

Investigating Spiralling Causality Between FDI and LSAs: The Case of Kenya

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Abstract—This study attempts to develop a framework within which any country can stimulate structural transformation and diversification in the economy and ensure a sustained economic development regardless of their natural endowments. In this regard, an attempt is made to shed light on the interaction between FDI spillovers and Location specific advantages of the host country, by developing a model which illustrates how FDI spillovers influences the competitiveness of the host country. Lastly, the case of Kenya was used for empirical test.

Keywords—*FDI Spillovers, LSAs, IDP, NF model*

I. INTRODUCTION

Developing countries are widely known for their comparative advantage in natural resources endowment but disadvantaged in terms of capital, knowledge and technological knowhow [1]. For instance, in 2016 extractive industries played a prominent role in developing economies, accounting for 20 to 30% of their Foreign Direct Investment (FDI) stock [2]. High returns from natural resources act as a disincentive for government in the developing world to invest in alternative economic activities which are central to sustainable development such as education and manufacturing [3]. Therefore, their economic development is mainly driven by inherited factors such as natural resources, making them not only the main source of revenue for their people's livelihood [4] but also one of the key decisive factors regarding FDI location choice to the developing world [5]. For instance 33% of the increase in FDI in 1987-1990 and 1995-1998 went to four oil producing countries in Sub-Saharan African (SSA) namely Nigeria, Angola, Republic of the Congo and Equatorial Guinea [6]. Theoretically, the reliance on inherited factors should decrease over time as the amount of FDI inflow increases given their widely accepted attributes as stimulus for productivity gains through the introduction of new processes and know-how, managerial skills, employee training and integration into the global supply chain [6]. This is also supported by the endogenous growth theory whereby spillover effects brought about by FDI contribute to the investment in human capital, upgrading of existing knowledge, and stimulating innovation within an economy [7]. Thus, the economic diversification and structural transformation would take place and induce high sufficient employment creation, reduced inequality, and considerable poverty reduction across developing world. However, this has not been the case for developing countries despite the increase witnessed in FDI inflow, they are still characterized with low productivity

growth due to heavy reliance on inherited factors and economic diversification and structural transformation is still limited [1]. Empirical studies have reported inconclusive and mixed results in regard to their effects in developing countries Bruno *et al* [8]. Carkovic *et al* [9] linked these conflicting results to methodological issues, while other studies such as Lipsey *et al* [10] and Blomström *et al* [11] linked this ambiguity to different level of absorptive capacity within the domestic economies. A number of empirical evidences have indicated that the effect of FDI on the host country's economic growth is contingent to the existence of certain conditions in the host country; Blomstrom *et al* [12] indicated that FDI effect is conditioned by the country's development level, Balasubramanyam *et al* [13] indicated that FDI effect depends on trade openness of the host economy, Borensztein *et al* [14] linked it to conditions of human capital in the host country, Alfaro *et al* [15] indicated that FDI effect is dependent to financial development, while Busse *et al* [16] and Adams *et al* [17] linked FDI effect to business environment of the host country. Clearly, it would be natural to argue that for economic diversification and structural transformation to take place and lead to a sustained development, inherited resources such as natural resources should be used to create and nurture necessary conditions up to a certain level, and this phase should precede the flow of FDI in the economy if their effect is to give rise to a sustained development. On the contrary, continuous heavy dependence on inherited factors has exposed developing countries to commodity price fluctuations and growth volatility as well as social tension and political instability [1]. Developing economies tend to take a rather different path to achieve competitiveness, they devote huge efforts and resources to attract foreign investors and expect the magic to happen! The central role of absorptive capacity for this to take place is always ignored or underrated.

The purpose of this study is to open the black box of the interaction between FDI and home base diamond, or more precisely location specific advantages (LSAs) of the host country to generate or improve its competitiveness, To illustrate this process, this study develops a three-path moderated mediation conceptual model framework whereby the effect of domestic factors on FDI through competitiveness depends on the level of FDI spillovers.

