Chapter 5

Does China Have an Impact on Foreign Direct Investment to Latin America?

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Abstract

This chapter analyses empirically whether the emergence of China as a large recipient of FDI has affected the amount of FDI received by Latin American countries. For the longest possible period given data availability (1984-2001), it finds no diversion of FDI from Latin America to China when other relevant factors are taken into account. Concentrating on the last few years (1995-2001), however, when FDI boomed worldwide and negotiations for China's WTO membership accelerated, the "Chinese effect" becomes highly significant. Assessing the impact country by country, China's inward FDI appears to have hampered that of Mexico and Colombia, but not the other four large Latin American economies studied.

Introduction

The rapid, remarkable emergence of China as an important player in the global economy has consequences for the rest of the world. An important one involves foreign direct investment (FDI). China has attracted a growing share of FDI flows since the1990s. After reaching an average of $28 billion a year in that decade, China's average annual FDI inflows increased to $47 billion after the PRC acceded to the World Trade Organization (WTO) in 2001[2] (Figure 5.1)

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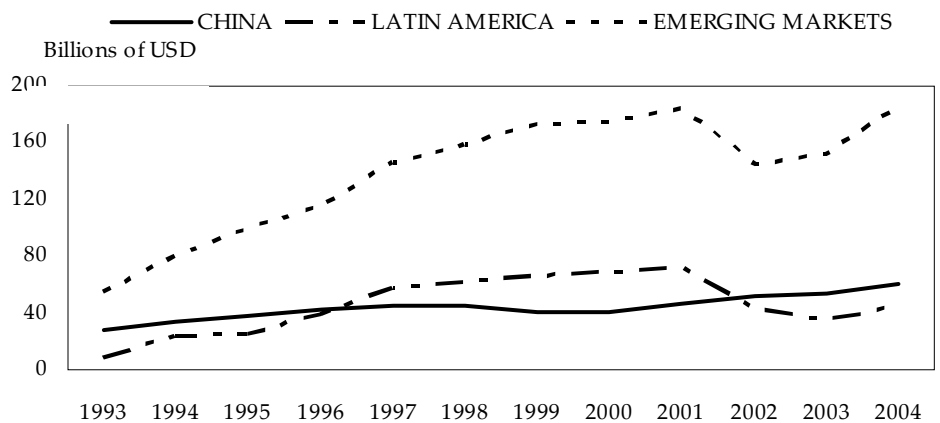
and continued to grow even faster, reaching $61 billion in 2004. In a relatively short time, China has accumulated the world's third largest stock of inward FDI after the United States and the United Kingdom. Foreign firms are attracted by China's rapid economic growth, increasing demand for consumer goods, relatively skilled and educated workforce for the wages paid, improved infrastructure and more predictable business environment. Since the early 1980s, China has drawn significant investment from regional conglomerates in Hong Kong China, Chinese Taipei, Macao China and Singapore, as well as from the largest industrial economies, particularly Japan and the United States.

Just as many countries fear China as an export competitor, concern grows, especially in developing countries, that FDI may be diverted into China. FDI is very important for Latin America as the major source of external financing that has helped modernise the economic structure. Nonetheless, FDI flows to Latin America started to fall in 2000 while FDI to China has been accelerating (Figure 5.1). Given FDI's relevance for the future of the region, deeper knowledge of its determinants seems clearly warranted. This study focuses on the impact of China as an increasingly important recipient of FDI.

Figure 5.1. **FDI Flows**
($ billion)



Source: Customs Administration of China, WEO database of the IMF.

ISBN: 9789264027961

Whether external financing is diverted from Latin American countries into China will depend on several factors. The first is the degree of integration of capital markets. If they are not fully integrated across countries – or, more likely, regions – an increase in Chinese inward FDI will not necessarily imply a reduction of FDI in other countries or regions. The large regional FDI flows in Asia may fit into this description. In fact, Hong Kong China, Chinese Taipei, Macao China and Singapore have been the main suppliers of FDI to China while practically irrelevant for other parts of the world, including Latin America.

A second factor concerns whether the global supply of FDI is constant or, more specifically, whether China's inward FDI affects worldwide FDI flows. If supply were constant, an increase in FDI to China would reduce the FDI to other regions. This could be the case for Latin America, but not necessarily since other regions could be affected. Moreover, the global supply of FDI may be elastic; in fact, if foreign direct investors reap large benefits from their presence in China or there are spillovers in other countries, more savings may be converted into FDI in other areas of the world. In the same vein, China's contribution to raising the rate of return on FDI could twist investors' preference towards FDI instead of other private capital flows (mainly portfolio or cross-border lending), particularly if their returns were not closely correlated with those on FDI. Moreover, China itself – with its huge saving rate – is an important source of FDI; outward FDI from China has increased by 66 per cent per year since its accession to the WTO, although it remains very low compared with FDI from the largest OECD countries.

A third aspect to consider is the nature of Chinese inward FDI. If oriented towards exports, it might reduce FDI in other countries competing in the same export markets. This effect will be less strong if FDI is oriented towards China's domestic demand. In addition, if FDI substantially increases Chinese imports, it might foster FDI to other countries that supply Chinese imports, particularly exporters of commodities, which are scarce in China.

It thus seems clear that the impact of Chinese inward FDI on Latin American countries is an empirical question. Very few attempts to address this issue appear in the literature. A first step – even if only descriptive – is in IDB (2004). It depicts the evolution of cumulative bilateral FDI flows to Latin America and to China and calculates a coincidence index of FDI home countries, which appears to be low. Chantasasawat *et al*. (2004) analyse empirically whether China is taking FDI away from other Asian and Latin American countries. They find that the level of Chinese inward FDI is positively related to other Asian economies' inward FDI and that there is practically no

ISBN: 9789264027961

impact on Latin American countries. Conducting the same exercise on the shares of FDI, they do show a negative Chinese effect on the Asian and Latin American shares.

This study goes beyond Chantasasawat *et al.* (2004) in a number of ways. *First*, it uses bilateral (homehost) and not aggregate data. Bilateral data much better describe investors' behaviour, avoid a potential aggregation bias and limit collinearity problems. *Second*, it not only estimates the impact of Chinese inward FDI on Latin America as a whole, but also differentiates among countries, because their productive structures and the types of FDI they attract differ greatly. For instance, Mexico and Central America have mainly received export-oriented FDI, while South America has attracted FDI mainly into the non-tradable sector (financial services and utilities) as well as natural-resource extraction. One would therefore expect China to have a negative impact on the first group, but not on the second, where it could even turn positive as China steps up its demand for commodities.

