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18 March 2012

Online at <https://mpra.ub.uni-muenchen.de/37436/>
MPRA Paper No. 37436, posted 19 Mar 2012 01:22 UTC

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Abstract

This paper aims to examine the relationship between foreign direct investment and the globalization. The Portuguese economy has been a net recipient of FDI. Understanding the main determinants of FDI inflows is important to take the macroeconomic policy decisions. The manuscript analyses the determinants of FDI in Portugal for the period 1990- 2008. Instrumental variable estimation of a dynamic panel model within a system generalized methods moments framework allows us to control for potential correlation issues and endogeneity bias.

The results show that the market size and globalization have a positive impact on FDI. Openness trade and urban population are also statistically significant. The paper confirms some relevant theoretical hypotheses on the causes of the FDI. The good results obtained with the GMM system estimator suggest that the building of dynamic theoretical model will be of interest to academic researches in FDI theory.

Keywords: Foreign Direct Investment; Globalization; Panel Data.

JEL codes: C23, F21.

1. Introduction

Foreign direct investment (FDI) has become even more important than trade. In last decade we assisted a third wave of globalization where the economic linkage between countries has been strengthened mainly by FDI flows. Despite the role of trade the multinational firms have chosen this way internalization and FDI has increased significantly over the last decade outpacing the expansion of the trade in the same period (UNCTAD,2006).

The link between FDI and globalization has been little studied in literature.

The literature of FDI began in 1960s and 1970s with Hymer (1960), Kindleberger (1969), and Caves (1971). Dunning (1981) with the eclectic theory of

FDI, suggested that internalization could be explained the movements of multinational enterprises (MNEs).

Hymer (1960) explained that activities of multinational enterprises do not involve capital mobility.

Caves (1971) considered that relative production costs, technology, trade and barriers are the determinants of foreign direct investments (FDI).

Dunning (1981) with the eclectic theory of FDI, suggested that internalization could explain the movements of MNEs. The author introduced the eclectic paradigm in 1992. The OLI paradigm explains why the investors invest in host country.

Ownership advantages could explain a free access to technology, new products. Firms have ownership characteristics (inputs) as in patents, brand, human resources, and financial assets. Localization advantages are explained by the motivation of FDI. In this topic, we need to think about efficiency, that J. Dunning calls movement of production where there are lower inputs costs (outsourcing of production). The author also analyses the foreign market proximity (strategic asset seeking).

In this case Dunning explains the relationships between foreign market proximity and exports, or foreign market proximity and new production (i.e, if it is better to move production).

This manuscript argues and provides evidence that globalization promotes a positive effect on foreign direct investment (FDI).

The study analyses the link between FDI (inward) and globalization for the period 1990-2008.

The structure of this paper is as follows. The next section presents the literature overview and development of hypothesis. In section 3 we present the methodology. Section 4 shows the econometric model. The final section provides conclusions.

Literature Review and Empirical Studies

The economic factors, such as, market size, its growth rate, labour cost, labour skills, per capita income have been considered as explanatory variables in the econometric models. The market size, usually the researchers use as a proxy GDP, population, or economic growth. Krugell and Naudé (2007), and Maniam (2007) found a positive correlation. Jonhson (2006) and Wijeweera et al. (2010) found a positive impact between population and foreign direct investment.

Trade openness is also an important determinant of FDI. It is expected that trade present a positive impact on inward FDI. Sun et al. (2001), Skabic, and Orlic (2007) found a positive sign.

The dominant paradigm (Carkovic and Levine 2002; Wijeweera et al . 2010) consider a positive sign between human capital and inward FDI.

Some studies consider nontraditional factors called institutional. According to these studies the globalization is positively correlated with inward FDI.

Jeon and Rhee (2008), Maniam (2007), Skabic, and Orlic (2007), and Rodríguez and Pallas (2008), Mukherjee (2008) explained the determinants of FDI using market

size, labour costs, labour skills, openness risk, macroeconomic and political stability. The recent literature as in Naudé and Krugell (2007) consider that foreign direct investment is a dynamic phenomenon. Naudé and Krugell (2007) specify a dynamic panel data (GMM-DIF) proposed by Arellano and Bond (1991). The study of Naudé and Krugell (2007) demonstrates that African policy makers have been intensifying their attempts to attract FDI, researching into the determinants of FDI in Africa.

Péridy (2004) explains the interrelationship between exports and FDI using a GMM-System estimator (Blundell and Bond, 1998, 2000). The author applied a gravity equation.

