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Abstract

We analyze 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 time span possible given data availability (from 1984 to 2001), we do not find a substitution from Latin American inward FDI to China, when other relevant factors are taken into account. However, concentrating on the last few years (from 1995 to 2001), 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.

Keywords: China, Latin America, FDI

JEL classification: F21, F3

1 Introduction

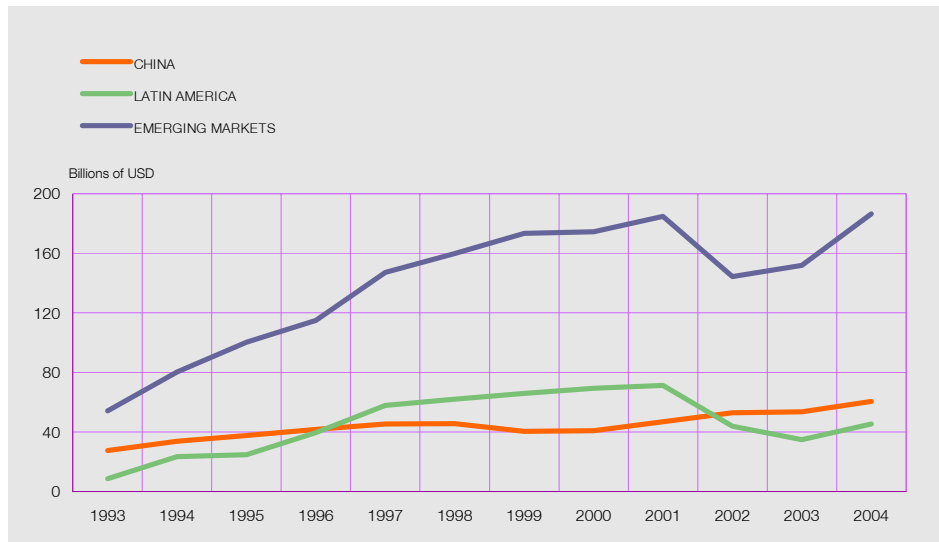
The rapid emergence of China as an important player in the global economy is a remarkable issue with consequences for the rest of the world. An important aspect is foreign direct investment (FDI) since China has been attracting a growing share of FDI flows since 1990s. After receiving an average of \$28 billion in the 1990s, China's annual FDI inflows have increased to \$47 billion on average since World Trade Organization (WTO) membership in 2001¹ (Graph 1) and have continued to grow even faster, reaching \$61 billion in 2004. In a relatively short period of time, China has accumulated the third largest stock of inward FDI after the US and the UK. Foreign firms are attracted by China's rapid economic growth, increasing demand for consumer goods, a relatively skilled and educated workforce for the wages paid, improved infrastructure and a more predictable business environment. Since the early 1980s, China has drawn significant investment from regional conglomerates in Hong Kong, Taiwan, Macao and Singapore, but also from the largest industrial economies, particularly Japan and the US.

In the same way as many countries fear China as a competitor in the export markets, there is a growing concern, especially in developing countries, that FDI may be diverted into China. FDI is very important for Latin America since it has been the major source of external financing in the last few years and has also helped modernize the economic structure. Nonetheless, FDI flows to Latin America started to fall in 2000 while FDI to China was accelerating (Graph 1). Given its relevance for the future of the region, deepening our knowledge of the determinants of inward FDI seems clearly warranted. This is what this study does, focusing on the impact of China as an always more important recipient of FDI.

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

1. These figures are drawn from IMF International Financial Statistics.

Graph 1. FDI Inflows



Sources: Customs Administration of China, WEO database of the IMF

A second aspect is if the global supply of FDI is constant or, more specifically, if the impact of China's inward FDI on 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 of Latin America but not necessarily since other regions could take the hit. However, 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 also in other areas of the world. In the same vein, China's contribution to raising the rate of return of FDI could twist investors' preference towards FDI instead of other private capital flows (mainly portfolio or cross-border lending), particularly if their returns were hardly correlated with those of FDI. Moreover, China itself – with a huge saving rate – is an important source of FDI; outward FDI from China increased 66% per year since its accession to WTO, although it still remains at very low levels compared to the largest OECD countries.

