, devaluation affects profitability because investment goods are combinations of domestic (infrastructure or construction) and foreign (equipment and machinery) components. Empirical studies shows this theoretical ambiguity, for instance, Serven and Solimano (1991); Cardoso (1991); Larrain and Vergara (1991); Ghura and Goodwin (2000), for a panel of developing countries real exchange rate is found to have insignificant effect on investment, but its variability (Serven, 1998) negatively affected investment. On the other hand, Faini and de Melo (1990) for a panel of 24 developing countries found that devaluation negatively impacted investment.

The reason for the inclusion of debt burden in the investment model as a key variable was the observation that investment rate sharply declined following the debt crisis in the early 1980's. It is expected to have negative relationship between debt overhang and private investment due to the fact that investor's anticipation of confiscatory taxes in order to finance the debt service payment in the future, which makes expected returns uncertain for investors. Empirical studies on debt-private investment nexus using debt to GDP ratio as a proxy for debt overhung have found negative association (Serven, 1998; Greene and Villanueva, 1991; Ghura and Goodwin, 2000); Admasu, 2002). Nevertheless, (Borensztein, 1990) noted that, instead of disincentive impact of raising debt to GDP ratio the importance lays on credit worthiness linked to debt overhang.

Compared to the industrial economies, public investment plays a key role in developing countries; however, it is important to consider the issue of substitutability and complementarities between private and investment public. Theoretically it is discussed that net effect of public investment is indeterminate (crowding out and crowding in effect could take place at a time). More specifically, the crowding out effect may arises due to developing countries limited market

size (private ventures are possibly displaced by public investment in productive sector), financial crowding out (as both the public and private sector runs for limited and same credit pool) and also the source of finance (foreign borrowing and/or domestic) for public investment (inflationary and debt accumulation creating uncertainty in the business environment). On the other hand, crowding in effect arises as a result of infrastructural targeted public investment. Fitzgerald et al., (1992). In this regard, Empirical studies; for instance, (Blejer & Khan, 1984); Balasa (1988); Lauman (1990); Greene and Villanueva, (1991); Oshikoya (1994); Khan and Kumar, (1997);Ghura and Goodwin, (2000); Feng, (2001) Admasu, (2002); Wai and Wong, (2007); Fowowe, (2011); Escaleras and Kottarid, (2014), have found mixed results by including public investment in their private investment model.

Further, inflation rate is a proxy for macroeconomic instability that could possibly deters private investment by distorting information contents of relative prices and thus raising the risk associated to long term investment. In this regard, Greene and Villanueva, (1991); Pastor Jr. and Sung, (1995); Feng, (2001); Fowowe, (2011); Ngoma et al, (2019); and Asongu et al, (2020) confirmed the negative effect of inflation rate. Moreover, an indicator of external shock and macroeconomic instability, terms of trade have been considered as culprit determining private investment, i.e., adverse movements in the terms of trade will result in upward movement in the costs of import relative to income, and declined purchasing power of export. Therefore, sever terms of trade possibly worsen the ratio of current account deficit to GDP. World price fluctuations will exert an impact on real exchange rate, inflation, resource allocation and on overall investment outlook. The study by Aizenman and marrion, (1995); Serven, (1998); Ghura and Goodwin, (2000), and Ouedraogo et al, (2019) confirmed the above stated hypothesis.

2.2.1. Uncertainty and Investment

Despite the ambiguous predictions forwarded by the theoretical formulation, uncertainty-investment nexus in economic theories has been discussed with a considerable attention. Based on the assumptions underlying in the theoretical formulation (most of them being developed on risk-neutrality framework), predictions on uncertainty's effect on private investment includes both positive and negative associations. In analyzing uncertainty's effect in the standard model (for risk neutral-investors), the consideration made is basically to examine the association between expected marginal revenue of product of capital and uncertain variables (typically real

wage or output price). For instance, consider perfectly competitive firm (characterized by constant-returns, capital being the only fixed factor while labor is adjusted without any cost in the face of varying output prices), price shock will make firms to change their optimal input mix making marginal revenue product of capital fall less (or rise more) than the relative output prices. In such stipulations, marginal profitability will be convex function of output prices and the Jensen's inequality reveals higher price uncertainty linked to higher expected profitability of capital resulting in rising desired capital stock and hence investment. Serven, (1998)

Recently, the analytical focus has shifted to adjustment costs (implied by acquisition and installation) of capital, substantially focusing on irreversible nature of fixed investment projects. In this respect, (Dixit & Pindyck, 1994) noted that, the irreversibility nature of fixed investment shifted the attention towards the inclusion of uncertainty and instability in the analysis of investment volatility. Business environment characterized by full of uncertainty and instability coupled with irreversible investment, creates value of waiting for more information in order to abate investment projects which are irreversible and unprofitable. Asymmetry in the adjustment cost of the stock of capital is the basis for this theory implying that optimal investment policies should consider balance between the associated value of waiting (present values of future returns in case they fall short of the user cost of capital) and costs of waiting (net present values of forgone returns by waiting for a project which would turn out successful anyway). The literature in this regard posits value of waiting by far could be higher under the condition that uncertainty is high, implying that the possibility of uncertainty as a main obstacle for investment. (Sioum, 2002)

Available empirical studies on uncertainty-investment nexus attempt to employ volatility of relevant variables (usually relative prices) as a proxy for measuring uncertainty in modeling investment. The assumption is high volatility rises the threshold that marginal profitability of capital below which investors will be in a range of inaction (disinvestment or no significant investment). In analyzing the impact of uncertainty on private investment for a panel of developing countries studies by Aizenman and Marion, (1995); (Hadjimichael & Ghura, 1995); Bleaney and Greenway, (2000); Serven (1998); Feng, (2001); Admasu, (2002) Le, (2004); Escaleras and Kottarid, (2014) have found a statistically significant relationship between different proxy variables of uncertainty and private investment. For instance, Aizenman and

Marion, (1995), analyzed the relationship between volatility and private investment for a sample of 50 developing countries for the period 1970-93. And found that negative effect of different volatility measures (exchange rate volatility, volatility of government consumption expenditure as a share of GDP, budget deficit volatility, volatility of GDP per capita growth, volatility of nominal money supply) on investment. Bleaney and Greenway, (2000) on the other hand, for a sample of 14 Sub Saharan Africa countries analyze the impacts of volatility of real exchange rate and terms of trade on investment for the period 1980 to 1995. And found statistically significant negative impact of real exchange rate volatility, while volatility of the terms of trade found to have insignificant effect.

Nevertheless, uncertainty is not confined only to the volatility of macroeconomic variables, but also sociopolitical instabilities which is detrimental to private investment.

2.2.2. Institutions, Sociopolitical factors and Private Investment

Most of the studies conducted on investment volatility highly emphasized on the standard economic determinants (economic size, economic growth, interest rate, exchange rate, inflation, trade openness, and public investment), but the role played by institutional and sociopolitical factors is pronounced. As pioneered by (North, 1993) work, the significance of institutional culprits in attaining favorable macroeconomic environment and economic development has gained a momentum. Theoretically, it is discussed that a sound institutional setting highly encourages economic agents both foreign and domestic in their activities. (North, 1993) Posits sound institutional setting is a guarantee for property rights, civil liberties and contract enforcement which possibly avoids rent-seeking and corruption. And thus a well-functioning legal rules, lower degrees of corruption and bureaucratic procedures, political stability, and other relevant proxies of quality institutions promotes investment, growth and eventually development.

Investment climate in a nation has a substantial impact on investment level, and one of the major culprits that affects investment climate is sociopolitical instability. For instance, Ikejiaku and Mordi (2010) noted that Africa's low investment profile is not mainly motivated by unprofitability; rather it is linked with conflict, weak governance, corruptions, high crime rates, and poor infrastructure. And these unfavorable investment climates increases transaction costs and high risk of doing business in general.

It is easier for investors to engage in productive activities in a society characterized by; peoples are free and protected to own properties, presence of rule of law, efficient, easily accessible, free, fair and just judicial system. (Goldsmith, 1995) And thus establishing reasonable and sustainable entry and exit rules, labor laws protecting both employees and employers right, and fair regulating repatriation of profit are incentives for private sector development, and 'unnecessary' and 'needless' workers agitations and strikes be avoided. Added to this, prevalence of political stability, absence of civil revolt threats, violence and unrests promotes investment. Since quality institutions are the reflections of less red-tapes, bureaucracy, rent-seeking, and corruption. Thus sound institutional setting will facilitate resource allocation and innovation by a means of productive investment. (Goldsmith, 1995; Obeng et al, 2017).

On the part of sociopolitical instability, it is linked with a decrease in saving and increased current consumption due to the fact that saving may become worthless. Sociopolitical instability characterized by displacement of peoples or deprives them of jobs (making saving unrealistic) and declined investors' confidence (investors prefer to hold their portfolios and properties in a portable and liquid terms such as gold or foreign currency which possess a better probability of retaining value). Thus sociopolitical instability is associated with a decline in the supply of investment capital (who saves) and demand for capital for capital (by investors), and this will result in less attractive job opportunities and declined potential pool of resources (saving) to invest. It follows, in countries with high degrees of sociopolitical instability; investment tends to in liquid and speculative terms leaving these countries to a low investment and low productive industries. Feng, (2001).

2.2.3. Regime Type and Private Investment

On the regime-investment nexus, the arguments mainly emphasizes on pressure for current (immediate) consumption, property rights, and dictators autonomy. To begin with the argument against democracy (democracy undermines private investment due to its pressure on current consumption)[7], elected officials are short sighted with an interest of raising their chance of winning next elections and thus they tend to adopt policies that promotes current consumption

[7] Walter Galenson and Karl De Schweinita argument can found in Przeworsk and Limongi (1993)

than investment. The increase in demand for immediate consumption threatens profit and in turn investment declines. Further democracy enables the median voters to redistribute income towards the poor which actually decreases the incentive to save and thereby to invest. Moreover, if the median voter is poorer (relatively)[8] then expropriation will prevail in a democracy. (Przeworsk and Limongi, 1993; Feng, 2001).

After concluding the inimical nature of democracy to investment and growth, arguments in favor of dictatorship is presented. Vaman Rao (1984) cited in (Adam & Limongi, 1993), argued that cutting current consumption fosters saving [investment]. Though it would be painful for the poor (peoples with low income, i.e., almost in all developing world), the government with an iron hand should marshal the required pool of resource for investment. The general argument basically assumes; first, the propensity to consume for the poor is higher and thus growth and democracy are incompatible at low level of income. Secondly, positive link is assumed between capital accumulation (investment) and growth. Finally, the responsive nature of democracy to pressure for current (immediate consumption) is established, i.e. The poor wants to consume immediately, workers can drive wages up by strongly organizing themselves (forming unions), reduced profits and thus declined investment. (Adam & Limongi, 1993). On the other hand, Maxfield (1990) cited in Feng, (2001), argued investment is not affected by political institutions (regime types), rather by coalitions of interest groups such as government bureaucracies, banks, and labor. It is the institutional and organizational structure that determines the pattern of economic policy and financial market integration and thus private sector development.

Furthermore, based on property right, two core arguments are presented on the regime type-investment nexus. The first is, democracy in the form of universal suffrage coupled with freedom to form unions threatens property. Thomas Macaulay and Karl Marx arguments of "Universal suffrage as the end of property and all civilization" and "Democracy unchains the class struggle" respectively can be found in (Adam & Limongi, 1993) work. And particularly, according to Karl Marx, democracy unchains the class struggle; the riches are expropriated by the poor using democracy; riches are threatened and thus subvert democracy 'abdicating' the political power

[8] If the median voter possess less capital compared to the average person and possibly if the poor is entitled to extensive political right then expropriation is inevitable in democracy. Feng, (2001)

permanently to the organized armed force and thus democracy crumbles. (Adam & Limongi, 1993)

The second argument is based on the political nature of democracy. Conesus and broad base supports are the features of democratic political system in the process of making the policies secured and efficient. But, autocracy in general suffers lack of fundamental social basis for its regime stability. Given these two regime types, investors will prefer for the democratic practice which at least institutionalizes redistribution of the system in the face 'political uncertainty' (characterized by irregular governmental change). Thus, in a democracy with strong middle class coupled with the redistribution system being institutionalized, it is more likely to decrease the circumstances in which the wealth of the rich can be expropriated by the poor. Feng, (2001).

2.3. Empirical Literature

Until this point emphasis is given to the theoretical formulation of investment model to include relevant macroeconomic variables, uncertainty, instability, regime types and institutional culprits. Now, empirical literatures on investment volatility for developing countries in general and Africa in particular will be critically reviewed.

To begin with studies conducted in a general framework for developing countries, Green and Villenueva, (1991) examined the macroeconomic determinants of private investment for a panel of 23 developing countries for the period 1975 – 87. Employing pooled time series-cross section approach they found that the ratio of public investment to GDP statistically significant with a positive sign implying that the existence of compelmentarity between public and private investment. Further, lagged real GDP per capita growth found to have positive and statistically significant impact on private investment, while lagged values of debt service ratio and debt stock was significant with negative sign[9]. Furthermore, the estimated coefficient of inflation rate turns out to be statistically significant and negative (implying higher inflation deters private

[9] Since, there a possibility that private investment rates may affect current values of GDP per capita, GDP per capita growth and debt service ratio, to minimize the problem of simultaneity bias lagged values of these variables were employed in the estimation. Green and Villenueva, (1991).

investment for sample countries included), however lagged values of real GDP per capita was positive but insignificant. And interestingly, the estimated coefficient for real interest rate is found to have a negative and statistically significant impact. Green and Villenueva, (1991).

Another line of research by Aizenman and marrion, (1995), analyzed the association between volatility and private investment in 50 developing countries over the period 1970-93. They used volatility measures such as volatility of government consumption expenditure as a ratio of GDP, volatility of budget deficits, volatility of nominal money supply growth, exchange rate volatility, percentage change in terms of trade and volatility of per capita GDP growth. By including other relevant variables (trade openness, real GDP, primary school enrollment, political instability indices based on the numbers of coups and revolution) their pooled time series-cross section analysis, Aizenman and marrion, (1995), found a negative relationship between the measurements of volatility and private investment. And also the effects of initial real GDP, measures of political instability and initial school enrollment turns out to be insignificant, while trade openness impacted private investment positively and statistically significant. Aizenman and marrion, (1995)

Pastor Jr. and Sung, (1995), using pooled time series-cross section approach for a sample of 15 developing countries[10] over the period 1973-86, examined democracy-private investment nexus.[11] They specified their dependent variable as private investment as a share of GPD determined by both economic and political variables. Economic variable includes expected growth rate, the change in credit to the private sector, public sector investment growth, inflation rate, variance of inflation rate, expected debt burden or debt overhang, and GNP per capita. And

[10] Only Kenya was included in their sample to represent Africa.

[11] Pastor Jr. and Sung, (1995), hypothesized that democracy potentially promotes private investment mainly because democracy by its nature its open political system which paves the way for policy makers to better understand and respond to the distributive pressures and by that reduce social conflict. Furthermore, it is more likely that democracy allows private investors institutional access. Pastor Jr. and Sung, (1995).

political variables such as democracy (index)[12], operation risk (index measures for various political and institutional culprits obtained from Business Environment Risk Intelligence) and index of worker share of income. Pastor Jr. and Sung, (1995), found that except GNP per capita, all economic variables statistically significant with the expected sign (inflation rate, variance of inflation rate and expected debt burden with negative sign, while other economic variables with positive sign). Moreover, all the political variables (democracy, operation risk and index of worker share of income) found to have a positive effect on private investment and statistically significant implying that democracy is not merely a substitute for risk reduction and policy stability, but "voice" or political access itself may positively affect private investment. Pastor Jr. and Sung, (1995).

