A DYNAMIC EMPIRICAL INVESTIGATION OF FOREIGN DIRECT INVESTMENT AND GROWTH FOR THE CASE OF MAURITIUS

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ABSTRACT

Using a uniquely generated data series of disaggregated capital stock and accounting for endogeneity and feedback issues in a VECM framework, this paper investigates the impact of foreign direct investment (FDI) on the economic growth of Mauritius for 1960–2004. The results show that FDI has indeed been an important ingredient in the economic growth of the country both in the short and long run. Interestingly, FDI is seen to have been more productive as compared with domestic private capital and public capital stock of the country. The study further confirms the presence of important endogenous relationship in FDI-growth link. FDI is not only seen to lead growth but to follow growth as well and is consistent with the 'market seeking' hypothesis. Deeper analysis reveals that FDI has a crowding in effect on domestic private capital accumulation and indicates thus the presence of indirect effects on growth.

Key words: *Foreign Direct Investment, Economic Growth, VECM.*

JEL classification: F21, F23, O40

1. INTRODUCTION

Development economists support the view that inflow of foreign direct investment (FDI) plays a critical role in the growth dynamics of host countries. FDI inflows represent additional resources a country needs to improve its economic performance and provides both physical capital and employment possibilities that may not be available in the host market. As De Gregorio (1992) argued, 'by increasing capital stock, FDI can increase country's output and productivity through a more efficient use of existing resources and by absorbing unemployed resources'. Unfortunately, the impact of FDI on growth remains more contentious in empirical studies than in theoretical studies. While some studies observe a positive impact of FDI on economic growth, others detect a negative relationship between these two variables. Among the main reasons for this controversy remains data insufficiency and methodological flaws in either cross-country or time-series investigations. In the case of cross-country studies, earlier studies failed to take into account continuously evolving country-specific differences in technology, production and socioeconomic factors and it is only recently that empirical studies have made use of panel data to correct the above (see Nair-Reichert & Weinhold, 2001; Bende-Nabende, Ford, Santoso, & Sen, 2003; Choe, 2003).

Another often ignored fact when assessing the effects of FDI on growth, in both time series and cross section analysis alike, has been the endogeneity issue. FDI may have a positive impact on economic growth leading to an enlarged market size, which in turn attracts further FDI. This is referred to as the market size hypothesis: markets with rapid economic growths tend to give multinational firms more opportunities to generate greater sales and profits and thus become more attractive to their investments. Given the possible interdependency of these two variables, there is a need for a proper test of endogeneity. Unfortunately, many existing studies have neglected this necessity.

A survey of literature shows that while there exists a number of studies on the relationship between FDI and growth in developed countries, there is not so much on developing countries and just a few on African countries. This may be because, as compared with other regions in the likes of Latin America and Asia, Africa has attracted a relatively small amount of foreign direct investment. Furthermore, no known study to our knowledge has focused on Small Island developing states within this context.

International Journal of Small Economies Vol. 01, No. 01, Year 2009 Pages 24-37,

This paper thus attempts to complement and supplement the few empirical works that have been done on the FDI-growth hypothesis in the case of Africa. The study is conducted for the small island developing state of Mauritius for the period 1960-2004. Using a uniquely constructed disaggregated capital series for the country with the help of the Perpetual Inventory Methodology, in addition to test economic impacts of FDI, the study also attempts to compare the relative effectiveness of each of these stocks in promoting growth. Interactions of FDI with the other types of capital stock are also examined. The above are modelled in a Vector Autoregressive framework to account for the endogeneity issue, after rigorously testing for the time series properties of the data.

The remaining discussion is organized into three sections. In Section 2, a brief summary of theoretical and empirical issues on the relationship between FDI and growth is provided. Section 3 presents a background of the Mauritian economy with respect to FDI. The specification of the model and the empirical results analysis are contained in Section 4. The last section draws the conclusion.

2. RELATED WORK

2.1 Theoretical underpinnings

Hermes and Lensink (2000) interestingly summarized the following different channels through which positive externalities[1] associated with FDI can occur, namely: i) competition channel: increased competition leads to increased productivity; efficiency and investment in human and/or physical capital, and also increased competition may lead to changes in the industrial structure towards more competitiveness and more export-oriented activities; ii) training channel: increased training of labour and management; iii) linkages channel : foreign investment is often accompanied by technology transfer; such transfers may take place through transactions with foreign firms; iv) demonstration channel: domestic firms imitate the more advanced technologies used by foreign firms.

