Foreign Direct Investment and Human Capital: A Dynamic Paradox for Developing Countries

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Abstract

This paper reviews the effects of Foreign Direct Investment (FDI) on the accumulation of Human Capital (HC); and analyzes several economic indicators within developing regions in relation to growth and development. It addresses questions surrounding recent FDI surges; technology transfer; and the importance of HC to economic growth. The analysis employs a dynamic panel procedure to analyze the impact of FDI on the accumulation of human capital, using data averaged over five year periods, for 1970-2010, with HC being the primary variable; and several macro-economic explanatory variables. The assumption is that technological advances are influenced by FDI inflows; which lead to dynamic economic changes; which further stimulate HC accumulation. This paper confirms that FDI has a positive impact on human capital variables represented by the average years of primary and secondary schooling, educational attainment of the total population, and the percentage of higher education in the total population over 15 years of age. Note that as FDI inflows translate into higher human capital
stocks; this can also have a growth effect on a country’s economy and therefore on FDI attractiveness. However, this positive impact was not statistically significant when the explanatory variables were expanded in each case. Furthermore, although technology absorption and education are identified as keys to this growth nexus; counter-intuitively, the evidence suggested that the relationship between tertiary education and FDI was insignificant for developing countries. The paper goes further to identify the importance of harnessing ‘parental human capital’, for the long-term economic development of developing countries.

**Keywords:** Foreign direct investment, human capital, technology transfer, economic growth, developing countries.

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**Introduction**

FDI attraction has been an important part of the growth strategy of developing countries. As such, the impact of foreign direct investment (FDI) on the growth of the economy has been the subject of much research; since many assume that greater inflows of FDI will bring greater benefits to the economy of especially developing countries, (DeMello, 1997). However, as a source of capital, the impact of FDI is dependent on several factors, such as: the form that it takes; the type of FDI; the level of Human Capital; the host sector; the scale; the duration; its location; etc. Additionally, research has supported the view that the enabling environment is critical to the absorption of FDI in a meaningful way for developing countries. (Saggi, 2007). So a study on the positive impact of FDI on developing economies must require a perspective that is more than just attracting FDI; but must also include the application of FDI for meeting sustainable growth objectives (D.W. te Velde, 2001).
The advent of globalization in the 1970s highlighted the role of FDI as an important source of funding for developing nations. However, a minimum threshold level of human capital was required for technological transfers and spillovers from FDI activities to take place. Further, there is also evidence that human capital on its own plays an important part in the growth and development of lesser developed countries. Even though there is some disagreement in the empirical findings as to the exact relationship between human capital and economic growth, there is still an abundance of evidence which suggest some positive impact between these variables. Finally, it has been suggested that FDI and human capital levels may have a symbiotic relationship, whereby the type and level of human capital may dictate the type of FDI inflows; while the level of FDI inflows may lead to technological advances and growth which in turn may spur human capital accumulation.

This paper will contribute to the literature on human capital, FDI, and economic growth by examining the impact of FDI on the accumulation of human capital in developing countries.

**Review Of The Literature**

The idea that human capital externalities could generate sustained growth over the long run has been a critical feature of the “New Growth” literature following the work of economists like Romer (1986), Lucas (1988), and Robelo (1991). These growth theories argued that long term growth was determined by forces within the analysis, for example government policies. There were no diminishing returns to a broadened concept of capital that included human capital.

That FDI may have an impact on the accumulation of human capital has been suggested by some authors. In order to analyze the various ways in which FDI may have a positive effect on the accumulation of human capital in developing countries we will use a demand and supply
framework, (Slaughter 2002; and Willem teVelde 2003). On the demand side, the literature suggests three channels by which FDI may positively affect the accumulation of human capital. These are technology transfer, spillovers, and physical capital investment. On the supply side the process is less well known and documented, but FDI can affect human capital development via its effect on general education, and official and informal on-the-job training, (Slaughter 2002).

