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Liberalization, Stock Market Development and Investment Efficiency in Africa

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Whereas there is extensive theoretical literature linking stock markets and investment efficiency, little empirical attention has been accorded to this relationship, particularly for African economies. Using the recently developed dynamic panel data estimators, this study explores the empirical relationship between stock market development and investment efficiency in Africa. The study used two samples, categorized as relatively developed stock markets and relatively underdeveloped stock markets. The findings suggest that stock market development matters for investment efficiency in relatively developed stock markets in Africa while in relatively underdeveloped stock markets, no consistent results are obtained. The study concludes that African stock markets can boost investment efficiency by enhancing privatization and diversifying financial instruments.

Field of Research: Financial Economics and Macroeconomics

1. Introduction

For a long time, most African governments dominated the financial sector despite the existence of immerse documented literature favoring market based systems as opposed to state dominated enterprises. State dominated enterprises do not often observe the tenets of efficient allocation of resources because they are not profit oriented. Observers in the early 1980s and early 1990s had taken the view that the public sector had "over-invested" in Africa and public investment competes rather than fosters private investment. Most African economies during that time engaged in investments in what has been termed as "white elephant projects", often associated with inefficiency.

Consequently, in the recent past, structural reforms and market-led policies ranging from privatization to relaxation of capital market controls have become the dominant themes in development strategies in African economies. The changing attitude towards the role of the public sector in the development of African economies has facilitated the development of stock markets. The dominant impetus for the recent creation of securities exchanges has been the privatization and commercialization programs of state owned enterprises in most African economies. The major objective of privatization of state-owned enterprises was meant to introduce efficiency into investment by allowing the private sector to drive the African economies. It was assumed that the private sector would instill competition based on market mechanisms, which would reverse the misallocation of resources by the public sector and enhance efficiency in investment.

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However, despite implementation of these liberalization measures which were meant to make the public sector leaner and enhance the private investment both in terms of quality and quantity, for over two decades, the private investment levels have been declining in African economies. Surprisingly, the public investment is still increasing, particularly in Sub-Saharan African (SSA) economies. These investment trends raise a number of questions with respect to the quality or efficiency of investment. Why are the private investment levels declining if the associated benefit of stock market development is increased efficiency and better allocation of resources facilitated by competitiveness and improved corporate governance associated with private sector promotion? Why are we still observing increasing trends of public investment when it is pulling out and transferring ownership to the private sector? Would this be an indication that the public sector is increasing investment in the wrong areas? Is the public sector still engaging in 'white elephant projects' thus the quantity of public investment is increasing but the quality declining?

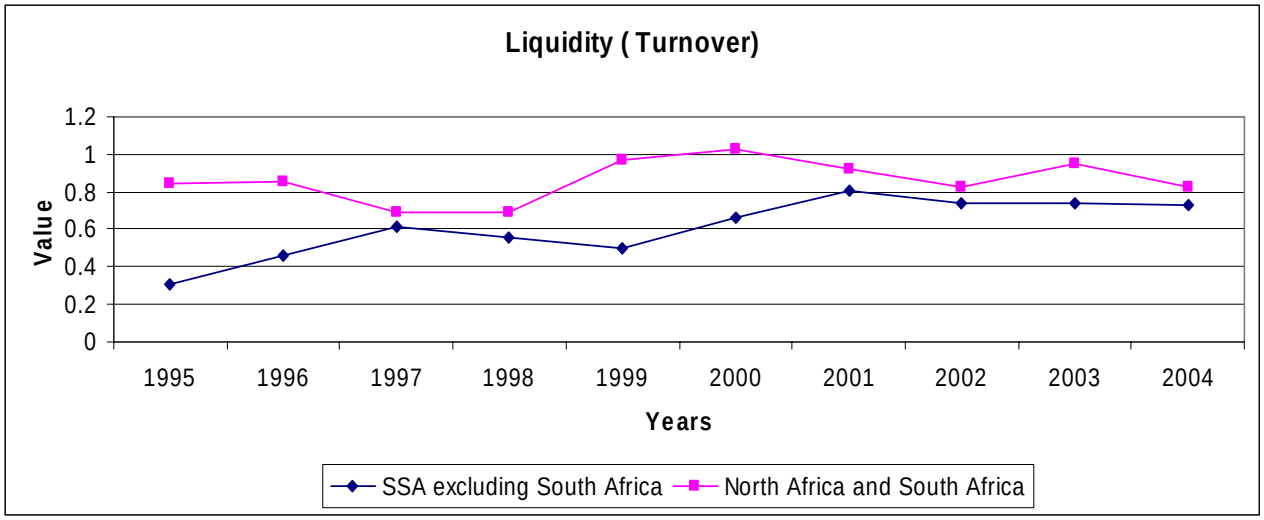
It is on the basis of this background that this research seeks to empirically address the question whether investment efficiency has been enhanced following the reform period. It uses the stock market indicator as the explanatory variable to assess this relationship since the change in ownership from the public sector to the private sector has been facilitated through the stock markets. The study covers all the countries in Africa with operational stock exchanges and uses an unbalanced panel data covering the period 1991 to 2004. These countries include Algeria, Botswana, Cote d' Ivoire, Ghana, Kenya, Mauritius, Nigeria, Namibia, Swaziland, Zambia, Zimbabwe, South Africa, Morocco, Egypt, Tunisia, Tanzania, Uganda and Malawi. This study also factors in the heterogeneity issues by isolating the sample countries into two groups based on the stock market development indices.

