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Abstract

This paper analyses FDI in 27 Asian countries in the period 2003-2011using a panel data quantile regression method and taking into account the heterogeneity in the data. Robustness tests are carried out by allowon

1.   Introduction

The literature on Foreign Direct Investment (FDI) has focused on various determinants, such as the domestic capital stock (Desai et al., 2005), economic growth (Prasad et al., 2007), employment protection (Dewit et al., 2009), exports (Helpman et al., 2004), knowledge capital (Carr et al., 2001), location choice (Becker et al., 2005), multinational characteristics (Zhang and Markusen, 1999), productivity spillovers (Barrios and Strobl, 2002), total factor productivity (De Mello, 1999), and technology transfers (Glass and Saggi, 2002). The present paper aims to contribute by examining FDI in a sample of Asian countries using panel quantile regressions Most studies analyse FDI flows from developed to developing countries (e.g., De Mello, 1997), either adopting a micro approach with company data (Alfaro et al., 2010; Gorg, Muhlen and Nunnenkamp, 2010) or a macro approach with national data (Fernandes and Paunov, 2011). By contrast, our focus is on FDI in Asia, a region for which only limited evidence is available at present. Moreover, our econometric approach (i.e., the panel quantile model) takes into account heterogeneity across countries and sheds light on how different covariates have generated FDI flows in different economies in the region.

The importance of taking into account heterogeneity has been highlighted in many recent studies (Chesher, 1984; Chesher and Santos-Silva, 2002). This can be done by estimating either panel data models allowing for heterogeneity (Pesaran, 2005) or quantile panel regressions including fixed effects to control for some unobserved covariates (Chernozhukov, Fernandez-Val, Hahn, and Newey, 2010). In the present case study we use the latter method and pay particul

This paper is organised as follows. The next section briefly reviews the relevant literature; Section 3 discusses some features of the Asian economies under investigation; Section 4 outlines the theoretical framework and the hypotheses to be tested; Section 5 introduces the econometric specification and discusses the data and the empirical results, including some robustness tests; Section 6 offers some concluding remarks.

2. Literature Review

Since the 1960s, when Hymer (1960) first introduced the notion of foreign direct investment (FDI), a succession of theories have been developed, such as the ownership advantage theory (Hymer, 1960), the product life-cycle theory (Vernoon, 1966) and the OLI paradigm (Dunning, 1980). In addition to improving multinational companies' (MNCs) returns, FDI can increase the host countries' savings and investment and improve technology. Hence, FDI has been investigated in numerous empirical studies (see Moosa and Cardak(2006), Jadhav (2012), Groh and Wich (2012) for some reviews of the literature). As noted by Groh and Wich (2012), there are two main strands in the literature: one focuses on the FDI determinants at the micro level, the other at the macro level. The current paper belongs to the latter category, mostly adopting the "gravity model" to explain FDI flows (Stein and Daude, 2001; Bevan and Estrinb, 2004; Bellak et al., 2008).

                              or.3 TD-.0067 Tc.0001 Tw(1 explaiReyDI)]T
Groh and Wich (2012) identify f

Wei (1995), Grosse and Trevino (1996), Liu et al. (1997) and Hsiao and Hsiao (2004) argue that cultural differences and geographic distance are also important factors determining inward FDI.

Natural resources also play an important role in attracting inward FDI (see, E.G., Asiedu and Lien, 2004). Deichmann et al. (2003), Onyeiwu and Shrestha (2004) and Jadhav (2012) argue that the reason is that resource-seeking is a strategy of MNCs-

and Montagna, 2010) and the distortions caused by FDI in domestic production (Sawaki, 2008).

3.   The Asian economies

Asia is the world's largest continent, in addition to being the most diverse in terms of geography, ethnicity and so on. It stretches from the Mediterranean, Black and Red Seas in the West to the Pacific Ocean in the East, and from the Siberian glacial Arctic Ocean in the North to the Indian Ocean in the South.

The second half of the 20th century was characterised by a number of waves of spectacular economic growth among countries of the Asian Pacific Rim, first in Japan, then in South Korea, Singapore, Hong Kong, Malaysia and Indonesia, among others.[1] In more recent decades, the rapid growth of China and India has also been breath-taking. Broadly speaking, the economic development of these countries has been based on exporting manufactured goods. In the case of the Middle East and the former Soviet Union republics of Central Asia, prosperity has been largely due to these countries' vast reserves of oil and other forms of non-renewable energy, in particular gas. Despite the many military conflicts and tensions that have plagued certain Asian regions and continue to destabilise others, and despite the financial crisis that rocked the Asian

Since Asia accounts for some 60% of the world's population and thus offers concentrations of cheap labour, some FDI source countries, including Japan, the United States and EU member-states, have invested strongly in labour-intensive industries, such as textiles and clothing and so on. In many Asian countries great emphasis is placed on creating and maintaining a highly educated and skilled workforce, which is essential for producing cutting-edge electronics and IT goods and services. With the improvements in the quality of education and favourable policies, FDI inflows are likely to continue to increase.

