Determinants Of Foreign Direct Investment: The Case Of Emerging Markets

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ABSTRACT

This paper aims to investigate the relationship between Determinants of Foreign Direct Investment (FDI) inflows and their determinants in 68 Emerging Markets between1984-2011. This paper uses a panel cointegration technique of Pedroni (1999, 2004) and Westerlund and Edgerton (2008) considering both structural breaks and cross-sectional dependence. Cointegration results indicate that there exists a positive long-run relationship between economic growth, openness and FDI and a negative long-run relationship between inflation, real effective exchange rate and FDI.

Keywords: FDI; Panel Cointegration Structural Breaks; Emerging Countries

1. INTRODUCTION

The major concern for investors, policy makers as well as researchers, mainly in the case of emerging economies, is grasping foreign investments. Recently, the world witnessed considerable changes at the level of economics, geopolitics, and production organization and distribution (Vijayakumar et al., 2010). Thanks to their developed consumer market, the emerging economies vastly lure capital; yet the research on FDI determinants in those markets is really scarce. This scarcity may be accounted for by the shortage of data and by some macroeconomic variables.

The literature has widely dealt with potential FDI determinants. Such determinants comprise the availability of an educated workforce (Noorbakhsh et al. 2001), infrastructure (Wheeler and Mody 1992), a stable climate for international investors such as political security (Schneider and Frey 1985), trade openness (Albuquerque et al. 2005), comparative costs like labor cost (Lucas 1993), tariffs and taxes (Gastanaga et al. 1998), and eventually access to natural resources (Agosin and Machado 2007).

Onyeiwu (2008) has recently stipulated that the key determinants of FDI flows are the openness of economy, the GDP per capita and the political risk, relying on a sample of 61 countries belonging or not to the MENA region. Contrary to a number of prior studies on the FDI determinants in the emerging countries, (Jiménez, 2011 ; Agosin and Machado 2007), the empirical findings of Eltayeb and Sidiropoulos (2010) focus on a spatial error model of panel data to account for the economic and institutional variables' impact in 12 MENA countries between the sub-period of 1975-2006. Their major contribution is that structural breaks during such long period can lead to biased results.

Wei (1997, 2000) believes that the risk of corruption negatively affects the FDIs and the multinationals' location choice. Also, good governance positively and significantly influences FDI inflows and outflows (Globerman and Shapiro, 2003). The institutional theory is of great importance for the emerging economies.

Onyeiwu (2003) relies on a fixed effects regressions panel to study the impact of institutional and economic fundamentals on FDI in the MENA region from 1975 to 1999 in 61 countries. However, the author has recently stipulated that show that the key determinants of FDI flows are the openness of economy, the GDP per capita and the political risk, relying on a sample of 61 countries belonging or not to the MENA region.

More recently, with reference to Tranparency International data of a 29-country panel over the 1980-2000 period, Mathur and Singh (2013) assert that any threat of corruption significantly affects the multinationals' location choice. Other than corruption, many empirical studies have examined the link between fundamental democratic rights and the FDIs (Harms and Ursprung, 2002 and Jensen, 2003).

Using panel data techniques with structural breaks process, Teulon and Guesmi (2013) investigate the relationship between FDI inflows and their determinants in six major countries in the South Asian Association for Regional Cooperation over the period 1998 to 2010. Their findings are that openness, growth and exchange rates as well as economic instability do have a long-run impact on FDI inflows in the panel. These results are confirmed by the work of Jabri and al. (2013) showing that openness, growth rate, exchange rate, and economic instability have a long-run impact on FDI inflows. Their tests include Pedroni (1999, 2004) and the Cusum test of Westerlund (2005) tests and apply co-integration tests where dependencies and structural breaks are considered.

The contribution of the present paper to the existing literature on FDI determinants in emerging economies is two-fold. Firstly, it concentrates in particular on 68 emerging countries over a period going from 1984 to 2011. Secondly, the developed panel cointegration techniques of Westerlund and Edgerton (2008) is used to provide reliable results that consider both structural breaks and cross-sectional dependence.

This paper's results show that a positive long term relationship exists between economic growth, openness and FDI, while a negative long term relationship exists between inflation, real effective exchange rate and FDI. Section 2 is devoted to the empirical approach used to measure and account for FDIs. Section 3 deals with presenting and discussing the results while section 4 is the conclusion.