1.1. Stock market development in Africa

In Figures 1 and 2 provided below, the stock market indicators, i.e., the turnover ratios and the stock market capitalization as a share of GDP for North African and South Africa and SSA countries excluding South Africa are compared. Although, the trend for SSA excluding South Africa economies indicates an upward turnover ratio in Figure 1, it is far below the figures for the North Africa and South Africa economies. This indicates that the North African region with only five countries and only three active markets and South Africa have relatively more developed stock markets than the SSA economies which are thirteen with the exclusion of South Africa. Figure 2 indicates similar observations with only 4 active markets in the combined graph of North Africa and South Africa exhibiting better performance than 13 countries in SSA.

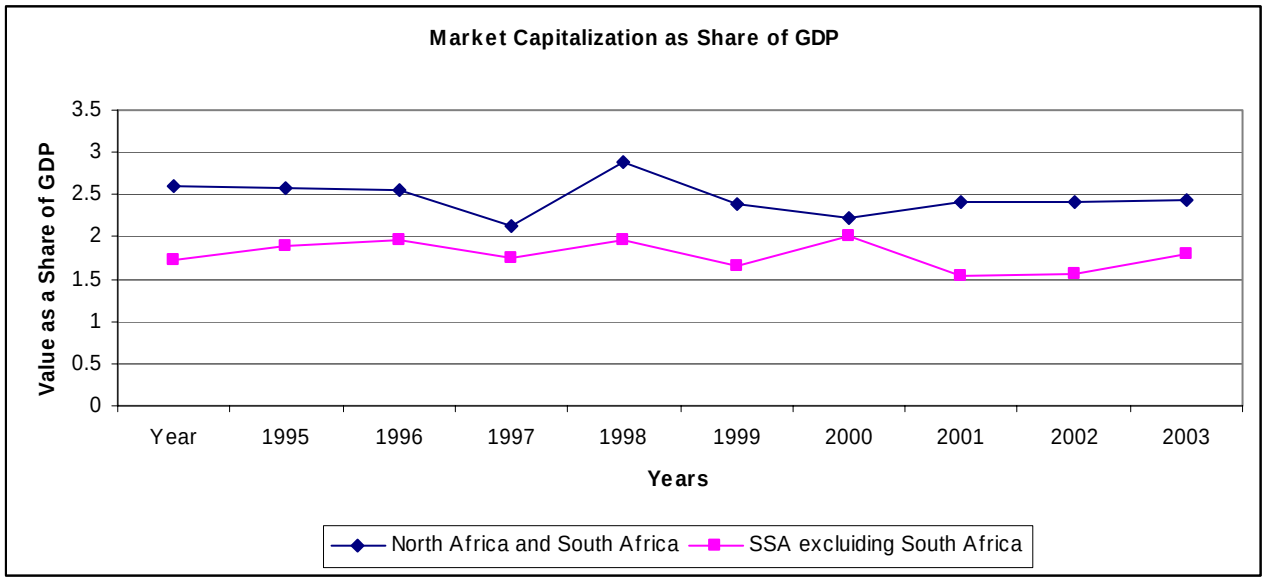
The analysis of the trends of the two stock market indicators provides a basis for categorizing the sample into two groups. Thus, in this study, the North Africa and South Africa countries are analyzed separately, categorizing them as relatively developed, in terms of stock markets, and the remaining SSA countries separately, categorizing them as relatively underdeveloped, in terms of stock markets.

