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FDI and Economic Growth Relationship Based on Cross-Country Comparison

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ABSTRACT: This paper aims to investigate empirically the impact of FDI on economic growth for Azerbaijan, Kyrgyz Republic, Kazakhstan, Tajikistan, Turkmenistan, and Uzbekistan over the period 1997-2010. The Johansen cointegration and Granger causality tests are used in order to analyze the causal relationship between FDI and economic growth. It is crucial to see the directions of causality between two variables for the policy makers to encourage private sectors. The cointegration test results indicated that FDI and Economic Growth variables are cointegrated for Azerbaijan and Turkmenistan. By using Granger Causality test we found that FDI causes GDP for Azerbaijan and bidirectional causality is observed for Turkmenistan.

Keywords: Economic growth; foreign direct investment; Granger causality
JEL Classifications: C32; F21; O4

1. Introduction

The relationship between Foreign Direct Investment (FDI) and economic growth is becoming more important for both industrial and developing countries. Many policy makers, economists and academicians contend that Foreign Direct Investment can have important effect on the host countries economic growth. Many of the empirical studies regarding the role of FDI in the host countries suggest that FDI may also assist developing countries through the provision of capital with creating new job opportunities, through the inflow of technology, through the inflow of managerial know-how and marketing skills, and through its impact on the development of efficient markets.[1] Because of the mentioned importance, industrialized and developing countries offers incentives to attract FDI in their economies. Beside the positive effects of FDI to the host countries, some firm-level studies do not support the idea that FDI promotes the economic growth.[2]

Since 1970, there have been only five major downturns in FDI inflow trend. In 1976 FDI inflows fell by 21%, in 1982-1983 the decline was 14% a year on average, in 1991 FDI inflow was down 24%, in 2001-2002 the bust in FDI registered 31% a year on average (UNCTAD, 2003), and finally, after a 16 % decline in 2008, global FDI inflow fell a further 37% in 2009 (UNCTAD, 2010).

[1] See Mello (1997, 1999) and Ozturk (2007) for a comprehensive survey of the nexus between FDI and growth as well as for further evidence on the FDI-growth relationship, Mody and Murshid (2002) for an assessment of the relationship between domestic investment and FDI, Neuhaus (2006) shows theoretically FDI not only raises the level of physical capital but also improves the quality of physical capital.
[2] See Carkovic and Levine (2005) and the references therein. Hanson (2001) has found weak evidence that FDI generates positive spillovers for host countries. For a recent, comprehensive discussion at the firm level see also Grog and Greenaway (2004).

FDI remains the biggest component of net resource flows to developing countries, and since 1990 it has been a growing part of total investment in these countries. The amount of FDI flowing to developing countries increased remarkably in the 1990s and now account for about 25% of global FDI (Erdal and Tatoglu, 2002). From only $15 billion in 1985 and $23.7 billion in 1990, FDI inflow to developing countries rose up to $162 billion in 2002 (Farrell, Remes, & Schulz, 2004) which is significant. Developing countries which proved to be relatively immune to the global turmoil in 2008 were not spared in 2009 but did better than developed countries. After six years of uninterrupted growth, reaching the historical record in 2008, 658 billion, FDI flows to developing countries decline by 24% in 2009 (UNCTAD, 2010).

The present paper is organized as follows. Section II includes literature review. Section III describes the methodology and shows estimated results. Last section is the conclusion.

2. Literature Review

Despite of the fact that FDI is very important for the countries, yet there is no universal agreement about the positive relationship between FDI inflow and economic growth. Many of the studies show that the data from only less developed economies has tended to show a clear positive relationship, while researches that have focused on data from only developed countries have found no growth benefit for the recipient country.

For example, FDI positive effects were proved by the Caves` (1974) pioneering work in Australia, and by Kokko (1994) in Mexico. In a research focusing on China, Dess (1998) finds that FDI has a significant positive effect on Chinese long-term economic growth. Ozturk and Kalyoncu (2007) investigates causality between Pakistan and Turkey. They found that it is GDP that causes FDI in the case of Pakistan, while there is strong evidence of a bi-directional causality between the two variables for Turkey. Gursoy and Kalyoncu (2012) investigates the empirically impact of FDI on economic growth of Georgia aver the period of 1997-2010. They found that FDI causes GDP in Georgia. Mullen and Williams (2005) and Choe (2003) have found that FDI has a positive effect on economic growth. But Borensztein et al. (1998), Alfaro et al. (2004), conclude that FDI will promote economic growth only when certain economic conditions are met in the host country, like a threshold level of human capital. Also, Hansen and Rand (2006) argue that FDI promotes economic growth, but the extent at which a country can benefit by FDI depends on its trade policies, labor force skills and absorptive capabilities. Agrawal and Khan (2011) in their study suggest that economic development depends on conduciveness of economic climate. In the absence of such a climate FDI may be counterproductive; it may thwart rather than promote growth.

