THE DETERMINANTS OF FIXED FOREIGN DIRECT INVESTMENT IN BOTSWANA (1980-2007)

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Abstract

The Government of Botswana has over the years provided a number of investment incentives to attract Foreign Direct Investment (FDI) into the country in order to diversify the economy away from the mining sector. However, despite the efforts to encourage FDI, the amount of FDI has continued to be relatively low. The FDI in Botswana is still skewed towards mining, especially diamond mining. This paper examines the determinants of FDI and the effects of economic growth on FDI in Botswana. The study uses the accelerator theory of investment in finding the effects of FDI on the economy. To examine the determinants of FDI, FDI is expressed as a function of GDP growth rates, human capital, terms of trade, domestic investment, and government expenditure. We use 1980-2007 time series annual data from Botswana Central Statistics Office (CSO) publications, Bank of Botswana and United Nations Conference on Trade and Development online statistics. In finding the determinants of FDI, we employ both the co-integration and Vector Error Correction Model to find the short-term and long-term effects. The econometric results show that GDP growth rates, terms of trade and domestic investment significantly influence FDI flows in Botswana. The results also show that economic growth significantly explains FDI flows in Botswana at 10% level of significance in the long-term. In addition, the results show that economic growth, terms of trade and domestic investment significantly explain FDI flows in Botswana in the short-term at 5% level of significance. Economic growth positively impacts on FDI in Botswana as expected in both the short-term and long-term. The positive impact of economic growth is consistent with the acceleration theory of investment. This finding confirms that the accelerator theory is useful in Developing Countries.

Key Concepts: Foreign direct investment, Botswana, accelerator, diversification, growth rate

1. Introduction

At independence in 1966, Botswana was one of the poorest countries in the world with an annual per capita income of US $100 and was regarded as one of the 10 poorest countries in the world (UNCTAD, 2003). The contribution of Agriculture to GDP was about 40 percent and was the main source of income and employment in the country. In the early years of independence in 1966, Botswana was dependent on foreign aid for most of her capital and recurrent budget. The discovery and exploitation of copper, nickel and diamonds in the 1970s, increased FDI inflows and resulted in economic growth. After three decades of rapid economic growth, Botswana has become an upper-middle income developing economy with a per capita income of $3 312 (MFDP, 2003; UNCTAD, 2003). The rapid economic growth is mainly driven by mineral revenue from diamonds. The revenue obtained from minerals sales was invested in health, education and infrastructure (UNCTAD, 2006).

The Government of Botswana, after realizing the benefits of FDI in stimulating economic growth, has developed investment incentives in order to attract FDI (MFDP, 2003). Investment incentives in Botswana include: stable political and good governance, a stable exchange rate and macroeconomic policies, good labour relations, low tax and corruption rates, low crime

levels and several trade agreements with different countries to provide free access to goods produced in Botswana (MFDP, 1997).

However, with all the above FDI incentives in place, the main source of FDI, export earnings, government revenues and the largest contributor to gross domestic product (GDP) is still the mining sector, especially in diamonds. Therefore, the government has found need to diversify the economy away from minerals; as the diamonds are non-renewable resources and their prices are subject to exogenous shocks. The importance of diversifying the economy is manifest during the economic recession (2008); the prices of diamonds went down adversely affecting government revenues. Therefore, the government finds it necessary to reduce the dependence on the diamonds for the country to attain sustainable economic growth (MFDP, 2009).

2. Background

The main objective of the Government of Botswana is to diversify the economy from dependence on a non-renewable mineral resource, like diamonds (MFDP, 2003). As a result, the Botswana Export Development and Investment Authority (BEDIA) was established by the Act of Parliament in 2000 to be the focal point of investment and export activities and BEDIA plays the role in the diversification and industrialization of the economy (MFDP, 1997). Notwithstanding the efforts that the government has undertaken to attract foreign direct investment, Botswana still experiences the problem of low levels of FDI.

At independence, Botswana did not have any destination advantages for FDI because her small population lived mostly in rural areas. Therefore, the government of Botswana chose to liberalize her economy. The discovery of minerals (diamonds, copper-nickel, and soda-ash) after independence increased Botswana's attractiveness to FDI (Siphambe, 2005).

