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The Contribution of Foreign Direct Investment to Exports

An Empirical Study of 23 LDCs

by Gladson Nwanna, Baltimore*

Insufficient capital and foreign exchange have often been portrayed as key constraints to the growth and development of less developed countries. These economies have thus come to rely on foreign direct investment as a means of increasing their capital base and foreign exchange reserves and, via the operation of foreign subsidiary firms, as a strategy for increasing the production not only of locally consumed commodities but also of exports. This article focuses on the latter aspect.

U nable to generate sufficient savings and investable funds internally, the economies of the less developed countries have come to depend more and more on capital inflows. Despite the controversies surrounding some of the inflows (both private and public, direct and indirect), there is no indication that the flows have ceased. Rather, we occasionally find relative shifts or changes in foreign capital inflow from one receptor country to the other, and from one donor or investing country to the other. These shifts, however, often reflect changes in the sources of inflows (private or public), in the timing or form of inflows (for example, direct and portfolio investments, grants, loans and other aid). Essentially, the flows continue.

As part of a development strategy, LDCs have also come to rely on capital inflows, especially those that take the form of direct investment, as a means of increasing the production of locally consumed commodities as well as export commodities. Increased exports and a corresponding reduction in imports, LDCs believe, will generate foreign exchange and further facilitate economic growth and development. It is not clear, however, from the available evidence how great a real contribution is made by foreign direct investment (FDI) towards increasing exports in LDCs. Most LDCs are still faced with a multitude of economic problems, some of which include declining production, declining exports and export revenues, as well as dwindling foreign exchange reserves. This study examines the export generating role of capital inflows. Specifically, it is the primary objective of this study to examine empirically the contribution of foreign direct investment to exports in developing countries, using a sample of 23

less developed countries. Both the direction of the impact of such inflows on exports of goods and services, as well as the magnitude of the impact, will be examined.

Empirical Evidence

There is a wealth of studies in the literature on economic development focusing on foreign capital inflows and their effects on both the receptor (host) and donor (home) countries. Similarly, a considerable number of these studies, apart from focusing on the impact of some forms of these inflows (for example, foreign direct investment) on the host country, have also dealt with developed countries (DCs) and less developed countries (LDCs) alike. The studies that have dealt with the LDCs as hosts to foreign capital inflows, usually in the form of direct investment, have for the most part taken a country by country approach. They have also focused mostly on the effects of such inflows on economic growth and development via their effects on key macroeconomic variables, in particular investment, savings and imports. Little effort has been made to measure explicity and directly the impact of foreign direct investment on exports in developing countries.

In 1977, however, Van Loo[1] examined the effect of foreign direct investment on investment in Canada, employing a system of equations that included an export supply equation. He found FDI to have a negative effect. In 1982 O'Sullivan[2] carried out a similar study of the impact of FDI on the economy of Ireland. He also

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[1] Frances Van Loo: The Effect of Foreign Direct Investment on Investment in Canada, in: Review of Economics and Statistics, Vol. 59, No. 4, September 1977.

employed a system of equations that included export supply as a dependent variable and FDI as an explanatory variable. In contrast to Van Loo's results, O'Sullivan found a positive effect. In 1984, yet another study was carried out along these lines by the present author, in which he examined the impact of FDI on investment in Nigeria. The result turned out negative, although statistically insignificant.

In all of these studies, the capital inflow effects on exports are examined only superficially with no attempt made at a detailed analysis of the effect on LDCs as a group. Moreover, the few studies mentioned above do not provide a clearer understanding of the real direction or the magnitude of the effect. The present study, however, deviates from previous ones in that it examines more directly, and measures more explicitly, the contribution of FDI to exports of goods and services from LDCs, and incorporates not only an aggregate analysis but also a country by country test. In addition it uses a larger sample of less developed countries.

Method and Sources

Two related hypotheses are tested empirically:

☐ that FDI has a net negative effect on exports from LDCs, in other words, that FDI has not contributed positively to exports, as casual empiricism might lead one to conclude from the experiences of declining exports in recent years;

☐ that the magnitude of the effect of FDI on exports varies from one LDC to another.