Serven, (1998), using GARCH (Generalized Autoregressive Conditional Hetroskedasticity) approach, and system GMM estimation, analyzed the link between macroeconomic uncertainty and private investment for 61 developing countries for the period 1972 to 1995. Serven, (1998), specified fixed investment as a ratio of GDP as a dependent variable, and included explanatory variables; real exchange rate, coefficient of variation of real exchange rate, relative price of capital goods, trade openness, private sector credit as a ratio of GDP, real interest rate and lagged dependent variable. The finding shows, coefficient of variation of real exchange (proxy for real exchange uncertainty) highly significant with negative sign. Further, relative price of capital goods and real interest affected investment negatively, while credit availability and real output found to have positive impact. And also real interest rates effect on private investment was insignificant implying that diversity of the financial market across developing countries. Moreover, Serven, (1998), discussed that weaker financial system coupled with higher trade openness may actually have a strong negative uncertainty-investment link. Serven, (1998).

[12] The measure for democracy was based the ratings of political participation competitiveness, executive recruitment competitiveness, constraint on chief executive and openness of executive recruitment, which is summation of 10-point scale taken from, Gurr [1990], Pastor Jr. and Sung, (1995).

Feng, (2001), examined the political determinants of private investment by isolating three political factors (political instability, political freedom and policy uncertainty) that could possibly affect private property rights and investment for a panel of 71 developing countries for the period 1978 to 1988. Combinations of both political and economic variables were used in the study. Among the political variables; political freedom (two variables: political rights and civil liberties were used in constructing political freedom variable in Gastil)[13], relative political extraction (as a proxy for policy uncertainty), and political violence measured by revolutions, riots, strike, coup d'état (per year) were considered. Further, Feng, (2001), specified the dependent variable as private investment as a percentage of GDP[14] and included other relevant economic explanatory variables; expected growth, inflation, public investment, primary school enrollment and inflation variability.[15] Employing pooled time series-cross section, Feng (2001) discussed; firstly, considering only political variables, found that both political freedom (with positive sign) and relative political extraction(with negative sign) were significant at 5% level, while strike (with negative sign) turns out to be significant at 10% level. Secondly, by including all economic and uncertainty variables, the finding shows that standard deviation of inflation, public investment, and socialist economy dummy negative and significant at 10%, while education and economic growth found to have positive impact on private investment. More importantly in the second model political freedom and relative political extraction were insignificant, while the variation of these two variables impacted investment negatively. Feng, (2001).

By identifying sociopolitical instability, regime change instability and policy uncertainty along with inflation rate and exchange rate volatility as culprits causing private investment volatility,

[13] The rank for political rights and civil liberties ranges from 1(the highest degree of freedom) to 7 (the lowest) based on various ranking categories i.e. the ranking categories can be found in the annex section. And to account for political instability, standard deviation of political freedom was used.

[14] The reason for specifying Private investment in the form of fixed capital as a share of GDP is to exclude financial investments and inventories, and thereby emphasize on investment in equipments and factories which are necessary to economic growth.

[15] To measure monetary uncertainty and quality of labor force (initial condition of human capital investment), standard deviation of inflation and primary school enrollment were respectively employed. Feng, (2001)

Le, (2004) examined the political and economic determinants of private investment for 25 developing countries for the period 1975-95.[16] Le, (2004), produced two types of sociopolitical instability variables by factor analysis; the first factor, collective protests incorporates riots, general strikes and antigovernment demonstrations, while the Second factor, violent uprisings and internal crackdowns that includes guerrilla warfare, purges and assassinations. For policy uncertainty variable, variations of contract enforcement, and relative political capacity (measuring government political capacity to implement policies) were used. Employing Feasible Generalized Least Square (FGLS), Le (2004) found that collective protests, constitutional regime change, relative political capacity and contract intensive money promoted investment and significant. Furthermore, violent uprisings, unconstitutional regime change, and variances of; relative political capacity, contract intensive money and inflation found to have negative impact on private investment (except inflation all are statistically significant). Le, (2004)

Other studies (Erden and Holcombe, 2006; Wai and Wong, 2007; Sudeshna et al, 2011; Zouhaier and Karim, 2012; Escaleras and Kottarid, 2014) have analyzed the culprits causing private investment fluctuation in the context of developing countries. Using a co-integration analysis for a panel of 54 developing countries over the period 1970 to 1998, Erden and Holcombe, (2006), examined the private-public investment relationship. They specified the dependent variable real gross private investment to be determined by real GDP, real gross public investment, real bank credit to the private sector, macroeconomic uncertainty (measured by constructed first principal components of the conditional variances of real GDP growth, real exchange rate and inflation rate obtained from GARCH (1,1) estimation. Their finding shows that, in the long run real GDP and real public investment promotes investment, while macroeconomic uncertainty and real interest rate are found to have negative impact on private investment. Furthermore, in the short run real public investment and credit availability positively related to private investment, while the long-run effects of real GDP, macroeconomic uncertainty and real interest rate turns out to be insignificant. Erden and Holcombe, (2006)

[16] Le, (2004), identified sociopolitical instabilities as internal uprisings, violent and non-violent protests that could possibly destroy physical capital, displace human capital, reduced job opportunities, disruption in personal saving, shifting assets to liquid and speculative forms and thereby declined investment. Further, Le, (2004), considered constitutional and unconstitutional regime change in the executive for regime change instability.

Using the modified version of the flexible accelerator model and OLS estimation for each country, Wai and Wong, (2007) analyzed the determinants of private investment for five developing countries.[17] They found that the effects of net capital inflow to the private sector, government investment, change in the bank credit to the private sector and private sector output were positive and statistically significant. Wai and Wong, (2007)

Moreover, employing 2SLS (two stage least square) estimation in which investment and sociopolitical stability are jointly determined, Sudeshna et al, (2011), for a panel of 128 countries spanning from 1994 to 2005 analyzed sociopolitical determinants of private investment. The choice variables considered for sociopolitical instability were ethnic tension, internal conflict, external conflict, government stability, law and order, military in politics, and religious tensions.[18] They further incorporated macroeconomic (real GDP, education, trade openness), demographic (population) and institutional (polity, i.e., institutional factor taking a score from +10 to -10, representing a functional democracy) culprits in their model. Sudeshna et al, (2011), from their finding discussed that sociopolitical stability promotes investment, .i.e. a unit increase in sociopolitical stability resulted in 4.313 increment in investment to GDP ratio. And also real GDP growth and education are found to have positive and statistically significant effect on private investment, while population growth and polity turns out with negative sign and significant, and thus Sudeshna et al, (2011), forwarded that unstable business environment impends not only foreign investment, but also leads to capital flight. Sudeshna et al, (2011)

Another notable study was conducted by Escaleras and Kottarid, (2014), which analyzed the joint effects of macroeconomic uncertainty, sociopolitical instability and public provision on private investment for a panel of 37 developing countries spanning from 1970 to 2000. Besides

[17] Their sample excludes Africa and considers Greece (1960-76), Korea (1960-75), Malaysia (1961-71), Mexico (1965-75) and Thailand (1961-75).

[18] Sudeshna et al, (2011), constructed an index using principal component analysis to seven sociopolitical variables: Ethnic tension, measuring the degree of tension related to racial, language or nationality divisions; Internal conflict, a measure of the political violence such as coups, civil wars and terrorisms; External conflict, representing violent and non-violent from foreign action to the incumbent government; government stability, proxy for government policy credibility and its ability to stay in office; law and order, assessment of the judiciary and popular obedience to the law; military in politics, measuring the participation of the military in the government; religious tensions, a proxy for instability due to religious wars and suppressions.

the standard macroeconomic variables, to measure macroeconomic uncertainty, inflation and exchange rate volatility were considered. And to account for sociopolitical instability; social variables, (such as assassinations, general strike, guerrilla warfare, purges, riots, revolutions), and political variables (anti-government demonstrations, regime change and constitutional changes) were considered. Moreover, Escaleras and Kottarid, (2014), included, real public investment and infrastructural index in modeling private investment. Employing system GMM, their findings show; measures of macroeconomic uncertainty, social unrest variable (riots and general strikes), all political variables, and real public investment, real interest rate negatively impacted private investment and statistically significant, while real GDP turns out be significant and positive. Escaleras and Kottarid, (2014)

Various empirical studies emphasizing on the determinants of private investment in Africa have been conducted. Among others, Oshikoya, (1994) analyzed the macroeconomic determinants of domestic private investment for seven African countries spanning from 1970-1988.[19] By estimating OLS on a separate pooled data for middle income and low income African countries, Oshikoya, (1994), found that real GDP, public investment, and credit availability with positive sign and significant (except real GDP) for both country classification, while external debt burden (with negative sign and significant) and terms of trade turns out to be positive but insignificant. Further, the estimated coefficient of real exchange rate turns out to be significant with positive sign (middle income countries) and negative (low income countries), while interest rate with negative sign (and significant) for low income countries, but insignificant for middle income countries. Moreover, the coefficients of variations of real GDP, money supply and real exchange rate (proxies for uncertainty) found to have significant (except for variation of money supply) and negative effect on private investment. Oshikoya, (1994)

In analyzing the financial determinants of domestic investment for a panel of 30 Sub Saharan Africa countries spanning from 1970 to 1995, Ndikumana, (2000), specified the dependent variable (total gross domestic investment as a percentage of GDP) to be determined by

[19] Oshikoya's (1994) sample includes middle income countries (Cameroon, Tunisia Mauritius and Morocco) and low income countries (Kenya, Malawi, and Tanzania)

measurements of financial development and other relevant variables.[20] Results from the fixed effect model estimation reveals that total liquid liabilities of the financial system as a ratio of GDP, total private sector credit provided by banks as a share of GDP, total domestic credit availed by banks as a percentage of GDP, a composite of financial development index, real GDP growth, and trade openness were positive and significantly determine domestic investment fluctuations, while credit to the public sector found to have a negative effect and significant. Further, the result shows that debt stock, debt service, inflation and the black market premium negatively impacts investment, while government consumption and interest rate turns out to be insignificant but with negative sign. Ndikumana, (2000)

Another line of study by Bleaney and Greenway, (2000), examined the impacts of volatility of real exchange rate and terms of trade on investment for a sample of 14 spanning from 1980-95. They used GARCH (1,1) to estimate the volatilities of real exchange rate and terms of trade, and the fixed effect model estimation result shows lagged dependent variable (lagged investment as a ratio of GDP), terms of trade and real GDP positive and significant, while real exchange rate volatility found to have a negative and significant effect on private investment. Further, terms of trade volatility turns out to be insignificant. Bleaney and Greenway, (2000)

Employing Generalized Least square (GLS), Ghura and Goodwin, (2000), analyzed the determinants private investment for a panel of 37 SSA, Asia and Latin America countries over the period 1975 to 1992. Their finding reveals that on a full sample result, real GDP growth, government investment, decline in world interest rate, financial deepening, and education were significant and positive, while domestic credit to the public turns out to be negative and significant. Moreover, domestic credit to the private sector, inflation and real exchange rate appears to have insignificant effect on private investment. Furthermore, Ghura and Goodwin, (2000), on cross regional result, discussed that Sub Saharan Africa highly affected by external shock (world interest rate), and the effect of real GDP appears to be insignificant. And also

[20] To account for financial development, Ndikumana, (2000), considered variables such as total liquid liabilities of the financial system as a ratio of GDP, total private sector credit provided banks as a share of GDP, total domestic credit availed by banks as a percentage of GDP, the claim on government and other public entity, and a composite of financial development index. And also other relevant variable considered were real GDP, inflation rate(the growth rate of the GDP deflator), banks lending rate, government consumption as a share of GDP, trade openness, total debt and debt service payment (as a percentage of GDP).

complementarily link between public and private investment holds for SSA, while the effect of external debt turns out insignificant and freedom index with significant negative impact on private investment. Ghura and Goodwin, (2000)

(Sioum, 2002), by employing random effect Feasible Generalized Least Square (FGLS), analyzed determinants of private investment, and public policy for a sample of 33 Sub Saharan African countries spanning from 1970 to 1998. (Sioum, 2002), specified the dependent variable (private investment) to be determined by standard macroeconomic variables, macroeconomic instability and sociopolitical instability.[21] The estimated coefficients of lagged per capita GDP, growth of per capita GDP, private sector credit, debt to GDP ratio, and export (measure of import capacity) turns out positive and significant in explaining investment fluctuations in SSA. Further, debt service, and measures of macroeconomic instability (terms of trade and real exchange variability) found to have negative effect and significant, while public investment, credit to the government, inflation volatility and growth volatility were insignificant with negative sign. Interestingly the estimated coefficients of measures of sociopolitical instability were negative but insignificant. (Sioum, 2002).

Fowowe, (2011), by employing system GMM examined the effect of financial sector reform on private investment for a sample of 10 African countries spanning 1980 to 2006. Estimated coefficients of financial reform index and output growth were positive and significant, while public investment and measures of macroeconomic instability (inflation rate volatility) sought to have a negative effect on private investment and significant. (Fowowe, 2011) Further study on the link between financial development and private investment for a panel of 18 SSA spanning from 1991 to 2004 was conducted by Misati and Nyamongo, (20011). Estimation results from the fixed effect model shows that lagged dependent variable (lagged private investment), GDP growth, private sector credit and informal economy promoted private investment in SSA and significant. While fiscal deficit and interest rate on deposit appears to be significant and negative,

[21] The standard macroeconomic variables includes per capita GDP, growth of per capita GDP, private sector credit, debt to GDP ratio, debt service, export (to measure import capacity), public investment, and government credit. Further to account for macroeconomic instability, terms of trade variability, real exchange variability, inflation variability, and growth variability were considered. Moreover, measures of sociopolitical instability such as guerilla warfare, assassinations, riots, revolutions, government crisis, constitutional change, strikes coup d'état, and purges were included. Sioum, (2002)

public investment and institutional factors (check and balance, and economic freedom) turns out to be insignificant with negative signs. Moreover, corruption perception index was insignificant, but still with expected sign (positive). Misati and Nyamongo, (20011)

(Chuku, Onye, & Kenneth, 2015), examined the structural and institutional determinants of private investment for a panel of 22 African countries spanning from 1980 to 2011. The choice variables they considered were real GDP growth, government consumption, trade openness, inflation, real interest rate, financial openness index, human development index, domestic credit to the private sector to GDP ratio, institutional quality, institutional structure, and business environment.[22] Employing system GMM estimation (Chuku, Onye, & Kenneth, 2015) found that economic size, economic growth, interest rate, inflation, and government consumption were statistically insignificant, while financial openness turns out as the main structural determinant of private investment. Moreover, institutional quality and structure, and business environment sought to have positive effect on private investment and statistically significant. (Chuku, Onye, & Kenneth, 2015).

Ouedraogo et al, (2019), analyzed public-private investment nexus for a panel of 44 SSA countries spanning from 1960 to 2015. Employing a pooled time series-cross sectional approach, Ouedraogo et al, (2019) confirmed that GDP per capita, public investment and credit availability sought to have positive effect on private investment in SSA, while terms of trade shock turns out with a negative sign. On the other hand the Mean Group estimators, including Mean Group (MG), Augmented Meant Group (AMG) and the Common Correlated effect Mean Group (CCEMG) result revealed that public investment is found to have a positive (significant), negative (significant), and insignificant impact based on the above stated estimation techniques.[23] Ouedraogo et al, (2019)

[22] Quality and structure of institutions in terms of contract enforcement, rule of law, judicial system, property rights and business environment (data from polity IV project data base). And for the human development index was based on Barro and Le (2013) to represent human capital index. Chuku et al, (2015)

[23] Those countries with complementarily experiencing the relationships between public and private investment were Angola, Botswana, Democratic Republic of Congo , Central African Republic, Côte D'Ivoire, Liberia, Ethiopia, Gabon, Ghana, Kenya, Mozambique, Chad, Mauritania, Malawi, Nigeria, Rwanda, Sudan, Sierra Leone, São Tomé and Príncipe, Swaziland, and Tanzania. Farther, crowding out effects of public investment was observed in countries; Cabo-Verde, Equatorial, Seychelles, Guinea, Madagascar, Mali, Niger,and Zambia.

