MAIN ARTICLES

AN INVESTIGATION OF THE DETERMINANTS OF INWARD FOREIGN DIRECT INVESTMENT FLOW INTO GHANA'S AGRICULTURAL SECTOR[1]

Justice G. Djokoto *(Department of Agribusiness)*
Central Business School, Central University College

ABSTRACT

The paper investigated the factors that attracted foreign direct investment (FDI) into the Agricultural sector in Ghana over the period 1970-2009 by estimation of a vector autoregressive model (VAR). Positive and statistically significant elasticities showed that nominal exchange rate, agricultural trade openness, GDP per capita, school enrolment and availability of uncultivated agricultural land were positively related to the dependent variable, FDI into agriculture. Available agricultural land and school enrolment showed the highest elasticities of 41.9 and 2.8 respectively, ahead of economic variables namely; nominal exchange rate, agricultural trade openness and GDP per capita. Policies with the objectives of strengthening school enrolment and access to available uncultivated agricultural land should be pursued. Improvement in international trade in agricultural products, economic growth and the strengthening of the current foreign exchange regime are required if Ghana hopes to attract more FDI into her agricultural sector.

Keywords: Foreign direct investment, agriculture, GDP per capita, trade openness, land availability, school enrolment.

NOTE: The proposal for this study was presented at the CBS Dean's Research Club meeting, Central University College, Accra.

INTRODUCTION

In many parts of Africa, the major challenge facing agriculture is how to increase farm production to meet changing food needs without degrading the natural resource base (Nkamleu, 2004). Agriculture in Ghana is predominantly rural, employs more than 60% of the labour force and is the backbone of the Ghanaian economy. It also contributes significantly to gross domestic product (GDP) and foreign exchange earnings. For example, in 2007, traditional and non-traditional crops contributed 41.1% to Ghana's foreign exchange earnings (ISSER, 2007) whilst the whole sector contributed 31.7% to GDP (World Bank, 2010). The major staple crops produced in Ghana include cereals (mainly

rice and maize) and root staples such as yam and cassava. Crop production in Ghana is done for three main reasons: food production for consumption, raw materials for industry and products for export. Animal production at the household level comprises poultry and small ruminants. Commercial production of animals is mainly in poultry. Thus, among the various sectors of the Ghanaian economy, agriculture is expected to lead economic growth. Local and foreign direct investments (FDI) in the agricultural sector are therefore essential.

FDI refers to an investment made to acquire lasting interest in enterprise operating outside of the economy of the investor (UNCTAD, 2002). This suggests that FDI comprise international capital flows in which a firm in one country creates or expands a subsidiary in another. FDI can also be defined as an investment involving a long-term relationship and reflecting a lasting interest and control of a resident entity in one economy in an enterprise resident in another economy (Rotjanapan, 2005). Clearly, FDI implies that the investor has significant degree, partial or full control or influence over the management of the enterprise resident in the other economy. According to Krugman and Obstfeld (2009), the most distinctive feature of FDI is that it encompasses transfer of resources and acquisition of control.

This study seeks to identify the factors that attract FDI into the Agricultural sector in Ghana.

Poverty is not unknown in Sub-Saharan Africa (SSA) including Ghana. The extent to which FDI can help reduce poverty depends on the sectors that benefit from the flows (Abdulai, 2005). FDI in a manufacturing sector may generate employment for the relatively skilled (in terms of the local market), and would not directly benefit the poor. However, FDI in primary sectors (including Agriculture, but excluding the gas and oil sectors) is more likely to employ unskilled labour and provide benefits to rural areas, which could reduce poverty in those areas. Krugell (2005), Asiedu (2006) and Moreira (2009) have acknowledged a dearth of recent literature on determinants of FDI in Africa. Some more recent cross-country studies on Africa have been conducted by Mutenyo, *et al* (2010), Blancheton & Opara-Opimba (2010) and Luiz & Ruplal (2010) among several studies.

The sparse specific country studies on determinants of FDI in Ghana, notably Tsikata, *et al* (2000), Kyereboah-Cleman & Agyire-Tettey (2008) and Barthel, *et al* (2008) failed to examine sectoral dimensions. The few sectoral country studies by Amos (2003) on mining, and Abdulai (2005) on total FDI, and Dah & Khadijah (2010) on oil did not focus on manufacturing and/or the agricultural sector, which is preferred for efficiency effects (Barthel *et al*, 2008). Neither did these studies investigate the determinants of FDI to these sectors let alone agriculture. Barthel *et al* (2008) recommended country level studies on determinants of efficiency-seeking FDI to sectors such as agriculture and manufacturing, hence the need for this paper.