Borenszein, De Gregorio, and Lee (1998) conclude that “FDI is a vehicle for the adoption of new technology, and therefore, the training required to prepare the labor force to work with new technologies suggest that there may also be an effect of FDI on human capital accumulation”. Monge-Naranjo (2002) hypothesized that FDI speeds up the accumulation of general human capital. He used an Overlapping Generations Model (OLG) to show that FDI alters the incentives for the accumulation of general human capital by changing the dynamical structure of the economy. Galor and Tsiddon (1997), who also used OLG models, states that the amount of real resources invested in human capital are positively related to the level of technology. Since FDI brings with it technological improvements, we may expect to witness increase investments in human capital as a result of FDI activities. Galor and Tsiddon (1997), further contend that technical progress increases the rate of return on investments in human capital and consequently stimulates further investments in human capital. Bils and Klenow (1998) contend that anticipated growth and technology-driven growth can induce more schooling by raising the effective rate of return on investments in schooling. It has been suggested in the literature that technology-driven growth in developing countries is an expected outcome of FDI activities. In this research we will view all technological progress as a byproduct of FDI activities. Thus we can expect to see an increase in schooling due to the activities of FDI in developing countries. Note too that the assumption is that foreign direct investment activities are by-products of MNEs’ activities.
Investment in physical capital which is related to new technology is another link that connects FDI with human capital development, (Slaughter 2002). The implication is that new technology will be embodied in new capital goods, and thus the demand for skilled labor will increase with the acquisition of new capital goods. (Blomstrom, Globerman, and Kokko 1999). Slaughter (2002) gives evidence which suggest that the coincidence of host affiliates, capital deepening and the shifting of relative employment towards more skilled workers is consistent with capital skill complementing technology transfer. Hammermesh (1993) gives a survey of empirical work which supports the contention that capital investments stimulate firms’ demand for more skilled labor. Furthermore, Borenzstein, De Gregorio, and Lee (1995) point out that the training required to prepare the host affiliates labor force to work with new technology suggest that there may be an effect of FDI on the accumulation of human capital. Borenzstein, De Gregorio and Lee (1995) used panel data in a test of 69 developing countries and found that FDI has a “crowding-in” effect on domestic investment thus facilitating the expansion of domestic firms. FDI actually leads to more domestic investment.

In conclusion, studies have looked at the effects of FDI and human capital on economic growth. Though the results are mixed, the general consensus is that both FDI and human capital positively affect economic growth. Some avenues through which FDI affects economic growth are via technology upgrading, and technology spillover. However, authors such as Xu (2000), Benhabib and Speigel (1994), and Borensztein, De Gregorio, and Lee (1998) argue that even though FDI promotes technology transfer, the higher productivity in the host country only holds when a minimal level of educational attainment is achieved. They refer to this as the threshold level. The reasoning being that some level technical ability is needed in order to promote the new technology. Can FDI itself contribute to increasing this threshold level? The purpose of this
research is to examine whether or not FDI contributes to the accumulation of human capital in developing countries by changing the dynamics of the economy thereby raising the rate of returns to schooling via the transfer of technology, spillovers and its effect on general education and training. If, as in many poorer developing nations, the level of educational attainment is below the threshold level needed for the transfer of technology, then FDI (along with host policies) can play a major role in reversing such deficiencies if its’ effects on human capital accumulation is positive. If this relationship between FDI and human capital exist, then even the poorest of countries may eventually realize productivity gains through FDI activities.

The Theoretical Argument of the Research

In Galor and Tsiddon’s (1997) model, increases in the average level of human capital led to technological advances which then led to further increases in the accumulation of future generations’ human capital. However the assumption of this research is that technological advances are brought about by the inflow of FDI. This then leads to increases in human capital accumulation. The idea that FDI can be a major source of technological transfer because of its technological content is pervasive in the literature.