(Iheonu, 2019), analyzed governance-domestic investment nexus for a panel of 16 African countries over the period 2002 to 2015. (Iheonu, 2019), specified the dependent variable (gross fixed capital formation) to be determined by macroeconomic variables (real GDP growth, exchange rate, and real interest rate) governance indicators (political stability, voice and accountability, government effectiveness, regulatory quality, rule of law, and control of corruption from World Governance Indicators). [24] The estimation result of the fixed effect GMM estimation reveals that political stability, voice and accountability positively linked to domestic investment and significant, while government effectiveness turns out insignificant (with positive sign). Further, the estimated coefficients of regulatory quality, control of corruption, and real GDP growth were positive and statistically significant in explaining domestic investment fluctuations in Africa, while exchange rate and inflation rate were insignificant. (Iheonu, 2019).

Ngoma et al, (2019), for a panel of 35 Sub Saharan Africa countries, spanning from 2000 to 2017, examined the macroeconomic determinants of private investment. They specified the dependent variable as private gross fixed capital formation as a share of GDP to determine by GDP growth, real interest rate, inflation rate, domestic credit to the private sector to GDP ratio, government debt to GDP ratio, and public investment. Employing the Panel Corrected Standard Error (PCSE), Ngoma et al, (2019) found that statistically significant link between private investment and GDP growth, Public investment, interest rate, and inflation (except real GDP growth all other being negative). Other explanatory variable included appears to be insignificant. Ngoma et al, (2019). Another line of research by (Mose, Jepchumba, & Ouru, 2020), employing system GMM for Kenya, Ruanda and Burundi spanning from 2009-2018, identified private investment as a percentage of GDP positively linked to real GDP per capita, domestic credit to private sector and statistically significant. Further, (Mose, Jepchumba, & Ouru, 2020), confirmed the existence of crowding out effect of public investment on private investment for the selected African countries.

Moreover, insignificant effect of public investment was observed in countries; Benin, Guinea-Bissau, Republic of Congo, Namibia, Cameroon, and Togo.

[24] Chimere et al, (2019), constructed Principal Components for the governance indicators into political governance (political stability and voice and accountability), Economic governance (government effectiveness and regulatory quality), and Institutional governance (rule of law and corruption level).

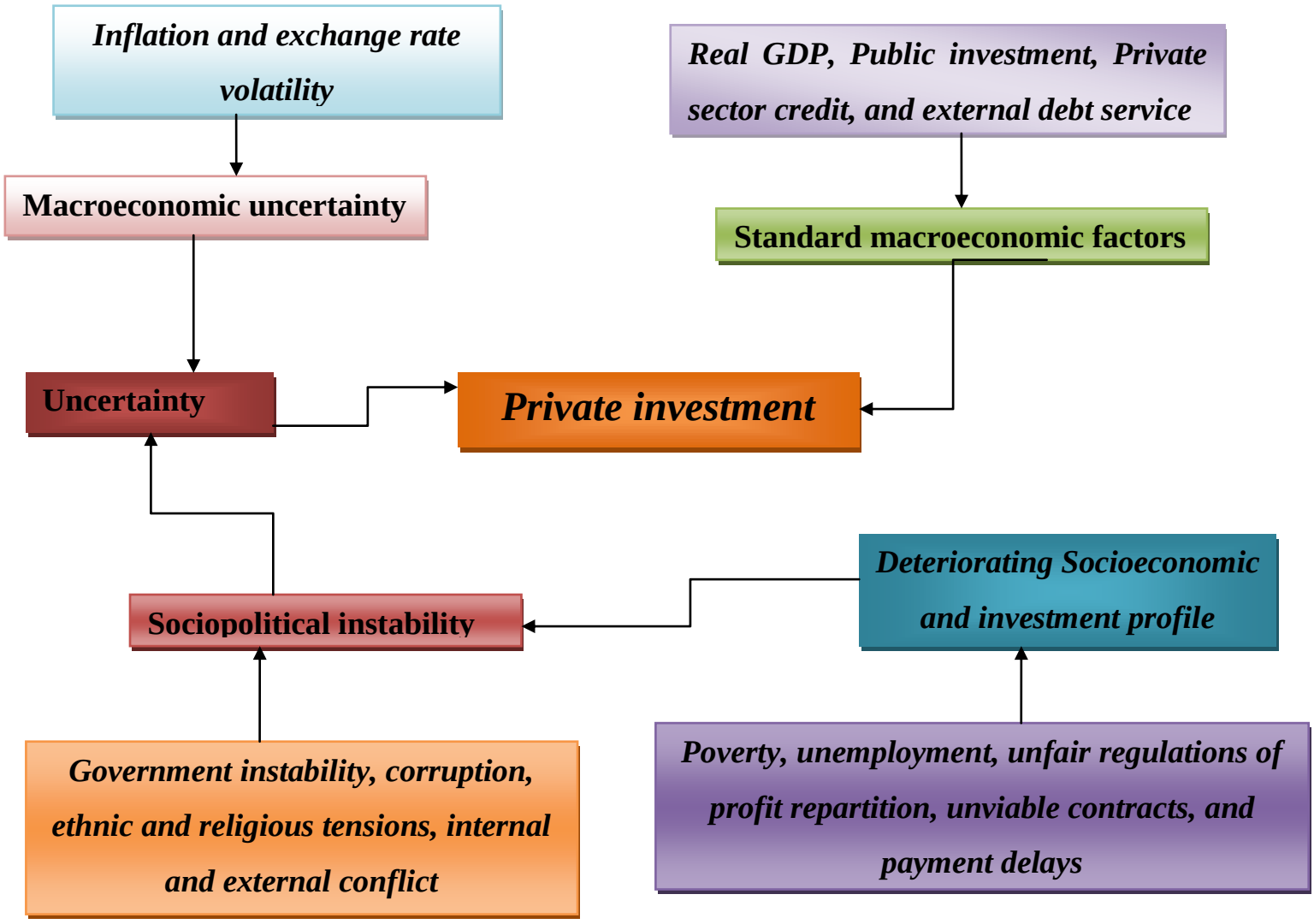
A more recent study by Asongu et al, (2020), examined financial and institutional determinants of private investment for a panel of 53 African countries over the period 1996 to 2010. The dependent variable (private investment to GDP ratio) was specified to be determined by governance indicators, GDP growth, inflation, trade openness, financial system deposit to GDP ratio, financial system credit, private sector credit, and deposit bank assets.[25] Employing system GMM estimation, Asongu et al, (2020), found that all the governance indicators were statistically significant and positively linked to private investment, whilst financial depth turns out insignificant. Further, inflation, trade openness, and economic growth were significant in explaining private investment fluctuations in Africa (except inflation all with positive sign). Asongu et al, (2020)

[25] Since there is a possibility of correlation among the governance indicators, Asongu et al, (2020), used principal component analysis (PCA) and constructed components into; political components (encompassing political governance, and voice and accountability), economic components (incorporating regulatory quality and government effectiveness), and institutional components (rule of law and control of corruption). Principal components analysis (PCA) is a statistical approach usually used in applied econometrics to minimize a large set of correlated indicators into a smaller component variables called principal components. Asongu et al, (2020).

2.4. Conceptual Framework

Based on the existing theoretical and empirical literature on the determinants of private investment, this study incorporates uncertainty culprits alongside standard macroeconomic determinants. Standard macroeconomic variables, such as real GDP (capturing the accelerator effects of output), public investment (to track down the crowding in and/or out effect), private sector credit, and external debt service (to capture the disincentive effect) are considered. Furthermore, uncertainty in terms of macroeconomic uncertainty and sociopolitical instability are included. The following diagram, figure 2.1 shows the conceptual framework developed for the analysis of private investment determinants emphasizing on uncertainty variables.

Figure 1 Conceptual framework ***(own formulation based on analytical and empirical review)***



Chapter Three

Methodology and Model Specification

It has been discussed in chapter two that the basic investment theoretical models defined in the context of industrial economies should be modified in the context of developing countries. In this section, we presented the modified specification of investment model, definitions of variables, the data source and type, and estimation methodology.

3.1. Model Specification

In order to identify whether uncertainty (represented by macroeconomic instability and sociopolitical instability) explains investment fluctuations in Sub Saharan Africa, and changes the relative importance of the standard regressor's two specifications are made. Specification one is based on uncertainty variables (macroeconomic uncertainty and sociopolitical instability variables). Following the existing empirical literatures [Aizenman and Marion, (1995); Hadjimichael and Ghura (1995); Bleaney and Greenway, (2000); Serven (1998); Feng, (2001); Admasu, (2002) Le, (2004); Pal et al, 2011; Escaleras and Kottarid, (2014)] two macroeconomic uncertainty variable and measures of sociopolitical stability variables are identified. In this respect, implied volatilities of inflation rate and exchange rate serves as a proxy for macroeconomic instability, whereas ethnic tension, internal conflict, external conflict, investment profile, socioeconomic conditions, corruption, bureaucratic quality government stability, law and order, military in politics, and religious tensions were used to construct an index representing sociopolitical stability. The model can be given as follows:

$$PI_{it} = f\left(PI_{i,t-1}\ \sigma_{it}, Z_{it}\right) + U_{it} \quad \ldots\ldots\ldots (1)$$

Where, PI_{it} is private investment, $PI_{i,t-1}$ is the lagged dependent variable, σ_{it} denotes a vectors of volatility measures of inflation and exchange rate and Z_{it} denotes an index of sociopolitical stability.

Added to the macroeconomic uncertainty and sociopolitical variables, model two incorporates variables based on the neoclassical flexible accelerator model which includes the standard explanatory variables modified in the context of developing countries. Based on the theoretical

and empirical background, real GDP, private sector credit, public investment, debt stock and debt service are specified in model two to explain private investment variations in SSA.

Real GDP per capita and its growth is included to capture the accelerator effect, and private sector credit on the other hand, empirically proved to be a major determining culprit of private investment in Africa (see Asongu et al, 2020;), which is part of the indicators in the financial development process. On the other hand, the inclusion of Public investment is to trace the crowding out and/or crowding in effects, while in order to find out the disincentive effects of debt burden, debt stock (which enters the model with debt service) is included. The same specification can be found in many empirical studies [see Greene and Villanueva, (1991); Oshikoya (1994); (Khan & Kumar, 1997); Serven 1998; Ghura and Goodwin, (2000); Feng, (2001) Admasu, (2002); Wai and Wong, (2007); Fowowe, (2011); Escaleras and Kottarid, (2014); Ngoma et al, (2019); Asongu et al, (2020)] And thus model two is given as follows:

$$PI_{it} = f\left(PI_{i,t-1}, \sigma_{it}, Z_{it}, X_{it}\right) + U_{it} \quad \ldots\ldots (2)$$

Where, X_{it} denotes a vectors of the above listed standard macroeconomic variables and U_{it} is the disturbance error term.

3.2. Definitions of Variables

In a panel data econometric analysis the determinants of private investment modeling, a modified neoclassical accelerator model is specified. The dependent variable of interest private investment is measured by gross fixed capital formation by the private sector (in billions of constant 2011 dollar). The advantage of employing private investment in the form of fixed capital formation is, first its emphasis on investment in equipment or factories which are considered as essentials for economic growth. And secondly, several studies (see Pastor Jr and Sung, 1995; Serven, 1998; Feng, 2001; Escaleras and Kottarid, 2014; Ngoma et al, 2019; Asongu, et al, 2020) used the same measure for the dependent variable specified in their studies. In relation to the explanatory variables, three categorization is made; standard macroeconomic determinants, macroeconomic instability, and sociopolitical stability variables.

Under the first categorization, standard macroeconomic variables, national output measured by real GDP which is inflation adjusted reflecting the values of all goods and services an economy

produces in base year prices (constant prices). As suggested by neoclassicalists, real output growth rate is positively linked to investment implying the change in aggregate demand for output which investors seek to meet. Several studies findings are consistent with the accelerator effects of output growth, and thereby established positive link between output growth and investment (Greene and Villenueva, 1991; Oshikoya, 1994; Ghura and Goodwin, 2000; Ndikumana, 2000; Sudeshna Pal et al, 2011; Escaleras and Kottarid, 2014; Asongu, et al, 2020). Further public investment enters the model as general government investment (gross fixed capital formation in billion constant 2011 dollars). Compared to the industrial economies, public investment plays a key role in developing countries; however, it is important to consider the issue of substitutability and complementarities between private and public investment. Theoretically it is discussed that net effect of public investment is indeterminate (crowding out and crowding in effect could take place at a time). Empirical evidence on public-private investment is mixed and shows the theoretical ambiguity [Blejer and Khan (1984); B. Balasa (1988); P. Lauman (1990); Greene and Villanueva, (1991); Oshikoya (1994); Khan and Kumar, (1997);Ghura and Goodwin, (2000); Feng, (2001) Admasu, (2002); Wai and Wong, (2007); Fowowe, (2011)][26]

Credit to the private sector is another major culprit when come to private investment determinants in developing countries in general and Africa in Particular. It is the financial resource availed to the private sector in the form of loans and advances, trade credits, and other account receivables establishing claims for repayment. (Olowofeso, Adeleke, & Udoji, 2015). Private sector credit reflecting domestic asset allocation possibly increases the activities of the private sector and thereby private investment. Since it is not possible for business agents to acquire funds from the debt market directly, they highly depend on the bank credit that remained substantial sources of financing their investment projects. And also, irrespective of the capital cost, availability and provision of loanable funds probably impacts investment decisions

[26] Given the scarceness of physical and financial resources in developing countries, public sector investment employs these resources that could have been availed to the private sector. Further, sources of financing (debt, tax, etc) possibly either crowds on and or crowds out private investment. And also governments of direct involvement in the productions of goods and services may put influence on private goods demand and thereby private investment. Moreover, consideration of crowding in or out is necessary the face of developing countries governments engagement in the provision of major infrastructure (see Greene and Villanueva, 1991).

(Chirinko, 1993; Oshikoya, 1994). In this regard following the consistent empirical evidence, positive link between credit to private sector and private investment is established. Furthermore, the reason for the inclusion of debt burden in the investment model as a key variable is to confirm the argument that debt overhang and private investment are negatively linked due to the fact that investors anticipation of confiscatory taxes in order to finance the debt service payment in the future, which makes expected returns uncertain for investors. Empirical studies on debt-private investment nexus using debt to GDP ratio as a proxy for debt overhung have found negative association (Serven, 1998; Greene and Villanueva, 1991; Ghura and Goodwin, 2000; Admasu, 2002).

The second category comprises of proxy variables for macroeconomic uncertainty such as standard deviation's of exchange and inflation rate. Available empirical studies on uncertainty-investment nexus attempt to employ volatility of relevant variables (usually relative prices) as a proxy for measuring uncertainty in modeling investment. Inflation rate volatility is considered as a proxy for macroeconomic instability that could possibly deters private investment by distorting information contents of relative prices and thus raising the risk associated to long term investment. In this regard, (Serven, 1998) confirmed the negative effect of inflation rate volatility on private investment, but (Sioum, 2002) for a panel SSA countries found statistically insignificant effect signifying the fact that the need for more scrutiny in the area. Through its effect on relative price of capital goods, exchange rate volatility affects profitability because investment goods are combinations of domestic (infrastructure or construction) and foreign (equipment and machinery) components. And the existing empirical studies shows the responsive nature of exchange rate confirmed by (Serven & Solimano, 1991), Bleaney and Greenway (2000) and Sioum, (2002) found a deterring effects of exchange rate volatility on private investment.

The third category is sociopolitical stability measures based on 'sociopolitical stability risk rating' of the International Country Risk Guide (ICRG) ratings which captures both social and political attributes. And this study utilized an index of sociopolitical stability constructed from twelve components. The sociopolitical risk rating is based on 0 - 100 points with the highest point indicating the lowest the potential risk (relatively stable sociopolitical environment), and more specifically risk rating points which less than 50 points are assigned the 'very high risk', 50

– 60 points as ‘high risk’, 60 – 70 is the ‘moderate risk’, 70 – 80 as ‘low risk’ and risk rating points between 80 – 100 falls under ‘very low risk’. The twelve components are: government stability, investment profile, socioeconomic condition, internal conflict, external conflict, ethnic tension, religious tension, corruption, military in politics, democratic accountability, and bureaucratic quality.