The primary interest in the test results is focused on the performance of the regression coefficient for the direct investment variable (β_{13}). A positive coefficient sign will result in the rejection of the first hypothesis and the acceptance of the alternative hypothesis. A coefficient value significantly different from unity will result in the acceptance of the second hypothesis. In a

[2] Patrick O ' S u l l i v a n : Impact of Foreign Direct Investment on the Economy of Ireland: 1960-1977, unpublished Ph.D. Dissertation, Fordham University, New York 1982.

way, it will provide a rationale for disaggregate treatment alongside aggregate analysis. It will provide, in addition, the basis for various degrees of policy initiative in the area of FDI. The empirical test of these hypotheses, i.e. the contribution of foreign direct investment to exports, will be made using a simple regression equation:

$$X_t = \beta_{10} + \beta_{11} YF_{t-1} + \beta_{12} Px_t + \beta_{13}D_{t-1} + \alpha_{14}$$

$$\frac{\delta X_t}{\delta YF_{t-1}} > 0; \qquad \frac{\delta X_t}{\delta Px_t} > 0; \qquad \frac{\delta X_t}{\delta D_{t-1}} \gtrless 0$$

where:

X   = exports of goods and services

YF_{t-1} = gross national expenditure of major trading partners, i.e. foreign importer countries (lagged one period)

Px   = relative price of exports

D_{t-1} = gross foreign direct investment (lagged one period)

ß   = constant, or coefficient of regression parameters

α   = error term

The specification of the export equation is based on standard economic theory and on the usual small country assumption of infinite elasticity. Although one may posit the assumption of inelasticity for the export supply curve on the basis that small as well as developing economies do not, or may not, respond quickly to external economic forces (e. g. changes in taste, price, technology and demand), the assumption made in the present study is not unreasonable since production for export is one of the major reasons that LDCs attract and encourage foreign direct investments. The expected partial derivatives for the various explanatory parameters are justified on economic grounds, except that of the foreign direct investment variable (D_{t-1}). One cannot *a priori* know the direction of the coefficient sign, since the impact of FDI on exports could be either positive or negative. Moreover, there is no theoretical justification for preferring or expecting one sign or the other. The FDI variable is lagged to reflect the timing process between the inflow of such

investment and its conversion into exports. The inclusion of a foreign expenditure or income variable (YF_{t-1}) is aimed at capturing the market size effect. It is based on the assumption that increases in income in foreign countries, especially in the countries of the major trading partners, will stimulate imports and create export markets for LDC commodities. It is further assumed that any significant increase in such imports will largely occur after the year following the accumulation of disposable income. The relative price of exports (Px) is included in the export equation to capture the price effects. Relative price ratio series calculated by dividing the corresponding world price index by the price index of tradeables would have been preferred. Since the index for the latter does not exist, the wholesale price index is used here.

All of the data used here came from two major sources: the Yearbook of International Financial Statistics and the Balance of Payments Statistics Yearbook, published by the International Monetary Fund (IMF). They are annual time series data, from 1963 to 1983. All of the data are expressed in constant 1980 prices and in US dollars. Data not originally expressed in US currency were converted into dollars using the market-par exchange rate series published in International Financial Statistics. The term "Foreign Direct Investment" as used in the present study represents gross inflows and includes retained earnings. This definition is consistent with that used by the IMF.

The sample of countries used comprises 23 LDCs: Argentina, Mexico, Brazil, Ecuador, Bolivia, Chile, Indonesia, Pakistan, Thailand, the Philippines, Guatemala, Senegal, Kenya, Algeria, Ivory Coast, Egypt, Turkey, Jamaica, Dominican Republic, Portugal, Singapore, Malaysia and Greece. The availability of reliable and complete time series data was of primary importance in the selection of these countries. To provide sufficient heterogeneity in the sample, countries were selected from various geographical regions of the world. These include Africa, Latin and Central America including the Carribeans, and South East Asia.

The major findings are presented in Table 1. Ordinary least squares was applied as the estimation method. In Table 1 some relevant statistics have been included for each equation tested, such as the coefficient of determination, adjusted for degrees of freedom $(\bar{R}^2)$, the F-statistic, the Durbin-Watson statistic (DW) and the standard errors of the regression parameters. The respective levels of significance of the regression coefficients are based on the t-statistics of the explanatory variables. The relevant levels of statistical

significance for the t test will be 1 % and 5 %. The F test is carried out at the 5 % level of significance.