While the literature largely discussed the importance of FDI to growth, one should also realize that economic growth could be an important factor in attracting FDI flows. This is explained by Brewer (1993) hypothesis of 'market seeking or market size hypothesis'. As Pfefferman and Madarassy (1992) stated "market size is one of the most important considerations in making investment location decisions for three reasons: larger potential for local sales, the greater profitability of local sales than export sales and the relatively diverse resources which make local sourcing more feasible". In other words, the market size hypothesis predicts that markets with large populations and/or rapid economic growths tend to give multinational firms more opportunities to generate greater sales and profits and thus become more attractive to their investments[2].

2.2 Related empirical studies

2.2.1 Evidences from developing countries.

In this part we review the empirical evidences on the FDI-growth hypothesis. Since research from African economies on the hypothesized link is so scant, and none is available for Small Island Developing States, we focus mainly on evidence from cross-countries and case studies of developing nations as these can provide interesting insights and such economies come closer to African ones. While earlier empirical work in the FDI-economic growth link area finds rather contradictory results, often negative or insignificant (see Jackman, 1982; Rothgeb, 1984), more recent research tends to overwhelmingly report positive relationship between FDI and growth of developing countries[3]. Some recent examples of case studies are De Mello (1996) for five Latin American economies, Marwah and Klein (1998) and Chakraborty and Basu (2002) for India, Li, Liu, and Rebelo (1998), and Hsiao and Shen (2003) for China, Ramirez (2000) for Mexico, Zhang (2001) for East Asian economies, Bende-Nabende et al. (2003) and Marwah and Tavakoli (2004) for the case of Philipinness and Thailand.

There also exist multi-country studies based mostly on cross-section or panel data. De Gregorio (1992), Blomstrom, Lipsey, and Zegan (1994), Balasubramanyan, Salisu, and Sapsford (1996), Borensztien, de Gregorio, and Lee (1998), de Mello (1999), Nair-Reichert and Weinhold (2001), Teboul and Mouslier (2001) and Wang (2002) are a few examples. It is only lately that some studies attempted to test for the direction of causation in FDI modelling. For instance Choe (2003) detected two-way causation and feedback effects between FDI and growth for the case of 80 countries. Bende-Nabende, Ford, Sen and Slater (2000) also found evidence from the Asia-Pacific Economic Cooperation region that FDI positively affects output

directly and indirectly while studying the long-run dynamics of FDI and its spillovers to output by using cointegration and VAR techniques. More recently Li and Liu (2005) used a large cross-country sample, including developing countries, and reported that FDI not only directly promoted economic growth by itself but also indirectly did so via human capital.

However it should be pointed out that some recent studies did not find a positive relationship between FDI and growth, for instance works from Kholdy, (1995), Carkovic and Levine (2002) and Durham (2004) among others.

2.2.2 The African case.

Nyatepe-Coo (1998) assessed the contributions of FDI to economic growth in selected countries in Southeast Asia, Latin America and Sub-Saharan Africa covering the period 1963-1992. The author reported that FDI did promote economic growth in the majority of the 12 countries examined. Bosworth and Collins (1999) in his study of 58 developing countries, including several in Africa, also found that FDI brought about a 'one-for-one increase in domestic investment'.

However the results from Cockcroft and Riddell (1991) suggested that FDI made a negligible contribution to productivity in most African countries during the 1980s. The authors argued that while FDI does bring with it knowledge, superior technology, and new innovations, many of these 'benefits' are not suitable for use in labour-abundant developing countries and that capital-intensive FDI may fail to create many jobs. Assanie and Singletone (2002) employed panel estimations within a simultaneous equation framework for a sample of 67 developing countries (including 19 SSA countries) and found that FDI has a positive impact on economic growth in middle-income countries (MICs) but that low-income countries (LICs) have not benefited from FDI flows.

Among the scarce empirical work on African countries cases (using time series analysis) features Obwona (1999) who studied the FDI-growth link for the case of Uganda over the period 1981-1995. Making use of a simultaneous equation model, where both the growth and FDI variables are endogenous variables, a two stage least squares (2SLS) estimation method was used. The author reported the existence of a simultaneity problem and that both the 'market size' and the 'growth' hypotheses were supported by the study and that FDI impacts on growth positively. In addition, there exists evidence that FDI significantly influences growth through public sector investment in Uganda.

Akinlo (2004) investigated the case of Nigeria for the period 1970–2001 in an error correction model. The author reported that both private capital and lagged foreign capital have some and not a statistically significant effect on the economic growth. The results supported the argument that extractive FDI might not be growth enhancing as much as manufacturing FDI. In addition, the results show that export, labour force and human capital all have a positive and statistically significant effect on growth whereas financial development has significant negative effect on growth (due to high capital flight).