Lastly, this study will use the case of Kenya as a developing country to investigate the interaction of natural resources and FDI inflow given the conditions existing in its economy.

II. THE MODERATING EFFECT OF SPILLOVERS AND THE SPIRALING CAUSALITY

The presence of FDI in the host economy has been linked to externalities which can be identified and exploited to stimulate the enhancement and upgrading of indigenous knowledge and capabilities [18]. A number of empirical studies have established evidence in this regard. According to Rojec *et al* [19], the presence of a foreign subsidiary in an economy can indirectly increase the rate of technical change and technological learning in the host country through knowledge spillovers to indigenous firms. The study conducted by Zhang *et al* [20] revealed that the exposure of domestic firms to FDI best practices can greatly influence their capability by increasing their openness to learning and exploring new knowledge [20]. The same study suggested that wider range of variety of foreign firm practices can streamline the impact of the transmission channels in that they give rise to opportunities to learn from observation and imitation which result into greater variety of knowledge transmission via supply chains and labor turnover. Furthermore, as pointed out by Nielsen *et al* [21], the probability of a given company conducting FDI in a given foreign location is conditioned by the characteristics of: (1) the host economy, (2) the parent firm and (2) the interaction between the parent firm and the destination location.

For the domestic capability to be developed, the initial knowledge base and capabilities should be available in the domestic economy [22]. This is supported by the results of a study conducted by Escribano *et al* [23] which found that external knowledge flows have a positive and significant impact on innovation performance, yet, as the study asserted, the amount of benefits from external knowledge largely depends on the level of capability in the host country. The recent rapid rise of developing countries such as China has reaffirmed how spillovers from foreign firms can act as a springboard to economic development, this has also contributed to ease long held views of the presence of FDI in the host country as a threat to domestic investment [24]; instead, FDI are now viewed as vital source of advanced knowledge, technology, and capital [25].

Different economic actors in the host country are affected by FDI spillovers, these include local firms, universities, research centers and industry associations [18]. FDI generate spillovers that enhance the capabilities of domestic firms and human resources, therefore leading to capacity-building and rapid growth in the host economy as well as structural change and industrial upgrading [26]. This leads to argue that external knowledge inflict an enhancing effect on capability of the host economy, by first improving its internal knowledge base and further boosting its ability to recognize, assimilate and exploit external knowledge. With upgraded capability, the host economy can reap benefits of FDI spillovers and become capable of identifying and exploiting external knowledge to improve its competitiveness.

Initial FDI will mainly target primary commodities and natural resources, as well as other sectors which require intensive physical capital input and low quality labor. As the amount of FDI increases, there will be construction of better and appropriate infrastructure, development of local skills and

human capital in general, and emergence of new and diversified industries in the domestic economy. Furthermore, due to linkage established between local firms and foreign ones, the ownership advantage of local firms will be upgraded. The overall effect will lead to a diversified economy with upgraded competitiveness. Furthermore, the presence of FDI will put pressure on the host country to improve and strengthen its institutions. As a result, the location becomes an attractive destination for FDI. Basing on this, it can be reasonably argued that the relationship between FDI spillovers and LSAs is spiraling (snowball effect) with feedback loops. In other words, as more foreign affiliates establish themselves in a given location, the likelihood of more foreign affiliates targeting the same location increases; and as more foreign affiliates flow in, LSAs get even better; this process goes on over and over again in self-reinforcing fashion.

For illustration, Fig. 1 shows how competitiveness is generated by developing ACAP from knowledge base existing within the domestic diamond under the moderating influence of FDI spillovers, this result in further attraction of inward FDI with further spillovers. This process gives rise to a framework whereby FDI spillovers play a moderating role with spiraling causal relationship with the domestic diamond.

In Fig. 1, path C represents the direct effect of knowledge base on competitiveness while Path AB represents its indirect effect through ACAP. Both paths are moderated by the presence of spillovers in the economy brought about by the presence of FDI and denoted by red arrows.

