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An Empirical Analysis of Macroeconomic and Political Determinants of Private Investment in Sub-Saharan Africa

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AN EMPIRICAL ANALYSIS OF MACROECONOMIC AND POLITICAL DETERMINANTS OF PRIVATE INVESTMENT IN SUB-SAHARAN AFRICA

By

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DISSERTATION:
AN EMPIRICAL ANALYSIS OF MACROECONOMIC AND POLITICAL DETERMINANTS OF PRIVATE INVESTMENT IN SUB-SAHARAN AFRICA

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DEDICATION

I dedicate this dissertation first to my late father Prince Kofi Drah Tamakloe, and second, to my late brothers Dennis, Ben and Michael. May their souls rest in perfect peace.

ABSTRACT

The general macroeconomic and political difficulties experienced by many Sub-Saharan African countries in the late 1980s has led to economic and political reforms to improve private investment performance. It has been estimated that Sub-Saharan African countries needed to boost private investment in gross domestic product some 25% in the 1990s to achieve sustainable growth and development (Pfefferman and Madarassy, 1989). However, private investment performance has fallen short of the estimated 25%, and remained stagnant between 12.4% and 14.1% per annum from 1993 to 2002.

The purpose of this study therefore is to examine the influence of macroeconomic factors and democracy, proxied by political rights and civil liberties scores, on gross private investment in Sub-Saharan Africa from 1993 to 2002. The study uses the neoclassical investment model which suggests that output, the real interest rate, the price of capital, the rate of depreciation of capital, and public sector investment are the main determinants of private investment. Also, the study examines the effects of other variables such as the per capita income, the credit availability to the private sector, the general price level, the external shock, the currency depreciation or devaluation, and the debt overhang, on private investment. The study utilizes panel data from 1993 to 2002 for 43 Sub-Saharan African countries and employs the panel least squares, the fixed effects and the random effects techniques to estimate the model. Following the Hausman test statistics, the study placed more weight on the fixed effects model and found that the growth rate of real output, the per capita income, and the past level of private investment are the significant factors affecting private investment in Sub-Saharan Africa. Democracy exerts the expected positive impact albeit insignificantly.

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CHAPTER 1

INTRODUCTION

The public sector, in the form of local, state, and federal or national governmental offices, organizations, and institutions, performs very important functions. Although the proper role of the government in economic development is subject to considerable debate, public sector economic literature suggests that government should provide public goods, correct for externalities induced by market transactions, and promote competition. In addition, government has a responsibility to stabilize the economy through the use of fiscal and monetary policies to control unemployment and inflation that may result from aggregate failure of the market. Most importantly, government also has the responsibility to redistribute income to reduce unequal distribution of income by market forces. However, in recent times, due to budgetary constraints and efficiency considerations, governments over the world have resorted to privatization and public-private partnerships arrangements to deliver public goods and services. This shift in emphasis from the public sector to the private sector demands increases in private sector investment in order to cope with the challenges of economic development and growth.

The role of total domestic investment in promoting economic development in post-independent Sub-Saharan Africa had been recognized by development planners. But there had been considerable debate and disagreement as to whether the public or the private sector should provide the leading role in promoting investment. In the presence of massive poverty and colossal market failures, many Sub-Saharan African countries opted for centralized development planning in which the state or the public sector assumed the commanding role in investment initiatives. Besides market failures and poverty, Sub-

Saharan African countries were heavily influenced by the examples of the former Union of Soviet Socialist Republics (U.S.S.R) and India that industrialized at a fast pace with centralized planning (Collier and Gunning, 1999; Hope, 1997; 1999). Sub-Saharan African countries not only adopted the Soviet Union's style of economic development but also its political governance model of one party or no party regimes without tolerance for political dissent and the suppression of political freedoms and civil liberties.

In the late 1980s and early 1990s, however, due mainly to economic stagnation and poor governance outcomes, there had been a re-thinking and re-conceptualization of economic development policy and political governance in Sub- Saharan Africa. As a result, many Sub-Saharan Africa countries implemented structural adjustment policies and democratic constitutional reforms in which the private sector was recognized as the main engine of growth. This study therefore examines the macroeconomic and political factors affecting private investment in Sub-Saharan Africa from 1993 to 2002 within the context of neoclassical investment theory and the McKinnon-Shaw hypothesis.

This chapter presents the background, the statement of the problem, the purpose of the study, the theoretical framework, the methodology, the significance of the study, and its limitations.

Background

Development strategy in many post-independent Sub-Saharan African countries in the early 1960s was shaped by centralized economic planning systems, various forms of socialist organizations and emphasis on Keynesian economics. Also, there were government administered price controls and regulated labor, commodity, and financial markets. Again, the share of the public sector in the economy was increased through the

appropriation and nationalization of private enterprises and financial institutions, and the creation of public monopolies responsible for the marketing of agriculture products. Furthermore, governments administratively allocated foreign exchange, and credit and, pursued restrictive trade policy and an inward-looking import-substitution industrial strategy (Hope, 1999).

These interventionist anti-market policies were adopted in the face of the stark realities of colossal market failures, poverty, illiteracy and disease and the need for rapid economic development to combat these problems. The positive outcomes of these policies made Collier and Gunning (1999) remark that in the 1960s Africa's economic future looked very prosperous. Despite the positive gains made in the 1960s, these interventionist anti-market measures overextended Sub- Saharan African governments in the 1970s, and overwhelmed their administrative capacity leading to disappointing outcomes such as poverty and social inequality, an external debt burden, a brain drain, capital flight, a huge balance of payments disequilibrium, a deteriorated physical infrastructure, unemployment and high crime rates. In addition, famine and malnutrition became severe, budget deficits expanded, agriculture productivity declined, and there was rapid urbanization coupled with scanty urban services such as water, electricity, telecommunication and transportation. Besides that, environmental degradation, political and civil strife increased, and corruption became pervasive (Hope, 1999; Jaycox, 1992).

The macroeconomic landscape was the exact replica of the political performance of many Sub-Saharan African countries in the 1970s and 80s because there were about 60 successful coups culminating in forceful change of regimes, 70 abortive coups, and 125 officially reported coup plots. Ghana represents one extreme case of 5 successful coups, 6

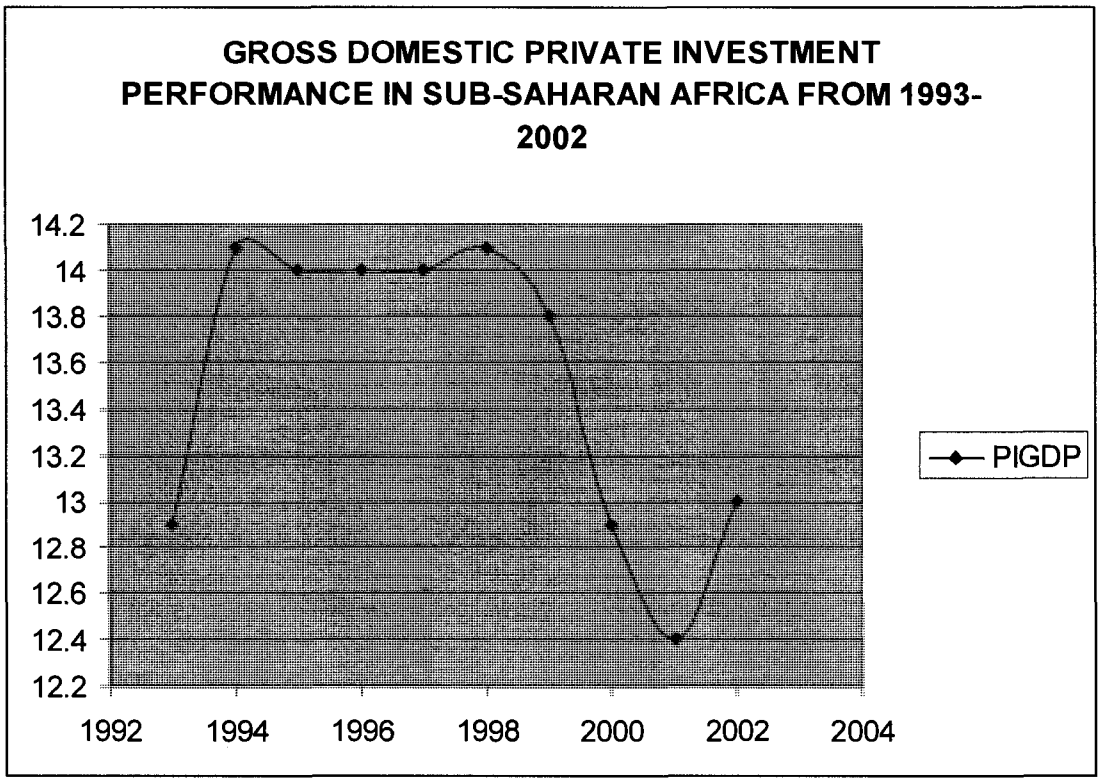
abortive coups and 13 formally reported coup plots, to the other extreme are cases like Botswana and a few others which experienced no coups at all (McGowan and Johnson, 1984; Fosu, 2003). Common to these irregular regime changes were abolition of national constitutions, a curtailment of political and civil liberties and the establishment of unresponsive military dictatorships. Again, these forceful overthrow of governments generated political instability and displacement of large segment of the population in many Sub-Saharan African countries. The displacement of the population was generally accompanied by a loss of jobs and property, thus reducing drastically the marginal propensity to save and invest. The political instability induced by military coups could further deter investment in fixed capital stocks such as factories, plant and machinery and land because investors would prefer to keep their assets in liquid forms such as in gold and foreign currencies. Thus in times of political instability the supply of investment capital by households and demand of investment funds by businesses would decline (Feng, 2002; Alesina and Perrotti, 1996; Alesina et al, 1996). In light of these developments, an institution of democratic governance and a large increase in private investment are suggested as a prescription for Sub Saharan Africa's dismal economic and political performance (World Bank, 1989; Khan and Reinhart, 1990; Hope, 1997). Private investments are justified on the ground that they respond to market signals which implies that society's resources are deployed to sectors that are most needed thus ensuring productive and allocative efficiency. Democracy on the other hand promotes the rule of law, independent and impartial judiciary, separation of governmental powers and checks and balances, periodic and competitive elections, press freedom and peaceful

regime change. These factors protect private capital and tend to decrease the appearance irregular regime change and political instability.

Problem Statement

In order to make the policy environment more friendly and conducive to private investment activities, most Sub-Saharan African countries implemented policies such as trade liberalization, privatization and financial market liberalization and democratization of governance, all being part of a general structural adjustment policies package. Appendix 1 gives the chronological list of major economic and political reforms and events in Sub-Saharan African countries. According to Pfefferman and Madarassy (1989), Sub-Saharan African countries needed to boost private sector investment to 25% of Gross Domestic Product (GDP) in the 1990s for sustainable growth and development. However, private investment performance has fallen short of the estimated 25% and remained stagnant between 12.4% and 14.1% from 1993 to 2002. This performance is even more disappointing and gloomy if its two giant's economies, Nigeria and South Africa are excluded. When only South Africa is excluded private- sector investment declined to 11.3% and 13.6% but if both South Africa and Nigeria are removed from the computation, the figures dropped to 11.1% and 13.9% between 1993 and 2002 (World Bank, 2004). Figure 1 depicts the trend in private investment performance below graphically.

FIGURE 1



Source: World Bank (2004)

This dismal performance of private investment deserves even stronger criticism if one considers the fact that in Africa, the minimum level of investment required per annum to replace the depreciated capital stock is estimated at 13% of GDP (World Bank, 1991; Serven and Solimano, 1991). It is imperative to study systematically the forces that promote private investment because private sector contributions to economic development have taken center stage in policy deliberations in Sub- Saharan Africa, and in bilateral and multilateral agencies such as the United States Agency for International Development, the World Bank, and the International Monetary Fund.

Theoretical framework

Several economic theories have been developed to explain investment behavior, including the accelerator model, the adjustment-cost model, and models based on credit rationing. Although each of these models only picks up a little bit of the complex reality of aggregate investment behavior, they still form the core of most empirical investigations of investment spending. The study of the determinants of private investment is further warranted because, as argued by Keynes in his classic work, the General Theory of Employment, Interest and Money, fluctuations in private investment play a significant role in determining the level of output and unemployment in an economy.

Furthermore, investment spending is a major determinant of long-term economic growth. Oshikoya (1994) undertook a pioneering research on the determinants of private investment for eight African countries and focused on macroeconomic factors, utilizing data from 1970 to 1988. The selection of the eight countries was based on data availability rather than on any scientific sampling technique thus affecting the generalizability of the results. Besides economic factors, political factors also influenced domestic private investment decisions (Serven and Solimano, 1993) but were excluded in Oshikoya's empirical work.

Purpose Statement

The purpose of this study is to examine the influence of macroeconomic factors and democracy (proxied by political rights and civil liberties scores) on gross private investment in Sub Saharan Africa from 1993 to 2002. The objective of the study is to test neoclassical investment theory which suggests that output, real interest rate, price of

capital, rate of depreciation, public sector investment are determinants of private investment and other effects such as per capita income, credit availability to the private sector, general price level, external shock, real depreciation or devaluation, debt overhang and democracy on private investment. The study also controls for the effects of geography and war.

Income per person (per capita income) has been identified as a factor affecting private investment because high income countries have the ability to save and investment more than low income countries (Greene and Villanueva, 1991). McKinnon (1973) and Shaw (1973) suggest that in the presence of large financial repression and lack of efficient capital markets in developing countries, credit availability could be an important factor affecting the level of private investment activity. Again real depreciation or devaluation has been postulated as a factor affecting private investment specifically in the export sector as devaluation tends to increase the domestic price of exports thus serving as an incentive for more private investment (Khan and Knight, 1985; Buffie, 1986). Besides, it has been argued that the existence of huge external debt is a disincentive to private investment as economic agents construe large external debt stock as a signal of high expected tax rates in the future (Borenzstein, 1989; Corden, 1988; Krugman, 1988). Pindyck (1991) posits that investment is irreversible and fraught with uncertainties, and therefore the inflation rate and the terms of trade may be factors that will affect private investment activity as rapid changes in these factors constitute uncertainties to private investors. Finally, democracy is postulated to institutionalize the redistributive system, and it is also established on a more support base than autocracy, therefore a democratic

environment is expected to be more conducive to private investment activity than autocratic political environment (Feng, 2001).

Research Questions

Sub-Saharan African countries implemented market oriented policy reforms in the late 1980s and early 1990s to promote private investment activity. In spite of this, private investment performance has remained far below the estimated 25% of GDP for sustainable development. However, private investment activity takes place in a political environment and, as Nyong'o (1997) suggests the top heavy bureaucracies created by one-party regimes in Sub-Saharan Africa were generally wasteful, corrupt, inefficient, repressive and detrimental to Africa's development. Although private sector initiatives and market reforms are essential for sustainable development, they are not sufficient conditions because they must go hand-in-hand with democratic governance (World Bank, 1989; Globerman and Shapiro, 2003). Therefore in an attempt to examine the factors that determine private investment activity in an economy, the research question must encompass both macroeconomic and political environment. In view of this assertion, the study seeks to answer the following two research questions:

1. What are the effects of macroeconomic variables on gross private investment in Sub-Saharan Africa?
2. What is the influence of democracy as measured by political rights and civil liberties scores on gross private investment?

Methodology

Research Design

The study uses a longitudinal panel of macroeconomic and political data of Sub-Saharan African countries over 1993 to 2002 to examine the influence of macroeconomic and political factors on private investment. Panel design is preferred over cross-section and time series design because panel data controls for heterogeneity among individual countries (Baltagi, 1995). Cross-section and time series studies do not control for heterogeneity thus leading to biased results. However, the use of panel data is not without cost. The disadvantage is that it involves annual data covering a short span of time for each country. This implies that asymptotic arguments depend largely on the number of countries tending to infinity. Increasing the time span will lead to higher costs, an upsurge in attrition rates, and increases in the computational difficulty for limited dependent variable panel data models (Green, 2000; Baltagi, 1995).

Data Analysis

Using quantitative data from African Development Indicators (2004), International Financial Statistics (2004) and Freedom House (2003), the study employs panel least squares, and fixed and random effects estimation techniques to estimate the private investment model. EXCEL, SPSS and EVIEWS computer programs are used to compute summary descriptive statistics, correlation and coefficients of the variables.

Significance of the Study

The significance of the study is justified by its important contributions to the literature and policy in several ways. First, the inclusion of two political variables, political rights and civil liberties as a proxy for democracy in the investment model

estimated. Second, an increase in the sample size by including all of the entire 48 Sub-Saharan African countries in the study. Third, the results of the study have implications for country level economic development policy and the impact of monetary, fiscal, structural adjustment, and stabilization policies on private investment. Finally, the study utilizes the latest annual time series data from 1993 to 2002 using both the fixed effects and the random effects estimation techniques to estimate the data. These panel estimation techniques capture the cultural, geographic and institutional differences on the estimated coefficients of the variables. The time period of the study coincides with major political, institutional, and economic reforms in many Sub- Saharan African countries.

Definition of terms

Sub-Saharan Africa is the term used to describe those countries of Africa that are not part of North Africa. It comprises 48 independent countries sharing similar socio-cultural and economic features. Appendix 2 gives a list and basic indicators of these countries. However, because of missing data Djibouti, Eritrea, Liberia, Namibia, and Somalia are not used.

Investment is defined to mean the flow of output in any given period that is used to maintain or increase the capital stock in an economy. The national accounts measure three main kinds of physical investment: investment in residential structures, fixed business investment, and inventory investment.

Capital in this context refers to the accumulated stocks of machinery, factories, and other durable factors of production.

Democracy in this research focuses on liberal democracy and it is used interchangeably with political freedom. It is defined to mean the degree to which a

political system facilitates political liberties and democratic rule. Political liberties exist when citizens of a political jurisdiction have the freedom to express different political views in any media and enjoy the freedom to establish or belong to any political party or group. When the national government of a country is accountable or answerable to its citizens and citizens are entitled to participate in the government directly or through their elected representatives, democratic rule is said to exist (Bolden 1993, 1990, 1986). Democracy or political freedom is operationalized by political rights and civil liberties scores according to Freedom House measures.

Political rights depend on elections being held freely and fairly and competitively in democratic countries, and opposition parties play an important role in checks and balances.

Civil liberties are a function of freedom of association, assembly, demonstration, speech, and religion, as well as free and independent media and court systems, freedom to do business on an equitable basis without excessive government corruption, and freedom to organize unions and other private groups (Feng, 2003; Freedom House, 2003, 1998). The Freedom House Survey rates political and civil liberties separately on a seven-point category scale in which 1 represents the most free and 7 the least free. The average ratings of both scores ranging from 1.0-2.5 are generally considered free, 3.0-5.5 partly free, and 5.5-7.0 not free.

Depreciation is an increase in the domestic price of a foreign currency largely by market forces.