Apart from the minerals, Botswana's sound macroeconomic management of the economy also increased Botswana's attractiveness to FDI. Botswana's appropriate macroeconomic management has helped the government to control expenditure and build up foreign reserves for many months of imports cover (Sentsho, 2000). In addition, the main objective of monetary policy in Botswana is to achieve a sustainable low inflation and competitive real exchange rate (MFDP, 2003). The management of the exchange rate is one of the strategies to attract FDI in Botswana. Botswana removed all exchange controls in 1999 to allow for free repatriation of profits, dividends and capital (MFDP, 2009). The main reason for the removal of exchange controls was to increase Botswana's competitiveness and increase foreign direct investment.

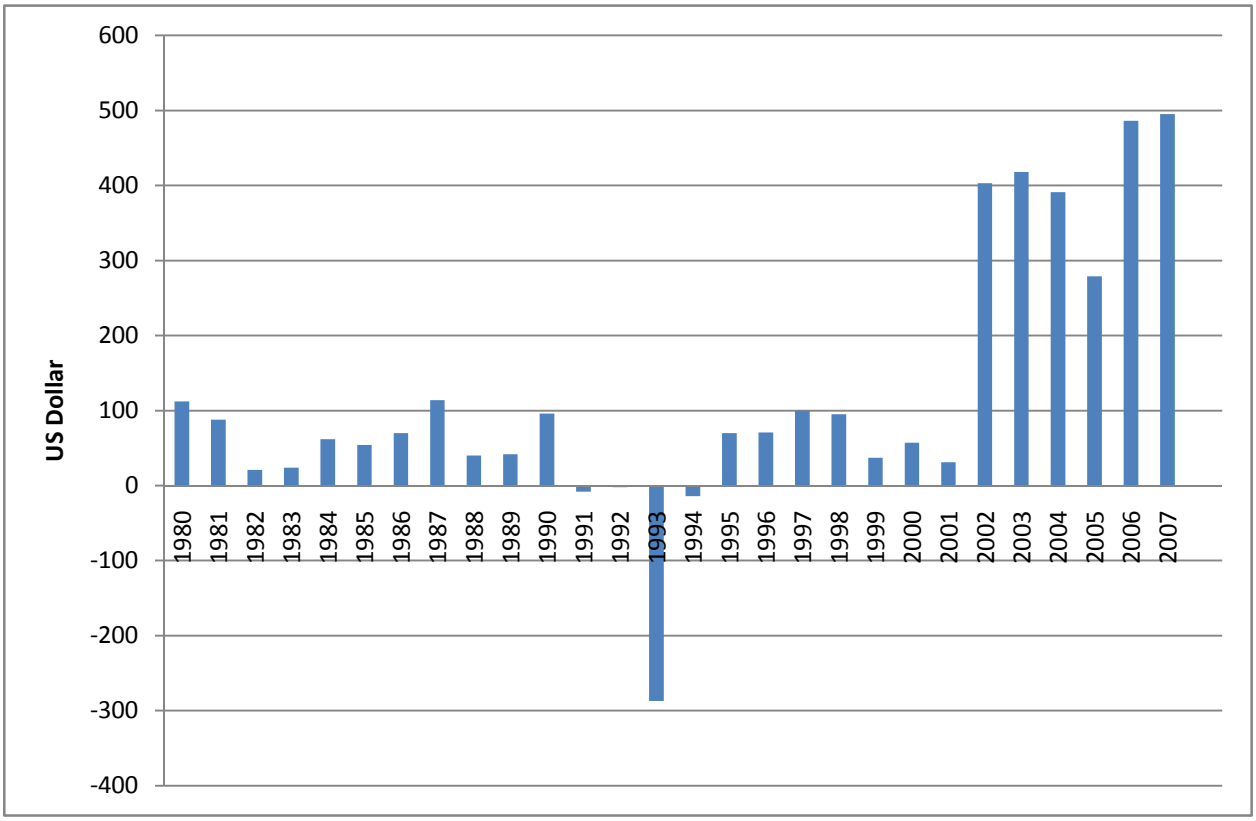
Botswana has the simplest and comprehensive tax regimes which are directed at increasing competitiveness, and FDI. Corporate tax rates in Botswana are the lowest in the SADC region at 15% for all manufacturing companies as well as International Financial Service Centre (IFSC) companies and 25% for other non-manufacturing companies. The 15% manufacturing tax comprises 10% additional tax and 5% basic company tax. The main reason for having the lowest taxes is to encourage both local and foreign firms to invest in order to achieve economic diversification (Sentsho, 2000; BEDIA, 2010).