Figure 1: Turnover ratios: developed and relatively underdeveloped stock markets



Source: Computed based on data from the World Development Indicators

Figure 2: Stock market capitalization as a share of GDP: developed and relatively underdeveloped stock markets:



Source: Computed based on data from the World Development Indicators

2. Literature review

The theories linking financial development and investment productivity are based on the financial repression hypothesis (Mckinnon, 1973; Shaw, 1973). Advocates of this hypothesis postulated that many financial systems in Africa had been subjected to financial repression characterized by low or negative real interest rates, high reserve requirements, mandatory credit ceilings; directed credit allocation to priority sectors, which undermined allocative efficiency; and heavy government ownership and management of financial institutions. Financial repression in the African economies laid

a basis for major financial reforms, including reforms in the capital market. Mckinnon and Shaw advocated for financial liberalization, which they argued contributes to increased possibilities of risk diversification by financial institutions, particularly if it involves the opening up of domestic markets to foreign competition. This helps reduce the cost of capital and improve the efficiency of financial intermediaries in a country thus enhancing returns to investment.

Since the Mckinnon and Shaw hypothesis, extensive theoretical literature focusing on the capital market has been developed. Some of the authors have used the multifunctional approach of stock markets to link stock markets to investment efficiency (Senbet & Otchere, 2005; Blair, 2000 a, b; Irving, 2000; Levine & Zervos, 1996; Demirguc-Kunt & Maksimovic, 1996; Obstfeld, 1994; Stiglitz, 1985). According to these authors, first, stock markets facilitate price discovery, price has information content and transmits signals to various stock holders in the market which facilitates decision making thus allowing allocation of resources to their best use. Second, stock markets promote efficient governance and control mechanisms by exerting external pressure and discipline in its operations. The market serves as a signal to managerial performance. In an environment of uncertainty, contractual parties cannot easily observe or control one another and enforcement mechanisms are costly. Stock markets provide price-based monitoring mechanisms for suboptimal behavior by management and hence put pressure on management to take corrective action. This is evident in the facilitation of takeovers by stock markets through price information, in which case, inefficient management is replaced by supposedly efficient management through accumulation of shares in the open market by the new owners.

Other authors however disagree with the above arguments contending that, due to dispersed stock ownership, individual investors are relatively small and they neither have the ability nor the incentives to acquire the costly yet necessary information for achieving efficient resource allocation (Stiglitz, 1985; 2000; Singh, 1993;1997). Furthermore, while stock markets can facilitate the collection of information on investment opportunities, they also make this information accessible to all market participants. This creates a free-rider problem which may discourage investors from expending resources to collect information (Stiglitz, 1985). Thus, according to these authors the positive linkages between stock markets and investment efficiency through information advantages may not accrue.

In terms of empirical studies, there is a general consensus in most of them that stock market development enhances investment efficiency. In some of these studies, the authors examined the impact of financial sector development on the quality of investment and they established that the main channel through which stock market development affects growth is through investment productivity (Lynch, 1995; Caporale, Howells and Msoliman, 2005)

The focus of most of the studies that have been done in Africa has been mainly on qualitative aspects. The few quantitative studies have either concentrated on growth and ignored the transmission mechanisms from stock market development to growth;

have not distinguished the role of stock markets from the role of banks in investment efficiency or have applied inappropriate estimation techniques (Applegarth, Kansteiner and Morrison, 2004; Ndikumana, 2000). This study attempts to bridge these gaps.

