ISSN: 0075-5222

The Relationship between Capital Market Development and Inflow of Foreign Direct Investment to Africa – a VECM-conditioned Impulse

Aregbeshola R. Adewale
Department of Business Management, College of Economic and Management Sciences, University of South Africa, Preller Street, Muckleneuk Ridge, City of Tshwane. P.O. Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 8505; E-mail: aregbra@unisa.ac.za

Abstract

The relationship between capital market development and inflow of FDI is well documented in literature. Documented evidence from Europe and American capital markets has been in affirmation of this thesis. However, a few similar studies conducted in Africa are largely country-specific and others marginalise various measurable indicators of capital markets. Using data generated through the World Bank databases for the six largest (and oldest) capital markets in Africa in a series of econometric techniques, this study reinforces the strength of capital market development and country's attractiveness to inflow of FDI both in the short and in the long run.

JEL Classification: C21, E22, E60, F21, F47

Keywords: capital market development, inflow of foreign direct investment, capital markets in Africa, vector error correction model, impulse response dynamics.

Background Information

Capital markets play essential roles in the functioning of national economies. Capital market is observed to be capable of "facilitat*ing* the flow of long-term funds from surplus units to deficit units" (Madura, 2001:3) within the economy. To that extent, an efficient capital market is capable of enhancing wealth creation within an economy through efficient sourcing and allocation of financial resources.

In a situation whereby the domestic capital market is unable to fulfil this role, the capital gap is largely filled by inflow of foreign capital. Foreign funding in the form of FDI is therefore, crucial in this regard, for countries and regions that are not able to mobilise domestic resources. Due to limited savings and inadequate depth of local capital markets in the developing world (Levine & Renelt, 1992), improved capital inflow will be required to cater for the surplus domestic demand for capital (Ito, 1999); especially within an expansionary macroeconomic regime.

Hence, the argument in support of foreign capital flows is premised on the cyclical effect of capital formation, in that, the rate of capital formation in a country contributes to determining capital market development, thereby furthering the attractiveness of a country to inflow of capital, especially FDI (De Long & Summers, 1991; Graham & Krugman, 1995). This

ISSN: 0075-5222

process therefore, enhances the efficiency of intermediation; thus, capital market development.

Greenwood and Smith (1997:146) underpin this proposition as they observe, "market formation is an endogenous process. Arranging and effecting trades requires resource expenditures. Bankers, stockbrokers, insurance agents, realtors, replacement agencies, and agents who enforce the terms of contracts make a living doing precisely this". This implies that market participants channel productive investments through economic agents in order to create utility, whose rental costs accrues through financial intermediation. One may argue, therefore, that the efficiency of capital productivity and the rate of investment gains influence the destination of capital flow, especially investments in the form of FDI.

It must be acknowledged that there are fundamental differences in the characteristics of foreign portfolio investments (FPI) and FDI, not only in terms of the motivating factors but also their resilience to market failures as well. This divergence makes it extremely challenging to draw a clear interrelationship or linkage between them, not to delve on causal effects (Vladimir, Tomislav & Irena, 2013). It must be noted, however, that these terminologies are largely used in policy documents as synonyms and the practise is also not uncommon in academic discourse.

Previous studies that specifically focus on the relationship between capital market development and inflow of FDI to Africa are limited. For instance, in the study conducted by Jeffus (2004) on the relationship between stock market development and FDI inflow, the focus was on four Latin American countries. In a similar study conducted by Chousa, Vadlamannati, and Tamazian (2008), they investigated the implications of capital market growth and quality on firm level FDI in emerging economies with firm level mergers and acquisition bias. In that study, only South Africa was included in the nine most-emerging economies studied. Vladimir, Tomislav and Irena (2013) investigated the impact of stock market development and inflow of FDI to Croatia.

In addition, Baker, Foley and Wurgler (2009) investigated the impact of stock valuation in the United States as a determinant of inflow of FDI from the OECD countries, where the impact of stock market was found to be significant. Hailu (2010) focussed his study on the relationship between capital market development and inflow of FDI to Africa between 1980 and 2007 in cross-country fixed effect estimation. The study included all African countries but nine in the estimation. The fact that the study included countries that do not have stock markets suggests a serious estimation bias.

Vladimir, Tomislav and Irena (2013) investigated the relationship between stock market development and the attractiveness of Croatia to inflow of FDI. Using VAR and cointegration techniques, these authors were able to establish the statistical significance of stock market development on the attractiveness of Croatia to inflow of FDI. However, that study was restricted to stock market, and the other capital market components were ignored.

ISSN: 0075-5222

Other studies on the developing countries such as the work of Alfaro, Chandab, Kalemli-Ozcanc, and Sayek (2004) used time series to estimate the link between FDI and economic growth, through the capital market development nexus in 50 economies from 1980 to 1995. In that study, the authors included 15 African countries. However, the study included some African countries that do not have stock markets, while ignoring the countries with larger capital markets.

For example, countries such as Gambia, Congo, Niger and Senegal were included in the sample (Alfaro et al, 2004: 108-109), while excluding big stock markets like Nigeria stock exchange (NSE) and Casablanca stock exchange (CasaSE), amongst others. The exclusion of some of the leading capital markets from that study is deemed erroneous, as their inclusion would arguably have influenced the result of the study significantly. The same logic holds for the inclusion of countries without visible capital markets in the estimation.

Quite a few other studies were either regional- or country-specific. For example, Allen and Ndikumana (2000) look at the relationship between economic growth and the level of financial market development, using cross-country time series data between 1970 and 1996. In that study, the authors only focussed on bank credit in eight southern African countries to estimate the entire financial sector.

From the on-going, this study departs from previous studies as its novelty contributes to our understanding of salient issues on capital market development in Africa. This contribution is achieved by presenting new perspectives that combine recent aggregate data that covers the six oldest (and by extension, the largest) capital markets on the continent in a panel environment, and analysing them using some of the recent econometric instruments. In addition, this study explores the impulse response effects of these variables in a comparative manner that has not been done before in any documented literature on inflow of FDI to Africa via capital market nexus.