In this research a basic level of human capital development is needed in order to attract FDI. This inflow of FDI into developing countries leads to some level of technological progress. The higher level of technology brought about by the inflows of FDI leads to dynamical changes in the economy which increases the rate of returns on investments in human capital for future generations thus leading to increases in human capital formation. Galor and Tsiddon (1997), and Monge-Naranjo (2002), argued that increases in the level of technology cause a dynamical
change in the structure of the economy, leading to an increase in the optimal level of investment in human capital throughout the economy. “Given that young workers foresee that, as long as it is in their best interest, foreign organizations will always invest in the country, then their returns to human capital investment is insured”. As the economy becomes more developed, both Galor and Tsiddon (1997), and Monge-Naranjo (2002), postulate some level of convergence in human capital. Thus as the economy becomes more advanced FDI should become relatively less important.

The Empirical Model

The regression equation in this research is motivated by the work done previously on growth. The theory dictates that we incorporate a time dimension in our analysis because FDI is expected to have an effect on the level of human capital of future generations. Hence our analysis will employ panel estimation in order to take advantage of both the time series and cross-sectional nature of our data. A common feature of most cross-country regressions is that the explanatory variables are entered independently and linearly. (Levine and Renelt, 1992). We will follow this trend.

The empirical equation used to analyze the impact of FDI on the accumulation of human capital will be based on a dynamic panel procedure with data averaged over five year periods, so that there will be eight possible observations per country over the 1970-2010 period. The regression equation based on the dynamic panel procedure will be based on the following equation:

$$H_{it} = \alpha + \lambda H_{i,t-1} + \beta FDI_{it} + \beta' Z_{it} + \eta_i + \epsilon_{it}.$$ 

The dependent variable, $H_{it}$, is a measure of human capital. The common intercept term $\alpha$. $H_{i,t-1}$ is a measure of the previous level of human capital. This is supposed to reflect the parental level
of human capital. FDI_{it} is a measure as before. Z_{it} is a vector containing other variables that have an effect on the accumulation of human capital. Additional explanatory variables will be used as a test of robustness and sensitivity. For example, see Levine and Renault, 1992 and Carkovic and Levine 2002. This conditioning set will be based on a set of variables which help determine the level of human capital in the economy. η_{i} is a common fixed effect term, and ε_{it} is a white-noise error term. The primary concern of this research methodology is the partial correlation coefficient, β. The subscripts i and t represents country and time periods, respectively.

There are many advantages of using the panel approach procedure over the cross-country approach which includes the OLS estimator. Carkovic and Levine (2002), for example, argue that panel procedures allow for the control of country-specific effects. In cross-country growth regressions, unobserved country-specific becomes part of the error term and this may bias the coefficient estimates. However, the panel estimator can control for these unobserved effects by differencing the data. The panel estimator can also control for the potential endogeneity of all the explanatory variables. Many of the growth regressions use explanatory variables that may themselves depend on growth. In this research we contend that human capital accumulation depends on FDI, but it has been argued convincingly that FDI inflow is also a function of human capital development. Thus there is an endogeneity problem with the regression equation. The OLS coefficients are biased whenever lagged levels of the dependent variable are used as an explanatory variable. However the panel estimator accounts explicitly for this bias. Another advantage of the panel estimator over the cross-country approach is that the panel estimator can allow the researcher to exploit the time-series nature of the variables under consideration.

One prominent way to address these problems has been through first-differenced generalized method of moments estimates applied to dynamic panel data (GMM). See Caselli, et al, 1996;
Carkovic and Levine, 2002. The basic idea is to take first-difference of the original regression equation so as to remove the unobserved time-invariant country-specific effects. The right hand side variables in the first-difference equation are then instrumented using the levels of the original series lagged two periods or more, under the assumption that the time-varying disturbances in the original levels equations are not serially correlated. To eliminate country-specific effects, first-differences of equation (10) were taken and obtained the following:

\[ H_{i,t} - H_{i,t-1} = \lambda (H_{i,t-1} - H_{i,t-2}) + \beta_1'(\text{FDI}_{i,t} - \text{FDI}_{i,t-1}) + \beta_2'(Z_{i,t} - Z_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}). \]

The new error term \( \varepsilon_{it} - \varepsilon_{it-1} \) is now correlated with the lagged dependent variable, \( H_{i,t-1} - H_{i,t-2} \). The use of instruments are now required to deal with problem of serial correlation and the possibility of the endogeneity of the explanatory variables (Carkovic and Levine, 2002).