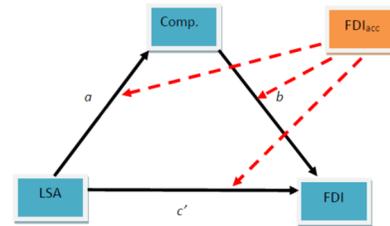


Fig. 1. Moderating Effect of FDI Spillovers (Spiraling Causality)

Where: *LSA* represent Location Specific Advantages, *Comp* represents Competitiveness, and *FDIacc* represent Accomplished. The black arrows illustrate mediation while red arrows illustrate moderation.

III. THE CASE OF KENYA

To validate the theoretical framework put forward in this study, the case of Kenya is used to examine how FDI spillovers influence further inflow of FDI with a moderating effect.

The used model consists of a moderated mediated model with a common moderator and a simple mediation model.

A. Model Specification and Hypothesis

The model can be estimated by the following two regressions:

$$\begin{aligned}
 M &= i_1 + a_1X + a_2W + a_3XW \\
 &+ e_M
 \end{aligned}
 \tag{1}$$

$$Y = i_2 + c'_1X + c'_2W + c'_3XW + b_1M + b_2W + b_3MW + e_Y \quad (2)$$

Where i_1 and i_2 are intercepts, e_M and e_Y are residual error terms. The effect of X on M is derived from (1) by grouping terms involving X and then factoring out X , resulting in:

H.1: under the moderation effect of spillovers from previously accomplished FDI inflow, with the presence of favorable LSAs, natural endowments in the host country influence the development and improvement of its competitiveness.

H.2: Under the moderation effect of spillover from previously accomplished FDI inflow, with the presence of favorable LSAs, competitiveness of the host economy leads to inflow of further FDI (snowball effect).

The combination of **H.1** and **H.2** leads us to the following third hypothesis:

H.3: There is a conditional indirect effect of natural endowments on further inflow of FDI through competitiveness under the moderation effect of FDI spillovers.

B. Methodology and Used Variables

To test our hypothesis, this study uses conditional process analysis, or conditional process modeling, which is used when the research goal is to understand and describe the conditional nature of the mechanism by which a variable transmits its effect on another and testing hypotheses about such contingent effects [27]. In this regard, our empirical test will be carried out using the Process tool developed by hay (Hayes, 2013). The Process tool has a number of benefits over normal regression tool such as mean centering, addresses heteroscedasticity problems, automatic computation of interaction and simple slopes analysis [28].

EFP, Herfindahl-Hirschman Product Concentration Index (HH), and their interaction under moderated influence of achieved FDI inflows were used to predict inflow of FDI.

Data were sourced from from World Development Indicators online database [29], online database of Global Footprint Network¹, the United Nations Commodity Trade Statistics Database (UN-COMTRADE) available through the World Integrated Trade Solutions (WITS) platform², and UNDP online database. The period under consideration ranged from 1970 to 2017.

To capture the environment factor in this process, a number of covariates were used. Our data were handled using the Two-step data transformation approach [30] to meet normality assumption and remove eventual outliers. To limit the issue of collinearity, variables were mean-centered by the PROCESS plugin [31]. To deal with heteroscedastic error

variance, heteroscedasticity-consistent inference method of HC0 (Huber-White) was used.

1) *Used variables:* This study uses the following variables:

Y: FDI inflow as a percentage of GDP (FDI). Data were sourced from

X: Ecological Footprint lagged by two years (EFP). Natural resources are known to be generally limited and biophysically constrained[32] as their loss through degradation and exploitation is irreversible. Natural resources are used to determine the Ecological Footprint which account for the dependence of an economy on natural resources [33], it is a measure of the human activities impact on the earth’s ecosystem.

M: Herfindahl-Hirschman Product Concentration Index (HH). This is a trade diversification indicator which measures the dispersion of trade value across an exporter’s products. A fall in this indicator’s value indicates the diversification in the exporter’s trade profile. This index can be expressed as:

$$\frac{\sum_{k=1}^{n_i} \left(\frac{x_{ik}}{X_i}\right)^2 - \frac{1}{n_i}}{1 - \frac{1}{n_i}} \quad (3)$$

Where: X is the total value of exports from reporter i , x is the value of exports of product k from country i , and n is the number of products exported by country i .

