

Economic growth, openness and foreign direct investment in oil-rich countries

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Abstract: *In this study, the effects of trade openness and foreign direct investment on economic growth through the transfer of technology have been examined. To investigate this issue, we use a sample of 19 oil-rich countries over the time period 1991-2006.*

We estimate two models to investigate this issue. At first, we estimate a model including TO (the ratio of import plus export to GDP) as trade openness, the ratio of FDI to GDP and some other variables as independent variables. The result of this model implies that FDI has positive and significant effect on economic growth while trade openness has negative and significant effect. To examine the negative coefficient of trade openness more, another model is estimated. Export to GDP and Import to GDP were separately considered as trade openness in second model and other variables were same. The result of second model indicates that FDI has positive and significant effect while both trade openness indices have insignificant effect on economic growth.

Keywords: Economic Growth, Trade Openness, Foreign Direct Investment, Technology Transfer

JEL Classification: O40, F21, F41

1- Introduction

Economic growth is an important economic goal for all economies. Some researchers consider two main reasons for this. The first reason is that countries want to satisfy the needs of their people and improve their living standards. The second is that countries want to obtain and protect their international competitiveness. For this reasons, investigation of the variables that affect economic growth and development is very important.

Nowadays, one of the most important variables affecting economic growth is openness. So, investigation of openness indices which affect growth is necessary. In this paper, the effects of trade openness and FDI on economic growth are studied and compared.

There exist many studies on this issue. Some empirical studies on trade openness and FDI interaction on growth (Borensztién et al, 1998; Kohpaiboon, 2004; Mansouri, 2005; Karbasi et al, 2005), FDI-growth nexus and trade-growth nexus (Lipseý, 2000 and Pahlavani et al, 2005) have mostly concluded that both FDI inflows and trade openness promote

economic growth. Nevertheless, there is some clear evidence that the growth enhancing effects of FDI inflows and trade vary in different countries. For some countries FDI and trade can even affect the growth process negatively (Borensztein et al., 1998; De Mello, 1999; Lipsey, 2000; and Xu, 2000). Indeed, the growth enhancing effects of FDI and trade interaction are not state independent but depend on various country specific factors such as the kind of openness.

In this paper, we want to compare the impact of trade openness and foreign direct investment on economic growth through the technological effects in 19 oil-rich countries over the time period 1991-2006. The outline of this paper is as follows. The next section explains the effect of openness on growth. Section 3 describes the model and estimation results for oil-rich countries. Section 4 concludes the paper.

2. The effect of openness on growth

In the neoclassical growth model, the growth rate of technology that determines the growth rate of per capita economic variables is exogenous. So, in this model, the growth rate of per capita economic variables in the long-run is exogenous whereas in the endogenous model, technology growth and economic growth are endogenous.

Trade openness and FDI provide appropriate base for technology growth. Thus, the explanation of the effect of the trade openness and FDI on economic growth in the context of endogenous growth models is more appropriate.

Primarily, we show a simple model for explaining how trade openness and FDI affect production and growth. Consider the following production function:

$$Y_t = A_t \cdot K_t^{\beta_1} \cdot L_t^{\beta_2} \cdot D_t^{1-\beta_1-\beta_2} \quad (1)$$

Where Y_t denotes the total output of the economy (real GDP) at time t , K_t is capital, L_t is labor and D_t denotes a homogeneous function of the factors of production related to trade at time t . The variable A_t captures the total factor productivity at time t . According to this function, a change in any of the variables on the right hand side of the above equation can change the total output. We introduce the function \mathbf{D} as follows:

$$\mathbf{D} = \sum_{i=1}^n x_i^a \quad 0 < a < 1 \quad (2)$$

Where x_i is i – th factor of production that is dependent on trade.

Also, it can be seen that technology is a function of openness as follows:

$$\mathbf{A} = \alpha_0 \cdot \mathbf{S}_{T0}^{\alpha_1} \cdot \mathbf{S}_{FDI}^{\alpha_2} \cdot \mathbf{L}^{\alpha_3} \cdot \mathbf{K}^{\alpha_4} \quad (3)$$

Where \mathbf{S}_{T0} denotes factors associated with trade openness that influences technology and \mathbf{S}_{FDI} is an index of factors associated with FDI that influence technology.

According to the above relation, it is observed that trade openness and FDI can affect economic growth via technological progress.

Now, according to the above relationships that are based on endogenous growth model and Nowak- Lehman (2000) article, we can explain the effects of international economic relationships on output growth rate via three channels:

First, endogenous technical progress makes the economic growth permanent. Innovation, imitation and adaptation are driven by the profit-maximizing behaviour of firms. Even though externalities might be connected with those activities, the costs of innovating, imitating or adapting new products and/or new technologies are covered by temporary profits that allow to set prices correspondingly (mark-up pricing), an idea already propagated by Schumpeter (Romer, 1990; Aghion and Howitt, 1992). Openness could enhance technological progress which, in turn, makes the long-run growth permanent. A speed up in technological progress could be caused by stronger capital goods imports, increased transfer of technology, higher foreign direct investment and/or more incentives to imitate and innovate, factors which are all positively correlated to trade liberalization as far as the empirics are concerned.

Second, according to the AK model an increase in savings and investment does not curb the incentives to accumulate capital. Crucial for this result is the assumption of constant returns to scale of the produced and accumulated factor (which comprises physical and human capital) and the 'unimportance' of non-reproducible factors, such as land. Capital accumulation becomes thus a profitable long-run business (Rebelo, 1991; Jones, 1995). If openness positively influences on savings and capital accumulation, then an adequate trade policy can promote growth in the long-run.