Bond, et al (2001) argues that there are important advantages that the first-difference GMM estimator has over other methods for dynamic panel data models. Firstly, the estimates will be no longer biased by any omitted variables that are constant over time. Secondly, the use of instruments allows parameters to be estimated consistently in models which include endogenous right hand side variables. In the above equation factors that affect the accumulation of human capital may also affect the right hand side variables. Finally, the use of instruments potentially allows consistent estimation even when measurement errors are present.

**Selection of Variables**

The level of income has a positive and significant effect on human capital development, (Freire-Seren, 1999). Many studies agree that economic growth leads to higher rates of human capital accumulation. Bils and Klenow (1998) give strong evidence that technology driven growth leads to higher rates of human capital accumulation. Another important explanatory variable is
government spending on education. Judson (1995) argues that government spending is a good indicator of education’s value. Levine and Renelt (1992) contend that most cross-country growth regressions include fiscal policy indicators in the conditioning set as a way to measure the effects of policy on the variable of interest. To measure the government’s effect on this variable of interest in this research, we will use the variable -public spending on education.

This research will examine human capital variables at the secondary school level based on education measures obtained by the WDI (2004, and 2013). Our initial analyses reveal that tertiary education was an insignificant indicator of human capital - a counter-intuitive and somewhat paradoxical finding for developing countries. According to Levine and Renelt (1992) secondary school enrollment may be preferable to other education-based measures of human capital because many countries have reached the upper bound for these other measures. Our main focus, therefore, the secondary school enrollment variable can be rationalized as a reflection of a flow of investment in human capital. (Noorbakhsh and Paloni, 2001). It also helps us to capture the threshold level . Therefore our primary human capital variable will be school enrollment at the secondary level. The main explanatory variables will be: the dependent variable lagged one period so as to capture the parental level of human capital, FDI and gross domestic product per capita; growth measured as an annual percentage; and public spending on education measured as a percentage of gross domestic product (GDP). All explanatory variables are taken from the World Development Indicators’ (2004 and 2013) data set.

The empirical literature on cross-country economic growth contains a myriad of explanatory variables and there is no consensus on which to include and which to exclude in empirical regressions. In this research FDI will measure the effects of resource allocation. The argument for this is two-fold. First, the literature suggests that FDI inflows increase competition among
firms in the host countries and thus stimulates economic growth. This aspect of FDI can be viewed as increasing efficiency in resource allocation. Firms that are not competitive become obsolete and resources are channeled to more competitive endeavors. Second, FDI has a technological content and this can improve efficiency in resource allocation. Additionally, it is very problematic to do a cross-country comparison with fiscal policy variables; but it may be a lot easier to compare FDI inflows between countries since these inflows usually come from OECD countries where the data may be more reliable.

**Empirical Result**

The results of the regression tables can be seen in Table 1. The GMM estimator was used for these analyses. Five GMM estimates were conducted with an additional variable added to each regression as a test of robustness; Tables 3 to 7 show these individual results, as follows: i) All explanatory variables were statistically significant and have a positive effect on the accumulation of human capital as measured by secondary school enrollment, which supports the stated hypothesis. ii) The regression results support the hypothesis that FDI leads to the accumulation to human capital. FDI is statistical significant at the one percent level and it remains robust to the inclusion of all other explanatory variables. (See Table 1). The regression coefficient is positive, throughout the tests of robustness.

We also ran an OLS regression on the full complement of the explanatory variables as an additional test of the robustness of the regression results. The FDI regression coefficient remained positive and statistically significant at the one percent level of significance. The parental level of human capital, as measured by the one period lag of the dependent variable, is
also shown to be statistically significant at the one percent level throughout the analysis. This supports the argument that the parental level of human capital affects future generations’ capital accumulation. The OLS results also support the importance of the parental level of human capital, (See Table 2).