On the whole the linear specification of the export supply equation performed credibly. A log-linear specification was thought to be useful since important elasticities could be derived. The results, however, were not satisfactory. Similarly, various lags were tested for some of the explanatory variables. The specification with a one period lag in foreign gross national expenditure (YF_{t-1}) and a one period lag in foreign direct investment (D_{t-1}) provided the best fit. Dummy variables were also inserted in each of the equations in an attempt to test for intercountry differences. This effect was, however, largely insignificant and had to be dropped. This allowed more degrees of freedom. It also enhanced the explanatory power of the equations. As clearly demonstrated in Table 1 the regression tests for both the aggregate equation and the individual countries performed satisfactorily. Over 90 % of the variation in exports was explained by the explanatory variables as demonstrated by the adjusted $\bar{R}^2$ statistic. The Durbin Watson statistics were all significant at the 5 % level, thus showing no evidence of positive first order serial correlation.

An analysis of Table 1 shows that for all LDCs as a group the level of foreign income and expenditure, the relative price of exports, and foreign direct investment explained approximately 95 % of the variation in the exports of goods and services. However, of the three variables only foreign market size and FDI were statistically significant at the relevant ranges of 1 % and 5 % respectively. The price variable was significant only at the 10 % level. The reason for the observed low significance for the price variable will be discussed below, when the individual country results are examined.

Positive Effect on Exports

Two useful results relating to the direction of impact and the size of the impact are also revealed in Table 1. Firstly, as shown by the sign of the direct investment coefficient in the aggregate equation, FDI into LDCs does have a direct positive effect on exports. This finding leads to the rejection of the first hypothesis, that FDI has a net negative effect on exports, and thus re-affirms the hopes and conviction of many LDCs that depend on FDI to stimulate and increase their exports. Secondly, the findings of this study support the second hypothesis that the magnitude of the effect of FDI on exports varies from one LDC to another. This is shown by the size of the FDI coefficients for the individual countries. These coefficients were significantly different from unity and

Table 1

Export Regression Equation Coefficients

Country	Constant	YF_{t-1}	Px	D_{t-1}	$\bar{R}^2$	F	DW
Aggregate Result	−4215	33.15 (2.94)*	2.43 (1.292)***	2.02 (0.878)**	.948	152.31	2.5
Argentina	−6321	23.21 (2.29)*	1.63 (.848)***	1.54 (.870)***	.931	59.3	1.92
Mexico	−5361	25.63 (2.51)*	1.45 (.140)*	1.48 (.822)***	.961	90.7	2.23
Brazil	−5001	37.82 (4.20)*	2.31 (1.16)***	1.89 (.875)**	.955	122.1	2.01
Ecuador	−3579	21.77 (2.65)*	1.97 (.775)**	−.123 (.112)	.929	78.3	1.87
Bolivia	−2579	19.11 (2.66)*	2.11 (.244)*	−.057 (.045)	.938	101.2	1.99
Chile	−2133	21.00 (2.28)*	1.91 (.240)*	.972 (.417)**	.944	99.3	2.16
Indonesia	−3875	25.39 (2.10)*	2.00 (.210)*	1.35 (.737)***	.950	115.7	2.2
Pakistan	−3028	32.01 (4.21)*	2.56 (1.27)***	2.26 (.682)*	.971	181.0	2.7
Thailand	−2798	38.25 (3.62)*	3.81 (1.92)***	3.01 (.772)*	.940	88.9	1.83
Philippines	−3251	41.72 (7.19)*	2.99 (1.57)***	3.97 (1.01)*	.941	134.3	2.12
Guatemala	−2978	36.83 (1.70)*	2.82 (1.39)***	2.98 (.790)*	.935	127.0	2.28
Senegal	−3511	27.22 (4.68)*	1.41 (.764)***	.782 (.278)**	.922	67.7	2.07
Kenya	−5766	24.81 (4.40)*	1.87 (.764)**	.995 (.404)**	.940	101.1	1.97
Algeria	−7712	20.39 (1.99)*	4.20 (.562)*	1.30 (.684)***	.973	113.9	1.96
Ivory Coast	−2900	17.77 (2.61)*	1.61 (.537)***	−.009 (.007)	.952	98.7	2.07
Egypt	−4802	19.62 (2.50)*	1.72 (.601)**	1.79 (.621)**	.927	68.3	2.18
Turkey	−4454	43.25 (2.81)*	3.2 (1.60)***	3.75 (1.41)**	.965	150.5	2.45
Jamaica	−2287	31.33 (3.91)*	2.01 (.785)**	2.87 (1.17)**	.950	91.8	1.91
Dominican Rep.	−2573	17.89 (1.50)*	1.30 (.714)***	1.10 (.470)**	.961	128.8	2.80
Portugal	−5281	56.72 (4.25)*	3.17 (.621)*	4.12 (.980)*	.970	100.3	1.96
Singapore	−4971	61.90 (6.19)*	3.33 (.683)*	3.87 (.987)*	.947	96.0	1.88
Malaysia	−6332	58.21 (6.56)*	3.03 (1.04)**	2.71 (1.007)**	.969	79.0	1.94
Greece	−5410	49.71 (4.59)*	2.92 (.764)**	1.99 (.498)*	.934	67.8	2.31