2. EMPIRICAL ANALYSIS

Our dataset of annual time series related to Foreign Direct Investment (FDI), Growth rate (Growart), Inflation (Inflrat), Trade Openness (Open) and Real Effective Exchange Rate (Reer). FDI is Net inflows of foreign direct Investment over GDP. Data is sourced from the World Bank (World Development Indicators). We consider a panel of 68[1] emerging countries over the period 1984-2011. The macroeconomic variables, fully reviewed and analyzed in the literature, set the background of this paper's FDI model.

Following Kamaly (2007), FDI is written as a function of GDP growth (*Growart*), inflation (*Inflrat*), trade openness (*Open*) and real effective exchange rate (*Reer*).The model to estimate is as follow:

$$\left(\frac{FDI}{GDP}\right)_{it} = {}_{i} + \text{Open}_{it} + \text{Growart}_{it} + Inflrat_{it} + \text{Re}er_{it} + {}_{it}$$

The FDI inflows, which are determined in terms of GDP percentage in order to account for the disparities in size amidst countries, do not bear an explosive endogenous variable in the regression (Kamaly, 2003).

- *Growart* is Real growth of Gross National Income per capita in percent as an expression the wealth of the host market. It is expected that this variable positively affects the FDI inflows growth.
- *Open* accounts for the country's economic openness, is measured in terms of imports and exports in GDP and has a positive impact on the FDI inflows. This variable affects positively the FDI inflows.
- *Inflrat* is the change in consumer price index and has been referred to in prior studies as the economic instability surrogate. It bears a negative expected sign.
- *Reer* is called the real effective exchange rate. This variable measures the development of the real value of a country's currency against the basket of the trading partners of the country.

[1]List of countries: Albania, Algeria, Angola, Saudi Arabia, Argentina, Azerbaijan, Bahrain, Bangladesh, Belarus, Bolivia, Brazil, Bulgaria, Chile, China, Colombia, Costa Rika, Egypt, El Salvador, Emirates Arab Union, Equator, Estonia, Russia, Gabon, Guatemala, Haiti, Honduras, Hungary, India, Indonesia, Iran, Iraq, Israel, Jamaica, Jordan, Kazakhstan, Kuwait, Latvia, Lebanon, Libya, Lithuania, Malaysia, Morocco, Mexico, Nicaragua, Nigeria, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Qatar, Syria, Czech R., Romania, Singapore, Slovakia, Slovenia, Sudan, Sri Lanka, Thailand, Tunisia, Turkey, Uruguay, Venezuela, Vietnam, Mongol.

3. RESULTS

3.1 Pre-Testing Results of Stationary: Panel Unit Root Tests

The panel-based methods proposed by Levin et al. (2002), Im et al. (2003), Fisher-ADF and Fisher-PP tests of Maddala and Wu (1999), Breitung (2000) and Carrion-i-Selevestre and al. (2005) are used in this study. The LLC (Levine, Lin and Chu) test is based on the ADF (Augmented Dickey Fuller) test. The IPS (Im, Pesaran and Shin) test is an extension of the LLC test that relaxed the homogenous assumptions by allowing for heterogeneity in the autoregressive coefficients for all panel members. Maddala and Wu (1999) suggest a non-parametric test, which is based on a combination of the p-values of the t-statistics for a unit root in each cross-section al unit (the ADF test).The testing approach has the advantage of allowing for as much heterogeneity across units as possible (Apergis et al.2011). Following Afonso and Rault (2008), the results obtained from traditional unit root tests are based on the assumption that no structural break exists in the series under consideration. Indeed, the standard unit root tests have serious power distortions in the presence of structural breaks. For this reason, we now investigate this issue, using two endogenous unit root tests for structural breaks of Carrion-i-Selevestre and al. (2005) (CiS) that propose a test statistic for the null hypothesis of panel stationarity that allows for the presence of multiple structural breaks. The table 1 reports the results of the panel unit root tests.