Life expectancy, public spending on education, and GDP per capita also have positive impacts on our human capital variable. Life expectancy is significant at the five percent level, while public spending remains significant throughout the analysis at the one percent level. The GDP variable alternates between the ten percent and one percent significance levels as more explanatory variables are added. Note that the OLS results show that GDP is statistically insignificant and it also carries the incorrect sign. The OLS results show that GDP has a negative impact on the accumulation of human capital (see Table 2). However, it should also be noted that since this regression coefficient is statistically insignificant we can ignore the negative sign but this still leaves us with the result that no impact was observed.

**Conclusion**

This paper confirms the need to study the relationship between FDI and other development variables such as Human Capital. It notes the surge in FDI levels to developing countries over the period in question, and suggests this may be a ‘globalization effect’. It also concludes that FDI may be the leading force of technological advancement in developing nations, although the level of absorption of this technology is directly related to the role of human capital in those countries. As such, FDI has a dependent impact on the growth of the economy of lesser developed countries. Further research is needed to examine the dynamic relationship between
FDI and Human capital in terms of the type of human capital needed to attract FDI; which in turn may lead to further increases in human capital. The paper also concludes that there is a symbiotic relationship between FDI and human capital; and a causal relationship from parental levels of human capital to future human capital accumulation. These all have significant implications for current and future economic development policy in developing countries.
References


Appendix A:

Table 1 – GMM Results (Full Sample)

Fixed Effect Estimation for GMM
Dependent variable = school enrollment secondary(% gross)

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>GMM</th>
<th>GMM</th>
<th>GMM</th>
<th>GMM</th>
<th>GMM</th>
</tr>
</thead>
<tbody>
<tr>
<td>(HC) school enrollment secondary(% gross) lagged</td>
<td>0.911***</td>
<td>0.70***</td>
<td>0.69***</td>
<td>0.39***</td>
<td>0.33***</td>
</tr>
<tr>
<td></td>
<td>(50.4)</td>
<td>(-15.87)</td>
<td>(12.08)</td>
<td>(6.60)</td>
<td>(4.38)</td>
</tr>
<tr>
<td>(FDI) Foreign direct investment, net inflows, (% of GDP)</td>
<td>1.68***</td>
<td>1.59***</td>
<td>2.44***</td>
<td>1.60***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(6.40)</td>
<td>(4.75)</td>
<td>(10.26)</td>
<td></td>
<td>(2.99)</td>
</tr>
<tr>
<td>(GPC) GDP per capita growth, (annual %)</td>
<td>0.48*</td>
<td>0.67***</td>
<td>0.36*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.95)</td>
<td>(4.78)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SXP) public spending on education, (% of GDP)</td>
<td>1.66***</td>
<td></td>
<td>1.32***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(7.00)</td>
<td></td>
<td>(5.39)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(LEX) Life expectancy, (taken at 5yr. Intervals)</td>
<td></td>
<td></td>
<td></td>
<td>102.21**</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(2.10)</td>
<td></td>
</tr>
</tbody>
</table>

Number of observations: 133, 131, 130, 100, 100
cross-sections: 26, 26, 26, 25, 25

Notes:
a) * significant at the 10% level.
b) ** significant at the 5% level
c) *** significant at the one % level.
d) t-statistic in brackets.
e) life expectancy is in log difference form for GMM regression.
Appendix B:

Table 2 - OLS Results

Dependent Variable: SC3
Method: Panel Least Squares (OLS)
Date: 05/27/13   Time: 11:40
Sample (adjusted): 1902 1908
Cross-sections included: 26
Total panel (unbalanced) observations: 126

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC3(-1)</td>
<td>0.827904</td>
<td>0.045288</td>
<td>18.28090</td>
<td>0.0000</td>
</tr>
<tr>
<td>FDI</td>
<td>1.328657</td>
<td>0.307138</td>
<td>4.325922</td>
<td>0.0000</td>
</tr>
<tr>
<td>GPC</td>
<td>-0.079346</td>
<td>0.325313</td>
<td>-0.243907</td>
<td>0.8077</td>
</tr>
<tr>
<td>SXP</td>
<td>0.020697</td>
<td>0.094550</td>
<td>0.218906</td>
<td>0.8271</td>
</tr>
<tr>
<td>LEX</td>
<td>2.933518</td>
<td>0.638234</td>
<td>4.596304</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