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

It seems, thus, clear that the impact of Chinese inward FDI on Latin American countries is an empirical question. There have been very few attempts in the literature: a first step – even if only descriptive – is found in a recent publication by the IADB (2004). The report 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. Chantasawat et al. (2004) analyze 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 impact on Latin American countries. They also conduct the same exercise on the shares of FDI where they do show a negative Chinese effect on the Asian and Latin American shares.

In our paper, we continue with the empirical approach and go beyond Chantasawat et al. (2004) in a number of ways. First, we use bilateral (home-host) data and not aggregate one. Bilateral data describes much better investor's behaviour, avoids a potential aggregation bias and limits collinearity problems. Second, we not only estimate the impact of Chinese inward FDI on Latin America as a whole, but also differentiate among countries since their productive structure and the type of FDI they attract is very different. For instance, Mexico and Central America have mainly received export-oriented FDI while South America has mainly attracted FDI into the non tradable sector (financial services and utilities), as well as for the extraction of natural resources. We would, therefore, expect China to have a negative impact of the first group of countries but not on the second. In the latter case, it could even turn positive as China steps up its demand for commodities.

A third difference between Chantasawat et al. (2004)'s approach and ours is that they assume the supply of FDI to be inelastic. This is quite a restrictive assumption for emerging countries, which have to compete for financing. We allow for the possibility of an elastic supply of FDI by introducing other capital flows as an additional regressor. In this way, we capture potential substitution or complementarities among flows. Fourth, we take into account the adjustment cost of FDI, which is known to be relevant for long-term (generally physical) investment, such as FDI. Fifth, we improve on the econometric technique to take better account of endogeneity. We use the generalized method of moments, instrumenting potentially endogenous variables with lags, exogenous variables and other valid instruments, in order to obtain unbiased and consistent estimators and as efficient as possible. Finally, we compare different time spans, so as 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 began already after China announced it would open up its economy at the end of the 1970s.

This paper is organized as follows: section 2 reviews the literature of FDI determinants; section 3 describes the dataset, the variables included, their sources and the a-priori on their relation with Latin American inward FDI; section 4 sets out our econometric strategy and its advantages and caveats; section 5 reviews the results; and, finally, section 6 draws the main conclusions and policy implications.

2 Determinants of FDI

A wealth of empirical literature has analyzed which are the main determinants of inward FDI and very little consensus exists, except perhaps for the size of the host country's economy.²

For a long time, the general view was that the “better” a country, in terms of its macroeconomic situation and institutional environment, the 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, Dasgupta and Singha (1998)]. In the same vein, a survey conducted to over 1000 chief executives of multinational enterprises concludes that macroeconomic and political stability, as well as the regulatory environment and country size are keys for foreign direct investors to decide where to establish themselves [AT Kerney (2003)].

Hausmann (2001), however, challenged the view showing evidence that poor-performers, in terms of lower GDP per capita and more 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 the case in low-skill labour intensive countries where FDI is mostly attracted by low salaries [Chantasasawat (2003)].

As for the size of the economy, Jaumotte (2004) and Love and Lage-Hidalgo (2000), among others, show evidence that the host country's total GDP and GDP per capita, respectively, help receiving more FDI. In addition, openness to trade also appears to be a relevant determinant of FDI [Singh and Jun (1995) and Albuquerque, Loayza and Servén (2003)].