Identifying the determinants of inward FDI into Agriculture will provide useful information for policy makers. The study will fill the void in the literature on FDI, especially for agriculture.

The rest of the paper is organised into four sections. A review of theoretical and empirical literature is captured in section two. Section three presents the data and models used. The results are presented and discussed in the fourth section. The conclusions and recommendations distilled from the discussions are captured in section five.

THEORETICAL[1] AND EMPIRICAL REVIEW

There are three perspectives underpinning the theories of FDI. Firstly, why a firm will favour FDI as a means of entering a foreign market other (rather) than exporting and licensing; secondly, why firms in the same industry often undertake FDI at the same time, and thirdly, why certain locations are favoured over others as a target for FDI.

The first, which is internationalisation theory (Hymer, 1976), seeks to explain the economic reasons for firms entering into foreign markets, especially internalisation gains and profit opportunities. This perspective points out that company growth opportunities and economic logic should be a guide for extending operations into other countries. In expanding abroad, firms often prefer FDI to licensing as a strategy for entering a foreign market (Hymer, 1976). According to this theory, FDI is preferred to licensing and exporting owing to some drawbacks. In the case of licensing, it may result in a firm giving away valuable technological expertise to a potential foreign investor. Again, licensing does not give a firm the tight control over manufacturing, marketing, and strategy in a foreign country that may be required to maximise its profitability. The fee received for licensing is not commensurate with the loss of control over manufacturing and marketing. Next, is competitive advantage where a firm's product is not a major driver of its competitive advantage rather than management, marketing, and manufacturing capabilities that produce those products. Such capabilities are often not amendable to licensing.

The second perspective explains the patterns of FDI. Firms invest in other countries as a follow-up strategy, that is, following their domestic competitors oversees.

Knickerbocker (1973) first put forward this theory, which is based on Oligopolistic industries. A critical competitive feature of such industries is interdependence of the major players. These firms tend to imitate each other's FDI strategy. Closely linked to the follower strategy in explaining pattern of FDI is the product life cycle hypotheses by Vernon (1966). According to Vernon, firms undertake FDI at particular stages in the life cycle of the product they pioneered. They invest in other advanced countries when local demand in those countries grows large enough to support local production. Production is subsequently shifted to developing countries when product standardisation and market saturation give rise to price competition and cost pressures. Investment in developing countries is seen as the best way to reduce cost.

The third perspective is known as *Dunning's Eclectic paradigm*. This paradigm, popular in the discipline of international economics, can be deduced from the theories of Dunning *et al* (1977) and Dunning (1988) about FDI. The

[1]The sub-section of theoretical review draws heavily on a paper by Djokoto, J. G. (2012).

theory posits that the extent, geography, and industrial composition of foreign production undertaken by Multinational Enterprise (MNE) is determined by the interaction of three sets of interdependent variables which, themselves, comprise the components of three sub-units (Dunning, 2001). The mathematical function is:

$$FDI = f(O, L, I) \quad \ldots\ldots 1$$

Where O is ownership, L is location and I is internalisation.

Ownership, location, and internationalisation are key competitive advantages in this paradigm. The ownership competitive advantage posits that, all things being equal, the greater the competitive advantages of the investing firms, *relative to those of other firms* the more they are likely to be able to engage in or increase their foreign production (Dunning, 2001). The **locational attractions** states that the more the immobile, natural or created endowments needed by the firms to use jointly with their own competitive advantage that favour a presence in a foreign rather than a domestic location, the more firms will choose to supplement or take advantage of their ownership specific advantages by engaging in FDI. For this reason, the MNE's would undertake activities so as to add value to their operations. The final competitive advantage which is **Internalisation** offers a framework for evaluating alternative ways in which firms may organize the creation and exploitation of their core competencies, given the locational attractions of different countries or regions. Such modalities range from buying and selling goods and services in the open market, through a variety of inter-firm non-equity agreements, to the integration of intermediate product markets and an outright purchase of a foreign corporation. In summary, the eclectic paradigm, like its near relative, internalisation theory, asserts that the greater the net benefits of internalising cross-border intermediate product markets, the more likely a firm will prefer to engage in foreign production itself, rather than license the right to do so, for example by a technical service or franchise agreement, to a foreign firm (Dunning, 1993). A number of empirical studies do confirm this theoretical framework and are reviewed in the rest of the section.

Ul-Haque *et al.*, (1997) have noted that domestic factors such as autonomous increases in domestic money demand and increases in the domestic productivity of capital are important in explaining inward FDI flows. Improvement in external creditor relations, adoption of sound fiscal and monetary policies and neighbourhood externalities are acknowledged by Calvo, *et al*, (1993). Among other domestic factors, macroeconomic performance, the investment environment, infrastructure and resources, and the quality of institutions are important in explaining inward FDI flows.

