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# Foreign Direct Investment in the Asian Economies

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## *Abstract*

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

## **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).

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.<sup>1</sup> In more recent decades, the rapid growth of China and India has also been breathtaking. 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 2003-2011 using 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.

## References

- Alfaro, L.; Chanda, A.; Kalemli-Ozcan, S. and Sayek, S. (2010) Does foreign investment promote growth? Exploring the role of financial markets on linkages. *Journal of Development Economics*, 91, 242-256.
- Agmon, T. and Lessard, D. R. (1977). Investor recognition of corporate international diversification, *Journal of Finance*, 32, 1049-1055
- Asiedu, E. and Lien, D. (2004). Capital Controls and Foreign Direct Investment. *World Development* Volume 32, Issue 3, March, Pages 479–490
- Asiedu, E. and Lien, D. (2011). Democracy, foreign direct investment and natural resources. *Journal of International Economics*. 84, 99-111.
- Baltagi, B.H.; Demetriades, P.O. and Law, S.H. (2009). Financial development and openness: Evidence from panel data. *Journal of Development Economics*, 89, 2, 285-296.
- Barrios, Salvador and Eric Strobl (2002) Foreign Direct Investment and Productivity Spillovers: Evidence from the Spanish Experience , *Weltwirtschaftliches Archiv* 138, 3, 459-481
- Bellak, C.; Leibrecht, M. and Riedl, A. (2008). Labour costs and FDI flows into Central and Eastern European Countries: A survey of the literature and empirical evidence. *Structural Change and Economic Dynamics*, 19, 17–37.
- Beck, Thorsten, R. Levine and N. Loayza (2000). Finance and the Sources of Growth,” *Journal of Financial Economics*,, 58: 261-300.
- Becker, S.O., K. Ekholm, R. Jäckie, M. Muendler (2005) Location Choice and Employment Decisions: A Comparison of German and Swedish Multinationals, *Review of World Economics / Weltwirtschaftliches Archiv* 141, 4, 693-731
- Bernini, C.; Freo, M. and Gardini, A. (2004) Quantile estimation of frontier production function. *Empirical Economics*, 29, 373 381.
- Bevan, A.A. and Estrin, S. (2004). The determinants of foreign direct investment into European transition economies. *Journal of Comparative Economics* 32 (2004) 775–787
- Borensztein , E.; De Gregorio, J. and Lee, J-W. (1998). How does foreign direct investment promote growth? Sources of growth. *Journal of International Money and Finance* 17, 4, 407-429.



Dunning, J. (1981). *International Production and the Multinational Enterprise*. Allen & Unwin, London.

Dunning, J. (1993). *Multinational enterprises and the global economy*. Reading, MA: Addison-Wesley Publications Co.

Dunning, J. H. and R. Narula (1996). *Foreign direct investment and governments: Catalysts for economic restructuring*. London and New York, Routledge.



presented in Canadian Economic Association, National Conference on policy.

Helpman, Elhanan, Marc J. Melitz, and Stephen R. Yeaple (2004) Export Versus FDI with Heterogeneous Firms, *American Economic Review* 94, 1, 300-316.

Hymer, Stephen Herbert. 1976. *The International Operations of National Firms: A study of foreign direct investment*. The MIT Press: Cambridge, MA. (1960 doctoral thesis submitted posthumously for publication by Charles P. Kindleberger)

Hsiao, F.S.T. and Hsiao, M.C.W. (2004). The chaotic attractor of foreign direct investment—Why China? A panel data analysis. *Journal of Asian Economics* 15, 641–670.

Hatzius, J. (2000). Foreign direct investment and factor demand elasticities. *European Economic Review*, 44, 117-143.

Jadhav, P. (2012). Determinants of foreign direct investment in BRICS economies: Analysis of economic, institutional and political. *Procedia - Social and Behavioral Sciences*, 37, 5-14.

Klein, W. M., and Rosengren, E. S. (1994). The Real Exchange Rate and Foreign Direct Investment in the United States: Relative Wealth vs Relative Wage Effects, *Journal of International Economics*, 36, 373-389

Koenker, R. and Basset, G. (1982). Robust Test for Heteroscedasticity Based on Regression Quantiles, *Econometrica*, Vol. 50, No.1, pp. 43-61.

Koenker, R. (2005). *Quantile Regression*, Cambridge, Cambridge University Press.

