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FDI and International Trade Relations in Libya: Theoretical Approach and Econometric Analysis

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Abstract

The core theory provides arguments for both complementary and substitute links between FDI and international trade. Accordingly, a number of empirical studies demonstrate a substitution of trade inflows by FDI, while others point out the existing of complementary effect between them.

The goal for the present study is to provide a theoretical basis regarding the relationship between FDI and trade by conducting empirical tests to explain the causal relationships among the inward FDI and imports in Libya. Are they complements for or substitutes? Thus, in this study we try to investigate if some evidence exists either supporting a substitution or a complementary relation between imports and inward foreign direct investment. To this aim, an aggregate time series approach is adopted using annually time series data for the period 1970-2003. A vector autoregressive model is employed for both multivariate cointegration analysis and Granger temporal causality testing. The results provide support of a positive long-term Granger causality going from imports to inward FDI, and not vice versa. For this reason, a positive long-term relationship between FDI and imports is identified, which support the complementarity hypothesis.

Key words: FDI, International Trade, Imports, Multivariate Cointegration, Granger causality and Libya

GEL Classification: F21, F23, F43, O11, O16.

1- Introduction:

Foreign Direct Investment (FDI) is considered as an important factor for economic development and growth in most economies. It is basically important for transition economies that suffer from lack of domestic savings to finance their economic upgrading. Its inflows are widely discussed both by scholars and policymakers. This is not surprising because the entry of a foreign investor is not simply the import of capital in another country, but has innumerable effects on the economy of the host country. It influences the production, employment, income, prices, exports, imports, economic growth, balance of payments, and the general welfare of the recipient country through international knowledge and technology transfer. It is also probably one of the most significant factors leading to the globalization of the international economy. Flows of FDI are contributing to build strong economic links between industrialized countries and developed countries, and also among developing countries (Erdal and Tatoglu, 2002).

FDI could be an important source of income for the Libyan economy and one of the major driving forces of transition. However, its potential remains as yet unrealized. Despite natural comparative advantages, Libya has one of the lowest levels of FDI inflows among North Africa's countries suffered negative annual FDI of between US\$80 million and US\$150 million during recent years (Wallace and Wilkinson, 2004). After the lifting of UN sanctions in 1999, Libya become more attractive and recorded a positive FDI flows during 2003 of up to US\$ 700 million (UNCTAD database) and the number in the last year 2004 has been increased crazily.

Even though, Libya has a good investment climate such as a strategic location, feasible natural resources (oil and gas) and new open-door policies, however, The new open-door policies are designed to attract firms to invest in Libya and allow private-owned corporation to joint venture alliance with foreign investors, especially after the lifting of the UN and USA sanctions. Because of its geographical position as the gateway between Europe and Africa to generate economic growth in Libya and other African states(Wallace and Wilkinson, 2004). Foreign firms have investments in Libya and the numbers of these companies during the last five years have increased. Most of these firms are from Europe, mainly Germany, Spain, the UK, France, and Italy. These countries are considered as the major business partnerships for Libya.

Regarding the positive impacts of FDI, it also has negative effects on the recipient country. UNCTAD has reported in the latest world investment report (WIR 2003) some major impacts on the host countries such as; anticompetitive by foreign affiliates, volatile flows of investment and related payments deleterious for the balance of payments, transfers of polluting activities or technologies, excessive

influence on economic affairs and decision-making, with possible negative effects on industrial development and national security, along with crowding out local firms, local products, technologies, networks and business practices with harmful socio cultural effects, also through its influence in increasing imports and reducing domestic demand and employment in the recipient country (if their motives structure recourses seeking). In this, detractors of FDI inflows often argue that foreign owners tend to have a higher propensity to obtain their inputs from abroad than do their domestically owned counterparts (Graham and Krugman, 1995). The higher import propensity of Multi National Enterprises (MNEs) will imply also a reduced demand for products of domestic suppliers and a cost in terms of national jobs. For all these reasons, whether FDI inflows represent a substitution or a complement for imports in the host country is an important aspect to address in evaluating the cost and benefit of FDI. As a consequence of this trade behavior of foreign firms, many governments feel the need to control inward FDI and the operations of foreign affiliates.