Botswana has a small population which was projected at 1.7 million in 2008 (CSO, 2008). Subsequently, the domestic market for goods and services is small and this has led the government of Botswana to enter into different bilateral and international trade agreements in order to increase its market base. These agreement include; Southern African Customs Union (SACU), Southern African Development Community (SADC) Protocol on Trade Cooperation, The Contonou Agreement and the World Trade Organization (WTO). There are several bilateral agreements between Botswana and other countries (MFDP, 2003).

2.1 FDI inflows in Botswana

Botswana used to receive a large amount of FDI compared to other SADC countries from the 1970s to 1980s (UNCTAD, 2003). From the 1990s, thereafter Botswana's share of FDI inflows fell considerably (especially between 1991 and 1994). The lowest FDI flows were received in 1993 (see, Graph 1 below which shows the level of FDI flows in Botswana between 1980 and 2007). Botswana's share of FDI flows decreased from one third in 1986-1990 to less than two percent in 1996-2000 (UNCTAD, 2003).

Graph 1: Level of FDI in Botswana from 1980-2007 (Millions of US Dollars $)



Source: UNCTAD online database, 2010

Problem statement: Despite the efforts to encourage FDI in Botswana, the amount of FDI has continued to be relatively low. Notably FDI in Botswana is still skewed towards mining, especially diamond mining. Therefore, Botswana has not been able to successfully diversify its economy towards non-mining activities. Botswana's FDI performance has slipped from being an FDI performer with high potential in 1988-1990 to performing below its high FDI potential (UNCTAD, 2003). In addition, the economic growth of 12% in the two decades after independence slowed down to a single digit in the 1990s (UNCTAD, 2006).

The purpose of the paper is to explain the determinants of FDI in Botswana. The objectives of the paper are twofold: first to investigate the efforts of economic growth, and second, to investigate the determinants of FDI in Botswana. The paper attempts to answer the following questions: are low levels of FDI due to economic growth? Are low levels of FDI due to low levels of human capital? Do government expenditures have an influence on FDI? Is it

unfavourable terms of trade that prevent FDI inflows to Botswana? Finally is the accelerator theory applicable in Botswana? The rationale of this study is that the findings will assist government of Botswana to formulate investment policies that might attract FDI. In addition, the findings will assist the Botswana authorities in their effort to diversify the economy from dependence on minerals such as diamonds. The paper also adds some knowledge on FDI literature. We employ the flexible accelerator theory of investment and other variables to determine their impact on FDI in Botswana. Time series regression equation is used to estimate the variables. The cointegration test (Johansen Cointegration test) will be carried out to determine if there is a long run relationship between various variables.

The paper is divided into six sections: section One gives the introduction, section Two presents the background, a brief overview of Botswana FDI policy and investment flows, section Three gives literature review, section Four is the data, section Five presents the methodology, and statistical techniques employed in the paper, section Six presents' empirical results and section Seven gives the conclusion.

3. Literature Review

Investment is the amount spent by businesses or individuals to add to stock of capital over a given period. Firms invest to make profits; they invest where the expected return exceeds that capital which was used to acquire the investment (Pratten, 1990; Malinvuad, 1998). Several studies of investment have used the flexible accelerator theory of investment to examine the determinants of investment.

The flexible accelerator investment model states that if the gap between existing capital and the desired capital stock is large, the firm's rate of investment will increase. The firm wants to close the gap between desired capital stock and the actual capital stock for every period (Asante, 2000; Erden and Holcombe, 2005). The flexible accelerator model can be developed from the capital stock relationships as;

$$I = \delta (K^{*} - K_{-1}) \qquad (3.1)$$

Where:

I = net investment

δ = partial adjustment coefficient

K^{*} = desired capital stock

K_{-1} = last period's capital stock

The acceleration investment model assumes that the desired capital stock (K^{*}) is proportional to the level of output, as given in the equation (2.3) below;

$$K^{*}_{t} = \alpha\ Y_{t} \qquad (3.2)$$

Where;

K^{*}_{t} = desired capital stock in period t

α = fixed capital/output ratio

Y_t = expected level of output in period t

In the flexible accelerator investment model, actual capital stock is always adjusted to desired capital stock in each period, which implies that $K^*_t = K_t$ (Turner, 1993; Du Toit and Moolman, 2004; Erden and Holcombe, 2005). In addition, output, internal funds, cost of external financing and other variables are included as determinants of the desired capital in the flexible accelerator investment model (Chirinko, 1993; Romer, 2006).