Koenker, R. ad Kevin F. Hallock, K.F (2001). Quantile Regression, *Journal of Economic Perspectives*, 15, 4, 143–156

Krugman, P. and Obstfeld, M. (1999). *International economics: theory and policy*. (5th ed.). New York: Addison Wesley Longman.

Leahy, D. and Montagna, C. (2010). Temporary social dumping, union legalization and FDI: a note on the strategic use of standards. *The Journal of International Trade & Economics Development*, 9, 3, 243-259.

Liu, X., Wang, C. and Wei, Y. (2001). Causal links between foreign direct investment and trade in China. *China Economic Review*, 12, 190–202

Liu, X.; Song, H.; Wei, Y. and Romilly, P. (1997). Country characteristics and foreign direct investment in China: A panel data analysis. *Review of World Economics*, Volume 133, Number 2, 313-329.

Li, X. and Liu, X. (2005). Foreign Direct Investment and Economic Growth: An Increasingly Endogenous Relationship. *World Development*, 33(3), 393-407.

Markusen James R. and K. Maskus (2002). A Unified Approach to Intra-Industry Trade and Foreign Direct investment” in Lloyd, P.J. and Lee, H.H. (eds.), *Frontiers of Research in Intra-Industry Trade* (Houndmills: Palgrave and Macmillan).

Mercereau, B. (2005). FDI Flows to Asia: Did the Dragon Crowd Out the Tigers? IMF Working Paper, WP/05/189.

- Moosa, I.A. and Cardak, B.A. (2006). The determinants of foreign direct investment: An extreme bounds analysis. *Journal of Multinational Finance and Management*, 16, 199–211.
- Mundell, R. (1957). International Trade and Factor Mobility, *American Economic Review* 47: 321-35.
- Naguib, R.I. (2012). The effects of privatisation and foreign direct investment on economic growth. 21, 1, 51-82.
- Nair- Reichert, U. and Weinhold, D. (2000). Causality tests for cross-country panels: new look at FDI and economic growth in developing countries. [Online]. Available [http://www.ciber.gatech.edu/workingpaper/99\\_00-12.pdf](http://www.ciber.gatech.edu/workingpaper/99_00-12.pdf)
- Nakamura, S.Y and Oyama, T. (1998). The Determinants of Foreign Direct Investment from Japan and the United States to East Asian Countries, and the Linkage between FDI and Trade. Bank of Japan Working Paper 98-11
- Onyeiwu, S. and Shrestha, H. (2004). Determinants of Foreign Direct Investment in Africa. *Journal of Developing Societies* June 2004 vol. 20 no. 1-2 89-106.
- Pesaran, M. H. (2006). Estimation and inference in large heterogeneous panels with a multifactor error structure. *Econometrica*, 74(4), 967-1012.
- Petri, P.A. and Plummer, M.G. (1998). The determinants of US investment abroad: Evidence of trade-investment linkages, Chapter 7 in Hiro Lee and David Rolland-Holst (eds.) *Economic Development and Cooperation in Pacific Basin: Trade, investment and environmental issues*. Cambridge University Press
- Pham, T.H.H. (2011) .Temporal causality and the dynamics of foreign direct investment and trade in Vietnam. *The Journal of International Trade & Economic Development*, 21,1, 83-113.
- Polachek, Solomon. (1997). Why Democracies Cooperate More and Fight Less: The Relationship between International Trade and Cooperation, *Review of International Economics*: 295-309.
- Prasad, E.S., Raghuram G. Rajan, Arvind Subramanian (2007) *Foreign Capital and Economic Growth*, *Brookings Papers on Economic Activity* 2007, 1, 153-209.
- Reynolds, T.; Kenny, C.; Liu, J. and Qiang, C.Z.W. (2008). Networking for foreign direct investment: the telecommunications industry and its effect on investment. *Information Economics and Policy*, 16, 159–164.
- Sawaki, H. (2008). Potential FDI causing large distortions in domestic production. *The journal of International Trade & Economic Development*, 17,4,485-500.
- Stein, E. and C. Daude (2001). ‘Institutions, Integration and the Location of Foreign Direct Investment’, in *New Horizons of Foreign Direct Investment*, OECD Global Forum on International Investment (Paris).

Takagi, S. and Shi, Z. (2011). Exchange rate movements and foreign direct investment (FDI): Japanese investment in Asia, 1987–2008. *Japan and the World Economy*, 23, 265–272.

Tuan, C. and Ng, L. F.Y. (2004). Manufacturing agglomeration as incentives to Asian FDI in China after WTO. *Journal of Asian Economics*, 15, 673–693

UNIDO (United Nations Industrial Development Organization). *Foreign Direct Investment in Southeast Asia: Experience and Future Policy Implications for Developing Countries*. Bangkok, Thailand, 2005.

