Volume: 2, Issue: 3
Page: 480-490
2018

ISSN 2520-4750 (Online) & ISSN 2521-3040 (Print)

International Journal of Science and Business

The Threshold Foreign Direct Investment under Application of the Growth Identification and Facilitation Framework: case of Benin

Kokou Wotodjo Tozo

Abstract:

This paper aims to contribute to the first stage in applying the Growth Identification and Facilitation Framework (GIFF) of the New Structural Economics (NSE). The key point is to give additional proactive guidelines to developing governments in their effort to attract foreign direct investment (FDI) for enabling growth and structural transformation under GIFF application. To proceed, we explore the importance of an initial condition. We claim that FDI has direct effect on growth only if it reaches a certain share of a country's GDP, it remains negative otherwise. We provide an empirical verification to our underlying hypothesis and find that FDI has positive impact on growth in Benin only if its share exceeds 2.062% of the country's GDP. Our finding, therefore, gives Benin Government a more precise target on the amount of FDI in the beginning.

IJSB
Accepted 28 July 2018
Published 30 July 2018
DOI: 10.5281/zenodo.1323190

Keywords: FDI, GIFF, Threshold, sample split, bootstrapping, Cobb-Douglas, Benin.

About Authors

Kokou Wotodjo Tozo, Researcher: Institute of New Structural Economics at Peking University & PhD candidate: University of International Business and Economics

Published By
IJSB International

1. Introduction

Foreign direct investment (FDI) has always been a central topic in industrial policies and a wide range of claims and works have been supportive of its growth effect on GDP. In the current era of increasing globalization, the presence of multinationals enterprises (MNEs) first helps many developing countries to connect to the global market. Internally, host countries benefit from technology spillovers in the form of knowledge transfer or skill upgrading. Added to these, right FDI contributes to job creation, higher wage, higher productivity, and enhances the overall competitiveness of the host country in the long run. For decades till date, the literature has explored possibilities or tried to provide answers to questions that often puzzle governments in developing countries. Studies include questions such as where to seek right FDI partners (Akamatsu 1962; Lin 2012), how to attract quality FDI (Moran et al. 2017) what motivate investors and how much amount of FDI is required for growth and so on. To our knowledge, the question on the optimality of FDI to growth is the one to have received too little attention from both researchers and policy-makers. Developing countries are still puzzled given the inability of many to reach consequent growth under FDI mechanism. On the origin of FDI that can benefit growth, policy advisers have proposed different ways of selection. One of the frameworks, recently proposed by Lin (2012) –our main focus- is the GIFF.

In light of recent literature, governments in developing countries, following the GIFF methodology can identify the right target for FDI based on the following features:

- Countries growing dynamically over the past 20 years
- Countries with consistent growth in the manufacturing over the past 20 years
- Countries with similar endowment structures to the host country about 20 years ago
- Countries with per capita income that is about 100 percent to 300 percent higher than their own today or similar per capita income about 20 years ago
- Countries with rising labor cost and wage higher than that in the host country
- Transfer countries with losing competitive advantage in the manufacturing sector as they are upgrading toward higher-end industries

Following the above technical description, GIFF has previously been applied to and documented on countries' cases including Nigeria (Lin and Treichel, 2012), Uganda (Lin and Xu, 2016) and Nepal (Xu and Hager-Loss, 2017) among others. However, the framework has been left flexible and, answer to some questions, such as the range or the specific value of countries' dynamic growth rate, the minimum FDI to give a sound kick to the host economic growth, the optimal FDI for an optimal GDP in the host country, and when the economy needs to upgrade to another or a higher-end industry, need to be explored. In practice, to the question of where to target right foreign investors following GIFF methodology, findings are nearly similar given the development level of host countries to match.

Table 1: Some findings in the literature

Host country	Nigeria	Uganda	Nepal
Potential target countries identified	China, Viet Nam, India, Indonesia	China, Viet Nam, India	China, Viet Nam, India

According to Xu and Hager-Loss (2017), if these selected countries, which were recently at the same level of development as the host economies are today, were able to grow consistently and generate employment from very low skill and capital bases by producing particular products, then the host countries are likely to realize some success by making these same goods. Such an argument means that the choice of FDI matters in that it explains why developing countries do not need to open doors to investments from whatever countries/industries they originate in. However, given that the host countries do not follow similar economic patterns, we are concerned and want to show that, following their absorption capacity, each country is particular and will face a threshold effect vis-à-vis the amount of FDI necessary for growth. In this, we are trying to contribute to Lin's framework by responding to one practical question: what is the minimum FDI needed to trigger a sound growth?

