

FOREIGN DIRECT INVESTMENT AND THE MATCHING CONCEPT: DEVELOPING MODEL ON DOWNSTREAM EFFECT

Yitbarek Takele, PhD

Addis Ababa University, Ethiopia

Adewale Adeniyi-kie, (MBA)

Bahir Dar University, Ethiopia

Abstract

The attractiveness of FDI to a particular location are reflections of perceived benefits which will aid the FDI and the Host community ability to achieve their various objectives which can be captured by examining the characteristics exhibited by the many stakeholders contributing to economic development of the location and also the goals of the investment. Studies of FDI and Host countries at microeconomic levels reveal the intricate interactions between the sectors. More importantly, the downstream study of the elements making up the country reveals the structure of the FDI and Investments and the interactions between the varying factors across the whole country though such studies are lacking in the extant literature. This paper attempted to develop a model at the downstream level which can capture FDI and investment situation using the matching concept which have not been done so far.

Keywords: FDI, Matching Concept, Downstream Effect

Introduction

Extensive studies on FDI at macro levels have always benchmarked countries against other seemingly developed economies. Progresses of countries like Ethiopia, USA, Ghana, Venezuela, China etc. are measured by computed scales of aggregates which tend to ignore years of experiences and events related to each country present status, thus presenting varying contradictory results. On the above, Blonigen and Wang (2005) argued that inappropriate pooling of data from developed and developing countries was responsible for contradictory empirical results of the effect of FDI. Besides, Velde (2005) noted that the impact of FDI at macro level is not homogeneously positive or negative as this depends on the FDI type, firm

characteristic, economic condition and policies which were notably different from country to country.

Though the heterogeneous nature of the pooled countries and FDI were revealed through various micro-level studies (for examples Haddad and Harrison, 1993; Aitken and Harrison, 1999; Mortimore, 2004; Garcia-Santana, 2011; and so on). There are still elements of aggregation which does not consider the downstream micro-level effects of the different regions/states making up the whole country. These downstream elements are also generally different across countries, revealing varying interrelationships between different entities contributing to the economic growth of each region/state vis-à-vis the country as a whole.

Evidently, since the characteristics features of individual country's regions/states vary in their overall Policies and factors operating in the country as a whole, the reaction of different FDIs towards each region/state also varies based on the heterogeneous characteristics associated with the FDIs themselves.

The heterogeneous characteristics of FDIs can be captured by the objectives of the same. These objectives according to the Ethiopian Government Proclamation are to make a profit. Though, Lall and Streeten (1977) noted that there are some FDIs which have nothing to do with profit, even then, these FDIs still have objectives which invariably have some effect on the economic growth of the location where they are found or plan to operate. Some of the characteristic features within a location that might be sought by FDIs and other Investments alike include the Local Market size, proximity to Regional and Global markets, Human Capital Development, available local inputs and so on – features which can help the FDI improve upon its profits. Similarly, the region/state within the country and generally the country as a whole are known to desire characteristic features which prospecting FDIs possesses. The objectives that policies, actions and attitude of government towards FDIs and other investments are to achieve are pointers to the kind of relationship that often exist between the parties and other stakeholders that relates to the economic contributions of the region/state elements within the country. The situations aforementioned are typical of many of the developing nations. In the case of the Ethiopian Government for example, the Government objectives can be derived from the Growth and Transformation Plan (GTP) which has influence on the different Proclamations and attitudes of the Government and her agencies at various levels. These Proclamations and GTP are further influenced by the unique features present in each of the regions that make up the country.

The Matching Concept and Downstream Effects

The above situation between the FDIs and the region/state elements of the country can be explained by the ‘matching model concepts’ as follows:

1. FDIs seek locations with characteristics or combination of features which when matched can help achieve their set objectives
2. States/Regions within a country or a country at large with an objective in which there are roles to be played by FDIs and other investments makes laws and set environments conducive for the type of investments which will enhance the capability to achieve their set objectives.
3. In both cases above, the parties (FDIs and State/Region) herewith called, ‘Actors’ have features or combination of features (characteristics) at levels which can be beneficial (considered as *transferable utility*) to the others parties’ set objectives.
4. Where the *transferable utility* or features are not up to the desired levels the FDIs or other Investments may choose to enhance portions of the same which will enhance the capability to achieve her set objectives.