Third, Chantasasawat *et al.* (2004) assume the supply of FDI to be inelastic – a quite restrictive assumption for emerging countries, which have to compete for financing – while this study allows for the possibility of an elastic supply of FDI by introducing other capital flows as an additional factor. In this way, it captures potential substitution or complementarities among flows. *Fourth*, it takes into account the adjustment cost of FDI, which is known to be relevant for long-term (generally physical) investment, such as FDI. *Fifth*, it improves on the methodology to analyse the observed phenomena. It uses the generalised method of moments (GMM), instrumenting potentially endogenous variables with lags, exogenous variables and other valid instruments in order to obtain estimators unbiased, consistent and as efficient as possible. *Finally*, it compares different time spans to assess whether China's impact on other countries' inward FDI is a recent phenomenon, linked to the negotiations and final participation in the WTO, or already had begun after China announced it would open up its economy at the end of the 1970s.

Determinants of FDI

A wealth of empirical work has analysed the main determinants of inward FDI, with very little consensus except perhaps for the size of the host country's economy[3]. For a long time, the general view held that the "better" a country, in terms of its macroeconomic situation and institutional environment, the

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more easily it would attract FDI. For example, Albuquerque *et al.* (2002) find that macroeconomic stability increases FDI. Hines (1995) and Wei (1997) show that corruption discourages it, and the same is true for poor business operating conditions (Singh and Jun, 1995) or the inability to repatriate profits (Mody *et al*., (1998). In the same vein, a survey of over 1 000 chief executives of multinational enterprises concludes that macroeconomic and political stability as well as the regulatory environment and country size are keys to foreign direct investors' decisions on where to establish themselves (AT Kearney, 2003).

Haussmann and Fernandez-Arias (2000), however, challenged this view, showing evidence that poor performers in terms of lower GDP per capita and less macroeconomic stability tend to attract more FDI. He also finds that countries with poorer institutions tend to attract more FDI as a share of total private capital flows. Another variable for which there is clearly no consensus is human capital. While it generally helps increase the marginal productivity of capital, this might not be so in lowskill, labour-intensive countries where low salaries mostly attract FDI (Chantasasawat *et al*., 2003). As for the size of the economy, Jaumotte (2004) and Love and LageHidalgo (2000), among others, show evidence that the host country's total GDP and GDP per capita, respectively, help to attract more FDI. In addition, openness to trade also appears relevant (Singh and Jun, 1995; Albuquerque *et al*., 2003).

Another strand of the literature has concentrated on the relation between trade and FDI (Brainard, 1997). Some studies find evidence of a substitution effect between the two while others argue in favour of complementarities. Substitution should in principle result when countries exporting a certain good decide to produce it in the destination country to avoid import or export tariffs. Complementarities could exist if FDI is export-oriented and requires importing inputs from the home country. Finally, some authors have concentrated on the role of push factors, either home-country or global, although there is no clear consensus on which ones are key. Albuquerque *et al*. (2002) report that push factors explain more than 50 per cent of FDI developments. In the same vein, LevyYeyati *et al*. (2002) show that the economic cycle in industrial countries is a relevant determinant of FDI, but the directions of influence change for the United States, Japan and Europe.

ISBN: 9789264027961

Variables and Data Issues

The dependent variable used here consists of annual bilateral inward FDI flows from the different OECD home countries to the six largest host economies of Latin America, expressed in millions of US dollars. The host countries are Argentina, Brazil, Chile, Colombia, Mexico and Venezuela (the full list of home and host countries is shown in Table 5-A1). The analysis is limited to these six because they are the only Latin American destinations included in the only database available on such flows for a large number of countries, namely the OECD's *International Direct Investment Statistics* (Table 4-A2 gives details on data sources).

There are two alternative time horizons. The longest possible one, given data availability, starts close to China's decision to conduct an open-door policy and runs from 1984 until 2001. This yields an unbalanced panel of 2 850 observations of bilateral FDI flows. Nonetheless, due to the missing values in the explanatory variables, this first model is estimated with a maximum of 527 observations[4]. Second, since the pattern of FDI flows appears to have changed since the mid-1990s, a shorter panel (1995-2001) is estimated. This period should also capture foreign investors' behaviour in the light of China's negotiations for WTO membership. This case permits only a maximum of 428 observations in the estimations.

The objective variable consists of bilateral inward FDI flows from different OECD countries to China. If there were a substitution effect from Latin American inward FDI towards China, the sign of its coefficient would be negative. The data are drawn from the same OECD source. This implies that they exclude important suppliers of FDI to China from the Asian region but outside the OECD. In reality, it is hard to think of potential competition between China and Latin America for FDI from Asian economies such as Hong Kong China, Macao China, Chinese Taipei or Singapore, which together accounted for 44 per cent of FDI in China in 2003. The cultural and ethnic ties between China and Asian nonOECD countries suggest a fragmentation in the FDI market. Including these countries as FDI providers could actually distort the answer to the question posed here, namely whether global foreign direct investors have reduced their FDI in Latin America because of China. FDI to Latin America originates mainly in OECD countries, which accounted for 76 per cent of the total received in 2002. The work thus focuses on FDI from them, to guarantee a relatively high degree of integration of the relevant FDI market and therefore real opportunities for substitution among destination countries.

ISBN: 9789264027961

Another objective variable, constructed as a robustness test, reflects bilateral inward FDI to Hong Kong China. Much reinvesting takes place between it and China, and it is not adequately accounted for in the statistics. This phenomenon, generally known as round-tripping, starts with China's exporting capital to Hong Kong China, favoured by tax advantages. This capital then returns to China in the form of FDI.

The other potentially relevant determinants of FDI, included as control variables, are classified into: *i)* capital flows, *ii)* bilateral variables, *iii)* host-country factors, *iv*) home-country variables and *v)* global factors. Adding them, the model estimated could be expressed as follows:

$$FDI_{i,t}^{j} = \lambda + \gamma \times FDI_{i,t-1}^{j} + \eta_1 \times FDI_{China,t}^{j} + \sum \alpha \times \text{capital flows}_t + \sum \beta \times \text{bilateral factors}_{i,t}^{j} + \sum \chi \times \text{host factors}_{i,t} + \sum \delta \times \text{home factors}_{t}^{j} + \sum \phi \times \text{global factors}_{t} + \varepsilon_{i,t}^{j}$$

I = host country (Latin America)
J = home country (OECD)

Capital flows include a number of factors. *First*, developments in other (portfolio and cross-border) capital flows are considered, to account for potential substitution between different types of investment. If it exists, the coefficient would have to be negative and significant. The data are drawn from the IMF *International Financial Statistics* (IFS). *Second*, one must allow for the possible persistence of FDI flows because investment requires time to adjust to desired levels. This is accounted for by taking the lag of the dependent variable. A *third* regressor considers the behaviour of other exporters of FDI, to determine whether investment decisions are influenced by what competitors do. Taking this into account involves including FDI from the whole OECD area to Latin America as well as to China and Hong Kong China. A positive and significant coefficient would indicate some kind of herd or "follow your competitor" behaviour among foreign direct investors. The *fourth* covers the possibility that FDI decisions may be taken at a regional level. In other words, if a country invests in, say, Chile, this could encourage additional investment in other Latin American countries. *Fifth*, FDI to OECD countries is introduced to test whether a possible preference of foreign direct investors to be present only in industrial countries discourages FDI to Latin America. *Finally*, the analysis controls for global trends in FDI flows, because it will certainly be easier for Latin American countries to receive investment during boom years for FDI. All these variables (except the first) are drawn from the OECD database.