Recent evidence for Ghana is available from Frimpong and Oteng-Abayie (2006), who studied the causal link between FDI and growth for the period 1970-2002. Using Toda-Yamamoto (1995) approach to study the direction of causality between the two variables, the author found no causality between FDI and growth for the sample period but that FDI did cause GDP growth during the sub period 1984-2002, a period of political stability and economic focus. The study however failed to confirm Growth-driven FDI, that is GDP growth in Ghana has not been attracting FDI inflows.

A review of the literature reveals that empirical evidence from African economies, especially from SIDS countries, based on time series analysis, has been very scarce and that mixed results exist in current research on the FDI-growth hypothesis. Moreover, the issue of causality and endogeneity has not received treatment until lately and even then, the few works report mixed results from bilateral causality tests. Our study thus attempts to supplement the above gaps.

3. ECONOMIC BACKGROUD OF MAURITIUS

Mauritius has been an important foreign investment recipient and has one of Africa's highest incomes per capita. On average, annual growth has been in the range of 5% to 6% (see Table A 1.1. in appendix the key economic indicators of Mauritius). In fact, since its independence in 1968, the economy has continued to prosper, though at varying pace, during the years and the government tried to ensure the long-term prosperity of the country by drawing up and implementing prudent development plans and continued on its diversification programme while at the same time promoting investment through its incentive packages. Mauritius has developed from a low-income, agriculturally based economy to a middle-income diversified economy and currently the latter rests on sectors such as the textile, tourism, sugar cane and financial services. There has been further effort by the government to diversify the economy with incentives given to the fishing and Information Communication Technology industries.

The Government has always been pursuing policies geared towards increasing FDI inflows and the current investment schemes cater for a wide range of incentives and facilities to attract foreign direct investment and institutional investors. Generally, incentive packages include a lower corporate tax rate of 15 percent (instead of the normal rate of 25 percent); exemption from customs and excise duties on imports of equipment and raw materials; exemption from tax on dividends; free repatriation of profits, dividends, and capital; preferential loan rates; and reduced tariffs for electricity and water. In addition, foreigners investing a minimum of USD 500,000 in the qualifying sectors are eligible for permanent resident status. The different Schemes that are presently available are summarized in Table A1.2 (see Appendix).

Apart from the numerous fiscal incentives offered, the government has also massively invested in modern public infrastructure. For instance with regard to telecommunications, Mauritius has a well-developed digital infrastructure and offers state-of-the-art telecommunications facilities including international leased lines and high speed Internet access. The quality of transportation infrastructure is also among the best of the continent. Moreover, investment in human capital has always been among the priorities of the nation. These investments are believed to be very beneficial to the economic development of the country[4] and also to act as support for private (inward and FDI) investment.

4. METHODOLOGY

4.1. The Economic Model

To estimate the effect of foreign direct capital on the economic performance of Mauritius, a standard production function derived from the augmented Solow-type model and used by Mankiw, Romer and Weil (1992), Levine and Renelt (1992) and Easterly (2001) is adopted. Such an approach has also been used recently by Borensztein et al (1998), Akinlo, 2004 and Li and Liu, 2005 among others and was found to be robust. The main explanatory variables for economic growth identified in these studies include investment, employment, human capital, openness, financial development and political instability. The following extended theoretical growth function is thus specified.

$$OUTPUT = f(PRISTOCK, PUBSTOCK, FDISTOCK, OPEN, EMP, EDU, FIN, POL) \quad (1)$$

Most studies have included total investment of the country in growth equation. For the purpose of the study, the level of capital stock was disaggregated in three types, namely domestic private capital, foreign direct investment and also public capital stock. This will allow us to investigate fully the role of FDI in economic development and such disaggregation is believed to allow useful comparative insights as well. Thus *PRISTOCK* is the private capital stock, *PUBSTOCK* and *FDISTOCK* being the public and foreign direct investment capital stock respectively.

In the growth literature there exists a unanimous consensus (see Delong and Summers, 1990, 1994; Reinhart and Carmen, 1989 and more recently Sala-i-Martin, 1997 and Arin, 2004) of the role of private investment in promoting economic performance, possibly because technological change is embodied in recent vintages of capital. As such there has been an overwhelming number of studies which established a positive link between public capital and economic growth (from the pioneering work of Aschauer, 1989 to recent studies of Sturm, Jacobs and Groote, 1999 and Pereira and Roca Sagales, 2003 among others). The

authors generally argued that these infrastructures provide the necessary support and more importantly come as additional unpaid input in the production function.