The matching model between the FDIs and the State/Region within a Country (for example Amhara National Regional State, ANRS of Ethiopia) are depicted in the concept diagram below.

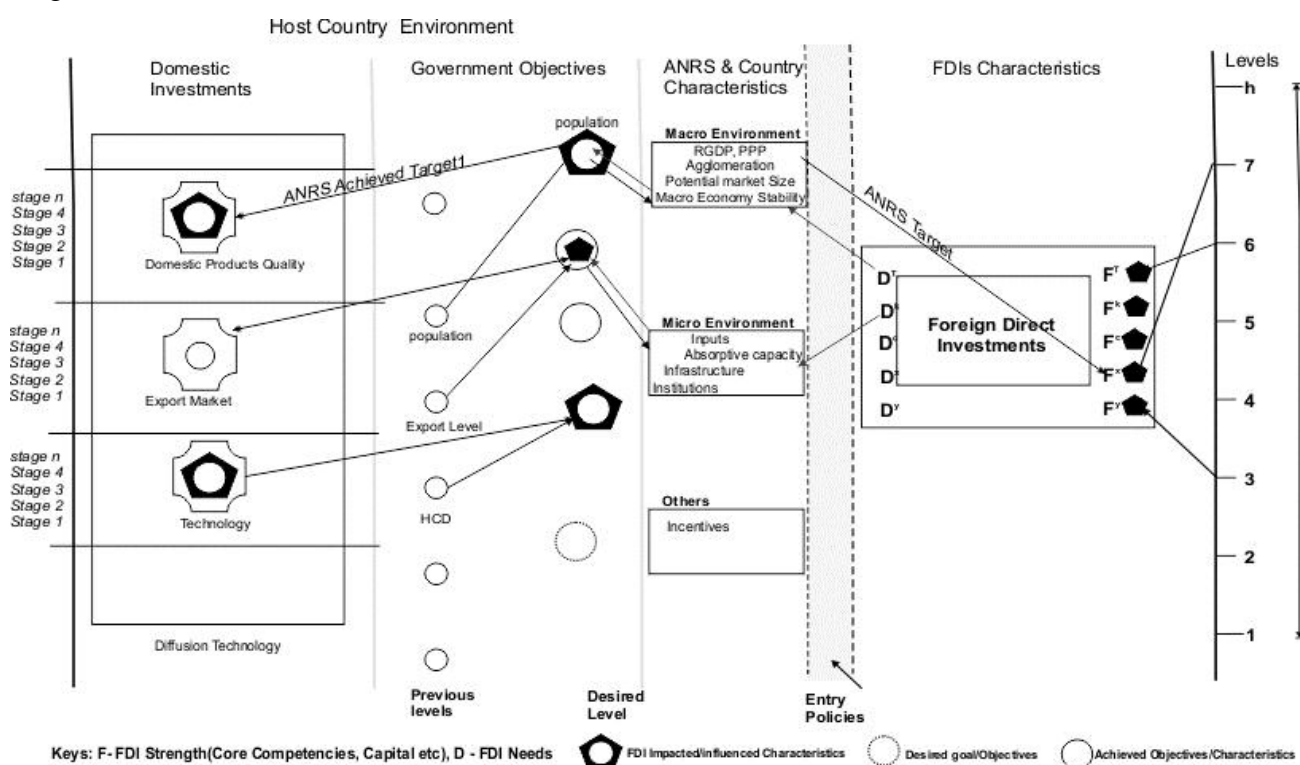


Figure-1. The matching model between the FDIs and the State/Region within a Country (Case of ANRS in Ethiopia and FDIs)

Rationale for Benchmarks and Matching Model

For Matching to take place between the Governments, the FDI's, the Domestic Investments and other Actors find desirable in each other or the overall system operating within the country. If the factors desired by the actors are not present within the country, the FDI's may look for other states/regions or countries with elements desirable to them while the Domestic Investments operating within a country might have to either look for other regions/states, close business or engage in Businesses which suit their objectives. For the Country or Government however, FDI's or domestic Investment which does not have elements which are suitable for their objectives are either blocked from operating or stringent conditions are set for them to be operating within the country, while various incentives are used to encourage and promote investments which promotes Government Objectives. But it must be noted that there are situations where in spite of Government stringent conditions or non-availability of factors that might affect the productivity or objectives of the investments, FDI's may still undertake Investments within a country after weighing of relevant factors and the factors that are not up to the quality desired by them are upgraded to the required standard. This of course can be the basis for technology transfer which is beyond the scope of the study.

