Foreign Direct Investment and Economic Growth: Evidence from Asian Selected Countries

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ABSTRACT – The purpose of this paper is to investigate the influence of foreign direct investment (FDI) on economic growth in Asian countries for the years 1980-2010. The IPS unit root test indicates that variables are stationary in level and Hausman test proves that we should apply the random effects model. Having estimated the model we come to the conclusion that FDI has positive and significant effect on economic growth and variables such as human capital, economic infrastructure and capital formation have positive effect on GDP. However, population, technology gap and inflation have negative effect on the economic growth.

KEY WORDS: foreign direct investment, economic growth, Asia, panel data

Introduction

One of the main concerns of the governments is to promote development and welfare level of the country. In the past two decades, FDI has been known as an important factor for growth and development. In the recent years, the Asian countries such as Thailand, Malaysia, Indonesia and China have attracted a significant portion of the FDI of the world. This action has been influential on economic growth in Asian countries, in a way that the economic growth has been increased to 7.7% in Southern Asia in 2005, 13.8% in Pakistan, 8% in Afghanistan, 8% in Bhutan and 8% in India.

The capital flow to Asian countries initiated in 1990 with an increasing rate following a decrease in 1980. The FDI has been increased in Asian developing countries from 396 million dollars in 1980 to 102,066 million dollars in 2001. This rate is equal to 13.9% of the whole FDI in 2001 (UNCTAD 2002).

The World Bank reports illustrated the capital growth in Southern Asia to be 23.6 billion dollars in 2005. This major share of this growth belongs to India attracting a considerable FDI of this region. In Pakistan, privatization and natural resources has caused the increase of FDI which was 1.1 billion dollars in 2004 to 2.2 billion dollars in 2005. The paper aims to shed a

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light on whether FDI has had any share in the increase of economic growth in Asian countries or not.

So many researches have been done in this regard. Borensztein and Gregorie & Lee (1978) proved that FDI in an endogenous model provides the grounds for growth in developed countries. Blomstorm and Kokko (1997, 1998) asserted that FDI provides economic growth in developing countries. On the other hand, Balasubramanyan et al. (1996) indicated that FDI, plays more important role in economic growth as compared to export. Carkovic and Levine (2005) also showed that FDI leads to the increase of economic performance. However, Gorg and Greenaway (2004) proved that FDI does not have any influence on economic growth. Behname (2011a, 2011b, 2011c) shows that GDP has a positive effect on FDI and FDI also has a positive effect on GDP.

Theoretical issues

Application of industrial policies such as tax and subsides to attract FDI signifies great benefits of foreign capital for the host countries. The Multinational firms bring about advantages such as advanced technology, trade secret, brand name and trademark, management techniques and marketing strategies (Dunning 1993). But the most important effect of FDI is the increase of growth in the host country.

We could examine the effect of FDI on economic growth within the framework of the growth models. In neoclassical growth model, it is believed that FDI just influences the per capita output level and has no effect on growth rate. However, in modern theories of economic growth, it is believed that FDI is effective on growth rate and level. Based on the recent theories, the main factor influencing the growth rate is the high technology in advanced countries which is transferred to the developing countries through FDI (Borensztein et al 1998). Because of the absence of essential grounds for the formation and improvement of technology in developing countries, these countries have to import these technologies into their country through FDI. On the other hand, through the spillover of technology to other domestic sectors, national economy would benefit this system. When the production technology is improved at the national level, the products would be supplied with higher quality and lower cost, and consequently, national production and per capita output would increase. In other words, technology is the potential source of productivity profits through spillover to domestic enterprises. Borensztein et al (1998) proved that the difference in level of human capital in different countries influences the level of attracting technology which finally would affect the economic growth. So, possessing human capital cause the increase of growth rate. On the other hand, it is to be considered that FDI cause the promotion and elevation of the level of human capital and improve the management techniques in developing countries.

FDI also could increase production and economic growth through the improvement of infrastructures. The multinational enterprises for extraction and transporting raw materials and also sales of final products are forced to modify the transportation and communication systems. The modifications of these infrastructures facilitate transportation of products and therefore, production process is improved. The effect of FDI on economic growth depends on the conditions of the host country. These conditions include trade openness, high rate of

saving and the existence of human capital. The highness of these criteria improves the conditions of host country's enterprises through demonstration, and contract effects, as well as the increase of exports.

