Study of the Effects of FDI Inflow on Balance Payment

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ABSTRACT

Capital inflow was one of the main causes of the integration of the range of world's economy in the last decade of the twentieth century. In this regard, many developing countries take some measures to attract this Foreign Direct Investment (FDI). Therefore, given the importance of this issue, the effects of exchange rate, foreign direct investment process and some other factors on Iran's trade balance index in an econometric model was investigated in this study. The results achieved show that the effects of the entry of foreign direct investment and exchange rate on trade balance index is positive, but small. In addition, the effect of these variables on nonoil exports is also positive.

KEYWORDS: Exchange rate, Foreign Direct Investment, Iran's Trade Balance Index, Nonoil Exports

1. INTRODUCTION

Capital inflow was one of the main causes of the integration of the range of world economy in the last decade of the twentieth century. The type of foreign direct investment among other flows has had more important role in this process. The role and impact of foreign direct investment on the macro-economy of developing countries has been the subject to discuss in many studies. The basic and main question in these studies is that whether foreign direct investment flow increases international trade or other factors in a country or make them restricted. Is FDI is a substitute for exports or increase it? While some evidences are mentioned in the theoretical discussions regarding the effects of FDI substitution or supplementary; however, experimental works almost show that there is a complementary relationship between extorts and investments. Regarding the existence of free trade zones and special economy of FDI entry in Iran, it has been started since many years (these trends were positive at least from 1993 onwards). However, this effect is not the same as other countries such as East Asian countries. But this issue can be studied for the Iranian economy. In general, regarding the fact that FDI was one of the major sources to finance the projects, the study of its effects on other macro-economic variables, including foreign trade is therefore very important.

Therefore, these questions will be responded in this study in that [1-6]:

First: how are the effects of the entry of Foreign Direct Investment (FDI) on the Iran's trade balance index?
Second: is the effects of FDI on nonoil exports are positive?
Third: what effects have other variables such as GSI exchange rate on Iran's export and trade balance index?

Along with the questions posed above, the main research hypothesis is whether FDI effects on Iran's trade balance index and nonoil exports is positive?

It is worth mentioning that this study aims to actually make clear the role and effects of FDI on Iran's international trade by conducting this study. In fact, this point will be clear that how is the effectiveness of trade on one of the advantages of FDI arrival such as technology. In continuous, theoretical bases are expressed in this study and then review of literature and entry of foreign investment are examined in the next part. The model will be analyzed and assessed in the 5th section, and finally the results of this research will be pointed out.

Theoretical Bases

The rapid growth of FDI and international trade and the need to adopt appropriate policies in the field of FDI at the international levels attracts again the interaction of these two issues at the center of expert's attention. The role of trade has long been grown and its development has been recognized and has been reflected in the commercial policies. The fact is that FDI likes the main way of delivering goods and services to the international markets and is a major factor in the organization of production at international level so as to increase the size, direction and the composition of world trade. It is clear that the measures taken by the countries towards FDI have the same effect on the level of FDI processes volume on trade. Regardless of the
independent impacts of FDI and trade on the economic growth and development, there is a mutual relationship between them that their beneficial effects will be decreased if they are ignored. However, despite the great importance in the mutual relationship between trade and foreign investment, these relationships are not much fully recognized. One reason for the lack of recognition and clear interaction of the mutual interaction between the two issues is that the theory of international trade and foreign investment theory have been created independently of each other. The efforts done for the integration of trade and FDI theory are performed is still in its early years. In the last thirty years, particularly since the mid-1980s, the field of international exchange has considerably been changed and this causes some changes in the formation and purpose of foreign direct investment and the activities of transnational corporations. This situation in turn has implications in the field of FDI mutual interactions and trade. The most important changes in the international environment is related to the reduction of technological and policy barriers to the movement of goods, services, production factors and companies and also this reality [7,8].

1. Technological Improvement
The advances occurred in the field of information and communication technologies not only makes possible the companies to perform daily management of wide and diverse networks and services throughout the world, but the advances created in the field of the integration of information and telecommunication technologies caused the potential of portability and mobility of many information-based services.

Policies Liberalization
In the recent years, the escalation of the liberation of the policies governing on trade and foreign investment trades can be observed [9-12]. Technological flows and movements and national capital has also been facilitated. Trade liberalization, started in the period after World War II with The General Agreement on Tariffs and Trade, is culminated with the completion of negotiations in Uruguay. In the course of negotiations, the average custom tariffs of industrial goods among advanced industrial nations are reached 4%. In many countries, steps were taken to open up industrial services on the foreign participation.