Methodology and Research design

This study uses a static and dynamic panel. In static panel were estimated with Pooled OLS, Fixed Effects (FE) and Random Effects (RE). The F statistic tests the null hypothesis of the same specific effects for all individuals. If we accept the null hypothesis, we could use the OLS estimator. The Hausman test can decide which model is better: random effects (RE) versus fixed effects (FE). The static panel data have some problems, as serial correlation, heteroskedasticity and endogeneity of some explanatory variables. The estimator GMM-system (GMM-SYS) permits the researchers to solve the problems of serial correlation, heteroskedasticity and endogeneity of some explanatory variables. These econometric problems were resolved by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998, 2000), who developed the first- differenced GMM (GMM-DIF) estimator and the GMM system (GMM-SYS) estimator. The GMM-SYS estimator is a system containing both first- differenced and levels equations. The GMM- SYS estimator is an alternative to the standard first-differenced GMM estimator.

To estimate the dynamic model, we applied the methodology of Blundell and Bond (1998, 2000), and Windmeijer (2005) to small sample correction to have corrected standard errors of Blundell and Bond (1998,2000).

The GMM system estimator is consistent if there is no second-order serial correlation in the residuals (m2 statistics). The dynamic panel data model is valid if the estimator is consistent and the instruments are valid.

Hypothesis

H1: The market size influences the decision of investors.

GDP is the absolute value of GDP per capita (PP, in current international dollars).

The hypothesis 1 is supported in a theoretical model of Dunning (1992). Krugell and

H2: Globalization promotes foreign direct investment.

For the hypothesis 2, we use the index of KOF. This index represents three dimension of globalization: economic; social and political (see Dreher, 2006; Dreher, Gaston, and Martnes, 2008). <http://globalization.kof.ethz.ch/> .

H3: FDI and the openness of economy have a positive correlation.

TRADE, it is a proxy for trade openness, defined as the exports/GDP ratio.

H4: There is a positive relationship between human capital and foreign direct investment.

SCHOOL, is the ratio of enrollment, regardless of age, to the population of the age that officially corresponds to the level of education shown. According to World Bank Indicators the tertiary education is an advanced research qualification normally requires, as a minimum condition of admission, the successful completion of education at the

secondary level. The source is United Nations Educational, Scientific and the World Bank.

H5: Urban population is positively correlated with foreign direct investment.

POP, is urban population refers to people living in urban area as defined by national statistical offices. It is calculates using World Bank population estimates and urban ratios from United World Urbanization Prospects.

Data collection analysis

The dependent variable used is FDI inward from OECD International Direct Investment Indicators. The index of globalization (KOF) used from *ETH*, Zurich. Other explanatory variables, as in GDP per capita, trade openness, human capital, and urban population are taken from *World Development Indicators* (2010), the World Bank.

Model Specification

The hypothesis can be tested with the following equation:

$$\begin{aligned} \text{LogFDI} = & \beta_0 + \beta_1 \text{LogGDP} + \beta_2 \text{LogKOF} + \beta_3 \text{LogTRADE} + \beta_4 \text{LogSCHOOL} + \\ & \beta_5 \text{LogPOP} + \delta t + \eta_i + \varepsilon_{it} \end{aligned} \quad (2)$$

Where FDI is the inward foreign direct investment, X is a set of explanatory variables. All variables are in the logarithm form; η_i is the unobserved time-invariant specific effects; δt captures a common deterministic trend; ε_{it} is a random disturbance assumed to be normal, and identical distributed (IID) with $E(\varepsilon_{it})=0$; $\text{Var}(\varepsilon_{it})=\sigma^2 > 0$.

The model can be rewritten in the following dynamic representation:

$$\text{LogFDI} = \text{LogFDI}_{t-1} + \beta_1 X_{it} - \rho \beta_1 X_{it-1} + \delta t + \eta_i + \varepsilon_{it} \quad (3)$$

Empirical Results

In table 1 we can observe the results of the descriptive statistics of the variables used in this study.

Table1: Descriptive Statistics

Variables	Mean	Std. Dev.	Min	Max
LFDI	4.24	0.92	0.85	6.82
LogGDP	6.12	0.97	4.45	8.99
LogKOF	1.91	0.05	1.77	1.97
LogTRADE	1.86	0.21	1.28	2.27
LogSchool	9.19	1.18	5.16	12.64
LogPOP	0.59	0.07	0.34	0.71

In table 1, we see the results with static panel data (OLS, Fixed Effects, and Random Effects estimators). Our analysis pretends to evaluate the signs of the coefficients and their significances. With Fixed Effects estimator the explanatory power is $\text{Adj. } R^2 = 0.98$. All explanatory variables are significant (LogGDP, LogTRADE, LogSchool, LogPOP at the 1% level), and LogKOF at 5% level. The hypothesis for market size (LogGDP) is according to the hypothesis formulate, i.e, the market size influences the decision of investors. For the coefficient of globalization (LogKOF), the literature predicts a positive sign. The result confirms the existence of such positive effect on the FDI. The variables openness trade (LogTRADE), human capital (LogSchool), and urban population (LogPOP) are significant with a positive expected sign.