Devaluation is an official action undertaken by the central bank to raise the domestic price of a foreign currency.

External shock refers to unexpected changes in major commodity prices with either favorable or adverse consequences.

Debt overhang refers to the external burden of developing countries that is so large that there can be no full repayment without destabilizing the debtor country. Creditor banks and governments would end up with less repayment than if they agreed to an orderly reduction of the debt through negotiation.

Limitations

The findings of the study should be interpreted with caution because the data set contains much missing information that was estimated using different methods and measures. The regression diagnostic tests show evidence of serial correlation in the data which might make the estimated coefficients less significant than they actually are. Attempts to correct for serial correlation turn the results in some cases into directions contrary to expectations. Again, the study aggregated private investment and assumed that the various types of private investment respond in the same way. Future research that disaggregates investment into its various components would go a long way to enhance our understanding of investment behavior. Despite these limitations, most of the findings of the study are consistent with both theoretical and empirical literature.

Study Overview

The study will be divided into five main chapters. The first chapter provides an introduction and background to the study and introduces the research problem and questions. The second part reviews both theory and the empirical literature on investment behavior in general. Chapter three details the data sources, model specification, and the estimation techniques, and the fourth chapter presents the estimated results of the

investment model. The fifth section discuses the results and the implications of the results for policy and future research.

In the next chapter, both the theoretical and empirical literature relating private investment to macroeconomics variables and democracy are reviewed in order to show the gaps in the political economy literature of private investment that the study attempts to fill.

CHAPTER II

LITERATURE REVIEW

Theoretical Review

Generally, the basic theory of investment begins by taking into account the fact that investment spending or expenditure is an option to financial saving for allocation consumption over time. The implication of this proposition is that for any additional or extra investment, the return to investment should be equal to the return on saving. Put differently, the marginal productivity of capital (MPK) should be equal to the real rate interest adjusted for depreciation (Sachs and Larrain, 1993). However, several empirical models such as the accelerator model, the adjustment- cost approach, Tobin's q theory of investment, and other theories based on credit rationing have been used to describe and estimate the investment function.

Early empirical investigations of aggregate investment spending by firms noted a close association between output and investment spending, and this observation was very important to the development of the accelerator model, the earliest theory of investment still in empirical use. The accelerator theory of investment, according to Clark, (1917) states that investment varies with output and that an increase in the demand for finished goods tends to increase investment in inventories more than proportional to increase in sales, except when the firm is constrained by: (1) lack of access to additional credit to undertake the extra investment, (2) an abnormal increase in supply prices, (3) the anxiety that the prosperity is of a temporary nature and (4) the inability of producers to make timely deliveries. In quantitative terms, the model assumes that there is a stable relationship between the capital stock the firm desires and the firm's level of output. To

be more precise, the accelerator theory suggests that the desired amount of capital is a constant fraction of output. However, this relationship is postulated rather than proved, so in its simplest form the model predicts that investment increases when output accelerates. The model has been found to be weak in three respects according to Jorgensen (1967), and Hall and Jorgensen (1971). First, the ratio of desired capital to the level of output (h) is assumed to be constant and this only holds if the cost of capital is fixed. In reality the cost of capital is not fixed because of changes in market interest rates or amendments of the laws governing investment. This means that h cannot be fixed because of changes in the market interest rates and investment laws. Second, the model assumes that investment is always enough to maintain the actual capital stock to be equal to the desired capital stock in every period. This assumption is untenable because of the costs of adjusting the capital stock and the unavoidable lags in the installation of capital. Third, since future output may not be known with certainty, it means that investment must be based on expectations of next period's desired level but these expectations may turn out to be inaccurate. Despite the limitations of the accelerator model, it actually explains much of the variation in investment and in most cases outperforms other more complicated models such as the real-business-cycle model and the imperfect information model in explaining and predicting investment behavior (Clark, 1979).

In response to the limitations and restrictive nature of the accelerator theory of investment, Chenery (1952) and Koyck (1954) formulated the flexible accelerator model. The flexible accelerator model focused on the time structure of the investment process and the determination of the desired level of capital by long-run considerations. Accordingly, changes in the desired capital are transformed into actual expenditure by a

geometrically distributed lag structure. In this model capital is adjusted toward its desired level by a constant proportion of the difference between desired and actual capital. Within the framework provided by the flexible accelerator model, output, internal funds and the cost of external finance are main the determinants of investment (Jorgenson, 1971). However, in the accelerator model of Clark (1917), expectations, profitability, and capital costs play no role in investment behavior and given an incremental capital-output ratio, it is easy to compute the investment requirements associated with a given target for output growth.

The neoclassical approach to investment was formulated by Jorgensen (1967) and Hall and Jorgensen (1971) to overcome the restrictive assumptions of the accelerator theory. The neoclassical approach states that the desired capital stock depends on the level of output and the user cost of capital which in turn is a function of price of capital, the real interest rate and the depreciation rate. The model also recognizes lags in decision-making and delivery which in turn result in a gap between actual and the desired capital stocks. The investment function within this model is thus an equation for the change in the capital stock. However, the assumptions of perfect competition, exogenously given output, static expectations about future prices, output and interest rates are implausible in the sense that investment is a future facing process that looks forward into the future. In addition, the lags in the investment decision-making and delivery processes are introduced in the model in an ad hoc manner (Serven and Solimano, 1992).

Adjustment cost models of Investment

Early theoretical formulations of the adjustment cost models of investment were undertaken by Eisner and Strotz (1963) and Lucas (1967). Essentially, the model posits that actual and desired levels of capital are not always equal because firms need a reasonable amount of time to estimate and install the desired level of capital. Investment proposals are always accompanied by feasibility studies, marketing analyses and financial negotiations. Investment decisions take time to implement because they involve considerable effort to build new factories, install new machines, and to hire and train employees. In addition, the overall cost of investment tends to rise if the firm rushes to complete the investment project quickly. Therefore, the objective of profit maximization tends to make firms make only gradual changes in the levels of their capital stock. The adjustment cost model adds a partial adjustment mechanism into the accelerator model, allowing a gradual adjustment of capital to the desired capital stock. The coefficient of partial adjustment ranges in value from 0 to 1, and if the coefficient is equal to 1, then we have the accelerator model. If it is less than 1, it implies that the actual capital adjusts only gradually from the actual to the desired capital stock. Generally, a lower value of the coefficient of adjustment indicates a lower speed of adjustment. However, according to Clark (1979), the adjustment cost model is an incomplete model because it is very difficult to determine the rate at which the actual capital approaches the desired or optimal capital stock.

Tobin's Q Theory

A related investment theory based on the adjustment cost model is the Tobin q Theory. The q theory, Tobin (1967), states that the rate of speed at which the capital

stock adjusts to its desired level is related to the ratio of the value of capital to its replacement cost. The variable q is defined as the stock market value of the firm divided by the replacement cost of the capital of the firm. In this way the stock market value of the firm helps to estimate the difference between the actual capital and the desired level of capital. The replacement cost of the capital of the firm is the cost that one must bear to purchase the plant and equipment of the firm in the open market. Specifically, when q is greater than 1, it implies that the desired level of capital is greater than the actual capital stock, so investment should be high. Conversely, if q is less than 1, the desired capital is less than the actual capital therefore investment must be low. The stock market therefore makes available information about the investment incentives facing firms. The q theory of investment is very easy to test in developed economies because of the existence of efficient capital and financial markets but difficult to test in developing countries due to the nonexistence of capital markets and the suppression of financial markets.

Credit Rationing

Investment theories based on credit- rationing imply that firms cannot easily borrow at market interest rate to finance investment projects. If firms are credit- rationed, the rate of investment will not depend only on the market interest rate and the profitability of investment, but also on the availability of investment funds, which in turn is determined by the cash flow of the firm that wants to undertake the investment. When government monetary authorities place interest rate ceilings on lending institutions below the market equilibrium interest rate, the available credit is rationed among firms that want to undertake investment. McKinnon (1973) documents the serious economic inefficiencies that may emanate from credit- rationing caused by governments setting

interests rates. The problem associated with the phenomenon of credit- rationing is more acute in developing countries especially in Sub- Saharan Africa during the period of state control and command of the national economy. Credit- rationing may also arise when lenders are unable to assess the risk of lending to a borrower. The important implication of credit- rationing is that it constraints firms to finance investment projects, and thus, constraining the actual capital stock to adjust to its optimal level as determined by market interest rates and the marginal productivity of capital. The theory of credit- rationing together with the adjustment cost model explain the gradual movement of the capital stock to its desired level. In addition to the formal theories and models of investment, several hypotheses had been suggested in the literature to explain investment behavior in developing countries.

Hypotheses of Investment Behavior in Developing Countries

First, McKinnon (1973), and Shaw (1973), hypothesized that changes in the volume of bank credit are directly related to private investment undertakings in developing countries. This is because financing through retained earnings and equity is totally unavailable in developing countries, and therefore bank credits tend to be the most important source of financing for private investment activities in developing countries (World Bank, 1990). The positive impact of the availability of bank credits on private investment in developing countries has been confirmed by studies undertaken by Blejer and Khan (1984), Wai and Wong (1982) and Fry (1980).

Second, it has been suggested that public sector investment has an impact on private investment although the exact effect is ambiguous. Public investment financed by domestic borrowing is likely to reduce the amount of credit available for private

investment, and the obvious result is a crowding out effect on the private sector (Balassa, 1988; Feng, 2001). On the other hand, the public investment may enhance private investment if public expenditure is directed towards the provision of transportation, health, educational and irrigational infrastructure. In this case public and private investments are complementary (Blejer and Khan, 1984; Greene and Villanueva, 1991; Oshikoya, 1994).

Thirdly, it has been hypothesized that a real devaluation affects private investment because, as an expenditure reducing and expenditure switching policy, devaluation impacts both domestic demand and, supply and ultimately private investment. The increase in the overall price level induced by devaluation reduces domestic demand, and, as a result of the slump in economic activity firms are likely to reduce investment spending (Khan and Knight, 1985). On the supply-side, since devaluation increases the price of exports as measured in domestic currency, investment in the export sector will increase while investment activity in the non-export sector will be depressed. However, devaluation raises the domestic price of imports, including capital and intermediate goods, and therefore devaluation may negatively affect private investment as a result of an increase in the real cost of imported capital goods (Buffie, 1986).

Fourthly, the irreversible nature of investment has been stressed in the literature. Pindyck (1991) argues that a major drawback of current investment models is that they overlook the fact that investment expenditures are irreversible, and therefore may be delayed. The irreversible nature of investment implies that investment spending represents sunk and irrecoverable costs. The ability to delay the implementation of

investment projects affords the firm the opportunity to access more information about prices, costs and other market factors before deploying its resources. The irreversibility of investment means that investment spending by firms is highly sensitive to uncertainties about future product prices, interest rates, and the cost and timing of investments in general. For macroeconomic policy implications, Pindyck argues that stability and credibility are much more important determinants of investment than tax incentives or interest rates. Therefore policies that stabilize exchange rates and prices may effectively promote private investment. Furthermore, it has been suggested that a large debt overhang may inhibit private investment activities (Borenzstein, 1989; Corden, 1988; Krugman, 1988). Higher debt service payments will squeeze funds available for investment, and developing countries may face credit constraints in the international capital markets where there are large debt service payments. Again, the geographical location of a country is posited to impact on private investment. Countries located close to the sea or navigable rivers benefit from reduced transportation costs for exports, and imports. Apart from distance, political barriers could constitute insurmountable obstacles to trade even if good relations with neighbors exist (Collier and Gunning, 1999). Finally, it has been suggested that civil war may have a negative effect on the stock of physical capital, investment and savings. Also, civil war may increase uncertainty, and this is likely to reduce the inflow of foreign direct investment, and perhaps promote capital flight (Gyimah-Brempong and Corley, 2005).

Foreign Direct Investment

Although the focus of this dissertation is on gross private domestic investment, this section of the literature review singles out private foreign direct investment because

of its important contribution to the development of Sub-Saharan African economies. The definition of foreign direct investment can differ depending upon the legal instrument being used and whether it is viewed from the home or host country perspective. Capital exporting countries favor a broader definition of foreign direct investment in order to maintain management and control, while capital importing countries favor a narrower definition so that they can retain autonomy over policies specific to the needs of their nation. The World Trade Organization (WTO) and International Monetary Fund (IMF) definitions of foreign direct investment favor management and control of the investment by the home country. The World Trade Organization maintains that foreign direct investment "occurs when an investor in one country (the home country) acquires an asset in another country (the host country) with the intent to manage that asset. The management dimension is what distinguishes foreign direct investment from portfolio investment in foreign stocks, bonds, or other financial instruments" (1996: 6). The International Monetary Fund defines foreign direct investment to as "investment that is made to acquire a lasting interest in an enterprise operating in an economy other than that of an investor, the investor's purpose being to have an effective choice in the management of the enterprise" (1980: 408). The definition of foreign direct investment thus shows that the locus of management and control are in the hands of the home country. Host nations favor a narrower definition so that they can maintain their sovereignty and limit their obligations in international agreements.

The Two-Gap model has been the theoretical model which illustrates the crucial role of foreign direct investment in developing economies (Chenery and Strout, 1966; McKinnon, 1964). An extension of the Harrod-Domar model of economic growth, the

model postulates that developing countries face a fixed import capacity because of the complete inelasticity of export earnings. As a result incremental savings could not be transformed into investment because of the difficulty of obtaining the complementary imported inputs that are required for domestic investment. Stated differently, the model purports to show that developing countries in general are constrained by independent savings, and foreign exchange and therefore foreign capital inflows will be required as a matter of necessity to overcome the foreign exchange constraint in order to achieve any desired or warranted rate of growth for the economy. Foreign capital or investment has been shown to be doubly productive according to the "Two- Gap Model" because not only does it supplement domestic savings, but even more importantly, it allows the foreign exchange bottleneck to be broken. However, Lal (1970), has shown that the assumptions required to generate a foreign exchange constraint to growth independent of the savings constraint are extremely unrealistic. Hence the "Two-Gap Model" with its mechanistic projections of necessary foreign capital requirements, is likely to be misleading. It is further argued that the massive debt burden facing most Sub-Saharan African countries makes the attraction of long term capital flows critical to help augment the total domestic savings required for high growth rate. The attainment of high economic growth will ease the debt burden so that funds can be focused on social programs that could help sustain development in the long term (Nyikuli, 1999; Trent, 2002).

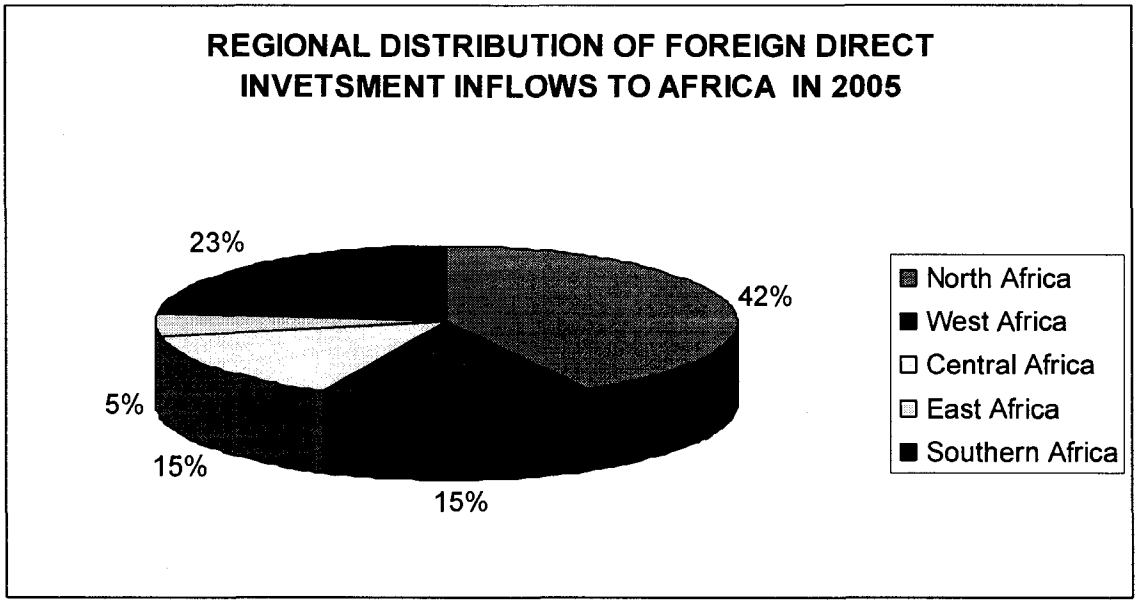
The Two-Gap Model and the massive debt burden facing many Sub-Saharan African economies suggest that foreign investment could play a positive role in the development of these countries, but there is no consensus on the positive impact of foreign investment on growth in the literature. In one instance, Walden and Rosenfeld,

1990; Chowdhury and Islam, 1993; Rodan, 1997; Gries, 2002; Borensztein et al., 1998 argue that foreign investment enhances economic growth through the provision of capital, technical and marketing expertise. On the other hand Razin et al., 1999 contends that foreign investment may have an adverse influence on employment, income distribution, and national sovereignty and autonomy. It may also worsen the balance of payments position if inputs require importation and profits eventually repatriated. The potential negative effects of foreign investment led to nationalization of foreign firms in many Sub-Saharan African countries and the adoption of inward-looking import substitution policies during early post-independence period. There has been reversal of these policies however, through the adoption of structural adjustment policies. Musila et al., 2006 disaggregated foreign investment into extractive, market seeking and export oriented types and suggested that export oriented investment is not likely to cause any divergence between private benefits to the investor and social benefits to the host nation. Extractive and market seeking types of investment could result in high social costs such as the exploitation of economic rents, pollution, and the worsening of income inequality through the establishment of dualistic economic structures.

According to World Investment Report (2006), surging corporate profits combined with commodity prices helped boost African FDI inflows in 2005 to a historic record of $31 billion from $17 billion the previous year. The composition of FDI in total capital formation also increased, to 19% in 2005. Despite this unprecedented performance, Africa's share of global FDI remains at about 3%. It is interesting to note that a large proportion of the 2005 inflows were concentrated in mining, especially oil and gas, thus validating the argument that natural resource availability is a key player in

FDI attraction and destination. The report further shows that five countries: South Africa, Egypt, Nigeria, Morocco and Sudan received about 66% of the region's inflows. Since FDI in Africa is usually concentrated geographically and industrially, this pattern of distribution in 2005 is not surprising. The regional distributions of FDI among Africa's five sub-regions also showed significant variations. As shown in Figure 2, North Africa obtained the lion's share in 2005 accounting for 42% of the total inflows to Africa, followed by Southern Africa, which received 23% of African inflows. This sub-region experienced the most impressive inflows in terms of growth and sectorial diversity, in 2005. Inflows rose to $7.1 billion from $1.5 billion in 2004, with investment taking place particularly in banking, telecommunications and mining industries. This increase explains the sub-regions second highest rankings from the lowest in 2004. West Africa and Central Africa are the third largest recipients of African inflows accounting for 15% each. As usual Nigeria received 70% of West Africa's inflow thus dominating the region. East Africa attracted the least inflows to Africa, obtaining only 5% of the inflows to Africa. The region consists of resource poor countries, and majority of which have recently experienced political instability. Sub-Saharan Africa received just 58% of the total inflows to Africa in 2005, which is quite small relative to its size and population. Figure 2 shows trends in foreign direst investment performance in Sub-Saharan Africa from 1993 to 2002.