ISBN: 9789264027961

Bilateral factors include the bilateral nominal exchange rate because it affects both the cost of the investment – if paid in local currency – and the value of repatriated profits. A depreciation of the host-country currency against the home-country one reduces both, so that the expected sign of the coefficient is not clear *a-priori*. The data are drawn from the IFS, and an increase implies a depreciation of the host currency against the home one. A measure of the relative investment cost is added, as measured by the difference in shortterm interest rates between the host and the home country, also from the IFS. The coefficient of this variable should in principle be negative but only if the investment is financed locally; otherwise it would be the home interest rate or an international one that matters. In addition, data on bilateral exports and imports from the IMF *Direction of Trade Statistics* (DOT) allow control for potential substitutability or complementarity between exports/imports and inward FDI. The final bilateral variable is an index of similarity in the home-country and host-country production structures, based on two-digit manufactured value-added data, from the United Nations Industrial Development Organization (UNIDO)[5]. This variable should indicate how similar the economies are and to what extent they may compete in third markets.

There are a number of potentially relevant host factors. Macroeconomic conditions related to the external sector, such as the level of external debt to GDP, the debt service, international reserves and export growth are included. Although no strong consensus exists on their influence, the first two should in principle bear a negative relation with inward FDI while the last two, particularly export growth, should be positively related. Other host macroeconomic conditions are GDP growth, the ratio of domestic investment to GDP and the fiscal balance, whose coefficients should in principle be positive. Inflation and the real exchange rate may be expected to reduce inward FDI insofar as they lower the host country's competitiveness. All these variables come from the IFS and the World Bank's World Development Indicators (WDI). Finally, the size of the economy should in principle foster FDI. It is proxied by a combination of GDP per capita and GDP[6], both in dollars. The two are drawn from the WDI and the IMF World Economic Outlook (WEO) database, respectively. Countries' endowments of natural resources are drawn from Haussmann and Fernandez-Arias (2000). Finally, due to the restrictions imposed by the methodology used – only time-variant variables can be considered – only a few host-country institutional characteristics are included, namely capital-account restrictions, drawn from Lane and Milesi-Ferretti (2004), the quality of creditor rights from the International Country Risk Guide database, and human capital, proxied by the literacy level from the WDI database. The first should discourage capital flows, including FDI, and the

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last two should yield a positive effect. As with the macroeconomic variables, however, one should not forget the general lack of strong consensus on their effects. Finally, for financial crises one dummy variable is included for each type of crisis – sovereign, currency or banking – which takes the value of one in each year in which a country finds itself in crisis. This allows capture of the cumulative impact of each of these events[7]. The information is drawn from Díaz-Cassou *et al*. (2006). Crises generally should discourage foreign investors, but banking crises tend to be followed by the opening of the banking system to foreign competition, mainly through privatisation. This could attract FDI.

For home-county effects GDP growth and GDP per capita from the WEO database are included. Developments in oil prices are taken as the main global factor affecting FDI. They are drawn from DataStream. Table 5-A3 shows the bilateral correlations between all these regressors.

Empirical Methodology

In undertaking the empirical analysis, a number of methodological issues need to be addressed such as endogeneity, how to capture adjustment costs of FDI, unobserved heterogeneity and the choice of the control variables. To tackle potential endogeneity as well as the existence of adjustment costs and unobserved heterogeneity, the analysis uses the GMM, following Arellano and Bover (1995). The Arellano-Bover estimator – also called the system GMM estimator – combines the regression expressed in first differences (lagged values of the variables in levels are used as instruments) with the original equation expressed in levels (this equation is instrumented with lagged differences of the variables) and allows inclusion of some additional instruments.

This option is preferred to a fixed-effects estimator for several reasons. *First*, it takes into account unobserved time-invariant bilateral specific effects. *Second*, one can tackle the potential endogeneity arising from the inclusion of the lagged dependent variable (to capture the adjustment costs) and other potentially endogenous variables in the righthand side of the equation, such as bilateral FDI to Latin America, other FDI flows and bilateral trade[8]. *Third*, it deals with the possibility that the dependent variable is not stationary. *Finally*, considering all possible instruments it achieves a high degree of efficiency.

The GMM estimators have two main disadvantages, however. First, because their properties hold asymptotically, it would be safer to use this methodology with a very large number of observations[9]. As a robustness test,

ISBN: 9789264027961

all regressions are run as a fixed-effect panel with robust standard errors. The results do not differ too much. The other disadvantage is that one cannot include time-invariant regressors because their coefficients are not identifiable with this methodology. This does not imply that there is a problem of omitted variables, however, because they are all included in the time-invariant country-specific effects.

To tackle omitted variables, first a general equation including all control variables considered is estimated (column one of Tables 5.1 and 5.2); then, a Wald test evaluates the joint hypothesis that the coefficients of the variables that are not significant individually are equal to zero. If it is not rejected, the model is re-estimated with only the significant controls. Otherwise, a less restrictive hypothesis is tested, still trying to reduce the number of regressors to the maximum extent possible. This sequential – from general to specific[10] – strategy is followed until one can reject that the remaining set of coefficients of the control variables is equal to zero (column two of Tables 5.1 and 5.2). This procedure achieves more efficient coefficients on the remaining parameters, including that of the variable of interest, i.e. Chinese inward FDI. The last model, apart from incorporating these restrictions on the regressors included, tests whether the effect of Chinese inward FDI is different across the Latin American countries (column three of Tables 5.1 and 5.2).