Domestic economic reforms were the main attraction for capital flows to the developing countries in the 1990s (Chuhan, *et al*, 1996). His conclusion is that economic reforms such as privatisation of public enterprise, liberalisation of currency and capital accounts, coupled with a stable macroeconomic environment have improved credit worthiness and expanded investment opportunities. Basu & Srinivasan (2002), citing success stories in Africa, adduced political and macroeconomic stability, well-designed structural reforms, and natural resources as contributors to the increase in

FDI in these countries. Asiedu (2002) observed that trade restriction and poor policy discourage FDI. These account for the small proportion of FDI flows to African countries. Additionally, she noted that African countries tended to be less open than other emerging markets and were perceived as very risky and characterised by poor policy environment relative to other developing countries.

Moriset (2000) showed that GDP growth rate and trade openness can be used to fuel the interest of foreign investors. A detailed review of the policy reforms implemented in Mali and Mozambique further indicates the following strategic actions for their recent success beyond macroeconomic and political stability: opening the economy through trade liberalisation reform; launching an attractive privatisation programme; modernising mining and investment codes; adopting international agreements related to FDI; developing a few priority projects that have multiplier effects on other investment projects and mounting an image building effort with the participation of high profile political figures.

Using a comprehensive dataset of 71 developing countries, about half of which are in the poorest region of Africa –Sub-Saharan Africa (SSA) – over the 1988□97 period, Asiedu (2002) wondered whether the determinants of FDI to developing countries are equally relevant for SSA. Examining three main variables – return on investment, infrastructure development and openness to trade –she concluded that SSA is different. Higher marginal product of capital and better infrastructure do not drive FDI to SSA and, although openness to trade has a positive impact on FDI to SSA, the impact is lower than non□SSA countries. The three policy implications distilled were: SSA countries need to liberalise their trade regimes in such a way that reform will be perceived as being credible by foreign investors; successful policies in other regions cannot be blindly replicated in Africa; African governments have to disseminate information about their countries to dispel the myth about the continent.

Bende-Nabende (2002) also provided empirical evidence for macro locational determinants for FDI to Africa. Using co-integration, with data on 19 SSA countries over the 1970-2000 period, he concluded that the most dominant long-run determinants of FDI in SSA were market growth, a less restrictive export-orientation strategy, the FDI policy liberalisation, real effective exchange rates, market size, and openness of the economy.

Openness to FDI, good infrastructure and institutional quality were important in explaining the performance of SSA FDIs in the world stage (Asiedu, 2004). The experience was characterised as absolute progress but relative decline. Indeed, from 1980-89 to 1990-99, SSA had reformed their institutions, improved their infrastructure and liberalised their FDI regulatory framework. However, compared with other developing regions, the degree of changes in FDI flows in SSA has been meagre. The policy implication that followed was the need to enhance SSA's policy environment in both absolute and relative terms. Asiedu (2006) again investigated FDIs to 22 SSA. She found out that regional blocs such as the Southern African Development Community (SADC) were important in enhancing FDI flows to the region. In addition to expanding the size of the market, regionalism can promote political stability by restrict-

ing membership to countries with democratic political systems, as well as providing incentives for member countries to implement good policies through the threat of sanctions or the loss of access to the bloc for errant countries.

For Uganda, Obwona (2002) observed that generous incentive packages such as tax holidays and exemptions were less effective in attracting FDI to Uganda. The more effective factors included macroeconomic and political stability and policy consistency. Infrastructure and institutional bottlenecks acted as deterrents to FDI. However, FDI had a positive impact on GDP growth in Uganda.

A review of the sparse literature of FDI in Ghana will provide some insights into the relationship between the determining factors and FDI. Tsikata, et al (2000) studied the determinants of FDI in Ghana and categorised FDI flows to Ghana since 1983 into three phases namely; the period 1983-88, 1989-92 and 1993-96. The first period witnessed sluggish inflows, averaging about $4 million per annum, and the highest and lowest inflows during the period being $6 million in 1985 and $2 million in 1984 respectively. The second, 1989-92 recorded moderate inflows averaging about $18 million per annum the highest and lowest being $22 million in 1992 and $14.8 million in 1990 respectively. The third, 1993-96 was a period of significant, but oscillatory inflows, which peaked in 1994 at $233 million, but fell by more than 50% the following year to $107million.