In fact, either positive or negative relationship between inward FDI and imports may exist. When, for instance, FDI entails producing products abroad that were previously exported from the investing country (motivated by lower transportation costs, avoidance of trade barriers, etc.), inflows of FDI and imports in the recipient economy are expected to be substitutes. If, instead, the motivation for FDI is to benefit from factor productivity and remuneration differentials across countries such as natural resources, a rise in foreign activity will probably be accompanied by an increased demand for inputs and intermediate goods. The latter will be provided either by the parent firm in the home country or by a subsidiary of the same group located in other economies. A similar positive relationship between FDI and imports is expected when, through foreign investment projects, MNEs try to consolidate market shares abroad, either by expanding marketing and distribution capabilities or by improving customer support (Alguacil and Orts 2003). However, the nature of this connection (positive or negative), and the duration of this influence seem to be particular to the economy analyzed, and specifically to the nature and character of the dominant FDI inflows. In this paper, we try to shed new light on the empirical relevance of foreign direct investment on imports by examining this relationship for the Libyan economy. We analyze this connection in a multivariate VAR model in an attempt to avoid the possibility of spurious associations as a result of variations in common determinants or simultaneity bias.

2- The Relationship between FDI and Trade

Essentially, trade theories explain the international patterns of trade in terms of

the comparative advantages arising from different relative prices between countries. Originally, the theory of comparative advantages was formulated by the British economist David Ricardo. He argued that trade patterns are explained by the factor endowments of the respective countries involved in trade. This theory was expanded and sophisticated by the Swedish economists Heckscher and Ohlin 1920, in the so-called Heckscher/Ohlin theorem, (H-O) here after. This theorem is one of the most influential theories in international trade. The emphasis is "on the interplay between the proportions in which different factors of production are available in different countries and the proportions in which they are used in producing goods". Several assumptions were made with regard to this model. First of all, there are two economies each one produces two goods, both labor and land as factors of production. In their model, they incorporated a number of realistic characteristics of production into labor and land which are needed to produce goods and services. The reason for that is to assume that free trade will make price factors equal between countries, or in other words, trade will increase wages in the countries where wage is initially low. They claimed that when price factors fail to equalize in the markets, it could provide incentives to firms to start foreign operations in order to gauge the lower cost of labor in foreign countries. The H-O model also claimed that if markets have perfect knowledge about input costs and profitability, there would be no incentive to start a foreign investment.

Theory of product cycle may serve as one additional explanation of the relationship between FDI and trade (Vernon, 1966). It explains the relationship between market and product and emphasizes the role of knowledge, innovation, scale, ignorance and uncertainty. It claimed that the product goes through different stages or cycles from innovation and introduction to the death of the product. These stages are introduction, growth, maturity and decline. On other words, the lifetime of a product is a sequence from domestic production to its export and then foreign production. This theory is known as the "first dynamic interpretation of the determinants of, and the relationship between, international trade and foreign production" (Chunlai 1997). In the second stage, a firm exports some productions to customers abroad because countries are at different stages of economic development to let them have some knowledge about the product. When the product reaches the maturity stage and becomes more and more standardized and firms can not compete with the product characteristic as many competitors enter the market, as the technology and innovation becomes more difficult to protect and as price elasticity grows (Hansen 1998). The target markets will be determined by the characteristics of the market and the inputs factors of production such as Research and Development (R & D) and labors skills and rates as suggested by Vernon. Foreign direct investments take a place mostly in developed countries (USA in Vernon's

model) and when the product cycle reaches its decline stage, these investments will move to the less developed countries (Europe) and later to developing countries (Africa and Asia) in order to get more benefit through cheaper labor and high market demand. That would make it possible for firms to establish itself in new markets by price reduction and becoming more attractive again. In some cases, a firm exports new products which are subsequently modified by foreign manufactures in order to suit the characteristics of their own country market. Eventually at the decline stage, a firm may reach their limit of innovation and the strategy costs no longer work compared to other competitors.