Results

The analysis, as described, regresses the six largest Latin American countries' inward FDI on bilateral FDI to China and controls for the all aforementioned regressors in the unrestricted model. The first step uses the whole sample from 1984 to 2001. This captures developments shortly after China started its open door policy until the most recent data coinciding with China's entry into the WTO. When all controls are introduced, no evidence emerges of a substitution effect from Latin American FDI to China (Table 5.1, column one). The same is true for FDI to Hong Kong China. Then, with the number of control variables reduced, the lack of a significant impact of Chinese inward FDI is confirmed (Table 5.1, column two).

Regarding the impact of China on the inward FDI of each of the Latin American countries considered, Argentina and Colombia are negatively affected at the 5 per cent and 10 per cent significance levels, respectively, but the parameters are very small (Table 5.1, column three). In addition, one cannot

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Table 5.1. **Results for the Long Time Span: 1984-2001**

Dependent variable: Bilateral FDI flow from home to host countries	(1) Common Effect for all Latin American Countries		(2) (1) + Jointly Non-Significant Coefficients Removed		(3) (2) + Individual Effect for Each Latin American Country (a)	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Latin America as a whole						
Bilateral FDI to China	-0.068	(0.234)	-0.062	(0.245)		
Bilateral FDI to HK, China	-0.033	(0.574)				
Country-specific (b): Impact of FDI to China on FDI:						
To Argentina					-0.095**	(0.043)
To Brazil					0.131	(0.383)
To Chile					0.075	(0.489)
To Colombia					0.228*	(0.091)
To Mexico					-0.068	(0.295)
To Venezuela					-0.062	(0.487)
Control Variables						
Capital flows						
Total capital flows over GDP	-16.535	(0.163)	9.357***	(0.002)	8.775***	(0.002)
Lag of bilateral FDI	0.259	(0.258)	0.221	(0.172)	0.312	(0.140)
OECD FDI to China	0.003	(0.329)				
OECD FDI to HK, China	0.006	(0.398)				
OECD FDI to Latin America	-0.001	(0.308)				
Total FDI of OECD Members	0.000	(0.448)				
Bilateral FDI to Latin America	0.061***	(0.002)	0.060***	(0.004)	0.051***	(0.003)
Bilateral FDI to OECD	0.002	(0.156)	0.001	(0.149)	0.001	(0.118)
Bilateral Variables						
Bilat. nominal exchange rate (c)	0.398**	(0.018)	0.082	(0.134)	0.099*	(0.067)
Host-home int. rate differential	0.164	(0.414)				
Exports	0.074**	(0.012)	0.038***	(0.007)	0.037***	(0.007)
Imports	-0.029	(0.409)				
Similarity in prod. structure	36.881	(0.808)	94.095	(0.258)	91.405	(0.256)
Host-country variables						
Macro variables						
External debt to GDP	-4.335	(0.571)				
Debt service to GDP	-95.210**	(0.018)				
External reserves	-0.012	(0.280)				
Export growth	-1.772	(0.620)				
GDP growth	40.084**	(0.024)	7.707	(0.162)	6.507	(0.205)
Inflation	-0.592	(0.225)				
Fiscal balance	-17.023	(0.384)				
Domestic investment/GDP	-18.733	(0.199)				
Real effective exchg. rate (d)	-0.831	(0.495)				

ISBN: 9789264027961

Table 5.1 continued

Dependent variable: Bilateral FDI flow from home to host countries	(1) Common Effect for all Latin American Countries		(2) (1) + Jointly Non-Significant Coefficients Removed		(3) (2) + Individual Effect for Each Latin American Country (a)	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
General characteristics						
Size	0.000	(0.540)				
Natural resources	1.045**	(0.043)	0.221**	(0.049)	0.216*	(0.055)
Institutional characteristics						
Capital account restrictions	166.729	(0.372)				
Creditor rights	32.538	(0.583)				
Literacy	81.430	(0.243)	15.644	(0.150)	13.752	(0.149)
Occurrence of crises						
Sovereign	-94.170	(0.448)				
Banking	459.129***	(0.007)	147.731***	(0.009)	135.266**	(0.010)
Currency	-157.281	(0.232)				
Home-country variables						
GDP growth	-31.985	(0.138)	-4.837	(0.219)	-3.288	(0.334)
GDP per capita	0.000	(0.957)				
Global Shocks: Oil price	6.699	(0.701)				
Constant	-7153.329	(0.246)	-1707.054	(0.114)	-1520.144	(0.112)
F-statistic	42678.81	(0.000)	497.36	(0.000)	1430.84	(0.000)
Observations	339		527		527	
Number of groups (home, host)	65		87		87	

Notes: Robust P-values are in parentheses. * = significant at 10%. ** = significant at 5%. *** = significant at 1%. Variables in italics are instrumented through the GMM procedure following Arellano and Bover (1995). Variables removed in columns (2) and (3) are jointly not significant at a 95 per cent confidence interval. The categorical variables *rating* and *civil and political liberties* are also included as regressors. (a) Although control variables' coefficients differ numerically from column (2), the results are qualitatively the same. (b) These variables result from multiplying FDI to China and a dummy variable that takes the value of one for the observations of each of the host countries. (c) Increase indicates depreciation of host currency. (d) Increase indicates an appreciation of the real effective exchange rate.

ISBN: 9789264027961

reject the hypothesis that the coefficients of each Latin American country are the same and equal to zero. Given the weakness of these two results, one can generally conclude that there is virtually no "Chinese effect" on Latin American inward FDI in this long time span.

To report on the significance of the control variables, we focus on the restricted model because the estimators are more efficient[11]. First, there is a strong and significant complementarity effect between FDI and other private capital flows, as the coefficient for total capital flows over GDP is positive and highly significant. This result supports the hypothesis of an elastic supply of FDI. Second, there is a certain degree of a "regional" effect, because an increase in FDI to a given Latin American country from a given home country raises investment in other countries of the region. This is shown in the highly significant, albeit small, coefficient on bilateral FDI to Latin America. Third, the amount of bilateral exports also appears to foster FDI, which supports the hypothesis of complementarity – not substitution – between the two. One possible interpretation is that FDI received by Latin American countries is export-oriented, at least in certain countries, and therefore fosters exports. Fourth, as one would expect, the availability of natural resources in the host countries contributes to higher inward FDI. Finally and interestingly, the occurrence of banking crises appears to foster FDI in all three specifications. The causal link probably lies less in the banking crises themselves than in the privatisation and opening to foreign competition that have followed them in practically all Latin American countries in the sample[12]. Finally, the fixed effects estimated for each home-host pair also pick up the information of the regressors, which barely change over time. This could explain why they are not found significant.