Figure 1   the stock of inward FDI into the Asian countries as a percentage of world FDI.

<<Insert Figure 1 around here>>

Sources: United Nations Conference on Trade and Development (unctadstat.unctad.org).

However, they vary greatly from country to country. According to the statistics reported in the UNCTAD database, during the period from 1970 to 2011 the least developed Asian countries attracted the least amount of FDI, accounting for less than 1% on average, while the more advanced developing countries welcomed the main share, more than 90%. Furthermore, among the latter group, the Eastern and South-Eastern Asian countries absorbed the overwhelming majority of FDI. FDI inflows into the former did not exceed those into the latter until 1984. With the implementation of an open-door policy and the start of a programme of structural reforms, China began to flourish and its government entered into the competition to attract FDI. As a result, since 1992, China has been the Asian country attracting the largest amount of FDI and has held the world's fourth largest stock of FDI since 2003 (UNIDO, 2005; Benoît Mercereau,

2005). As already remarked, FDI inflows into

Hypothesis 3 (OPEC): FDI increases with OPEC membership (Gately, 1984). Oil is a source of wealth and therefore a driver of FDI. Again a dummy is defined being equal to 1 in case of membership and 0 otherwise.

Hypothesis 4 (GDP): FDI is affected positively by GDP growth rate. Traditionally it is thought that FDI increases growth (Borensztein, De Gregorio and Lee, 1998). However, causation may run in the opposite direction, i.e. rapid economic growth may attract FDI (growth-driven FDI) (Bevan and Estrin, 2004).

Hypothesis 5 (credit): FDI is affected positivel

Hypothesis 11 (trade and investment globalisation): FDI is affected positively by trade and investment globalisation (Baltagi, Demetriades and Law, 2009).

5. Empirical analysis

In average regressions the average measures

methods (Buchinski, 1994; Koenker and Basset, 1982; Koenker and Hallock, 2001; Koenker, 2005).

To estimate the FDI regression, we used a balanced panel data on FDI in 27 Asian countries over the period 2003-2011, available

A fixed-effects quantile regression model for panel data is estimated using the R software (Geraci, 2012). Specifically, it is the lqmm - quantile regression model for independent and hierarchical data with fixed and random effects. The coefficients can be interpreted as the FDI percentage in quantile q_i accounted for by each of the covariates. Based on the AIC-Akaike Information Criterion Statistics, the quantile model provides an adequate fit to the data compared with the quantile estimates (0.5 quantile) of the OLS average value.

By comparing the average regression (0.5 quantile) with the other quantile regression values, it can be seen that the average estimates (positive in all cases) are misleading: the quantile regression shows that the relationship between covariates and FDI is not linear for some variables. For example, the OECD dummy variable displays coefficient values that is decreasing for the upper (but not the lower) quantiles. The same pattern emerges for other variables. FDI decreases homogenously for the OECD variable in the sample and also decreases with the Yrsffc variable for most quantiles. The GDP growth rate variable is only significant for small quantiles. The same pattern is observed for exports-gdp. The Credit-gdp variable display statistical significant values for the upper quantiles. Overall, there is clear evidence of heterogeneity across countries given the differences in the statistical significance of the variables.

Next, we control for the endogeneity of the GDP growth rate as well. While FDI may increase growth (Borensztein, De Gregorio and Lee, 1998), causation may also run in the opposite direction, with rapid economic growth attracting FDI (growth-driven FDI, Bevan and Estrin, 2004). Therefore, we estimate a quantile regression with instrumental variables (IVFEQR - instrumental variable quantile regression with fixed effects, Harding and Lamarche, 2009), instrumenting the GDP growth rate with its lagged value.

<< Insert Table 4 around here>>

The results in Table 4 are very similar to those in Table 3, suggesting robustness.

6. Conclusions

This paper analyses FDI in 27 Asian countries in the period 2003-2011using a panel data quantile regression method and taking into account the heterogeneity in the data. Robustness tests are carried out by allowing for the endogeneity of the GDP growth rate (Harding and Lamarche, 2009). Overall, there is clear evidence of heterogeneity as indicated by the differences in the relative importance of the factors affecting FDI in the various countries. Moreover, the analysis by quantile confirms that bigger economies tend to attract more sizeable FDI inflows than smaller ones, as one would expect.