Conceptual discourse

Conceptually, there are limited documented evidence on the relationships between capital market development and inflow of FDI. In the face of this challenge, our discourse will be specifically focused on the banking sector and the equity platform, based on their specific relevance to this study. According to Claessens, Dooley and Warner (1995), portfolio investors are largely not motivated to commit funds to long-term projects. To achieve their investment targets, they commit to high-yielding stock markets that offer not only risk diversification opportunities and short-term capital gains, but macroeconomic stability as well. These considerations glaringly exclude capital markets in the developing world as possible attractors. It must also be noted that portfolio investors are arms-length investors with limited interest in the fund's administration. As such, the assurance of macroeconomic stability that instigates stock market participation is an automatic impulse to motivate inflow of FDI (Hausmman & Fernández-Arias, 2000; Agbloyor, Abor, Adjasi & Yawson, 2013).

ISSN: 0075-5222

Oyama (1997) enumerated the stock market dynamics in Venezuela, Jordan and Pakistan. She also observes that capital market liberalisation, especially the liberalisation that targets foreign participation in the stock market, reduces investment risk premiums in the country. This author opined that inflow of FDI to these countries was particularly higher during the periods of investment rapture on the stock market when the headlines stock indices appreciated the most. The argument goes further to suggest that the growth in stock values serves as assurance on macroeconomic stability of the country, thereby motivating investors to commit investments in the form of FDI, which are riskier in nature mainly because they are not as easily reversible.

In addition, after detailed analyses of the linkages between FDI and FPI between Germany and the major economies, De Santis and Ething (2007) conclude that the movements of stock prices on the equity trading platform are the major determinants to the attractiveness of a country to foreign investment in the form of FDI. These authors suggest that the volatility of stock valuation on the equity platform serves as critical indicators to foreign direct investors on the attractiveness of the country to inflow of FDI. The argument goes on to suggest that the more appreciative the headlines indices, the more attractive the country becomes for FDI.

In the African context, Adam and Tweneboah (2008) also investigate this linkage in Ghana. According to these authors, by liberalising the equity platform, both domestic and foreign investors, as well as institutional investors are allowed to be active participants on the stock market platforms. According to these authors, as a result of the increase in stock turnover rate and increasing stock market capitalisation, Ghana is observed to be more attractive to inflow of FDI. In a similar study, Soumaré and Tchana Tchana (2011) suggest that liquid and well-supervised equity market encourage foreign investors to take up equity stake in the host economy, especially through the mergers and acquisition arrangements. This result corroborates the findings of Chousa, Tamazian and Vadlamannati (2008) where a strong relationship between stock market development and inflow of FDI via merger and acquisition nexus are established.

Soumaré and Tchana Tchana (2011) further observe that the presence of multinational companies in the host country motivates the policy makers to liberalise the equity market, thereby encouraging wider participation on the equity platforms. Notable among those regulations are investor protection, and equity trading regulations that ultimately catalyse the development of the stock market. Apart from stock market effects on inflow of FDI, we also observe some relationships between the development of local banking system and inflow of FDI to the country. Evidence suggests that developed banking sectors do not only serve as source of funding to foreign direct investors (Caves, 2007), but actually attract investment directly (Goldberg, 2007).

Klein, Peek and Rosengren (2002) support the hypothesis of strong linkage between banking sector development and inflow of FDI. These authors argue that the development of banking sector enhances the attractiveness of the host country to inflow of FDI. The argument goes further to emphasise the importance of social capital between the MNCs and the domestic

ISSN: 0075-5222

banks. These authors specifically argue that the strength of this social capital determines the preference of the MNC's offshore location.

Goldberg (2007) also corroborates this argument by observing that the financial crises of the mid-to-late 1990s in Latin America provided additional opportunities for the entry of foreign banks into the region, as Latin American countries sought to recapitalise their banks and improve the efficiency of their financial systems. In his study of 37 developing economies, Zakaria (2007) adopts multivariate methods to uncover the causal linkage between capital market development and inflow of FDI. In that study, the author found no conclusive evidence in support of causal flow from inflow of FDI to the banking sector. However, the author was able to establish a causal relationship between inflow of FDI and stock market development.

Further, Kholdy and Sohrabian (2008) conducted a study to investigate the linkage between inflow of FDI and capital market development. These authors were able to uncover a strong bidirectional causal link between capital market development and inflow of FDI in 10 of the 22 countries sampled. They further observe that the impact of FDI inflow on capital market development is stronger in the short run. In a similar study conducted by Dutta and Roy (2008), these authors investigate the relationship between financial market development, inflow of FDI and political risks. In a panel analysis that covers 97 countries over a period of 20 years, the authors were able to establish a short-run relationship between financial market development and inflow of FDI.

Research methodology

In this study, extensive inference is made to the previous studies and the knowledge gleaned from the literature lends credence to the adoption of variables that measure the relationship between inflow of FDI to Africa, and the performance of capital market (both equity and banking sector) to that effect. As discussed earlier, the dependent variable in this study is inflow of FDI, while equity market capitalisation and equity turnover rate will measure the performance of the stock market. The banking sector performance will be measured through domestic credit provided by banking sector as a percentage of GDP (*BANK*), the ratio of total claims on the nonfinancial private sector as a percentage of GDP (*NONFIN*), and the domestic credit to private sector as a percentage of GDP (*PRIVY*).

The choice of variables used in this study follows the lead provided by Levine and Zervos (1998). This choice is further reinforced by the work of Beck and Levine (2002) as well as Beck, Demirgüç-Kunt and Levine (2003). Further, the model specification for the study is the substituted FDI function in the growth model proposed by Levine and Zervos (1998) as shown in equation 1.

$$FDINFL_{it} = \alpha_0 + \alpha_1 FDINFL_{it-1} + \alpha_2 CMT_{it} + \alpha_3 X_{it} + \varepsilon_{it} \qquad (1)$$

ISSN: 0075-5222

According to equation 1:

$FDINFL_{it}$ depicts inflow of foreign direct investment;

$FDINFL_{it-1}$ is the lagged of inflow of foreign direct investment;

CMT_{it} is the capital market indicators for country *i* at time *t*;

X_{it} contains control variables and ε_{it} is the error term.