Data and methodology

Before estimation of the model, we should be ensured of the stationarity of variables. Dickey-Fuller, (1981) Augmented Dickey and Phillips-Perron tests are used to measure the stationarity of time-series variables, however, for panel data which have higher power compared with time-series, other tests are applied. These tests are: Im, Pasavan and Shin (2003), Levin, Lin and Chu (1992). Among different unit root tests in econometrics literature, the LLC and IPS are more famous than others. Both of these tests have been made based on ADF.

Assuming that data are homogeneous, LLC test has been made for dynamics of autoregressive coefficients for all panel parts. However, IPS more generally considers heterogeneity of this dynamics.

The benchmark model of autoregressive is as follows:

$$Y_{it} = \rho_i Y_{it-1} + \delta_i X_{it} + \varepsilon_{it} \tag{1}$$

where shows

i = 1,2,…N of the countries from the times of t=1,2,….,T.

X_{it} are exogenous variables in the model.

ρ_i is the autoregressive coefficient and

ε_{it} is the static process.

If ρ_i <1, Y_i is weakly stationary and if ρ_i =1, then Y_i has a unit root. In this paper, IPS test was used for the unit root, because the economic structures of the respective countries are different.

Table 1. Unit root test and Panel data

OPE	FDI	INV	HU	POP	INF	GDP
-2.54*	-4.53*	-2.09*	-2.45*	-3.13*	-4.21*	-3.44*

The variables are stationary at the 5% confidence level.

As defined in Table 1, all the variables were significant in 5% level. It means the variables are stationary, and so, spurious regression is avoided. The Hausman (1978) test was used to select the fixed effect or random effect models. This test shows that the random effect model should be applied.

Methods

The main variables for economic growth in this study include investment, population growth, GDP per capita, infrastructure (telephone line), inflation, productivity, human capital and foreign direct investment.

This paper applies the panel data model for estimation of the parameters for southern Asia countries (e.g. Bahrain, Iran, Saudi Arabia, Qatar, Kuwait) we have chosen these countries because ones have the same economic structures and they are exporting oil countries. The basic specification for the model is

$$g_{it} = \beta_0 + \beta_1 INF_{it} + \beta_2 POP_{it} + \beta_3 HU_{it} + \beta_4 INV_{it} + \beta_5 FDI_{it} + BX_{it} + \varepsilon_{it}$$

where g is the real GDP per capita growth of country i, INF is infrastructure, POP is the population growth and HU is human capital in the host economy. FDI is the foreign direct investment and INV is gross capital formation as a percentage of GD. The group of X includes a group of variables to test the robustness of results (e.g. dummy variables, interaction of FDI with other variables, inflation…). We could consider the endogenous form of the model i.e. FDI to be a dependent variable. The technology gap is measured by the following:

$$GAP_{it} = (y\max - y_{it})/y_{it}$$

where the GDP per capita of Iran is used as y max. Before proceeding to estimate panel data, we carry out unit root tests to examine whether the variables are stationary. The data set used covers 6 countries over the period 1980-2010. The sources of variables are UNdata, the World Bank Group, UNCTAD and Growth Data Resources.

Empirical results

The results of the main equation are shown in Table 2. The specifications of column 2.1 are based on the main variables of FDI, HU and POP. The effect of human capital and foreign investment variables on economic growth is positive and significant. Behname (2011a) and Borensztein et al (1998) show the same results for the different countries. FDI such as domestic investment increase aggregate demand and aggregate demand augment domestic output.

The effect of population on growth is positive, but insignificant. We insert INV to the equation to explain column 2.2. This equation shows that capital formation has positive effect on economic growth. In this column all of the variables are positive and significant. If population has a high human capital, increasing it augment GDP. In equation 2.3 the infrastructures are also inserted. The proxy required for infrastructure is the telephone line. In this clarification the infrastructure has positive effect on economic growth, but FDI has no effect on growth. Aitken et al (1997) show the same results in their study. In explanation 2.4, we insert technology gap. This variable has negative effect on growth, and in this equation, FDI has positive and significant effect on economic growth. In explanation 2.5, we insert the interaction relation of technology gap and FDI, which has negative effect on economic

growth. These variables affect GDP in an indirect way. In the last explanation, we insert INFR inflation rate, as an economic risk, into the equation which has negative effect on economic growth.