*   Significant at the 1 % level
**   Significant at the 5 % level
*** Significant at the 10 % level

Values in parentheses represent standard errors.

were in fact greater than unity in almost all of the cases tested. However, in accepting the second hypothesis, this study rejects any presumption of a one-to-one relationship between the dollar value of FDI and a corresponding dollar value increase or decrease in the exports generated.

The observed positive contribution of FDI to exports confirms the earlier findings of O'Sullivan[3] but contrasts with those of Van Loo[4] who found a negative relationship. This may be explained by the size, proximity and similarities of the economies reflected in Van Loo's study. Although no elaborate explanations or detailed tests were made, Van Loo essentially dealt with two developed economies, the USA as the investing country and Canada as the receiving country. The similarities of these economies and of their exports vis-à-vis the prevailing conditions in the LDCs under consideration in the present study without doubt account largely for the divergent results. Moreover, there is little reason to believe that the encouragement of FDI in Canada is given the same level of strategic importance and urgency as in LDCs, where it often represents a deliberate policy aimed at stimulating exports.

In addition to the observed positive and complementary effect of FDI on exports, this study has shown that such investments generate a more than proportionate increase in exports. In the present case, $1 of FDI generates about $2 in exports. This complementary effect of FDI is particularly important, not only in the wake of declining exports and increasing trade deficits but also in the concern that capital inflows may not be contributing significantly to economic growth in LDCs.

Variation between Countries

The results for the individual countries are presented in Table 1. As with the aggregate results, the equations for the various countries performed satisfactorily. They showed a good fit and the explanatory variables were highly predictable of exports in the respective LDCs. In all of the countries tested, the foreign expenditure variable performed as expected. It was found statistically significant at the 1 % level and had the expected positive sign. In the case of the direct investments and the price of exports the results were varied. For the latter, all of the country coefficients had the expected positive sign. Out of the 23 countries in the sample, the export price variable for 7 of the countries

[3] Patrick O'Sullivan, op. cit., p. 108.

[4] Frances Van Loo, op. cit., p. 478.

was significant at the 1 % level, and for 6 at the 5 % level. In the remaining 10 countries the price variable was only significant at the 10 % level. Further analysis of the price of exports parameter reveals that the significant export price variables were recorded in those countries whose exports consisted mostly of fuels, minerals and metals, or of manufactures and machinery. In those countries whose exports largely consist of primary commodities the export price variable was not very significant. The low significance level for the latter group of countries may relate to the nature of the production of primary commodities, which is often seasonal. It may also reflect the relative slowness and inability of these economies in adjusting production to respond quickly to changes in the prices of their major export commodities.

The most pertinent result, however, is that of the direct investment variable (D_{t-1}). In almost all of the countries tested, the estimated coefficients turned out with positive signs except for Ecuador, Bolivia and Ivory Coast, where some negative signs were recorded. Tests of significance using t ratios, however, found the FDI coefficients for these countries statistically insignificant. Out of the remaining 20 countries that recorded positive effects, 7 were found significant at the 1 % level, 9 at the 5 % level and 4 at the 10 % level. Additional analysis shows that the countries with recorded low significance or insignificance at the relevant levels were mostly those whose exports are dominated by petroleum or primary commodities. This may be explained by the nature of petroleum ownership, production and export. The petroleum industry is highly indigenous in most of the countries that depend primarily on the commodity (e. g. Algeria, Mexico). The low significance is perhaps suggestive of the fact that FDI to LDCs dependent on petroleum and primary commodity exports concentrates for the most part on production for the domestic market rather than for the export market. There is, however, no sustained empirical evidence in support of this suggestion. Instead, the low significance recorded may be explained by the fact that FDI to LDCs has, traditionally, largely not been channelled to the primary producing sectors or to activities such as agriculture.