OPEN, which proxies for the level of openness of the country is also included in the economic model following the work of Dollar (1992), Sachs and Warner (1995) and Edwards (1998). These authors supported the idea that increased trade openness raised economic growth through access for a country to the advances of technological knowledge of its trade partners, access to bigger markets, by encouraging the development of R&D through increasing returns to innovation and also by providing developing countries with access to investment and intermediate goods that are vital to their development processes.

EDU accounts for the quality of labour and was included in the model. This follows the arguments and empirical evidences of Mankiw, Romer, and Weil (1992), Barro (1998) and more recently Temple (2001). Human capital can be thought of as affecting economic growth in the sense that workers with higher levels of education or skills should, ceteris paribus, be more productive and more inventive and innovative. Higher levels of human capital may also encourage capital accumulation, or may raise the rate of technological catch-up for follower countries (Temple, 2001).

Following the works of Borensztein et al (1998), Akinlo (2004) and Li and Liu (2005), other growth variables namely employment, financial development and political instability were also included in the economic model. The latter two control variables are believed to have played an important role in the economic development of Mauritius over time.

4.2. The Econometric Methodology

Below is the econometric log-linear formulation of the equation (1) above and the lowercase variables denote the natural log of the respective uppercase variable results:

$$output = \alpha + \beta_1 pristock + \beta_2 pubstock + \beta_3 fdistock + \beta_4 open + \beta_5 emp + \beta_6 edu + \beta_7 fin + \beta_8 pol + \varepsilon \quad (2)$$

The disturbance term ε is a deviation from the above relationship. When the output and inputs time series are unit root processes but the disturbance term is a stationary process, equation (2) becomes a cointegrating relation implying a long-run relationship between output, private capital, transport capital, non-transport capital, and labour. The slope coefficients are then interpreted as long-run elasticities.

Unit root tests from Augmented Dickey-Fuller (ADF) and Philips-Perron test reveal that the individual series have a unit root in level form but not in first-difference form and are thus I(1). The Johansen (1988) procedure was then used to determine the presence of cointegration in a vector-error-correction model (VECM) of output, private capital, public capital, foreign direct capital, openness, employment, education, financial development and political instability.

The VECM also allows, through the application of Granger-Causality tests, examination of the direct and the potential indirect effects of FDI stock on output in the short-run. An increase in FDI not only has a direct effect on output by increasing productive capacity but also has a potential indirect effect on output by inducing an increase in and increasing the efficiency of private capital (crowding in hypothesis). In addition, the present VECM also enables an analysis as to whether increased public capital, quality of labour, openness, employment, financial development and political instability crowds in or crowds out the other types of capital. As such better worker training dispensed by foreign investors has often been argued to raise the level of productivity. Very importantly, the framework helps to incorporate the endogeneity issue, that is output of a country can also be a determinant of FDI (market- seeking hypothesis).

4.3 Sources of Data

To measure *OPEN*, we use total of export and imports divided by the GDP of the country. *EDU*, a proxy for the quality of human capital, is measured by the secondary enrolment ratio. *EMP* is measured as the number of people in employment, while *FIN* by the ratio of liquid liabilities to the country's Gross Domestic Product (GDP) [6] and *POL* by the number of riots[7] in a given year and is used as a proxy for the political stability of the country. The dependent variable *OUTPUT* is proxied by the real Gross Domestic Product at

constant price. The data series were available from the Central Statistical Office (CSO), the Bi-annual Digest of Statistics (various issues), and the International Financial Statistics Yearbooks (various issues).

The different capital stocks of the country, that is the domestic private capital stock, the foreign direct capital stock and the public capital stock have been generated using the standard Perpetual Inventory Method (PIM)[7] as recommended by the OECD (2001a), and the US Bureau Of Economic Statistics (1998). The main sources for the construction of the above independent variables are from the country's Accountant General Annual report (various issues) and the Bank of Mauritius Annual Report. The time period of the study is over the years 1960 -2004.