Y = growth in GDP = (GROWTH) (3.3)

Substituting (3.3) in (3.2) and letting desired capital stock $K^*_t = (INV/Y)^*$ we obtain:

$$(INV/Y)^* = \alpha\ GROWTH \quad (3.4)$$

Where; INV = gross domestic fixed investment

Equation (3.4) states that the growth in desired investment in any given period is a proportion of growth in GDP.

The partial adjustment equation implies that the gap between desired investment and actual investment is not fully covered at any given time and is given as;

$$\Delta\ (INV/Y)_t = \lambda\ [(INV/Y)^* - (INV/Y)_{t-1}] \quad (3.5)$$

Where λ = coefficient of adjustment. Equation (3.6) states that net investment is equal to desired investment less actual investment, and is partially covered by λ. The acceleration model of investment allows economic conditions to influence the adjustment coefficient λ as shown below;

$$\lambda = \beta_0 + (\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \ldots.)/[(INV/Y)^* - (INV/Y)_{t-1}] \quad (3.6)$$

Where X is the variable that affect λ; i = 123...n and β are coefficients.

There are many empirical studies on FDI in both developed and developing countries. Using Ordinary Least Squares (OLS) Na and Lightfoot (2006) examined the determinants of FDI at regional level in China during the critical period of 2002. The year 2002 is referred to as the critical year, as it is a year after China exceeded the United States of America (USA) in attracting FDI. The authors used five determinants of FDI namely: GDP (to capture market size), roads (to capture infrastructure development), labour quality (proxy for education), labour costs and degree of openness (proxy by the percentage of states owned enterprises and FDI). The study found that GDP (market size), labour quality (education) and the degree of openness had significant impact on FDI in the 30 different regions in 2002.

Of those regions, or even those excluded by a differentiated openness profile, Dhakal, Mixon and Upadhyaya (2007) assessed the factors that determine FDI inflows in the former socialist countries of Eastern and Central Europe using Ordinary Least Squares (OLS) for the period 1995-2004. FDI inflows are modeled as a function of the market size (real GDP), inflation, the current account balance, the real exchange rate, openness and government regulation in the

host country. The study found that the real exchange rate, openness of the economy and deregulation are the primary factors determining FDI inflows in these countries.

The confirmation of the foregoing primary factors is found in Demirhan and Masca (2008) after examining the determinants of FDI to developing countries using cross-sectional analysis over the period 2000-2004. The study used a sample of cross-sectional data on 38 developing countries. The dependent variable was FDI while independent variables were growth rate of per capita GDP, telephone main lines per 1000 people measured in logs, degree of openness, risk and corporate taxes. The econometric results showed that growth rate of per capita GDP, telephone main lines and degrees of openness had positive sign and were statistically significant. Inflation and tax rates had negative sign and were statistically significant.

All in all, recent studies have attempted to test for the direction of causation in FDI modeling because of the possibility of endogeneity. FDI may have a positive impact on economic growth leading to an enlarged market size, which in turn attracts more FDI. Due to the interdependence between the two variables, researchers found it fit to do a proper test of endogeneity.

Fedderke and Romm (2005) studied the determinants of FDI and the impact of FDI on the economic growth in South Africa for the period 1956-2003 using Vector Error Correction Model (VECM). The authors found that foreign and domestic capital are complementary. Therefore, meaning that there is a positive technological spillover from foreign to domestic investment in South Africa during the study period.

Ayanwale (2007) also investigated the empirical relationship between non-extractive FDI and economic growth and examined the determinants of FDI in Nigeria. In order to find the determinants of FDI, OLS was employed and Two Stage Least Squares (2 SLS) was used to investigate the relationship between FDI and economic growth. The author found the determinants of FDI in Nigeria were: market size, infrastructure development and stable macroeconomic policy. FDI contributes positively to economic growth even though it was not significant.

Karimi and Yusop (2009) also examined the causal relationship between FDI and economic growth in Malaysia using Toda-Yamamoto test for the period 1970-2005. They found no strong bidirectional relationship between FDI and economic growth. Karimi and Yusop (2009) suggested that the determinants of FDI which are human capital, level of technology and productivity affect the relationship between FDI and economic growth.