Tsikata et al (2000) described a three-way nexus of economic growth, investment and political stability, which had emerged since the coup d'etat of 1972. In that year, a growth rate of 2.3% was recorded, accompanied by a more than 60% drop in FDI (from $30.6 million in 1971 to $11.5 million in 1972). In 1979 when Rawlings took power and was perceived as anti-business, growth fell to as low as -3.2%; there was also an outflow of $2.8 million of FDI. The state of the economy worsened further in his second advent that is from a negative growth rate of 3.5% in 1981 to 6.9% in 1982; however, inflow of FDI remained constant at $16.3 million. The relationship emerged again when a parliamentary democracy replaced the military junta in 1992. The rate of growth of 5.3% in 1991 fell to 3.9% in 1992. This had been previously attributed to deficit financing undertaken in the democratisation process. The FDI flow however, increased from $20 million in 1991 to $22.5 million in 1992.

Frimpong and Oteng-Abayie (2008) however, showed that there was no link between FDI and economic growth. Specifically, they noted that, in Ghana, FDI caused economic growth and not vice versa. This was the case for the period after the Structural Adjustment Programme (SAP). They implied that, efforts at attracting FDI will definitely contribute to economic growth. Specifically for agriculture, Djokoto (2011) noted that there was no growth-FDI linkage over the period 1970-2008.

Barthel et al (2008) identified access to land, property registration, labour market (regulations, availability of skilled labour, labour productivity) and political instability as factors inhibiting FDI flows into Ghana. Following these findings, they recommended the following: speeding up of reforms in land administration and property registration; GIPC liaising with labour unions and the

labour commission to make labour unions more business friendly; Government focusing on few subsectors in manufacturing such as agro-processing and food and beverages; and making education more functional.

Dah and Khadijah (2010) established a positive relationship between FDI and locational attraction. Of the two components within the locational attraction, natural resource attracted more FDI than market size in the case of Africa. It was noted that through a case study of Angola, oil attracted FDI because oil was location specific which attracted foreign firms. These investments on the other hand contributed to the productive capacity of the receiving country thus stimulating economic development. They however noted that the availability of natural resources (oil) and its ability to attract foreign investment did not guarantee economic development. The establishment of appropriate institutions, mechanisms and policies would ensure efficient use of oil revenue for sustained economic growth.

From the review, some factors have been noted to influence FDI flows, namely; macroeconomic environment, political stability, natural resources, property rights, land availability, education and human resources, and openness to trade.

The different determinants of FDI into Agriculture in Ghana represent a fundamental focus of this study. From the above, the following variables are examined for their effects on FDI: inflation, exchange rate and GDP per capita constituting macroeconomic environment; democracy, representing political stability; school enrolment representing labour and human resources; trade openness to capture openness, and ratio of uncultivated land to cultivated land to take care of agricultural natural resources.

DATA AND METHODS

Data

Studies in FDI determinants have employed primary data at the firm level (Barthel et al (2008) and secondary time series data (Tsikata et al, 2000; Dah and Khadijah, 2010; and Blancheton & Opara-Opimba, 2010). Owing to data availability, the study adopts aggregate times series secondary data.

Data on agricultural inward FDI (AGFDI) was obtained from Ghana Investment Promotion Centre (GIPC) in US dollars. Nominal exchange rate in US$/GHS was obtained from African Development Indicators (ADI) of the World Bank. This was expected to move in the same direction with AGFDI. Inflation in percentage changes of CPI was obtained from ADI. Inflation erodes the value of money, thus an increase in inflation (INF) is expected to be a disincentive to inward AGFDI flows. GDP per capita (GPC) represents market size. A positive sign was hypothesised with AGFDI. A new trade openness variable according to Squalli & Wilson (2011) was computed as in equation 2. It is the (X+M)/GDP adjusted by the proportion of a country's trade relative to the average world trade. This they christened composite trade share (CTS).

$$CTS_G = \frac{(X+M)_G}{\frac{1}{n}\sum_{j=1}^{n}(X+M)_j} * \frac{(X+M)_G}{GDP_G} \quad \text{.....2}$$

Exports and imports of agricultural products at current US dollars were obtained from FAOSTAT database. Ghana's GDP at current prices and share of agriculture in Ghana's GDP were obtained from ADI. A positive sign was expected *a priori*. Democracy and political

governance was represented by polity4 data from the polity project website: . The data contained a negative number (-1). In order to make it possible to take the natural logarithm of the data, 2 was added to convert the negative 1 to positive 1 and all other members of the series increased by 2 (Frenkel, 1976). Land and water are key natural resources in agriculture. Water resources were not captured, as the data available on the AQUASTAT database of FAO did not show any variability. Natural resources were proxied by ratio of uncultivated agricultural land to total agricultural land (UCR). *A priori*, natural resources should exert a positive effect on AGFDI inflows. Data on net primary school enrolment rate from WDI had so many empty cells though it was a better measure of level of education of labour. As such, gross school enrolment was used. School enrolment should exert a positive effect on AGFDI.