Another strand of the literature has concentrated on the relation between trade and FDI [Brainard (1997) and Chen (1994)]. Some find evidence of a substitution effect between the two while others argue in favour of complementarities. Substitution should, in principle, be the result of countries exporting a certain good which decide to produce it in the destination country so as 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 in home country or global ones although there is no clear consensus on which ones are key. Albuquerque, Loyza and Servén (2002) report that push factors explain more than 50% of FDI developments. In the same vein, Levy-Yeyati, Panizza and Stein (2002) show that the economic cycle in industrial countries is a relevant determinant of FDI but the direction of influences changes for the US, Japan and Europe.

² 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 Lim, 2001).

3 Variables and data issues

Our *dependent variable* is composed of annual bilateral inward FDI flows from the different OECD home countries towards the six largest host economies of Latin America, expressed in millions of US dollars. These are Argentina, Brazil, Chile, Colombia, Mexico and Venezuela (the full list of home and host countries is shown in Table A-1). The reason to limit our analysis to these six countries is that they are the only Latin American ones included in the only database available for bilateral FDI flows for a large number of countries, namely the OECD's International Direct Investment Statistics (Table A-2 gives details on data sources).

We have followed two alternatives time horizons. The longest possible one, given data availability, which starts close to China's decision to conduct an "open door" policy, namely from 1984 until 2001. This yields an unbalanced panel of 2850 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 observations³. Second, since the pattern of FDI flows appears to have changed since the mid-1990s, we estimate a shorter panel, from 1995 to 2001. This period should also capture foreign investors' behaviour in the light of China's negotiations for WTO membership. In this case, we only have a maximum of 428 observations in the estimations.

Our *objective variable* is the 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 this coefficient would be negative. The data is drawn from the same OECD source as the dependent variable. This implies that our data excludes important suppliers of FDI to China, which find themselves in the Asian region but outside the OECD. In reality, it is hard to think of a potential competition between China and Latin America for FDI from Asian countries such as Hong Kong, Macao, Taiwan or Singapore, which accounted for 44% of FDI received in China in 2003. The cultural and ethnical ties between China and Asian non-OECD countries, suggest that there is a fragmentation in the FDI market. Including these countries as FDI providers could actually distort the answer to the question we pose ourselves, namely whether global foreign direct investors have reduced their FDI in Latin America because of China. On the contrary, the FDI to Latin America is mainly originated in OECD countries, which accounted for 76% of the total received in 2002. Therefore, our work focuses on the FDI from OECD countries so as to guarantee a relatively high degree of integration of the FDI market and, thereby, real opportunities of substitution among destination countries.

We also construct another objective variable, as a robustness test, which reflects bilateral inward FDI to Hong Kong. This is because a lot of reinvesting takes place between the two economies and is not adequately accounted for in the statistics. This phenomenon, which is generally known as roundtripping, starts with China's exporting capital to Hong Kong, favoured by tax advantages. This capital, then, returns to China in the form of FDI.

The other potentially relevant determinants of FDI, which we include as control variables, are classified into: (i) capital flows, (ii) bilateral variables, (iii) host country factors, (iv) home country variables and (v) global factors.

3. 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 the existence of missing values in the non-significant regressors.

The model estimated could be expressed as follows:

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

i = host country (Latin America)

j = home country (OECD)

As for *capital flows*, we include a number of different controls. First, we consider developments in other capital flows (namely portfolio and cross-border) so as to account for the potential substitution between different types of investment. If such substitution existed, the coefficient would have to be negative and significant. This data are drawn from the IMF International Financial Statistics (IFS). Second, we allow for the possible persistence of FDI flows since investment requires time to adjust to desired levels. We do so by taking the lag of the dependent variable. A third regressor considers the behaviour of other exporters of FDI, so as to determine whether investment decisions are influenced by what competitors do. To take this into account, we include FDI from the whole OECD to Latin America, as well as to China and Hong Kong. A positive and significant coefficient would indicate some kind of herd behaviour among foreign direct investors or “follow your competitor”. Fourth, we also consider the possibility that FDI decisions may be taken at a regional level. In other words, if a country invests in, say, Chile, it could encourage additional investment in other Latin American countries. Fifth, we introduce FDI to OECD countries to test whether a possible preference of foreign direct investors to be present only in industrial countries discourages FDI to Latin America. Finally, we control for global trends in FDI flows. This is because it will certainly be easier for Latin American countries to receive investment boom years for FDI. All these variables are drawn from the above-mentioned OECD database.