R-squared | 0.834387 | Mean dependent var | 63.20285 |
Adjusted R-squared | 0.828912 | S.D. dependent var | 22.17593 |
S.E. of regression | 9.172571 | Akaike info criterion | 7.309186 |
Sum squared resid | 10180.46 | Schwarz criterion | 7.421737 |
Log likelihood | -455.4787 | F-statistic | 152.4049 |
Durbin-Watson stat | 1.928668 | Prob(F-statistic) | 0.000000 |

Appendix C:

Table 3 – 1st Differences Transformation Results

Dependent Variable: SC3
Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 05/27/13   Time: 18:33
Sample (adjusted): 1903 1908
Cross-sections included: 26
Total panel (unbalanced) observations: 133
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument list: @DYN(SC3,-2)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC3(-1)</td>
<td>0.911575</td>
<td>0.018064</td>
<td>50.46339</td>
<td>0.0000</td>
</tr>
</tbody>
</table>
Appendix D:

Table 4 – GMM Panel Results (FDI)

Dependent Variable: SC3
Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 05/22/13   Time: 01:58
Sample (adjusted): 1903 1908
Cross-sections included: 26
Total panel (unbalanced) observations: 131
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument list: @DYN(SC3,-2)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC3(-1)</td>
<td>0.708171</td>
<td>0.044622</td>
<td>15.87048</td>
<td>0.0000</td>
</tr>
<tr>
<td>FDI</td>
<td>1.686970</td>
<td>0.263204</td>
<td>6.409366</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Effects Specification

Cross-section fixed (first differences)

| R-squared | -0.850129 | Mean dependent var | 5.672205 |
| Adjusted R-squared | -0.864471 | S.D. dependent var | 8.813870 |
| S.E. of regression | 12.03495 | Sum squared resid | 18684.38 |
| J-statistic | 19.92566 | Instrument rank | 21.00000 |
Appendix E:

Table 5 - GMM Panel Results (FDI, GPC)

Dependent Variable: SC3
Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 05/22/13   Time: 02:12
Sample (adjusted): 1903 1908
Cross-sections included: 26
Total panel (unbalanced) observations: 130
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument list: @DYN(SC3,-2)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC3(-1)</td>
<td>0.691324</td>
<td>0.057207</td>
<td>12.08462</td>
<td>0.0000</td>
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<tr>
<td>FDI</td>
<td>1.595343</td>
<td>0.335377</td>
<td>4.756872</td>
<td>0.0000</td>
</tr>
<tr>
<td>GPC</td>
<td>0.480902</td>
<td>0.246028</td>
<td>1.954666</td>
<td>0.0528</td>
</tr>
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</table>

Effects Specification

Cross-section fixed (first differences)

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>-0.974088</td>
<td>Mean dependent var</td>
<td>5.671653</td>
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<tr>
<td>Adjusted R-squared</td>
<td>-1.005176</td>
<td>S.D. dependent var</td>
<td>8.847964</td>
<td></td>
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<tr>
<td>S.E. of regression</td>
<td>12.52909</td>
<td>Sum squared resid</td>
<td>19936.23</td>
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<tr>
<td>J-statistic</td>
<td>17.45451</td>
<td>Instrument rank</td>
<td>21.00000</td>
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</tr>
</tbody>
</table>
Appendix F:

Table 6 - GMM Panel Results (FDI, GPC, SXP)

Dependent Variable: SC3
Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 05/22/13   Time: 02:15
Sample (adjusted): 1903 1908
Cross-sections included: 25
Total panel (unbalanced) observations: 100
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument list: @DYN(SC3,-2)