Annual data on AGFDI is available from 1995 to 2010. Djokoto (2011) had earlier generated AGFDI data covering 1966 to 2010 by first modelling data for 1966-1994 with AGFDI as explained and Net FDI (obtained from UNCTADSTAT database) as explanatory variable. This model was used to estimate data for 1971-1995. An exponential growth equation was then applied to the 1971 to 2010 data to fill in the spaces for 1966-1970. He used this in a Granger causality test. The use of that data posed problems in this multivariate study. Therefore, the AGFDI was restricted to 1995 t0 2010. All the series were first converted to natural logarithm form after which the frequency was increased to quarterly frequency in Eviews 7.

Method

The model estimated was specified as:

$$LAGFDI_t = \beta_0 + \beta_1 LAGTO_t + \beta_2 LEX_t + \beta_3 LGPC_t + \beta_4 LSE + \beta_5 LUCR_t + \beta_6 LP4_t + \beta_7 LINF + GPC + \vartheta_t \quad \ldots\ldots 3$$

where:

AGFDI is inward FDI flows to agriculture sector

AGTO is agricultural trade openness

EX is nominal exchange rate

GPC representing size of economy

SE is total school enrollment

P4 is proxy for democratic government

INF is inflation

UCR is availability of natural resources; unclutivated agricultural land

L means natural logarithm

ϑ *is error term*

β_i *are coefficients*

and subscript t is representative of time series

RESULTS AND DISCUSSIONS

Stationarity and Cointegration tests

As required for time series data, the test for unit roots was performed. Using the augmented Dickey-Fuller test (ADF) and Phillips-Perron tests for all variables the results are shown in table 1.

Table 1. Unit Root Test using Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP)

Variable	ADF	PP
LUCR	-3.176126 ** I(0)	-3.386120** I(0)
LEX	-3.481607** I(1)	-3.462054** I(1)
LAFDI	3.481607** I(1)	-4.265819*** I(1)
GPC	-3.607994*** I(2)	-9.763062*** I(2)
INF	-3.478854** I(1)	-4.435096*** I(1)
P4	-4.772077*** I(1)	-4.772077*** I(1)
SE	-3.446451** I(2)	-9.727759*** I(2)
AGTOP	-3.303262** I(1)	-3.901846*** I(1)

****-significance at 1% level, **-significance at 5% level. All significance is of MacKinnon (1996) one-sided p-values*

The ADF and PP are in agreement that GPC and SE are integrated of order 2 whilst LEX, LAGFDI, INF and AGTOP are integrated of order 1. Only LUCR is stationary at both levels. The combination of I(0), I(1) and I(2) precludes the use of currently available techniques test for cointegration, that is; Johansen's technique and Auto-Regressive Distributed Lag technique. Despite the importance of the I(2) variables they were reluctantly dropped to pave the way for the use of ARDL to test for cointegration. The computed statistics (F and W) fall below both the 10% and 5% critical (table 2). Thus the null hypothesis that there is no cointegration cannot be rejected.

Table 2. ARDL Test for Cointegration[a]

F-statistic	95% Lower Bound	95% Upper Bound	90% Lower Bound	90% Upper Bound
2.4011	2.8444	4.1593	2.4195	3.5635
W-statistic	95% Lower Bound	95% Upper Bound	90% Lower Bound	90% Upper Bound
14.4066	17.0665	24.9558	14.5170	21.3807

[a] *complete ARDL model with ECM are shown in table A1.*

VAR models Estimations

Following the non-cointegration of the variables, the unrestricted Vector Autoregressive model (VAR) was estimated (Table A2). A Breusch-Godfrey Serial Correlation LM Test showed existence of serial correlation in the model (Table A3).

The model was subsequently corrected for serial correlation (equation 4) and tested for heteroscedasticity (Table 2). The diagnostics test showed homoscedasticity of the variances.

$$LAGFDI_t = 0.12 + 5.00LUCR_t + 1.06FDI_{t-1} - 0.88LEX_{t-1} + 0.56LINF_{t-1} + 0.84P4_{t-1}$$
$$(0.8647)\ (0.9274)\ (9.8342)^{***}\ (1.5020)\quad (2.0347)^{**}\quad (2.3654)^{**}$$
$$+ 0.49AGTOP_{t-1} + 0.52AR(1) \qquad \ldots\ldots 4$$
$$(0.7765)\qquad (3.6253)^{***}$$
$$R^2 = 95.9\% \quad Adjusted\ R^2 = 95.3\% \quad F - statistic = 180.95^{***}$$

The figures in parenthesis are the student *t*-statistics of the estimated coefficients with * meaning 10% significance level, ** 5% significance level and *** 1% significance level.