Moreover, government stability is based on the assessment of government’s ability to stay in an office and carry out its declared program; and particularly with sub components of government unity, legislative strength, and popular support, and each sub component with 0 – 4 points making government stability maximum points to 12 points. On the other hand, socioeconomic conditions (with 12 maximum points) denoting the socioeconomic pressures in the society at work that could possibly constrain government action and fuel social dissatisfaction; and the sub components are unemployment, poverty, and consumer confidence with 0 – 4 points for each sub component.

Further, the risk rating assigned to the investment profile is based on three components of contract viability, profit repartition, and payment delays indicating factors influencing the risk to invest each sub component with 0 – 4 point, and thus the maximum point assigned to investment profile is 12 points. Internal conflict (12 points maximum) on the other hand is an assessment of political violence’s and its impact on governance, and the sub components are civil war, coup threat, terrorism, and civil disorder. And external conflict measures the risk to the existing government from foreign action characterized by non-violent external pressure (diplomatic pressure, trade restriction, withholding of aid, sanctions, territorial disputes etc) and violent external pressure (war-cross border conflict).

Furthermore, corruption (maximum of 6 points) is an assessment of the prevailing corruption in the political system with its common forms of nepotism, excessive patronage, favor-for-favor, job reservation, close ties between politics and business, and secret party funding. On the other hand, the fact that the military is not elected by anyone its involvement in politics is against democratic accountability, and maximum of 6 point is assigned. Moreover, religious tension (maximum of 6 point) is measured domination of governance and/or society by a single religious group seeking to replace civil laws and to exclude others in the social and/or political process.

Besides, ethnic tension measures the extent of tensions due to nationality, racial, and language conflict and the associated rating is 6 points.

On the other hand, law and order (6 points on maximum) form a single component, albeit its two components are assessed separately; law is measured by the impartiality and strength of the legal system, while order is captured by the popular observance of the law. Besides, democratic accountability (maximum of 6 point) measures the responsiveness of governments to their people and basically the types of governance considered in the risk rating are alternating democracy, dominated democracy, de-facto one party state, de-jure one party state, and autocracy. And finally, bureaucratic quality (maximum of 4 point) is the measures of institutional strength and quality of bureaucracy. And the composite sociopolitical stability index this study utilized is based on the above stated variables on the basis of 0 – 100 points. In this regard, Sudeshna Pal et al, 2011 using the ICRG sociopolitical stability rating confirmed the existence of deterring effects of sociopolitical instability on private investment.

3.2.1. Measuring Macroeconomic Uncertainty

Since most of the empirical studies (see Serven, 1998; Bealney and Greenway, 2000; Feng, 2001; Admasu, 2002; Escaleras and Kottarid, 2014) used the implied volatilities of exchange rate and inflation rate, following the above stated works this study employed these implied volatility measures to proxy macroeconomic uncertainty. With regard to the model to be used in the estimations of uncertainty, Generalized Autoregressive Conditional Hetroskedasticity (GARCH) estimation technique is considered. Let $Z_{t-1} = \mathcal{J}(X_{t-1}, X_{t-2}, X_{t-3}, \dots)$, where X= real exchange rate and inflation rate denoting information set available at $t-1$. Based on Z_{t-1}, $\epsilon_t = X_t - E[X_t \mid Z_{t-1}]$, which is the difference between $X_t$and its best prediction made at $t-1$.

For the implementation of GARCH model let $E[X_t \mid Z_{t-1}]$ be given by:

$E[X_t \mid Z_{t-1}] = \Phi_0 + \Phi_1 X_{t-1}$…….. (1) And $\epsilon_t = \sum_t^{1/2} u_t$

So that these variables are assumed to be multivariate autoregressive of order one [VAR (1)] and further $\sum_t$ is assumed to follow first order difference equation. Thus the estimated model is given by:

$X_t = \Phi_0 + \Phi_1 X_{t-1} + \epsilon_t$…….. (2)

$\sum_t = \delta_0 + \delta_1 \sum_{t-1} + \beta_1 \epsilon_t \epsilon_t'$ ….. (3) And $u_t \sim i.i.d(0, I)$

Where X_t and ϵ_t are vectors; Φ_0 and δ_0 are parameter vectors; $\sum_t$ is the conditional variance matrix of ϵ_t; I is an identity matrix; $\Phi_1, \delta_1, and\ \beta_1$ are parameter matrices. This is a generalized autoregressive conditional heteroskedasticity GARCH (1, 1) model (Bollerslev, 1986), and the parameter matrices for the model is be $\theta = (\Phi_0, \Phi_1, \delta_0, \delta_1, \beta_1)$ which is estimated by maximum likelihood estimation. By applying model (2, 3) estimation is made, and once the parameters are obtained, $\sum_t^{1/2}$ is estimated and used as uncertainty measure for exchange rate and inflation rate. We applied equation 2 and 3 to each country separately.

3.3. Data

As mentioned above in analyzing the determinants of private investment emphasizing on the macroeconomic uncertainty and sociopolitical stability, this study exploited panel data for a sample of 26 Sub-Saharan African countries spanning from 1986 to 2016.[27] The data set that we used is primarily retrieved from online data base of World Bank; World Bank Development Indicators and African Development Indicators (for real GDP and its growth, private sector credit, exchange rate, debt service, and period averaged inflation rate). And for the private investment and public investment variables we used data from IMF Fiscal Affairs department. Further, for the sociopolitical stability measures we employed International Country Risk Guide (ICRG) ratings for sociopolitical stability

[27] The selection of countries (cross-section) and time series is made based on the availability of data. And the lists of countries included are: Angola, Botswana, Burkina Faso, Cameron, Congo DR, Cote d'Ivoire, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Malawi, Mali, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Togo, Uganda, Zambia, and Zimbabwe.

3.4. Estimation Methodology

This study is based on a dynamic panel models, and Panel data estimation, which comprises cross sectional-time series components, enables us to employ a richer analytical and more flexible method which actually requires advanced techniques of estimations. In what follows, this study is based on a dynamic panel data study of determinants of private investment with an emphasis on macroeconomic uncertainty, sociopolitical stability, and standard macroeconomic variables in SSA. In a dynamic model lagged endogenous variables are/is included to explain the variation in the dependent variable, i.e., the introduction of past lagged dependent variable in addition to macroeconomic and sociopolitical variables is to capture inertia and enables us to test the persistence of private investment growth in SSA in the period under consideration.

Regarding the econometrics estimation, this study closely follows the works of Escaleras and Kottarid, (2014) and Acemoglu et al, (2019) in which dynamic (linear) panel model is employed in formulating the main estimated equation. And the base line dynamic panel model that will be estimated takes the form:

$$PI_{i\,t} = \lambda PI_{i\,t-1} + X_{i\,t}\beta + V_j + \theta_t + \varepsilon_{i\,t} \; = \ldots\ldots\ldots\ldots\ldots (3.9)$$

Where $PI_{i\,t}$ is private investment as a percentage of real GDP, $PI_{i\,t-1}$ is lagged dependent variable, and $X_{i\,t} = (x_{i\,t}, \sigma_{i\,t}, Z_{i\,t})$ denoting a row vector comprising of standard macroeconomic variables, uncertainty measures, and sociopolitical instability measures. And thus $x_{i\,t}$ denotes the standard macroeconomic variables included based on theoretical and empirical background, $\sigma_{i\,t}$ is uncertainty measure, and $Z_{i\,t}$includes sociopolitical variables. V_j and $\theta_t$represents country specific and year fixed effect respectively, while $\varepsilon_{i\,t}$ denotes a random noise, and our parameter of interest are λ and β (column vector). . $i = 1, 2, 3, \ldots, N$ and $t = 1, 2, 3, \ldots, T$ subscripts reflecting the cross section-time series data dimensions.

As in Acemoglu et al, (2017), our model of interest is estimated based on the standard sequential exogeneity assumption and no endogeneity problem. Endogeneity problem arises when the explanatory variables are jointly determined with private investment. And further, no serial correlation among the error term is another assumption made. As discussed above, this study closely follows the works of Escaleras and Kottarid, (2014) and Acemoglu et al, (2017), and thus

we start our estimation of the model first employing the standard within estimator for a dynamic model with fixed effects.

Unlike Acemoglu et al (2017), in order to correct some of the problems of difference GMM estimator possess, this study utilized forward orthogonal deviation (FOD) and system GMM estimation method. The main difference between difference GMM and FOD is on how the variables are differenced to drop the time-invariant component in the model. In difference GMM, the model is transformed by differencing t-1 from t, while FOD estimator which is proposed by Arellano and Bover (1995) transforms the data by deducting the average values of all future values from that of current observation and this approach is more helpful particularly in retaining more data points when faced with unbalanced data with gaps.

The motivation behind employing GMM is that it serves as a further proof of robustness of our first estimation and more importantly it is with an intention of avoiding the possibility of "Nickell's bias" which is related to the employing of within estimator for a dynamic panel model. Nickell (1981), noted that using OLS estimator for a dynamic model with fixed effects possibly produces biased and inconsistent parameter estimates, and thus such models are more suitably can be estimated employing GMM estimation.

Notwithstanding, system GMM differs from difference GMM in the types of internally generated instrumental variables it employs. As a type of instrumental variable estimation method, difference GMM employs lagged levels to be instruments to differenced variables. On the other hand, system GMM using differenced instruments for level lagged variable, effectively augments the difference GMM estimator and produces more appropriate outputs. Therefore, this study is based on, forward orthogonal deviation (FOD) and system GMM estimator which actually uses instrumental variables that are generated within the model. The basis for employing instrumental variables techniques is to control for possible endogeneity problem.

Furthermore, to accept the GMM estimation results obtained, we made robustness checks to the reduction of the instrument count. As discussed by Roodman (2009), if not constrained GMM estimators may result in instrument proliferation and particularly this is the case when time periods considered for the selected sample increases. Instrumental proliferation highly affects the value of parameter estimate, and also compromises the power of test for over identification, and

thus Roodman (2009) asserted that it is important for researchers in GMM result robustness testing to reduce instrument set.

Chapter Four

Result and Discussion

Under this chapter, the researcher presents the analysis of private investment, macroeconomic uncertainty, and sociopolitical stability in SSA countries utilizing different econometric techniques. In the first section (section 4.1), our discussion highly emphasizes on the descriptive statistics of the data based on the summary statistics (basics statistics) and pair wise associations of variables to provide preliminary support for the stated hypothesis. The relative importance of employing descriptive analysis in our study is motivated to indicate the presence of heterogeneity in terms of the distribution of private investment, sociopolitical stability, macroeconomic volatilities and standard macroeconomic variables across SSA countries and over time. And also it helps to understand and picture trends of our policy variables. The second (section 4.2) is the discussion of estimation results that we specified in chapter 3. In this regard, we begin with the estimation of our baseline dynamic model of the within fixed effect estimator, and then adopt forward orthogonal deviation (FOD) and system GMM estimator. In order to better understand the explanatory powers of sociopolitical stability and macroeconomic uncertainty, estimation results are presented in an incremental approach with uncertainty variables (macroeconomic and sociopolitical) followed by standard macroeconomic variables. And generally this study has exploited three estimation techniques to take advantages of each estimator and to use it as a further proof of robustness check of the obtained results.

And finally, under section three (section 4.3), we present analysis and discussions to make sense of the estimation results presented in section two of this chapter. More importantly this section discusses the channels through which sociopolitical stability, macroeconomic volatility, and other standard macroeconomic variable could affect private investment across Sub Saharan African countries and over time. Altogether, this chapter chiefly discusses and explores analysis of private investment, macroeconomic uncertainty and sociopolitical stability along with standard macroeconomic determinants of private investment based on dynamic panel model and panel dataset.

4.1. Descriptive Statistics

Let us start our discussion with the basic statistics of the dependent variable-private investment, and the right hand side explanatory variables-macroeconomic volatility (measured by inflation and exchange rate volatility), sociopolitical stability, and standard controlled macroeconomic variables shown in table *4.1(a)* of summary statistics. As presented in table *4.1(a)*, the number of observation is not the same (the highest being 806 and the lowest as 749) for all the variables under consideration implying the fact that the panel data used in the study is unbalanced panel data with missing points in the selected sample. Based on our data for the period 1986 to 2015, gross fixed capital formation by the private sector (private investment) as a percentage share of GDP in Sub-Saharan Africa countries averaged at 9.71 percent. And this figure tells the very low performance of the region compared to Africa Development Bank's (2013) recommendation of "African countries should increase domestic investment to 35% of GDP and particularly private investment to at least 23% of GDP." Further, Compared to the explanatory variables included, the standard deviation of the dependent variable (private investment) is 6.006 which is the lowest with minimum and maximum values of 0.103 % and 47.621% respectively.

Further, our measure of sociopolitical stability index [28] is based on the International Country Risk Guide (ICRG) of 'sociopolitical stability' on a 0 – 100 points rating. More specifically an index points between 80 – 100, 70 – 80, and 60 – 70 are categorized as very low risk, low risk, and moderate risk (of sociopolitical instability) respectively, whereas index points less than 50 and 50 – 60 falls under the very high risk and high risk (of sociopolitical instability) respectively. Given this categorization, an important observation is that the mean value of sociopolitical stability (53.81 point) as shown in table *4.1 (a)* of summary statistics, implies that on average the selected samples lies under the high sociopolitical instability category of 50-60 point with the minimum and maximum values of 11.67 and 78.5 points respectively. And thus it is not surprising to observe lower standard deviation of the sociopolitical stability which is 10.32.

[28] The sociopolitical stability index is based on twelve variables with social and political attributes and these variables are: government stability, investment profile, socioeconomic condition, internal conflict, external conflict, ethnic tension, religious tension, corruption, military in politics, democratic accountability, and bureaucratic quality

Table 4.1(a) Summary Statistics

VARIABLES	N	mean	Sd	min	Max
Private invest-%GDP	781.000	9.712	6.006	0.103	47.621
Sociopolitical stability	806.000	53.813	10.322	11.670	78.500
Stdeviation inflation	806.000	257.532	1,750.987	5.542	42,875.461
Stdeviation exchange	806.000	676.824	1,229.188	0.252	10,072.957
Real GDP growth	779.000	3.571	7.209	-51.031	106.280
Public invest-%GDP	780.000	5.208	4.105	0.394	27.987
Credit to private-%GDP	749.000	18.478	23.588	0.156	160.125
LnExternal debt service	769.000	20.119	20.945	-1.370	23.268

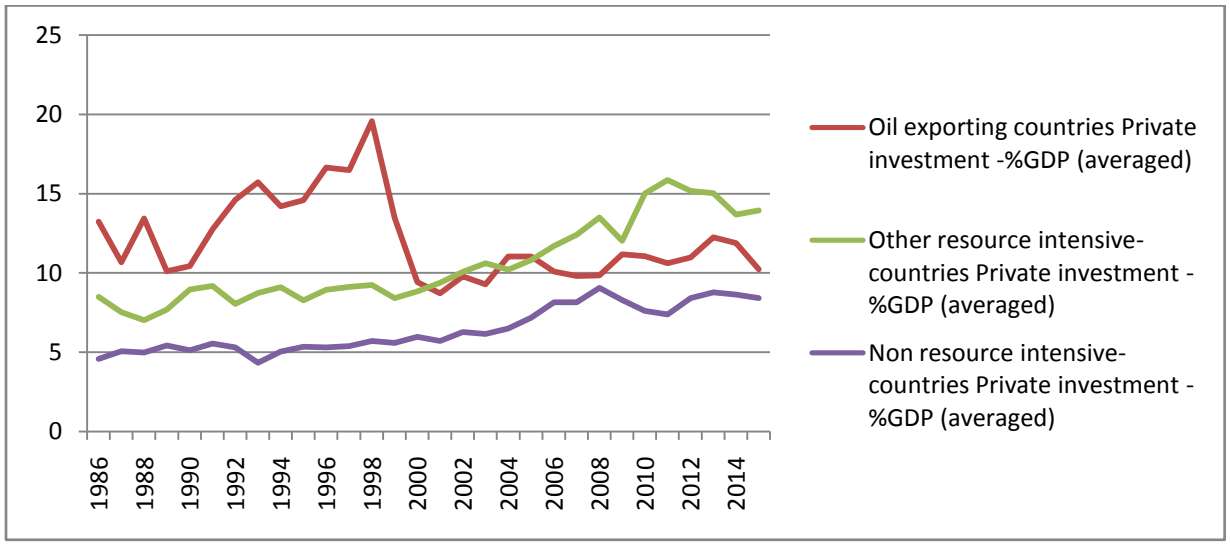
Source: *own computation using STATA*

Moreover, as shown in the summary statistics table *4.1 (a)* the standard deviation of measures of macroeconomic volatility (inflation and exchange rate volatility) is 257.5 and 676.8 respectively which is higher than the rest of the explanatory variables signifying the possibility that sociopolitical instability and the standard controlled macroeconomic variables may have non-trivial impact on private investment. Furthermore, real GDP growth in SSA for the period 1986-15 averaged at 3.57% with standard deviation of 7.21. The voluminous minimum (-51.03%) and maximum (106.25%) values of real GDP growth rate were observed in Liberia in 1990 and 1997 respectively. The possible main reasons to this extremely high real GDP growth rate were external arrears resulting in breakdown of Liberia's relation with creditors and donors internationally, and more importantly the devastating 8-year lasting civil war which came to an end in 1997. Based on table *4.1 (a)* for the period 1986-15 the mean value of public investment as a share of GDP (5.2%) is lower compared to the private investment to GDP ratio with the lowest standard deviation of 4.1 and minimum and maximum values of 0.39% and 27.98% respectively. And also, credit to the private sector as percentage of GDP in Sub Saharan African countries is found to have mean values of 18.47% signifying the underperformance of the

financial sector and the very low access to financial resources, and the minimum and maximum value of 0.15% and 160.12% respectively.