However, Haddad and Harrison`s (1993) findings and Aitken and Harrison`s (1999) in Venezuela do not support the positive relationship between FDI and the economic growth. In another research of Carkovic and Levine (2005), it is found that FDI does not have any significant impact on economic growth in the host country. Herzer et al. (2007) has argued that with 28 developing countries data there exists neither a long-term nor a short-term effect of FDI on growth; in fact, there is not a single country where a positive unidirectional long-term effect from FDI to GDP is found.

Finally, researches for developing countries show that, consensus has been reached-subject to economic climate- FDI tends to have positive effect on overall economic development.

3. Methodology and Empirical Results

The data is taken from the database of the World Bank in order to investigate the impact of FDI on GDP over the period of 1993-2011. In order to investigate the impact of FDI on economic growth, the following following empirical model was used:

$$GDP = \alpha + \beta * FDI \qquad (1)$$

First of all it is analyzed the time-series properties of the data obtained. Stationary of the series is investigated by using Augmented Dickey-fuller test (ADF). ADF test is based on the following regression:

$$\Delta Y_t = \alpha + \lambda t + \beta Y_{t-1} + \delta_1 \Delta Y_{t-1} + \ldots + \delta_{t-k} \Delta Y_{t-k} + \varepsilon_t \qquad (2)$$

Table 1. ADF unit root test for FDI and GDP at level

Countries	Series	t-statistics	Test critical values	Probability
Azerbaijan	FDI	-2.256224	-3.733200	0.4310
	GDP	-0.629828	-3.733200	0.9611
Kazakhstan	FDI	-3.144177	-3.733200	0.1300
	GDP	-0.503672	-3.733200	0.9709
Kyrgyz Republic	FDI	-0.673333	-3.828975	0.9517
	GDP	-1.176987	-3.791172	0.8746
Tajikistan	FDI	-2.319138	-3.759743	0.4005
	GDP	-1.162354	-3.759743	0.8808
Turkmenistan	FDI	3.740256	-3.828975	0.9999
	GDP	-1.390058	-3.759743	0.8202
Uzbekistan	FDI	-1.322990	-3.759743	0.8403
	GDP	1.356173	-3.759743	0.9998

ADF unit root test is applied on both levels first differences and second differences for FDI and GDP of the investigated countries (table 1 and 2). It is found that FDI and GDP are non-stationary series on levels. The hypothesis of a unit root in FDI for the countries Azerbaijan, Kazakhstan, Kyrgyz Republic, and Tajikistanis rejected as first difference at 5% level at confidence. So FDI is integrated of order 1, I (1) for these countries. FDI is integrated of order two for the other countries. Table I reports the results of ADF for FDI and GDP series.

Table 2. ADF unit root test for FDI and GDP for first difference and second difference

i) first difference

Countries	Series	t-statistics	Test critical values	Probability
Azerbaijan	FDI	-4.613622	-3.875302	0.0172
	GDP	-3.793159	-3.759743	0.0474
Kazakhstan	FDI	-5.067119	-3.875302	0.0090
	GDP	-3.015970	-3.828975	0.1650
Kyrgyz Republic	FDI	-5.380751	-3.828975	0.0049
	GDP	-3.337597	-3.828975	0.1039
Tajikistan	FDI	-5.069308	-3.791172	0.0066
	GDP	-3.681550	-3.828975	0.0625
Turkmenistan	FDI	1.421027	-3.875302	0.9998
	GDP	-3.408323	-3.933364	0.1017
Uzbekistan	FDI	-2.951453	-3.933364	0.1871
	GDP	-1.954894	-3.791172	0.5740

ii) second difference

Countries	Series	t-statistics	Test critical values	Probability
Kazakhstan	GDP	-3.437374	-3.875302	0.0933
Kyrgyz Republic	GDP	-4.852588	-3.828975	0.0106
Tajikistan	GDP	-5.545086	-3.828975	0.0039
Turkmenistan	FDI	-5.282861	-3.875302	0.0067
	GDP	-7.067630	-4.008157	0.0015
Uzbekistan	FDI	-2.504079	-3.933364	0.3207
	GDP	-4.411437	-3.828975	0.0206