2. Methodology

In this section, we elaborate the basic models to allow for empirical verification of our previous claim. For this purpose, we focus our discussion on the specific case of Benin, a West African least developed country (LDC) which exhibits suitable conditions for GIFF application.

2.1. Theoretical foundation

Assume investors have all decided to fill the demand in FDI of a developing country seeking opportunities in a transfer country and that all other conditions such as investment incentives, infrastructure, lower labor cost are guaranteed. Our purpose is to determine a threshold parameter or the minimum amount of FDI as a %GDP of the host country from which the economy can substantially take off.

To do this, let's consider the traditional augmented Cobb Douglas production function to express the relationship between output and input:

$$Y = Af[K, L] = AL^{\alpha}K^{\beta} \qquad (1)$$

Where Y is the real output, A is the transformation parameter or the total factor productivity (TFP), L is labor, K the physical capital, α and β are respectively labor and capital elasticity coefficients. Assume the domestic output also depends on other factors. Here, for simplicity, we consider for our interest externalities E from foreign capital stock in the form of foreign direct investment $FDI = x$. In this case, the real output can be then expressed as:

$$Y = AL^{\alpha}K^{\beta}E^{\varphi} \qquad (2)$$

Where Y, A, L, K, α and β are defined as before and φ represents the FDI elasticity coefficient. So E is defined as the externality $E \in]1; 1[$. Consider there are constant returns to scale, implying that $\alpha + \beta + \varphi = 1$ or $\varphi = 1 - \alpha - \beta$ and equation (2) becomes:

$$Y = AL^{\alpha}K^{\beta}E^{1-\alpha-\beta} \qquad (3)$$

Following Fedderke and Romm (2004), let the externality be represented by a simple Cobb Douglas of the type:

$$E = (L.K.x^{\gamma})^{\theta} \qquad (4)$$

Where x denotes the foreign owned capital and L and K are defined as before. Remark that by inserting equation (4) into (3), we obtain:

$$Y = AL^{\alpha+\theta(1-\alpha-\beta)}K^{\beta+\theta(1-\alpha-\beta)}x^{\gamma\theta(1-\alpha-\beta)} \qquad (5)$$

By deriving and manipulating (4) with respect to K and x we have:

$$e_{Kx} = \left(\frac{\partial K}{\partial x}\right)\left(\frac{x}{K}\right) = \gamma \qquad \textbf{(See Appendix 1)}$$

Here e_{Kx} captures the effect in terms of elasticity of foreign capital on domestic capital. De Mello (1997) and Ramirez (2000) suggest that if $\gamma < 0$ i.e. $e_{Kx} < 0$, this means that foreign capital has a crowding-out effect on the domestic one at least in the short run (Fedderke and Romm, 2004).

On the other hand, θ captures the spillover of foreign investment on the productivity of capital and labor. In fact:

$$e_{YK} = \left(\frac{\partial Y}{\partial K}\right)\left(\frac{K}{Y}\right) = \beta + \theta(1-\alpha-\beta) \text{ and } e_{YL} = \left(\frac{\partial Y}{\partial L}\right)\left(\frac{L}{Y}\right) = \alpha + \theta(1-\alpha-\beta)$$

(See appendix 1)

Note that $\theta > 0$ implies positive spillover and $\theta < 0$ implies negative spillover from foreign investment. And whenever $\gamma > 0$ or $\gamma < 0$, FDI may still have a positive effect on output in the long run. Thus γ could be interpreted as the short term (marginal) and θ the long-term (intertemporal) elasticity of substitution between domestic and foreign capital. For our interest, we are looking for a quantity of FDI $q > \gamma$ from which θ becomes positive. In order word, every amount of FDI $q < \gamma$ attracted in the short run will have a negative effect on growth.

The threshold parameter γ and the impact coefficient θ can be found using the sample splitting technic as suggested by Hansen (2000), inspired by the threshold autoregressive model (TAR), which is also used in Sidek (2012).