Table 1. Panel Unit RootTests

	FDI	**ΔFDI**	**Growart**	**Inflrat**	**Δ Inflrat**	**Open**	**ΔOPen**	**Reer**	**ΔReer**
LLC	-0.546 (0.292)	-24.881 (0.000)	-15.134 (0.000)	-1.308 (0.195)	-93.097 (0.000)	0.211 (0.583)	-27.253 (0.0000)	-6.981 (0.000)	-16.260 (0.000)
IPS	173.079 (1.000)	-27.191 (0.000)	-17.395 (0.000)	-1.574 (0.157)	-42.593 (0.000)	5.574 (1.000)	-28.684 (0.000)	-6.003 (0.000)	-22.349 (0.000)
ADF-Fisher	300.269 (0.000)	1183.25 (0.000)	592.902 (0.000)	747.688 (0.000)	1321.36 (0.000)	87.951 (0.999)	900.504 (0.000)	280.808 (0.000)	858.659 (0.000)
PP-Fisher	278.568 (0.000)	3311.92 (0.000)	642.667 (0.000)	692.528 (0.000)	3422.88 (0.000)	58.163 (1.000)	2634.17 (0.000)	398.487 (0.000)	1079.26 (0.000)
Breitung	-2.733 (0.003)	-10.006 (0.000)	-10.439 (0.000)	-6.787 (0.000)	-6.906 (0.000)	11.172 (1.000)	-2.916 (0.001)	4.956 (1.000)	-12.171 (0.000)
CiS WithBreaks	11.638 (0.0069) [5.540]		8.297 (0.0000) [4.899]	8.125 (0.0000) [4.838]		4.164 (0.0088) [4.778]		33.324 (0.0000) [6.504]	
CiS WithoutBreaks	9.176 (0.0000) [4.268]		13.065 (0.0010) [4.404]	13.139 (0.0000) [4.545]		10.449 (0.0000) [4.309]		98.226 (0.0000) [17.076]	

Notes: Probabilities for the Fisher-type tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality. The choice of lag levels for the Breitung, IPS and Fisher-ADF test are determined by empirical realisations of the Schwarz Information Criterion.The LLC and Fisher PPtests were computed using the Bartlett kernel with automatic bandwidth. Automatic lag length selection based on Schwarz Information Criteria (SIC):5. Δ denotes the first difference.
Test of Carrion et al. (2005): The number of break points has been estimated using the LWZ information criteria allowing for a maximum of m^{max} = 5 structural breaks. The long-run variance is estimated using both the Bartlett spectral kernel with automatic spectral window bandwidth selection as in Andrews (1991), Andrews and Monahan (1992) and Sul et al. (2003). The bootstrap distribution is based on 2,000 replications.
The p-values are respectively in parentheses. The bootstrapped critical values are respectively in the brackets.

Thus, the null unit root hypothesis is worth considering for the first five tests with no dependencies and structural breaks for all variables. Yet, when considering the first difference, the null hypothesis is discarded; which entails that the first difference reinforces the panel unit root results. Therefore, all the variables dealt with in this paper are order one-integrated. In the two tests of Carrion-i-Selevestre et al. (2005), the null hypothesis of panel stationarity cannot be rejected at the 5% level of significance when computing the long-run variance assuming homogeneity. The critical value of the bootstrap distribution leads to the same conclusion, i.e. we cannot reject the null hypothesis of stationarity.

3.2 Co-Integration Tests: Without and with Dependencies and Structural Breaks

The second step of our empirical work involves investigating the long-run relationship between GDP growth, inflation, trade openness and real effective exchange rate and FDI using the panel cointegration technique due to Pedroni (1999, 2004) and Westerlund and Edgerton (2008). Pedroni (2004) proposed two types of cointegration tests: panel tests and group tests. To start with, the panel tests rely on the method of the within dimension, that is the panel cointegration statistics test, which is fourfold: panel v-statistic, panel rho-statistic, panel PP- statistic as well as panel ADF-statistic.

The group tests, on the other hand, rely on the method of the between dimension, that is the group mean cointegration statistics test, which is threefold: group rho-statistic, group PP-statistic as well as group ADF-statistic. Contrary to the alternative hypothesis where a cointegration between variables exits, the null hypothesis implies no cointegration with H_0:ρ_i= 1.