FIGURE 2

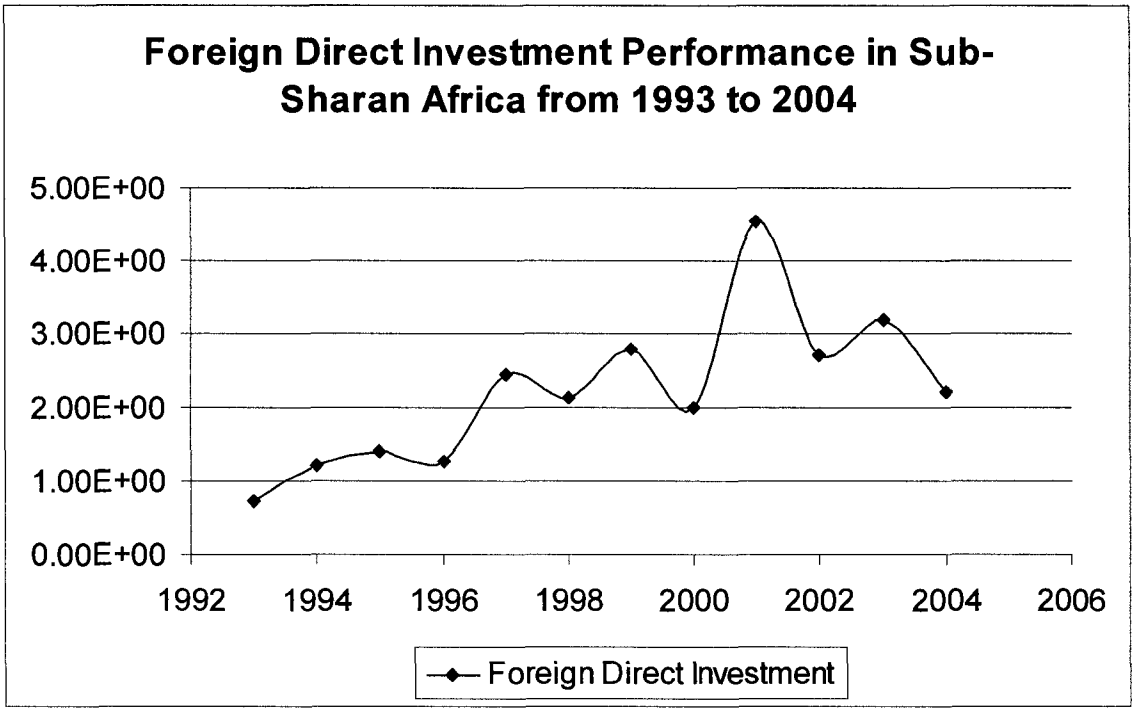


Source: World Investment Report UNCTAD (2006)

According to Fig 2, the year 1993 recorded the lowest inflow; about 1% of GDP and 2001 witnessed the highest inflow, 4.5% though not quite impressive. The overall trend indicates that foreign direct investment as a proportion of gross domestic investment is very small as compared to Latin America and the Caribbean which recorded an average of 9.3% over the same period. Sub-Saharan African countries need to attract more FDI in order to close the savings gap and break the foreign exchange constraint as suggested by the two-gap model. FDI inflows can help African economies to achieve and sustain an average GDP growth rate of 7% suggested by the Economic Commission for Africa as sufficient to help reduce the percentage of people in poverty by half by 2015. Empirical studies have shown that market size, labor costs, openness of the economy, taxes and tariffs, political instability, corruption, poor infrastructure and inflation are the key determinants of direct investment (Morriset, 2001; Asiedu, 2002; Reinhart and Rogoff, 2002). Thus policies and strategies that significantly increase market size, enhances labor skill acquisition, minimizes political instability, reduces corruption among public

officials to the barest minimum, improves infrastructure and, increases macroeconomic stability would at least improve the attractiveness of the investment climate in Sub-Saharan Africa.

FIGURE 3



SOURCE: World Development Indicators (2006)

Democracy and Investment performance

There are three schools of thought on the impact of democracy on private investment; the compatibility school, the conflict school and the skeptics school according to Feng (2003). The compatibility school argues that democracy enhances private investment because a lack of government repression and the presence of freedom may reduce capital flight resulting in an increase in private capital formation (Kormendi and Meguire, 1985; Pastor and Hilt, 1993; Pastor and Sung, 1995; Helliwell, 1994). On the other hand the conflict school contends that the authoritarian system of government

with a strong political base is more likely to attract private investment than democracy especially in developing countries (Gerschenkron, 1992; O'Donnell, 1978; O'Donnell and Schmitter, 1986; Root, 1996). The negative impact of democracy on capitalist development according to Pastor and Sung (1995) was a major issue for classical thinkers. Democracy is generally thought to be a disincentive to investment in two ways. First, Huntington and Dominique (1975) suggest that democracy increases the national propensity to consume thereby depleting the available resources for savings which is a major determinant of investment expenditure. Przeworski and Limongi (1993) expressed a similar sentiment that the channel through which democracy impedes economic growth is the increased demand for immediate consumption, which reduces the availability of capital for investment investment. Second, the median voter theorem suggests that democracy allows the median voter to redistribute resources from the capital owner towards the poor thus reducing work effort, savings, and investment It is generally contended that democracy substitutes the "one dollar one vote" system of the market place with "one man one vote" regime of the ballot box. Since the median voter is the one that casts the deciding vote in the majoritarian system of governance is not likely an owner of capital, the median voter will vote to redistribute wealth in favor of the poor. Some economists also echo the concern that the extensive political rights the poor voter enjoyed under democracy may create an avenue for capital expropriation (Dornbusch and Edwards, 1991; Persson and Tabellini, 1990; Alesina and Rodrik, 1994). The disconnection between the "person rights" and "property rights" explains the reason why leading democracy such as Britain and the United States initially restricted the franchise to property owners. However, Feng (2001) discounted this view and argues that

democratic system is generally established on a wider support base and involves compromises which to some extent guarantee the efficiency and security of the political process more than autocracy. Autocratic regimes generally pose a false semblance of government stability but lack legitimacy which is a fundamental requirement for regime stability. Besides, political adjustment under a democratic system of government minimizes long-term radical political change while the prospect of a peaceful regime change under autocracy is doubtful. Private investors caught between the two political systems will prefer democracy because democracy institutionalizes the redistribution system and reduces income inequality. Therefore democracy promotes a strong middle-class and reduces the probability of the poor expropriating the assets of the rich (Feng, 2003; 2001; Pastor and Sung, 1995). Finally, the skeptics school also known as the coalition thesis holds that political institutions have no effect on private investment but rather domestic coalitions of bankers, government bureaucracies, and labor influence private investment. Maxfield (1990), the main exemplar of this school, argues that the institutional and organizational capacity of banks leads to particular economic policy patterns that have an impact on the integration of financial markets. In the presence of a strong connection between bankers and industry and the relationship between the banks and the state is dictated by autonomous monetary authorities, the strong connection between banks and industry is likely to result in economic policy pattern that favors free capital mobility. Therefore when an economy experiences high inflation and high taxation there is likely to be a capital flight and a resultant shortage of domestic industrial capital. Using Argentina, Brazil and Mexico as examples, Maxfield rejects the view that political-regime type has a fundamental impact on capital flight and domestic investment.

The coalition thesis may not apply to many Sub-Saharan African countries because the key assumption of central bank autonomy is nonexistent.

Empirical Literature

It is very difficult to organize the empirical literature on the determinants of private investment around major themes. However, the empirical literature can be broadly classified into two. First those that address only macroeconomic variables and policies and second, those that focus on the influence of the political environment on private investment activities in addition to macroeconomic issues. With respect to space or place, some of the studies focus on developing countries in general or regions for instance Africa or Latin America and country specific studies. The commonality among these studies is the agreement on the measurement of the dependent variable; private investment as the ratio of gross private investment to GDP. The independent variables differ among the studies depending upon the model being estimated or the hypothesis being tested. The independent variables identified in the literature include the growth rate of GDP, per capita income, real exchange rate, credit to the private sector, public investment as a percentage of GDP, inflation rate, real interest rate, the debt burden measured as the ratio of external debt service payments to the export of goods and services and the ratio of the country's stock of external debt to its nominal GDP. The political variables are political freedom computed from political rights and civil liberties scores (used to operationalize democracy), political instability also constructed from the standard deviation of political freedom and policy uncertainty measured by the standard deviation of relative political extraction (Feng, 2001).

Wai and Wong (1982) explore the determinants of private investment based on a modified version of the flexible accelerator theory of investment for five developing countries using time series data from 1960 to 1974. The independent variables included in the model are private sector output, change in bank credit to the private sector, government investment, net capital inflow to the private sector and private capital stock The results of the study show that government investment, change in bank credit to the private sector and net capital inflow to the private sector are significant in explaining private investment in these countries although the relative significance of these variables differ across countries.

Blejer and Khan (1984) examine the influence of macroeconomic policies on private investment for 24 developing countries using a least squares dummy variable estimation technique (LSDV) over the period 1971 to 1979. The results of the study indicate that change in credit to the private sector and change in output exert a significant positive impact on private investment. However, the level of public investment shows a positive relationship while the change in public investment exerts a negative impact.

Musalem (1989) estimates time series data for Mexico from 1960 to 1987 and finds that private investment is positively related to public investment and real exchange rate especially for new capital equipment but negatively related to real interest rate. The results confirm the complementarity between private investment and public investment and expansionary effect of devaluation on private investment.

Balassa (1988) estimates cross-sectional data for 21 developed and 94 developing countries for the 1973-84 periods and finds that public and private investments are negatively related, with an increase in public investment resulting in a decrease in private

investment. The estimates further indicate a negative correlation between the share of public investment in total investment and the size of the incremental output-capital ratios, which shows a lower efficiency of public capital as compared to private capital.

Serven and Solimano (1991) analyzed the effects of macroeconomic adjustment and reform efforts on private investment in 29 developing countries using annual time series data from 1970 to 1988. The econometric results show that the real growth of output has a significant positive impact on private investment, and public investment has a positive effect on private investment after one-year. In addition, the foreign debt-burden measured as the ratio of external debt stock to gross domestic product exerts a strong and negative impact on private investment.

Greene and Villanueva (1991) analyzed the effects of macroeconomic variables on private investment for 23 developing countries from 1975 to 1987 using pooled time series and cross section approach. The results of the study indicate that private investment is positively related to real GDP growth, level of per capita GDP, and the rate of public sector investment. The real interest rates, domestic inflation, the debt service ratio, and the ratio of debt to GDP were found to be negatively related to private investment.

Faini et al (1990) analyzed the effects of real exchange rate, debt and foreign exchange availability on private investment for 83 developing countries using annual data from 1978 to 1988. The results of the study indicate that the debt burden and real exchange rate have a negative impact on private investment while the availability of foreign exchange enhances investment. A further implication of the results is that real exchange rate appreciation has a promotional impact on the private investment while exchange rate depreciation has a negative impact on private investment.

Oshikoya (1994) focuses on the determinants of private investment in Africa using data on eight African countries from 1970 to 1988 on combined, and separate pooled data for middle, and low income countries. The study implies that increases in real output (GDP) have a positive impact on private investment for both group of countries although at different significant levels. Public investment appears to be positively related to private investment for both groups significantly. This result fails to reject the hypothesis that public investment crowds out the private sector. The impacts of real exchange rates, domestic inflation rates and change in terms of trade on private investment behavior differ between the middle and low income countries in terms of magnitude and levels of significance. The real exchange rate has a positive effect on investment in middle income countries, but negative, small and insignificant for low income countries. Inflation rates have a negative and significant impact on investment for low income countries but a positive effect for middle income countries. Changes in the terms of trade are weak because of the insignificant negative coefficients. Credit availability, debt service ratio and lagged private investment have similar effects on private investment in both country groupings. The large or higher significant coefficient of the lagged dependent variables suggest that there is a strong inertia in private investment in both country groups. The standardized coefficients however suggest that the lagged debt service ratio, domestic inflation, public investments and the real exchange rate had the most impact on private investment in middle income countries. Credit to the private sector, the domestic inflation rate, the GDP growth rate and the debt-service ratio had the largest impact on private investment rates in low-income countries.

Pastor and Sung (1995) examine the influence of democracy[1], political and operations risk[2] ,and worker share of income measured as employee earnings as percentage of value added in manufacturing on private investment for 15 developing countries from 1973 to 1986. Following Blejer and Khan (1984) and Greene and Villanueva (1991), the expected growth rate of GDP, change in credit to the private sector, growth rate of public sector investment, inflation rate, coefficient of variation of the inflation rate, debt to GDP ratio, and per capita income are introduced into the investment model as control variables, and country specific dummies are added to capture inter-country differences. The model is estimated using an ordinary least squares-dummy variable (OLS-DV) approach and, the random effects (RE) regression technique. For the OLS-DV results, all the economic control variables are significant except per capita income and change in credit to the private sector , which are weakly significant. In addition the pro-democracy hypothesis of the study is confirmed. The random effects estimation of the full model further reinforced the finding that democracy can indeed exert a positive influence on private investment decision making. However, the findings of the study should be accepted with caution because only one country from Africa (Kenya) was included in the sample, an important control variable, the real exchange rate, was also excluded. Finally, there were many missing observations some of which were estimated. The consequence was a reduction in the sample size from 30 to 15. Feng (2001) on the other hand examined the impact of political freedom, political instability and policy uncertainty on private investment for forty developing countries using average

[1] Pastor and Sung (1995) employed Gurr (1990) measure of democracy which is a composite index derived by adding together measures of the competitiveness of political participation, competitiveness of executive recruitment, openness of executive recruitment and constraints on the executive among others.
[2] The risk measure is a composite of quantitative assessments of political, economic and policy characteristics developed by the Business Environment Risk Intelligence, S.A. (BERI).

data from 1978 to 1988. The study used expected growth rate, inflation, variability of inflation, primarily school enrollments, and public investment as economic control variables. The results of the study indicated that political freedom promotes private investment, while political instability and policy uncertainty adversely affect private investment. The signs of all economic control variables are consistent with a priori expectations except for public investment, which indicates a negative relationship with private investment, thus supporting the crowding out hypothesis.

Summary of empirical literature

The review of the empirical literature has shown first that, the growth of real output exerts a positive impact on private investment. This positive effect has been confirmed by studies undertaken by Green and Villanueva (1991), Serven and Solimano (1991), Oshikoya (1994), Wai and Wong (1982) and Blejer and Khan (1984). Second, the effect of public investment on private investment had been found to be of mixed consistency with the theoretical literature. Wai and Wong (1982), Musalem (1989), Greene and Villanueva (1991), Blejer and Khan (1984) find a positive impact of public investment on private investment while Balassa (1988) and Feng (2001), find a negative effect of public investment on private investment. Third, credit availability exerts a positive impact on private investment. This has been confirmed by studies undertaken by Fry (1981), Blejer and Khan (1994), Wai and Wong (1982) and Oshikoya (1994). However, Pastor and Sung (1995) find no significance effect. Fourth, the real interest rate has been identified as a factor affecting private investment, and Greene and Villanueva (1991) and Musalem (1989) found a negative impact of real interest rate on private investment. Fifth, inflation rate as a measure of uncertainty has been found to

exert a negative impact on private investment. This negative impact has been confirmed by Greene and Villanueva (1991), but Oshikoya (1994) finds a positive effect of inflation for a group of middle income African countries. The level of per capita income has been found to be a factor affecting private investment positively. Greene and Villanueva (1991) find a positive effect while Pastor and Sung (1995) finds only a weakly significant positive effect. Furthermore, according to the empirical literature, the real exchange rate is a factor affecting private investment. Musalem (1988) finds a positive impact of the real exchange rate on new capital equipment for Mexico, while Faini et al (1990) find a negative effect for a group of 83 developing countries. Oshikoya (1994) finds a positive effect of the real exchange rates for middle income countries, but a negative and insignificant effect for low income countries in Africa. Again the external debt burden has been found as a determinant of private investment in the empirical literature. Serven and Solimano (1991) find a negative impact of the external debt burden on private investment for 29 developing countries while Greene and Villanueva (1991), also find a similar effect for 23 developed countries. Oshikoya (1994) finds a similar effect for eight African countries. In addition, the terms of trade as another indicator of uncertainty affects private investment. Oshikoya (1994) finds a negative but insignificant effect for the terms of trade on private investment for a group of middle income and low income countries in Africa. Finally, for a group of 15 developing countries and 42 developing and OECD countries, Pastor and Sung (1995) and Feng (2001) confirmed the positive impact of democracy on private investment, albeit using different measures of democracy.

The review of the literature has shown that private investment is a complex phenomenon to explain. This assertion is supported by the ambiguity in the theoretical literature especially with respect to the impact of real exchange rate, public investment and democracy on private investment. For instance while one strand of the literature suggests that public sector investment may impact negatively on private investment because of the crowding out effect, another strand implies a positive effect of public investment on private investment Furthermore, empirical results are mixed on the impact of public investment and real exchange rate on private investment. According to Serven and Solimano (1991) a significant drawback of most of the studies that find mixed results with respect to the impact of public investment on private is that they failed to consider the separate effects of infrastructure projects such as roads, bridges, hydroelectric dams, and irrigation on private investment. Also, exchange rates are overvalued in most developing countries with its distortionary effects on domestic price of inputs and output, thereby making it very difficult to capture the true effects of the exchange rate on private investment. Again the choice of explanatory variables is not consistent across studies but largely depends on the theoretical and hypothetical assumptions of the study in question. Besides, the literature has demonstrated that there is dearth of studies on Sub-Saharan Africa except for Oshikoya (1994). The study of private investment performance in Sub-Saharan Africa warrants more examination because the region lags behind other regions such as Latin America and Asia in private investment performance (Bouton and Sumlinski, 1997). Furthermore, Serven and Solimano (1993: 25) suggest that the relationship between political regime and private investment is one of the issues for further research, therefore political reforms such as democratization, political,

administrative, and fiscal decentralization and civil service reorganization deserve empirical analysis. However, no empirical work has been undertaken to examine the impact of these reforms, especially the effect of democratization on private investment in Sub-Saharan Africa. This study attempts to fill some of the gaps in the literature by examining the macroeconomic determinants of private investment including the influence of democracy, focusing on Sub-Saharan Africa from 1993 to 2002 in response to Serven and Solimano (1993). In the next chapter the economic model of private investment is described and specified and data sources and the limitations of construction of some of the variables are stated.