3- Literature on FDI and trade:

In this section, as a point of departure for exploring the empirical evidence as to whether FDI complements or substitutes trade, we begin with a brief survey of the theoretical and empirical literature on the FDI-trade relationship.

3.1 Theoretical Studies

Mundell (1957) used an extension of the basic model (H-O model) to show that trade and capital movements can be substitutes, namely, that the introduction of tariffs would induce a flow of FDI towards the country where tariffs are imposed. That is, the same way those restrictions to international movements of factors can be substituted by trade (the original H-O model), restrictions to trade can be replaced by international movements of factors, in particular capital given the intrinsic imperfect mobility of labor. In a way, these hypotheses based on the H-O model are not very different from those based on capital movements. Taveira (1984) points out, in both cases "FDI was analyzed as a re-equilibrium device within a generally perfectly competitive economy" a major limitation of the explanatory potential of both approaches.

Generally speaking, the model described above (H-O model) leads to a very practical importance: when trade is caused by differences in factor endowments it can be substituted by a capital movement in the sense that capital movement reduces trade in goods. Indeed, if some of the assumptions were eliminated, the model would become generally invalid. The real world is characterized by market distortions, such as economies of scale, international differences in technologies, non-homogeneous factors of production (for example, skilled and unskilled labor), transportation costs, differences in preferences of economic agents, etc. Nevertheless, differences in factor endowments provide a significant explanation of possible relationship between the capital and good flows. If the effects of these market distortions do not overcome the effect of difference in factor endowments,

the substitutability relationship between the capital flows and trade flows will dominate at aggregate level. Thus, we would expect that foreign investment might substitute the endowment-based trade for labor intensive items, such as clothing, and/or capital-intensive items, such as machinery, that is widely conducted between developed countries and developing or transition countries. This theoretical conclusion allows us to formulate the relevant suggestion for the case of Libya: FDI into the Libya secondary manufacturing (such as machine-building industry) may potentially substitute trade.

In addition, the theory of international trade explains various situations where trade between countries is caused by many other factors, not only by the difference in factor endowments, as postulated in the Heckscher-Ohlin model. We will review some of these explanations below.

Consider the model in which trade is caused by differences in production technologies. The analysis of this model which is proposed below relies on the work by Markusen et al (1995), and Purvis (1972) who proved that in this case factor mobility can not be a substitute for trade, and that "the introduction of capital mobility into a free trade situation may serve to increase the volume of trade" (Purvis, 1972).

In microeconomic theory, the most popular argument for complementarity relationship refers to the theory of vertical FDI (for example, Markusen et al, 1996). They claimed that, investing in manufacturing may increase the import of inputs to the recipient country as well as the export of intermediate goods to the investing country through the vertical production relations. The output of one subsidiary is often the input into production of another. Also, (Kojima, 1973, 1978, 1986) tried to explain the distinctive character of trade-oriented Japanese FDI, obeying the principle of comparative advantages, vis-à-vis US investment conducted in an oligopolistic market structure, anti-trade oriented and damaging to both home and host countries in the long run (Dunning, 1993a). The basic theorem is that "Direct Foreign Investment should originate in the investing country's comparatively disadvantaged industry (or activity), which is potentially a comparatively advantaged industry in the host country" (Kojima, 1982). If this is the case, Kojima argues, (pro-trade oriented, or Japanese) FDI and international trade are complementary and lead to a dynamic reorganization in the international division of trade and the associated gains for all countries involved.