It also becomes critical to bring a dimension that analyzes the determinants of FDI using Autoregressive Distributed Lag (ARDL) framework. (Shahrudin, Yusof and Satar, 2009). In finding the determinants of FDI in Malaysia for the period 1970-2008, FDI is expressed as a function of money supply (to capture financial development), GDP (market size), growth rate of GDP, government expenditure, openness, exchange rate, corporate tax, inflation rate and crisis (to capture the effects of Asian crisis). The study revealed that financial development and economic growth contribute positively to the inflow of FDI in Malaysia.

4. Data

As previously mentioned, the purpose of the study is to explain the determinants of FDI in Botswana and to investigate the effects of economic growth on FDI in Botswana. Macroeconomic time series annual data is used to estimate FDI against; GDP growth, terms of trade, human capital, government expenditure, terms of trade and domestic investment covering the period 1980-2007. The sources of the annual data are Bank of Botswana, Botswana Central

Statistics Office (CSO) and United Nations Conference on Trade and Development (UNCTAD) online statistics.

The ratio of foreign direct investment to GDP, FDI */GDP* is the dependent variable for the model. *GDPGR* is the growth rate in GDP and *GDPGR* is used as a measure for economic growth. An increase in economic growth results in an increase in investment, and therefore FDI as stated by the flexible accelerator investment theories (Agrawal, 2000; Carkovic and Levine, 2003). *HC* (Human capital) the variable is proxied by secondary school enrollment. The endogenous growth theory postulates that FDI positively affect human capital. A well educated population tends to understand and adapt to new technology, thereby resulting in positive effects of FDI on economic growth (Akinlo, 2004; Yetkiner, 2006). *The* terms of trade "*TOT"* is the ratio of export prices to import prices (Px/Pm). Terms of trade is included to capture the openness of the host economy to trade. The Dunning's Eclectic theory states that Multi National companies invest in host countries that have access to local and regional markets. We expect a positive impact of *TOT* on FDI in Botswana as the country has entered into different bilateral and international agreements to increase its market base. *The* ratio of domestic investment to GDP (DI/GDP) variable captures the favourable investment climate in a host country (Amasaied, 2004). The ratio of government expenditure to GDP (GOE/GDP) shows the size of the government in an economy and government spending in infrastructure development in a country. Investors will invest where there is infrastructure development as postulated by the Dunning Eclectic theory (Anywale, 2007).

5. Methodology

The study will use the flexible accelerator theory of investment and other variables to address the above stated purpose of the study. The study will adopt a model developed by Demirhan and Masca (2008). Our model differs from that by Demirhan and Masca (2008) in that it includes other variables not included in Dermirhan and Masca model. These variable include; government expenditure and domestic investment. However, the telephone main lines per 1,000 people and composite risk rating variables used by Demirhan and Masca (2008) are excluded from our models as it is difficult to obtain data for these variables in Botswana. The functional form of FDI model is given as;

$$FDI = f(GDPGR, HC, TOT, DI, GOE) \quad (1.1)$$

Where; FDI, dependent variable is the foreign direct investment and the explanatory variables are: GDP growth rates (GDPGR), human capital (HC), terms of trade (TOT), domestic investment (*DI*) and government expenditure (*GOE*). The linear form of equation (1.1) is specified below as;

$$(FDI/GDP) = \beta_0 + \beta_1 GDPGR_t + \beta_2 HC_t + \beta_3 TOT_t + \beta_4 (DI/GDP)_t + \beta_5 (GOE/GDP)_t + \varepsilon_t \quad (1.2)$$

where; *FDI/GDP*,dependent variable is FDI as a ratio of GDP and the explanatory variables are: GDP growth rates (*GDPGR*), human capital (HC), terms of trade (*TOT*), ratio of domestic investment to GDP (DI/GDP), ratio of government expenditure to GDP (GOE/GDP), error term (ε) and the time t.

Equation (1.2) can be further presented in the log linear form as;

$$\text{Log}(FDI/GDP)_t = \beta_0 + \beta_1 \text{log} GDPGR_t + \beta_2 \text{log} HC_t + \beta_3 \text{log} TOT_t + \beta_4 \text{log}(DI/GDP)_t + \beta_5 \text{log}(GOE/GDP)_t + \varepsilon_t \quad (1.3)$$

Equation (1.3) is estimated to determine the influence of independent variables on FDI, the dependent variable.