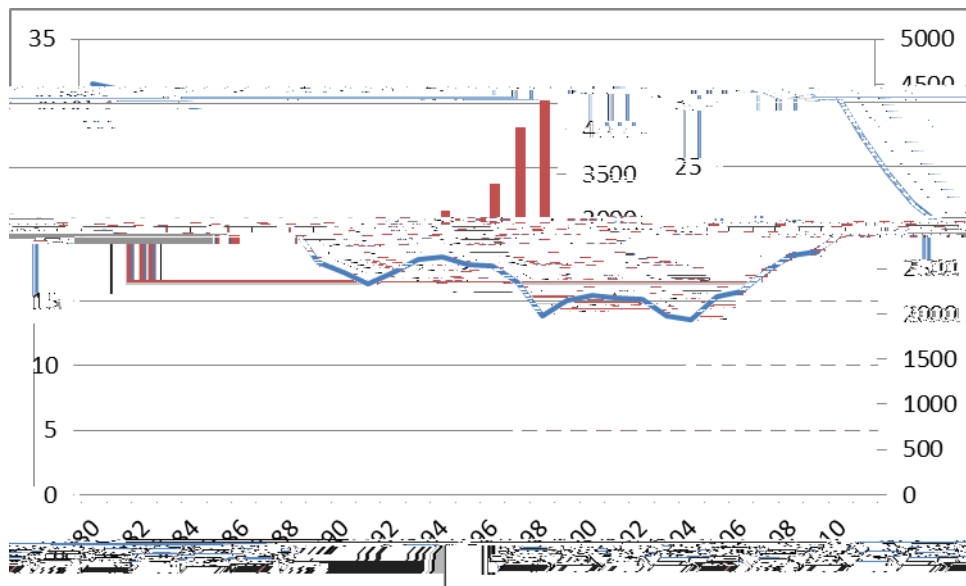
United Nations Conference on Trade and Development (UNCTAD) (2002). *The World Investment Report*.

VERNON, R. (1966) International investment and international trade in the product cycle, in: *Quarterly journal of Economic*, 83, (1), pp. 190-207.

Wei, Shang-Jin (1995). Attracting foreign direct investment: Has China reached its potential? *China Economic Review*, Volume 6, Issue 2, Pages 187–199

Zhang, Kevin Honglin and Markusen, James R. (1999) Vertical Multinationals and Host- Country Characteristics. *Journal*

**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](http://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



	<b>(0.171)</b>	(0.151)	(0.170)	(0.195)	(0.178)	(0.210)	(0.227)	(0.205)	(0.220)
globalizat	0.010 (0.015)	0.001 (0.014)	0.001 (0.018)	0.010 (0.026)	0.032 (0.030)	0.028 (0.038)	0.069 (0.036)	<b>0.092</b> <b>(0.034)</b>	<b>0.078</b> <b>(0.034)</b>
trade	<b>0.039</b> <b>(0.018)</b>	0.040 (0.020)	<b>0.047</b> <b>(0.017)</b>	0.043 (0.026)	<b>0.042</b> <b>(0.021)</b>	0.042 (0.067)	0.040 (0.063)	0.080 (0.054)	0.079 (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

0.41994( .003.003 T7V[(0.)7.5(26)6(8)6( 0.)7+1.429027(.0(41 2ef410.88 .16 .48 .47998 ref79.44 564.92 .)586.88f198.24 58

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

gdprate      **0.077**    **0.065 0.077**  
**(0.027)**

**(0.813)(0.807)**



globalizat	0.010 (0.015)	0.001 (0.014)	0.001 (0.018)	0.010 (0.026)	0.032 (0.030)	0.028 (0.038)	0.069 (0.036)	<b>0.092</b> <b>(0.034)</b>	<b>0.078</b> <b>(0.034)</b>
trade	<b>0.039</b> <b>(0.018)</b>	0.040 (0.020)	<b>0.047</b> <b>(0.017)</b>	0.043 (0.026)	<b>0.042</b> <b>(0.021)</b>	0.042 (0.067)	0.040 (0.063)	0.080 (0.054)	0.079 (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	
kaopen	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%
3	11	Moving band that is narrower than or equal to +/-2% (i.e., allows for both appreciation and depreciation over time)
	12	Managed floating
excluded	13	Freely floating
	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