The point behind the sample splitting is to separate the sample into two regimes such that θ takes negative and positive signs for the lower and upper subsamples respectively for a certain value of FDI. In a regression, such practices can formally take the forms:

$$r_t = \begin{cases} \theta_1' x_t + e_t, \; q_t \le \gamma & (i) \\ \theta_2' x_t + e_t, \; q_t > \gamma & (ii) \end{cases} \qquad (6)$$

Where r_t stands for the growth rate, q_t the threshold variable used to split the sample into two group and e_t is the regression error.

2.2. *Estimation method and empirical verification: the case of Benin*

Assume, for Benin, that industries with comparative advantage are given. Next, we can show that the country is potentially a favorite destination for the selected transfer countries. In practice, by applying the first stage of GIFF; China, Vietnam, and India have been identified as potential targets for Benin (**see Appendix 2**). Currently, in Vietnam and India, the minimum wage is respectively around \$172 and \$155 per month, much higher than that in Benin (around \$64). In China, the lowest minimum wage is more than triple that of Benin. From these countries where labor cost is relentlessly surging, investors are now favoring locations with cost-competitive structure –such as Benin, to relocate their labor-intensive manufacturing businesses.

Besides the potential cheap labor, Benin is also home to a vibrant young population. Of the nearly 12 million people, 48% is between 15 and 60 years old. This working-age population is projected to grow significantly in the future as the population under 15 accounts for 47% of the total and only 5% is above 60 years old (INSAE, 2016). Politically, Benin is one of the most stable countries in Africa. Although these advantages and many others including, for instance, its strategic location –a coastal country and a gateway for international businesses, Benin is in great need of foreign investment to hope for a consequent economic take-off. Our objective is to find analytically and empirically which scale of FDI can really give a boost to Benin's economy, provided that investors from right transfer countries are attracted to invest there.

To do this, let's consider an original sample

$\{r_t, x_t, q_t\}_{t=1}^{n}$, $r_t \in \mathbb{R}, q_t \in \mathbb{R}, x_t$ an $m-$vector and $q_t \in x_t$, a time series as opposed to the cross-section in Hansen (2000). To proceed, let's recall the sample splitting or threshold regression model in (6). The model allows the regression parameters to take different signs such that:

$$r_t = \begin{cases} \theta_1' x_t + e_t, & q_t \le \gamma \ FDI\ has\ negative\ effect\ on\ growth \\ \theta_2' x_t + e_t, & q_t > \gamma \ FDI\ has\ positive\ effect\ on\ growth \end{cases}$$

Our first and central purpose is to determine the threshold parameter γ to enable the sample splitting. In the second place, we will be able to estimate the regression parameters, find out whether our hypotheses hold and verify if θ_2 is significantly different from θ_1. This will necessitate to test $\delta_n = \theta_2 - \theta_1 = 0$. To do these, the model can be written in a single equation by creating a dummy variable $d_t(\gamma) = \begin{cases} 1\ if\ q_t \le \gamma \\ 0\ if\ q_t > \gamma \end{cases}$, and $x_t = x_t d_t(\gamma)$. In this case, equation (6) becomes:

$$r_t = \theta' x_t + \delta_n' x_t(\gamma) + e_t, \qquad \theta = \theta_2, \delta_n = \theta_2 - \theta_1\ and\ e_t \sim iid\ N(0, \sigma^2) \qquad (7)$$

Consider the assumption that $e_t\ is\ iid, E(e_t) = 0\ and\ E(e_t^2) = \sigma^2$. Hansen (1999) suggests that following the latter assumption the appropriate regression method can be least squares (LS) although equation (7) may not be linear in parameters. That being assumed, the LS can then be approximated to the maximum likelihood estimation (MLE). To obtain the threshold parameter, let's solve for γ that minimizes the scaled likelihood ratio given by:

$$LR_n^*(\gamma) = \frac{LR_n(\gamma)}{\hat{\eta}^2} = \frac{S_n(\gamma) - S_n(\hat{\gamma})}{\hat{\sigma}^2 \hat{\eta}^2} \qquad (8)$$

With the corresponding adjusted confidence region $\Gamma^* = \{\gamma: \quad LR_n^*(\gamma) \le c\}$, where $LR_n(\gamma) = n \frac{S_n(\gamma) - S_n(\hat{\gamma})}{S_n(\hat{\gamma})}$ is the likelihood ratio under $e_t \sim iid\ N(0, \sigma^2)$, S_n the sum of squared errors and $\hat{\eta}^2$ the nuisance term. Taking α as the rejection criterion under LS, and given that Γ^* is not normally distributed, $c = c(\alpha) = 2\ln(1 - \sqrt{1 - \alpha})$ is the asymptotic confidence interval in the no rejection region.