We assume that the tests are running with individual intercept and deterministic trend. The results of Pedroni are reported inTable2. According to the Pedroni test (1999, 2004), the cross-sectional units have to be independent, otherwise their size properties would be misleading. Yet, when dealing with long time spans, such tests become inadequate as they fail to account for the structural change during those periods. Therefore, both the economic dependencies and the structural breaks in panel context are worth pondering in case of studying any cointegration with the macroeconomic and financial data according to Westerlund and Edgerton (2008). Since their test is general, it generates serially correlated and heteroskedastic errors, time trends that are unit-specific and unknown structural breaks at the level of the intercept and slope of the cointegrated regression, with dates varying from one unit to another. The findings of Westrlund and Edgerton (2008) are shown in table 3.

Table 2. Pedroni (2004) residual cointegration test without dependencies and structural breaks

Within Group	Panel v-stat	-2.18764
	Panel rho-stat	-3.12356
	Panel pp-stat	-6.12220
	Panel-ADF-stat	-3.46274
Between Group	Group rho-stat	0.78402
	Group-pp-stat	-11.27921
	Group ADF-stat	-5.76600

The null hypothesis is that the variables are not cointegrated

Table 3. Westerlund and Edgerton (2008) residual cointegration test With dependencies and structural breaks

	No break	**Level break**	**Regime shift**
Zt(*N*)	-3.195 (0.009)	6.438 (0.007)	-0.780 (0.660
Zf(*N*)	-5.307 (0.088)	-3.254 (0.005)	-0.638 (0.449)

Note: The test is implemented using the Campbell and Perron (1991) automatic procedure to select the lag length. We use three breaks, which are determined by grid search at the minimum of the sum of squared residuals. The P-values are for a one-sided test based on the normal distribution.

Table 2 indicates that the four panel statistics among the four statistics used of the within- dimension, discard the no cointegration null hypothesis and approve the variables cointegration. The null hypothesis is further discarded by two out of the three between-dimension staistics, namely the PP-statistic and the ADF-staistic, which further confirms the existence of cointegration among variables. To conclude, six out of seven tests confirm the long-term variables cointegration.

Table 3 exhibits the results of Westerlund and Edgerton (2008). The results indicate that for the first and second model the cointegration reject the null hypothesis of no cointegration and approve that there is evidence of cointegration between variables. In fact, with the exception of $Z_{\emptyset}(N)$ in the no-break model, all the test values are negative. The most extreme observation is for the $Z_{\tau}(N)$ test in the level-break model.

In conclusion, we cannot discard the null unit root hypothesis for the first five tests with structural breaks and no dependencies for all level form variables. Indeed, the very first difference discards the null hypothesis and supports the panel unit root. Therefore, all our variables are integrated of order one. The binary tests of Carrion-i-Selvestre et al. (2005) prove that the panel stationarity null hypothesis cannot be discarded at the 5% significance level because it assumes long-term homogeneity. This result is further supported by the bootstrap distribution values.

Table 4. Long-run estimates

Variables	Growart	Inflrat	Open	Reer
OLS	0.222895	-0.000392	14.94364	-1.1210^{-6}
	(12.462)***	(1.588)*	(19.246)***	(1.849)*
	0.136647	-0.000402	9.719999	-0.000576
FMOLS	(5.236)***	(1.620)*	(4.683)***	(2.103)**
	0.086872	-0.001274	13.48762	-0.004906
DOLS	(1.967)**	(2.491)**	(5.059)***	(1.735)*

Cointegrating equation deterministics: intercept and trend.
The numbers in parentheses are absolute value of t-statistics.
***, ** and * indicate statistical significance at the 1, 5 and 10% levels, respectively.

For panel OLS, DOLS and FMOLS long-run estimates, we find that economic growth and openness appear to play a positive and significant effect on the entry of FDI in emerging countries while inflation, as a proxy for economic instability and real effective exchange rate have a negative and significant role.

4. CONCLUSION

In this paper, we have reported on a study of cointegration analysis between FDI and GDP growth, inflation, trade openness, real effective exchange rate based on a cross-country panel data set covering 68 countries and the time period between 1984 and 2011. The results indicate presence of cointegrating relationship between the variables concerned for all the country-groups considered. Economic growth and openness have a positive effect while inflation and real effective exchange rate have a negative and role on the entry of FDI in emerging countries.

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