5. ANALYSIS AND FINDINGS

Given that all variables used in the model were all found to be I(1), the Johansen procedure was applied to investigate cointegration. A lag order of 2 was selected for the VECM on the basis of the Schwarz Information Criterion. The results imply that both the trace and maximal eigenvalue tests clearly support the presence of one cointegrating vector at the 5% significance level. An estimate of this cointegrating vector, normalised on output, is shown in Table 1. This is consistent with the econometric relationship specified in equation (2). The coefficients attached to the different inputs of the growth function have their theoretical signs and are significant. What is of interest to us is that, it is observed that a 10% increase in foreign capital stock raises the output of Mauritius by 9.73% in the long-run. This positive estimate is seen to be higher than those estimates found in the literature on African nations (see Nyatepe-Coo, 1998; Obwona, 1999; Akinlo, 2004)[8]. The quality of FDI received in the sectors, the attractive fiscal incentives offered during the years coupled with improved support infrastructure may provide an explanation to the above. The other types of capital stock were also seen to be beneficial to economic performance. The coefficient 0.973 for *fdistock*, a measure of output elasticity, suggests that FDI stock might have been indeed more productive than both domestic private capital (0.72) and public stock (0.16) as well. Technology and managerial skills transfer from the surge of foreign direct investors in the 1980's in the Export Processing Zone as well as in the hotel industry in the country in the 1990's following the tax holidays and other incentives granted by government are believed to have played a major role in explaining this disparity. The sizeable role of the level of openness and quality of labour and to a lesser extent the role of employment, financial development and political instability are acknowledged.

Table 1 : Estimates of long run parameters (α and β vectors).

Variables	β	***t-ratios***	α	***t-ratios***
output	*1*		*-0.38****	*-3.45*
pri	*-0.72****	*-6.3*	*-0.29***	*-2.18*
pub	*-0.16****	*-4.2*	*-0.32**	*- 1.93*
fdi	*-0.97****	*-2.64*	*-0.64***	*-2.22*
open	*-0.48****	*-2.52*	*-0.29**	*-1.88*
emp	*-0.21***	*-2.12*	*-0.34**	*-1.78*
edu	*-0.41***	*-2.06*	*-0.44**	*-2.23*
fin	*-0.18****	*-2.85*	*-0.29*	*-1.35*
pol	*0.07**	*1.78*	*0.17*	*1.27*

*significant at 10%, ** significant at 5%, ***significant at 1%

Formulation and estimation of the VECM (see Engle and Granger, 1987) were then considered. The estimated error-correction equations are not subject to residual autocorrelation (as per the Durbin Watson Statistic) at the 5% significance level and appear in Table 2. The set of equations is also observed, on the whole, to pass the diagnosis test related to functional formal form, normality and heteroscedasticity. The regressions perform rather well with the R^2 ranging from 0.52 to 0.72. Ericsson et al., (1998) argued that weak exogeneity is a sufficient condition for the efficient inference on the parameters of interest in a conditional model. Weak exogeneity tests on each of the equations were performed and the Wald-test enables us to reject the null hypothesis of weak exogeneity at 5% significance level in all cases. The variables in the system are all endogenous, given that the lagged error-correction terms in all the equations of the VECM are significant.

Table 2: Estimates of the Error-Correction Model

Variables	***Δoutput***	***Δpri***	***Δpub***	***Δfdi***	***Δopen***	***Δemp***	***Δedu***	***Δfin***	***Δpol***
Constant	*4.34**	*-1.55*	*2.31**	*4.34***	*1.24**	*0.55*	*3.11*	*1.34*	*1.11*
$\Delta output_{t-1}$	*-0.4E-3*	*0.053***	*-0.035*	*0.47***	*0.73**	*0.53**	*0.13**	*0.21**	*0.01*
Δpri_{t-1}	*0.52***	*0.55****	*-0.01*	*0.024*	*0.062**	*0.64**	*0.08*	*0.15*	*0.04*
Δpub_{t-1}	*0.13**	*0.25**	*0.74***	*0.25***	*0.012*	*0.12**	*0.007*	*0.06*	*0.002*
Δfdi_{t-1}	*0.61***	*0.21***	*0.053*	*0.53****	*0.16**	*0.23**	*0.11*	*0.15*	*-0.12*
$\Delta open_{t-1}$	*0.44***	*0.37***	*0.043*	*0.37***	*1.22***	*0.11*	*0.041*	*0.03*	*0.023*
Δemp_{t-1}	*0.15**	*0.05*	*0.056*	*0.02*	*0.11*	*0.64**	*0.034*	*0.08*	*-0.11**
Δedu_{t-1}	*0.18**	*0.21***	*0.05*	*0.22**	*0.18**	*0.21**	*0.71***	*0.12**	*-0.12***
Δfin_{t-1}	*0.11**	*0.16***	*0.09**	*0.15**	*0.02*	*0.08*	*0.12*	*0.53**	*-0.07*
Δpol_{t-1}	*-0.03*	*-0.14**	*-0.12**	*-0.22**	*-0.11*	*-0.1**	*-0.06*	*0.02*	*0.76**
υ_{t-1}	*-0.38***	*-0.29***	*-0.32**	*-0.64***	*-0.29**	*-0.3**	*-0.4**	*-0.29*	*-0.17*
R^2	*0.72*	*0.69*	*0.61*	*0.67*	*0.74*	*0.67*	*0.64*	*0.52*	*0.53*
D W statistic	*1.89*	*2.19*	*1.92*	*2.11*	*2.16*	*2.12*	*1.89*	*2.43*	*2.36*