To find the estimate of γ we will use the bootstrapping technique by resampling the original data with R replications. In Sidek (2012) and Hansen (1997), R=1000 whilst 5000 in Hansen (2000). For our purpose, we use the default R=2000 (in STATA). It's even suggested that results can become accurate with R=50. In most literature with the sophistication of available statistic tools, some have used R in the range of 1000 to 10,000. To construct the regression equation, we consider factors likely to be more determinant for growth in the long run. These include accumulation of capital stock, labor force participation as in (Verner et al.) and productivity. The expression is as follows:

$$r_t = \theta_0 + \theta_{i(i=1,2)} FDI_t + \theta_{i+k(i=3,\dots n,\ k=0,1,\dots,K)} X_t + \varepsilon_t \qquad (9)$$

Where r_t is the GDP growth rate, FDI_t is the net inflows of foreign direct investment (% of GDP), $X_t(a\ vector\ of\ independent\ variables)$ including other factors assumed to have a relevant impact on growth and ε_t the error term. The test used to determine the threshold parameter and regiment the sample is expressed as:

$$threshold_{test} = r_t\ \ X_t, q(FDI_t)\ trim_{per(p)} rep(R) \qquad (10)$$

Where r_t and X_t are defined as before, FDI_t is the threshold variable, p is the percentage of sample to trim from the ends and R is the number of bootstraps. We perform the threshold test with STATA 14 using the user-written command by Hansen (2000) who also replicated the work of Durlauf and Johnson (1995).

2.3. Data, results, and discussion

For our purpose, time series data, ranging from 1990 to 2015 per availability, were collected for Benin from World Development Indicators Catalog (WDI) of the World Bank. The summary statistics, test and regression results are shown in the following tables:

Table 2: Summary statistics

Variable	Obs	Mean	Std. Deviation	Minimum	Maximum
FDI net inflow (%GDP)	26	1.478707	1.804185	-0.90019	6.080271
GDP growth (%Δ)	26	4.520157	1.776112	1.711578	8.976134
GDP per capita (USD)	26	1467.008	364.3227	945.3767	2116.064
Export (in log)	26	20.59331	0.598231	19.71228	21.8354
FDI threshold dummy	26	0.307692	0.470679	0	1
Labor force particip. (15+ years of total population)	26	71.8555	0.67442	70.787	72.66
Manufgt value added (%Δ)	26	3.150502	6.366381	-11.5645	19.55008
Gross Capital Formation (%Δ)	26	8.169674	16.90325	-20.8423	46.21353

Table 3: Estimates of the threshold parameter

GDP growth (%) as the dependent variable		
Independent variables	Labor force, Gross Capital Formation	(+) GDP per capita as labor productivity
Values of $\hat{\gamma}$	2.062**T	2.062***
$LR_n^*(\hat{\gamma})$	10.201	10.418
Bootstrap p-value	0.012	0.000

*** p<0.01, ** p<0.05
T: the true value is 2.06155152

We have tested the null hypothesis of "no threshold" against "threshold" effect of FDI on Benin GDP growth. The results as in the above suggest that there is indeed a threshold value of $\hat{\gamma} = 2.062$ in consideration to the traditional Cobb-Douglas (CD). When controlled for by introducing the labor productivity variable as in the Augmented CD, the parameter stays as is, but becomes more statistically significant. We also find that the adjusted 95% confidence interval is given by $\Gamma^* = [-0.240, 3.183]$ as shown in "figure 3.1 below. These results are fundamental. First, the threshold value suggests that FDI can foster economic growth in Benin only if the overall yearly net inflow is above 2.062% of its GDP. For analytical purpose, this value will allow us to regiment the sample and then confirm whether the following hypotheses formulated on θ_1 and θ_2 hold:

Hypothesis 1: $\theta_2 \neq \theta_1$, the impact parameters are different across regimes
Hypothesis 2: $\theta_1 < 0$, FDI has negative impact on growth in the first regime
Hypothesis 3: $\theta_2 > 0$, FDI has positive impact on growth in the second regime