1.2. Mutual Impacts of FDI and trade
1.2.1. Static Effects
Merging and integrating the production within the system of big corporates towards performance-based efficiency means that company's activities are divided into different components in which relative static advantages of different locations are considered in this regard. Labor divisions obtained from this action provide potential opportunities for the countries in the field of participation in the production and trade associated with transnational corporations [13]. These countries are specialized in the production of components of goods and services that have a relative advantage within [14].

2.1.2. Dynamic Effects
More mutual relationship between FDI and trade has also potential implications for dynamic change and economic growth [15,16]. These consequences are appeared through technological development and innovations in the countries where attract transnational corporations. In parallel with the development of international labor division among firms within the transnational corporations, not only are the affiliated companies to the relative static advantages of different locations, but they increasingly focus on the fields that further local potentials are found for.

2.2. A Short Review on the Theoretical Bases of Foreign Direct Investment
Basically, theories related to existential philosophy of direct foreign investment and that countries intend to attract or perform foreign direct investment are divided into two main groups: one group is the set of ideas that predict the supposition of market success. The second group is the assumptions that are based on flawed markets that are discussed separately below [17,18]:

1.2.2: Theories Based on the Supposition of Complete Competition
A series of these views (neoclassic) have special focus on the assumption of complete competition and it is mainly supposed that there are no flaws and inefficiencies, thus firms will not able to increase their market power by creating an exclusive network. It is focused on relative rate of expected return, which the theory of transferred capital flow from the countries with low efficiency to the countries with high efficiency can be referred to; moreover, this theory has been reviewed by P. Wickham in 1994. He indicated in this article that direct foreign investment flow in developing countries are dynamics and are primarily increased and are processed with the considerable volatility before being reached to a fast growing. Another set of theories in this group is concerned with the reduction of investment risks or spreading this risk through doing foreign direct investment, and the other group is concerned with the issue of production and market size. It is believed here
that transfer of capital flows is performed in the countries that have market attractions. Also, these firms will not able to increase the profitability of these markets by replacing the local markets to the foreign markets and vice versa.

Theories specifically involved in this group are as follows:

1. Different Rates of Return
2. Portfolio Diversification
3. Output and market size

2.2.2. Theories based on incomplete markets

Theories studied in the previous section have no particular assumption regarding market defects and inefficiencies. Perhaps, the study performed by Hymer was the first analysis that showed the structure of markets and specific characteristics of firms must play a role in explaining direct foreign investment. The role of these factors have been analyzed in the static framework which focuses both on the issues related to industrial organizations and making decision-making process internalized and multi-exclusive competitions and the considerations related to production cycle in a dynamic analysis.

Specifically, theories involved in this group are as follows:

1. Industrial Organization
2. Internalization
3. An electric approach

2.2.2. Theories based on incomplete markets

In his article entitled "impacts of direct foreign investment (export-based policies) on the balance of payments in developing countries and after analyzing the model ", Arsalan Razmi [19] indicates that the impacts of such policies has not much been emphasized in developing countries as it should and concluded that short-term effects of the policies to attract FDI on payments balances is negative and this may be due to the nature of investment and the type of policies.

In the early 1970s and during some researches performed, Griffin pointed out this issue that instead of increasing the domestic sources by the foreign capitals which henceforth contribute to the economic growth and development, is in fact led to the reduction of domestic savings and negative effects on the country's economic growth. Using cross-section method among countries to estimate the impacts of foreign investments and foreign grants and economic growth, Dunn Bornschier and Robinson concluded that such transfers of foreign capitals is led to relative growth among countries as well as cause economic inequality within a country. But this issue is created in the long term and these countries are faced with relative reduction in their growth. However, this issue largely depends on the development level of assimilator country.

In his study entitled "foreign direct investment and demand extension factor", John Hatzius [20] explains that the liberalization of foreign direct investment makes labor costs for internal investment more important and caused the demand of labor force to be occurred in the long run and this view was asserted with the data from England and Germany. Increasing each unit of labor force is led to the withdrawal of foreign direct investment and its reduction will lead to foreign direct investment. In addition, in her study entitled "the impact of foreign direct investment on the progress of developing countries", Fatemeh Nazifi [21] came to this conclusion that there is a direct relationship between foreign direct investment and the economic growth of domestic investment and the level of human capitals.