Herfindahl-Hirschman Product Concentration Index ranges from 0 to 1; a higher index indicates a low level of diversification, while a low index close to zero indicates a high level of diversified export portfolio.

W: Accomplished FDI (FDIacc). This variable consists of FDI inflow lagged by one year.

Rewriting (1) and (2) plugging in the variables of our model, we obtain:

$$HH = i_1 + a_1EFP + a_2FDIacc + a_3EFP.FDIacc + e_{HH} \quad (4)$$

$$FDI = i_2 + c'_1EFP + c'_2FDIacc + c'_3EFP.FDI_{acc} + b_1HH + b_2FDIacc + b_3HH.FDIacc + e_{FDI} \quad (5)$$

Where: *EFP* denotes Ecological Footprint, *FDIacc* denotes accomplished foreign direct investment, *HH* denotes Herfindahl-Hirschman Product Concentration Index; i_1 and i_2 are intercepts, e_{HH} and e_{FDI} are residual error terms.

2) *Covariates (lagged by one year):* Inflation, consumer prices (annual %); Air transport, registered carrier departures worldwide; Electric power consumption (kWh per capita); Trade Openness (Trade as % of GDP); Human Development Index (HDI); Net official development assistance and official aid received (constant 2015 US\$); GDP growth (annual %); and Fixed telephone subscriptions (per 100 people)

3) *Dummy variables:* To reflect on stability of the country which may have an influence on its economic performance and inflow of FDI, this study developed three dummy variables³:

- War and Conflicts,

¹Data are available at: www.footprintnetwork.org

²Available at: <https://wits.worldbank.org/Default.aspx?lang=en>

³This dummy variable was constructed using data available at <https://www.bbc.com/news/world-africa-13682176> and <https://www.ft.com/content/e5eaff30-5376-11e3-b425-00144feabdc0>

- Election and other major political events
- Unrest and instability

The variable of War and Conflicts was designated as the dummy variable of reference.

C. Test Results and Discussion

The empirical test has revealed the following findings:

1) Outcome variable: HH (Herfindahl-Hirschman Product Concentration Index)

Path: $\theta_{X \rightarrow M} = \alpha_1 + \alpha_3 W$

The overall model is significant: $F(13,24)=10.81$, $p<0.01$, $R^2=67\%$; meaning that 67% of variance in HH is due to the predictors in the model. However, their interaction was not significant.

Significant relationships:

Elections and other major political events were found to be negatively related to HH with significance, $b=-0.05$, $t(24)=2.58$, $p=0.0164$ ($p<0.05$). This implies that the increase in the number of elections and other major political events lead to a decrease in the value of HH, i.e. increase in economic diversification. This may be due to the fact that the ruling party always tries to do more to stimulate economic growth when elections are approaching or any other political event which requires people's support. This may include launching new projects, or putting in place new investment promotion initiatives.

Unrest and instability positively predicted HH with significance, $b=0.04$, $t(24)=2.31$, $p=0.0300$ ($p<0.05$). This implies that increase in the value of this variable leads to less diversification in the economy. Understandably, unrest and instability in the country pose a significant impediment to its economic activities and setback to its progress.

Inflation was found to be positively related to HH with significance, $b=0.06$, $t(24)=2.38$, $p=0.0254$ ($p<0.05$). This implies that increase in the value of inflation leads to less diversification in the economy. Indeed, inflation can have negative consequences on business competitiveness by making exports prices less competitive in world markets leading to a decrease in export orders. As a result, there will be limited incentives to make new investment. Furthermore, a high inflation causes uncertainty among investors which may lead to a lower level of capital investment spending. Lastly, inflation may triggers increase in the cost of borrowing acting as a disincentive for new investment ventures.