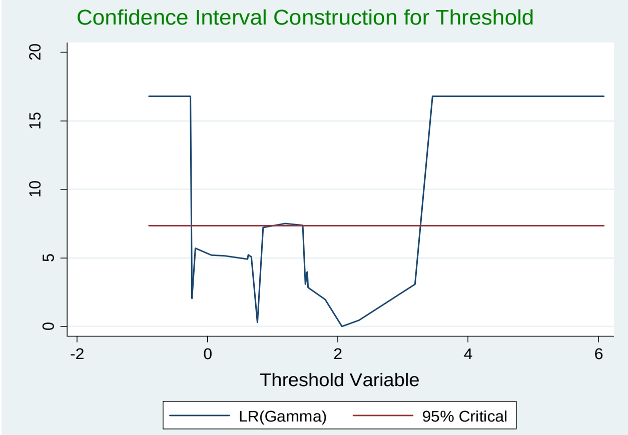

Figure 3.1: Confidence Interval Construction for Threshold

Table 4: Regression results

	GDP growth (%∆) as the dependent variable			
Independent Variables	**Dummy (no control)**	**Dummy (controlled)**	**Regime 1** $q \leq 2.062$	**Regime 2** $q > 2.062$
Labor force participation (15+ yrs)	3.014 (1.780)	3.418* (1.850)	3.841 (2.772)	1.712 (2.464)
Gross Capital Formation (%∆)	0.0604*** (0.0167)	0.0574*** (0.0173)	0.0289 (0.0211)	0.0805 (0.0273)
GDP per capita	0.00433 (0.00313)	0.00693 (0.00413)	0.00672 (0.00552)	0.0385 (0.0209)
Threshold dummy	1.269* (0.738)	1.822* (0.895)		
Exports of goods and services (in log)		-1.400 (1.550)	-1.657 (1.818)	-20.56 (11.12)
Manufacturing value added (%∆)		-0.0350 (0.0465)	-0.0970 (0.0620)	0.0669 (0.0584)
FDI			-0.0430 (0.442)	1.501 (0.814)
Constant	-219.3 (132.5)	-223.4 (137.7)	-248.0 (214.9)	244.6 (201.7)
t-test	0.099	0.055	---	---
Observations	26	26	18	8
R-squared	0.536	0.565	0.571	0.970

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

We first wanted to test for the difference in the regression parameters θ_1 *and* θ_2 by introducing the dummy options which takes value 1 for $FDI > 2.062$ and 0 otherwise. Both coefficients in the original as well as in the controlled estimation were positive and significant at 10% level. This result suggests that FDI has higher impact on growth whenever it exceeds 2.062% of Benin GDP. But this doesn't say anything about the signs of the regression parameters. As assumed earlier, if θ_2 is not far from θ_1 then they are not likely to be statistically different across regimes. To confirm this claim, we t-tested the nulls, using the estimates $\hat{\delta} = \hat{\theta}_2 - \hat{\theta}_1 = 0$ against $\hat{\theta}_2 \neq \hat{\theta}_1$ which in both cases were rejected at 10% significance level under simple least squares with limited data of 26 observations. Also, note that the significance level of the regression parameters does not hold too much importance given that the data has been shuffled 2000 times to detect the threshold parameters with high accuracy. Therefore we are more concerned with the signs of each estimate of θ_t. To verify this, the last two regressions were aimed to show whether the parameters take different signs in different regimes or not. In fact, the results confirm our previous predictions, suggesting that for $q \leq 2.062$, $\hat{\theta}_1 = -0.0430 < 0$ and $q > 2.062$ $\hat{\theta}_2 = 1.501 > 0$.

3. Conclusion, implication, and limits

This paper built on the augmented Cobb-Douglas production model, the threshold and the sample splitting methodologies to elaborate a unique framework and provide an answer to a practical question in the first stage of the Growth Identification and Facilitation Framework (GIFF) application. We argued that, under GIFF application, developing countries need a target line in terms of the minimum amount of FDI necessary to trigger economic growth. By applying this to Benin, we found a threshold value of 2.062, statistically significant at 5% and if controlled for, becomes highly significant at 1% level. Our findings suggest that FDI can contribute to economic growth in Benin only if the share of net inflow exceeds 2.062% of the country's GDP. This means that, in particular industries following the country's comparative advantage as advocated by GIFF, Benin should strive to keep the bulk FDI share to GDP above 2.062%. Note that in 26 years, beginning in 1990, Benin managed to surpass this figure only 8 times on a yearly basis, which on average, isn't a very good performance.