In H-O model of international trade, it is explicitly assumed that the trade between countries is conducted in the "secondary manufacturing" whereas virtually a large part of international trade and FDI are in "primary commodities". As pointed out by Schmitz and Helmberger, it is really a mistake to claim that trade in

oil, copper or wood products would be fostered by imposing barriers on the international capital flows as implied by the H-O model (Schmitz and Helmberger, 1970). The relevant conclusion in this context is that the "capital movements and trade in primary products are complements rather than substitutes, and impediment to one also impedes the movement of another" (Schmitz and Helmberger, 1970). (Theoretical model that would show this relationship is similar to the already described model of trade between countries with different production technologies, although it requires relaxing the Mundell assumption of identical demand conditions between countries.) The conclusion of Schmitz and Helmberger may be of high value to our analysis of Libyan economy. In fact, the widespread financial difficulties of transition countries often induce policies that stimulate export-oriented production in order to generate foreign currency inflows. Natural resources are one of the few assets of these countries that attract foreign partners. Therefore, we may suspect that FDI into primary industries in transition economies, in particular in Libya, would be a complement to trade rather than substitute.

In short, we can say that whether FDI affects trade positively or negatively, and what benefits we can expect from foreign production, will critically depend on the underlying reasons for international exchange, and on the character and nature of FDI, both forming part of this relationship. This question, far from being determined theoretically, has to be settled empirically. Having found which pattern of these relationships dominates in Libya, we would be able to make some conclusions about particular incentives of and impediments to foreign investors in Libya.

4- Standard Specification and Variables Definition

To see the extent to which inward FDI and imports interact, the correlation for these variables from 1970 to 2003 have been obtained. However, as mentioned in the previous section, this correlation might be driven by the presence of common determinants, leading thus to an erroneous interpretation of causality. To circumvent this problem, we simultaneously estimate imports and FDI, with two other variables that account for potential income and for the impact of macroeconomic instability.

The positive influence of the domestic market size (MS) on imports (IMP) and inward FDI (FDI) is captured here by Gross Domestic Product (GDP). Additionally, when dealing a business in a developing country, special emphasis is often placed on the assessment of instability, since a large number of countries are still characterized by unstable political and legal environment. Libya as a developing country faces some foreign political conflicts, such as the UN sanction from 1992-

1999, and the USA embargo from 1986 -2003, which affects and retracts trade and FDI inflows to Libya. Thus, the Libyan inflation in terms of the GDP deflator (INF) is used as a proxy of political instability and uncertainty.

The model consists of four variables, Foreign Direct investment (FDI) Gross Domestic Products (MS), Import (IMP), and Inflation (INF). The sample consists of annual time series observation (1970-2003). The data source for the dependent variable (net FDI inflows and imports) and the explanatory variables are the World Development Indicators (WDI 2003) and Central Bank of Libya. The models are estimated using the Eviews statistical software.

5- Methodology

In order to determine the direction of causation in a bivariate context, tests of causality based on the concepts of Granger (1969) and Sims (1972) have been used frequently in econometrics to test dynamic hypotheses in both single-equation and system settings. To avoid spurious results in the causality testing we need to proceed as following steps: firstly, to determine the order of integration of the series. In this study we employed the Augmented Dickey-Fuller (ADF) unit root test to determine the order of integration for all the time series variables. Secondly, to identify the possible long-term relationships among the integrated variables included in the system we employed Johansen's (1988) and Johansen and Juselius (1990) cointegration technique. Thirdly, Granger causality will further require inclusion of an error term in the stationary model in order to capture the short term deviations of series from their long-term equilibrium path.

The evidence of cointegration rules out the possibility of the estimated relationship being "spurious" and implies that Granger causality must exist among the variables in at least one direction, either unidirectional or bidirectional. The Granger causality may emerge either through the level of disequilibrium in the cointegrated relationships (captured by the Error Correction Terms ECTs) and/or the changes in the explanatory variables (as tested via the F-statistics for each). In other words, the Vector Error Correction Model (VECM) allows us to distinguish between "short-term" and "long-term" Granger causality (through the significance of the F and t-tests, respectively).

The error-correction term (ECT) stands for the short-run adjustment to long-term equilibrium trends. This term also opens up an additional channel of Granger causality so far ignored by the standard causality tests. Consequently, some or all of the variables must be Granger caused by the disequilibrium term, and the current change in a Granger-caused variable will partly be the result of its adjustment to the trend value of the other variables in the system (Granger, 1988).