4. Study of the process of foreign direct investment in Iran

As can be seen in Table (1), an investment equivalent of $ 1200 million in the foreign investment has been attracted in the free zones of the country during the years 2002-2009 which $ 804 million (62%) is related to the years 2008-2009. This rate is about 49.2 % in Gheshm free zone, 49.7% in Kish free zone and 0.92% in Chabahar has been invested (Table 1). Statistics show this reality that the organizations in free zones have failed to attract foreign investment in their own capacity; that is mainly caused by the lack of infrastructures and basic amenities in order to attract foreign investment. Moreover, it is expected that this trend will be improved in the years to come by increasing or completing required infrastructures and also the measures taken to remove legal hiatuses in the free zone, including sanction of monetary and banking law in the free zones and the law of attracting and encouraging foreign investment [22-24].

<table>
<thead>
<tr>
<th>Free zones</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kish</td>
<td>315</td>
<td>302</td>
<td>300</td>
<td>917</td>
</tr>
<tr>
<td>Gheshm</td>
<td>143</td>
<td>217</td>
<td>100</td>
<td>460</td>
</tr>
<tr>
<td>Chabahar</td>
<td>0/3</td>
<td>1/2</td>
<td>53/5</td>
<td>55</td>
</tr>
<tr>
<td>Total annual</td>
<td>458/3</td>
<td>520/2</td>
<td>453/5</td>
<td>1423</td>
</tr>
</tbody>
</table>
5. Introducing the Model:

To study the impacts of variables such as Foreign Direct Investment (FDI) in the production, GDP and exchange rate and the relationship between this exchange on Iran's commercial balance index, the following algorithm model has been used:

\[
LTRADE = f(LGDP, LFDIR, LERN, LPXPD)
\]  

(1)

where independent variables in the above equation is as follows:

LTRADE = nonoil exports
LGDP: gross domestic production
LFDIR: foreign direct investment
LERN: nominal exchange rate (informal)
LPXPD: the ratio of export values to import values

According to the theoretical discussions in macro-economy, it is expected that GPD had positive effect on trade balance index. Also, based on the theoretical discussions mentioned in the previous discussions, it is expected that foreign direct investment develop trade balance index. According to the theoretical discussions, exchange rate increase exports (if extended) and the reduction of imports, thus it is expected that the effects of those changes are positive.

Also, exports were evicted in a separate model to specify the impacts of those variables on nonoil exports. Therefore, instead of the trade balance index in the second model, dependent variable is just Iran's nonoil exports specified as follows:

\[
LEXPNO= f(LGDP, LFDIR, LERN, LPXPD, LyF)
\]

(2)

In the model above and also in the previous model, LyF indicates foreigners' income which is considered an important and influential variable on exports in the theoretical discussions. Also, LyF shows gross domestic production in South Korea. This choice is because South Korea was one of the biggest trade partners of Iran in recent years. In addition, one of the similar structures of Iranian economy in the last decades and its commercial relations with Iran has been expanded in recent years.

The first step in analyzing the patterns is to study the reliability of patterns which will be explored:

5.1. Variables Reliability

Generalized Dickey-Fuller Test has been used to study variables reliability which the result of this review has been summarize and reported in Table (2).

Generally, according to Dickey Fuller Test, all variables in the model are unstable. Therefore, subtracting method is used to make the variable reliable. So first grade difference variables are used, which the result obtained has been reported in Table (2).
Table (2): Study of variables reliability in their first grade difference

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intercept</th>
<th>Optimal hiatus</th>
<th>calculated statistics</th>
<th>ADF</th>
<th>Critical value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>%1</td>
</tr>
<tr>
<td>DLTRADE</td>
<td>No</td>
<td>0</td>
<td>-2/32</td>
<td>-2/75</td>
<td>-1/96</td>
</tr>
<tr>
<td>DLERAN</td>
<td>No</td>
<td>1</td>
<td>-3/01</td>
<td>-4/068</td>
<td>-3/122</td>
</tr>
<tr>
<td>DLGDP</td>
<td>No</td>
<td>1</td>
<td>-5/4</td>
<td>-4/068</td>
<td>-3/122</td>
</tr>
<tr>
<td>DLPXPD</td>
<td>No</td>
<td>1</td>
<td>-5/22</td>
<td>-2/77</td>
<td>-1/96</td>
</tr>
<tr>
<td>DLyF</td>
<td>No</td>
<td>0</td>
<td>-3/27</td>
<td>-4/01</td>
<td>-3/10</td>
</tr>
<tr>
<td>DLFDIR</td>
<td>No</td>
<td>1</td>
<td>-1/63</td>
<td>-2/77</td>
<td>-1/96</td>
</tr>
</tbody>
</table>

Source: based on Eviews software and research findings has been summarized and reported.