<table>
<thead>
<tr>
<th>Variable (SC3(-1), FDI, GPC, SXP)</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC3(-1)</td>
<td>0.396497</td>
<td>0.059994</td>
<td>6.608962</td>
<td>0.0000</td>
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<tr>
<td>FDI</td>
<td>2.445868</td>
<td>0.238165</td>
<td>10.26964</td>
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<tr>
<td>GPC</td>
<td>0.676967</td>
<td>0.141514</td>
<td>4.783757</td>
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<tr>
<td>SXP</td>
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<td>0.238104</td>
<td>7.006253</td>
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Effects Specification

Cross-section fixed (first differences)

<table>
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<tr>
<th>Statistic</th>
<th>Value</th>
<th>Description</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
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<td>Mean dependent var</td>
<td>5.092967</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>-2.494318</td>
<td>S.D. dependent var</td>
<td>9.323072</td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>17.42771</td>
<td>Sum squared resid</td>
<td>29157.60</td>
</tr>
<tr>
<td>J-statistic</td>
<td>18.91100</td>
<td>Instrument rank</td>
<td>21.0000</td>
</tr>
</tbody>
</table>
Appendix G:

Table 7 - GMM Panel Results (FDI, GPC, SXP, LEX)

Dependent Variable: SC3
Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 05/27/13   Time: 11:31
Sample (adjusted): 1903 1908
Cross-sections included: 25
Total panel (unbalanced) observations: 100
White period instrument weighting matrix
White period standard errors & covariance (d.f. corrected)
Instrument list: @DYN(SC3,-2)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
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<td>SC3(-1)</td>
<td>0.331815</td>
<td>0.075716</td>
<td>4.382344</td>
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<tr>
<td>FDI</td>
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<td>0.538031</td>
<td>2.991102</td>
<td>0.0035</td>
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<tr>
<td>GPC</td>
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<td>0.213954</td>
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<tr>
<td>SXP</td>
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<td>0.245738</td>
<td>5.392456</td>
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<tr>
<td>LEX</td>
<td>102.2175</td>
<td>48.50782</td>
<td>2.107237</td>
<td>0.0377</td>
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</table>

Effects Specification

Cross-section fixed (first differences)

<p>| | | | | |</p>
<table>
<thead>
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<tbody>
<tr>
<td>R-squared</td>
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<td>Adjusted R-squared</td>
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<td>S.E. of regression</td>
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<td>J-statistic</td>
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<td>Instrument rank</td>
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</table>
SHORT BIO

DR. DEXTER DARRELL GITTENS

Dr. Dexter Darrell Gittens received the Bachelor of Arts degree from the University of the West Indies, in Trinidad, his MA in Economics from CUNY, and His PhD from Fordham University in the United States. He currently works as an Assistant Professor in the School of Business at the University of the Southern Caribbean (USC) in Trinidad, W.I.

Dr. Gittens has had extensive teaching experience in the areas of economic theory, and business management, focusing on managerial economics and small business entrepreneurship, at both the undergraduate and graduate levels. Dr. Gittens main areas of interest include Economic Growth with a focus on human capital and foreign direct investment, and Business Entrepreneurship in small developing countries.

Additional he has been a member of many committees, such as the Honors Board at Monroe College in the USA, and the Graduate Council, and Thesis Examination Committee at USC. Currently he continues to sit on both these committees at USC.
DR. STEPHEN WAYNE PILGRIM

Dr. Stephen Wayne Pilgrim is a University Vice President, University Lecturer and International Consultant. Presently, he is dual-based both in the Caribbean and in the United Kingdom, where he lived for over twenty (20) years. In addition to having significant university management experience, he also consults with several governments of the Caribbean in terms of investment attraction generally, and has designed special programs specifically for private and public sector. He also lectures in the area of strategic marketing & logistics.

His academic background is in the field of international economics, with emphasis on foreign direct investment strategies for small developing countries. He graduated with his Higher Degrees from University of Reading, UK; and the University of the West Indies, Barbados, West Indies.

His research interests include ‘turnaround strategies’ for micro, small and medium sized enterprises; as well as international development and marketing. Additionally, he is a member of many significant regional and international organizations, which are essentially foreign investment companies. Some of these are based in UK, North America, Latin America and the Caribbean.