The R squared and adjusted R squared are very high. *F*-statistic is also high with exact significance of 0.00. Following these impressive model statistics, inferences can then be drawn. All the coefficients possessed the *a priori* signs except nominal exchange rate and inflation. In terms of significance, only two of the variables under investigation were statistically significant, namely, inflation and polity4. The natural logarithm estimation means the coefficients are elasticities. Thus a 1% increase in inflation will induce a 0.56% increase in FDI to agriculture in Ghana. This is contrary to the findings of Calvo, *et al* (1993) and Chuhan, *et al*, (1996) and in conformity to the outcome of the study by Ul-Haque *et al.*, (1997). The positive relation between inflation and FDI to agriculture can be attributed to the relatively high inflationary situation in Ghana for some time. The results possibly point out that FDI can cope with some increases in inflation. The threshold of which was not investigated by this paper.

The positive and significant coefficient of the P4 variable (0.84) means that 1 % increase in P4 will induce 0.838% in FDI to agriculture. Ghana retuned to multi-party democracy in 1993 following eighteen years (1981-1992) of non-democratic rule. Since the data covered 1995 to 2010 this result is expected. This result confirms the findings of Tsikata, *et al* (2000), Basu & Srinivasan (2002), Obwona (2002), Asiedu (2006) and Barthel *et al* (2008). Tsikata *et al* (2000) described a three-way nexus among growth democracy and FDI into Ghana over the period 1972 to 1992. The finding of positive elasticity of P4 extends the democracy-FDI connection to cover 1995 to 2010 though Djokoto (2011) did not confirm the growth-FDI connection over the period 1970-2008 for agriculture and Frimpong and Oteng-Abayie (2008) could also not confirm this link for the whole economy of Ghana with data over 1970-2002.

One quarter lag of FDI is positive and statistically significant at 0.00%. The exact elasticity is 1.06. This is the highest significant elasticity among the coefficients. This clearly shows that FDI to agriculture in the previous quarter begets more FDI to agriculture in Ghana in the next quarter. The annual lag situation was earlier established by Djokoto (2011) and Djokoto (2012). This finding implies that successful FDI projects in agriculture attract more FDI projects. This calls for concerted efforts to service foreign investors, such that they can 'good mouth' Ghana's agricultural sector to prospective investors.

Contrary to several studies (Moriset, 2000; Asiedu, 2002; and Bende-Nabende, 2002) but not specifically on agriculture, openness to

trade in agriculture is ineffective in attracting FDI into agriculture in Ghana. Essentially, openness to trade is expected to promote inward FDI to agriculture. This is so for a number of reasons. Firstly, trade will signal to foreign investors that the environment supports production and export of such products. Secondly, it provides evidence that investors who intend to export their produce have evidence of possibility of export from Ghana if they invest in production in Ghana. Thirdly, MNEs in agribusiness may be interested in diversifying backward as well as geographically into the country. The fourth reason is that, MNEs initially purchase agricultural produce from Ghana and with time establish facilities that produce those products. However, Djokoto (2012) explains that cocoa beans constitute the greatest single crop contributing to Ghana's agricultural exports. The indigenous dominance and non-plantation farms structure does not encourage foreign investment in production of cocoa beans. Additionally, the price of cocoa beans is regulated, which constitute some disincentive to foreign investors who may not reap the full foreign price of the beans sold. Thus, increased agricultural exports over the period 1995 to 2010 have failed to signal and cause an inward flow of FDI into the sector. Therefore promoting openness of agricultural external trade may be for other reasons but it is incapable of inducing FDI into the sector. The importance of *I* in Dunning's *OLI* is not upheld by the data.

Nominal exchange rate of Ghana cedis over the period of 1995 to 2010 did not have any statistically significant effect on inward FDI to agriculture in Ghana. This is contrary to the findings of Bende-Nabende (2002). It would have been expected that for a fixed dollar sum, the nominal value of the Ghana cedi sum is higher. Assuming no local currency value decline internally, the nominal value of investment of foreign currency denominated in local currency will be higher. Indeed, it implies that there will be more cedis to pay for products and services locally. Secondly, considering that substantial FDI projects in the sector are export-oriented, a decrease in value of the cedi relative to the dollar is no disincentive. The findings however do not conform to this.