CHAPTER III

METHODOLOGY

Research Design

The study uses panel data to examine the influence of macroeconomic and political variables on private investment from 1993 to 2002. The panel design is preferred over cross-section and time series designs because panel data controls for heterogeneity among individual countries. Cross-section and time series studies do not control for heterogeneity thus leading to biased results. Second, panel design provides more informative data, more variability, less collinearity among variables, and more degrees of freedom and efficiency while time series and cross-section data are afflicted by collinearity. Third, panel data are better able to study the dynamics of adjustment while cross-section distributions that appear to be relatively stable mask a multitude of changes. Panel data are useful for studying the duration of economic phenomena if the panels are long enough. Fourth, panel data identify and measure effects that are simply not detectable in pure cross-section or pure time series. Finally, panel data allows data to be collected on individual countries over time thus reducing the biases resulting from aggregation. However, the use of panel data is not without problems. An obvious problem is that it involves annual data covering a short span of time for each country. Increasing the time span will lead to higher cost, an upsurge in attrition rates and increases the computational difficulty for limited dependent variable panel data models (Green, 2000; Baltagi, 1995).

Economic Model of Investment

The neoclassical investment theory formulated by Jorgensen (1967) and Hall and Jorgensen (1973) despite the limitations of its applicability to developing countries has been the starting point for early econometric studies of private investment behavior in developing countries (Wai and Wong, 1982; Blejer and Khan, 1984; Greene and Villanueva, 1991). The neoclassical economic theory of investment suggests that private investment rate is a negative function of real interest rate as a measure of user cost of capital and a positive function of the growth of real output (GDP) per capita. However, the relationship between private investment and growth of real output can readily be obtained from the flexible accelerator model where there is a fixed relationship between the desired stock of capital and the level of real output. Within the context of developing countries, the neoclassical model implies that the rate of public investment is a factor affecting private investment even though the exact relationship is ambiguous (Blejer and Khan, 1984). In addition to the variables derived from the neoclassical investment theory, McKinnon (1973) and Shaw (1973) hypothesized that in less developed countries private investment is a positive function of accumulation of real money balances due to limited access to credit and equity markets. Therefore one expects a positive relationship between private investment and real interest rate contrary to what the neoclassical model suggests.

Model Specification

Based on neoclassical investment theory and other hypotheses discussed in the literature and following Wai and Wong (1982), Blejer and Khan (1984), Greene and Villanueva (1991), Oshikoya (1994) and Feng (2001), the private investment function is generally specified as follows:

$$PIGDp_{it} = \beta_0 + \beta_1 RGDP_{it} + \beta_2 PCAP_{it} + \beta_3 PUIGDP_{it} + \beta_4 CCPS_{it} + \beta_5 RIR_{it} + \beta_6 PCCPI_{it} + \beta_7 TOT_{it} + \beta_8 IRER_{it} + \beta_9 EDPE_{it} + \beta_{10} LPIGDP_{it} + \beta_{11} PORIT_{it} + \beta_{12} CILIB_{it} + \beta_{13} SEADUM + \beta_{14} WDUM + \mu_{it}$$

The dependent variable is PIGDP, measured as the ratio of gross private investment to gross domestic product (GDP). The macroeconomic variables in the model are the growth rate of real GDP (RGDP), the per capita income (PCAP), the proportion of public investment in gross domestic product (PUIGDP), the change in credit to the private sector (CCPS), the real interest rate (RIR), the percentage change in the consumer price index (PCCPI), the index of the terms of trade (TOT), the index of real effective exchange rate (IRER), the ratio of external debt service payments to export of goods and services (EDPE), and the lagged ratio of private investment in gross domestic product. The political variables are political rights (PORIT), and civil liberties (CILIB). The control variables are availability and presence of seaport (SEADUM) and war (WDUM) respectively. The random error term is μ with all the classical assumptions, i, country, t, time and the βs are parameters or coefficients to be estimated. Various versions of the general model are estimated and the results presented in Chapter Four.

Data

The study analyzes the effects of macroeconomic and political variables on private investment in Sub-Saharan African countries using panel data from 1993 to 2002. Data on private investment, the dependent variable measured as a percentage of Gross Domestic Product (GDP) is readily available in the 2004 Edition of the African Development Indicators extracted from the World Bank Africa Database. RGDP is the growth rate of real GDP suggested by both neoclassical and accelerator theory to exert a positive impact on investment. Gross Domestic Product measures the total output of all final goods and services produced by residents and nonresidents. Growth rate of gross domestic product provides annual growth rates calculated from GDP at constant 1995 prices. PCAP is real gross product per capita based on the hypothesis that high income countries should save more and invest more rapidly than low income countries. Per capita GDP is obtained by dividing the final value of all goods and services produced in a country by a country's population. It also controls for country size in terms of population and level of economic development. PUIGDP is the ratio of public sector investment to GDP as a measure of crowding out or crowding in and its exact impact on private investment may be negative or positive depending on the quality of investment.

Change in credit to the private sector (CCPS) is an increase or decrease in credit to the private sector in millions of U.S. dollar. In consonance with McKinnon-Shaw hypothesis, its expected sign should be positive. RIR is the real interest rate as a measure of user cost of capital suggested by the neoclassical investment theory and in accordance with the neoclassical model this should exert a negative influence on private investment. However, in this study because of multiplicity of interest rates in Sub-Saharan Africa and

the existence of large financial repression real, the real discount rate is employed. The real discount rate in each year is the nominal discount rate deflated by the annual change in inflation as reflected by the consumer price index (CPI). The two variables capture the effects of monetary policy on private investment

The inflation rate (PCCCPI) is the annual rate of increase in the consumer price index. The CPI is the weighted average price of goods and services in the consumption basket selected according consumption patterns in the base year. High rates of inflation indicate macroeconomic instability which creates uncertainty in the investment climate and thus, discouraging private investment. TOT is the index of the terms of trade calculated as the ratio of a country's export unit values or prices to its import unit values or prices and it captures the impact of external shock on private investment. Unfavorable movements in the terms of trade will increase the cost of imports in terms of exports and ultimately the worsening of the current account deficits thus inducing macroeconomic instability which may negatively affect private investment. According to the expectation of the irreversibility theory of investment an increase in the terms of trade should exert a positive influence on private investment because adverse movements in the terms of trade create uncertainty in the minds of private investors which increases the rewards for waiting or delaying investment.

The index of real effective exchange rate (IRER) is a measure of real depreciation or devaluation and it is a combined measure of real exchange rate and effective exchange rate. The real exchange rate is the nominal exchange rate adjusted for relative prices between the countries under consideration while the effective exchange rate captures the movement of the exchange rate against a weighted basket of foreign

currencies. A real devaluation or depreciation increases the level of foreign prices measured in domestic currency and this results in the rise in the price of traded goods relative to non-traded goods in the domestic country. Investment in traded goods will increase as a result of devaluation whilst investment in non-traded goods will decrease. However, if domestic factor prices rise less than proportionately to the domestic currency price of final goods, devaluation or depreciation should have a stimulative effect on private investment. A decrease in the index indicates real depreciation or devaluation whilst a rise in the index shows real appreciation or revaluation. Oshikoya (1994) finds a positive and significant impact of real exchange rate for middle income countries in Africa but negative and insignificant effect of real exchange rate on private investment for low income African countries.

The ratio of external debt service payments to exports of goods and services or the debt service ratio (EDPE) is the measure of the external debt burden. It has been postulated that a heavy debt overhang decreases the incentive to invest as private investors construe it as a higher expected tax rate on future income and profits. Greene and Villanueva, 1991 and Oshikoya, 1994 find a negative and significant effect of large external debt on private investment. LRPIGDP is the lagged ratio of private sector investment to GDP (lagged dependent variable) as a test for inertia in private investment.

Democracy is measured as political rights (PORIT) and civil liberties (CILIB) scores. They are computed by the Freedom House. Political rights are ranked from 1 to 7; 1 representing the highest degree of freedom and 7 representing the lowest degree of freedom. The computation is based on national elections being held freely, fairly, and competitively in democratic countries, and opposition parties play an important role in

checks and balances. The civil liberties score also ranked from 1 to 7; 1 representing the highest degree of liberties and 7 representing the lowest degree of liberties. It is based on freedom of association, assembly, demonstration, speech, and religion, free and independent media and court system and the freedom to do businesses on an equitable basis without excessive government corruption, and freedom to organize unions and other private groups (Feng, 2001: 277-278; 2003: 44-48). Because both the political rights and civil liberties scores are measured in reverse, a negative relationship is expected between these variables and private investment. Feng (2001) combined these variables to construct political freedom but this dissertation deviates sharply from Feng's empirical work and rather follows Ghura and Hadjimichael (1996) by testing the individual effects of these variables on private investment. Pastor and Sung (1995) and Feng (2001) find a significant and positive impact of democracy on private investment performance in developing countries albeit using different measures of democracy. SEADUM is a dummy variable to capture the effects of availability and presence of seaport on private investment and it adopts a value of zero for landlocked countries and a unit value for countries located along the coast. WDUM is also a dummy variable meant to capture the effect of wars generally on private investment in Sub-Saharan Africa and a country that experiences some form of armed conflict on its territory or with its neighbor from 1993 to 2002 receives a unit value while a country that experiences no armed conflict from 1993 to 2002 obtains zero. The macroeconomic variables, the percentage change in real GDP, the ratio of public-sector investment to GDP, the change in credit to the private sector, the percentage change in the consumer price index, the index of the terms of trade, the index of real exchange rate, and the ratio of external debt service payments to export of

goods and services are extracted from the World Bank Africa Development Indicators Database 2004 and 2006 CD-ROM version and International Finance Statistics published by the International Monetary Fund.

Political rights and civil liberties scores, the only two political measures included in the model are available in the Freedom House database various issues in time series. The variables, symbols, and sources of data are summarized in Table 1.

Table 1 Variables, Symbols and Sources of Data Collection

Variable	Symbol	Source of Data
Ratio of private investment in GDP	PIGDP	World Bank African Development Indicators (ADI) 2004
Growth rate of real GDP	RGDP	African Development Indicators
Per capita income	PCAP	African Development Indicators
Public Investment in GDP	PUIGDP	African Development Indicators
Change in credit to the Private sector	CCPS	ADI (2004) and IFS, IMF 2004
Real interest rate	RIR	ADI (2004) and WDI CD-Rom 2006
Percentage change in the Consumer price index	PCCPI	WDI (2006) CD-ROM VERSION
Index the terms of trade	TOT	ADI (2004)
Index of real effective Exchange rate	IRER	ADI (2004)
External debt service payment to export of goods and services	EDPE	WDI (2006) CD-ROM VERSION
Private investment in real GDP lagged one year	LPIGDP	ADI (2004)
Political rights	PORIT	Freedom House, 2003
Civil liberties	CILIB	Freedom House, 2003
Seaport	SEADUM	
War	WDUM	

Data Description

The analysis of the data starts with the computation of the mean, the range and the standard deviation, (summary statistics) and the association among the variables. Tables 2 and 3 present the summary statistics and the correlation matrix respectively. The summary statistics show that the ratio of private investment to GDP, the dependent variable averaged 13.3% but ranges from .4% to 112% with a standard deviation of 5.2% from 1993 to 2002. The highest value of 112% was recorded in Equatorial Guinea in 1996 mainly due to investment in the oil and gas industry. The mean of the growth rate of real GDP is 3.6% and varies from a low of -50.2% to a high of 71.2% with a standard deviation of 7.4%. Rwanda experienced the lowest negative growth rate in 1994 probably due to the outbreak of the civil war, while Equatorial Guinea recorded the highest growth rate in 1997 as a result of unprecedented growth in the oil and natural gas sectors. The average per capita income is $836.9 and ranges from $60 to $7330 with a standard deviation of $1342. Seychelles recorded the highest per capita income in 1997, while Democratic Republic of the Congo registered the lowest per capita income in 1997. Public investment activity in gross domestic product according to the summary statistics varies among Sub-Saharan African countries. Its annual average is 7.4% and ranges from -7.8% to 33.1% with standard deviation of 5.2%. The change in credit to the private sector shows a positive average of $221.1m, but ranges from -$83.00m to $22,432m with standard deviation of $1477.1m. The real interest rate shows a positive mean of 1.79% over the study period but varies widely from -131% to 91% with a standard deviation of 19.51%. The percentage change in the consumer price index shows a wide variation in Sub-Saharan Africa from 1993 to 2002. Its mean is 100.63% and ranges from -9.62% in

Lesotho in 2001 to 23,773.13 in the Democratic Republic of the Congo in 1994 reflecting the economic mismanagement of the Mobutu regime with a standard deviation of 1181.48. With an average value of 44.1, the terms of trade varies from 44.1 to 1242.0 with a standard deviation of 59.87. The index of real effective exchange rate has a mean of 282.88 with a standard deviation of 3770.9. The debt-service ratio indicates that on average Sub-Saharan African countries devote 17.14% of their export earnings to service their external debts. However, this figure could be as high as 104.55% and as low as 4.5% in some cases. Political rights and civil liberties scores show an average performance of 4.54 and 4.44 respectively. These imply that on average Sub-Saharan African countries are classified as partly free. Seaport and war dummy variables are 0.65 and 0.21 on the average respectively. According to Table 3, there is a positive association among private investment, public investment, and credit to the private sector, real effective exchange rate, per capita income, political rights, civil liberties, real growth of gross domestic product, seaport, and terms of trade but a negative association with debt-ratio, inflation, real discount rate, and war. The correlation matrix does not show any serious multicollinearity among the independent variables except perhaps between credit availability and inflation (0.7) and between political rights and civil liberties (0.87).

In a preliminary estimation, the study first employs ordinary least squares (OLS) estimation technique to estimate the panel data from 1993 to 2002 for 48 Sub-Saharan African countries in order to examine the influence of the various independent variables on private investment. Ordinary least squares estimation technique is justified on the grounds of the Gauss-Markov Theorem. According to this theorem, in the class of all estimators ordinary least squares yield the best linear unbiased estimators (Pindyck and

Rubinfield, 1991). Then, fixed and random effects estimation techniques are utilized to capture country and time specific effects on the estimated coefficients as panel data lends itself easily to estimate these two models. The fixed effects approach takes the intercept term to be a group specific constant term in the regression model and that differences across units can be captured in the constant term. The random effects approach on the other hand specifies that the intercept term is a group specific disturbance similar to the error term (Greene, 2002). However, if the intercept term is assumed to be the same across all units, then ordinary least squares should yield efficient and consistent estimates. The ordinary least squares estimation technique assumes a constant variance of the error term (homoscedasticity), independence or an uncorrelated error term (no serial correlation), normality and stationarity. However, these assumptions are often times violated in time series and cross-sectional data yielding unbiased and consistent but inefficient estimates. These violations could render hypothesis tests unreliable and may also result in spurious regression with respect to the non-stationarity problem (Pindyck and Rubinfield, 1991; Gujarati, 1992; Greene, 2000).

The results of the panel least squares regressions, and both the fixed and the random effects models, are presented in the next chapter. Because of missing observations Djibouti, Eritrea, Liberia, Namibia and Somalia are not used, thus the final results are based on 43 instead of 48 countries. Time trend and averages are computed to obtain some estimates missing data, and Appendix 3 gives a detailed method of how the estimated data were obtained or generated.

Table 2. Summary Statistics

Variable	Mean	Max	Min	Std. Dev.
Ratio of private investment in GDP	13.30	112.4	0.400	5.212
Growth rate of real GDP	3.61	71.2	-50.20	7.435
Per capita income	836.9	7330	60.00	1342
Public Investment in GDP	7.4	33.1	-7.8	5.2
Change in credit to the Private sector	22.1	22,432	-83.0	1477.1
Real interest rate	1.79	91.5	-131.8	19.51
Percentage change in the Consumer price index	102.63	23773.13	-9.62	1181.48
Index of the terms of trade	100.53	1242.0	44.1	59.87
Index of real effective Exchange rate	282.88	77622.0	0.00	3770.9
External debt service Payment to export of goods and services	17.14	104.55	0.4514	15.15
Political rights	4.54	7.0	1.0	1.92
Civil liberties	4.44	7.0	2.0	1.37
Seaport	0.65	1.0	0.0	0.48
War	0.211	1.0	0.0	0.41

Table 3 Correlation Matrix

	PIGDP	PUIGDP	CCPS	CILIB	EDPE	IRER	PCAP	PCCPI	PORIT	RGDP	RIR	SEADUM	TOT	WDUM
PIGDP	1.00													
PUIGDP	0.0164	1.00												
CCPS	0.005	-0.172	1.00											
CILIB	0.057	-0.412	0.161	1.00										
EDPE	-0.210	-0.089	0.463	0.258	1.00									
IRER	0.033	-0.152	0.091	0.063	-0.041	1.00								
PCAP	0.23	0.005	-0.072	-0.382	-0.255	-0.0200	1.00							
PCCPI	-0.017	-0.075	0.768	0.090	0.219	0.0552	-0.0379	1.00						
PORIT	0.0443	-0415	0.168	0.872	0.198	0.042	-0.310	0.0889	1.00					
RGDP	0.293	0.077	-0.124	0.044	-0.166	-0.186	0.040	-0.058	0.0223	1.00				
RIR	-0.081	0.121	-0.498	-0.163	-0.246	-0.363	0.043	-0.388	-0.108	0.010	1.00			
SEADUM	0.1445	-0.035	0.099	-0.080	0.082	0.040	0.199	0.055	-0.052	0.0249	-0.130	1.00		
TOT	0.115	0.002	0.002	0.048	-0.0248	-0.021	0.016	-0.001	0.029	0.0276	-0.113	0.134	1.00	
WDUM	-0.142	-0.231	0.267	0.473	0.4065	0.100	-0.218	0.148	0.431	-0.083	-0.216	-0.220	0.0503	1.0

CHAPTER IV

RESULTS

The purpose of the empirical investigation is to estimate the effects of macroeconomic and political factors on gross private investment from 1993 to 2002 using panel least squares, fixed and random effects estimation techniques for 43 Sub-Saharan Africa countries. Panel least squares results are first presented, followed by the fixed effects results and finally the random effect results. Diagnostic results show evidence of serial correlation in the data so the study employs the lagged dependent variables approach (Pindyck and Rubinfield, 1991; Wooldridge, 2000). The lags of the dependent variable are included in the various specifications of the model to correct for serial correlation, and the results shows significant improvements in the Durbin Watson (DW) statistics. The various specifications of the general investment model estimated include the neoclassical-political rights model, neoclassical-civil liberties model, McKinnon-Shaw-political rights model, McKinnon-Shaw-civil liberties model, macroeconomic-political rights model, and macroeconomic-civil liberties model. In the neoclassical models the emphasis is on the impact of the real interest rate on private investment. The McKinnon- Shaw models posit credit availability to the private sector as (measured by the change in the dollar amount of credit to the private sector) the main determinant of private investment. The macroeconomic-political rights and civil liberties models combine both the neoclassical and McKinnon-Shaw models to analyze the joint influence of real interest rate and credit availability to the private sector on private investment. The dependent variable in all the models is the amount of gross private investment in real gross domestic product (PIGDP). The figures in parentheses are standard errors of the

parameter estimates; ***, **, and * indicate that the estimated value is significantly different from zero in a one tail-test at the 1%, 5%, and 10% error levels, respectively. Adjusted R-square and Durbin Watson statistics are reported at the bottom of each table.