Table 2. Impact of FDI on per capita GDP growth

	2.1	2.2	2.3	2.4	2.5	2.6
Constant	3.12**	1.21	1.33**	2.31**	1.22	-1.31
	(-2.32)	(1.09)	(2.09)	(2.22)	(0.42)	(-1.14)
POP	0.42	0.12**	-0.51**	-0.13	0.14	0.21**
	(1.02)	(2.05)	(-2.13)	(-1.21)	(-1.01)	(-2.15)
HU	0.93**	0.71**	0.92**	0.31**	0.21**	.23**
	(2.11)	(1.21)	(2.12)	(2.01)	(2.13)	(2.27)
FDI	0.19**	0.39**	0.45	0.22**	0.31***	0.11*
	(2.12)	(2.11)	(1.01)	(2.11)	(3.52)	(1.91)
INV		0.13**	0.21**	0.21	0.25**	0.20**
		(2.31)	(2.30)	(1.33)	(2.12)	(2.35)
INF			0.25**	0.22**	0.63	0.22**
			(2.00)	(2.31)	(1.13)	(2.04)
GAP				-0.09**	-0.11**	-0.07
				(-2.16)	(-2.08)	(-1.24)
FDI*GAP					-0.14**	-0.21
					(-1.98)	(-0.91)
INFR						-0.29**
						(-2.10)

Notes: t-values reported in parentheses;
*** significant at 1% level;
** significant at 5% level;
* significant at 10% level.

Table 3 shows the results of FDI equation. This table studies the effect of GDP on FDI. In equation 3.1, the effect of economic growth and human capital on FDI attraction has been positive, while population shows negative effect.

Based on this table, economic growth, human capital, trade, capital formation and economic infrastructure have positive and mostly significant effect on attracting foreign capital, while population and economic risk, inflation, leads to the decrease of foreign investment. Aitken & Harrison (1999) and De Mello (1997) show the same results. Here OPE is openness that a positive effect on FDI, it means that openness and FDI have a complementary relationship.

Table 3. Impact of growth on FDI inflow

	3.1	3.2	3.3	3.4	3.5	3.6
Constant	-2.19**	2.19***	1.34**	-2.21**	-2.50	-1.44
	(-2.00)	(3.32)	(2.11)	(-2.14)	(-1.21)	(-1.51)
GDP	0.09**	0.02**	0.02	0.03**	0.04**	0.03**
	(2.32)	(2.28)	(1.17)	(2.01)	(2.11)	(2.01)
HU	0.30**	0.325	0.21*	0.32	0.23**	0.03
	(2.14)	(1.11)	(1.98)	(1.32)	(2.14)	(1.03)
POP	-0.24**	-0.35**	-0.28	-0.21	-0.24**	-0.23
	(-2.22)	(-2.11)	(-1.02)	(-1.14)	(-2.28)	(-1.37)
OPE		0.02**	0.03**	0.05**	0.04**	0.10
		(2.31)	(2.16)	(2.10)	(2.14)	(1.29)
INV			0.32**	0.52*	0.25**	0.02**
			(2.09)	(9.88)	(2.15)	(1.98)
INFR				-0.15**	-0.13**	-0.14**
				(-2.01)	(-2.50)	(-2.24)
INF					0.21***	0.21**
					(3.22)	(2.16)
FDI*GAP						0.36**
						(2.06)

Notes: t-values reported in parentheses;
*** significant at 1% level;
** significant at 5% level;
* significant at 10% level.

Conclusion

The study examines the influence of foreign direct investment (FDI) on economic growth in Asian selected countries for the years 1980-2010. Having applied the stationarity, it has been concluded that all the variables are stationary and we would not be trapped with spurious regression. The Hausman test shows that our selection is random effect model. In two other separate tables, we examined the effect of FDI on economic growth, and the effect of GDP on FDI. In each table, we insert variables into the equation separately to be compared. The results of FDI effect on growth indicate that FDI has significant and positive effect on economic growth in Asia region.

With regard to these facts, we come to the conclusion that it is necessary for the countries of Asia to attract the FDI in order to improve growth and welfare of their country. On the other hand, the second table, the effect of GDP on FDI, indicates that factors such as human capital, trade, economic infrastructure and capital have positive effect on attracting FDI. So, the countries located in this region are able to increase their FDI and consequently the growth of their country by emphasizing these variables.

Among other factors effective on economic growth, we could mention economic infrastructure, human capital, decrease of technology gap and capital formation which

increase the growth. However, the population growth, the increase of technology gap, and inflation increase leads to the decrease of economic growth. Based on the obtained results, the countries of Asia should devote their most attention to economic infrastructure and capital formation, since it directly increases GDP and affects it indirectly through attracting FDI.

References

Aitken, B. J., Hanson, G. H., & Harrison, A. E. 1997. "Spillovers, foreign investment, and export behavior." *Journal of International Economics*, (43): 103-132.