Notwithstanding, the data shows that the prevalence of heterogeneity within the region; for instance, average private investment to GDP ratio varies from Oil exporting countries (12.05%) to Other-resource intensive countries (10.56%) and the lowest performance is registered by non-resource intensive countries (7.72%) for the period 1986-15. Further, on a country specific level of some selected sample, the highest average private investment as a percentage of GDP is observed in Botswana (16.88%) followed by Gabon (16.81%), Angola (14.59%), Zimbabwe (13.78%), Zambia (13.3%), Uganda (13,18%) and South Africa (13.04%), while Guinea-Bissau (1.95%), Guinea (3.48%) and Serra Leone (4.48%) registered the lowest average private investment as a percentage of GDP. Figure 4.1(a) below shows averaged private investment as a percentage of GDP of the selected sample of Sub-Saharan African countries based on *'oil exporting', 'other resource-intensive' and 'non-resource intensive' countries* classification for the period 1986-15.

Figure: 4.1 (a) averaged Private investment as % GDP in SSA (1986 -20 15)



Source: Own computation of data obtained from IMF using WB country classification as Oil-exporting, other resource-intensive, and Non-resource intensive countries[29]

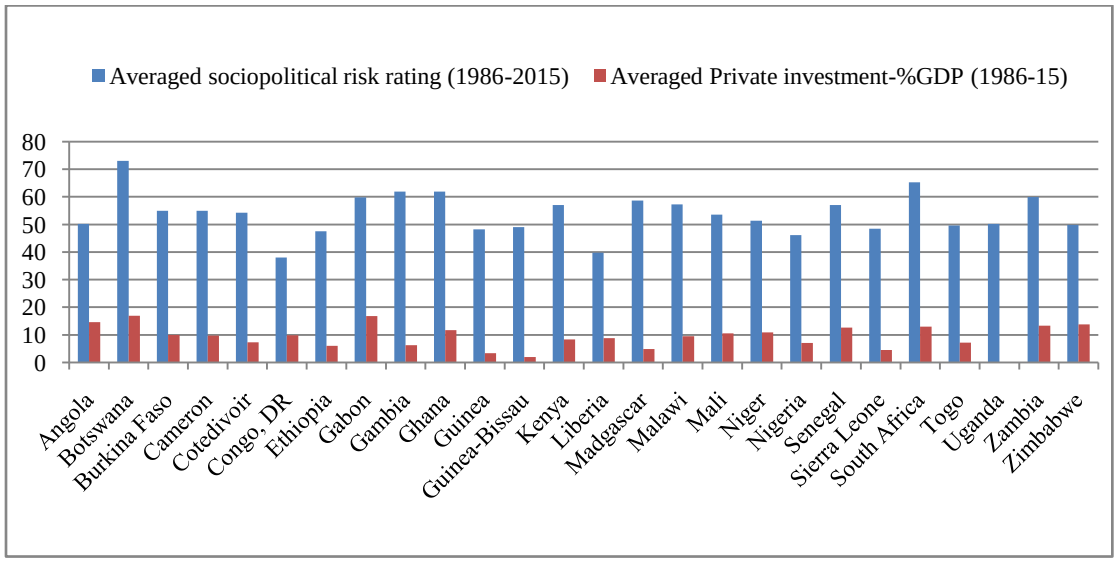
As shown in *figure 4.1(a)* above, average private investment as a percentage of GDP over the period 1986-15 in Oil exporting countries showed pronounced fluctuations compared to resource intensive and non-resource intensive countries. And particularly, average private investment as %GDP in oil exporting countries has increased continuously from 1989 to 1997 reaching its peak of 19.56%, and showed a dramatic decline in 2000 to 9.4%, and besides macroeconomic instability, this decline could be related to the persistent conflicts, civil wars, poor governance, and reduced ODA in Angola (one of the biggest economy in the oil exporting country classification) that resulted in the destruction of property, economic infrastructure, and degraded investment climate UN (2005). As shown in the figure above between 2000 – 10 average private investments for all country classification remained below 15%, and moreover non-resource intensive countries registered the lowest average private investment -%GDP which is below 10%. Specifically, over 2008 – 09 average private investment for all of the three country classification has declined and possibly the decline may be related to the global financial and economic crisis of 2008/9.

Given the standard deviation of the sociopolitical stability of 10.32, it is not surprising that on average for the period 1986-15, there is a slight difference across selected sample SSA countries on the basis of countries classification of oil-exporting (52.74 points), other resource-intensive (57.92 points), and non-resource intensive-countries (54.25 points). However, there is a considerable difference based on country specific comparison; for instance, it is only Botswana on average that registered the highest point (73.08 points) and entered the low risk rating category of the 70-80 points over the period 1986-15, while Ghana, Gambia, and South Africa succeeded to join the moderate risk category of 60-70 points. Comparatively, Congo DR (38.04), Liberia (39.75), and Nigeria (46.090) fall under the very high risk category of 0-50 points, and

[29] World Bank classifies countries as Oil exporting, other resource intensive, and non-resource intensive. From the selected sample, Angola, Cameron, Gabon, and Nigeria falls under the oil-exporting country classification, whereas Botswana, Burkina Faso, Congo DR, Ghana, Guinea, Liberia, Mali, Niger, Sierra Leone, South Africa, Zambia, and Zimbabwe are under other resource-intensive countries. And further, Cote d'Ivoire, Ethiopia, Gambia, Guinea-Bissau, Kenya, Madagascar, Malawi, Senegal, Togo, and Uganda are identified as non-resource intensive country.

figure 4.2(b) below shows how the region is heterogeneous in terms of sociopolitical stability distribution. Further as presented in figure 4.1(b) below, average sociopolitical stability (on 100 index point) for Botswana, Gabon, Ghana, Malawi, Mali, Niger, Senegal, South Africa and Zambia falls under the moderate risk rating of sociopolitical instability, and interestingly these countries has registered higher average private investment as %GDP compared to countries falling in the very high risk of sociopolitical stability category over the period under consideration in SSA. The following figure presents sociopolitical stability based on 100 index points and private investment % GDP in SSA for the period between 1986 – 15 (average).

Figure 4.1(b): sociopolitical stability, and private investment %GDP in SSA between 1986 – 15 (averages)



Source*: Own computation of data obtained from IMF and ICRG*

In this regard, elucidating some of the factors that accounted for the categorization of Congo DR, Liberia, and Nigeria under the very high risk category of less than 50 points. To beginning with Congo, over the period under consideration Congo DR experienced a high rate of sociopolitical instability characterized by communal violence that erupted in 1992 between Luba Kasi (minority) and Lunda (majority) in Shaba or Katanga which resulted in weakening of the central

government, autonomous regional governments, and Mobutu's removal from power in 1997.[30] Generally, from the data we observed that Congo DR faced failed central government, armed ethnic-militia conflict, assassination of leaders (Nascent Kabila in 2001), repressing of oppositions, tribal conflicts, autocratic regime, and civil war with the involvement of other African countries like Rwanda. And the second SSA country in our sample which scored the very high risk rating of sociopolitical instability between 1986-15 is Liberia with 39.75 points, and possibly the following incidents has contributed to the lowest sociopolitical stability rating: uprising under the leadership of Charles Taylor against the existing government led by Samuel Doe (1989); external force involvement by the ECOWAS by sending the peace keeping force and the execution of Doe by the NPLF (1990); rebel attacks from the Liberian united for reconciliation and democracy (2000); the internal turmoil that resulted in 50000 and more Liberian and Sierra Leonean displacement; Embargos by the UN on timber exports (2002); religious tension between Muslims and Christians (2006); boarder war with Ivory Coast (2012), among others resulted in the categorization of Liberia to the very high risk rating category.

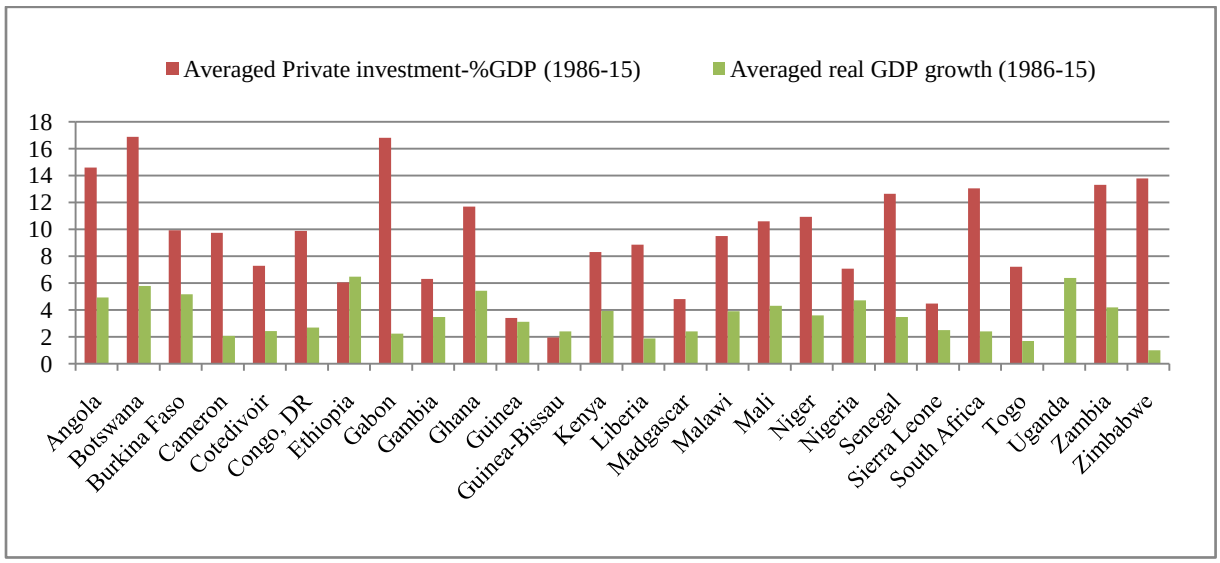
Further, Nigeria, the biggest economy in the region falls under the very high risk of sociopolitical instability category owing to factors such as Ethnic rivalries by ethnic militias in the Niger delta, tension related to oil exploitation, systematic oil infrastructure attacks, the emergency of Boko Haram, and ethnic and religious tensions between the north Islamic Hausas and Southwest Christians Yorubas are among others. After all, the above listed three countries and other SSA countries falls under the high risk of sociopolitical instability owing to government instability, internal and external conflict, ethnic and religious tensions, involvement of the military in politics, higher level corruption, and low level of bureaucratic quality.

Furthermore, the data shows variation in terms of GDP growth, public investment and credit to the private sector prevails between the selected samples of SSA countries. In this Oil exporting countries on average registered the highest GDP growth of 4.49% followed by non-resource intensive countries (4.13%) and other resource intensive countries (3.5%) for the period 1986-15. On a country specific comparison we observed that Ethiopia's average GDP growth (6.47%)

[30] Rwanda supported a group of rebel army of Tutsis from eastern Zaire to remove Mobutu from power.

over the period under consideration turns out to be the highest growth rate in the region followed by Uganda (6.39%), Botswana (5.79%), and Ghana (5.44%), while the lowest is registered by Zimbabwe (0.99%), Liberia (1.87%) and Togo (1.7%). The following figure below presents average real GDP growth rate, and private investment as %GDP for SSA countries for the period 1986 – 15.

Figure 4.1 (c): average real GDP growth rate, and private investment as %GDP for SSA countries (1986 – 15)



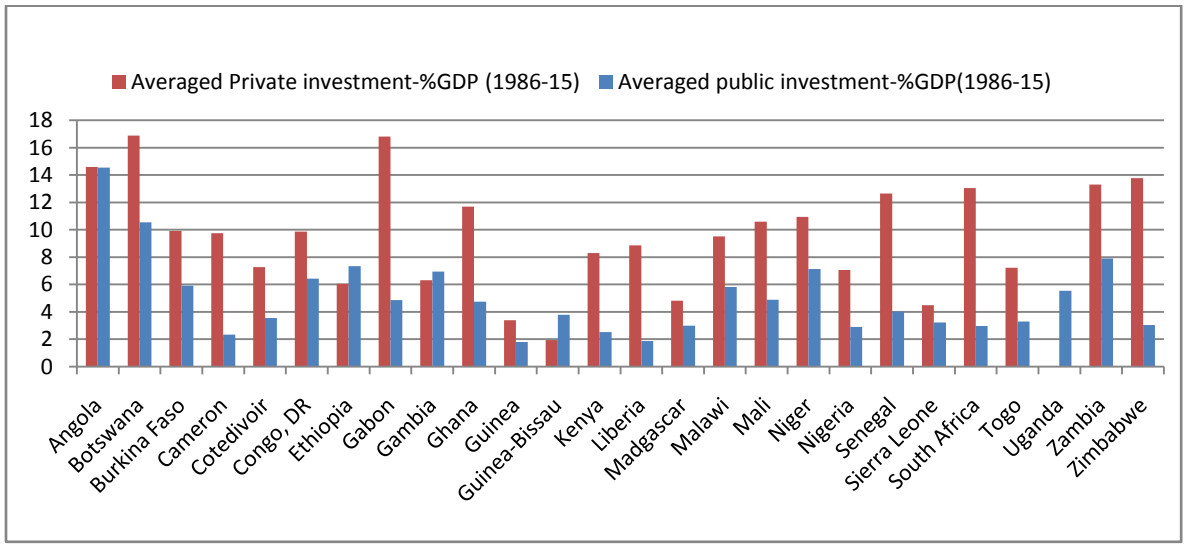
Source*: Own computation of data obtained from IMF and WB*

Figure 4.1(c) above conveys important information regarding the possible direction of the relationship between private investment and real GDP growth, and country specific fixed effects within the region. For instance, Zimbabwe and Gabon which registered the lowest real GDP growth (less than 1%, and 2.2% respectively) in the region experienced the highest average private investment as %GDP (close to 14%, and greater than 16.81%) compared to all other countries in the sample (except Botswana), and this signifies the need to incorporate country specific effects in modeling private investment and it is against the assertion of the accelerator effects of output growth. On the other hand, Botswana which registered the third highest average real GDP growth rate (5.79%) in the region experienced the highest average private investment as a percentage of GDP compared to other countries in the sample, and this corroborates the accelerator principle. Given the fact that no voluminous values between private investment and

output growth measured by real GDP growth, we may also relate private investment and the accelerator effect of output in our observation of Angola, Burkina Faso, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Nigeria, and Sierra Leone.