Trade openness was found to be negatively related to HH with significance, $b=-0.43$, $t(24)=-2.68$, $p=0.0131$ ($p<0.05$). This implies that the increase in value of trade openness increases the diversification in the economy. first, this is due to the fact that increase in trade acts as an investment incentive. Second, the knowledge imbedded in traded goods and services spills over to the host country, giving rise to new investment avenues.

Human Development Index was found to be negatively related to HH with significance, $b=-2.26$, $t(24)=-2.83$, $p=0.0093$ ($p<0.05$). Understandably, long and healthy life, access to knowledge and a decent standard of living lead to

improved and upgraded knowledge and capability which in turn contribute to competitiveness of the country.

Fixed Telephone was found to be negatively related to HH with significance, $b=-0.11$, $t(24)=-2.68$, $p=0.0130$ ($p<0.05$). As Fixed Telephone proxied technology, it is clear that technology improves competitiveness of the economy by increasing its level of diversification. Indeed, new technology gives rise to new investment avenues while improving efficiency in the existing ones.

Energy Consumption was found to be positively related to HH with significance, $b=1.12$, $t(24)=2.63$, $p=0.0146$ ($p<0.05$). This ambiguous relationship may suggest inefficiency in energy consumption.

2) Outcome variable: FDI

The overall model is significant: $F(15,22)=4.65$, $p<0.01$, $R^2=42\%$. The interaction between the EFP and the moderator added an addition of $R^2=0.09$ above the main effects with significance ($p=0.0058$); while the interaction between HH and the moderator added an addition of $R^2=0.04$ above the main effects with significance ($p=0.0094$);

Significant relationships:

Accomplished FDI was found to be positively related to new inflow of FDI, $b=0.27$, $t(22)=-2.30$, $p=0.0323$ ($p<0.05$). Indeed, the presence of foreign firms in a country removes uncertainty for other foreign potential investors, they know what to expect. In addition, the presence of foreign firms may incite the government to improve its investment climate and regulations so as to retain these investors. As a result, the investment climate becomes more attractive to further inflow of FDI. Lastly, in virtue of agglomeration theory, other foreign firms may be attracted to that location to take advantage of different benefits and facilitations generated as a result of other foreign investors operating in the area.

Unrest and instability were found to be negatively related to new inflow of FDI, $b=-0.68$, $t(22)=2.53$, $p=0.0488$ ($p<0.05$). Understandably, unrest and instability cause significant damage and loss to business operators; thus, the increase in the frequency of unrest and instability scares away foreign investors.

Fixed telephone was found to be negatively related to FDI inflow, $b=-1.57$, $t(21)=-3.30$, $p=0.0033$ ($p<0.05$). This relationship may seem ambiguous; however, new technology brings with it new capability and new investment avenues. This gives rise to new domestic investors who take over businesses previously occupied by foreigners. This exerts a crowd-out effect on foreign investors given that technology is no longer their exclusive ownership advantage.

Finally, both interactions were significant: The interaction of EFP with FDI, $b=-6.11$, $t(22)=2.00$, $p=0.0058$ ($p<0.05$); the interaction of HH with FDI, $b=-5.26$, $t(22)=-2.85$, $p=0.0054$ ($p<0.05$).

The slopes of EFP and HH predicting FDI inflow at each level of accomplished FDI inflows reveal the followings:

$$a) \text{ Path: } \theta_{X \rightarrow Y} = c'_1 + c'_3 W$$

Focal predictor: EFP;

Moderator: accomplished FDI inflow

The simple slope shows a downward trend of the effect of EFP on new inflow of FDI under the increasing moderation level of accomplished FDI;

For low level of accomplished FDI inflow, EFP $b=7.11$, $t(22)=1.67$, $p=0.1083$ ($p>0.05$); there is no significant relationship between EFP and new inflow of FDI;

For average level of accomplished FDI inflow, EFP $b=2.90$, $t(22)=0.68$, $p=0.5055$ ($p>0.05$) there is no significant relationship between EFP and new inflow of FDI;

For high level of accomplished FDI inflow, EFP $b=-1.31$, $t(22)=-0.28$, $p=0.78$ ($p>0.05$), there is a negative significant relationship between EFP and new inflow of FDI.