Aitken, B. J., & Harrison, A. E. 1999. „Do domestic firms benefits from direct foreign investment?." *American Economic Review*, (89): 605-618.

Akinlo, A. E. 2003. „Globalisation, international investment and stock market growth in sub-Saharan Africa". *Institute of Developing Economies V.R. F Series*, 382.

Balasubramanyan, V. N., Salisu, M., & Sapsford, D. 1996. „Foreign direct investment and growth in EP and IS countries." *The Economic Journal*, (106): 92-105.

Behname, Mehdi. 2011a. „Studying the Effect of Foreign Direct Investment on Economic Growth in Greater and Traditional Middle East Countries." *Journal of Economic Analysis*, 45 (3-4): 35-43.

Behname, Mehdi. 2011b. „Determinants of foreign direct investment in Iran." Management and Economics conference, Iran, Miane

Behname, Mehdi. 2011c. „The relationship between growth, foreign direct investment and trade in Mena countries: A causality test." *Journal of Emerging Markets: Regional Perspective eJournal*.

Blomstrom, M., & Kokko, A. 1997. „How foreign investment affects host countries." In Policy research working paper (Vol. 1745). Washington, DC: World Bank.

Blomstrom, M., & Kokko, A. 1998. „Multinational corporations and spillovers." *Journal of Economic Surveys*, (12): 247-277.

Borensztein, E., De Gregorio, J., Lee, J.W. 1998. "How does foreign direct investment affect economic growth?." *Journal of International Economics*, (45): 115-135.

Buckley, P. J., Clegg, J., Wang, C., & Cross, A. R. 2002. „FDI, regional differences and economic growth: Panel data evidence from China." *Transnational Corporation*, (11): 1-23.

Carkovic, M., Levine, R. 2002. „Does foreign direct investment accelerate economic growth." Unpublished Working Paper. University of Minnesota.

De Mello, L. R., Jr. 1997. "Foreign direct investment in developing countries and growth: A selective survey." *Journal of Development Studies*, (34): 1-34.

Dickey, D., & Fuller, W. 1981. „Likelihood ratio statistics for autoregressive time series with a unit root." *Econometrica*, (49): 1057-1072.

Dunning, J. 1993. *Multinational Enterprises and the Global Economy*. Addison-Wesley, Wokingham.

Feder, G. 1983. „On exports and economic growth." *Journal of Development Economics*, (12): 59-73.

Gorg, H., Greenaway, D. 2004. „Much ado about nothing? Do domestic firms really benefit from foreign direct investment?." *World Bank Research Observer*, (19): 171-197.

Hausman, J.A. (1978). „Specification tests in econometrics." *Econometrica*, (46): 1251-1272.

Hausman, J.A., Taylor, W.E. 1981. „Panel data and unobservable individual effects." *Econometrica*, (49): 1377-1398.

Im, K.S., Pesaran, M.H., Shin, Y. 2003. Forthcoming. „Testing for unit roots in heterogeneous panels". *Journal of Econometrics*.

Levin, A., Lin, C.F.Chu. 1992. *Unit root tests in panel data: asymptotic and finiste sample properties. Discussion Paper* (92-93).

Markusen, J. R., & Venables, A. J. 1999. « Foreign direct investment as a catalyst for industrial development.“ *European Economic Review*, (43): 335–356.

The World Bank Group., www.worldbankgroup.org

The World Bank., www.data.worldbank.org

UNCTAD., www.unctad.org

UNCTAD (United Nations Conference on Trade and Development) 2002. *World Investment Report*, New York.

United Nations. 2007. *World Investment Report 2007 Transnational Corporations as Engines of Growth, Department of Economic and Social Development*, United Nations, New York.

Direktna strana ulaganja i ekonomski rast: dokazi iz odabranih zemalja

REZIME – *Svrha ovog rada je da istraži uticaj direktnih stranih ulaganja na privredni rast u azijskim zemljama u periodu izmedju 1980 i 2010 god. Koršćen je IPS jedinični test. Nakon procena ,došlo se do zaključka da direktna strana ulaganja imaju pozitivan i značajan uticaj na privredni rast ,dok varijable kao što su ljudski kapital, privredna infrastruktura i kapital imaju pozitivan učinak na društveni bruto proizvod. Međutim, stanovništvo, tehnološki jaz i inflacija imajui negativan učinak na privredni rast.*

KLJUČNE REČI: *direktna strana ulaganja, privredni rast, Azija, panel podataka*