The above table shows that all the variables in this pattern are reliable in the first difference. In other words, the hypothesis $H_0$ based on the common root is rejected in the first order difference. For example, DLTRADE is reliable in the zero optimal hiatus and with -2.32 ADF statistics at the 95% significance level, because the value of calculated ADF statistics at the critical level of 1% and 5% onwards is also bigger than critical value (in terms of absolute rate) which indicates variable reliability. Also, an explanation about other variables can be indicated depending on their optimal hiatus and also their ADF statistics.

5.2. Model Estimation

To estimate the effects of model's independent variable on dependent variable (trade balance index), OLS method is used, which the results achieved can be expressed as follows:

$$LTRADE = 109.87 + 2.74 \text{LGD}P (-1) + 0.096 \text{LF}DIR + 0.79 \text{LERN}$$

$$(24.78) \quad (2.75) \quad (2.12) \quad (1.67)$$

$$= -0.42 \text{LPXPD} (-1) - 5.94 \text{LyF} (-1) + 0.93 \text{Dumy}$$

$$(0.65) \quad (-2.87) \quad (3.47)$$

$R^2 = 0.86$

$DW = 2.05$

(3)

In the above model, the impacts of GDP is positive with a period of delay on Iran's trade balance index is positive. In addition, foreign direct investment has a positive and significant effect on Iran's trade index, though this effect is less than 1%. Because the input value of FDI to the country is not considerable, there are not many effects on other microeconomic variables, but its positive effectiveness indicates that principled steps ought to be taken to attract foreign investments. It is expected that its investment on the country's macro-economy will be more substantial by increasing the volume of FDI input to the country. Also, the 0.79 ratio of this variable indicates that the sensitivity of exports and imports in Iran is not still very sensitive to exchange rate, or in other words, is not flexible. It is also mentioned tacitly that the condition of Marshall-Lernoul of export tension + imports tension bigger than 1 in Iran's economy (foreign trade) does not exist in Iran.

The effect of this exchange on trade balance index is negative, but it is statistically insignificant. Also, the effect of foreigner's income with a period of hiatus on balance index is negative. In fact, this indicates that Iran's commercial trade balance with South Korea is negative in that we were more importers than exporters from this country. Livestock variable in fact indicates number one for the years in which exchange rate adjustment and liberalization is performed for the rest of years. Generally, the effects of independent variables on dependent variable of the model are almost based on theoretical arguments and previous expectations. In other words, the insensitivity of trade balance index is the exchange rate and also the positive impact of FDI on trade balance index is significant points of model estimation. To evaluate better the effect of variables on the dependent variables of the second model chosen for the estimation, the impact of independent variables on nonoil exports variable is studied. In other words, the considered model will be as follows:

$$\text{LEXPNO} = f(\text{LGD}P, \text{LF}DIR, \text{LERN}, \text{LPXPD}, \text{LyF})$$

(4)

Where LEXPNO variable shows nonoil exports in the above model and the other variables have also been involved in this model based on the same definition.

After estimating the model, the coefficients obtained will be reported as follows:
As the above equation shows, national capital has had a positive and significant effect on nonoil exports with two hiatus periods. The effect of Foreign Direct Investment (FDI) on nonoil exports is positive and significant, but this impact is negligible. In other words, although the effects of Foreign Direct Investment are positive, no significant change will be created in the size of nonoil exports. The effect of exchange rate on nonoil exports of Iran is positive, but it is weaker in terms of significance to other variables mentioned before. It can also be said that responses of nonoil exports is not very strong against exchange rate changes; in other words, Iran export supply is not flexible against exchange rate changes. One percent change in the exchange rate of Iran's exports is less than one percent. The effect of relative prices (LPXPD) on nonoil exports is positive, but not statistically significant. Also, the foreigners' income or the earnings of South Korea had a positive and significant impact on Iran's nonoil exports. Livestock variable has also less positive and significant effect on Iran's nonoil exports according to the previous definition (effects of liberalization of exchange rate).