The second exercise restricts the panel to a more recent time span, from 1995 to 2001, for a number of reasons. First, there may have been a structural change in the evolution of FDI since the mid-1990s. Second, China accelerated its negotiations for WTO membership in this period, before it finally acceded in 2001. An additional, more technical, reason is that the potential problem of non-stationarity (although considered in the Arellano-Bover methodology) is clearly reduced for this shorter time span.

In this period, a clearly negative and significant effect of Chinese inward FDI on that to Latin America emerges (Table 5.2, columns one and two). In a country-by-country analysis of the impact, Mexico and Colombia are negatively and significantly affected by increases in Chinese inward FDI — particularly Mexico, at a 99 per cent confidence level (95 per cent for Colombia).

ISBN: 9789264027961

Table 5.2. **Results for the Shorter Time Span: 1995-2001**

Dependent variable: Bilateral FDI flow from home to host countries	(1) Common Effect for all Latin American Countries		(2) (1) + Jointly Non-Significant Coefficients Removed		(3) (2) + Individual Effect for Each Latin American Country (a)	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
Objective Variables						
Latin America as a whole						
Bilateral FDI to China	-0.154*	(0.065)	-0.157**	(0.024)		
Bilateral FDI to HK, China	-0.084	(0.299)				
Country-specific (b): Impact of FDI to China on FDI:						
To Argentina					-0.083	(0.244)
To Brazil					-0.219	(0.260)
To Chile					0.035	(0.737)
To Colombia					-0.844**	(0.013)
To Mexico					-0.287***	(0.007)
To Venezuela					-0.204	(0.230)
Control Variables						
Capital flows						
Total capital flows over GDP	42.349**	(0.034)	9.168	(0.193)	7.464	(0.296)
Lag of bilateral FDI	0.031	(0.877)	0.046	(0.259)	0.064*	(0.055)
OECD FDI to China	-0.002	(0.430)				
OECD FDI to HK, China	0.023**	(0.018)				
OECD FDI to Latin America	-0.004*	(0.013)				
Total FDI of OECD Members	0.000	(0.379)				
Bilateral FDI to Latin America	0.086**	(0.004)	0.121***	(0.001)	0.108***	(0.001)
Bilateral FDI to OECD	0.001	(0.177)				
Bilateral Variables						
Bilat. nominal exchange rate (c)	0.621**	(0.020)	0.179**	(0.045)	0.276***	(0.008)
Host-home int. rate differential	-3.149	(0.158)				
Exports	0.203***	(0.001)	0.247***	(0.000)	0.250***	(0.002)
Imports	-0.121**	(0.033)	-0.168***	(0.003)	-0.167**	(0.011)
Similarity in prod. structure	97.138	(0.682)				
Host-country variables						
Macro variables						
External debt to GDP	-3.307	(0.667)				
Debt service to GDP	122.735**	(0.043)				
External reserves	-0.019	(0.130)	-0.007	(0.151)	-0.005	(0.250)
Export growth	5.459	(0.374)				
GDP growth	-33.646	(0.260)				
Inflation	8.161	(0.165)				
Fiscal balance	-94.879	(0.170)				
Domestic investment/GDP	29.968	(0.507)				
Real effective exchg. rate (d)	-1.911	(0.530)				

ISBN: 9789264027961

Table 5.2. (continued)

Dependent variable: Bilateral FDI flow from home to host countries	(1) Common Effect for all Latin American Countries		(2) (1) + Jointly Non-Significant Coefficients Removed		(3) (2) + Individual Effect for Each Latin American Country (a)	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
General characteristics						
Size	0.000	(0.450)				
Natural resources	1.702**	(0.044)	0.677**	(0.022)	0.621**	(0.032)
Institutional characteristics						
Creditor rights	47.222	(0.410)				
Literacy	193.501**	(0.026)	46.056*	(0.085)	35.217	(0.189)
Occurrence of crises						
Sovereign	-195.527	(0.347)				
Banking	-398.843	(0.128)	222.233***	(0.000)	217.170***	(0.001)
Currency	53.805	(0.773)				
Home-country variables						
GDP growth	-7.787	(0.702)				
GDP per capita	0.007	(0.260)				
Constant	-20930.168	(0.026)	-4928.704	(0.062)	-3882.54	(0.138)
F-statistic	6425.51	(0.000)	338.92	(0.000)	291.51	(0.000)
Observations	172		428		428	
Number of groups (home, host)	60	99	99			

Notes: Robust P-values are in parentheses. * = significant at 10%. ** = significant at 5%. *** = significant at 1%. Variables in italics are instrumented through the GMM procedure following Arellano and Bover (1995). Variables removed in columns (2) and (3) are jointly not significant at a 95% confidence interval. (a) Although control variables' coefficients differ numerically with column (2), the results are qualitatively the same. (b) These variables result from multiplying FDI to China and a dummy variable that takes the value of one for the observations of each of the host countries. (c) An increase indicates depreciation of the host-country currency. (d) An increase indicates appreciation of the real effective exchange rate.

ISBN: 9789264027961

As Table 5.2 shows, when Chinese inward FDI increases by $100 million, Colombian and Mexican inward FDI flows are reduced by $84 million and $29 million respectively. Notwithstanding the relatively large difference in the parameters, the impact could be similar since one cannot reject the hypothesis that both coefficients are statistically equal. This result is particularly interesting for Mexico because the North American Free Trade Agreement (NAFTA) was in place during the whole period and inward FDI generally increased. In fact, it began to fall only more recently, in 2002, but this does not imply that China had no effect. The results should be read in terms of a counterfactual: had Chinese inward FDI not been so strong, Mexico could have attracted more FDI than it actually did. Finally, excluding the impact on Mexico and Colombia, no dislocation can be found from the other Latin America countries to China[13].

Results for control variables are very similar to those for the longer panel, except for two. The bilateral nominal exchange depreciation is now clearly significant in increasing FDI to Latin American countries, which hints that lower investment cost, because of the exchange-rate depreciation, weighs more than a reduction in repatriated benefits. In addition, larger bilateral imports seem to imply less Latin American inward FDI. This result is in line with the hypothesis of substitution between imports and FDI and hints at the existence of a large share of FDI geared towards domestic demand for Latin American countries as a group. Considering this result together with the previous on export complementarity, it could well be that the complementarity stems from countries with more export-oriented FDI, such as Mexico, and the substitutability of imports comes from some of the South American countries. In any event, this hypothesis cannot be tested because the data contain only Latin American aggregate coefficients for the control variables.