Equation 1 is remodelled in 2 to align with the standard practice in panel data analysis. The general proposition is that the time-varying exogenous variables used as instruments in the estimation would correlate with the error terms, thereby triggering endogeneity. Based on this assumption, the FDI equation is thus specified as a dynamic serial correlation model as suggested by Ndikumana (2000). The consideration for valid instrumentation of the model yields equation 2:

$$FDINFL_{it} = \alpha_0 + \alpha_1 FDINFL_{it-1} + \alpha_2 CMT_{it} + \alpha_3 INFLATION_{it} + \alpha_4 TRADE_{it} + \varepsilon_{it} \quad (2)$$

From equation 2, annual percentage change in consumer prices (*INFLATION*) and trade volume as a percentage of GDP (*TRADE)* are introduced into the estimations as a set of control variables. These control variables are used to accommodate other variables that are likely to affect the outcome of the estimation aside the identified variables. These control variables are carefully chosen because capital market variables are not the only determinants of the attractiveness of an economy to inflow of FDI. The use of these variables in similar studies has been documented (Beck & Levine, 2002; Beck, Demirgüç-Kunt & Levine, 2003). A country specific fixed effect is assumed for the error term as follows:

$$\varepsilon_{it} = \mu_i + \upsilon_{it} \quad (3)$$

where ε_{it} denotes error term and it contains the country-specific fixed effects that are time-variant (μ_i) and υ_{it} is assumed to be exogenous and normally distributed with zero mean and constant variance (σ_υ^2) both over time and across country.

Having specified the model, the next consideration is on the choice of most suitable estimation technique. Although, various econometric approaches can be used to estimate an equation, the consideration for endogeneity in the face of achieving the best possible dynamism in the estimation, restricts our option to dynamic panel approach. This approach is developed by Arellano and Bond (1991) as revised by Arellano and Bover (1995). Documented studies have established the reliability of this technique (Filer, Hanousek & Campos, 1999; Alfaro et al, 2004) and its reliability as well (Adjasi & Biekpe, 2006; Chousa, Vadlamannati & Tamazian, 2008).

ISSN: 0075-5222

To further allay the fears of endogeneity, we apply the orthogonal deviation in the GMM environment as suggested by Arellano and Bover (1995). In a recent study, Hayakawa (2009) corroborates the opinion of these authors that unobserved individual effects are removed by the forward orthogonal deviation in dynamic panel analyses. This author further contends that the GMM estimator transformed through the application of forward orthogonal deviation technique tends to work better than those transformed by the first difference in addressing autocorrelation/endogeneity in estimations. It is thus suggested that the orthogonal deviation technique enhances the validity and suitability of the instruments used in the GMM estimation, thereby addressing the problem of endogeneity.

The robustness of GMM technique to weak instrument bias has been proven in the study by Arellano and Bover (1995). The estimations in this study are instrumented by suitable lag levels and lagged first differences of the regressors. To minimise the number of GMM-style instruments used and due to concern of sample size, we restrict the maximum lags of dependent variables in the estimation. Sargan test of over-identifying restrictions and the Arellano-Bond test that the average autocovariance of residuals of order two is zero are reported and all results are based on robust standard errors. The Sargan test of over-identifying restrictions helps to uncover possible autocorrelation between the instruments and the model residuals.

Sample size and data

This study is focussed on uncovering the impacts of capital market development on the attractiveness of African countries to inflow of foreign direct investment. Sample selection in academic studies is a common practice. In a study of market efficiency and stock return behaviour in Africa's emerging equity markets, Alagidede (2008) focused on six largest African stock markets. In a similar study, Adjasi and Biekpe (2006) investigated 14 African countries.

Taking a lead from the previous studies, this study covers six African countries. The sampling focuses on the oldest six African stock markets[1] in order to ensure a wider data coverage. Appendix 1 contains the list of stock markets in Africa, the date of their establishment and the sampled countries. The chosen top and oldest (six) stock markets are clearly marked in the appendix. It must be pointed out that some of the variables used in this estimation record missing units. To ameliorate a series of estimations biases that are unique to unbalanced panel (Baltagi, 2006), 5-year moving average (forward and backward as may be required) is adopted.

Data analysis

To start with, we ran stepwise regression (not reported) in order to uncover the explanatory powers of the variables used in the estimation and all the variables are adjudged suitable to

[1] These stock markets have been established by 1960.

ISSN: 0075-5222

achieve the study objective. Further on the analysis, we estimate an error correction model (ECM). According to documented evidence (Jönsson, 2005; Baltagi, 2008), ECM is mostly applied in econometrics to diagnose possible errors in "pool" panel estimation. The ECM is applied in panel estimation to accommodate cross-sectional effects error components that are not included in the series (that is, cross-sectional error disturbances).

The conventional ECM equation is depicted in equation 3:

$$y = \alpha iNT + X\beta + u = Z\delta + u \quad (4)$$

Where y is *NT*1*, *X is NT*K*, *Z = [iNT, X]*, $\delta' = \alpha'\beta'$ and *iNT* is a vector of one of the dimensions of *NT*. This equation can also be expressed as:

$$u' = Z_{\mu}\mu + v \text{ is} \quad (5)$$

Where $u' = (uii \ldots\ldots uiT, u21 \ldots\ldots, u2T \ldots\ldots uN1 \ldots\ldots uNT)$

Equation 5 – the transformed form of equation 4, stacks the observation to ensure that the slower index is placed over the cross-section while the faster index is placed over time. This is done given that country-specific dynamics generally leads to slow reaction as compared to time-specific effects.