Third, positive externalities linked to capital accumulation (in a broader sense) lead to constant or even increasing returns of the produced factor (Romer, 1986, 1987). Positive externalities suspend the assumption of diminishing returns to capital (which is a crucial assumption in the neoclassical model) and thus make permanent increases in the growth rate of output possible.

Externalities lead to the result that one-time improvements in efficiency (as induced by openness) can permanently increase the rate of economic growth (U. S. International Trade Commission, 1997).

3- Model and empirical results

In this section, we examine whether the trade openness has more significant and positive effect on growth or FDI. We use a panel data of 19 oil-rich countries for 16 years to estimate the following regression:

$$\text{Growth}_{it} = c_i + \alpha_1 \log \text{GDP}_{it-1} + \alpha_2 \text{FDI}_{it} + \alpha_3 \text{TO}_{it} + \alpha_4 \text{Capital}_{it} + \alpha_5 \text{Labor}_{it} \quad (4)$$

Where **Growth** denotes economic growth, **FDI** is the ratio of Foreign Direct Investment to GDP, **TO** is the trade openness index (import plus export divided by GDP), **Capital** is the ratio of capital formation to GDP, **Labor** is **Labor** growth and $\log \text{GDP}_{t-1}$ denotes gross domestic product in last period. The result of the estimation of the above relationship is as follows:

Table 1: Estimated Regression(the ratio of import plus export to GDP as the trade openness index)

Variable	Coefficient	Std. Error	t-statistic	Probability
TO	-0.011215	0.005060	-2.216202	0.0275
FDI	0.165750	0.060302	2.748691	0.0064
CAPITAL	0.236415	0.029980	7.885828	0.0000
LABOR	-0.253822	0.111503	-2.276372	0.0236

LNGDP _{t-1}	0.089663	0.165433	0.541990	0.5883
C	-2.927871	1.795213	-1.630932	0.1040

According to the above results, FDI and capital have positive and significant effect on economic growth. On the other, the coefficient of trade openness is negative and significant. As it is shown, the coefficient of $\log \text{GDP}_{t-1}$ is positive but not significant and implies the lack of convergence among the oil-rich countries. The coefficient of labour is negative and significant. Lack of skill and less labour intensive industry of oil in these countries could be one of the reasons for this result.

Although the coefficient of FDI is positive with a value 0.165750 and also significant, the coefficient of trade openness is -0.011215 that is negative and significant. The above results imply that FDI could be a stronger channel through which the transfer of technology is done.

In order to investigate more deeply the negative effect of the trade openness variable on growth, we divide TO into two variables. So, equation (5) including EX (exports to GDP) and IM (imports to GDP) instead of TO (imports plus exports divided by GDP) is estimated. Indeed, this model is estimated to see whether it is imports or exports that cause this negative effect.

Therefore, equation (5) is considered as follows:

$$\text{Growth}_{it} = c_i + \alpha_1 \log \text{GDP}_{it-1} + \alpha_2 \text{FDI}_{it} + \alpha_3 \text{EX}_{it} + \alpha_4 \text{IM}_{it} + \alpha_5 \text{Capital}_{it} + \alpha_6 \text{Labor}_{it} \quad (5)$$

Where **EX** denotes the ratio of exports to GDP and **IM** denotes the ratio of imports to GDP. In this model, **EX** and **IM** are considered as the trade openness indices.

The estimation of equation (5) based on panel data of the same period and countries has the following results.

Table 2: Estimated Regression(exports to GDP and imports to GDP as the trade openness indices)

Variable	Coefficient	Std. Error	t-statistic	Probability
EX	-0.003445	0.020396	-0.168910	0.8660
IM	-0.021731	0.027213	-0.798534	0.4252
FDI	0.170323	0.061502	2.769374	0.0060
CAPITAL	0.238315	0.030412	7.836337	0.0000
LABOR	-0.257140	0.111991	-2.296077	0.0224
LNGDP _{t-1}	0.087955	0.165742	0.530672	0.5961
C	-2.909143	1.798579	-1.617467	0.1069

As the above table shows, exports and imports are now insignificant. Again FDI and capital formation have positive and significant effects on economic growth. labour coefficient is negative and significant as before. The coefficient of lag of GDP is positive and insignificant, implying the lack of convergence among the countries under study. Again, the above results imply that FDI could be a stronger channel for the transfer of technology and the promotion of economic growth.

According to table 1 and 2, FDI has is more effective than trade openness in increasing economic growth in oil-rich countries. One reason for this result is that most of the

export volume of these countries is oil and, in most of these countries, foreign exchange incomes from oil are spent on consumer imported goods. These goods do not influence economic growth.

4- Conclusion

In this study, the effects of trade openness and foreign direct investment on economic growth through the technological effects have been examined. So, the significance of effect of FDI and trade openness on transfer of technology has been compared for a sample of 19 oil-rich countries over the time period 1991-2006.

Initially, in order to investigate this issue, we estimate one model including TO (imports plus exports to GDP) as trade openness, FDI and several other variables. The result of this model suggests FDI has positive and significant effect on economic growth while trade openness has negative and significant effect. In order to investigate more deeply the negative effect of the trade openness on economic growth, we divide TO into two variables in another model. So, the ratio of exports to GDP and the ratio of imports to GDP were separately considered as trade openness in the second model and other variables were same. The result of the second model indicates that FDI has positive and significant effect while both of trade openness indices have insignificant effects on economic growth.

According to regressions estimated, FDI is more important than trade openness in promoting economic growth in oil-rich countries. One reason for this result is that most of the exports is oil and, in most of these countries, most of oil incomes are spent on consumer imported goods which could not promote economic growth and is not important for the transfer of technology.

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