3. Methodology

A commonly used aggregate statistic to measure the efficiency of investment is the Incremental Capital Output Ratio (ICOR). The ratio measures the increase in capital stock needed to produce a unit of output. ICOR is the ratio of investment relative to GDP growth rate. The ICOR is calculated as follows: $\frac{I/Y}{\Delta Y/Y}$, where I represent investment, Y represents output and Δ represents the difference operator. A higher ICOR signifies lower capital productivity hence lower investment returns, interpreted as investment inefficiency. This study adopts the same measure to represent investment efficiency as has been used in other studies, (Mushfiq-Us-Swaleheen, 2005; Jayaraman & Ward, 2004). Thus, the dependent variable is the ICOR representing the efficiency of investment. One lag of the efficiency investment measure is included to capture the persistence of investment efficiency. The basic model is represented as follows:

$$ICOR_{it} = \beta_0 + \beta_1 ICOR_{it-1} + \beta_3 EquityS_{it} + \beta_4 x_{it} + V_{it}, \ldots, \ldots \quad (1)$$

Where, EquityS represents two measures of stock market development measuring the size and liquidity of the stock market. The size of the stock market is measured using market capitalization to GDP ratio(stockC) while liquidity is measured using two indicators, which are, the ratio of total value traded on the stock exchange to GDP(stock market liquidity abbreviated as stocliq), and ratio of total value traded on the stock exchange to market capitalization (turnover ratio). $V_{i,t}$ represents the individual, time and error components of the model. The vector x_{it} captures other factors that influence investment efficiency, referred to as control variables. These include Corruption Perception Index (CPI) constructed by the Transparency International to capture the governance and institutional issues pertinent to inefficiencies in investment in Africa; private investment as a share of public investment(priv/pub) to capture the efficiency benefits associated with private investment as opposed to public investment; interest rate(real r) to capture the extent of the shift from financial repression to financial liberalization and the associated efficiency benefits in African economies; Income per capita(GDPca) to capture the impact of the abundance of labor technology in African economies; public investment(publ) to capture the assumed facilitative role of government and population growth rate(popul) to capture the rapid growth rate and also the impact of HIV/AIDs on investment efficiency, (Jayaraman & ward, 2004; Meon & Weill, 2005).

The study adopts instrumental variable estimation method because the presence of a lagged dependent variable as one of the explanatory variables implies that results from traditional estimation methods such as Ordinary Least Squares (OLS), Fixed Effect (FE) and Random Effect (RE) are biased. This is because the lagged dependent variable is correlated with the error term. Thus this study utilizes System-GMM, which is the most modern instrumental variables estimation technique and it also solves the problems of

measurement error, omitted variables, endogeneity, besides allowing the users to discard error correction models (Baltagi, 2002; Blundell & Bond,1998; Arellano & Bover, 1995)

4. Findings and discussions

The empirical results are provided in Tables 1 and 2 below, representing results for SSA excluding South Africa and North Africa and South Africa datasets, respectively. The results reveal distinct differences between the two sets of data with the North Africa and South Africa data exhibiting consistently positive relationships between the stock market development indicators and investment efficiency. The results for SSA excluding South Africa on the other hand, do not exhibit consistency. In some cases, the coefficients of the stock market indicators bear opposite signs to the North Africa and South Africa dataset. For example, the coefficient of the stock market liquidity for SSA excluding South Africa data bears a negative sign and is statistically significant as can be observed in column 5, Table 1. For the data set of North Africa and South Africa on the other hand, the coefficient of both the liquidity measures i.e., the stock market liquidity and the turnover ratio have a positive sign and are statistically significant as can be observed in columns 3 and 4 in Table 2.

These empirical findings from the North Africa and South Africa data confirm the earlier claims which were suggesting that a leaner public sector is associated with increased investment efficiency. The unexpected positive coefficient of the stock market capitalization for the SSA excluding South Africa data set may be explained by the assumption that some of the privatization proceeds might have been channeled to innovative projects.

Table 1:The Dependent Variable is Incremental Capital Output Ratio - SSA Excluding South Africa

Independent Variables	Sys- GMM1	Sys-GMM2	Sys-GMM3	Sys- GMM4
GDPca	-7.18(-1.98)**	-5.75(-3.51)***	-6.14(-1.5)	-2.88(-0.813)
priv/pub	5.6(1.35)-	3.3(0.385)	4.78(1.3)	-
Popul	10.6(2.79)***	7.6(2.10)**	11.4(2.57)***	-
CPI	45.2(2.66)***	47.37(2.37)**	59.08(2.64)***	21.1(1.19)
real r	4.92(2.33)**	3.43(1.87)*	5.08(2.24)**	4.14(2.21)**
Publ	-17.8(-2.98)***	-12.6(-2.05)**	-17.8(-2.76)***	-14.3(-4.13)***
stockC	0.83(1.71)*	-	-	1.44(2.33)**
Stocliq	-	-	6.26(1.55)	-7.69(-1.98)**
turnover ratio	-	-1.5(-0.58)	-	-
ICOR(-1)	0.21(0.359)	0.08(0.213)	0.13(0.227)	-0.12(-0.20)
Sargen test (p-value)	44.00(0.387)	37.24(0.114)	41.03(0.513)	19.50(0.851)
AR(1) test(p-value)	-2.233(0.026)*	-2.342(0.019)*	-2.198(0.028)*	-2.291(0.022)*
AR(2) test (P-vaue)	1.409(0.159)	1.617(0.10)	1.599(0.11)	1.59(0.112)