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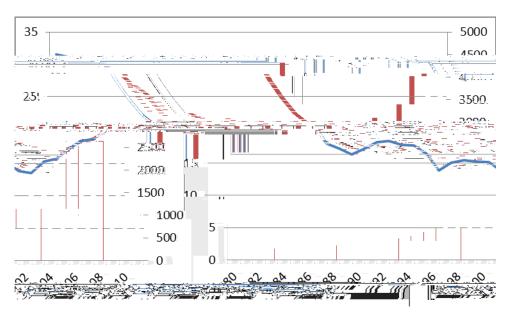VERNON, R. (1966) International investment and international trade in the product

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Figure 1   The stock of inward FDI in Asian countries (1980-2011)

Note: LHS = the proportion of the inward FDI stock in the world in %; RHS = the stock of inward FDI in billion US dollars.
Source: United Nations Conference on Trade and Development (unctadstat.unctad.org)

Table 1: Sample Countries (27 countries)

Pacific & South Asia (17)			Near-, Mid-Eastern & Cent. Asia (10)	
Bangladesh	South Korea	Philippines	Israel	Kyrgyz Republic

	(0.171)	(0.151)	(0.170)	(0.195)	(0.178)	(0.210)	(0.227)	(0.205)	(0.220)
globalizat	0.010	0.001	0.001	0.010	0.032	0.028	0.069	**0.092**	**0.078**
	(0.015)	(0.014)	(0.018)	(0.026)	(0.030)	(0.038)	(0.036)	**(0.034)**	**(0.034)**
trade	**0.039**	0.040	**0.047**	0.043	**0.042**	0.042	0.040	0.080	0.079
	(0.018)	(0.020)	**(0.017)**	(0.026)	**(0.021)**	(0.067)	(0.063)	(0.054)	(0.048)
Pseudo R2	0.268	0.297	0.293	0.286	0.368	0.264	0.276	0.224	0.230
Observations	241	241	241	241	241	241	241	241	241

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	-2.503	-1.897	-2.786	-2.834	-2.774	-2.920	-3.952	-4.129	-4.204
	(0.813)	(0.706)	(0.690)	(0.730)	(0.807)	(1.044)	(1.594)	(1.169)	(1.109)

gdprate   **0.077   0.065 0.077**

(0.027)

(0.813)(0.807)

globalizat	0.010	0.001	0.001	0.010	0.032	0.028	0.069	**0.092**	**0.078**
	(0.015)	(0.014)	(0.018)	(0.026)	(0.030)	(0.038)	(0.036)	**(0.034)**	**(0.034)**
trade	**0.039**	0.040	**0.047**	0.043	**0.042**	0.042	0.040	0.080	0.079
	(0.018)	(0.020)	**(0.017)**	(0.026)	**(0.021)**	(0.067)	(0.063)	(0.054)	(0.048)
Pseudo R2	0.268	0.297	0.293	0.286	0.368	0.264	0.276	0.215	0.331
Observations	241	241	241	241	241	241	241	241	241
AIC	10404	10310	10320	10322	10324	10308	10304	10305	10301

Appendix 1: Sources of the Data

OECD	OECD website
OPEC	OPEC website
R3	Carmen M. Reinhart and Kenneth S. Rogoff (2004) "The Modern History of Exchange Rate Arrangements: A Reinterpretation"; Quarterly Journal of Economics 119(1):1-48
FDI	World Bank Database
gdprate	
exports_gdp	
imports_gdp	
reserves	
creditgdp	
economicglb	KOF Globalization Index
tradeglb	
kaoopen	The Chinn-Ito Index
yrsoffc	Database of Political Institutions
herfgov	
politics	Freedom in the World Country Ratings

The classification of the exchange rate regime arrangements

3 categories	15 categories	Specification
1	1	No separate legal tender
	2	Pre-announced peg or currency board arrangement
	3	Pre-announced horizontal band that is narrower than or equal to +/-2%
	4	De facto peg
2	5	Pre-announced crawling peg
	6	Pre-announced crawling band that is narrower than or equal to +/-2%
	7	De facto crawling peg
	8	De facto crawling band that is narrower than or equal to +/-2%
	9	Pre-announced crawling band that is wider than or equal to +/-2%
	10	De facto crawling band that is narrower than or equal to +/-5%
	11	Moving band that is narrower than or equal to +/-2% (i.e., allows for both appreciation and depreciation over time)
3	12	Managed floating
	13	Freely floating
excluded	14	Freely falling
	15	Dual market in which parallel market data is missing.

Sources: Carmen M. Reinhart and Kenneth S. Rogoff (2004), "The Modern History of Exchange Rate Arrangements: A Reinterpretation"; Quarterly Journal of Economics 119(1):1-48