In according with these arguments, the vector autoregressive model to be estimated here will comprise of FDI, IMP, MS and INF, as showed below. In model (1) all variables are symmetrically and endogenously considered at first.

$$\begin{bmatrix} imp_t \\ fdi_t \\ ms_t \\ inf_t \end{bmatrix} = \beta_0 + \beta_1 \begin{bmatrix} imp_{t-1} \\ fdi_{t-1} \\ ms_{t-1} \\ inf_{t-1} \end{bmatrix} + \dots + \beta_n \begin{bmatrix} imp_{t-n} \\ fdi_{t-n} \\ ms_{t-n} \\ inf_{t-n} \end{bmatrix} + \begin{bmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \\ e_{4t} \end{bmatrix} \quad (1)$$

Since we are interested in testing whether FDI is Granger-caused by Imports, let us first rewrite (1) in a more explicit form where the assumption of cointegration has been added:

6- Empirical Results

We employed Granger's (1969) concept of causality to test the relationship between FDI, Imports, market size and inflation using the annual data. We formulate a vector autoregressive (VAR) system, comprised of four variables as mentioned in the previous section. In the lag selection procedure for this VAR, we follow Akaike Information Criteria (AIC) and Schwartz Criteria (SC) of lag to be included in our model. Both criteria confirm that 2 is the optimal lag length opted.

The time series properties of the data are investigated using the Augmented Dickey Fuller (ADF) test based on inclusion of an intercept as well as a linear time trend. It is evident from the results shown in Table 1 that all the variables were non-stationary in their levels and are stationary in their first differences. Thus all four variables (FDI, IMP, MS and INF) are integrated of order one.

Table 1: TEST OF THE UNIT ROOT HYPOTHESIS

| Variable | Level | First Difference |
|----------|--------|------------------|
| FDI | -1.885 | -5.002 |
| MS | -2.187 | -4.083 |
| IMP | -2.181 | -4.818 |
| INF | -1.031 | -4.232 |

The critical values for the variables in levels are -2.954 and -2.615 at 5% and 10% significance level, respectively

Given the common integrated properties of the variables under the consideration, the next step is to test for the presence of the cointegration in the four dimensional VAR model by employing the Johansen (1988) and Johansen and Juselius (1990) procedure, using the two an optimal lag structure for the VAR, as shown in Table 2.

Table 2: Cointegration Test, Johansen's 1991

| Hypothesized | | Trace | 5 Percent |
|--------------|------------|-----------|----------------|
| No. of CE(s) | Eigenvalue | Statistic | Critical Value |
| None * | 0.618 | 49.568 | 47.21 |
| At most 1 | 0.302 | 20.658 | 29.68 |
| At most 2 | 0.192 | 9.855 | 15.41 |
| At most 3 | 0.108 | 3.438 | 3.76 |
| | | Max-Eigen | |
| None * | 0.618 | 28.909 | 27.07 |
| At most 1 | 0.302 | 10.803 | 20.97 |
| At most 2 | 0.192 | 6.4173 | 14.07 |
| At most 3 | 0.108 | 3.438 | 3.76 |

* denotes rejection of the hypothesis at the 5% significant level

Trace and Max-Eigen value tests indicates 1 cointegrating equation at the 5% level

The results in Table 2 indicate that there exists one cointegrated vector; that means there is one long run relationship among variables. This evidence of cointegration rules out spurious correlations and implies at least one direction of Granger causality is existed. Given that there is one cointegrating vector in the four-variable VAR used in the cointegration tests, it is best to estimate models with one error correction term included to capture both long-run and short-run relationships.

The results of Granger causality tests based on Vector Error Correction Model (VECM) method are shown in Table 3.