Public investment as a percentage of GDP further remained below the average values of private investment for oil exporting, other resource intensive, and non-resource intensive countries with 6.15%, 9.77%, and 4.58% respectively. On a country level we observe variations in public investment as percentage of GDP; on average between 1986-15 Angola registered the highest public investment as a share of GDP (14.53%) followed by Botswana (10.55%), Zambia (7.9%) and Ethiopia (7.34%), whereas the lowest is registered by Guinea (1.81%), Cameron (2.34%) and Kenya (2.52%). Figure 4.1 (d) below shows average public and private investments -%GDP in SSA for the period 1986 to 2015.

Figure 4.1 (d) average public investment as and private investment -%GDP in SSA (1986 to 2015)



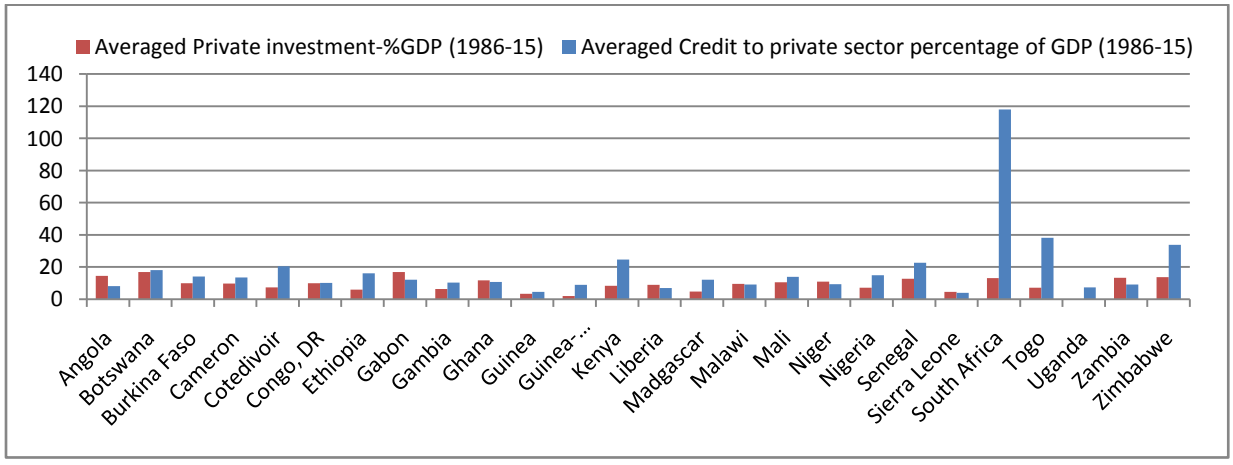
Source*: Own computation of data obtained from IMF*

Figure 4.1 (d) shows heterogeneous distribution of averaged public and private investment across Sub-Saharan African countries for the period under consideration. Between 1986 – 15, public investment as a percentage of GDP is found to be higher than private investment in Ethiopia, Gambia, and Guinea-Bissau, while Angola registered a balanced average public-private

investment as a share of GDP which is 14.5%. Despite AfDB's (2013) recommendation of rising public investment as a percentage of GDP to at least 10% in order to complement and promote effectiveness of private investment, it is only Angola and Botswana that registered above the minimum threshold. Moreover, on average terms (from 1986-15) private investment is highly dominated public investment in Botswana, Gabon, Zimbabwe, Zambia, South Africa, and Senegal with all registering more than 12% percent of their GDP. Out of the 26 selected SSA countries 18 of them experienced average public investment-%GDP of less than 6%.

Notwithstanding, average domestic credit to the private sector as a share of GDP in SSA between 1986 – 15 as shown in figure 4.1 (e) below, South Africa registered the extreme credit to private-%GDP (117.95%) in the region followed by Togo (38.2%), Zimbabwe (33.9%), Kenya (24.57%), Senegal (22.75%), and Coted'voire (20.56%), whereas the remaining selected samples (20 countries out of 26) registered below 20%. On the other hand, Sierra Leone (3.97%), Guinea (4.59%), Liberia (7.03%) and Guinea-Bissau (8.95%) exhibited the extreme lowest averaged domestic credit to the private sector as a percentage of GDP over the period under consideration. These values signify the very low performance of the financial sector which is characterized by low access to finance by the private sector and financial crowding out which is related to government deficit financed domestically.

Figure 4.1 (e): average credit to the private sector as a percentage of GDP (1986-15)



Source*: Own computation of data obtained from IMF and WB*

Based on the discussion of some of the basic statistics, it is confirmed that Sub Saharan African and particularly the selected samples possesses heterogeneity in terms of private investment, sociopolitical stability risk rating and the stated macroeconomic conditions, which actually entails country specific effects do really matters. Regarding the correlation matrix (*presented in the Annex section annex 1*) provides a preliminary support to the associations between the dependent variable- private investment, and sociopolitical stability, inflation and exchange rate volatility, GDP, public investment, credit availability, and external debt service. As shown in the correlation matrix, sociopolitical stability and measures of macroeconomic volatility (inflation and exchange rate volatility) turns out in line with the researcher's prior expectation, and also we observed that GDP through its accelerator effect, public investment with a complementary effect and credit availability as a measures of financial sector development are with the expected positive sign, while external debt service unconventionally turns out with negative sign. Further, the detail discussions of estimation results are presented in the following section, section 4.2.

4.2. Estimation Results

It is discussed that before exploiting any estimation technique to obtain a parsimonious model fitting in the study under consideration, and gain robust result, theoretical and empirical relevance must be examined via diagnostic tests. In this respect, the common opinion regarding which estimation technique to employ and what most empirical studies utilized is Hausman (1978) specification test which is named after him to choose between the within fixed effect and random effect models. And thus, by examining the correlation between the intercepts and the regressors, Hausman specification test guides which model to employ with null hypothesis of uncorrelated independent variables and intercept, and thereby rejection of the null hypothesis indicating appropriateness of the random effect model. Basically, in a fixed effect model, the intercept term is included in the linear regression model to vary the individual units (i) and also incorporates country specific effects (reducing omissions of variables), while the random effect model excludes the intercept term from the regression and summarizes by a random error term.

Notwithstanding, as discussed in chapter III, deviating from the common opinion of employing Hausman specification test, we build on Acemoglu et al. (2019) important work in choosing the within estimator, and thus we start estimation of our baseline model employing the standard within estimator for a dynamic model with fixed effects. Contextualizing Acemoglu et al. (2019)

specification to our modeling, our measure of sociopolitical stability differs from sociopolitical instability by unobserved characteristics such as social, political, institutional, and historical aspects that could possibly affect private investment and thus panel data estimates with country fixed effects more likely to increase the explanatory power of sociopolitical stability. Besides controlling for the country fixed effects, to obtain unbiased estimates we further incorporated the time-varying unobservable effect that could possibly affect Private investment related to sociopolitical and economic conditions. And thus based on the assumption of sequential exogeneity implying that past private investment and all the right hand side explanatory variables are orthogonal, and also serially uncorrelated error terms is another assumption. As discussed in Acemoglu et al. (2019) given long panels (in our case 30 years panel dataset) and sequential exogeneity assumption with asymptotic errors of $\frac{1}{T}$ "the within fixed effect estimator provides a natural starting point". Therefore, following Acemoglu et al. (2019) we estimated of our baseline model by employing the within estimator for a dynamic model with fixed effects. And unlike Acemoglu et al. (2019), we further employed other dynamic panel model estimators with fixed effects, such as FOD and system GMM. The following sub section presents the within fixed effect estimation results.

4.2.1. The within fixed effect Estimation

Table 4.2 (a) presents the within fixed effect estimation results of private investment equation as a function of sociopolitical stability, macroeconomic volatility, and standard controlled variables. The result is presented in an incremental approach by which we started with sociopolitical instability and macroeconomic volatility variables, and incrementally standard macroeconomic variables are included. Specification one (model 1), the first column includes only an index of sociopolitical stability and macroeconomic uncertainty variables without controlling for standard macroeconomic variables. As shown in column one of table 4.2 (a), lagged private investment, sociopolitical stability index, and exchange rate volatility (measuring macroeconomic volatility) turns out with the expected sign and statistically significant at less than five percent level of significance. Lagged dependent variable capturing the status quo (inertia) related to investment climate is significant at 1% level of significance and positively affects private investment. Corroborating our prior expectation, Sociopolitical stability index capturing the relative stability of the sociopolitical climate turns out positive and statistically significant at 5% level in affecting

private investment in SSA. And interestingly, the estimated effect of sociopolitical stability on private investment is relatively larger compared to macroeconomic volatility variable (exchange rate volatility), which is 1% percent improvement in sociopolitical stability is associated with 0.8% rise in private investment in SSA countries.

Table 4.2 (a): Regression Result from the within fixed effect estimator

VARIABLES	(1) model 1	(2) model 2
L.lnPrivate_Invst	0.633*** (0.052)	0.568*** (0.061)
Socio-polit_stability	0.008** (0.003)	0.007** (0.003)
lnStdevaition_inflat	0.031 (0.022)	0.032 (0.027)
lnStdevaition_exchang	-0.037** (0.017)	-0.043** (0.018)
lncredit_to_Private		0.022 (0.032)
lnexternal_debt service		0.010 (0.017)
lnreal_GDP		0.285* (0.151)
lnpublic_invest		-0.003 (0.061)
Year	0.029*** (0.005)	0.023*** (0.007)
Constant	-49.890*** (9.527)	-43.511*** (11.071)
Observations	754	716
R-squared	0.713	0.699
Number of Countryid	26	26

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

Further based on our finding in column one of table 4.2 (a), exchange rate volatility denoting macroeconomic volatility adversely affects private investment in SSA which is in line with the researcher's prior expectation. At 5% level of significance, macroeconomic uncertainty captured

by exchange rate volatility decreases private investment by 0.03%. However, inflation volatility one of the proxy for macroeconomic uncertainty turns out insignificant and with unexpected sign, implying that the data could not support the hypothesis that inflation volatility has effects on private investment in Sub-Saharan Africa. Inflation volatility measured by the unconditional standard deviation of inflation seems to have an insignificant effect across Sub-Saharan Africa and over time.

With further inclusion of the standard macroeconomic variables as shown in table 4.2 (a) of column two, the estimation of within fixed effect result shows a slight decline in the estimated effect of sociopolitical stability and lagged dependent variable to 0.7% and 0.56% respectively. And we also observed an increase in exchange rate volatility coefficient to 0.043% (given the negative sign showing the direction of its association with private investment). On the other hand, real GDP is statistically significant with the expected sign (positive) corroborating the assertion of the positive accelerator effect of output on private investment in SSA countries. At 10% level of significance, a 1% rise in real GDP spreads 0.28% increase in private investment.

Rather unconventional, our finding shows that public investment, credit to the private sector, and external debt are statistically insignificant. Despite its statistical insignificant effect, the negative sign with public investment shows the existence of crowding out effect that arises due to SSA's limited market size, financial crowding out as both the public and private sector runs for limited and same credit pool. And credit to the private sector turns out with the expected sign (positive), but statistically insignificant. Furthermore, contrary to the assertion that external debt and its associated debt service creates disincentives on private investment with the anticipations of higher taxes to finance it in the future, the variable turns out insignificant (and with unexpected sign) in explaining private investment fluctuation in Sub-Saharan African countries.

The within fixed effect estimates that we used in our dynamic panel model estimation presented in table 4.2 (a) of column 1 – 2 possess an asymptotic bias of order $1/T$ known as "Nickell bias" which actually arises due to the failure in the assumption of strict exogeneity of dynamic panel model (Nickell, 1981). Give that our panel has a fairly large T (on average each country in the panel is observed 29 times), the asymptotic bias in our estimates should be small, which motivates the use of within fixed effect estimator in column 1 – 2 of table 4.2 (a) as a starting point. In analyzing the effects of macroeconomic volatility and sociopolitical stability on private

investment, we faced with ‘no perfect strategy’ examining the effects of the right hand side explanatory variables. Thus we adopted different strategies, particularly on the estimation techniques employed to obtain similar results and make sure that our results are robust. Therefore, to deal with the problem of “Nikell bias” and obtain consistent estimates, we further employed forward orthogonal deviation (FOD) and system GMM estimators which are presented in the following sub section.

4.2.2. FOD and System GMM Dynamic Panel Results

As discussed in the estimation methodology, this study closely follows the works of (Escaleras and Kottarid, 2014) and (Acemoglu et al, 2019). In what follows the estimation results from Forward Orthogonal Deviation (FOD) and system GMM estimator are presented. Basically, the motive behind employing these general methods of moment is to address autocorrelation problem of the residuals, and also given that the lagged values of the endogenous variable is included as a regressor and some other control variables are endogenously determined with private investment. On the other hand, dynamic GMM estimator addresses the issue of “Nickell’s bias” which is related to the within fixed effect estimation which produces biased and inconsistent parameter estimates. And also more importantly, it serves as a further proof of robustness of our estimation result.

More specifically, Forward Orthogonal Deviation and system GMM estimator are employed to correct some of the problems that difference GMM possesses. The FOD estimator differs from difference GMM because it transforms the data by deducting the average values of all future values from current observation, and thereby drops the time-invariant component. And given the fact that our data faces missing points or values, this approach is more helpful in retaining more data points. Furthermore, system GMM differs from difference GMM in the types of internally generated instrumental variables used, and it uses differenced instruments for level lagged variable which effectively augments the difference GMM and produces more appropriate outputs.

Table 4.2 (b): Estimation Results of FOD and system GMM estimators

VARIABLES	(1) FOD-GMM	(2) FOD-GMM	(3) SYS-GMM
L.lnPrivate_Invst	0.607*** (0.111)	0.579*** (0.064)	0.538*** (0.088)
Socio-polit_stability	0.008*** (0.003)	0.007** (0.003)	0.021*** (0.004)
lnStdevaition_inflat	0.034 (0.026)	0.031 (0.026)	0.020 (0.027)
lnStdevaition_exchang	-0.04** (0.019)	-0.046** (0.019)	-0.072** (0.031)
lncredit_to_Private		0.022 (0.032)	0.039 (0.076)
lnexternal_debt service		0.011 (0.016)	-0.012 (0.038)
lnreal_GDP		0.275* (0.159)	0.470*** (0.095)
lnpublic_invest		-0.004 (0.060)	0.023 (0.072)
Year	0.031*** (0.009)	0.022*** (0.006)	0.018*** (0.006)
Constant			-36.654*** (11.126)
Hansan statistics	0.403	0.203	0.25
AR(1)	0.044	0.018	0.007
AR(2)	0.207	0.178	0.115
Number of instruments	8	24	25
Observations	728	690	716
Number of Countryid	26	26	26

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

And the estimation results from forward orthogonal deviation and system GMM estimators are presented in table below. As in the case of within fixed estimation, we still adopted an incremental approach; we begin with sociopolitical instability and macroeconomic volatility variables, and then include the standard controlled variables to the right hand side respectively. To begin with the diagnostic test result given in table 4.2 (b), the included variables are jointly significant as given by Wald test statistics for the overall regressions.

And the Hansen's J statistics, which is the test for instrumental validity and over identifying restriction is between the acceptable range of (0.1 – 0.25) as suggested by Roodman (2009). Further, Z-statistics test of the Arellano-Bond AR(2) of the second-order autocorrelation in the residuals as shown in table 4.2 (b) reveals that the non-existence of second-order autocorrelation implying that the non-inclusion of more lagged dependent variables on the right hand side.

Regarding estimation results presented above in column (1) of table 4.2 (b) shows the specification representing private investment as a function of sociopolitical stability and measures of macroeconomic volatility (exchange and inflation rate volatility). As in the case of the within fixed effect estimator, the forward orthogonal deviation estimation result in column (1) shows that lagged dependent variable and exchange rate volatility remains significant at 1% and 5% level of significance respectively. However, sociopolitical stability improved its level of significance from 5% to 1%, while its estimated effect on private investment remained the same. Interestingly similar to the within estimator, inflation rate volatility remains insignificant in explaining private investment fluctuations in SSA.