Panel Least Squares

This section presents the results of the panel least squares regressions and the separate effects of geography and wars in general are analyzed in each model. The panel least squares estimation technique assumes differences among cross-sectional units can be captured in a single constant term. Table 4 presents interesting results of the neoclassical-political rights model. First, the coefficient of the growth rate of real domestic product (RGDP) is positive and significant at the 5% and 1% levels when regressed with sea (SEADUM) and war dummies (WDUM) respectively. The results confirm association between output and investment identified in early econometric studies. Second, per capita income (PCAP) which is a proxy for stage of economic development and the propensity to save and invest is positive according to expectations but its level of significance varies in the models. It is significant at the 11% level with the sea dummy but significant at the 10% level when the effect of war is controlled for. Third, public investment in gross domestic product (PUIGDP) is positively related to private investment but insignificant. The results show that an increase in public investment may complement private investment. Fourth, the real interest rate (RIR), the variable of interest in the neoclassical investment function is negative according to expectations. It is significant at the 10% level when analyzed with the influence of war but insignificant at conventional levels (10.5%) in the seaport model. Fifth, the

Table 4 Neoclassical –Political rights model of private investment: Panel Least Squares

Variables	1	2
C	1.339487	1.584404
	(1.574089)	(1.565349)
RGDP	0.100926**	0.102458***
	(0.046853)	(0.046874)
PCAP	0.000335	0.000378*
	(0.000279)	(0.000274)
PUIGDP	0.000279	0.057239
	(0.073171)	(0.073212)
RIR	-0.027790	-0.028677*
	(0.022181)	(0.022246)
PCCPI	9.19E-05	9.46E-05
	(0.000295)	(0.000295)
TOT	-0.005828	-0.005293
	(0.005423)	(0.005411)
IRER	0.000689	0.000725
	(0.001032)	(0.001033)
EDPE	-0.030753	-0.027394
	(0.024647)	(0.025709)
LPIGDP	0.775453***	0.778268***
	(0.033537)	(0.033758)
SEADUM	0.602649	
	(0.725529)	
WDUM		-0.014808
		(0.987925)
PORIT	0.326464**	0.320338**
	(0.203511)	(0.216442)
Adj R-sq	0.665449	0.664832
F-stat	70.61772	70.42514
DW	2.227246	2.229832
N	386	386

* Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level. Standard errors are in parentheses.

coefficient of the percentage change in the consumer price index (PCCPI) is positive contrary to expectations but insignificant. Sixth, the terms of trade (TOT) is negatively related to private investment contrary to expectations but, its coefficient is not statistically significant. Seventh, the real and effective exchange rate (IRER) is positively related to private investment but the relationship is not statistically significant. The implication is that currency appreciation may have a promotional effect on private investment while devaluation or depreciation exerts the opposite effect. Eighth, the external debt burden (EDPE) is negatively related to private investment according to expectations but the estimated coefficient is statistically significant at the 10% level only in the sea dummy (SEADUM) model. Ninth, the lag of private investment is positive and highly significant at the 1% level. Tenth, the availability of seaport (SEADUM) is positive but insignificant. Furthermore, the war dummy (WDUM) carries the expected negative sign but the estimated coefficient is insignificant. Finally, political rights (PORIT) are negative and significant at the 5% and 10 % levels.

In the neoclassical-civil liberties model, democracy is proxied by civil liberties and the individual effects of availability of seaport and war are analyzed in each model and the results are summarized in Table 5. First, interestingly, the coefficients of the real growth of gross domestic product (RGDP) remain significant at the 5% level. Second, the per capita income (PCAP) is positive and significant at the 10% level. Third, public investment in gross domestic product (PUIGDP) is positive but insignificant. Fourth, the real interest rate (RIR) is negative and is only significant at 13% and 14% levels. Fifth, the percentage change in the consumer price index (CCPS) is positive but insignificant.

Table 5 Neoclassical –Civil liberties model of private investment: Panel Least Squares

Variables	3	4
C	-0.130975	0.098584
	(1.907281)	(1.927873)
RGDP	0.099929**	0.101938**
	(0.046746)	(0.046768)
PCAP	0.000439*	0.000486**
	(0.000289)	(0.000286)
PUIGDP	0.078590	0.074792
	(0.073692)	(0.073659)
RIR	-0.024860	-0.026267
	(0.022188)	(0.022216)
PCCPI	0.000109	0.000113
	(0.000294)	(0.000295)
TOT	-0.006024	-0.005303
	(0.005412)	(0.005398)
IRER	0.000678	0.000732
	(0.001029)	(0.001030)
EDPE	-0.036054*	-0.030184
	(0.024869)	(0.025676)
LPIGDP	0.769196***	0.771183***
	(0.033774)	(0.034112)
SEADUM	0.677733	
	(0.725545)	
WDUM		-0.266403
		(1.001243)
CILIB	0.643276**	0.653070**
	(0.306333)	(0.330184)
Adj R-sq	0.667072	0.666359
F-stat	71.12788	70.90304
DW	2.219720	2.219000
N	386	386

* Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level. Standard errors are in parentheses.

Sixth, the index of the terms of trade (TOT) is negative and insignificant. Seventh, the real and effective exchange rate (IRER) is positive but insignificant. Eighth, the coefficient of the ratio of external debt repayment to export of goods and services (EDPE) is negative and significant at the 10% level in sea dummy equation but insignificant in the war dummy equation. Ninth, the availability of seaport (SEADUM) exerts positive but insignificant effect on private investment. Tenth, the war dummy (WDUM) is negative according to expectations but exerts an insignificant impact on private investment. Finally, civil liberties scores exert a positive impact on private investment and it is significant at the 5% levels.

A clear consensus has emerged in recent years that, in contrast to developed countries one of the principal constraints on investment in developing countries is the quantity rather the cost of financial resources. McKinnon (1973) and Shaw (1973) are the proponents of this argument. Tables 6 and 7 present the empirical results of this model of private investment in which the main variable of interest is changed from the real interest rate to credit to the private sector. First, in the political rights, sea, and war model, the growth rate of real gross domestic product capita income (RGDP) is positive and significant at the 5% and 1% levels. Second, the per capita income (PCAP) is positive and significant at the 10% level in the war equation. Third, public investment in gross domestic product (PUIGDP) is positive but insignificant. Fourth, change in credit to the private sector (CCPS), the variable of interest is positive according to expectations but statistically insignificant. Fifth, interestingly, the percentage change in the consumer price index (CCPS) is negative according to uncertainty and irreversibility of private investment hypotheses. Sixth, the index of the terms of trade (TOT) is negative and

insignificant. Seventh, the index of real and effective exchange rate is positive and insignificant. Eighth, the ratio of external debt repayments to export of goods and services (EDPE) is negative and significant at the 10% level in the sea dummy equation. Ninth, the coefficient of the lagged private investment (LPIGDP) is positive and statistically significant at the 1% level. Tenth, the availability of seaport (SEADUM) is positive but insignificant. Also, political rights (PORIT) are positive and significant at the 5% and 10% error levels. Furthermore, the effect of war (WDUM) in the political rights model is positive but insignificant. Perhaps, a possible explanation is that the threat or escalation of wars in general may cause a marginal increase in investment in inventories and plant and machinery by private businesses in the military sector in Sub-Saharan African countries and this may partially offset the fall of investment in other parts of the economy.

The results of the civil liberties model as summarized in Table 7, first, indicate that the real growth of real gross domestic product (RGDP) is significant at the 5% and 1% levels. Second, the per capita income (PCAP) is positive and significant at the 10% and 5% levels. Third, interestingly, public investment in gross domestic product (PUIGDP) is positive and its coefficient approaches the 10% significant level. Fourth, the coefficient of change in credit to the private sector (CCPS) exerts a positive but insignificant impact on private investment. Fifth, the percentage change in consumer price index (PCCPS) retains its negative coefficient but insignificant. Fifth, the coefficient of the index of the terms of trade is negative but insignificant. Sixth, the real and effective exchange rate is positive but insignificant at the 5% level. Seventh, the debt service ratio (EDPE) maintains its negative coefficient and significant at the 10% level.

Eighth, the lagged of private investment in gross domestic product (LPIGDP) is significant at the 1% level. Ninth, the coefficients of seaport (SEADUM) and war dummy (WDUM) are positive and negative respectively but insignificant at 5% levels. Finally, civil liberties exert a negative impact on private investment and its coefficient is significant at the 1% level.

The final version of the panel least squares regression in Table 8 is the macroeconomic-political model where the impact of both real interest rate and credit to the private sector on private investment are analyzed in addition to other macroeconomic variables and democracy. Democracy is proxied by the political rights and civil liberties scores, and the results are presented in Table 8.

First, the results of the macroeconomic-political model of private investment suggest that the coefficient of the rate of growth of gross domestic product (RGDP) is positive and statistically significant at the 5% level. Second, the per capita income (PCAP) is positive and significant at the 5% level. Third, public investment in gross domestic product (PUIGDP) is positive but insignificant. Fourth, real interest rate (RIR) is negative but insignificant. Fifth, the change in credit to the private sector (CCPS) is positive but insignificant. Sixth, the coefficient of percentage change in consumer price index (PCCPI) is negative but insignificant. Seventh, the index of the terms of trade is (TOT) negative but insignificant. Eighth, the real and effective exchange rate (IRER) is positive but insignificant. Ninth, the ratio of external debt repayment to export of goods and services (EDPE) is negative and significant at the 10% level. The lagged ratio of private investment in gross domestic product (LPIGDP) is positive and significant at the

Table 6 McKinnon –political rights model of private investment: Panel Least Squares

Variables	5	6
C	1.084606	1.354721
	(1.559614)	(1.555948)
RGDP	0.102070**	0.103620**
	(0.047096)	(0.047123)
PCAP	0.000327	0.000373*
	(0.000280)	(0.000276)
PUIGDP	0.067671	0.065418
	(0.074076)	(0.074120)
CCPS	0.000323	0.000328
	(0.000398)	(0.000399)
PCCPI	-4.71E-05	-4.45E-05
	(0.000438)	(0.000438)
TOT	-0.004884	-0.004314
	(0.005395)	(0.005384)
IRER	0.001064	0.001112
	(0.000976)	(0.000978)
EDPE	-0.035697*	-0.032656
	(0.027865)	(0.028804)
LPIGDP	0.775178***	0.778572***
	(0.033891)	(0.034097)
SEADUM	0.642124	
	(0.729035)	
WDUM		0.051146
		(0.991869)
PORIT	0.329397**	0.317271*
	(0.204664)	(0.217939)
Adj R-sq	0.664604	0.663907
F-stat	69.99388	69.77858
DW	2.212828	2.216058
N	384	384

* Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level. Standard errors are in parentheses.

Table 7 McKinnon –civil liberties model of private investment: Panel Least Squares

Variables	7	8
C	-0.530991	-0.309242
	(1.866726)	(1.896729)
RGDP	0.101448**	0.103579**
	(0.046943)	(0.046976)
PCAP	0.000446*	0.000497**
	(0.000290)	(0.000287)
PUIGDP	0.093283*	0.089732
	(0.074893)	(0.074889)
CCPS	0.000393	0.000405
	(0.000398)	(0.000399)
PCCPI	-0.000106	-0.000104
	(0.000437)	(0.000438)
TOT	-0.005201	-0.004388
	(0.005381)	(0.005367)
IRER	0.000986	0.001064
	(0.000973)	(0.000975)
EDPE	-0.044841**	-0.038764*
	(0.028286)	(0.028825)
LPIGDP	0.766591***	0.768751***
	0.034223	0.034598
SEADUM	0.717716	
	(0.728171)	
WDUM		-0.275270
		(1.007140)
CILIB	0.690125**	0.701381**
	(0.690125)	(0.332506)
Adj R-sq	0.666790	0.665987
F-stat	70.67508	70.42383
DW	2.203884	2.202310
N	384	384

* Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level. Standard errors are in parentheses.

Table 8 Macroeconomic –political model of private investment: Panel Least Squares

VARIABLES	9	10
C	1.641216 (1.555338)	0.193532 (1.876039)
RGDP	0.103622** (0.047033)	0.103281** (0.046914)
PCAP	0.000373* (0.000275)	0.000483** (0.000286)
PUIGDP	0.062193 (0.074041)	0.084152 (0.075027)
RIR	-0.025479 (0.023151)	-0.021318 (0.023195)
CCPS	0.000202 0.000414	0.000289 0.000415
PCCPI	-6.25E-05 (0.000438)	-0.000113 (0.000438)
TOT	-0.005177 (0.005410)	-0.005254 (0.005397)
IRER	0.000732 (0.001034)	0.000728 (0.001032)
EDPE	-0.033787* (0.027607)	-0.041471* (0.027982)
LPIGDP	0.776275*** (0.033734)	0.769320*** (0.034027)
PORIT	0.318589** (0.204342)	
CILIB		0.639387** (0.307628)
Adj R-sq	0.664995	0.666677
F-stat	70.11517	70.63955
DW	2.228862	2.217942
N	384	384

* Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level. Standard errors are in parentheses.

1% level. Finally, the coefficients of political rights and civil liberties are positive and significant at the 5% level.

The results of the panel least squares indicated that the growth rate of real output, per capita income, real interest rate, debt service ratio, past level of private investment in gross domestic product, political rights and civil liberties are the significant factors affecting private investment in Sub-Saharan Africa. The adjusted R-Squares which are statistically significant at the 1% level indicate that on average the general investment model explains about sixty-six percent (66%) of the variation in private investment.

The Fixed Effects Model

This section presents the results of the fixed effects model. The fixed effects model assumes that differences across cross-sectional units are a country specific term which can be captured in the constant term. The estimation is based on macroeconomic and political rights-civil liberties model and to prevent the model from being near singular, time invariant variables of sea port availability and war are deleted from the model. Again, to minimize the problem of exogeneity between amount of private investment in gross domestic product and the growth rate of real gross domestic product, the effect of growth rate of real gross domestic product is lagged one year. Table 9 shows interesting results of the effects of macroeconomic variables and democracy measured as political rights and civil liberties scores on private investment.

The results of the fixed effects model suggest that first, the effect of growth rate of real gross domestic product (RGDP) is significant at the 10% level in both models. Second, surprisingly and contrary to expectations, per capita income (PCAP) is negative and significant at the 5% level. Third, public investment in gross domestic product

(PUIGDP) is positive but insignificant at the 5% level. Fourth, real interest rate (RIR) is positive but insignificant at the 5% level contrary to expectations of neoclassical investment theory but consistent with McKinnon-Shaw hypothesis. McKinnon (1973) and Shaw (1973) contended that in the presence of huge financial repression in developing countries firms would not equate the marginal product of capital to real interest rate hence one should expect a positive relationship between private investment and real interest rate. Fifth, the change in credit to the private sector (CCPS) is positive according to expectation but its coefficient is not significant at the 5% level. Sixth, the percentage change in consumer price index (PCCPI) carries the expected negative sign but its coefficient is not significant at the 5% level. Seventh, the index of the terms of trade exerts a negative impact on private investment contrary to expectations and its coefficient approximates the 10% significant level. Eighth, the index of real and effective exchange rate (IRER) is positive but its coefficient is not significant at the 5% level. Ninth, the external debt-service burden (EDPE) exerts negative but insignificant impact on private investment. Tenth, the effect of private investment after one year is positive and statistically significant at the 1% level indicating a strong inertia in private investment. Finally, the impact of political rights (PORIT) and civil liberties (CILIB) are negative according to expectations implying that improvement in political rights and civil liberties has a promotional effect on private investment albeit not statistically significant at the 5% level.

The Random Effects Model

The random effects estimation technique is based on the assumption that cross-section sample countries are drawn randomly from a much larger population, and thus there is no correlation between the explanatory variables and the error term. Table 10 presents the interesting results of the random effect estimation technique. First, the random effects results suggest that the effect of the growth rate of real gross domestic product (RGDP) on private investment is significant at the 1% level. Second, the level of per capita income (PCAP) is positively related to private investment and the estimated the coefficients are significant at the 10% and 5% levels respectively. Third, the effect of public investment in gross domestic product (PUIGDP) is positive but insignificant at the 5% level. This result supports the complementarity between the private and public investments hypothesis because public investment in roads, bridges and irrigation dams enhances the productivity of private capital. Fourth, the coefficient of the real interest rate (RIR) is negative according to expectations of the neoclassical investment theory but its effect is not statistically significant at the 5% levels. Fifth, the change in credit to the private sector (CCPS) is positive according to expectations but lacks statistical significance at the 5% level. Sixth, the percentage change in the consumer price index (PCCPI) is negatively related to private investment but insignificant at the 5% level. Seventh, the terms of trade exert a negative but insignificant effect on private investment. Eighth, the coefficient of real and effective exchange rate (IRER) is positive but insignificant at the 5% level. Ninth, the ratio of external debt service repayment to the export of goods and services (EDPE) is negative and significant at the 10% level.

Table 9 Macroeconomic –political model of private investment: Fixed Effects Method

VARIABLES	11	12
C	12.40541 (3.397219)	11.85834 (4.288392)
RGDP	0.080417** (0.051405)	0.079335* (0.051467)
PCAP	-0.004673** (0.002561)	-0.004656** (0.002571)
PUIGDP	0.016498 (0.128931)	0.015346 (0.128962)
RIR	0.033182 (0.033163)	0.031230 (0.032946)
CCPS	0.000554 (0.000650)	0.000540 (0.000650)
PCCPI	-0.000370 (0.000536)	-0.000364 (0.000536)
TOT	-0.006804 (0.005656)	-0.006769 (0.005659)
IRER	0.000274 (0.001082)	0.000249 (0.001083)
EDPE	-0.026681 (0.051212)	-0.024317 (0.051007)
LPIGDP	0.489658*** (0.051525)	0.490238*** (0.051531)
PORIT	-0.214106 (0.422125)	
CILIB		-0.104197 (0.705479)
Adj R-sq	0.687787	0.687559
F-stat	14.83159	14.81690
DW	1.925444	1.926259
N	384	384

* Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level. Standard errors are in parentheses.