*significant at 10%, ** significant at 5%, ***significant at 1%

Diagnosis test

Output equation

F-Stat	Serial correlation*[1]	Functional Form*[2]	Normality*[3]	Heteroscedasticity*[4]
13.64[0.00]	0.24[0.62]	1.12[0.29]	1.36[0.25]	0.065[0.798]

Private capital equation

F-Stat	Serial correlation*	Functional Form*	Normality*	Heteroscedasticity*
16.23[0.00]	2.63[0.11]	0.08[0.78]	1.4[0.22]	0.024[0.876]

Public capital equation

F-Stat	Serial correlation*	Functional Form*	Normality*	Heteroscedasticity*
11.21[0.00]	0.75[0.39]	0.424[0.52]	11.5[0.03]	0.149[0.699]

FDI equation

F-Stat	Serial correlation*[1]	Functional Form*[2]	Normality*[3]	Heteroscedasticity*[4]
14.64[0.00]	0.44[0.80]	0.9[0.39]	1.12[0.31]	0.25[0.60]

Openness equation

F-Stat	Serial correlation*[1]	Functional Form*[2]	Normality*[3]	Heteroscedasticity*[4]
12.24[0.00]	1.17[0.27]	1.43[0.49]	1.2[0.27]	2.65[0.10]

Employment equation

F-Stat	Serial correlation*[1]	Functional Form*[2]	Normality*[3]	Heteroscedasticity*[4]
13.64[0.00]	0.77[0.39]	5.34[0.00]	20.2[0.000]	0.64[0.50]

Education equation

F-Stat	Serial correlation*	Functional Form*	Normality*	Heteroscedasticity*
15.21[0.00]	0.61[0.51]	0.003[0.9]	1.42[0.23]	0.127[0.721]

Financial development equation

F-Stat	Serial correlation*[1]	Functional Form*[2]	Normality*[3]	Heteroscedasticity*[4]
11.64[0.00]	0.29[0.67]	1.15[0.31]	1.6[0.20]	0.075[0.77]

Political Instability equation

F-Stat	Serial correlation*[1]	Functional Form*[2]	Normality*[3]	Heteroscedasticity*[4]
9.43[0.00]	1.12[0.29]	1.18[0.30]	18.1[0.000]	12.065[0.00]

*[1]Based on Lagrange multiplier test of residual serial correlation.(LM version)
*[2]Based on Ramsey's RESET test using the square of the fitted values.(LM version)
*[3]Based on a test of skewness and kurtosis of residuals.(LM version)
*[4]Based on the regression of squared residuals on squared fitted values.(LM version)

Foreign direct is confirmed to be an important element in economic growth even in the short run. The lower coefficient in the short run might indicate that such capital might take some time to have its full effect on the economy. Thus a 1 percentage-point increase in the growth rate of FDI capital leads to a 0.61 percentage-point increase in the growth rate of output after one year and this is an estimate of the direct effect. Private capital and public capital are also significant in explaining the short-run variation in output and so are the levels of openness, employment, education, financial development and political instability of the

country. Moreover the coefficient of the lagged error correction term υ is -0.38, which indicated that about 38% of the disequilibrium is corrected in the next period. One can also confirm bi-causality between growth and i) domestic private investment, ii) FDI, iii) education level, iv) openness level and v) financial development, thus suggesting reinforcing and dynamic effects.