Finally, a number of robustness tests do not change the results[14]. The first one tackles the close relation between Hong Kong China's and Chinese inward FDI, taking as the objective variable the sum of FDI to China and Hong Kong China. Second, the extreme hypothesis of complete substitution from Latin American inward FDI to that of China is tested. As could be expected from the results, the hypothesis is rejected. Third, the regressions are run taking logs for all variables for which this is possible. Fourth, the potential endogeneity of the bilateral exchange rate is accounted for by taking instruments. The fifth test controls for the potential endogeneity of the externality associated with total FDI to Latin America excluding the FDI of the host country.

ISBN: 9789264027961

Conclusions

This chapter investigates how Chinese inward FDI affects FDI flows to Latin American countries. Over the long period from 1984 to 2001 it finds hardly any evidence of FDI dislocation from Latin American countries to China, but such dislocation does seem to be present in a more recent period (1995-2001) that focuses on the years when FDI flows grew more rapidly worldwide and negotiations for China's WTO membership accelerated. This arises from a significant negative impact on Mexican and Colombian inward FDI, while the other Latin American countries are not affected. Given that FDI generally increased during the period, these results probably imply that: had Chinese inward FDI not been so strong, these two countries could have attracted more FDI.

This suggests that competing in the same sectors as China increases the likelihood of an FDI substitution. A cursory look at the sectoral structure of FDI in Mexico and Colombia shows that manufacturing accounts for 56 per cent of the total in Mexico (the largest of all sectors) and 21 per cent (the largest after financial services) in Colombia. By contrast, Brazil has a much smaller share of FDI in manufacturing (about 10 per cent) while most of it concentrates on telecommunications and financial services[15]. In any event, this interpretation is only tentative because not enough evidence exists that this is the main channel through which China affects Latin American FDI. In fact, because the focus of the chapter is on the behaviour of global investors, the authors opted for bilateral rather than sectoral data so that not much can be said about the channels by which China may influence other host countries. Both bilateral and sectoral data would be ideal but they are not available.

Looking into the future there are reasons to expect that China will continue to receive large amounts of FDI and perhaps even increase them. The country is bound to embark on a large privatisation process, which has already been announced for some sectors. In addition, the wage differential with Latin American countries will probably continue for quite some time given China's large – for some close to infinite – elasticity of labour supply. Finally, even if wages increase substantially, they will boost the purchasing power of a very large population. This will make China a particularly attractive country for FDI targeting domestic demand.

ISBN: 9789264027961

The scenario in which China continues to attract a large share of world FDI may seem worrisome for Latin American countries, particularly those with productive structures more similar to China's. This reflects only one side of the coin, however. Heavy FDI in China also provides tremendous opportunities in the medium term. For geographical reasons, Latin American countries are not as well positioned as Asian economies to reap some of these benefits, such as assembling and re-exporting manufactured products – yet they will clearly benefit from China's increasing demand for raw materials in a scenario where it continues to grow fast. This applies not only to Latin American exports, but also to inward FDI in sectors related to raw materials. Interestingly, potential investors in the region are not only the global players included in our database, basically OECD countries, but also China itself, which will want to ensure its access to raw materials. The further opening of these sectors to foreign investors is a pre-condition for Latin American countries to reap these benefits of China's increasing global presence.

ISBN: 9789264027961

Notes

1. Both authors were affiliated with Banco de España at the time of writing. Alicia Garcia-Herrero is now working as an economist at the Hong Kong branch of the Bank of International Settlements (BIS). The opinions expressed are theirs and not necessarily those of Banco de España. They would like to thank Juan Carlos Berganza, Luis Molina, José Manuel Montero and Juan Ruiz for their clarifications on data and methodological issues. They are also grateful for suggestions from participants in the First LAEBA Conference on the Challenges and Opportunities of the Emergence of China and in a Banco de España seminar, as well as Javier Vallés and an anonymous referee. Remaining errors are obviously their own.

2. These figures are drawn from IMF *International Financial Statistics*.

3. Reviewing the reasons behind the lack of consensus is beyond the scope of this paper, but two very important ones are the lack of reliable data (Singh and Jun, 1995) and the difference between horizontal and vertical FDI (Ewe Ghee, 2001).

4. This is the number of observations in the restricted model (after eliminating jointly non-significant parameters). In the general model the number of observations is lower, 339, because of missing values in the non-significant regressors.

5. The construction of this measure of economic similarity follows García-Herrero and Ruiz (2004). It is expressed as

$$S_{j,i,t} = -\sum_{n=1}^{N} \left| s_{n,j,t} - s_{n,i,t} \right|$$

where N is the number of sectors. Note that $S_{i,j,t}$ represents the average of discrepancies in economic structures in the period t. $S_{i,j,t}$ might take values between 0 for identical structures and –2 for disjoint productive structures. Therefore higher values for $S_{i,j,t}$ imply more similarity between the host and home productive structures.

6. Both variables are also controlled for separately and the results do not change.

7. To test the robustness of the results a different dummy takes the value of one only in the first year of the crisis.

ISBN: 9789264027961

8. A robustness test also instruments for the bilateral nominal exchange rate. The results do not change.

9. In any event, the small-sample problem is less acute for the Arellano-Bover estimator than the Arellano-Bond one, because it has been shown to provide more accurate estimations in small samples (Bond, 2002). Additionally, this estimator does not require time stationarity as long as T is small, which seems to be the case here.

10. See Campos *et al.* (2005) for details on the general-to-specific strategy.

11. The bilateral nominal exchange rate, the debt service and GDP growth in the host country are significant only in the first specification with all regressors. The nonsignificance in the restricted model may be due to the increased number of observations and degrees of freedom.

12. That this result is found only for the dummy that considers all crisis years and not only the burst of the crisis supports this interpretation.

13. In other words one cannot reject that the coefficients of Argentina, Brazil, Chile and Venezuela are the same and equal to zero.

14. The results of these tests are available on request.

15. This has been estimated using FDI flows from the three main investors in Brazil, namely the United States, Spain and Japan. Unfortunately, one cannot compare Mexico and Colombia with the other Latin American countries included in the analysis because the authors could not find sectoral information.