3.5. Study of the relationship between the causality of patterns

To investigate the causal relationship between main variables of the first model, Granger Causality Test has been used. The main variables which the causality relationship between them should be studied based on research hypotheses (Hypothesis V) is Foreign Direct Investment and Trade Balance Index. After doing the study, the results obtained can be reported as follows:

Hypothesis $H_0$: foreign direct investment is not the Granger cause of trade balance index.

The obtained F for this test is 129/214 and its probability is zero; therefore, $H_0$ hypothesis cannot be accepted and in fact there is a causality relationship between foreign direct investment and trade balance index. Also,

Hypothesis $H_0$: trade balance index is not the Granger cause of foreign direct investment.

The obtained F for this test is 122.578 and its probability is zero; therefore, $H_0$ cannot be accepted and there is a causality relationship between trade balance index and foreign direct investment.

In general, there is a bidirectional causality relationship between foreign direct investment and trade balance index and these two variables will have direct effects on each other. The fifth hypothesis of this study indicating that there is a relationship between FDI and trade balance index is accepted. Also, a causality test has been done among basic variables of the second model. The variables taken for this test are nonoil exports (LEXPORTNO) and foreign direct investment (FDIR).

Hypothesis $H_0$: foreign direct investment is not the Granger cause of nonoil exports.

The obtained F for this test is 2.68 and its probability is 0.12. Since the obtained probability is bigger than 0.05, $H_0$ hypothesis cannot therefore be rejected.

$H_0$ hypothesis: nonoil export is not the Granger cause of foreign direct investment.

The obtained F for this test is 4.38 and its probability is 0.047. Since obtained probability is smaller than 0.05, $H_0$ hypothesis cannot be accepted and there is a causality relationship between nonoil exports and foreign direct investment.

Therefore, there is a bidirectional relationship between nonoil exports and foreign direct investment from nonoil exports.

4.5. Response Functions

Along with the OLS method which the relationship among variables is studied, time series method is also used to study better the relationship between variables in the short and long runs. Of course, it is evident that a short-term relationship between variables is followed in this method, or in other words, we seek to answer this question that if a positive shock is forced in the region of each of the variables on trade balance index, how will be the response of the index (short term). OLS method cannot be accountable for this regard. Therefore, VAR technique was used (vector regression model). Of course, since long-term relationships are not followed in this
method, the tests related to it (such as integration test) were not reported and what justs was related to short-term study has been reported in the figure of next page.

As can be seen in this figure 1, trade balance index (LTRADI) (first chart, left) shows a positive and significant response on four successive periods against the positive shock. Also, trade balance index response on GSP shock is positive. Other variables had their own specific effects which is the illustrative of this effects and the effects of important variables are studied here. Trade balance index has showed a response significantly at least to the second period and a weaker significance from the third period onwards against the shock forced by foreign direct investment.

Figure 1. Response to Cholesky one S.D. innovation ±2 S.E.

Conclusion

Investment is one of the basic parameters of economic growth and development and economic literature. In this study, the role of various investments, i.e. foreign direct investments has also been discussed in this study. Also, according to the findings of this study, it can be said that:

1. The effect of foreign direct investment on trade balance index is positive and significant, but in a low rate.
2. The effect of informal exchange rate on Iran's trade balance index is positive but insensitive. That is to say, trade balance index has low elasticity against exchange rate changes.
3. The impact of foreign direct investment on Iran's nonoil exports is positive, but insignificant.
4. The impact of exchange rate on nonoil exports is positive, but with low elasticity. In fact, low elasticity connotes this points that other than price variables such as inflation exchange rate that can affect nonoil exports, the fundamental question in this study is in fact to study the effects of entering foreign direct investment on other macroeconomic variables, especially trade balance index and nonoil exports. Iran's nonoil exports are still facing with obstacles in other parts such as domestic investment and production. Important factors such as labor force productivity and exports compatibility are among the factors that can have significant effects on nonoil exports in Iran's economy along with price factors such as exchange rate.
5. There is a bidirectional relationship between foreign direct investment and trade balance index.
6. There is a unidirectional relationship between nonoil exports and foreign direct investment. Trade balance response is a positive response against positive shock of FDI entrance in the short run.

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