Further, with the inclusion of all standard controlled variables as depicted in column (2) of table 4.2 (b), the FOD estimation result shows that the estimated coefficient (and in fact the level of significance) of sociopolitical stability remained unchanged. 1% improvement in sociopolitical stability boosts private investment in SSA by 0.73%. On the other hand, exchange rate volatility turns out with deterring effects on private investment, which is similar to the within estimation result. And a 1% increase in exchange rate volatility results in 0.046% decline in private investment. Further, real GDP has a positive explanatory power in determining private investment in SSA and it is statistically significant at 10%, while credit to the private sector, external debt service, and public investment are insignificant which is actually similar with that of the within fixed effect estimation results.

More interestingly in the system GMM estimation as depicted in column (3) of table 4.2 (b), we observed persistency in the explanatory power of lagged dependent variable, sociopolitical instability and exchange rate volatility. The estimated impact of sociopolitical stability in the system GMM estimator has improved compared to both the within and FOD estimates, which is at 1% level of significance a 1% improvement in the sociopolitical stability boosts private investment in SSA by 2.13%. Equally important, exchange rate volatility capturing macroeconomic uncertainty deters private investment at 5% level and its estimated effect remained comparable to our previous dynamic panel models estimations. A 1% percent rise in exchange rate volatility spreads 0.072% decline in private investment in SSA. On the other hand, real GDP corroborating the accelerator effect of output on private investment turns out with improved estimated coefficient and at 1% level, a one percent increase in real GDP results in 0.47% rise in private investment in Sub Saharan Africa. Similar to the within and forward orthogonal deviation, the system GMM estimation result shows that inflation rate volatility, public investment, credit to the private sector, and external debt service found to have a statistically insignificant effect on private investment in SSA countries. However, we observed that there is a change in the signs of the estimated coefficients of external debt service and public investment to negative (in line with our prior expectation) and positive (denoting complementary effect) respectively.

From the three dynamic panel model estimations results discussed in table 4.2 (a) and 4.2 (b), we observed that lagged dependent variable remained statistically significant at 1% level of significance in all the three models with positive sign. More importantly, sociopolitical stability effects on private investment in SSA turns out positive and statistically significant in all of the three models, which is in line with the researcher's prior expectation. Moreover, the estimated coefficient of sociopolitical stability improved from (0.007) in the within fixed effect and FOD to (0.0213) in the system GMM estimation. On the other hand, exchange rate volatility (our measure of macroeconomic uncertainty) has shown a persistent deterring effect on private investment in SSA, and statistically significant at 5% level of significance in all of the three models under consideration. Further the estimated coefficient of exchange rate volatility improved from (-0.031) in the within fixed effect and (-0.046) in FOD estimation to (-0.069) in system GMM estimation. And a more interesting improvement is observed in the estimated coefficient of real GDP from (0.275) to (0.470) in the system GMM estimation, and also the

level of significance showed a considerable improvement from 10% level in the within fixed effect and FOD estimation to 1% level of significance in the system GMM estimation with the same positive effect on private investment in SSA in all the three models under consideration.

Overall, we employed three variants of dynamic panel model estimation techniques with an intention of safe guarding the robustness of our estimation results, and more specifically we followed Roodmans (2009)'s robustness check guidelines for the forward orthogonal deviation and System GMM estimators. Each of the GMM estimators result presented above has produced more than five hundred instruments, and compared to the number of countries (26) these instruments are highly disproportional and resulted in a perfect Hansen-J statistic with P-values of (1.00). In this regard, Roodman (2009), asserted this as a typical problem of low power and thus the need to reduce the number of instruments in order to get robust results. Following this guideline we included fewer lags of the dependent and other explanatory variables. Despite the change in the signs and magnitude of estimated coefficients, our preferred model shows that in all of the GMM estimation public investment, credit to the private sector and external debt service are statistically insignificant and do not explain private investment fluctuations in Sub Saharan African countries. In our estimation, we employed both collapsing and limiting the numbers of lags used as instruments, and managed to bring the P-values of Hansen-J test for over-identification statistic to the level that Roodman (2009) suggested which is within the range of (0.1 – 0.25). These outputs are obtained after a series of attempts in making Hansen-J statistic to the recommended level, and the P-values of AR (1) and AR (2) to the acceptable range.

This section has mostly dealt with the discussion of estimation results obtained from the within, forward orthogonal and system GMM estimators. And thus it is important to further analyze our empirical findings in the context of theoretical and existing empirical background. Therefore, the following section presents analysis of our finding to make sense of the results obtained.

4.3. Making Sense of the Results

Deviating from the standard investment theories that are developed mainly to explain industrial economies; we contextualized to picture the status quo of SSA countries by incorporating uncertainty in terms of sociopolitical instability and macroeconomic volatility. Our empirical finding shows that relatively stable investment climate captured by sociopolitical stability

promotes private investment. It also showed an empirical evidence for the deterring effect of macroeconomic volatility captured by exchange rate volatility.

To make our finding sensible, elucidating the general theory by relating to existing empirical findings is important. Our econometric estimation result, specifically from the system GMM estimates show that the magnitude of the estimated effects of sociopolitical stability (2.13%) on private investment is by far greater than other significant variables, which is almost 29.59 times that of exchange rate volatility and 4.53 times of the effects of real GDP. And this result signifies the high explanatory power of sociopolitical factors implying that sociopolitical instabilities captured by government instability, sever socioeconomic conditions, deteriorating investment profile, internal and external conflict, corruption, military in politics, religious and ethnic tensions, law and order, democratic accountability, and bureaucracy quality highly exerts negative impact on private investment by creating unfavorable investment climate in SSA countries .[31] In this regard, North (1993) forwarded that sound institutional setting is a guarantee for property rights, civil liberties and contract enforcement. And sound institutional setting is a reflection of well-functioning legal rules, lower degrees of corruption and bureaucratic procedures, political stability, and other relevant proxies of quality institutions that promote investment, growth and eventually development. It is easier for investors to engage in productive activities where peoples are free and protected to own properties, presence of rule of law, efficient, easily accessible, free, fair and just judicial system (See Goldsmith, 1995; Feng, 2001).

Further, it is argued on the role of establishing reasonable and sustainable entry and exit rule, labor laws protecting both employees and employer's right, and fair regulating repatriation of profit are incentives for private sector development, and unnecessary-needless workers agitations and strikes be avoided (Li, 2009). In addition Gehlbach and Keefer, (2011) forwarded that political stability, absence of civil revolt threats, violence and unrests promotes investment. Interestingly, Ikejiaku and Mordi (2010) discussed that Africa's low investment profile is not

[31] Our index of sociopolitical stability, which is obtained from ICRG ratings for social and political risk, is based on twelve variables: government instability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tension, ethnic tensions, law and order, democratic accountability, and bureaucracy quality. (See chapter 3 for detail discussion of these variables and for better understanding of our sociopolitical stability index).

mainly motivated by unprofitability; rather it is linked with conflict, weak governance, corruptions, high crime rates, and poor infrastructure. And these unfavorable investment climates increases transaction costs and high risk of doing business in general.

In line with the above arguments, our finding covers that sociopolitical stability encourages the investment climate and promotes private investment, while sociopolitical instability deters private investment in SSA countries. And our empirical findings are comparable to the findings of (Feng, 2001; Sudeshna Pal et al, 2011; Escalersa and Kottarid, 2014). Feng (2001) found that sociopolitical instability discourages private investment, and argued that sociopolitical instability is linked with the decrease in saving and increased current consumption by making saving worthless. And moreover, sociopolitical instability characterized by displacement of people or deprive them of job (making saving unrealistic) and declined investors confidence prompting investors' preference to hold their portfolio and properties in a portable and liquid terms such as gold or foreign currency which possess a better probability of retaining value. Notwithstanding, Sudeshna pal et al (2011), confirmed the co-existence of private investment underperformance and sociopolitical instability associated to unstable business environment and declined investors' confidence not only deters private investment but also leads to capital flights. On the other hand, Escalersa and Kottarid (2014) in their finding discussed that it is social and political instability measured by political regime, continuous institutional changes, and social tension that highly influence private investment decision by creating unfavorable private investment climate.

In a nutshell, our empirical findings asserts sociopolitical stability promotes private investment, while sociopolitical instability deters private investment and mainly the following factors accounted to the high risk of sociopolitical instability: *(a)* unstable government failing to carry out its declared program *(b)* sever socioeconomic conditions denoting the socioeconomic pressures in the society at work that could possibly constrain government action and fuel social dissatisfaction *(c)* deteriorating investment profile captured by unfair regulation of profit repartition, contract viability, , and payment delays worsening the risk to invest *(d)* internal conflict characterized by political violence's such as civil war, coup threat, terrorism, and civil disorder *(e)* external conflict in the form of non-violent external pressure (diplomatic pressure, trade restriction, withholding of aid, sanctions, territorial disputes etc) and violent external pressure (war-cross border conflict) *(e)* religious tension (domination of governance and/or

society by a single religious group seeking to replace civil laws and to exclude others in the social and/or political process) and ethnic tension (tensions due to nationality, racial, and language) *(f)* deteriorating institutional strength and quality of the bureaucracy, and involvement of the military in politics (the military is not elected by anyone its involvement in politics is against democratic accountability). Therefore, sociopolitical instability exerts a deleterious effect on private investment via decreased saving and increased current consumption by making saving unworthy, thereby declined supply of investment capital. Moreover, the deterring effect of sociopolitical instability explained by declined investors' confidence prompting investors to hold their portfolio and properties with better probability of retaining value in terms of a portable and liquid terms such as gold or foreign currency. Thus the net negative effect of sociopolitical instability is associated with the decline in the supply of investment capital and demand for capital.

Notwithstanding, in all of the three models that we estimated, exchange rate volatility (proxy for macroeconomic volatility) is found to have a statistically significant negative effect on private investment in SSA countries. In this Regard, serven (1999) forwarded that high exchange rate volatility in developing countries in general and SSA in particular creates uncertainty to private investors in relation to profitability and costs of the investment. Exchange rate volatility is associated to the erratic swings of relative investment profitability in both sectors of non-traded and traded goods. And also given the high import content of investment, exchange rate volatility is linked to uncertainty in the costs of new intermediate and capital goods. Further, Serven (1999) discussed that the inability of developing countries to provide better and developed financial markets that offers enhanced risk-diversification opportunities and the high degree of openness signifies the deterring effects of exchange rate volatility on private investment in developing countries in general and more importantly in Africa in particular.

Corroborating Serven's (1999) discussion, our empirical finding suggests that SSA countries are characterized by high import content of capital and intermediate goods (investment goods), and being highly exposed to international trade. And thereby, through its effect on relative price of capital goods, exchange rate volatility affects profitability because investment goods are combinations of domestic (infrastructure or construction) and foreign (equipment and machinery) components. And thus, exchange rate volatility which is a proxy for macroeconomic

instability deters private investment by distorting information contents of relative prices and thus raising the risk associated to long term investment. Therefore, given the irreversible nature of investment, macroeconomic uncertainty creates value of waiting for more information to abate irreversible and unprofitable investment projects. And our finding is comparable to the findings of Bleaney and Greenway, (2000) and Sioum, (2002).

Rather unconventionally, inflation volatility turns out to be insignificant implying that the data could not support the hypothesis that inflation volatility has effects on private investment in Sub-Saharan Africa. Inflation volatility seems to have an insignificant effect across SSA and over time. The possible explanation could be most SSA countries use monetary policy approach to manage inflation, based on inflation-interest rate relationship. And majority of SSA countries central banks are beholden to elected politicians. Given that most of SSA countries are highly indebted, there exist lower borrowing and growing inflation relationship due to SSA signifying the presence of financial crowding out by the government, and even more politicians in these countries have an incentive to print money to pay down their debts. In other words given the financial crowding out effect by most SSA government borrowing, its impact on private investment through higher inflation and its associated volatility is not significant. Similar argument can be found on Sioum, (2002) work.

Furthermore, our empirical finding depicted that real GDP quiet convincingly and positively affects private investment in SSA countries. The positive estimated coefficient of GDP corroborates the assertion that real output growth rate is positively linked to private investment implying the change in aggregate demand for output which investors seek to meet. And this result is in line with several findings which are consistent with the accelerator effects of output, and thereby established positive link between output growth and investment. Our finding is comparable to the works of Oshikoya (1994), Bleaney and Greenway (2000), Sioum (2002), Sudeshna et al. (2011), and Escaleras and Kottarid (2014).

Similar to the findings of Ghura and Goodwin (2000), our empirical result asserted that credit to the private sector remains statistically insignificant explaining private investment in SSA countries. In this regard the possible explanation is that investors in most of SSA highly depend on the bank credit that remained substantial source of financing their investment project. But the banking system is not providing a credit which is enough to promote existing and new

investment projects (See IMF, 2005). Sub-Saharan Africa is still characterized by a very low credit to the private sector compared to other developing countries, and most of the factors identified for the low performances includes higher liquidity of banks with lower propensity to lend (failure in securing lending), the enforcement of creditors right are weak, absence of adequate information on debtors, and also government deficit and the amount of resource that the government seeks from the banking system. (IMF, 2005)

Compared to developed countries, public investment in developing countries is expected to play a key role in the development process of these economies and in this regard it is important to consider the issue of substitutability and complementarities between private and public investment. Theoretically it is discussed that net effect of public investment is indeterminate (crowding out and crowding in effect could take place at a time). Despite its insignificant effect as shown from the system GMM estimation result of empirical finding, public investment turns out with positive sign indicating the possible crowding-in effect which actually arises as a result of infrastructural targeted public investment. The existing empirical literature forwarded that the availability and provision of quality public investment in infrastructure, for instance better road network, could possibly reduce the costs associated to planting new factory or transportation of heavy equipments. And thus by reducing production cost, and increasing expected rate of return (by increasing marginal productivities of private inputs-labor and capital), public investment could play a key role to complement private investment in SSA countries. (See Escaleras and Kottarid (2014)

Furthermore, contrary to the assertion that debt service creates disincentives on private investment with the anticipations of higher taxes to finance it in the future. Corroborating Ghura and Goodwin (2000), our empirical finding suggests that external debt service seems to be insignificant compared to the sociopolitical instability and macroeconomic uncertainty in explaining private investment fluctuation across SSA countries over time. The possible reason could be justified with the argument that, it is rather the credibility in the international financial market matter the most compared to the disincentive impacts of external debt on private investment in Sub-Saharan Africa. As discussed in the Harro-Domar growth model, capital accumulation in the form of saving could be augmented through external borrowing to fill the financing gap, and given the fact that SSA countries high external financing (due to the low level

of saving in the region) external debt could augment capital accumulation though its effectiveness requires further examination.

All taken together, our empirical finding revealed that sociopolitical instability has higher deleterious impact on private investment compared to both macroeconomic volatility and standard determinants of private investment across SSA over time. On the other hand, macroeconomic volatility captured by exchange rate volatility found to have a deterring effect on private investment, while inflation rate volatility seems to be insignificant in explaining private investment fluctuations in SSA countries over time. Further, our empirical finding depicted that real GDP's accelerator effect on private investment across SSA over time is statistically significant, while credit to the private sector, public investment and external debt service sought to have insignificant impact on private investment in Sub SSA. Based on our empirical findings, the following chapter presents conclusions of our empirical work and forwards some policy implications.

Chapter Five

Conclusion and Policy Implication

In this chapter, we present the conclusions and policy implications drawn from the estimation result and analysis forwarded in chapter 4. The first section, section 5.1, discusses conclusion of our study followed by section 5.2 policy implications.

5.1. Conclusions

By analyzing the determinants of private investment for a panel of 26 SSA countries, this study sheds light on the effects of macroeconomic uncertainty and sociopolitical instability culprit's on private investment. We utilized macroeconomic data from the World Bank and International Monetary Fund, and an index of sociopolitical stability risk rating from International Country Risk Guide (ICRG) data base over the period 1986 to 2015. Exploiting three variants of dynamic panel model data estimation (the within fixed effect, forward orthogonal deviation and system GMM), our empirical finding revealed that private investment across SSA countries over time is highly determined by sociopolitical stability. The estimated positive effects of sociopolitical stability in SSA is found to be highly pronounced compared to macroeconomic and standard macroeconomic determinants.