In this study, we estimate the vector error correction model (VECM) through the final prediction error (FPE) and Akaike's information criterion (AIC) under the rank restriction *r* = 1. We restrict the regression rank because such restrictions permit consistent estimation of the cointegration space within the limit of the restriction. Further, we include two lags of the differences of the variables being the optimal achievable lag length because of the small sample size. This approach has been used in previous study by Breitung, Brüggemann and Lütkepohl (2004). According to these authors, this technique is particularly utilised in econometrics to uncover the speed of adjustment of the time-series to disequilibrium. However, the error terms have to be statistically significant to be regarded as being relevant to policy intervention (Alogoskoufis & Smith, 1991; Baltagi, 2008; Keller, 2012). The result of the ECM for the model is presented in Table 1:

ISSN: 0075-5222

Table 1: Vector Error Correction Estimates (1980-2012): Dependent variable – inflow of FDI

	Error correction estimation results					
	FDINFL	BANK	NONFIN	PRIVY	EQCAP	TURNOVER
Lag 1	1.00000	-0.005121 (0.04787) [-0.10698]	-0.038252 (0.02820) [-1.35669]	-0.046686 (0.04461) [-1.04660]	0.049632 (0.02093) [2.37135]**	-0.132252 (0.03677) [-3.59647]***
Differenced	-0.118678 (0.04791) [-2.47703]**	-0.014512 (0.09234) [-0.15716]	-0.090312 (0.07081) [-1.27537]	0.012229 (0.21239) [0.05758]	-0.895302 (0.29684) [-3.01607]***	0.391491 (0.15250) [2.56713]**
Differenced in lag 1	-0.383916 (0.08336) [-4.60544]***	-0.023846 (0.05799) [-0.41121]	0.027279 (0.05305) [0.51417]	-8.95E-05 (0.02726) [-0.00328]	0.018113 (0.01328) [1.36388]	-0.069659 (0.03503) [- 1.98827]*
Differenced in lag 2	-0.036352 (0.07937) [-0.45802]	-0.032173 (0.05378) [-0.59818]	0.058018 (0.05268) [1.10134]	0.001122 (0.02631) [0.04265]	0.017858 (0.01412) [1.26471]	-0.087406 (0.03580) [-2.44146]

Estimated coefficients on the first line, standard errors in parenthesis (); and t-statistics in brackets [].
The results are computed separately for each equation using the appropriate residuals
**** p<0.01, ** p<0.05, * p<0.1 {Emphasis are placed on *** p<0.01, ** p<0.05}*

From Table 1, there is a total of 1080 system (balanced) observations with an included observation of 180 for each of the possible VECM models (derived by alternating the dependent variables). The stability of the model is determined by the Durbin Watson statistics that ranges between 1.89 and 2.05.

A look at the individual variable suggests that the differenced *FDINFL*, and its differenced form in lag 1 are statistically significant. In both instances, the error correction mechanisms are negative and significant, suggesting that about 12 per cent and 38 per cent of the deviations from equilibrium (respectively) are corrected within the first year through structural reform. Also, the relationship between lagged *FDINFL* and lagged *EQCAP* is statistically significant; so also is the differenced *EQCAP* in lag 1. Further, *TURNOVER* in lag 1, differenced as well as differenced in lag 2 are statistically significant, suggesting that more than 13 per cent, 39 per cent and nine per cent of the disequilibrium expressed in the variables are corrected within the first and second year respectively, with an undertone of structural reform.

The total value of all traded shares in a stock market exchange as a percentage of GDP (*TURNOVER*) is also seen as an important determinant of *FDINFL* in this analysis. However, the other combinations in Table 1 appear not to have significant short term effects. An important observation from the estimation is that only the total value of all listed shares in a stock market as a percentage of GDP (*EQCAP)* and the total value of all traded shares in a stock market exchange as a percentage of GDP (*TURNOVER*) are statistically significant as determinants of *FDINFL*, but their speeds of adjustment to equilibrium are weak.

To gauge the integration order of the variables, the Levin, Lin and Chu (2002) panel unit root test is conducted (not reported). This approach is preferable because it provides a good approximation for the empirical distribution of the test statistic even in relatively small samples (as the case in this study). The overall stationarity test for the variables used in this study indicates that the variables are not integrated in the same order, regardless of the type of analysis. Although, all the variables become stationary at a point, but their order of integration varies widely. To that extent, it becomes important to introduce each of the

ISSN: 0075-5222

variables in their first difference. This further reinforces the justification for the adoption of orthogonal deviation technique in preference to conventional differencing method.

According to the analyses contained in Table 2, both time-specific effects and cross-sectional analysis were conducted. The two-way error correction methods are used in order to accommodate the likelihood of either or both of these errors in the estimation. The Hausman test suggests that the introduction of period fixed effect is strong as the null hypothesis falls in the region of rejection, hence the justification for introducing period fixed dummy into the regression.

The test further suggests that cross-sectional effects are statistically significant, as the hypothesis falls within the region of rejection, hence the motivation for introducing cross section fixed effect dummy (orthogonal deviation) (Arellano & Bover, 1995). Further, we adopted the weighting matrix in the criterion function in order to establish the robustness of the GMM to heteroskedasticity and autocorrelation of unknown form in the estimation (Baltagi, 2008). We thereby tackle multicollinearity and endogeneity bias by implementing a robust estimation procedure through the instrumentation and orthogonalisation. By so doing, the reliability and sensitivity of the analysis are ensured.