Besides, using the OLS technique, the findings have rather proven domestic investment in the form of fix capital accumulation to be significantly correlated with growth in Benin, but not net inflow of FDI. This may primarily be related to the small sample size. And it happens so because although the series for FDI has longer span, data for some control variables were limited in time. Further studies can remedy such issues by focusing on other countries or by using larger dataset if available –e.g. quarterly or monthly data. Moreover, by selecting specific industries, one can test whether or not FDI is monotonically linked to growth in different regimes using the resampling technique for Benin or other countries.

References

Akamatsu, K. (1962), "A historical pattern of economic growth in developing countries" *Journal of Developing Economies*, pp. 3-25

Asali, M. and Campoamor A. C. (August 2011) "On the effect of the FDI on the local human capital formation" https://www.uv.es/inteco/jornadas/jornadas8/PAPER9_campoamor_asali.pdf

De Mello, L. R (1999), "Foreign direct investment-led growth: evidence from time series and panel data", *Oxford Economic Papers*, vol. 51, 133-151

Durlauf, S. N., and P. A. Johnson P. A (1995), ''Multiple Regimes and Cross-Country Growth Behavior,'' *Journal of Applied Econometrics*, 10, pp. 365-384.

Fedderke, J.W. and Rom A. T. (December 2004), "Growth Impact and Determinants of Foreign Direct Investment into South Africa, 1956-2003", pp. 5-6

Hansen, B. E. (1997), "Inference in TAR models," *Studies in Nonlinear Dynamics and Econometrics*, vol. 2(1), pp. 1-14

Hansen, B. E. (1999). Threshold effects in non-dynamic panels: Estimation, testing and inference. *Journal of Econometrics* 93, pp. 345–368.

Hansen, B. E. (2000), "Sample Splitting and Threshold Estimation", *Econometrica*, vol. 68(3), pp. 575-603, http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators#

INSAE, Benin (2016), "principaux indicateurs sociodémographiques et économiques (RGPH-4, 2013)", *INSAE*, pp. 25

Lin, J. Y. (2012) "The Quest for Prosperity: How Developing Economies Can Take Off", *Princeton, NJ: Princeton University Press*, pp. 158-160

Lin, J. Y. and Treichel V. (2011), "Applying the Growth Identification and Facilitation Framework: The Case of Nigeria", *The World Bank* Working Paper Series 5776, pp. 17-18

Lin, J. Y. and Xu J. (June 2016) "Applying the Growth Identification and Facilitation Framework to the Least Developed Countries: The Case of Uganda" *Department of Economics and Social Affairs, CDP Background paper* No. 32, pp. 3

Moran, T. H.; Görg, H., Seric, A., and Krieger-Boden, C. "How to Attract Quality FDI?" *Leibniz Information Centre for Economics*, KCG Policy Paper, No. 2, pp. 3-6

Ramirez, M. (2000), "Foreign direct investment in Mexico: a cointegration analysis," *Journal of Development Studies*, vol. 37 (1), pp. 138-162.

Sidek, N. Z. M. (2012) "Estimating an Optimal Threshold Value for Foreign Investment in Malaysia" *IEEE Business, Engineering & Industrial Applications Colloquium (BEIAC)*, pp. 232-236

Verner, T. and Chudarkova S. "production function, human capital and selected countries of the European Union" *Recent Researches in Applied Economics and Management* - Volume I, pp. 382

Xu, J. and Hager-Loss, S. (August 2017) "Applying the Growth Identification and Facilitation Framework to Nepal" *Department of Economics and Social Affairs,* CDP Background paper No. 35, pp. 15

Appendix

Appendix 1: Calculation and proofs

- **Getting γ using equation (4)**

We have $E = (L.K.x^{\gamma})^{\theta}$

$$E_K = \frac{\partial E}{\partial K} = \theta L^{\theta} x^{\gamma\theta} K^{\theta-1} \text{ and } E_x = \frac{\partial E}{\partial x} = \theta\gamma L^{\theta} K^{\theta} x^{\gamma\theta-1}$$

$$\frac{E_K}{E_x} = \frac{\partial_x}{\partial_K} = \frac{\theta L^{\theta} x^{\gamma\theta} K^{\theta-1}}{\theta\gamma L^{\theta} K^{\theta} x^{\gamma\theta-1}} = \frac{x^{\gamma\theta} K^{\theta} K^{-1}}{\gamma K^{\theta} x^{\gamma\theta} x^{-1}} = \frac{x}{\gamma K} \rightarrow \frac{\partial_x}{\partial_K}\frac{K}{x} = \frac{1}{\gamma} \rightarrow$$