Our estimation result confirmed the deleterious effects of sociopolitical instability on private investment mainly characterized by: government instability; sever socioeconomic conditions fueling social dissatisfaction; deteriorating investment profile captured by unfair regulation of profit repartition, contract viability, and payment delays, worsening the risk to invest; internal conflict (civil war, coup threat, terrorism, and civil disorder) and violent and non-violent external conflicts; religious and ethnic tensions; deteriorating institutional strength and quality of the bureaucracy. Regarding the channel of its effect, sociopolitical instabilities affect private investment through its negative effect on saving (increased current consumption), and declined investors' confidence inducing investors to hold their portfolio and properties with better probability of retaining value in terms of a portable and liquid terms such as gold or foreign currency. Resulting in a net effect of decline in the supply of investment capital and demand for capital, and thereby decline in private investment.

Equally important, in all of the three models that we estimated, private investment across Sub-SSA overtime is found to be significantly and negatively affected by exchange rate volatility. Exchange rate volatility negatively affects private investment by influencing profitability and the associated cost of investment projects, and more specifically the erratic swings in profitability and prevalence of high import content in investment goods creates uncertainty in the business environment and thereby negatively affecting private investment. In this regard, SSA countries characterized by high import content of intermediate and capital; inability to provide better and developed financial markets that offers enhanced risk-diversification opportunities and high degree of openness, are negatively affected by exchange rate volatility. Given that investment goods are combinations of domestic (infrastructure or construction) and foreign (equipment and machinery) component, our empirical finding confirmed that through its effect on relative price of capital goods, exchange rate volatility affects profitability and the cost of investment projects in Sub SSA.

Notwithstanding, all the results from our estimation of private investment equation for SSA countries confirmed that inflation volatility seems to have an insignificant effect across SSA over time. And the possible reason could be the financial crowding out effect by most SSA government borrowing, its impact on private investment through higher inflation and its associated volatility is not significant. Furthermore, our empirical result asserted that credit to the private sector remains statistically insignificant explaining private investment in SSA countries. The insignificant effects of private sector credit signify the underdevelopment of financial markets in SSA countries. SSA is still characterized by a very low credit to the private sector compared to other developing countries, and the banking system is not providing a credit which is enough to promote existing and new investment projects. The insignificant association between credit to private sector and private investment in SSA countries could be explained by higher liquidity of banks with lower propensity to lend, weak enforcement of creditors right, absence of adequate information on debtors, and also government deficit.

Contrary to the assertion that, public investments crowding in and/or crowding out effect on private investment, our empirical findings suggests it is statically insignificant in explaining investment fluctuation across SSA. And what we observed is that public investment is insignificant. Despite its statistical insignificant effect, as shown in our system GMM estimation,

public investment turns out with positive sign indicating the possible crowding-in effect which actually arises as a result of infrastructural targeted public investment. On the other hand, crowding out effect due to SSA countries limited market size, financial crowding out, and the source of finance, which is foreign borrowing and/or domestic resulting in inflationary and debt accumulation creating uncertainty in the business environment. Notwithstanding, our empirical finding depicts the effect of external debt service on private investment seems insignificant across SSA countries over time, and the possible reason could, rather be the credibility in the international financial market matter the most compared to the disincentive impacts of external debt on private investment in SSA.

5.1. Policy Implication

Our empirical finding has identified the significant effects of sociopolitical stability variables, macroeconomic volatility captured by exchange rate volatility, and macroeconomic variables. Based on our findings the following policy implications are forwarded. Given the pronounced positive effects of sociopolitical stability, SSA countries to tackle down the deterring effects of sociopolitical instability, should establish stable government that carry out its declared programs; improve the socioeconomic condition (unemployment, poverty, and consumer confidence) to reduce social dissatisfactions. They should further develop fair regulations of profit repartition, contract viability, and avoid payment delays, reducing the risk to invest, and reducing the incidents of internal and external conflict will highly complements private investment. Further promoting sound institutional setting, lowering corruption, and reducing ethnic and religious tensions promotes private investment, and thus SSA countries should develop policies directed to promote sociopolitical stability and encourage private investment in the region.

Given the limited production capacity associated with heavy dependency on imported intermediate and capital goods, to reverse the deterring effects of exchange rate volatility, and benefit from depreciated exchange rate, SSA should promote strategies on the diversification of production activities and thereby make less dependent on imported investment goods. This is actually related to most of the SSA countries which are still dependent on primary exports (traditional exports) characterized by price and income inelastic demand for these products. Policy makers should consider the need to promote import substitution by encouraging the development of local demands for investment capital goods. And this could be attained through

industrialization promoting the manufacturing sector to create and gain the advantages of value additions. Further, to minimize the possible deleterious impacts of exchange rate volatility on private investment, central banks in SSA countries should hold enough reserves that will serve as intervening option to stabilize exchange rate volatility.

Moreover, policy makers should take into account the positive effects of real GDP on private investment across SSA countries overtime explained by the accelerator effect, and should pursue "pragmatic" growth lead strategies. On the other hand, the insignificant effects of volatility on private investment could be due to absence of objectively sated central banks managed by official beholden to politicians, and the presence of financial crowding out by the government, and thus policy makers should emphasize on establishing independent central banks and reduce the pressure of financial crowding out effect. Equally important, private sector credit sought to have insignificant impact on private investment in SSA countries signifying the underdevelopment of the financial sector; in this regard policy makers should institute mitigation measures through a well-functioning financial-system, building adequate financial infrastructure and institution. Further, the net effects of public investment on private investment in SSA is found to be complementing (positive), but still insignificant, and this implies policy makers in SSA countries should minimize the crowding out effect of public investment and attain complementary effect through infrastructural targeted public investment. And lastly not the least, the negative insignificant effect of external debt service still has something to tell to policy makers in SSA countries. Since the negative effect of external debt service is explained by disincentives on private investment with the anticipations of higher taxes to finance it in the future, policy makers in SSA countries should draw policies and strategies directed to utilizing external debt on self-liquidating productive investment through a proper project appraisal.

However, it should be understood that, to capture and understand the economy in its full dynamics regarding the adjustments in relation impulses and shocks requires the use of full-fledge CGEM (computable general equilibrium models). Employing single equation model as in our case to analyze wide-ranging policies could be too much ambitious. Nevertheless, by utilizing robust estimates for the key parameters based on a fairly thorough model, one could possibly be able to make anticipations of most likely outcome and the associated policy implication for a more specific realm of the economy (like ours, private investment). Therefore,

we beg for a further an in-depth and robust analysis of private investment, sociopolitical instability, and macroeconomic uncertainty across SSA countries by utilizing full-fledge Computable General Equilibrium Models.

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Appendix

Appendix 1: Correlation matrix

```
. corr lnPr_i Total_100_points lnstdinflavariance lnstdexchvariance lngdp lnpu_i lnncredit_sharegdp lnndebt_serv_onext
(obs=739)
```

	lnPr_i	Total_~s	lnstdi~e	lnstde~e	lngdp	lnpu_i	lnncre~p	lnndeb~t
lnPr_i	1.0000							
Total_100_~s	0.3072	1.0000						
lnstdinfla~e	-0.1402	-0.3323	1.0000					
lnstdexchv~e	-0.1055	-0.1193	-0.1684	1.0000				
lngdp	0.8912	0.2212	-0.0778	0.0062	1.0000			
lnpu_i	0.8590	0.3028	-0.0978	-0.1125	0.8670	1.0000		
lnncredit_~p	0.4941	0.3391	-0.2095	-0.2616	0.3689	0.4008	1.0000	
lnndebt_se~t	0.7502	0.2073	0.0207	0.0060	0.8684	0.7426	0.3259	1.0000

Appendix 2: The within fixed effect estimator

```
Fixed-effects (within) regression               Number of obs      =       754
Group variable: Countryid                       Number of groups   =        26

R-sq:  within  = 0.7129                         Obs per group: min =        29
       between = 0.9904                                        avg =      29.0
       overall = 0.9189                                        max =        29

                                                F(5,25)            =    232.81
corr(u_i, Xb)  = 0.8286                         Prob > F           =    0.0000

                                    (Std. Err. adjusted for 26 clusters in Countryid)
```

lnPr_i	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnPr_i						
L1.	.63295	.0515854	12.27	0.000	.5267079	.7391921
Total_100_points	.0075235	.0030856	2.44	0.022	.0011685	.0138785
lnstdinflavariance	.0309753	.0219534	1.41	0.171	-.0142386	.0761892
lnstdexchvariance	-.0370248	.0168321	-2.20	0.037	-.0716912	-.0023585
Year	.0286631	.0051393	5.58	0.000	.0180786	.0392477
_cons	-49.89037	9.527456	-5.24	0.000	-69.51254	-30.26821
sigma_u	.58451196					
sigma_e	.41224473					
rho	.66781522	(fraction of variance due to u_i)				

Appendix 3: the within Fixed effect estimator (Continued)

```
Fixed-effects (within) regression               Number of obs      =       716
Group variable: Countryid                       Number of groups   =        26

R-sq:  within  = 0.6991                         Obs per group: min =        20
       between = 0.9860                                        avg =      27.5
       overall = 0.9356                                        max =        29

                                                F(9,25)            =    218.61
corr(u_i, Xb)  = 0.6724                         Prob > F           =    0.0000

                                    (Std. Err. adjusted for 26 clusters in Countryid)
```

lnPr_i	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnPr_i						
L1.	.5681934	.0612029	9.28	0.000	.4421437	.6942432
Total_100_points	.0070719	.003137	2.25	0.033	.0006111	.0135327
lnstdinflavariance	.0323749	.02744	1.18	0.249	-.0241389	.0888886
lnstdexchvariance	-.0428225	.0184964	-2.32	0.029	-.0809165	-.0047285
lnncredit_sharegdp	.0224542	.0324933	0.69	0.496	-.0444671	.0893755
lnndebt_serv_onext	.0104598	.0165841	0.63	0.534	-.0236959	.0446155
lngdp	.2847183	.1514122	1.88	0.072	-.0271211	.5965576
lnpu_i	-.003274	.0613266	-0.05	0.958	-.1295786	.1230306
Year	.0228358	.0065153	3.50	0.002	.0094174	.0362542
_cons	-43.51083	11.07134	-3.93	0.001	-66.31268	-20.70898
sigma_u	.29304994					
sigma_e	.41263117					
rho	.33527503	(fraction of variance due to u_i)				

Appendix 4: forward orthogonal deviation estimation

```
Dynamic panel-data estimation, one-step difference GMM
------------------------------------------------------------------------------
Group variable: Countryid                       Number of obs      =       728
Time variable : Year                            Number of groups   =        26
Number of instruments = 8                       Obs per group: min =        28
F(0, 26)      =         .                                      avg =     28.00
Prob > F      =         .                                      max =        28
------------------------------------------------------------------------------
             |               Robust
      lnPr_i |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lnPr_i |
         L1. |   .6072803    .110923     5.47   0.000     .3792747    .8352859
             |
  Total_100_points |   .0078123   .0026664     2.93   0.007     .0023315    .0132932
lnstdinflavariance |   .0337432    .026418     1.28   0.213    -.0205598    .0880462
 lnstdexchvariance |  -.0398801   .0186676    -2.14   0.042    -.0782519   -.0015082
              Year |   .0306869   .0089199     3.44   0.002     .0123518     .049022
------------------------------------------------------------------------------

Instruments for orthogonal deviations equation
  Standard
    FOD.(Total_100_points lnstdinflavariance lnstdexchvariance Year)
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L.Total_100_points collapsed
    L(2/4).lnPr_i collapsed
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -2.01  Pr > z =  0.044
Arellano-Bond test for AR(2) in first differences: z =   1.26  Pr > z =  0.207
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(3)    =   3.52  Prob > chi2 =  0.318
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(3)    =   2.93  Prob > chi2 =  0.403
  (Robust, but weakened by many instruments.)


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```

Appendix 5: the forward orthogonal deviation estimator (continued)

Dynamic panel-data estimation, one-step difference GMM

Group variable: Countryid		Number of obs	= 690
Time variable : Year		Number of groups	= 26
Number of instruments = 24		Obs per group: min	= 19
F(0, 26)	= .	avg	= 26.54
Prob > F	= .	max	= 28

lnPr_i	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnPr_i						
L1.	.5363114	.0640767	8.37	0.000	.4045997	.668023
Total_100_points	.0073122	.0032714	2.24	0.034	.0005877	.0140368
lngdp	.3115788	.1707393	1.82	0.080	-.0393807	.6625384
lnpu_i	-.0022508	.0631372	-0.04	0.972	-.1320312	.1275297
lnncredit_sharegdp	.0238312	.0343039	0.69	0.493	-.0466816	.094344
lnndebt_serv_onext	.0101043	.0164079	0.62	0.543	-.0236227	.0438313
lnstdinflavariance	.0353024	.028387	1.24	0.225	-.023048	.0936528
lnstdexchvariance	-.0460131	.0200492	-2.30	0.030	-.0872249	-.0048013
Year	.0242475	.0069117	3.51	0.002	.0100402	.0384548

Instruments for orthogonal deviations equation
  Standard
    FOD.(lngdp Total_100_points lnndebt_ext_total lnpu_i lnncredit_sharegdp
    lnndebt_serv_onext lnstdinflavariance lnstdexchvariance Year)
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L(1/5).(lngdp Total_100_points) collapsed
    L(2/6).lnPr_i collapsed

Arellano-Bond test for AR(1) in first differences: z = -2.37 Pr > z = 0.018
Arellano-Bond test for AR(2) in first differences: z = 1.36 Pr > z = 0.173

Sargan test of overid. restrictions: chi2(15) = 56.85 Prob > chi2 = 0.000
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(15) = 19.24 Prob > chi2 = 0.203
  (Robust, but weakened by many instruments.)

Appendix 6: System GMM

Dynamic panel-data estimation, one-step system GMM

Group variable: Countryid		Number of obs	= 716
Time variable : Year		Number of groups	= 26
Number of instruments = 25		Obs per group: min	= 20
F(9, 25)	= 23160.49	avg	= 27.54
Prob > F	= 0.000	max	= 29

lnPr_i	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
lnPr_i						
L1.	.4587619	.1290845	3.55	0.002	.1929075	.7246164
Total_100_points	.021335	.0043426	4.91	0.000	.0123914	.0302787
lngdp	.4705113	.1234371	3.81	0.001	.2162879	.7247347
lnpu_i	.0387267	.0828212	0.47	0.644	-.1318466	.2093001
lnncredit_sharegdp	.0598718	.0890493	0.67	0.508	-.1235286	.2432722
lnndebt_serv_onext	-.0166298	.0423229	-0.39	0.698	-.1037955	.0705359
lnstdinflavariance	.0272825	.0325829	0.84	0.410	-.0398233	.0943884
lnstdexchvariance	-.0720279	.0336979	-2.14	0.043	-.1414301	-.0026257
Year	.0199283	.0066525	3.00	0.006	.0062273	.0336294
_cons	-40.69358	12.86056	-3.16	0.004	-67.18039	-14.20677

```
Instruments for first differences equation
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    L(1/4).(lngdp Total_100_points lnstdexchvariance) collapsed
    L2.lnPr_i collapsed
Instruments for levels equation
  Standard
    lngdp lnndebt_ext_total lnpu_i lnncredit_sharegdp lnndebt_serv_onext
    lnstdinflavariance Year
    _cons
  GMM-type (missing=0, separate instruments for each period unless collapsed)
    D.(lngdp Total_100_points lnstdexchvariance) collapsed
    DL.lnPr_i collapsed
------------------------------------------------------------------------------
Arellano-Bond test for AR(1) in first differences: z =  -2.69  Pr > z =  0.007
Arellano-Bond test for AR(2) in first differences: z =   1.58  Pr > z =  0.115
------------------------------------------------------------------------------
Sargan test of overid. restrictions: chi2(15)   =  42.75  Prob > chi2 =  0.000
  (Not robust, but not weakened by many instruments.)
Hansen test of overid. restrictions: chi2(15)   =  18.10  Prob > chi2 =  0.258
  (Robust, but weakened by many instruments.)


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```