Further analysis from column 3 (domestic private investment equation) shows that FDI has a 'crowding in' effect on domestic private investment and has, in fact, played an important role in promoting domestic capital accumulation confirming the existence of indirect effect. This is consistent with Jansen (1995), De Mello (1999) and Agosin and Mayer (2000). A 1 percentage-point increase in the growth rate of FDI leads to a 0.21 percentage-point increase in the growth rate of private capital after one year. A 1 percentage-point increase in the growth rate of private capital leads to a 0.52 percentage-point increase in the growth rate of output after one year. The latter two pieces of information taken together imply that a 1 percentage-point increase in the growth rate of FDI leads to a 0.11 percentage-point increase in the growth rate of output after two years. This might be interpreted as an estimate of the indirect effect of FDI on output in the short run via the private capital channel. In the same reasoning it is also seen that indirect economic effect of FDI via the openness channel exists (a 1 percentage-point increase in the growth rate of FDI leads to a 0.07 percentage-point increase in the growth rate of output after two years). Public capital stock is also seen to be an important ingredient in domestic investment. The presence of bi-causality between domestic inward investment and i) income level of the country ii) FDI and iii) level of openness is also observed.

Interestingly from column 5, the results of the FDI equation reveal that FDI does not only lead growth but the latter is also an important determinant of the FDI as shown by the positive and significant coefficient of Δy_{t-1}. This is in line with the 'market size/seeking' hypothesis and is consistent with research from De Mello (1996), Zhang (2001) and Liu, Burridge and Sinclair (2002). FDI is also attracted by both levels of domestic private investment and public capital which has contributed to the favourable investment climate in the country. Political instability, education, trade openness and level of financial development of the island have also been important elements in FDI generation. We should note from the table the bi-causality relationships that exist between both education and trade openness, in addition to domestic private investment, and FDI.

It is also possible from our framework to analyse the Granger-causal relation between a series of variables pairs. Following Geweke et al (1983), who indicated that the Granger procedure conducted using a Wald chi-square test statistic outperforms other causality tests in a series of Monte-Carlo experiments, we accordingly applied Wald tests to a selected test series set of pair-wise causality. A summary of results of the ECM based causality is summarised in the table 3. It should be noted that these results are to a large extent in line with the one obtained earlier. The above findings were also confirmed to a large extent by impulse response analysis[10].

Table 3: Summary of ECM-based causality test

Variables Pairs	***Direction Of causation***
Output and fdi	Bi causality
Output and pri	Bi causality
Output and pub	Causality from *pub* to *Output*
Output and open	Bi causality
Output and emp	Causality from *emp* to *output*
Output and edu	Bi causality
Output and fin	Bi causality
Output and pol	Causality from *pol* to *output*
Fdi and pri	Bi causality
Fdi and pub	Causality from *pub* to *fdi*
Fdi and edu	Causality from *edu* and *fdi*
Fdi and open	Bi causality
Fdi and emp	Causality from *fdi* to *emp*
Fdi and fin	Causality from *fin* to *fdi*
Fdi and pol	Causality from *pol* to *fdi*

6. CONCLUSION

The paper investigated the dynamic relationship between FDI and the economic performance for the case of the small developing island state of Mauritius over the period 1960-2004 in a VECM approach. The results suggest that FDI has been contributing to the output level of the economy in both short and long run and may have been more productive than the other types of capital stocks. Moreover, FDI does not only precede growth output level of the country but also attracts FDI thus confirming the presence of bi-causality and feedback effects in the FDI-growth relationship. Further analysis suggests that FDI is positively related to the level of domestic private capital accumulation suggesting the presence of 'crowding in' effects as well. Interestingly, both types of capital, that is domestic private and the public capital, were found to be important for the country to attract FDI. Results from the study also suggest bi-causal relationship between growth and i) domestic private investment, ii) education level, iii) openness level and iv) financial development implying important feedback and dynamic effects. As such bi-causality relationships exist between both education and trade openness, in addition to domestic private investment, and FDI. Lastly, the error correction framework confirmed the existence of a stable long-run relationship and, moreover, determined a deviation from the long-run equilibrium following a short-run shock is corrected by about 38 per cent after each year. The above results highlight the importance of FDI in economic growth and provide new evidences for the case of island economies using recent cointegration approach in a dynamic framework.

Researchers may wish to pursue further studies to build on this paper. Further research works may include a cross-country analysis comparing a group of developing economies, which are quite dependent on FDI for their success and development. Or, alternatively, African countries may be compared to Latin American countries.