Illustrating the Rationale: The Case of the Ethiopian Government

From the GTP the Ethiopian Government desire to earn more Foreign Exchange, increase employment amongst others, hence the targeting of firms with large capacity, to firstly export most of its products and employ large number of manpower; The FDI or Investment firm on the other hand, may be looking for Access into the Regional or Global Market for which Ethiopia on the basis of macroeconomic stability, local raw material inputs amongst other factors tend to be favorable but the level of quality of the skilled manpower is not as desired by the company. The Company might weigh the value of their Regional or Global Access objectives against this 'possible shortcoming' and still seek entrance into the specific region/state or the country. The foreign firm or Investment can then take up the responsibility of 'Regular Retraining of Manpower' shaping them into levels of workforces required to meet its own targeted objectives of firstly production and then the other objective of accessing the Regional or Global Market.

Model Presentation

Based on the above scenarios the researcher rationalized that various conditions exist which warrants the different formation of the same model whose end is to produce outputs at certain level or standard for the Global or Regional Markets. Hence the same model is

presented under various conditions of the desirability of elements based on factors weighing of the different actors:

Where All Elements are as desired by all Parties

$$\exists G \in (GPDT_{Access}, Gphy_{infrast}, Glocal_{laborqual}) \equiv \exists FDI \ni (PDT_{Access}, phy_{infrast}, local_{laborqual}) \tag{Eqn. 1}$$

The above equation can be read as follows; **There exist** in Government or region/state Elements (Efforts) $GPDT_{Access}$, $Gpy_{infrast}$ and $Glocal_{laborqual}$ (Product Access to Regional and Global Market, Infrastructure and Local Labor Quality) Equivalent to FDI Contained Desire or Need denominated by PDT_{Access} , $phy_{infrast}$, $local_{laborqual}$. The aim of the Government from the previous example is to optimize what she has, improve upon it, so that she can attract the ‘Best Fit’ to meet her overall desire namely meeting the set objective(s) – ‘accelerate the economy of the country.’ *Eqn. 1* can be considered as a stable and pure situation which is equivalent to the Becker-Shapley-Shubik model of matching under transferable utility. The same logic applied to the FDIs seeking all elements found within the country. The same argument also explains why FDIs also seek Developed Economic or Nations to set up business.

Where Some Elements are Not as desired by Actors

$$\exists G \in (GPDT_{Access}, Gphy_{infrast}), \nexists Glocal_{laborqual} \cong \exists FDI \ni (PDT_{Access}, phy_{infrast}, local_{laborqual}) \tag{Eqn. 2}$$

In this situation as hypothesized previously, once the FDI firm can see that Matching can take place if and only if the labor quality $Glocal_{laborqual}$ which does not exist can be improved upon, the firm will set up shop in the country and work on ‘Regularly’ developing the skill through retraining, mentorship etc. of the labor to the quality it desires. The implication of Eqn. 2 finds bearing on the work of Chiappori-McCann-Nieshem (2010) mentioned earlier and can be considered as matching with imperfect transferable utility.

Transferable Utility & Downstream Effects

The implication of the above models is that the objectives of all Actors through their interaction will almost always lead to Transferable Utility as there always exist individual utilities in the process of transformation of factors. The implication is finding a measure h on $X \times Y$ such that the marginal of h are F and G and h solves the following;

$$Max_h \int_{X \times Y} s(x, y) dh(x, y) \tag{Eqn. 3}$$

For Dual functions $u(x)$, $v(y)$ the above function becomes;

$$\underset{u,v}{\text{Min}} \int_X u(x) dF(x) + \int_Y v(x) dG(y) \quad \text{Eqn. 4}$$

Under the constraint

$$u(x) + v(y) \geq s(x, y) \text{ for all } (x, y) \in X \times Y$$

Where, X and Y are Labor, infrastructure, Market Size or other factors that might affect the FDI within the country and u and v are derivatives or added utility that might be performed at the minimal level by any of the Actors for suitability of their objectives.