Table 3: Granger Causality Test

| ECM: | D(FDI) | D(IMPORT) |
|------------|------------|------------|
| ECT (-1) | -0.002 | 0.012 |
| | [-1.936] | [0.790] |
| D(FDI(-1)) | -0.237464 | -3.572916 |
| | [-0.85618] | [-1.81577] |
| D(MS(-1)) | -23.67446 | 116.2439 |
| | [-1.38620] | [0.95937] |
| D(IMP(-1)) | -0.010064 | -0.073245 |
| | [-0.23964] | [-0.24583] |
| D(INF(-1)) | 1.036271 | 36.72474 |
| | [0.05532] | [0.27633] |
| C | 16.08717 | -71.26599 |
| | [0.35026] | [-0.21871] |

$$FDI = 227588 + 0.0036 MS + 0.990IMP - 500.870INF$$

Table 3 presents the results of temporal Granger causality tests. The short-run dynamics is also explored by performing multivariate Granger causality tests for the VECM.. Emphasis in this study is placed only on the relationships between FDI and imports. From the VECM out put it is noted that the ECT coefficient (0.002) for the FDI equation is statistically significant [-1.936], while the ECT coefficient for the Imports equation is not significant. This implies that Import did Granger cause FDI (but not vice versa) in the long run. As far as the short-run Granger causality is concerned, the data show a causal relationship going from IMP to FDI.

In the FDI equation, for instance, we found the expected positive sign with respect to domestic income and imports, respectively. In this relationship, we prove further the existence of a long run positive relationship between foreign direct investment and imports. In fact, an estimate influence of imports on FDI equal to 0.99 is identified which support the complementary hypothesis

7- Conclusions

In this paper, the relationship between FDI and Trade has been investigated. Some earlier theoretical models show the ambiguity of the relationship and predicted either substitutes or complementary relationship between FDI and trade. To examine this relationship the dynamic causal relationships between FDI and Imports in Libya was determined. From a theoretical perspective, it is possible to conceive situations in which FDI acts either as a complement or as a substitute to imports. When, for instance, foreign production results in a horizontal expansion of multinational firms, where the affiliates tend to replicate the parent's production activity and/or tariff jumping and/or results from differences in factor endowments such as factors of production (for example, skilled and unskilled labor), transportation costs, etc, FDI and imports from the investing country will probably be substitutes. In contrary, the decisions of vertical expansion within the multinational enterprise, or the decisions of establishing distributional assets in local markets indicate that firms may find it profitable to internationally spread different stages of their production or distribution process, with the end of better fitting factor requirements with country's resources, or with the purpose of establishing distributional networks to attend demand requirements and increase market share or when FDI are in primary commodities In these cases, a complementarity between inward foreign direct investment and imports would be almost ensured.

Unit root and Johansen's cointegration tests have been employed followed by a vector error correction model to capture within-sample Granger-causality among the mentioned variables.

Using time-series data, we investigate the temporal relationship between imports and foreign direct investment in Libya for the period 1970-2003. With this aim, we employ a vector autoregressive model for both Granger causality testing and multivariate cointegration analysis. To control for common determinants of imports and FDI, we include further domestic demand and inflation rate in our model.

On the basis of the cointegration tests, one long-run relationship has been identified. Actually, we can easily recognized an implied demand function for imports in which not only relative prices and domestic demand seems to be significant and with the expected values, but also FDI inflows appear positively related with imports in the long run.

Eventually, in the case of cointegrated variables, the error-correction term may prove of crucial importance in testing the direction of causality. Second, a strong one-way relationship from import to FDI exists. Also the result indicate that a positive long-term relationship between FDI and imports is identified, which indicates supports the complimentarily hypothesis.

ملخص الدراسة

هذه الورقة تدرس الأسس النظرية للعلاقة بين الإستثمارات الأجنبية المباشرة والتجارة الخارجية في الجماهيرية، وذلك عن طريق إجراء اختبارات عملية لشرح العلاقات السببية بين تدفق الإستثمار الأجنبي والواردات وهل تلك العلاقة بديلة أم مكاملة. وقد بينت نتائج الدراسة وجود علاقة سببية طويلة الأمد تتجه من الواردات الي تدفق الإستثمارات الأجنبية وليس العكس. كما تشير نتيجة التحليل باستخدام الاختبارات العملية للمتغيرات الي وجود تلك العلاقة الموجبة بين المتغيرين والتي تدعم فرضية وجود علاقة مكاملة بينهما.

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