For all the coefficients the t-statistics are in parenthesis, *, **, *** denote 10%, 5% and 1% significance levels, respectively. For the diagnostic tests, the p-values are in parenthesis.

Table 2: The Dependent Variable is Incremental Capital Output Ratio – North Africa and South Africa

Independent Variables	Sys- GMM1	Sys-GMM2	Sys-GMM3	Sys- GMM4
GDPca	-2.8(-7.91)***	-4.29 (-3.7)***	-3.5 (-2.9)**	0.1(3.49)***
Popul	-13.3(-7.85)***	1.7(4.67)***	-0.13 (-0.52)	-
CPI	50.1(7.97)***	-8.81(1.57)	5.52 (2.76)**	-
real r	4.9(6.53)***	2.8(1.2)	1.9(3.24)***	19.5(1.21)
Publ	-1.44 (-6.31)***	0.6(10.6)***	-0.01 (-0.457)	-12.0(6.23)***
stockC	0.32(1.90)*	-	-	7.12 (2.54)**
Stocliq	-	-	0.43 (6.2)***	11.4(1.42)
turnover ratio	-	0.2(9.08)***	-	-
ICOR(-1)			-	-2.4(-3.96)
Sargen test (p-value)	18.45(0.80)	39.38(0.67)	40.04(0.613)	45.63 (0.44)
AR(1) test(p-value)	-2.012(0.046)*	-1.967(0.047)*	-2.362(0.033)*	-1.918(0.049)*
AR(2) test (P-vaue)	1.057(0.290)	1.416 (0.157)	-1.472(0.41)	-0.4158(0.678)

For all the coefficients the t-statistics are in parenthesis, *, **, *** denote 10%, 5% and 1% significance levels, respectively. For the diagnostic tests, the p-values are in parenthesis.

The perverse negative sign of the coefficient of GDPpca in both data sets under review may be explained by arguing that, even when GDPpca increases in the case of African economies whose income levels are still very dismal, no shifting from labor-intensive technologies to capital-intensive technology occurs since most African economies are labor-abundant economies. Labor intensive technologies are often inefficient, moreover if these technologies are combined with outdated machinery as is often the case in African economies and poor management of production processes, the efficiency of investment is bound to be compromised even with increased GDPpca.

The coefficients of the other control variables i.e., interest rate, corruption, population and public investment are significant and bear the expected signs in most of the models where they are included for both sets of the data under review. These results imply that in Africa, apart from the effect of the stock market development on investment efficiency, GDPca, interest rates, corruption and public investment are the other confirmed determinants of investment efficiency.

5. Conclusions and recommendations

This study sought to explore the relationship between the stock market development and investment efficiency. It empirically examined the effects of stock market development indicators on investment efficiency. Due to the heterogeneous nature of the countries under review with respect to stock market development, the study separated countries with relatively advanced stock markets from relatively underdeveloped stock markets based on their stock market indices. The study has therefore made comparisons between two sets of data identified as North Africa and South Africa and SSA excluding South Africa.

Three major conclusions emerge from this study. First, the African stock markets have the potential to increase investment efficiency, create wealth and long-term capital needed for development. Second, a lean public sector promotes investment efficiency.

Third, poor governance, measured by the Corruption Perception Index, provides incentives for diverting efforts from productive activities, which compromises investment efficiency.

The study therefore recommends the following two suggestions to enhance investment efficiency using the stock market development as a means of resource mobilization. First, the study recommends enhanced diversification of the financial instruments being offered in the stock markets to cater for all sectors of the private sector in these economies and to increase competition, which will enhance innovativeness, hence increased efficiency. Second, the policy of privatization efforts of state owned enterprises should be accelerated in the economies where the state still dominates in business so as to boost corporate governance and encourage efficient investment.

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