Table 2: The GMM Panel Regression (1980-2012) - Dependent Variable – FDINFL

VARIABLES	I	II	III	IV	V
FDINFL(-1)	0.01634 (0.00127)***	0.1862 (0.0217)***	0.3271 (0.1015)***	0.0983 (0.0106)***	0.7631 (0.2161)***
EQCAP	0.017020 (0.004180)***				
INFLATION	0.021737 (0.013215)				
TRADE	0.047866 (0.012770)***				
TURNOVER		0.020931 (0.005505)***			
INFLATION		0.017804 (0.013257)			
TRADE		0.052265 (0.012468)***			
BANK			0.033227 (0.010379)***		
INFLATION			0.022785 (0.013772)*		
TRADE			0.055044 (0.012947)***		
PRIVY				0.019902 (0.005883)***	
INFLATION				0.021649 (0.013733)	
TRADE				0.057802 (0.012469)***	
NONFIN					0.005179 (0.023507)
INFLATION					0.026338 (0.026338)**
TRADE					0.034139 (0.013656)**
Observations	192	192	192	192	192
Number of countries	6	6	6	6	6
Sargan Test (Prob >chi2)	0.304	0.288	0.596	0.232	0.891
Orthogonal Deviations	Yes	Yes	Yes	Yes	Yes

*Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Cross-section weights instrument weighting matrix and convergence was achieved after 1 weight iterations. Cross-section weights (PCSE) standard errors & covariance (no d.f correction).*
Maximum lags of dependent and predetermined variables for use as instruments are limited to 1.
Period fixed (dummy variables) applied in the estimation

ISSN: 0075-5222

Using the total value of all listed shares in a stock market as a percentage of GDP (*EQCAP)* as the explanatory variable in column I, the robust standard errors suggests statistical significance of the model, coupled with the *p-value* that is statistically significant at 1 per cent. The statistical insignificance of Sargan tests (0.304) lends credence to the statistical validity of the estimation (Gujarati & Porter, 2009; Keller, 2012). The estimation coefficient indicates a positive relationship with the dependent variable, suggesting that a country with high level of equity capitalisation has the tendency to attract more inflow of FDI than a country with less capitalised equity market. The coefficient of equity turnover rate (*TURNOVER*) is also positive and statistically significant (Column II). The explanatory power of the coefficient suggests that equity turnover rate is more motivating to attract inflow of FDI than the total value of all listed shares in a stock market as a percentage of GDP (*EQCAP)*. This finding is in line with the outcome of the studies conducted by Jeffus (2004), as well as Baker, Foley and Wurgler (2008); however not for countries in Africa.

Caves (1996, 2007) hypothesis is reinforced when we consider the statistical importance of financial resources provided to the private sector by domestic money banks as a share of GDP (*BANK*). As indicated in column III, *BANK* is not only statistically significant with positive coefficient, but the variable also exhibits the highest level of explanatory power (0.03). Considering the explanatory power of the coefficient of effect of domestic credit provided by banking sector as a percentage of GDP on inflow of FDI, it could be argued that *BANK* positively influences inflow of FDI (*FDINFL*) more than any other capital market variable.

The domestic credit to private sector as a percentage of GDP (*PRIVY*) is also statistically significant with positive coefficient. Although, the explanatory power of the variable is weaker relative to equity turnover rate (*TURNOVER*) and domestics bank credit (*BANK*), it is stronger than that of equity market capitalisation (*EQCAP*). In essence, although equity market capitalisation is a statistically significant positive motivator for inflow of FDI, its influence in this regard is weaker compared to *PRIVY*, *EQCAP* and, more importantly, *BANK*.

The fifth capital market variable used in this analysis (*NONFIN*) indicates a positive coefficient but it is statistically insignificant. It could thus be observed that claims on domestic real nonfinancial sector by the Central Bank as a percentage of GDP does not serve as an important pull factor for inflow of FDI into the sampled African countries. Although, the period analysis suggests that this variable has become increasingly important in determining the attractiveness of the sampled African countries since 2005 up until 2012, just like the rest of capital market development variables used in this analysis.

In addition, the estimation is done on two-stage least squares (2SLS – not reported) using instrument weighting matrix in robust coefficient covariances, which is contingent on the transformation of the residuals in the orthogonal deviations environment. This weighting technique exhibits robust property in that it is the optimal weighting matrix for the transformed model specification (as suggested by Arellano & Bover, 1995). The output of the

ISSN: 0075-5222

2SLS is not significantly different from the results of the GMM estimation. Hence, the assumption of the validity of the estimation presumably holds for the GMM estimations.

Although, the regression analysis is able to establish relationship between the dependent and independent variables, it is important to establish the speed of adjustment of the dependent variables to the possible shocks on independent variables. In econometrics, an impulse response function depicts the effect of a one-time shock (more importantly of the dependent variable) to one of the innovations on current and future values of the potential endogenous variables (Pesaran & Yongcheol, 1998).

To control for individual effects in all the impulse response estimations, the residuals are orthogonalised while the instrumental variables are restricted using the AIC criteria. In the absence of these restrictions, the long-run reactions of the variables to the impulses hitting the system could be blurred, and the results may be misleading (Lewis & Reinsel, 1985).

Further, these diagnostic procedures ensure that the instrumental variables are contemporaneously uncorrelated and endogeneity bias is eliminated (as suggested by Pesaran & Yongcheol, 1998). The impulse response estimation for this study is generated using the nonfactorised one unit innovations. This technique is informed by the nature of FDI data and capital market dataset that are presented in natural numerical or currency units. Further, the point of equilibrium in the speed of adjustment for all the impulse response estimations is set to zero (0), given that (0) is the balancing point between negative and positive. The result of the impulse response estimation is presented in Table 3. In Table 3, all the variables in the estimations are entered at the same time, especially given that the introduction of the variables separately into the system yields the same result.

Table 3: Impulse Response Estimates (1980-2012): Response of FDINFL to Capital Market

Period	BANK	NONFIN	PRIVY	EQCAP	TURNOVER
1	0.000000	0.000000	0.000000	0.000000	0.000000
2	-0.023238	0.031819	0.005451	0.012223	0.085354
3	-0.061279	0.099444	0.027208	0.028655	0.054149
4	-0.076296	0.113791	0.041010	-0.000673	0.076214
5	-0.055945	0.114639	0.023717	-0.008374	0.061940
6	-0.060183	0.107780	0.042321	-0.012313	0.063750
7	-0.070794	0.102943	0.045335	-0.009711	0.081459
8	-0.065645	0.096792	0.046376	-0.008193	0.102405
9	-0.068091	0.097605	0.053718	-0.009917	0.120982
10	-0.074827	0.101259	0.060055	-0.010815	0.134971
Nonfactorized one unit innovation.					