ISBN: 9789264027961

Table 5-A-1. **List of Countries Considered**

Home Country	Host Country	Additional Countries or Areas
Australia	Argentina	China
Austria	Brazil	Hong Kong, China
Belgium	Chile	Latin America
Canada	Colombia	OECD
Czech Republic	Mexico	World
Denmark	Venezuela	
Finland		
France		
Germany		
Greece		
Hungary		
Iceland		
Ireland		
Italy		
Japan		
Korea		
Mexico		
Netherlands		
New Zealand		
Norway		
Poland		
Portugal		
Slovak Republic		
Spain		
Sweden		
Switzerland		
Turkey		
United Kingdom		

ISBN: 9789264027961

Table 5-A-2. **Variables and Data Sources**

Variable Type	Name	Description	Units	Source
Bilateral	Bilateral FDI	Bilateral FDI	$ millions	OECD
Bilateral	Bilateral exchange rate	Bilateral exchange rate; increase implies depreciation in home currency	Host per home currency	IFS, IMF
Bilateral	Bilateral exports	Bilateral export flows	$ millions	DOT, IMF
Bilateral	Bilateral imports	Bilateral import flows	$ millions	DOT, IMF
Bilateral	Host-home interest rate differential	Host-home differential in short-term interest rates	Percentage	IFS, IMF
Bilateral	Similarity in production structures	Index of similarity in production structures	Index	UNIDO
Capital flows	Bilateral FDI to China	Level of FDI flows of each home country to China	$ millions	OECD
Capital flows	Bilateral FDI to Hong Kong, China	Level of FDI flows of each home country to Hong Kong, China	$ millions	OECD
Capital flows	Bilateral FDI to Latin America	Level of FDI flows of each home country to the six Latin American countries included	$ millions	OECD
Capital flows	Bilateral FDI to OECD	Level of FDI flows of each home country in the OECD	$ millions	OECD
Capital flows	OECD FDI into OECD	FDI of all OECD countries in OECD area	$ millions	OECD
Capital flows	OECD FDI to China	Level of FDI of all OECD Members to China	$ millions	OECD
Capital flows	OECD FDI to Hong Kong, China	Level of FDI of all OECD Members to Hong Kong, China	$ millions	OECD
Capital flows	OECD FDI to Latin America	Level of FDI of all OECD Members to Latin America	$ millions	OECD
Capital flows	Total FDI of OECD Members	FDI of all OECD Members to the world	$ millions	OECD
Global	Oil Price	Brent crude	$/bbl., monthly	Datastream
Home	GDP Growth in Home Country	Growth rate of GDP at constant prices	Percentage	WEO, IMF
Home	GDP per Capita, Home Country	GDP per capita at current prices	Dollars	WEO, IMF

ISBN: 9789264027961

Host	Capital Account Restrictions	Dummy: = 1 if the country had capital-account restrictions; = 0 otherwise		Miles-Ferrati (1998)
Host	Creditor Rights	Contract viability, profits repatriation, payment delays		PRS Group
Host	Debt Service to GDP	Interest expenditures plus amortisation	Per cent of GDP	World Bank
Host	Domestic Investment over GDP	Fixed capital investment	Per cent of GDP	World Bank
Host	Export Growth	Annual growth of exports valued in dollars	Per cent	World Bank
Host	External Debt to GDP	Total external debt	Per cent of GDP	World Bank
Host	External Reserves	Total reserves minus gold	$ millions	IFS, IMF
Host	Fiscal Balance	Public-sector balance (positive indicates surplus; negative indicates deficit)	Per cent of GDP	IFS, IMF
Host	GDP Growth	Real annual GDP growth rate	Per cent	IFS, IMF
Host	Inflation	CPI annual growth rate	Per cent	IFS, IMF
Host	Literacy	Adult (over 15) literacy rate	Per cent	World Bank
Host	Natural Resources	Natural resources valuation	$ millions (PPP)	Haussmann (2001)
Host	Occurrence of Banking Crises	Dummy: = 1 if banking crisis in a given year		Diaz *et al.* (2004)
Host	Occurrence of Exchange Crises	Dummy: = 1 if currency crisis in a given year		Diaz *et al.* (2004)
Host	Occurrence of Sovereign Crises	Dummy: = 1 if country in default in a given year		Diaz *et al.* (2004)
Host	Other Capital Flows over GDP	Portfolio and other investment flows	Per cent of GDP	IFS, IMF
Host	Political and Social Liberties	Political and social freedom: 0 = more freedom	Categorical	Freedom House
Host	Rating	Sovereign debt risk rating	Categorical	Moody's
Host	Real Effective Exchange Rate	Real effective exchange rates (an increase indicates an appreciation)	Index	IFS, IMF
Host	Short-term Interest Rate		Per cent	IFS, IMF
Host	Size	Product of GDP per capita and GDP		WEO, IMF

ISBN: 9789264027961

Table 5-A-3. **Correlation Among Variables**

	1	2	3	4	5	6	7	8	9	10	11
1. Bilateral FDI to China	1.00										
2. Bilateral FDI to Hong Kong, China	0.44	1.00									
3. Bilateral FDI to Latin America	0.34	0.55	1.00								
4. Bilateral FDI to OECD	0.29	0.55	0.36	1.00							
5. Bilateral exports	0.17	0.33	0.35	0.16	1.00						
6. Bilateral imports	0.15	0.32	0.32	0.15	0.99	1.00					
7. OECD FDI to China	0.23	0.06	0.13	0.19	0.05	0.04	1.00				
8. OECD FDI to Hong Kong, China	0.11	0.11	0.18	0.30	0.07	0.05	0.75	1.00			
9. OECD FDI to Latin America	0.09	0.09	0.22	0.35	0.07	0.06	0.71	0.90	1.00		
10. Total FDI of OECD countries	0.03	0.07	0.19	0.39	0.06	0.06	0.52	0.75	0.89	1.00	
11. External debt to GDP	-0.06	-0.04	-0.06	-0.09	0.06	-0.05	-0.28	-0.25	-0.21	-0.20	1.00
12. External reserves	0.08	0.04	0.12	0.19	0.12	0.10	0.59	0.60	0.61	0.52	-0.35
13. Export growth	0.04	0.02	-0.01	0.04	0.01	0.01	0.08	0.06	-0.01	0.06	-0.08
14. GDP Growth	0.02	0.01	-0.01	-0.03	0.00	0.00	0.09	0.12	0.03	-0.05	-0.13
15. Size	0.06	0.04	0.10	0.18	0.15	0.12	0.48	0.54	0.55	0.48	-0.42
16. Inflation	-0.04	0.00	-0.03	-0.05	-0.02	-0.01	-0.14	-0.03	-0.08	-0.11	-0.05
17. Fiscal balance	0.02	0.00	0.00	0.00	0.00	-0.01	0.11	0.08	0.03	0.01	0.06
18. Debt service to GDP	-0.02	-0.01	0.01	0.03	0.01	0.01	-0.09	-0.08	0.00	0.07	0.69
19. Natural resources	0.00	0.00	0.00	0.00	0.06	0.07	0.00	0.00	0.00	0.00	-0.25
20. Capital account restrictions	0.00	0.01	0.03	0.05	0.01	0.02	0.06	0.13	0.17	0.13	0.09
21. Total capital flows over GDP	0.06	0.03	0.07	0.10	0.02	0.00	0.35	0.32	0.32	0.26	-0.50
22. Domestic investment over GDP	0.05	0.03	0.00	-0.02	0.05	0.04	0.08	0.05	-0.02	-0.07	-0.34
23. Sovereign crises	-0.07	-0.04	-0.08	-0.15	-0.05	-0.03	-0.36	-0.32	-0.32	-0.35	-0.40
24. Banking crises	0.03	-0.01	-0.03	-0.05	-0.02	0.02	0.01	-0.16	-0.15	-0.13	-0.19
25. Currency crises	-0.01	-0.01	0.01	0.01	-0.02	-0.02	-0.06	-0.11	0.04	0.03	0.29
26. Creditor rights	0.01	0.02	0.04	0.05	0.08	0.07	0.19	0.32	0.28	0.17	-0.33
27. Similarity in productive structures	-0.09	-0.13	-0.07	-0.13	0.03	0.02	-0.03	-0.05	-0.11	-0.12	-0.24
28. GDP growth in home country	-0.06	0.05	0.08	0.04	0.00	0.01	0.15	0.14	0.17	0.16	0.06
29. GDP per capita in home country	0.41	0.28	0.20	0.31	0.15	0.13	0.38	0.44	0.42	0.34	-0.13
30. Real effective exchange rate	-0.13	-0.24	-0.17	-0.18	-0.06	-0.06	-0.15	-0.18	-0.18	-0.16	0.04
31. Bilateral exchange rate	-0.01	0.07	0.13	0.26	-0.03	-0.03	0.22	0.27	0.29	0.28	-0.07
32. Host-home interest rate differential	-0.03	0.01	-0.02	-0.03	-0.01	0.00	-0.13	-0.03	-0.09	-0.08	0.02
33. Oil price	-0.05	-0.02	-0.01	0.07	0.01	0.02	-0.21	-0.25	-0.17	0.12	0.01
34. Literacy	0.05	0.03	0.08	0.13	-0.03	-0.04	0.34	0.41	0.42	0.35	0.15