Table 2: Static Panel Data

Independent Variables	OLS	Fixed Effects	Random Effects
LogGDP	0.86 (0.55)	0.35 (3.71)***	0.19 (6.50)***
LogKOF	0.41 (0.54)	0.80 (2.22)**	0.26 (1.11)
LogTRADE	0.32 (5.32)***	0.75 (5.91)***	0.41 (3.69)***
LogSchool	0.92 (6.83)***	0.98 (8.78)***	0.37 (2.04)*
LogPOP	6.70 (4.11)***	11.58 (3.50)***	7.70 (16.05)***
C	-1.43 (-3.33)***		3.36 (4.90)***
Adj. R ²	0.92	0.98	0.96
LM (χ^2)			0.910
Hausman (χ^2)			80.580***
Observations	262	262	262

T- statistics (heteroskedasticity corrected) are in round brackets.

***/**/*- statistically significant at 1%,5%, and 10% level respectively. The LM test has χ^2 distribution and test the null hypothesis of non-correlation between non-observable individual effects and explanatory variables. The Th Hausman test has χ^2 distribution and tests the null hypothesis of non-correlation between non-observable individual effects and explanatory variables.

The GMM system estimator is consistent if there is no second-order serial correlation in the residuals (m2 statistics). We used the criterion of Windmeijer (2005) small sample correction to have consistent stand errors. The instruments in levels used are LogFDI(3,8), LogGDP(3,8), LogKOF(3,8), and LogPOP(3,8) for first differences. For levels equations, the instruments are used first differences all variables t-2. As shown in Table 3, the equation presents consistent estimates; with no serial correlation for the GMM-SYS estimator (m1, m2, and statistics).The specification Sargan test shows that there are no

problems with the validity of the instruments used. For lagged dependent variable (LogFDI_{t-1}), a positive sign was expected and the results confirm this.

The variable, LogGDP(income per capita), used also by Krugell and Naudé (2007), and Maniam (2007) has a significant and predicted positive effect on FDI.

Table 3: Dynamic Panel Data

Independent Variables	GMM-System
LogFDI _{t-1}	0.02 (1.97)*
LogGDP	0.15 (2.44)**
LogKOF	1.91 (2.31)**
LogTRADE	0.96 (3.18)***
LogSchool	0.79 (5.59)***
LogPop	8.33 (2.84)***
C	4.65 (2.69)***
M1	0.76 [0.448]
M2	0.52 [0.600]
Sargan Test	25.07 [1.000]
Observations	261

The null hypothesis that each coefficient is equal to zero is tested using a second-step robust standard error.

T-statistics (heteroskedasticity corrected) are in round brackets. ***/**/*- statistically significant, at the 1%,5%, and 10% level, respectively. P-values are in brackets. Year dummies are included in all specification (this is equivalent to transformation the variables into each period). M1 and M2 are tests for first-order and second-order serial correlation in the first-differenced residuals, asymptotically distributed as N(0,1) under the null hypothesis of no serial correlation (based on the efficient two-step GMM estimator). Sargan test is a test of over-identifying restrictions, asymptotically distributed under the null instruments' validity.

The index of globalization (LogKOF) presents a positive expected sign. The studies of Leitão (2011 a), and Dreher et al. (2008) found a positive correlation between globalization and FDI. According to this result, we can concluded that globalization manipualtes the decision of foreign investors. The openness trade influences positively the FDI. Our result is according to the hypothesis formulated. The variable, human capital (LogSchool) presents a positive sign, confirming the theoretical forecast proposed by the literature. Carkovic and Levine (2002) found the same result. The coefficient of LogPOP (population) is positive as expected and significant at 1 per cent level. This result demonstrates the importance of population of host country. In the other words, population of host country influences the decision of foreign investors.

Conclusion

In this manuscript, we provide an overview of the development of foreign direct investments (FDI), including localization and globalization.

The FDI flows from European countries indicate that Spain, Netherlands, and the United Kingdom are the major investors.

For the measurement of FDI we used a static and dynamic panel data analysis (GMM-system estimator). Our sample covers the time period of 1990 to 2008 for 33 countries.

The lagged FDI variable presents an expected positive sign. According to this result we can concluded that foreign direct investment promotes the specialization between countries.

We find empirical evidence for the effect of some economic variables on Portuguese FDI: market size (GDP), openness trade and globalization are also statically

significant. The human capital (School) is an important determinant of FDI. As Portugal is a small open economy and relatively labour abundant country the results confirm what has been hypothesized: as more open to trade and cheaper labour, higher will be the FDI flows in Portugal. The study has however, some limitations. A deeper analysis needs to include other control variables: market growth, language and cultural similarity.

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