Conventionally, impulse response estimation helps, amongst others, to ascertain stationarity in the estimated variables. In practice, if the estimated model is not stationary, the asymptotic values will not be displayed since they do not exist. More importantly, if the estimated model is stationary, the impulse responses will asymptote to zero (Pesaran & Yongcheol, 1998; Baltagi, 2008). In Table 3, both these cases hold, especially given that the impulse responses asymptotes to zero for all the explanatory variables. It must be pointed out that one standard deviation shock is selected to control for innovation uncertainty when estimating the standard errors of the responses in the impulse response estimations.

The coefficients of the representation presented in the analysis contained in Table 3 may be interpreted as reflecting the responses of FDI inflow to impulses (innovation shocks) of capital market development indicators hitting the system. Looking at individual variables in Table 3, the reaction of inflow of FDI to one unit shock in financial resources provided to the

ISSN: 0075-5222

private sector by domestic money banks as a share of GDP (*BANK*) begins in the second period and it continues negatively for the duration of the estimation period (nine years).

By implication, the speed of adjustment of FDI inflow to one unit innovation on *BANK* is very significant and this relationship suggests that inflow of FDI is negatively influenced by *BANK* and the effect is even greater in the fourth and 10th periods (eight and seven per cent respectively). However, the reaction of inflow of FDI to one unit innovation shock on *NONFIN* is positive, and the effect is greater in the fourth and the fifth periods (11 per cent). Further, the reaction of inflow of FDI to *PRIVY* is positive and the impulse response is highest in the 10th period (six per cent).

The responses of FDI inflow to the two equity market variables were both negative and positive. For *EQCAP*, the first two periods are positive and the effect is greater (three per cent) in the third year, but the negative effects are very mild and the worst responses are recorded during the sixth and 10th periods (one per cent). For a unit shock on *TURNOVER*, the response of FDI inflow is positive and the highest response is recorded in period ten (13 per cent).

Considering the reaction of FDI inflow to these capital market variables, it is evident that these variables play strong deterministic role on the attractiveness of the sampled African countries to inflow of FDI. More specifically, the reaction of FDI inflow to a unit shock in financial resources provided to the private sector by domestic money banks as a share of GDP (*BANK*) as well as a unit shock on the total value of all traded shares in a stock market exchange (*TURNOVER*) may negatively affect inflow of FDI to the sampled African countries. A cautious approach to any possible innovative shock on these explanatory variables will thus be expedient. The same sentiment is generated when the impulse shock is extended to a period of 50 years. However, the speed of adjustment of *BANK* became relatively resilient from period 13 onward and, that of *TURNOVER* from period 24 onward.

Although, the impulse response approach unveils the speed of adjustment of the explanatory variables to innovations shock on the dependent variables, little is known about the direction of causality among the estimated variables. To this extent, causality tests are deemed important. The decision criterion of causality is premised on the realisation that the null hypothesis of no causality has to be rejected, as determined by the *p-value* of the series. More specifically, we reject the Null in the rows for *p-values* <= 0.05. The result of the causality tests are presented in Table 4.

Table 4: Granger Causality Test (1980-2012): lag of 2

Direction of causality		Statistical significance
→		
FDINFL	EQCAP	(0.38128)
EQCAP	FDINFL	(3.37066)*
FDINFL	TURNOVER	(0.3195)
TURNOVER	FDINFL	(0.1413)*
FDINFL	BANK	(1.10540)
BANK	FDINFL	(0.44435)*
FDINFL	PRIVY	(1.02365)
PRIVY	FDINFL	(0.05814)
FDINFL	NONFIN	(1.05504)
NONFIN	FDINFL	(1.26532)
Observation		186
Number of countries		6

*F-statistics are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

ISSN: 0075-5222

From Table 4, in three of the possible ten instances, we do not reject the null that capital market variables do not homogeneously cause inflow of FDI. From Table 4, there are only three causal relationships in the analysis, and they are unidirectional. In specific, causality runs from equity capitalisation to inflow of FDI. Causality also runs from equity turnover rate to inflow of FDI and the last causality runs from the financial resources provided to the private sector by domestic money banks as a share of GDP to inflow of FDI.

In all the three instances, the causal relationship is weak. However, despite the weak statistical significance of these causal relationships, argument can be advanced that three of the five capital market variables used in this analysis motivates inflow of FDI to the sampled African countries. The Granger causality tests lend credence to the causal relationship between stock market development and inflow of FDI. In specific, stock market development indicators (*EQCAP* and *TURNOVER*) are found to be capable of influencing inflow of FDI in the estimation. In addition, one of the most important components of the capital market (*BANK*)) is also found to directly Granger cause inflow of FDI to Africa.

Discussion and conclusion

The findings contained in this study points to the need to develop Africa's capital market in order to attract inflow of foreign direct investment. As informed by the econometric analyses, there is strong evidence to suggest that Africa is currently not attracting a significant portion of global flow of FDI. Currently, the developed economies (topped by the United States) attract the bulk of global flow of FDI, which may contribute in explaining why those economies are sustainably developed. An argument could be advanced that if the most developed economies continuously strive to attract as much FDI as possible; the developing countries (especially countries in Africa) are expected to initiate possible policy interventions that are competitive enough to enhance Africa's attractiveness to inflow of FDI.

As suggested by previous studies conducted in the advanced economies and Latin America, the development of domestic capital market is found to be a significant determinant of the attractiveness of a host country to inflow of FDI. From the on-going, it thus becomes apparent that the development of domestic capital market is an important determinant for any country to benefit from inflow of FDI.

Following from the analysis, evidence emerged that Africa has the potential to increase her share of global stock of FDI in a sustainable way. To achieve this, a new growth-path needs to be channelled, essentially through the development of domestic capital market. This study corroborates Caves' (2007) hypothesis on investors' behaviour on the role of capital market in the host country to meet financial needs of foreign investors, especially in the African context.