Agriculture is a highly land intensive enterprise. However, the statistical insignificance of LUCR in above model shows the contrary. The result disagrees with the role of *L* in theoretical model outline earlier. This result also disagrees with evidence in support of *L* in the studies of Basu & Srinivasan (2002) and Dah & Khadijah (2010). More importantly, this finding should be considered from the perspective that other variables such as democracy and inflation are more important than availability of land.

CONCLUSION AND RECOMMENDATIONS

The current paper sought to identify the factors that attract FDI into the agricultural sector in Ghana. The results show that agricultural trade openness, nominal exchange rate, and uncultivated agricultural land do not attract inward FDI flow to agriculture in Ghana. However, inflation (modest level, may be), democracy and one quarter lag of inward FDI induces inward FDI into agriculture in Ghana in the current quarter. In the light of the above discussions and conclusions, the following recommendations are appropriate:

- Stakeholders in Ghana's democracy must consolidate the gains from the current democratic dispensations and not relent on efforts that will sustain democracy and good governance in Ghana.

- In as much as inflation must be curtailed or stabilised as a macroeconomic goal, some level of inflation is appropriate to attract FDI into agriculture.

- Ghana Investments Promotion Centre and other agencies that service foreign investors must increase their efforts to provide quality service in order to attract more FDI into agriculture.

- Efforts at liberalised exchange rate regime that allows market forces to determine the price of currencies, policies such as free compulsory basic education, capitation grant and school feeding programme which are directed towards increasing school enrolment, and streamlining land acquisition procedures and resolution of disputes speedily may be beneficial but ineffective in inducing more FDI into agriculture.

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Table A1

Autoregressive Distributed Lag Estimates

ARDL(1,0,0,1,1,1) selected based on Schwarz Bayesian Criterion

Dependent variable is FDI			
63 observations used for estimation from 1995Q2 to 2010Q4			
Regressor	Coefficient	Standard Error	T-Ratio
FDI(-1)	1.0064	.050631	19.8764***
CAR	-5.8731	3.2836	-1.7886*
EX	.37677	.29315	1.2853
GPC	-1.0269	.46888	-2.1900**
GPC(-1)	1.3424	.48203	2.7850***
INF	-1.3016	.17072	-7.6240***
INF(-1)	1.1164	.17897	6.2377***
TOP	-2.8068	.43747	-6.4160***
TOP(-1)	3.1110	.41397	7.5150***
C	-1.4839	.70568	-2.1028***

R-Squared	0.97824	R-Bar-Squared	0.97455
S.E. of Regression	0.053754	F-Stat. F(9,53)	264.7587***
Mean of Dependent Variable	4.1670	S.D. of Dependent Variable	0.33693
Residual Sum of Squares	0.15315	Equation Log-likelihood	100.2211
Akaike Info. Criterion	90.2211	Schwarz Bayesian Criterion	79.5055
DW-statistic	0.84392	Durbin's h-statistic	5.0105***

Testing for existence of a level relationship among the variables in the ARDL model

F-statistic	95% Lower Bound	95% Upper Bound	90% Lower Bound	90% Upper Bound
2.4011	2.8444	4.1593	2.4195	3.5635
W-statistic	95% Lower Bound	95% Upper Bound	90% Lower Bound	90% Upper Bound
14.4066	17.0665	24.9558	14.5170	21.3807

If the statistic lies between the bounds, the test is inconclusive. If it is above the upper bound, the null hypothesis of no level effect is rejected. If it is below the lower bound, the null hypothesis of no level effect can't be rejected. The critical value bounds are computed by stochastic simulations using 20000 replications.

Diagnostic Tests

Test Statistics	LM Version	F Version
A:Serial Correlation	CHSQ(4) = 26.0629***	F(4,49) = 8.6436***
B:Functional Form	CHSQ(1) = 2.9534*	F(1,52) = 2.5576
C:Normality	CHSQ(2) = 14.8477***	Not applicable
D:Heteroscedasticity	CHSQ(1) = 0.98923	F(1,61) = .97311