5.1 Data stationary test

The study makes extensive use of time-series macroeconomic variables to be able to address the objectives. Since time series data follow a random walk which is an attribute of non-stationary, the testing procedure will start by checking whether data are stationary or non-stationary. Therefore, if the data are found to be non-stationary, they will be transformed to become stationary to avoid spurious regression (Verbeek, 2000). The following time series tests were carried out: Unit root tests (Augmented Dickey-Fuller), co-integration (Johansen test) and Vector Error Correction Model (VECM).

6. Empirical results and interpretations

The study employed Dickey-Fuller test (1979) to check whether the time series variables are stationary or non-stationary. The ADF is applied to time series variables in levels and first differences to check for stationary or non-stationary (Gujarati, 2003). The ADF equation is defined as;

$$\text{ADF: } \Delta x_t = \beta_0 + \beta_{1\,t} + \beta_2 x_{t-1} + \Sigma\, \beta_k \Delta x_{t-k} + \varepsilon_t \qquad (1.4)$$

The objective is to test for stationarity of β_2 in the ADF equation. If the ADF test statistics (t-statistic) for the variable is greater than the critical value in absolute form, then we reject the null hypothesis leading to the conclusion that the variable is stationary at various significance levels (1%, 5% and 10%). If the ADF test statistic is less than the critical value, we do not reject the null hypothesis meaning that the variable is non-stationary at the various significance levels (Gujarati, 2003). In carrying out the ADF test, the study will use the p-values (Pr<Tau) of the ADF test statistics (tau) for the variables at levels. If the p-values (Pr<Tau) of the ADF test statistics (tau) for the variables are greater than 0.05 (at 5% level of significance), then we do not reject the null hypothesis leading to the conclusion that the variables is non-stationary at level.

The ADF test results of variables at level form showed that the p-values (Pr<Tau) of the ADF test statistics (tau) for all the variables at level are all greater than 0.05 at levels. Therefore, we do not reject the null hypothesis leading to the conclusion that all the variables at levels are non stationary. This suggests that the all the variables must be differenced to induce stationary.

The ADF test results of variables at difference form showed that the probability of p-values (Pr<Tau) of the ADF test statistics (tau) for differenced variables: FDIGDP, GDPGR, HC, TOT, DIGDP and GOEGDP are all less than 0.05 for all levels at 5% level of significance. Therefore, we reject the null hypothesis and leading to the conclusion that the above stated differenced variables are stationary and are of order of integration 1. The results are consistent with the previous studies that macroeconomic time series have unit root, and therefore, are co-integrated of order I(1).

6.1 Co-integration

Upon finding that some of the time series data (FDIGDP, GDPGR, HC, TOT, DIGDP and GOEGDP) are integrated of the same order I (1), only then can the co-integration test be carried out. Co-integration is carried out to determine the long run and equilibrium effects of the explanatory variables on FDI (Verbeek, 2000; Koop, 2005). In order to draw the long-run equilibrium relationship among the variables of FDIGDP, GDPGR, HC, TOT, DIGDP and GOEGDP, a Johansen-Juselius method was applied. It is necessary to determine an appropriate optimal lag length for the task where the Vector Auto-Regression (VAR) lag length selection criteria test was used since the Johansen co-integration test is sensitive to the choice

of the lag length. Lag 3 is chosen because the results of the Akaike Information Criterion (AIC), Swartz Bayesian Criterion (SWC) and Hannan-Quinn Information Criterion (HQ) indicates that three is then appropriate lag length in this case at 5% level of significance.

After finding the lag lengths, then the Johansen co-integration test can be carried out. The test statistic is known as the Trace statistic (Gujarati, 2003). If the Trace statistic for the equation is greater than the critical value (Lmax), then we reject the null hypothesis leading to the conclusion that the equation is co-integrated at various significance levels (1%, 5% and 10%).