$$\boxed{e_{Kx} = \frac{\partial K}{\partial x}\frac{x}{K} = \gamma}$$

- **Getting e_{YK} and e_{YL} using equation (5)**

We have $Y = AL^{\alpha+\theta(1-\alpha-\beta)} K^{\beta+\theta(1-\alpha-\beta)} x^{\gamma\theta(1-\alpha-\beta)}$

$$Y_K = \frac{\partial Y}{\partial K} = [\beta + \theta(1-\alpha-\beta)] AL^{\alpha+\theta(1-\alpha-\beta)} K^{[\beta+\theta(1-\alpha-\beta)]-1} x^{\gamma\theta(1-\alpha-\beta)}$$

Pose $K_0 = AL^{\alpha+\theta(1-\alpha-\beta)} K^{[\beta+\theta(1-\alpha-\beta)]-1} x^{\gamma\theta(1-\alpha-\beta)}$

$$\frac{K}{Y} = \frac{K}{AL^{\alpha+\theta(1-\alpha-\beta)} K^{\beta+\theta(1-\alpha-\beta)} x^{\gamma\theta(1-\alpha-\beta)}} = \frac{1}{AL^{\alpha+\theta(1-\alpha-\beta)} K^{[\beta+\theta(1-\alpha-\beta)]-1} x^{\gamma\theta(1-\alpha-\beta)}} = 1/K_0$$

$$e_{YK} = \left(\frac{\partial Y}{\partial K}\right)\left(\frac{K}{Y}\right) = [\beta + \theta(1-\alpha-\beta)] * K_0 * 1/K_0 \rightarrow \boxed{e_{YK} = \beta + \theta(1-\alpha-\beta)}$$

Following similar steps as to above, we can show that: $\boxed{e_{YL} = \alpha + \theta(1-\alpha-\beta)}$

Appendix 2: Selection method for FDI target countries using GIFF step 1

Option 1: countries with per capita GDP 100-300% above that of the host country (H)

country	GDP per capita [current year]	Ratio [current year]	Average GDP growth [past 20 years]	Average growth manufacturing VA % of GDP [past 20 years]
Calculation: Ratio current year= [Per cap$_i$_CY/Per cap (H_CY)]*[2→4]				

Option 2: countries with per capita GDP similar to that of H 20 years ago

country	GDP per cap [20 years ago]	Ratio [20 years ago]	Average GDP growth [past 20 years]	Average growth manufacturing VA % of GDP [past 20 years]
Calculation/selection: Ratio 20 years ago= 1 ≤ [Per cap$_i$_20 ago/Per cap (H_CY) ≤ 1.5				

Shortlist of dynamically growing countries [overall GDP growth]

Rank/GDP av. growth	Countries	Average GDP growth [past 20 years]	Average growth manufacturing VA % of GDP [past 20 years]
Decision criterion: keep if average growth rate is greater than 6 over the last 20 years			

Shortlist of dynamically growing countries [share of manufacturing VA in GDP growth]

Rank/GDP av. growth	Countries	Average GDP growth [past 20 years]	Average growth manufacturing VA % of GDP [past 20 years]
Decision criterion: keep if average growth rate is greater than 6 over the last 20 years			

Findings

Countries with per capita GDP 100-300% above that of Benin	West Bank and Gaza, Myanmar, Lao PDR, Nigeria, Vietnam Uzbekistan, India, Cabo Verde, Angola
Countries with per capita GDP similar to that of Benin 20 years ago	Vietnam, India, Armenia, Uzbekistan, Cabo Verde, China Nigeria, West Bank and Gaza
Dynamically growing countries	China, Angola, Lao PDR, India, Cabo Verde, Vietnam, Armenia, West Bank and Gaza, Nigeria, Uzbekistan
Top 3 dynamically growing and most competitive in Manufacturing	China, India, Vietnam

Source: Authors' compilation, https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.KD

Cite this article:

Tozo, K. W. (2018). The Threshold Foreign Direct Investment under Application of the Growth Identification and Facilitation Framework: case of Benin. ***International Journal of Science and Business, 2*(3), 480-490. doi: https://doi.org/10.5281/zenodo.1323190**

Retrieved from http://ijsab.com/wp-content/uploads/265.pdf

Published by