As suggested in a series of studies conducted by Caves (1974, 1982, 1996, 2007) on the behaviour of multinational corporations, emphasises was placed on the relevance of the intermediation role of the host country's capital market (especially the equity market and banking sector) in funding future investments that are aimed at expanding operational capacity. In addition, meeting risk diversification motives of foreign investors by providing financial platforms that are capable of generating low-cost credit facility to support the financial need of the investment is important (Jeffus, 2004). To that extent, this study emphasises the need to develop Africa's capital market, especially capital market components such as equity markets and the banking sector.

ISSN: 0075-5222

References

Adam, A. N. and Tweneboah, G. (2009). "Foreign Direct Investment and Stock Market Development: Ghana's Evidence", *International Research Journal of Finance and Economics*, Vol. 26:178-185.

Adjasi, K. D. and Biekpe, N. B. (2006). "Stock Market Development and Economic Growth: The Case of Selected African Countries", *African Development Review*, Vol. 18(1): 144–161.

Alagidede, P. 2008. "*Market Efficiency and Stock Return Behaviour in Africa's Emerging Equity Markets",* Unpublished Doctoral Thesis, Loughborough University.

Alogoskoufis, G. and Smith, R. (1991). "On Error Correction Models: Specification, Interpretation, Estimation", *Journal of Economic Survey*, Vol. 5(1): 97-128.

Agbloyor, E. K., Abora, J., Charles Komla Delali Adjasi, C. K. D and Yawson, A. (2013). "Exploring the Causality Links between Financial Markets and Foreign Direct Investment in Africa", *Research in International Business and Finance*, Vol. 28: 118-134.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S and Sayek, S. (2004). "FDI and Economic Growth: the Role of Local Financial Markets", *Journal of International Economics*, Vol. 64(1): 89-112.

Allen, D. S. and Ndikumana, L. (2000). „Financial Intermediation and Economic Growth in Southern Africa", *Journal of African Economies*. Vol. 9(2): 132-160.

Arellano, M. and Bond, S. (1991). "Some Tests of Specification for Panel Data: Monte Carlo Evidence and Application to Employment Equations", *Review of Economic Studies*, Vol. 58(2): 277-297.

Arellano, M and Bover, O. (1995). "Another Look at the Instrumental Variables Estimation of Error-Components Models", Journal *of Econometrics*, Vol. 68 (1): 29-51.

Baker, M., Foley, C. F and Wurgler, J. (2009). "Multinationals as Arbitrageurs: The Effect of Stock Market Valuations on Foreign Direct Investment", *The Review of Financial Studies*, Vol. 22(1): 337-369.

Baltagi, B, H. (2008). "*Econometrics Analysis of Panel Data",* 4th Edition. John Willey and Sons Limited, Chichester.

Baltagi, B. H. (2006). "Unbalanced Panel Data: A Survey". *Journal of Statistical Papers*, Vol.47: 293-523.

Beck, T. and Levine, R. (2002). "Industry Growth and Capital Location: Does Having a Market or Bank-Based System Matter?" *Journal of Financial Economic*, Vol. 64: 147-180.

Beck, T. H. L., Demirgüç-Kunt, A., and Levine, R. (2003). "Law and Finance: Why Does Legal Origin Matter?" *Journal of Comparative Economics*, Vol. 31(4): 653-675.

ISSN: 0075-5222

Breitung, J., Br¨uggemann, R. and L¨utkepohl, H. (2004). *"Structural Vector Autoregressive Modeling and Impulse Responses"*. In Lütkepohl, H and Krätzig, M. (eds). Applied Time Series Econometrics. Pages 159-196. Cambridge University Press, Cambridge, Boston.

Caves, R. E. (2007). "*Multinational Enterprise and Economic Analysis",* Third Edition, Cambridge University Press, Cambridge, Boston.

Caves, R. E. (1996). "*Multinational Enterprise and Economic Analysis",* 2nd Edition. Cambridge University Press, Cambridge, United Kingdom.

Caves, R. E. (1982). "*Multinational Enterprise and Economic Analysis"*, Cambridge University Press, New York.

Caves, R. E. (1974). "Multinational Firms, Competition and Productivity in the Host Country", *Economica*, Vol. 41: 176 - 193.

Choong, C.-K., Yusop, Z., Soo, S.-C. (2004). "Foreign Direct Investment and Economic Growth in Malaysia: The role of domestic financial sector", *The Singapore Economic Review*, Vol. 50 (2): 245-268.

Chousa, J. P., Valdlamannati, K. C. and Tamazian A. (2008). "*Does Growth and Quality of Markets Drive Foreign Capital? The Case of Cross-border Mergers and Acquisitions from leading Emerging Economies",* William Davidson Institute Working Paper Number 911.

Claessens, S., Dooley, M. P. and Warner, A. (1995). "Portfolio capital Flows: Hot or Cold?" *The World Bank Economic Review*, Vol. 9(1): 153-174.

DeLong, J. B. and Summers, L. H. (1991). "Equipment Investment and Economic Growth", *Quarterly Journal of Economics*, Vol. 106(2): 445-502.

De Santis, R. A and Ehling, P. (2007). "*Do International Portfolio Investors Follow Firm's Foreign Investment Decisions?"* Frankfurt, European Central Bank Working Paper No. 815.

Dutta, N. and Roy, S. (2008). "*Foreign Direct Investment, Financial Development and Political Risks"*. West Virginia University Working Paper, Virginia, United States of America.

Filer, R. K., Hanousek, J and Campos, N. F. (1999). "*Do Stock Markets Promote Economic Growth?"* The Centre for Economic Research and Graduate Education of Charles University (CERGE), Working Paper Number 267.

Goldberg, L. S. (2007). "Financial Sector FDI and Host Countries: New and Old Lessons", *Federal Reserve Bank of New York Economic Policy Review*, March: 1-17.

Graham, E. M. and Krugman, P. (1995). "*Foreign Direct Investment in the United States",* Washington: Institute of International Economics.