End Notes

1. However, FDI may have negative effect on the growth prospect of the recipient economy namely through i) substantial reverse flows in the form of remittances of profits, and dividends ii) MNCs tend to operate in imperfectly competitive sectors iii) FDI may crowd out domestic savings and investment (See Ramirez, 2000 for more treatment on the negative effects of FDI).
2. Empirical studies by Schneider & Frey (1985) and Wang & Swain (1995) all support this hypothesis.
3. The vast literature on the effect of foreign direct investment on growth has been surveyed many times. De Mello (1997) and Borensztein et al. (1998) provides an annotated selective survey of earlier studies.
4. Empirical evidence on the positive link between public capital exists for the case of Mauritius. See Khadaroo and Seetanah (2006).
5. Even then it should be noted that the country did not undergo any political instability phase during the period of study.
6. see King and Levine (1993), Levine et al (2000).
7. see Alesina, Oezler, Roubini, and Swagel (1996) and Barro(1991).
8. The base year has been taken as 1950 and the depreciation rate has been estimated to be 5.5% as per the Central Statistical Office.
9. Similar results were obtained when analysis was made in a Cobb-Douglas framework. In fact an output elasticity of FDI of 1.2 was reported. Such elasticities turned out to be 0.73, 0.32 and 0.14 for the private, public capital stock and labour respectively.
10. Detailed analysis of impulse response functions is available from the author upon request.

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Appendix

Table: A 1.1: Selected Economic Indicators: 1976-2005

Year	1976	1980	1990	2000	2004
GDP at basic prices (Rs m)	4,165	8,697	33,415	105,206	152,638
Real GDP Growth Rate (%)	16.2	-10.1	7.3	9.3	4.7
Real GDP per capita (US $)	186	180	296	4,430	-
Inflation Rate (%)	13.4	42	13.5	4.2	4.7
Unemployment Rate (%)	-	-	6.7	7.7	8.5
GDFCF/GDP (%)	30.9	27.5	36.4	22.9	21.6
Gross Domestic Savings /GDP (%)	25.6	10.3	26.0	26.3	22.7
Net Exports/GDP (%)	-6.9	-10.3	-7.2	-0.6	-2.4
FDI Inflows (Rs m)	200	300	609	1,265	1,796
Population (mid-year)	903,610	966,039	1,058,775	1,186,873	1,233,386
Infant Mortality Rate	40.2	32.9	20.4	23.5	21.8

Source: Central Statistical Office

Table A1.2: Selected Incentive Schemes to Attract Investment

	Schemes	Type Of Business / Criteria	Incentives
1	Export Enterprise Scheme	• Manufactured goods • Deep-sea Fishing • Printing and Publishing • Agro-businesses • Other export-oriented activities	• Corporate Tax 15% • Duty free import of raw materials, machinery and equipment • Exemption from VAT. • Tax-free dividends. • No capital gains tax. • Free repatriation of profits, dividends & capital. • 60% remission of customs duties on buses used for workers • 5% registration duty on immovable assets • 50% relief on personal income tax for 2 expatriate staff over 4 years • Duty remission on the import of 2 cars for investment exceeding Rs 50 m • Sale on the local market, exempted of customs duty.
2	Pioneer Status Enterprise Scheme	• Technology and skills not available in Mauritius. • Applicants categorized under: o New technology o Support industries o Service industries	• Corporate tax 15% • Exemption from customs duty on equipment and raw materials. • Tax free dividends. • Free repatriation of profits, dividends & capitals. • 4.4% registration duty on immovable assets • 50% relief on personal income tax for 2 expatriate staff over 4 years
3	Hotel Management Scheme	• Hotel chains of international repute.	• Corporate Tax 15% • Tax free dividends for 10 years • Free repatriation of profits, dividends & capital. • Term loans & overdrafts at preferential rates.
4	Information and Communication Technology (ICT) Scheme	• 3D animation & multimedia • Business Process Outsourcing/ Back office operations • Call centres/ contact centres • Data digitalization • Data disaster recovery services & centres. • Electronic data processing, warehousing, & management • Engineering design services. • Online education & high-end ICT training. • Technical documentation. • Website development services.	• Tax holiday up to 2008 & corporate tax 15% thereafter • For call centres the company can opt for a uniform 5% corporate tax • Duty-free import of equipment • Accelerated depreciation allowances for ICT equipment of 50% plus annual allowance of total investment over 3 years • 50% relief on personal income tax for a given umber of IT specialists • Duty-free import of personal belongings for expatriates • Fast track processing of visa, work & residence permits for expatriates. • Electricity tariffs at industrial rates • 4.4% registration duty on the purchase of land & building. • Duty-free import of 2 cars for initial investment exceeding Rs 50m
5	Scheme To Attract Professionals For Emerging Sectors (SAPES)	• Attract non-citizen professionals in emerging sectors.	• Grant work and resident status for 3 years to the professional, spouse and dependents. • Right to acquire one immovable property as personal residence. • Spouse of personal entitled to a 3 years work permit. • On expiry of residence permit, the family can apply for a permanent residence status. • Duty-free imports of personal effects.