Using lag length of 3, a Johansen-Juselius co-integration analysis was performed for the variables, FDIGDP, GDPGR, HC, TOT, DIGDP and GOEGDP. Both the trace test suggests that the null hypothesis of no co-integration equation (H_0: r=0) is rejected in favour of the alternative that there exists at least one co-integration equation (H_1: r≥1). Four of the trace values have p-values less than 0.05 (the 5% level of significance, implying there is fairly strong evidence for the presence of four co-integration regressions. There is, therefore, a long-term relationship among the following six variables: GDP growth rates, foreign direct investment, human capital, terms of trade, domestic investment and government expenditure. The long term relationship is presented in equation (1.5) below.

$$FDIGDP_t = -0.42 + 0.025 * GDPGR_t - 1.22 * HC_t + 1.0.7 * TOT + 1.91 * DIGDP + 6.48 * GOEGDP \quad (1.5)$$

Standard errors (0.162) (0.0036) (0.2647) (0.0465) (0.1250) (0.43723)

The co-integrated equation (1.5 above) reveals that all variables are significant. Economic growth, terms of trade, domestic investment and government expenditure show a positive long-term relationship with FDI as postulated by economic theories (flexible accelerator for economic growth and FDI, Dunning eclectic theory for terms of trade and government expenditure; and simple accelerator theory for domestic investment). On the other hand, FDI has negative long-term relationship with human capital. The negative relationship between FDI and human capital suggests that Botswana may have a human capital below the minimum threshold to benefit from FDI as the study done by Borensztein, De Gregorio and Lee (1998).

6.2 Vector Error Correction Model (VECM)

Having found the existence of a long-run equilibrium relationship between FDIGDP and the explanatory variables; GDPGR, HC, TOT, DIGDP and GOEGDP, there is need to investigate the short-run dynamics toward long-run equilibrium. According to Engle and Granger (1987), a Vector Auto-regression Analysis (VAR) that incorporates an error correction term is Vector Error Correction Model (VECM). By these arguments, a VECM was estimated and the results reported in Table 1 below.

Table 1: Results of VECM for the FDI model in Botswana (1980-2007)

VECM, lag order 3

Maximum likelihood estimates, observations 1983-2007 (T=25)

Dependent variable: dFDIGDP

Variable	Coefficient	Standard error	t-ratio	p-value
dGDPGR 1	0.0116949	0.004476	2.613	0.0241**
dGDPGR 2	0.008029	0.003824	2.099	0.0597*

dTOT 1	-0.248184	0.075588	-3.283	0.0073***
dTOT 2	0.0034519	0.0890433	0.3877	0.7057
dHC 1	-0.267979	1.02652	-0.2611	0.7989
dHC 2	0.100557	1.02895	0.09773	0.9239
dDIGDP 1	-0.534559	0.211363	-2.529	0.0280**
dDIGDP 2	-0.009640	0.191306	-0.05040	0.9607
dGOEGDP 1	0.631386	0.915438	0.6897	0.5047
dGOEGDP 2	-0.699706	0.775722	-0.9020	0.3864
ECT	-0.551390	0.0801342	-0.6881	0.5057

Note: Asterisks (*) = variable is significant at 10%. (**)= variable significant at 5%; (***) = variable is significant at 1%; $R^2 = 0.75$; Durbin Watson = 2.33

Diagnostic tests

Heteroscedasticity: P (Chi-Square (1) > 0.0284678) = 0.866014

Normality: Chi-square (12) = 16.7458 [0.1594]

From the table above, the goodness of fit as measured by the R^2 is 0.75 meaning that the explanatory variables: GDPGR (economic growth rates), HC (human capital), TOT (terms of trade), DIGDP (ratio of domestic investment to GDP) and GOEGDP (ratio of government expenditure to GDP) can explain about 75% of the variation in FDIGDP (ratio of FDI to GDP), implying that the FDI model fits the data well.

The results of the diagnostic tests are; the Durbin-Watson statistic of 2.33 does not point to the problem of serious autocorrelation. The Arch test shows that there is no problem of heteroscedasticity. The model is normally distributed as seen by the Normality test. The results of the model evaluation show that the fundamental statistical requirements have been adequately met, inferring that the empirical results of the model are indeed reliable.

From Table 1, the coefficient for economic growth show positive and significant coefficient in the long-term at 10% level of significance. Other variables do not affect FDI in the long-term. Economic growth, terms of trade and domestic investment significantly affect FDI in the short-term at 5% level of significance.

The coefficient for economic growth is positive (as expected) and statistically significant in both short-term (at 5% level of significance) and long-term (at 10% level of significance). Therefore, stating that economic growth positively impact on FDI as postulated by the flexible accelerator theory and consistent with the results of the studies by Choe (2003) and Yetkiner (2006). The results indicate that a 1% increase in economic growth will result in an increase in FDI by 1.23% in the short-term; also a 1% increase in economic growth will result in an increase in FDI by 0.8% in the long-term holding other variables constant. The results indicate that economic growth is important in both the short-run and long-run in Botswana as it result in increases in FDI.