Table10 Macroeconomic –political model of private investment: Random Effects Method

VARIABLES	13	14
C	1.641216	0.193532
	(1.499257)	(1.812651)
RGDP	0.103622***	0.103281**
	(0.045337)	(0.045329)
PCAP	0.000373*	0.000483**
	(0.000265)	(0.000276)
PUIGDP	0.062193	0.084152
	(0.071372)	(0.072492)
RIR	-0.025479	-0.021318
	(0.022316)	(0.022412)
CCPS	0.000202	0.000289
	(0.000399)	(0.000401)
PCCPI	-6.25E-05	-0.000113
	(0.000422)	(0.000423)
TOT	-0.005177	-0.005254
	(0.005215)	(0.005215)
IRER	0.000732	0.000728
	(0.000997)	(0.000997)
EDPE	-0.033787*	-0.041471*
	(0.026611)	(0.027037)
LPIGDP	0.776275***	0.769320***
	(0.032518)	0.032878
PORIT	0.318589**	
	(0.196974)	
CILIB		0.639387**
		(0.297234)
Adj R-sq	0.664995	0.666677
F-stat	70.11517	70.63955
DW	2.228862	2.217942
N	384	384

* Significant at the 10% level; ** Significant at the 5% level; *** Significant at the 1% level. Standard errors are in parentheses.

Tenth, the coefficients of the political rights and civil liberties are positively related to private investment and significant at the 5% level. Finally, the effect of private investment after one year is positive and highly significant at the 1% level.

The Hausman Test

The analyses so far have shown that the fixed effects and random effects estimation techniques have provided different results. Therefore, the inevitable question is which should be used? Hausman (1978) provided the correlated random effects test. The Hausman Test has a Chi-square distribution with degrees of freedom corresponding to the number of explanatory variables. The test excludes the constant term(s) in the model. The null hypothesis is that the individual effects are uncorrelated with the regressors in the model. The alternative hypothesis is that the individual effects are correlated with the regressors in the model. Therefore, the rejection of the null hypothesis implies that the fixed effects should be estimated. Table 11 provides a summary of the Hausman Test, the test statistics and the corresponding p-values.

Table 11: Correlated Random Effects- Hausman Test

Test Summary	Chi-Sq Statistics	Chi-sq. d.f.	Prob.
Cross- section (PORIT)	61.695031	11	0.000
Cross-section (CILIB)	59.73006	11	0.000

The foregoing has presented the results of the panel least squares, fixed and random effects estimation techniques of the private investment model and the Hausman Test. The original regression results of all the models can be referenced under Appendix 4. The next chapter discusses the results within the context of both theoretical and empirical literature, and the policy implications of the results are highlighted. In addition the chapter provides limitations of the study, directions for future research and conclusion.

CHAPTER V

FINDINGS, DISCUSSIONS AND CONCLUSION

An empirical analysis of macroeconomic and political determinants of private investment in Sub-Saharan Africa demands systematic study because the region lags behind the rest of the world in promoting private investment and improving democratic governance. This study is grounded in neoclassical investment theory, and investigates the McKinnon-Shaw hypothesis and other hypotheses which emphasize the influence of macroeconomic, political and geographical factors in explaining private investment behavior. The literature review demonstrates a dearth of studies focusing on Sub-Saharan Africa and little understanding of the determinants of private investment. The research problem for the study is the fact that the factors influencing private investment promotion in a region implementing structural adjustment policies (SAPs) and political reforms are not known. Therefore the study seeks to answer the question: What are the macroeconomic and political determinants of private investment in Sub-Saharan Africa from 1993 to 2002? The answers to the research question are indicated in the discussion of the findings.

Data for the study are obtained from the World Bank African Development Indicators (ADI) 2004, the World Development Indicators (WDI) 2006 CD-ROM Version, the International Financial Statistics, 2004 and Freedom House, 2003. Because of missing values, the investment function is estimated only for 43 out of 48 Sub-Saharan African countries. The estimation techniques used to estimate the data are panel least squares, the fixed effects and random effects methods.[3]

[3] EXCELL, SPSS, and EVIEWS are the computer software programs employed to analyze the data.

Discussions

Private Investment and Macroeconomic Factors

First, the study's result indicate that growth rate of real output exerts positive and significant impact on private investment in all the estimation techniques. This finding supports the accelerator theory of investment and neoclassical investment theory. At the empirical level this finding is consistent with Green and Villanueva (1991), Oshikoya (1994), Wai and Wong (1982) and Blejer and Khan (1984).

Second, per capita income as a measure of country size in terms of income and population, propensity to save, and the level of economic development is positive and significantly related to private investment except in the fixed effects model where it is negative and significantly related with private investment. The negative effect contradicts Green and Villanueva (1991) and Pastor and Sung (1995). One possible explanation is that high income countries tend to consume more and save less, thus drive interest rates up which may reduce private investment.

Third, public investment in gross domestic product exerts a positive but insignificant impact on private investment in all the models thus implying that there is complementarity between private and public sectors. Public investment in roads, health, education, irrigation and hydro electric dams and other infrastructure projects enhances the efficiency of private capital although insignificantly. This positive effect is weaker than the findings of Wai and Wong (1982), Musalem (1989) and Blejer and Khan (1984).

Fourth, the impact of the real interest rate on private investment has been found to have mixed effects with respect to the estimation techniques. The panel least squares and random effects estimation techniques indicate that real interest rate is negatively

correlated with private investment according to the expectations of the neoclassical investment theory. This finding supports the results of Greene and Villanueva (1991) and Musalem (1989). On the other hand the fixed effects estimation technique indicates a positive relationship between real interest rate and private investment. A possible explanation is that in many Sub-Saharan African countries, bank credits tend to be a reliable source of financing private investment. Thus, an increase in real interest rates tends to boost savings and eventually private investment because of the positive association between savings and private investment.

Fifth, the study finds that credit availability to the private sector is positively related to private investment, although statistically insignificant. At the theoretical level this finding is consistent with the McKinnon (1973) and Shaw (1973) hypothesis which posits that in the developing countries what matters is the quantity of credit not the cost, because firms would not equate the marginal product of capital to real interest rate due to financial repression. This finding is consistent with studies undertaken by Fry (1981), Blejer and Khan (1994), Wai and Wong (1982) and Oshikoya (1994) all of whom find similar and significance impact of bank credit on private investment. Pastor and Sung (1995) found a positive but not significant effect for a group of 15 developing countries from 1973 to 1986.

In addition, the results indicate that inflation (the percentage change in the consumer price index) as measure of macroeconomic instability and uncertainty exerts a positive impact on private investment in the neoclassical investment function but negative in the McKinnon-Shaw and the fixed effects and random effects models. The estimated coefficients however, do not indicate any significant impact on private

investment. This negative impact is consistent with similar finding by Greene and Villanueva (1991). Oshikoya (1994) on the other hand found positive effect for a group of middle income African countries. The positive association between private investment and inflation may explained by the fact that an increase in the price level tend to reduce real interest rate, thus the cost of borrowing. This may boost investment as firms may borrow at a cheaper cost to expand their plant capacity.

Furthermore, the results indicate that the terms trade as a measure of external shock is negatively related to private investment contrary to expectations. A significant aspect of the changes in the terms of trade is the resultant income effects because an increase in the terms of trade implies that the price of exports has gone up relative to the price of imports. With the same amount of physical quantity of exports, the country can now import more goods. Therefore, an increase in terms of trade may boost income, savings, and private investment. This finding corroborates Oshikoya (1994) which found similar negative but insignificant effects for a group of middle and low income African countries.

Again, the real and effective exchange rate is insignificant but positively related to private investment in all the estimated models, indicating that currency appreciation or revaluation promotes private investment. The study's finding confirms Musalem (1988) which found similar positive impact of the exchange rate on new capital import for Mexico. It also confirms Oshikoya (1994) which found a positive but insignificant effect for middle income African countries. This finding implies that currency devaluations undertaken by many Sub-Saharan African countries had no positive impact on private investment.

Finally, the results of the study indicate that the external debt burden measured as the ratio of external debt repayments to export of goods and services is negatively and significantly related to private investment. Thus, the finding confirms the debt-overhang hypothesis and empirical studies undertaken by Greene and Villanueva (1991) for 23 developing countries, Serven and Solimano (1991) and Oshikoya (1994).

Private Investment, Geography and War

The results of the study indicate that the effect of geography proxied as the availability of a seaport is positively correlated with private investment but insignificant. This negative correlation between private investment and seaport availability deserves public action because forty percent of the Sub-Saharan Africa's population lives in landlocked countries with high transportation costs and poor trade facilities (Ndulu, 2006). The effect of war in general is negative on private investment except in the McKinnon-political rights model where the coefficient becomes positive. A possible explanation for the positive effect of war on private investment is that the threat or escalation of wars in general may cause a marginal increase in investment in inventories and plant and machinery by private businesses in the military sector in Sub-Saharan African countries and this may partially offset the fall of investment in other parts of the economy.

Private Investment and Democracy

The effect of democracy proxied by political rights scores and civil liberties scores on private investment is mixed with respect to the estimation techniques.

Democracy exerts a negative and significant impact on private investment in the panel least squares and the random effects estimation techniques thus, supporting the conflict school which suggests that extensive political rights and civil liberties may be inimical to private capital formation (Gerschenkron, 1992; Root, 1996). The implication of the finding is that democratic governance reforms may significantly deter private capital formation in Sub-Saharan Africa. This finding is not surprising because the institutionalization of democratic governance has led to periodic pre-post election violence in many Sub-African countries. On the other hand the fixed effects results indicate a positive association between private investment and democracy albeit insignificantly. The positive correlation between private investment and democracy is consistent with the compatibility school which suggests that democracy promotes private investment (Pastor and Sung, 1995; Helliwell, 1994). The positive impact is consistent with studies undertaken by Pastor and Sung (1995) for 15 developing countries and Feng (2001) for 42 developing countries although using different measures of democracy. Pastor and Sung (1995) and Feng (2001), however found significant positive impact of democracy on private investment.

Policy Implications

The findings of the study have important implications for macroeconomic, democratic governance, and country level economic development policies. First growth promotes private investment according to the findings of the study. Therefore policies that directly enhance growth would promote private investment and economic development simultaneously. Second, expansionary fiscal policy that reduces credit to the private sector may reduce private investment because of the positive correlation between

credit availability and private investment. Similarly, tight monetary policy that restricts credit to the private sector and puts an upward pressure on interest rates may have the potential of contracting private investment. Third, the findings of the study have implications for exchange rate devaluation and the reduction in government deficits which are important components of structural adjustment measures. Exchange rate devaluations are likely to have adverse repercussions for investment since many Sub-Saharan African countries rely heavily on imported capital goods. Reduction in government deficits that are achieved through cuts in public investment may have adverse consequences for private investment because public investment in health, education and physical infrastructure is complementary to private investment. Fourth, debt reduction strategies should be pursued vigorously to levels that are sustainable since private investors construe high external debt levels as a future tax on capital. The present levels of debt for many Sub-Saharan African countries cannot be reconciled with the present levels of growth, thus discouraging investment, which in turn reduces the ability of the government to pay and ultimately adds to the pressures of repayment. Again, democratic governance policies should focus on empowering institutions such as the electoral commissions and the judiciary to be independent of executive influence and manipulation to reduce many pre-post election tension and violence. Finally, for country level economic development policy that aims at the attraction of new businesses and the retention and the expansion of existing businesses, the policy implication is that public investment, the growth of real output and the past level of investment attracts news businesses and the expansion of existing ones.

Contribution to Theory

The study has expanded the neoclassical investment function by adding a political dimension for Sub-Saharan African countries. The original model focuses on interest rates and macroeconomic economic factors as the main drivers of private investment. Democracy, the political variable of interest is proxied by political rights scores and civil liberties scores. Although democracy's impact on private investment is mixed, the research nevertheless provides insights into the political context in which private investment takes place.

Limitations and Directions for Future Research

The first limitation of the study is missing data and this has led to the deletion of five countries resulting in a final sample of 43. In some cases missing values are forecasted or the means are computed and used in the analysis. Second, the findings with respect to democracy in the panel least squares and random effects estimation methods should be interpreted with caution because more comprehensive measures of democracy are being developed by Kaufmann et al (2005) but the limitations are that they are not available in annual time series and only cover a short span of time. Future research could explore these measures when they become available in time series. Third, the study aggregates private investment and assumes that the various forms of investment respond in the same way. Future research that disaggregates investment into its various components would go a long way to enhance our understanding of investment behavior. Fourth, the study does not account for the effects of taxes and subsidies on private investment due to the lack of data. Finally, common to all time series data, regression

diagnostics show evidence of serial correlation. Although this has been corrected for there is no perfect method for eliminating serial correlation. The presence of serial correlation might make the estimated coefficients less significant than they actually are. Despite, these limitations, most of the findings of the study are consistent with both the theoretical and empirical literature.

Conclusion

This study examines macroeconomic and political factors affecting private investment in Sub-Saharan African countries from 1993 to 2002. This time period witnessed many economic and political events in Africa such as the implementation of structural adjustment polices and the introduction of multi-party democracy. The study utilized three estimation techniques to analyze the data: panel least squares, fixed effects and random effects. The Hausman Test statistics indicates that Sub-Saharan Africa countries are not randomly drawn from a larger population of developing countries and there is correlation between the explanatory variables and the error term. Therefore, the greatest weight is placed on the results of fixed effects estimation technique. According to the fixed effects estimation results, this study finds that the growth rate of real output, real per capita income, and the past levels of private investment are significant factors affecting private investment. Public investment, real interest rates, credit to the private sector, inflation, terms of trade and real and effective exchange rate are not statistically significant in promoting private investment in Sub-Saharan Africa. Democracy exerts the expected positive impact on private investment albeit insignificantly. This implies that in Sub-Saharan African countries where elections are held freely and fairly and in competitive environment may experience a better private investment performance than in

countries that lack basic political rights. Besides, countries that guarantee freedom of association, speech, religion, free independence of the media and court system and freedom to do business on an equitable basis without excessive government corruption would experience superior private investment outcomes. Despite, the statistical significance of the fixed effects model, the random effects model has some intuitive appeal (Greene, 2000). Therefore, in discussing the findings and the policy implications of the study, the results of the random effects model are also taken into consideration.

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Appendix 1: List of Major Economic and Political events in Sub-Saharan Africa from 1990-2002

Angola
1991. The government and UNITA conclude a peace agreement
1992. Elections held and MPLA wins a narrow majority but UNITA refuses to accept the results so fighting resumes.
1993. The UN sponsors peace talks amidst continued fighting.
1999. It is estimated that there are 1.5 million refugees inside Angola displaced by the civil war.

Benin
1990. New constitution is adopted, paving the way for political stability.
1991. Privatization or liquidation of 100 state-owned companies begins under newly elected president Nicephore Soglo.
1994. The CFA franc is devalued by 50 percent, boosting exports and increasing inflation.
1996. Kerekou defeats Soglo in an election to become president again.
2001. Kerekou wins re-election to the presidency.

Botswana
1995. The Botswana Stock Exchange was established.
1997. The Botswana Export Development Investment Authority is established.
1998. Festus Mogae is elected president.
2001. 22 Companies listed on the Stock Exchange, including 6 South African companies.

Burkina Faso
1991. A new constitution is adopted by referendum. Campaore is elected president: opposition boycotts the election.
1993. Enhanced Structural Adjustment Facility (ESAF) is signed with IMF.
1994. The CFA franc is devalued.
1998. Campaore re-elected as president in a contested election. Civil unrest sparks off following the assassination of newspaper editor, Norbert Zongo.
1999. There is a general 1-day strike over privatization, low salaries and assassination of Zongo.
2000. 22 state-owned enterprises are privatized.
2001. Burkina Fasso suffers severe drought.

Burundi
1993. Assassination of democratically elected President Melchoir Ndadaye leads to civil war.
1996. Major Pierre Buyoya becomes president in a military coup.

Cameroon
1993. Opposition political parties are legalized.
1994. Cameroon's currency, the CFA franc, is devalued by 50 percent.
1997. The government embarks on a program of structural reform in collaboration with the IMF and the World Bank, aimed at increased privatization.
2000. Work begins on the Chad-Cameroon Oil Production and Pipeline project.

Cape Verde
1990. Opposition political groups form the Movement for Democracy (MPD) In April and campaign to take part in elections.
1991. MPD wins the first multi-party election in January with majority in the National Assembly and electing Antonio Monteiro as president.
1992. A new constitution is adopted.
1996. Monteiro is reelected president.
2001. Pedro Pires, of the African Party for the Independence of Cape Verde (PAICV), is elected president by a narrow margin of 12 votes.

Central African Republic
1993. Ange-Felix Patasse is elected president.
1996-97. Several army mutinies break out over unpaid salaries and quickly degenerates into violence and widespread looting of the capital city of Bangui. Patase flees.
1997. Bangui accords are signed to reconcile of all political factions; France withdraws its troops in October.
1998. The UN sends a peacekeeping force to help maintain order throughout the legislative and presidential elections.
1999. Patasse is reelected president.
2001. More mutinies disrupt the political and economic stability of the country.

Chad
1990. Iddriss Beby takes power by military force.
1996. Constitution is voted on by referendum. Presidential elections are held.
2000. The Chad-Cameroon oil production and pipeline project begins.

Comoros
1990. Djoha is elected president.
1995. Djohar is ousted by a coup.
1996. Elections conducted and is won by Taki Abdoukarim' National Union for Democracy in Comoros (NUDC) but opposition boycotted the elections.
1997. In August, a secessionist movement headed by Abdallah Ibrahim calls for the independence of Anjouan Island.
1998. In March, over 99 percent of Anjouan citizens vote for independence in a referendum. Moheli Island declares independence. Troops are sent to restore order.
1998. President Taki dies amid rumors of a political assassination. An interim government is formed under Tadjine Ben Siad Massoude.
1999. Colonel Azali Assoumani takes power through a coup and imposes military rule.
2001. Anew constitution and new national government are established.

Congo, Democratic Republic of the
1990. The United States ends its economic and military support to Mobutu because of corruption and human rights abuses.
1991. Domestic and international pressure mounts and Mobutu agrees to form coalition government with UDPS leader Etienne Tshisekedi.
1992. The multiparty constitutional conference resumes amid squabbling and continued unrest.
1994. Approximately 500,000 Rwandan ethnic Tutsi's killed by Rwandan ethnic Hutus. About 1.3 million Rwandan ethnic Hutus flee into eastern Zaire to escape retribution from the new Tutsi government. Among the refugees are Hutus responsible for the massacre.
1996. Revolt in Eastern Zaire because Zairean Tutsi's threatened by Hutus. Uganda and Rwanda seize the opportunity to select veteran guerrilla fighter Laurent Kabila to invade eastern Zaire.
1997. Kabila's army, composed mainly of Rwandans and Ugandans, takes Kinshasa and Mobutu flees into exile and Kabila appoints himself as the president and changes the country's name back to Democratic Republic of Congo.
1998. Kabila ejects his Rwandan followers which starts a war backed by Rwanda and Uganda against him. Rebel activity unofficially divides the Congo into three regions.
2001. President Laurent Kabila is assassinated and his son Major General Joseph Kabila appointed as interim president.