The measure of the above transformation or desirability of factors can be measured either by consideration of the financial activities involved in the transformation or the benefits that arose from such activities at each firm or Actors' levels. But obtaining such intrinsic firm-level records are difficult and such data may not fully quantify the *utile* derived or processes involved at arriving at choice of decision, the best option involves using primary survey which can be captured by qualitative data (see. Rao *et al.*, 2003)

Making the Model More Robust: Applying Cobb-Douglas Production Function

The above model and all the relevant variables can be captured using Total-Factor Productivity (TFP) which according to Economics, accounts for effects in total output not caused by inputs. In so doing, it is assumed that the total output of a country comes from contributions of the FDI, Domestic Investments, Government or Public Investments and so on.

The models above can be considered in terms of Cobb-Douglas in eqn.5 where total output (Y) represented function of total-factor productivity (A), capital input (K), labor input (L), and α is the capital input share of contribution. The implications here as a rationale above are that an increase in either A , K , L will result in increased output. Further to the above, total-factor productivity can be improved through technology, knowledge and absorptive capacity of the employees and other intrinsic factors proxy by Human Capital Development, Absorptive Capacity, Research & Development and so on.

$$Y = A \times K^\alpha \times L^{1-\alpha} \quad \text{Eqn. 5}$$

The Cobb-Douglas equation above can be written in the natural logarithm form which as follows:

$$\ln Y = \ln A + \alpha \ln K + (1 - \alpha) \ln L \quad \text{Eqn. 6}$$

The above represents the aggregate output of a country. This aggregate can be decomposed into Outputs (denoted by y_{rs}) for each of the regions (r) and Sectors (s) within the same country. These outputs added together form Y aggregate – a logic that can be used for testing and confirming the internal consistency of the data. Further to these for measurability various variables are denominated as a ratio of the relevant annual and average Real Gross Domestic Product, RGDP²⁰ of the country.

Hence,

$$Y = y_1 + y_2 + y_3 + y_4 + y_n + \varepsilon \quad \text{Eqn. 7}$$

Where y_1, y_2, y_3, y_4 and y_n represent the outputs from each region of the country and ε is included to compensate for any other unknown factors or noise that might affect the output.

Also, it should be noted that the composition of every outputs from each region came from both FDIs and Domestic investments which is inclusive of the Public Investments by Government. Different factors have varying effects on the different investments mentioned above affecting their reactions to such factors. Hence, the aggregate output (Equation 7) at the national and regional levels can be rewritten as;

$$Y = \sum_{\theta=n}^{\theta=1} \theta (FDI_y + DomI_y) \quad \text{Eqn. 8}$$

Where θ , can be considered as a composite of all factors affecting actors in the region and the country as a whole.

Deriving the Benchmarks

As mentioned above, the effect of a factor θ can vary from region to region for different sectors based on the varying characteristics for which a particular region have abundance compared to another. This situation helps us to understand the degree and how the region reacts to θ . Hence, to understand the factors that affect Amhara Regional State's FDI and Technology Diffusion, the Benchmark for Amhara Region can be derived from the benchmark of the country, through cross-tabulation of Amhara with other regions that are noted to be attracting FDIs within the country. Comparing the values of the different factors in relation to GDP across the major regions that were noted for attracting FDIs exposes the strengths and weaknesses of each enabling the identification of the extent of the same factors within the regions. Understanding the extent of effect helped in denominating how the factors affected the sectors, industries and firms.

²⁰RGDP: The measurement of the value of all goods and services produced in a period less goods and services consumed in the production process during the same period.

Therefore, the benchmark for a give state/region can be captured by the following model as follows;

$$\text{National_Investment} = \beta_0 + \beta_1 \text{DOMINVEST_capital}_{rst} + \beta_2 \text{FDI_capital}_{rt} + \beta_2 \text{Humancapital}_{rt} + \text{NIncentives}_{rt} + \varepsilon_1 + \varepsilon_2 \quad \text{Eqn.9}$$

Where r is region, s is a particular sector and t is the year.