Terms of trade are negatively related to FDI and statistically significant at 1% level of significance in the short-term. The results show that a 1% increase in terms of trade will lead to 24.8% decrease in FDI in the short-run. Therefore implying that Botswana trade openness negatively affects FDI flows in the short-run. The terms of trade impact positively on FDI in the long-term even though the effects are insignificant. The results are consistent with the

Dunning's Eclectic theory even though there are insignificant. As previously stated, Botswana has a small population which results in a small market. Therefore, the government of Botswana has entered into different bilateral and international trade agreements to increase its market base.

The domestic investment is negative and statistically significant in the short-run at 5% level of significance. The results indicate that a 1% increase in domestic investment will lead a decrease in FDI by 53.4% in the short-term, ceteris paribus. This means that domestic investment has negative effects on FDI. The reason for the negative impacts is that local investment sector in Botswana is still very low to compete or benefit from FDI. The government of Botswana encourages the participation of domestic firms to increase the economic growth. However, in the long-term, domestic investment also have some negative effects on FDI.

The human capital is negative and statistically insignificant in the short-term. This means that the level of human capital has a negative impact on FDI, but the impact is insignificant in the short-term. The result do not confirm to the endogenous growth model, even though the results are insignificant, they are consistent with the findings of Kaulihowa (2009) who found that human capital had a negative impact on FDI flows in Namibia. Therefore, suggesting that Botswana's human capital maybe below the minimum threshold and that the labour force lack the skilled manpower to have a positive impact in FDI. In the long-term, human capital has a positive impact on FDI though the impacts are insignificant. The results are consistent with the endogenous growth theory. The government of Botswana has invested in education and training; and education has received the highest share of government expenditure.

Government expenditure (GOEGDP) is positive and statistically insignificant in the short-term. The government expenditure positively affects FDI flows in Botswana in the short-run. The variable (government expenditure) is used to capture the infrastructure development in Botswana. The results of government expenditure even though they are insignificant, are consistent with the Dunning's Eclectic theory that states that Multi National Companies will invest where there is better infrastructure. Upon independence, the government of Botswana has played a major role in providing an efficient infrastructure to create an enabling environment for the private sector. The government expenditure has continued to increase since independence. In the long-term, government expenditure negatively affect FDI flows in Botswana.

According to the VECM results, the coefficient of the EC1 (error correction term) for the FDIGDP equation is negative (-0.0551) as expected even though it's statistically insignificant. The error correction term corrects for the long-run equilibrium and should be negative. Therefore, the error correction term is (-0.0551) stating that if there is a shock in the system, it takes only 6 months for foreign direct investment to restore its equilibrium level.

7. Conclusions

This study examines the effects of FDI on Botswana's economy using the flexible accelerator theory of investment and other variables. To examine the determinants of FDI, FDI is expressed as a function of GDP growth rates (GDPGR), human capital (HC), terms of trade (TOT), domestic investment (DI), and government expenditure (GOE). The study uses 1980-2007 time series annual data from Botswana Central Statistics Office (CS0) publications, Bank of Botswana and United Nations Conference on Trade and Development (UNCTAD) online statistics. The study employs both the co-integration and Vector Error Correction Model (VECM) to find the short-term and long-term effects.

The study finds that there exists a co-integrating relationship between FDI and the explanatory variables; economic growth, terms of trade, domestic investment, human capital and government expenditure in Botswana. The VECM results show that GDP growth rates, terms of trade and domestic investment significantly influence FDI flows in Botswana. The results also show that economic growth significantly explains FDI flows in Botswana at 10% level of significance in the long-term. In addition, the results show that economic growth, terms of trade and domestic investment significantly explain FDI flows in Botswana in the short-term at 5% levels of significance. Economic growth positively impacts on FDI in Botswana as expected in both the short-term and long-term. The positive impact of economic growth is consistent with the flexible accelerator theory. Terms of trade and domestic investment negatively affect FDI in the short-term; the results are inconsistent with the Dunning's eclectic and acceleration investment theories. Human capital and government expenditure do not have the impact in FDI flows in Botswana in both the short-term and long-term.

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