ISBN: 9789264027961

	12	13	14	15	16	17	18	19	20	21	22
12. External reserves	1.00										
13. Export growth	-0.01	1.00									
14. GDP Growth	0.06	0.10	1.00								
15. Size	0.89	0.02	0.02	1.00							
16. Inflation	-0.01	0.00	-0.17	0.07	1.00						
17. Fiscal balance	-0.07	0.10	0.18	-0.18	-0.21	1.00					
18. Debt service to GDP	-0.12	-0.08	-0.09	-0.20	-0.32	0.11	1.00				
19. Natural resources	0.46	0.02	-0.05	0.52	0.29	-0.53	-0.22	1.00			
20. Capital account restrictions	0.06	-0.18	0.04	0.02	0.09	-0.06	0.08	0.08	1.00		
21. Total capital flows over GDP	0.27	-0.04	0.29	0.16	-0.34	0.29	-0.22	-0.20	-0.16	1.00	
22. Domestic investment over GDP	0.06	0.10	0.40	0.07	-0.11	0.06	-0.16	0.04	-0.15	0.40	1.00
23. Sovereign crises	-0.30	-0.12	-0.04	-0.20	0.36	-0.30	0.04	0.20	0.12	-0.56	-0.21
24. Banking crises	0.11	-0.10	-0.21	0.11	0.16	-0.04	0.19	0.01	-0.08	-0.20	-0.14
25. Currency crises	-0.21	-0.02	-0.32	-0.11	0.08	-0.21	0.18	-0.06	0.09	-0.35	-0.25
26. Creditor rights	0.31	0.04	0.30	0.30	-0.18	0.34	-0.06	-0.10	-0.13	0.43	0.42
27. Similarity in productive structures	0.22	0.07	0.02	0.39	0.17	-0.21	-0.24	0.37	-0.12	-0.01	0.12
28. GDP growth in home country	0.07	0.10	0.01	0.07	0.00	-0.07	0.07	0.00	0.08	-0.05	-0.01
29. GDP per capita in home country	0.29	0.05	0.07	0.25	0.00	0.08	-0.06	0.00	0.07	0.15	0.02
30. Real effective exchange rate	-0.12	0.01	-0.01	-0.11	0.02	-0.01	0.01	0.00	-0.03	-0.07	0.01
31. Bilateral exchange rate	-0.11	-0.02	0.04	-0.23	-0.13	0.06	0.02	-0.33	0.09	0.15	-0.05
32. Host-home interest rate differential	-0.04	-0.05	-0.17	0.04	0.86	-0.15	-0.24	0.20	0.05	-0.30	-0.07
33. Oil price	-0.10	-0.05	-0.23	-0.07	-0.01	0.01	0.18	0.00	-0.04	-0.02	-0.28
34. Literacy	0.00	-0.05	0.03	-0.01	-0.10	0.46	0.07	-0.72	0.04	0.17	-0.10

	23	24	25	26	27	28	29	30	31	32	33
23. Sovereign crises	1.00										
24. Banking crises	-0.05	1.00									
25. Currency crises	0.19	0.30	1.00								
26. Creditor rights	-0.35	-0.22	-0.29	1.00							
27. Similarity in productive structures	0.02	0.00	-0.09	0.08	1.00						
28. GDP growth in home country	0.04	0.02	0.05	-0.10	-0.01	1.00					
29. GDP per capita in home country	-0.16	-0.09	0.00	0.15	-0.33	0.00	1.00				
30. Real effective exchange rate	0.06	0.02	0.00	-0.06	0.13	-0.01	-0.28	1.00			
31. Bilateral exchange rate	-0.22	-0.19	0.06	-0.03	-0.21	0.02	0.18	-0.03	1.00		
32. Host-home interest rate differential	0.26	0.20	-0.04	-0.16	0.11	0.02	0.01	0.02	-0.09	1.00	
33. Oil price	0.04	0.21	-0.03	0.06	-0.03	-0.04	-0.15	0.03	-0.02	-0.03	1.00
34. Literacy	-0.10	-0.01	0.06	0.22	-0.22	0.06	0.21	-0.09	0.17	-0.10	-0.10

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Table of Contents

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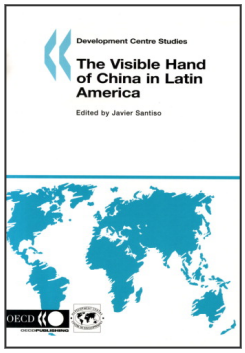

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