Congo, Republic of the
1991. Congo return to multiparty democracy under a new constitution and the country's name changed back to the Republic of the Congo.
1992. Sassou-Nguesso is defeated in the presidential elections by Pascal Lisouba. Later, Lissouba is accused of ethnic favoritism and armed factions loyal to Sassou-Nguesso rise against him.
1997. Civil war breaks out in Brazzaville, which results in Brazzaville's destruction. Later that year, Sassou-Ngueso overthrows Lissouba with assistance from Angola.

Cote d'Ivoire
1990. Opposition parties are legalized. Houphouet-Boiney is re-elected under first multi-party elections.
1993. Houphouet-Boiney president since independence in 1960 dies and Henry Konan Bedie, president of the national assembly succeeds him.
1994. The CFA franc was devalued in January by 50 percent to prepare the grounds for economic reforms and sustained period of economic growth.
1995. In October, Konan Bedie wins 95 percent of the presidential votes in the face of widespread opposition boycott.
1998. The constitution is amended in August strengthening the powers of the president and barring the Quattara from standing in the 2000 presidential election.
1999. Bedie is ousted in a coup, and a military government under Robert Guei is installed.
2000. Laurent Gbagbo declared himself president after attempt by Robert Guei to declared himself the winner.

Djibouti
1991. Civil war with the Afars commences in the North and the rebel group FRUD is formed.
1992. Multiparty elections under new constitution return Ghouled and his PRP party to power.
1994. Peace accord is signed, ending the 3-year uprising by Afar rebels.
1996. Proposed budget cuts cause a general strike and civil unrest.
1997. Multiparty elections return FRUD-RPP alliance with Ghouled as president.
1998. A border dispute between Ethiopia and Eritrea leads to an increase in trade though Djibouti.
1999. Successor to Ghouled, Ismael Guelleh, wins the presidential elections.

Equatorial Guinea
1991. Large oil and natural gas deposits are discovered.
1994. Investment by Mobil in the oil sector is followed by a large multinationals over the next couple of years.
1996. Multiparty won by Obiang with 98 percent of the vote but the election is widely contested as unfair.
1997. French becomes the second official language and the government claims attempted coup in May and doubles the size of the military to 2,000.
1998. Attacks on government installations in January.
1999. The ruling party increases its majority in parliament.
1999. The border dispute with Sao Tome and Principe is settled by negotiation.
1999. First university established.

Ethiopia
1991. Ethnic insurrection, a collapsed economy and the final collapse of the Derg regime. The Ethiopian Peoples Revolutionary Democratic Front (EPRDF) is democratically voted into office.
1993. Eritrea establishes its independence under a UN-monitored referendum. Ethiopia and Eritrea commence a border war that continues to restrain the development of both countries.

Gabon
1990. After much social unrest, President Bongo introduces multiparty democracy into the country.
1994. Devaluation of the CFA franc by 50 percent
1998. Bongo is reelected President with 67 percent of the vote.

Gambia
1994. A military coup overthrows Jawara. Captian Yahya Jammeh assumes presidency.
1996. Elections return Yahya Jammeh as president.
1998. IMF approves 3-year Enhanced Structural Adjustment Facility of US$27 million.
1999. Poverty Reduction and Growth Facility US$4.5 million loan from IMF is approved.

2000. Gambia receives US$91 million in debt relief under the Highly Indebted Poor Countries scheme.

Ghana
1990. Mass protest led by the Movement for Freedom and Justice, demands a national referendum to establish a multiparty system.
1992. Draft constitution approved in a referendum which allows political associations to exist. In November presidential elections return with 58.3 percent of the vote and the December Parliamentary elections return the NDC with 189 out of 200 seats.
1995. Riots in Accra in February over the introduction of the value added tax (VAT) lead to four deaths and the withdrawal of the tax.
1996. Rawlings wins re-election and the NDC retains a majority in parliament.
1999. Fall in gold prices upsets Ghana's economic recovery.
2000. John Agyekum of the New Patriotic Party gains a majority in parliament.

Guinea
1991
Multiparty politics are introduced under a new constitution.
1996. A group of army officers attempt a military coup but are unsuccessful.
1998. Conte is re-elected as president.

Guinea Bissau
1997. Guinea Bissau joins UEMOA.
1998. Civil war breaks out after Veira dismisses the army chief.
1999. Governement of national unity installed and Guinean and Segalese troops who had come to the aid of Veira withdraws.
1999. Veira is ousted. Multiparty elections are held.
2000. Kumba Iala is elected president.

Kenya
1992. The Kenyan government re-introduces multiparty politics.
2000. Kenya signs a long awaited 3-year Poverty Reduction and Growth Facility (PRGF) with the IMF and World Bank.

Lesotho
1986-97. A period of political unrest, coups, and skirmishes between rebel troops and government loyalists. Moshoeshoe II eventually gains power then dies in a car accident.
1994. Lesotho joins the Southern African Development Community (SADC).
1998. Elections held under alleged cheating and to prevent violence the government invites troops from Botswana, South Africa and Zimbabwe to help restore order. Heavy fighting ensues resulting in 80 percent of shops and businesses damaged severely.
2000. Government promises to call new elections and privatize more enterprise.

Madagascar
1992. New Constitution enacted; Ratsiraka defeated in elections by Albert Zafy.
1996. Zafy impeached by parliament; Ratsiraka returns to office.
1999. Madagascar becomes eligible for U.S. debt relief.

Mali
1992. First multiparty elections held.
1994. In January CFA franc is devalued by 50 percent, raising the prices of imports in local currency and reducing import quantity.
2000. Mali is granted debt-relief under Highly-Indebted Poor Nations program. Railway from Bamako to the coast of Dakar re-opens. Dam at central Mali to improve rice cultivation is opposed by local and environmental groups.

Mauritania
1991. A new constitution is adopted, and opposition parties are legalized.
1997. President Taya is reelected president in a landslide victory.

Mauritius
1991. A coalition MSM and MMM wins elections.
1992. The constitution is amended to make Mauritius a republic with the British Commonwealth.
2000. Anerood Jugnauth is elected president as head of a coalition between the MSM and MMM.

Mozambique
1992. A truce between RENAMO and FRELIMO signed after much destruction after much destruction and complete dissolution of the economy. FRELIMO became a legalized political party and was integrated into a newly created multiparty democratic system.
1992-1999. The World Bank and the IMF fully imposed structural adjustment programs emphasizing mass privatization, currency devaluation, foreign investment, and stabilization policies.

Niger
1991. Multiparty constitution introduced.
1993. Mahamane Ousmane is elected president.
1994. CFA franc devalued.
1996. Col. Mainassara seizes power.
1999. Mainassara is shot and Major Dauda Wanke becomes president. Wanke steps down later and Mamadou Tandja is elected president.

Nigeria
1993. Presidential election won by Abiola but annulled by Babanginda (June 23) who retires and appoints businessman Shonekan as interim ruler.
1993. Abacha outs Shonekan (November, 17) and inaugurates a brutal regime.
1998. Gen Abacha dies and his succesoor inaugurates plans for return to civilian rule.

1999. The Third Republic inaugurated with Obansajo as the elected president after gubernatorial and local assembly elections.

Rwanda
1990. Attack from a rebel group of Tutsi exiles based in Uganda and Cenatral African nations and Belgium send troops to help the Habyarimana regime defends itself.
1991. A new constitution is ratified that states that Rwanda is a multiparty democracy.
1992. Commodity price shock (coffee) continues. The World Bank imposes more privatization with proceeds going to service Rwanda's external debt.
1992. Ethnic tensions between Hutus and Tutsi's rise.
1994. President Habyarimana dies after his plane is shot down and Hutus set out to massacre all Tutsi within the country.
1994. An external rebel group (Rwanda Patriotic Front) takes control of Rwanda and forms a transitional government of national unity to oversee return to normalcy.
1996. The Rwandan government tacitly backs Kabila's efforts to overthrow the government of the Congo.
1996. Huge numbers of refugees who had fled during 1994 return to the country.
1998. President Kabila expels Rwanda's forces from the Congo and Rwanda in turn supports rebel groups in the Congo seeking Kabila's ouster.
2000. Paul Kagame a Tutsi is elected president of Rwanda in special parliamentary vote, but the government is still considered to be in transition.

Sao Tome and Principe
1990. A new constitution is approved by referendum by and allows multiparty politics.
1991. First multiparty elections
1994. Principe is granted political and administrative autonomy.

Senegal
1994. The West African Economic and Monatary Union (UEMOA) is established to replace the CEAO.
1994. The CFA franc, common currency of UEMOA, is devalued by nearly 100 percent.
2000. Abdoulaye Wade, from the Democratic Party is elected president, making him the country's first non-socialist president since the country gained independence in 1960.

Seychelles
1991. Return to multiparty political system.
1993. Third constitution is adopted.
1995. The Economic Development Act passed in attempt to attract offshore financial services; establishment of the Seychelles International Trade Zone (SITZ).
1997. Abandonment of the fixed link between the Seychelles rupee and the IMF'S special drawing rights (SDR).
1998. Rene and his supporters win in legislative elections.

Sierra Leone
1991. Massive unemployment and high inflation, coupled with the spillover of the Liberian civil war, plunges Sierra Leone into civil strive perpetuated by the Revolutionary United Front (RUF) rebels.
1999. Lome peace accord between the RUF and the government of Sierra Leone that allows the deployment of over 12,000 UN peacekeeping troops in the country.
2000. Despite the peace accord, internal fighting continues.

South Africa
1990. Following years of mounting black protest and increasing sanctions against South Africa because of apartheid, President F.W. De Klerk announces the unconditional release of Nelson Mandela from prison and the legalization of the ANC, PAC, and other anti-apartheid groups.
1991. The Group Areas Act, Land Acts, and the Population Registration Act are officially rescinded.
1994. First democratic elections take place under a new constitution. The ANC wins a majority in parliament and elects Nelson Mandela as president.
1996. National Party pulls out of government of national unity and first official census occurs in post-apartheid South Africa.
1999. Second democratic elections held and ANC increases its majority in parliament and selects Thabo Mbeki as president.

Sudan
1989-99. Umar al-Bashir overthrows al-Mahdi's regime and institutes a dictatorship. Sudan supports terrorism and civil war rages in the south and Sudan is practically isolated.
1996. Bashir popularly elected as president.
2000. Bashir is popularly elected for a second term as president.

Swaziland
1992. People's United Democratic Movement (PUDEMO) declares itself an opposition party, which is illegal.
1992. Crackdown on opposition activities and more than 50 opposition activists arrested.
1996. PUDEMO spearheads campaign of protests and disobedience.
1997. The trade union calls for strikes nationwide.

Tanzania
1995. The first multi-party lections are held, resulting in Chama Cha Mapinduzi (CCM) victory.
1995. Enhanced Structural Adjustment Facility is negotiated with the IMF, emphasizing rapid privatization of parastatals.

Togo
1991. Pro-democracy pressures mount and Eyadema agrees to transitional government leading to free elections.
1992. Opposition parties launch a general strike, which lasts for 9 months and decimated Togo's economy.
1994. Eyadema wins presidential elections under fraudulent conditions that keep opposition parties and voters away.
1994. Multi-party legislative election are held and won by opposition parties.
1994. The CFA franc is devalued, leading to a surge in exports in Togo.
1998. Presidential elections are again boycotted by the opposition and deemed flawed by outside observers.
1999. CFA franc becomes tied to the euro. Legislative elections are won by Eyadema's RPT.

Uganda
1998. Uganda starts involvement with in the war in the Democratic Republic of Congo.
2000. A flawed national referendum maintains the no-party political system.
2001. Presidential elections held in March.

Zambia
1991. Multi-party elections are won by the Movement for Multi-party Democracy (MMD) led by Frederick Chiluba. The MMD embarks on a program of IMF-sponsored free market reform.
1996. The MMD wins a second round of elections.
2000. Copper mines fully privatized.

Zimbabwe
1991. The Enhanced Structural Adjustment Program (ESAP) is adopted and the constitution is amended to deny recourse to the courts in cases of seizure land by the government.
1994. Economic recession leads to widespread industrial unrest.
1996. Mugabe is returned to the office with 96 percent of the votes with 32 percent voter turnout.
1997. Corruption becomes an issue with allegations of official contracts being unfairly awarded and embezzlement of public funds by civil servants and ministers.
1998. Unprecedented food riots in most of the country's urban centers in response to rises in the price of the staple food, maize meal.
1998. Opposition protests government's decision to send troops to the Democratic Republic of Congo.
2000. Government encourages war veterans to occupy farms, and considerable violence erupts.
2000. Legislative elections are conducted in which the ZANU-PF wins a narrow majority.

Source: Encyclopedia of National Economies 2002 Volume 1

Appendix 2: Basic Indicators: Size and Growth Rates

Country	Population (millions) 2004	Land area thousands of sq km	Average annual growth (%) 2000-04
Angola	15.5	1,247	4.6
Benin	8.2	111	1.2
Botswana	1.8	567	5.7
Burkina Faso	12.8	274	0.3
Burundi	7.3	26	0.0
Cameroon	16.0	465	2.7
Cape Verde	0.5	4	40.0
Central Africa Rep	4.0	623	0.3
Chad	9.4	1,259	3.6
Comoros	0.6	2	-0.1
Congo, Dem.Rep	55.9	2,267	0.0
Congo, Rep	3.9	342	-0.5
Cote d'Ivoire	17.9	318	-2.4
Djibouti	0.8	23	0.0
Equatorial Guinea	0.5	28	0.0
Eritrea	4.2	101	-3.4
Ethiopia	70.0	1,000	1.3
Gabon	1.4	258	0.3
Gambia	1.5	10	0.8
Ghana	21.7	228	2.4
Guinea	9.2	246	1.0
Guinea-Bissau	1.5	28	3.8
Kenya	33.5	569	0.3
Lesotho	1.8	30	1.8
Liberia	3.2	96	-2.8
Madagascar	18.1	582	-1.5
Malawi	12.6	94	-0.3
Mali	13.1	1,220	2.3
Mauritania	3.0	1,025	4.0
Mauritius	1.2	2	2.9
Mozambique	19.4	784	6.2
Namibia	2.0	823	3.2
Niger	13.5	1,267	0.0
Nigeria	128.7	911	2.7
Rwanda	8.9	25	0.3
Sao Tome and Principe	0.2	1	2.3
Senegal	11.4	193	1.6
Seychelles	0.1	0	-2.3
Sierra Leone	5.3	72	5.3

Appendix 1 Cont'd
Basic Indicators: Size and Growth Rates

Country	**Population (millions)** 2004	**Land area thousands** of sq km	**Average annual growth** (%) 2000-04
Somalia	8.0	627	0.0
South Africa	45.5	1,214	2.2
Sudan	35.5	2,376	7.5
Swaziland	1.1	17	-0.7
Tanzania	37.6	884	4.6
Togo	6.0	54	-0.7
Uganda	27.8	197	-0.7
Zambia	11.5	743	0.3
Zimbabwe	12.9	387	-6.2

Source: Africa Development Indicators, 2006
Note: Djibouti, Eritrea, Liberia, Namibia, and Somalia are excluded from the study.

Data Treatment Appendix 3

Country	Variables with missing observations	Period	Mode of correction
Angola	PUIGDP	1993-1996	Computed from Gross Domestic Investment
	CCPS	1993-1995	Time trend
	RIR	1993-1995	Time trend
	IRER	1993-2002	SDR Index
Burkina Faso	IRER	1993-2002	SDR Index
	EDPE	1995-99-02	Average
Cameroon	EDPE	1996-2002	Average
Cape Verde	RIR	1993-2002	Commercial Bank lending rate
Central African Rep	EDPE	1995-2002	Average
Chad	EDPE	1995-2002	Average
Comoros	PCCPI	1993-2002	Computed from CPI
	IRER	1994-2002	SDR
	EDPE	1996-2002	Average
	RIR	1993-2002	Commercial Bank lending rate
Congo Dem. Rep	EDPE	1993-2002	Used 2002 Estimates
Congo Republic	PCCPI	1997-1998	Computed from CPI
	RIR	1997-1998	Time Trend
Equatorial Guinea	PCCPI	1995-2002	Computed from CPI
	EDPE	1996-2002	Average
	PCAP	2002	Time Trend
Ethiopia	RIR	1993-2002	Commercial lending rate
Gabon	RIR	2001	Time trend
Gambia	EDPE	1998-2002	Time trend
Guinea	CCPS	1999-2000	Time trend
	PCCPI	1993-2002	Computed from CPI
	RIR	2001-2002	Time trend
Guinea Bissau	EDPE	1998-2000	Time trend
	IRER	2002	SDR
Kenya	RIR	2000-2002	Time trend

Data Treatment Appendix Cont'd

Country	Variables with missing observations	Period	Mode of correction
Lesotho	PCCPI	1997-1999	Time trend
	RIR	1997-1999	Commercial Bank Lending rate
Madagascar	RIR	2000-2002	Time trend
Mali	IRER	1993-2002	SDR Index
Mauritania	IRER	1998-2002	SDR
	EDPE	1999-2002	Time trend
	RIR	1993-2002	Commercial Bank lending rate
Mauritius	IRER	1993-2002	SDR
	RIR	1999-2002	Time trend
Mozambique	RIR	1993	Time trend
	PCAP	1993-1996	National sources and time trend
		1999-2000	
Namibia	PCCPI	1993-2002	Computed from CPI
	IRER	1993-2002	SDR
	EDPE	1993-2002	
Niger	TOT	2000-2002	Time trend
	IRER	2001-2002	SDR Index
Rwanda	PCCPI	1994-1995	1984-94 period average and mid 1995
	RIR	1994-1995	Time trend
Sao Tome	CCPS	1993-1995	Time trend
	PCCPI	1993-2002	Computed from CPI
	IRER	1993-2002	SDR Index
	EDPE	1993-1997	Time trend
Sierra Leone	RIR	1993-2002	Commercial Bank lending rate
South Africa	PUIGDP	1993-1997	Computed from gross domestic investment
	EDPE	1993	Time trend
Sudan	PIGDP	1993-1996	Time Trend
	PUIGDP	1993-1998	Time trend
	RIR	1993-2002	Commercial bank deposit rate

Data Treatment Appendix Cont'd

Country	Variables with missing observations	Period	Mode of Correction
Swaziland	IRER	1993-2002	SDR Index
	RIR	2002	Time trend
Zambia	EDPE	1993-1996	Time trend
	CCPS	1993	Time trend
	RIR	1998-2002	Time trend
	PCAP	1999-2002	Time trend
Zimbabwe	IRER	1999-2002	Time trend
	EDPE	1995-2002	Average
	RIR	2002	Time trend
	PCAP	2000-2002	Time trend

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS

Equation 1
Neoclassical-civil liberties-seaport model

Dependent Variable: PIGDP
Method: Panel Least Squares
Date: 12/19/07 Time: 22:57
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 386