Johnson-Neyman significance region(s) indicates that the point of significance ($p<0.05$) is situated below 0.1824 level of accomplished FDI inflow below the mean.

$$b) \text{ Path: } \theta_{M \rightarrow Y} = b_1 + b_2 W$$

Focal predictor: HH;

Moderator: accomplished FDI inflow

For low level of accomplished FDI inflow, HH $b=-0.20$, $t(22)=-0.09$, $p=0.9283$, there is no significant relationship between HH and new inflow of FDI;

For average level of accomplished FDI inflow, HH $b=-3.83$, $t(22)=-2.02$, $p=0.0560$, there is no significant relationship between HH and new inflow of FDI;

For high level of accomplished FDI inflow, HH $b=-7.46$, $t(22)=-3.19$, $p=0.0042$, there is a negative significant relationship between HH and new inflow of FDI.

Johnson-Neyman significance region(s) indicates that the point of significance ($p<0.05$) is situated above 0.0212 level of accomplished FDI inflow above the mean.

3) *Direct and indirect effect:*

a) *Conditional direct effect(s) of X on Y:*

b) $EFP \rightarrow HH \rightarrow FD$

The simple slope shows a downward trend of effect of EFP under the increasing moderation of accomplished FDI, however, it failed to show any significant effect, this may be because of the size of the used sample since the Johnson-Neyman significance region(s) indicated the point of significance which is situated below 0.1824 level of accomplished FDI inflow below the mean. The simple slope reveals the followings:

For low level of accomplished FDI inflow, EFP $b=7.11$, $t(22)=1.67$, $p=0.1083$, there is a no significant relationship between EFP and new inflow of FDI;

For average level of accomplished FDI inflow, EFP $b=2.90$, $t(22)=0.68$, $p=0.5055$, there is no significant relationship between EFP and new inflow of FDI;

For high level of accomplished FDI inflow, EFP $b=-1.31$, $t(22)=0.68$, $p=0.0071$ ($p<0.5055$), there is no significant relationship between EFP and new inflow of FDI.

c) *Conditional indirect effect(s) of X on Y:*

d) $EFP \rightarrow HH \rightarrow FD$

The slopes of conditional indirect effects failed to reveal any significant effect. This is typical for developing economies which fail to boost their attractiveness to foreign investors by improving their competitiveness within the country. As a result, to retain existing FDI while attracting others, developing countries have to grant them substantial incentives and preferential treatments at the expense of the local economy and investors.

The above findings indicated that FDI spillovers are not contributing to the improvement of competitiveness. Also, the results reveal that FDI inflow may lead to a crowd-out effect on domestic if increased up to a certain level.

IV. CONCLUSIONS

In today's economy, competitiveness is central to any country's sustained development. The era where abundant natural resources were considered as a source of competitiveness and prosperity of a nation is long overdue. This study demonstrated how developing economies which are heavily dependent on natural resources can generate competitiveness by instigating the structural transformation and diversification of the economy.

This study attempted to open the black box of the interaction between FDI and location specific advantages, by developing a model which illustrates how FDI spillovers influences the competitiveness of the domestic economy by moderating LSAs and their spiraling causal relationship with feedback loops, giving rise to cumulative or snowball effect on the host country competitiveness.

Lastly, this study used the case of Kenya to empirically investigate how natural endowments influence further inflow of FDI through competitiveness under the moderation effect of FDI spillovers. The findings revealed that the path adopted by Kenya to attract FDI do not lead to sustained growth, thus retaining existing FDI while attracting further more may prove to be quite challenging for Kenya. The test results also indicated that the increase in FDI inflow may lead to a crowded-out effect.

By shedding light on the interaction mechanism between FDI and existing factors in the domestic economy, this study can be useful by policy makers and researchers, specifically in the developing world, to review their policies toward FDI if the later are to stimulate sustained growth through competitiveness. In addition, it can be used to understand why the inflow of FDI has so far failed to boost their competitiveness to their expectation.

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