A:Lagrange multiplier test of residual serial correlation

B:Ramsey's RESET test using the square of the fitted values

C:Based on a test of skewness and kurtosis of residuals

D:Based on the regression of squared residuals on squared fitted values

Error Correction Representation for the Selected ARDL Model ARDL(1,0,0,1,1,1) selected based on Schwarz Bayesian Criterion Dependent variable is dFDI63 observations used for estimation from 1995Q2 to 2010Q4			
Regressor	Coefficient	Standard Error	T-Ratio
dCAR	-5.8731	3.2836	-1.7886*
dEX	.37677	.29315	1.2853
dGPC	-1.0269	.46888	-2.1900**
dINF	-1.3016	.17072	-7.6240**
dTOP	-2.8068	.43747	-6.4160***
ecm(-1)	.0063697	.050631	0.12581
List of additional temporary variables created:			
dFDI = FDI-FDI(-1)			
dCAR = CAR-CAR(-1)			
dEX = EX-EX(-1)			
dGPC = GPC-GPC(-1)			
dINF = INF-INF(-1)			
dTOP = TOP-TOP(-1)			
ecm = FDI -922.0336 CAR + 59.1509 EX + 49.5445 GPC -29.0800 INF + 47.7503			
TOP -232.9646 C			
R-Squared	0.73073	R-Bar-Squared	0.68500
S.E. of Regression	0.053754	F-Stat. F(6,56)	23.9713***
Mean of Dependent Variable	0.013035	S.D. of Dependent Variable	0.095777
Residual Sum of Squares	0.15315	Equation Log-likelihood	100.2211
Akaike Info. Criterion	90.2211	Schwarz Bayesian Criterion	79.5055
DW-statistic	0.84392		
R-Squared and R -Bar-Squared measures refer to the dependent variable dFDI and in cases where the error correction model is highly restricted, these measures could become negative.			

Table A2. Unrestricted VAR model

Dependent Variable: FDI
Method: Least Squares
Sample(adjusted): 1995:2 2010:4
Included observations: 63 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.441901	0.763291	-0.578942	0.5650
CAR	1.717294	3.991696	0.430217	0.6687
FDI(-1)	1.033721	0.067956	15.21159	0.0000
EX(-1)	-0.421293	0.375040	-1.123327	0.2661
INF(-1)	0.364780	0.194465	1.875815	0.0659
P4(-1)	0.716531	0.163168	4.391365	0.0001
TOP(-1)	-0.081492	0.433628	-0.187931	0.8516

R-squared	0.946306	Mean dependent var	4.167028
Adjusted R-squared	0.940553	S.D. dependent var	0.336932
S.E. of regression	0.082150	Akaike info criterion	-2.056109
Sum squared resid	0.377920	Schwarz criterion	-1.817983
Log likelihood	71.76743	F-statistic	164.4918
Durbin-Watson stat	1.069639	Prob(F-statistic)	0.000000

Table A 3. Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	8.028322	Probability	0.000886
Obs R-squared	14.43929	Probability	0.000732

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 01/27/12 Time: 13:14

Variable	Coefficient	Std. Error	t Statistic	Prob.
C	0.608716	0.703887	0.864792	0.3910
CAR	2.580455	3.633087	0.710265	0.4806
FDI(-1)	-0.043355	0.062643	-0.692087	0.4918
EX(-1)	-0.139439	0.337122	-0.413615	0.6808
INF(-1)	0.138823	0.177609	0.781620	0.4379
P4(-1)	-0.035496	0.146446	-0.242385	0.8094
TOP(-1)	-0.043865	0.388852	-0.112806	0.9106
RESID(-1)	0.475809	0.137295	3.465588	0.0010
RESID(2)	0.083768	0.142458	0.588018	0.5590

R-squared	0.229195	Mean dependent var	-5.00E-16
Adjusted R-squared	0.115002	S.D. dependent var	0.078074
S.E. of regression	0.073447	Akaike info criterion	-2.252937
Sum squared resid	0.291302	Schwarz criterion	-1.946775
Log likelihood	79.96752	F-statistic	2.007080
Durbin-Watson stat	1.963835	Prob(F-statistic)	0.062949

Table A4. White Heteroskedasticity Test

White Heteroskedasticity Test:			
F-statistic	1.190996	Probability	0.315923
Obs R-squared	14.00022	Probability	0.300694

ABOUT THE AUTHOR

Mr. Justice G. Djokoto holds a B.Sc. degree in Agriculture with specialisation in Agricultural Economics and Master of Philosophy degree in Agricultural Administration both from the University of Ghana, Legon. Prior to enrolling for the Master's programme, he obtained a Post graduate diploma in Education. Justice is a member of faculty in the Agribusiness department of Central Business School, Central University College in Accra Ghana and a member of Econometric Society. Foreign direct investment and agribusiness, technical and economic performance of organisations, and technology and record keeping of agribusiness firms are research areas that engage his attention.

ADDRESS:
Justice G. Djokoto
Department of Agribusiness
Central Business School, Central University College
P. O. Box DS 2310, Dansoman, Accra, Ghana.
Email:dgameli2002@gmail.com, Tel: +233-28-503-7399