Effect of Operational Investment Types & Sectors in Real GDP

Understanding that approved FDI data according to sectors revealed what sectors FDI and Government are interested in, the size of investments and the capital committed can be used as indicators for measuring level of commitment. Also level of risks (for example in new factory construction, training and transfer of ‘core competencies etc. to local employees) such Investments are willing to take within the region or country over long periods is also a proxy for commitment. The researchers rationale that the analysis based on the above presents a bigger picture of the FDI situation or ‘Process-to-factor relationships which can be extended beyond those of approved or FDI inflows. Hence, for robustness of the analysis, it became imperative analyzing FDI and other investments at Operational²¹ stage. Further for robustness, the investments in operating stage in the previous year will continue contributing to the RGDP for the following year until they stopped existing in the system – country, region or sector. Conversely, factors such as the capital base of an investment, Government Policies, and so on may change but this does not change the previous years’ contributions made by such sector, firm or industry, only the present and future year RGDP contributions will be affected. Drawing from the model presented in equation 8 the above presuppositions can be captured as follows:

$$gdp_{nxyz} = r_1 K_0 + r_2 (K_1 + K_0) + r_2 (K_2 + K_1 + K_0) \dots + r_n (K_{n-1} + \dots K_2 + K_1 + K_0) + \varepsilon_n \quad \text{Eqn.10}$$

Where “ gdp_n ” is the Real GDP contribution for year “ n ” (e.g. 2003, 2004, 2007) in region “ x ” by sector “ y ”, investment type (Domestic or FDI) “ z ”. While “ r ” denoted the Effect or fraction contributed to year “ n ” RGDP by factor (or aggregate of factors) “ K ” and ε is account for any white noise or effects that cannot be quantified for year.

NB: K_n can be affected by incremental or decremented changes making its value become $K_n \pm dK$.

²¹ The aggregate of ‘Under-Implementation’ and ‘Operating’ Investments that contributed to the regions’ or country’s RGPD through Implementation of plans, operations and processes involving resources (e.g. capital) commitment.

Conclusion

By and large, in this research piece an attempt has been made to develop a model on downstream effect of FDI by applying the matching concept. The model tried to capture all relevant variables by presenting a real case in the Ethiopian scenario. The original model has been relaxed and expanded by incorporating the concept of transferable utility and the Cobb-Douglas production function. Besides, the benchmark for the states has been derived and the effects of operational investment types and sectors on real GDP get captured making the model more comprehensive and flexible. Therefore, it can be claimed that this research contributed significantly to the existing body of knowledge.

References:

- Assaf Razin and Efraim Sadka. (2007). *Foreign Direct Investment: Analysis of Aggregate Flows*. Princeton, NJ: Princeton University Press.
- Bhattacharjee, A. (2012). *SOCIAL SCIENCE RESEARCH: PRINCIPLES, METHODS, AND PRACTICES*. Florida, USA.
- Brainard, S. L. (1993). An Empirical Assessment of the Proximity-Concentration Tradeoff between Multinational Sales and Trade. *NBER Working Paper, 4580*.
- Garcia-Santana, M. (2011). Cross-Country differences in size distribution of firms and importance of FDI. *Vigo Workshop on Dynamic Macroeconomics*.
- Haddad M. and Harrison .A. (1993). Are there positive spillovers from direct Foreign Investment? Evidence from panel data for Morocco. *Journal of Development Economics, 42*, 51-74.
- Lall, Sanjaya and Streeten, Paul (1977). Foreign investment, transnationals, and developing countries quoted in Markusen and Venables (1997). Westview Press (Boulder, Colo.)
- Mortimore, M. (2004). The Impact of TNC strategies on Development in Latin America and the Caribbean. *In D.W te Velde ed. (2004)*.
- Nora Dudwick, Kathleen Kuehnast, Veronica Nyhan Jones, and Michael Woolcock. (2006). *ANALYZING SOCIAL CAPITAL IN CONTEXT: A Guide to Using Qualitative Methods and Data*.
- Rao, Vijayendra and Woolcock, Michael. (2003). *Integrating qualitative and quantitative approaches in program evaluation*. New York: Oxford University Press.
- Te Velde, D. W. (2006, January 30). *Foreign Direct Investment and Development, An historical perspective*. UNCTAD, Overseas development Institute.