Non-primary Exports

On the other hand, the relatively high significance level recorded for the FDI variable was found largely in those countries whose exports consist mostly of non-primary export products or are largely diversified i.e. consisting of primary commodities, fuels, minerals and metals, machinery, textiles and other manufactures. The explanation for the relatively high statistical significance for this category of countries is not hard to find. It may be

related to the unique characteristics of these commodities as much as to the underlying reasons for some foreign direct investments. These commodities are for the most part geared towards larger markets abroad in the absence of sufficient domestic markets. Besides, the conditions in the production of these commodities in LDCs (e.g. lower labour cost) often make it economical and more competitive for foreign subsidiary firms to produce them in LDCs and export them overseas for sale either directly in the market or to the parent company as semi-finished goods. Hence the record amount of inflow, for example, into the United States of shoes from Brazil, clothes and textiles from Thailand, Portugal, Egypt and Turkey and machinery from Malaysia.

Another interesting result shown in Table 1 is the lack of uniformity in the size of the contribution or impact of FDI on exports across LDCs. This, however, was expected given the differences amongst the economies, as well as the relative importance of FDI to the respective economies. In most of the countries tested, the size of the effect was more than unity. These were also the countries whose FDI coefficients were found to be highly significant. Out of the four countries whose coefficient values were less than unity or close to unity, two were economies mostly dependent on primary commodities and one on fuels, minerals and metals. No explanations are provided for this divergence in results. On the whole the results for the individual countries support the aggregate findings. In addition they provide a further explanation for the performance of the explanatory variables in the aggregate equation, especially the price and FDI variables.

Conclusions

The results recorded here provide some reassurance for less developed countries, especially those that depend on FDI to boost their exports or to diversify their economies. It will also help to enlighten, and perhaps silence, critics who are sceptical of the contribution of such inflows to exports and on the economic growth of LDCs. On the other hand, given the relatively poor production and export performances of primary producing LDCs, and the bias in the sectoral flow of FDI, the results of this study will provide some basis for a variety of policy reforms on the part of investor countries (DCs) as well as on the part of receiving, host countries. In the present study no attempt has been made to examine whether the activities of foreign firms or the flow of foreign direct investment was concentrated mostly in the domestic market or in the production of non-export commodities in those countries where

negative FDI effects were recorded, or where a lesser contribution was made to exports. A positive answer may provide an acceptable justification for such investments since it would be tantamount to fostering the import substitution goal of most LDCs.

Also, no attempt has been made to carry out a similar examination for the countries where existing FDI showed a larger positive effect. It is possible that FDI inflows may not be applied at all to production for domestic consumption or for the domestic market but largely for exports. Where this becomes the dominant feature of FDI the import substitution industrialization effort may be stifled and an insufficient supply of goods for domestic consumption may lead to increased importation and wastage of valuable foreign exchange. Such an outcome is also possible in the case where the revenue resulting from such exports does not trickle down to other non-export sectors of the economy. The recent increases in the importation of commodities previously exported, especially of food commodities by some LDCs, exemplifies this possibility.

Finally, no attempt has been made to explore the implications of these findings for the continued flow of FDI into LDCs and for economic growth in the countries tested. It is the conviction of this author that no useful and complete discussion of such implications can be made without a more detailed analysis of the economic, political and social effects and/or – more importantly – the past contributions of FDI and other inflows to the economic growth and development of these countries. Furthermore, any meaningful appraisal will also be incomplete without having to compromise the "ceteris-paribus" condition often implicit in aggregate studies of heterogeneous economies with various unique characteristics and significant differences. Future researchers may want to tackle these issues or explore further in these directions. In addition, they may find it enlightening to examine within a system and simultaneous framework the short and long run contributions of FDI to exports and other key macro-economic variables in the economic growth and development of LDCs. With the availability of more sophisticated models and longer time series data the present study could be usefully expanded. More countries could also be brought into the sample. In conclusion, attention must again be drawn to the problems of aggregation and the bias that could result from such aggregation across non-homogeneous countries in both time-series and cross-section studies. This implies that considerable care should be taken in extrapolating these results to other countries and for other time periods.