The results indicate that FDI and GDP have different order of integration for the countries Kazakhstan, Kyrgyz Republic, Tajikistan, and Uzbekistan. For the case of Azerbaijan and Turkmenistan FDI and GDP have the same order of integration. Cointegration test is performed for the countries which have same order of integration for FDI and GDP. Johansen

cointegration test is used to investigate the relation between FDI and GDP in the long-run. The results of Johansen Cointegration test are reported in Table 3.

Table 3. Johansen Cointegration Test

i) Azerbaijan

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.809665	32.08459	15.49471	0.0001
At most 1 *	0.381219	7.200060	3.841466	0.0073

ii) Turkmenistan

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.693328	17.07394	15.49471	0.0287
At most 1	0.036893	0.526266	3.841466	0.4682

The results of Johansen Cointegration test indicate that FDI and GDP for Azerbaijan and for Turkmenistan are cointegrated. Since GDP and FDI have long-run equilibrium for Azerbaijan and Turkmenistan, Granger causality test is performed for those countries. The Granger causality explains the relationship between two variables that are cointegrated. It investigates whether the lagged varies of one variable can significantly explain the changes of other variable as statistically. The Granger causality between two variables can be changed as the number of lags is changed. The number of lags is decided by using the Akaike Information Criterion (AIC) in this study. We found lag 2 for Azerbaijan and Turkmenistan (table 4).

Table 4. Lag order selection for Granger Causality Test

i) Azerbaijan

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-717.9097	NA	1.67e+39	95.98797	96.08237	95.98696
1	-693.5484	38.97818	1.12e+38	93.27312	93.55634	93.27010
2	-675.1142	24.57895*	1.70e+37*	91.34855*	91.82059*	91.34353*
* indicates lag order selected by the criterion						

ii) Turkmenistan

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-637.8501	NA	1.71e+37	91.40716	91.49845	91.39871
1	-604.4818	52.43599	2.61e+35	87.21168	87.48556	87.18633
2	-593.2804	14.40170*	9.83e+34*	86.18292*	86.63939*	86.14067*
* indicates lag order selected by the criterion						

After finding lag numbers, we analyze the causality between FDI and GDP by using Granger Causality Test (Table 5). There are four possible outcomes regarding causal relationships between GDP and FDI: unidirectional causality from GDP and FDI or vice versa; bidirectional causality between the two variables; and, lack of any causal relationship.

Table 5. Granger causality test

i) Azerbaijan

Null Hypothesis:	Lag	F-Statistic	Prob.
GDP does not Granger Cause FDI	2	0.48175	0.6313
FDI does not Granger Cause GDP		52.8201	5.E-06

ii) Turkmenistan

Null Hypothesis:	Lag	F-Statistic	Prob.
GDP does not Granger Cause FDI	2	25.6401	0.0002
FDI does not Granger Cause GDP		7.96367	0.0102

In Table 5 the causality test results between GDP and FDI is reported. The probability values for F statistics are given on the right side of Table 5. If these probability values are less than any α level, then the hypothesis would be rejected at that level. Test results indicate that bidirectional causality exists between FDI and GDP for Turkmenistan. For the case of Azerbaijan a unidirectional causality between FDI and GDP is observed. It is found that FDI Granger causes GDP for the case of Azerbaijan.

4. Conclusion

The causality between FDI and GDP by using Granger causality test for Azerbaijan, Kyrgyz Republic, Kazakhstan, Tajikistan, Turkmenistan, and Uzbekistan over the period 1997-2010 is investigated in this study. The ADF unit root test results indicated that Kyrgyz Republic, Kazakhstan, Tajikistan, and Uzbekistan have different order of integration. Therefore Johansen Cointegration test is applied to Azerbaijan and Turkmenistan. After finding long run cointegration relationship, we investigate causal relationship by using Grager Causality test. It is found that FDI Granger causes GDP in the case of Azerbaijan. So for the case of Azerbaijan unidirectional causality exists. In the case of Turkmenistan bidirectional causality is observed. FDI Granger causes GDP and GDP Granger causes FDI for the case of Turkmenistan.

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