Greenwood, J. and Smith, B. (1997). "Financial Markets in Development, and the Development of Financial Markets", *Journal of Economic Dynamics and Control*, Vol. 21(1): 145-186.

Hailu, Z. A. (2010). "Demand Side Factors Affecting the Inflow of Foreign Direct Investment to African Countries: Does Capital Market Matter?" *International Journal of Business and Management*, Vol. 5(5): 104-116.

Hausmann, R. and Fernandez-Arias, E. (2000). "*Foreign Direct Investment: Good Cholesterol?"* Inter-American Development Bank (IADB), Research Department Working Paper No. 417.

Hayakawa, K. (2009). "First Difference or Forward Orthogonal Deviation - Which Transformation should be used in Dynamic Panel Data Models? A Simulation Study", *Journal of Economics Bulletin*, Vol. 29(3): 2008-2017.

Ito, T. (1999). "*Capital Flows in Asia"*. NBER Working Paper Series No: 7134.

Jeffus, W. M. (2004). "FDI and Stock Market Development in Selected Latin American Countries", *International Finance Review*, Vol. 5: 35-44.

Jönsson, K. (2005). "Cross-Sectional Dependency and Size Distortion in a Small-Sample Homogenous Panel Data Unit Root Test". *Oxford Bulletin of Economic Statistics*, Vol. 67: 369-392.

Keller, G. (2012). "*Managerial Statistics"*. 9th Edition, SOUTH-WESTERN CENGAGE Learning, London.

Kholdy, S and Sohrabian, A. (2008). "Foreign Direct Investment, Financial Markets and Political Corruption"' *Journal of Economic Studies*, Vol. 35 (6): 486-500.

Klein, M. W., Peek, J. and Rosengren, E. S. (2002). "Troubled Banks, Impaired Foreign Direct Investment: The Role of Relative Access to Credit", *American Economic Review*, Vol. 92(3) 664-682.

Levin, A., Lin, C. and Chu, C-J. (2002). "Unit Root Tests in Panel Data: Asymptotic and Finite-sample Properties", *Journal of Econometrics*, Vol. 108: 1-24.

Levine, R., and Renelt, D. (1992). "A Sensitivity Analysis of Cross-Country Growth Regressions", *American Economic Review*, Vol. 82(4): 942-963.

Levine, R and Zervos, S. (1998). "Stock Markets, Banks, and Economic Growth", *The American Economic Review*, Vol. 88(3): 537-558.

Lewis, R. and Reinsel, G. C. (1985). "Prediction of Multivariate Time Series by Autoregressive Model Fitting", *Journal of Multivariate Analysis*, Vol. 16: 393-411.

Madura, J. (2001). "*Financial Markets and Institutions"*. 5th Edition, South-western Publishers, Cincinnati.

Ndikumana, L. (2000). "Financial Determinants of Domestic Investment in Sub-Saharan Africa: Evidence from Panel Data", *World Development*, Vol. 28 (2): 381-400.

ISSN: 0075-5222

Oyama, T. (1997). "Determinants of Stock Prices: The Case of Zimbabwe", I*MF Working Paper No. 97/117.*

Pesaran, M. H. and Yongcheol, S. (1998). "Impulse Response Analysis in Linear Multivariate Models", *Journal of Economics Letters*, Vol. 58: 17-29.

Soumaré, I. and Tchana Tchana, F. (2011). "*Causality between FDI and Financial Market Development: Evidence from Emerging Markets",* MPRA Paper No. 31328.

Unite, A. and Sullivan, M. (2001). "*The Impact of Liberalisation of Foreign Bank Entry on the Philippine Domestic Banking Market".* Philippine Institute for Development Studies, PASCN Discussion Paper no. 2001 - 08, December.

Vladimir, A; Tomislav, G and Irena, R. (2013). "The Relationship between the Stock Market and Foreign Direct Investment in Croatia: Evidence from VAR and Cointegration Analysis*",* *Journal of Financial Theory and Practice*, Vol. 57(1): 109-126.

Zakaria, Z. (2007). "The Causality Relationship between Financial Development and Foreign Direct Investment", *Jurnal Kemanusiaan,* Vol. 10: 1-23.

ISSN: 0075-5222

Appendix A
List of African Stock Markets and Exchanges

Name of Exchange	Country	Year established	Study Sample
West African régional stock exchange - Bourse Régionale des Valeurs Mobilières - BRVM	Côte d'Ivoire, Benin, Burkina Faso, Mali, Niger, Senegal, Togo, Guinea Bissau	1998	
Bourse des Valeurs Mobilieres d'Alger	Algeria	1997	
Botswana Stock Exchange	Botswana	1989	
Cameroon - Douala Stock	Cameroon	2011	
Bolsa de Valores de Cabo Verde	Cape Verde	2005	
The Egyptian Exchange	Alexandria Stock Exchange	1883	X
	The Cairo Stock Exchange	1903	
Ghana Stock Exchange	Ghana	1989	
Nairobi Stock Exchange	Kenya	1954	X
Libyan Stock Exchange	Libya	2007	
Malawi Stock Exchange	Malawi	1995	
Mauritius Stock Exchange	Mauritius	1988	
Casablanca Stock Exchange	Morocco	1929	X
Mozambique Stock Exchange	Mozambique	1999	
Namibia Stock Exchange	Namibia	1992	
Nigerian Stock Exchange	Nigeria	1960	X
Sierra Leone Stock Exchange	Sierra Leone	2009	
Rwanda Stock Exchange	Rwanda	2005	
Johannesburg Stock Exchange	South Africa	1887	X
Khartoum Stock Exchange	Sudan	1995	
Swaziland Stock Exchange	Swaziland	1990	
Dar es Salaam Stock Exchange	Tanzania	1996	
Bourse de Tunis	Tunisia	1969	X
Uganda Securities Exchange	Uganda	1997	
Lusaka Stock Exchange	Zambia	1994	
Zimbabwe Stock Exchange	Zimbabwe	1993	