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.130975	1.907281	-0.068671	0.9453
RGDP(-1)	0.099929	0.046746	2.137714	0.0332
PCAP	0.000439	0.000289	1.518901	0.1296
PUIGDP	0.078590	0.073692	1.066461	0.2869
RIR	-0.024860	0.022188	-1.120417	0.2633
PCCPI	0.000109	0.000294	0.370348	0.7113
TOT	-0.006024	0.005412	-1.113065	0.2664
IRER	0.000678	0.001029	0.659229	0.5102
EDPE	-0.036054	0.024869	-1.449756	0.1480
PIGDP(-1)	0.769196	0.033774	22.77483	0.0000
SEADUM	0.677733	0.725545	0.934102	0.3509
CILIB	0.643276	0.306333	2.099921	0.0364

R-squared	0.676584	Mean dependent var	13.52720
Adjusted R-squared	0.667072	S.D. dependent var	11.14470
S.E. of regression	6.430481	Akaike info criterion	6.590570
Sum squared resid	15465.30	Schwarz criterion	6.713550
Log likelihood	-1259.980	F-statistic	71.12788
Durbin-Watson stat	2.219720	Prob(F-statistic)	0.000000

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS
Equation 2
Neoclassical-political rights-war model

Dependent Variable: PIGDP
Method: Panel Least Squares
Date: 12/19/07 Time: 22:54
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 386

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.584404	1.565349	1.012173	0.3121
RGDP(-1)	0.102458	0.046874	2.185833	0.0294
PCAP	0.000378	0.000274	1.376949	0.1694
PUIGDP	0.057239	0.073212	0.781822	0.4348
RIR	-0.028677	0.022246	-1.289106	0.1982
PCCPI	9.46E-05	0.000295	0.320110	0.7491
TOT	-0.005293	0.005411	-0.978122	0.3286
IRER	0.000725	0.001033	0.702445	0.4828
EDPE	-0.027394	0.025709	-1.065510	0.2873
PIGDP(-1)	0.778268	0.033758	23.05466	0.0000
WDUM	-0.014808	0.987925	-0.014989	0.9880
PORIT	0.320338	0.216442	1.480019	0.1397

R-squared	0.674408	Mean dependent var	13.52720
Adjusted R-squared	0.664832	S.D. dependent var	11.14470
S.E. of regression	6.452082	Akaike info criterion	6.597277
Sum squared resid	15569.38	Schwarz criterion	6.720257
Log likelihood	-1261.275	F-statistic	70.42514
Durbin-Watson stat	2.229832	Prob(F-statistic)	0.000000

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS
Equation 3
Neoclassical-civil liberties-seaport model

Dependent Variable: PIGDP
Method: Panel Least Squares
Date: 12/19/07 Time: 22:57
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 386

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.130975	1.907281	-0.068671	0.9453
RGDP(-1)	0.099929	0.046746	2.137714	0.0332
PCAP	0.000439	0.000289	1.518901	0.1296
PUIGDP	0.078590	0.073692	1.066461	0.2869
RIR	-0.024860	0.022188	-1.120417	0.2633
PCCPI	0.000109	0.000294	0.370348	0.7113
TOT	-0.006024	0.005412	-1.113065	0.2664
IRER	0.000678	0.001029	0.659229	0.5102
EDPE	-0.036054	0.024869	-1.449756	0.1480
PIGDP(-1)	0.769196	0.033774	22.77483	0.0000
SEADUM	0.677733	0.725545	0.934102	0.3509
CILIB	0.643276	0.306333	2.099921	0.0364

R-squared	0.676584	Mean dependent var	13.52720
Adjusted R-squared	0.667072	S.D. dependent var	11.14470
S.E. of regression	6.430481	Akaike info criterion	6.590570
Sum squared resid	15465.30	Schwarz criterion	6.713550
Log likelihood	-1259.980	F-statistic	71.12788
Durbin-Watson stat	2.219720	Prob(F-statistic)	0.000000

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS
Equation 4
Neoclassical-civil liberties-war model

Dependent Variable: PIGDP
Method: Panel Least Squares
Date: 12/19/07 Time: 22:45
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 386

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.098584	1.927873	0.051136	0.9592
RGDP(-1)	0.101938	0.046768	2.179637	0.0299
PCAP	0.000486	0.000286	1.699215	0.0901
PUIGDP	0.074792	0.073659	1.015385	0.3106
RIR	-0.026267	0.022216	-1.182343	0.2378
PCCPI	0.000113	0.000295	0.384336	0.7009
TOT	-0.005303	0.005398	-0.982357	0.3266
IRER	0.000732	0.001030	0.710252	0.4780
EDPE	-0.030184	0.025676	-1.175551	0.2405
PIGDP(-1)	0.771183	0.034112	22.60725	0.0000
WDUM	-0.266403	1.001243	-0.266072	0.7903
CILIB	0.653070	0.330184	1.977898	0.0487

R-squared	0.675891	Mean dependent var	13.52720
Adjusted R-squared	0.666359	S.D. dependent var	11.14470
S.E. of regression	6.437368	Akaike info criterion	6.592711
Sum squared resid	15498.45	Schwarz criterion	6.715691
Log likelihood	-1260.393	F-statistic	70.90304
Durbin-Watson stat	2.219000	Prob(F-statistic)	0.000000

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS
Equation 5
McKinnon-political rights-seaport model

Dependent Variable: PIGDP
Method: Panel Least Squares
Date: 12/19/07 Time: 22:31
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 384

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.084606	1.559614	0.695432	0.4872
RGDP(-1)	0.102070	0.047096	2.167286	0.0308
PCAP	0.000327	0.000280	1.166250	0.2443
PUIGDP	0.067671	0.074076	0.913530	0.3616
CCPS	0.000323	0.000398	0.810914	0.4179
PCCPI	-4.71E-05	0.000438	-0.107584	0.9144
TOT	-0.004884	0.005395	-0.905196	0.3659
IRER	0.001064	0.000976	1.089804	0.2765
EDPE	-0.035697	0.027865	-1.281039	0.2010
PIGDP(-1)	0.775178	0.033891	22.87285	0.0000
SEADUM	0.642124	0.729035	0.880787	0.3790
PORIT	0.329397	0.204664	1.609452	0.1084

R-squared	0.674237	Mean dependent var	13.52474
Adjusted R-squared	0.664604	S.D. dependent var	11.17371
S.E. of regression	6.471075	Akaike info criterion	6.603313
Sum squared resid	15577.43	Schwarz criterion	6.726770
Log likelihood	-1255.836	F-statistic	69.99388
Durbin-Watson stat	2.212828	Prob(F-statistic)	0.000000

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS

Equation 6

McKinnon-political rights-war model

Dependent Variable: PIGDP
Method: Panel Least Squares
Date: 12/19/07 Time: 22:34
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 384

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.354721	1.555948	0.870672	0.3845
RGDP(-1)	0.103620	0.047123	2.198928	0.0285
PCAP	0.000373	0.000276	1.351366	0.1774
PUIGDP	0.065418	0.074120	0.882598	0.3780
CCPS	0.000328	0.000399	0.822568	0.4113
PCCPI	-4.45E-05	0.000438	-0.101596	0.9191
TOT	-0.004314	0.005384	-0.801177	0.4235
IRER	0.001112	0.000978	1.136649	0.2564
EDPE	-0.032656	0.028804	-1.133712	0.2576
PIGDP(-1)	0.778572	0.034097	22.83405	0.0000
WDUM	0.051146	0.991869	0.051565	0.9589
PORIT	0.317271	0.217939	1.455781	0.1463

R-squared	0.673559	Mean dependent var	13.52474
Adjusted R-squared	0.663907	S.D. dependent var	11.17371
S.E. of regression	6.477796	Akaike info criterion	6.605389
Sum squared resid	15609.80	Schwarz criterion	6.728847
Log likelihood	-1256.235	F-statistic	69.77858
Durbin-Watson stat	2.216058	Prob(F-statistic)	0.000000

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS
Equation 7
McKinnon-civil liberties- seadum model

Dependent Variable: PIGDP
Method: Panel Least Squares
Date: 12/19/07 Time: 22:38
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 384

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.530991	1.866726	-0.284450	0.7762
RGDP(-1)	0.101448	0.046943	2.161101	0.0313
PCAP	0.000446	0.000290	1.541095	0.1241
PUIGDP	0.093283	0.074893	1.245553	0.2137
CCPS	0.000393	0.000398	0.989285	0.3232
PCCPI	-0.000106	0.000437	-0.241798	0.8091
TOT	-0.005201	0.005381	-0.966447	0.3344
IRER	0.000986	0.000973	1.013315	0.3116
EDPE	-0.044841	0.028286	-1.585276	0.1138
PIGDP(-1)	0.766591	0.034223	22.39976	0.0000
SEADUM	0.717716	0.728171	0.985643	0.3249
CILIB	0.690125	0.307153	2.246846	0.0252

R-squared	0.676360	Mean dependent var	13.52474
Adjusted R-squared	0.666790	S.D. dependent var	11.17371
S.E. of regression	6.449948	Akaike info criterion	6.596772
Sum squared resid	15475.88	Schwarz criterion	6.720230
Log likelihood	-1254.580	F-statistic	70.67508
Durbin-Watson stat	2.203884	Prob(F-statistic)	0.000000

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS
Equation 8
MCKINNON CILIB AND WDUM MODEL

Dependent Variable: PIGDP
Method: Panel Least Squares
Date: 12/19/07 Time: 22:40
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 384

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.309242	1.896729	-0.163040	0.8706
RGDP(-1)	0.103579	0.046976	2.204921	0.0281
PCAP	0.000497	0.000287	1.733360	0.0839
PUIGDP	0.089732	0.074889	1.198193	0.2316
CCPS	0.000405	0.000399	1.015079	0.3107
PCCPI	-0.000104	0.000438	-0.237183	0.8126
TOT	-0.004388	0.005367	-0.817589	0.4141
IRER	0.001064	0.000975	1.091710	0.2757
EDPE	-0.038764	0.028825	-1.344821	0.1795
PIGDP(-1)	0.768751	0.034598	22.21983	0.0000
WDUM	-0.275270	1.007140	-0.273318	0.7848
CILIB	0.701381	0.332506	2.109379	0.0356

R-squared	0.675580	Mean dependent var	13.52474
Adjusted R-squared	0.665987	S.D. dependent var	11.17371
S.E. of regression	6.457716	Akaike info criterion	6.599180
Sum squared resid	15513.18	Schwarz criterion	6.722637
Log likelihood	-1255.043	F-statistic	70.42383
Durbin-Watson stat	2.202310	Prob(F-statistic)	0.000000

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS
Equation 9
Macroeconomic-political rights model of private investment

Dependent Variable: PIGDP
Method: Panel Least Squares
Date: 12/28/07 Time: 20:35
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 384

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.641216	1.555338	1.055215	0.2920
RGDP(-1)	0.103622	0.047033	2.203178	0.0282
PCAP	0.000373	0.000275	1.354423	0.1764
PUIGDP	0.062193	0.074041	0.839973	0.4015
RIR	-0.025479	0.023151	-1.100589	0.2718
CCPS	0.000202	0.000414	0.486832	0.6267
PCCPI	-6.25E-05	0.000438	-0.142709	0.8866
TOT	-0.005177	0.005410	-0.956854	0.3393
IRER	0.000732	0.001034	0.707377	0.4798
EDPE	-0.033787	0.027607	-1.223880	0.2218
PIGDP(-1)	0.776275	0.033734	23.01148	0.0000
PORIT	0.318589	0.204342	1.559093	0.1198

R-squared	0.674617	Mean dependent var	13.52474
Adjusted R-squared	0.664995	S.D. dependent var	11.17371
S.E. of regression	6.467298	Akaike info criterion	6.602145
Sum squared resid	15559.25	Schwarz criterion	6.725603
Log likelihood	-1255.612	F-statistic	70.11517
Durbin-Watson stat	2.228862	Prob(F-statistic)	0.000000

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS
Equation 10
Macroeconomic-civil liberties model of private investment

Dependent Variable: PIGDP
Method: Panel Least Squares
Date: 12/28/07 Time: 20:40
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 384

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.193532	1.876039	0.103160	0.9179
RGDP(-1)	0.103281	0.046914	2.201474	0.0283
PCAP	0.000483	0.000286	1.687141	0.0924
PUIGDP	0.084152	0.075027	1.121620	0.2627
RIR	-0.021318	0.023195	-0.919070	0.3587
CCPS	0.000289	0.000415	0.696219	0.4867
PCCPI	-0.000113	0.000438	-0.258959	0.7958
TOT	-0.005254	0.005397	-0.973543	0.3309
IRER	0.000728	0.001032	0.706118	0.4806
EDPE	-0.041471	0.027982	-1.482044	0.1392
PIGDP(-1)	0.769320	0.769320	22.60894	0.0000
CILIB	0.639387	0.307628	2.078441	0.0384

R-squared	0.676250	Mean dependent var	13.52474
Adjusted R-squared	0.666677	S.D. dependent var	11.17371
S.E. of regression	6.451045	Akaike info criterion	6.597112
Sum squared resid	15481.14	Schwarz criterion	6.720570
Log likelihood	-1254.646	F-statistic	70.63955
Durbin-Watson stat	2.217942	Prob(F-statistic)	0.000000

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS

Equation 11

Macroeconomic-political rights model of private investment-Fixed effects estimation

Dependent Variable: PIGDP
Method: Panel Least Squares
Date: 12/28/07 Time: 20:44
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 384

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.40541	3.397219	3.651636	0.0003
RGDP(-1)	0.080417	0.051405	1.564383	0.1187
PCAP	-0.004673	0.002561	-1.825059	0.0689
PUIGDP	0.016498	0.128931	0.127962	0.8983
RIR	0.033182	0.033163	1.000564	0.3178
CCPS	0.000554	0.000650	0.852485	0.3946
PCCPI	-0.000370	0.000536	-0.690704	0.4902
TOT	-0.006804	0.005656	-1.203005	0.2299
IRER	0.000274	0.001082	0.252822	0.8006
EDPE	-0.026681	0.051212	-0.520985	0.6027
PIGDP(-1)	0.489658	0.051525	9.503234	0.0000
PORIT	-0.214106	0.422125	-0.507211	0.6124

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.737513	Mean dependent var	13.52474
Adjusted R-squared	0.687787	S.D. dependent var	11.17371
S.E. of regression	6.243423	Akaike info criterion	6.647760
Sum squared resid	12551.66	Schwarz criterion	7.285624
Log likelihood	-1214.370	F-statistic	14.83159
Durbin-Watson stat	1.925444	Prob(F-statistic)	0.000000

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS
Equation 12
Macroeconomic and civil rights model of private investment: Fixed effects estimation

Dependent Variable: PIGDP
Method: Panel Least Squares
Date: 12/28/07 Time: 20:50
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 384

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.85834	4.288392	2.765218	0.0060
RGDP(-1)	0.079335	0.051467	1.541479	0.1242
PCAP	-0.004656	0.002571	-1.811299	0.0710
PUIGDP	0.015346	0.128962	0.118993	0.9054
RIR	0.031230	0.032946	0.947898	0.3439
CCPS	0.000540	0.000650	0.831191	0.4065
PCCPI	-0.000364	0.000536	-0.680132	0.4969
TOT	-0.006769	0.005659	-1.196171	0.2325
IRER	0.000249	0.001083	0.230133	0.8181
EDPE	-0.024317	0.051007	-0.476744	0.6339
PIGDP(-1)	0.490238	0.051531	9.513406	0.0000
CILIB	-0.104197	0.705479	-0.147697	0.8827

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.737321	Mean dependent var	13.52474
Adjusted R-squared	0.687559	S.D. dependent var	11.17371
S.E. of regression	6.245705	Akaike info criterion	6.648491
Sum squared resid	12560.84	Schwarz criterion	7.286355
Log likelihood	-1214.510	F-statistic	14.81690
Durbin-Watson stat	1.926259	Prob(F-statistic)	0.000000

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS

Equation 13

Macroeconomic-political rights model of private investment: Random effects estimation

Dependent Variable: PIGDP
Method: Panel EGLS (Cross-section random effects)
Date: 12/28/07 Time: 20:54
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 384
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.641216	1.499257	1.094686	0.2744
RGDP(-1)	0.103622	0.045337	2.285589	0.0228
PCAP	0.000373	0.000265	1.405086	0.1608
PUIGDP	0.062193	0.071372	0.871392	0.3841
RIR	-0.025479	0.022316	-1.141757	0.2543
CCPS	0.000202	0.000399	0.505042	0.6138
PCCPI	-6.25E-05	0.000422	-0.148047	0.8824
TOT	-0.005177	0.005215	-0.992646	0.3215
IRER	0.000732	0.000997	0.733836	0.4635
EDPE	-0.033787	0.026611	-1.269660	0.2050
PIGDP(-1)	0.776275	0.032518	23.87223	0.0000
PORIT	0.318589	0.196974	1.617412	0.1066

Effects Specification

	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	6.234108	1.0000

Weighted Statistics

R-squared	0.674617	Mean dependent var	13.52474
Adjusted R-squared	0.664995	S.D. dependent var	11.17371
S.E. of regression	6.467298	Sum squared resid	15559.25
F-statistic	70.11517	Durbin-Watson stat	2.228862
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.674617	Mean dependent var	13.52474
Sum squared resid	15559.25	Durbin-Watson stat	2.228862

APPENDIX 4: EVIEWS ORIGINAL REGRESSION RESULTS

Equation 14

Macroeconomic-civil liberties model of private investment-Random effects estimation

Dependent Variable: PIGDP
Method: Panel EGLS (Cross-section random effects)
Date: 12/28/07 Time: 20:58
Sample (adjusted): 1994 2002
Cross-sections included: 43
Total panel (unbalanced) observations: 384
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.193532	1.812651	0.106767	0.9150
RGDP(-1)	0.103281	0.045329	2.278459	0.0233
PCAP	0.000483	0.000276	1.746140	0.0816
PUIGDP	0.084152	0.072492	1.160843	0.2465
RIR	-0.021318	0.022412	-0.951209	0.3421
CCPS	0.000289	0.000401	0.720566	0.4716
PCCPI	-0.000113	0.000423	-0.268015	0.7888
TOT	-0.005254	0.005215	-1.007588	0.3143
IRER	0.000728	0.000997	0.730811	0.4654
EDPE	-0.041471	0.027037	-1.533871	0.1259
PIGDP(-1)	0.769320	0.032878	23.39957	0.0000
CILIB	0.639387	0.297234	2.151124	0.0321

Effects Specification

	S.D.	Rho
Cross-section random	0.000000	0.0000
Idiosyncratic random	6.233075	1.0000

Weighted Statistics

R-squared	0.676250	Mean dependent var	13.52474
Adjusted R-squared	0.666677	S.D. dependent var	11.17371
S.E. of regression	6.451045	Sum squared resid	15481.14
F-statistic	70.63955	Durbin-Watson stat	2.217942
Prob(F-statistic)	0.000000		

Unweighted Statistics

R-squared	0.676250	Mean dependent var	13.52474
Sum squared resid	15481.14	Durbin-Watson stat	2.217942