As *bilateral factors*, we include the bilateral nominal exchange rate because it affects the cost of the investment – if paid in local currency – but also the value of repatriated profits. A depreciation of the host country currency against the home country one reduces the cost of the investment but also profits repatriated, so that there is no clear a-priori on the expected sign of the coefficient. The data is drawn from the IFS and an increase implies a depreciation of the host currency against the home one. We add a measure of the relative investment cost, measured by the difference in the short-term interest rate between the host and the home country, and which is also drawn 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 to matter. In addition, we take bilateral exports and imports from the IMF Direction of Trade Statistics. This allows us to control for the potential substitutability or complementarity between exports/imports and inward FDI, as described in the previous section. Finally, we include an index of the similarity in the production structure between the home and the host countries, based on two-digit manufactured value added data from United Nations Industrial Development Organization (UNIDO).⁴ This variable should

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

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

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 structure.

indicate how similar their economies are and to what extent they may compete in third markets.

Finally, other 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 in the empirical literature as to their influence, the first two should, in principle, bear a negative relation with inward FDI while the last two, particularly the latter, should be positively related. Other host macroeconomic conditions are GDP growth, the level 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 in as far as they lower the host country's competitiveness. All these variables are drawn from the IFS and the World Bank World Development Indicators (WDI). Finally, the size of the economy should, in principle, foster FDI. We proxy it by a combination of GDP per capita and GDP⁵, both in US dollar. The two are drawn from the WDI and the IMF World Economic Outlook (WEO) database, respectively. We also include a country's endowment of natural resources, drawn from Hausmann (2001). 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 last two should, in principle, yield a positive effect. However, as for macroeconomic variables, we should not forget the general lack of a strong consensus in the literature.

Finally, other potentially relevant host country factors are financial crises. We include one dummy variable for each type of crisis, sovereign, currency or banking, which take the value of one in each year in which a country finds itself in a crisis. This allows us to capture the cumulative impact of each of these events.⁶ The information is drawn from Díaz-Cassou, García-Herrero and Molina (2004). While we should generally expect crises to discourage foreign investors, it is also true that banking crises tend to be followed by the opening up of the banking system to foreign competition, mainly through privatization. This could attract FDI.

As for *home* country effects, we include GDP growth and GDP per capita, from the WEO database. Finally, we take developments in oil prices as the main *global* factor affecting FDI. These are drawn from Datastream. Table A-3 shows bilateral correlation between all these regressors.

5. We also control for both variables separately and the results do not change.

6. To test the robustness of the results, we construct a different dummy, which only takes the value of one in the first year of the crisis.

4 Empirical methodology

Given the paper's objective, determining in the most accurate way whether China's inward FDI affects Latin America's one, we face one major challenge: endogeneity. Endogeneity could lead to a biased coefficient of our objective variable (Chinese inward FDI). Other potential problems are how to deal with the adjustment costs of FDI, unobserved heterogeneity and the choice of the control variables not to lose too many degrees of freedom while avoid a missing variable problem. To tackle potential endogeneity, but also the existence of adjustment costs and unobserved heterogeneity, we use the Generalized Method of Moments (GMM), following Arellano and Bover (1995).

The Arellano-Bover estimator – also called 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 to include some additional instruments.

We prefer this option to a fixed-effects estimator for several reasons. First, it allows us to take into account unobserved time-invariant bilateral specific effects. Second, we 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 right-hand side of the equation, such as bilateral FDI to Latin America, other FDI flows and bilateral trade.⁷ Third, it deals with the possibility that the dependent variable is not stationary. Finally, we achieve a high degree of efficiency by considering all possible instruments.

However, there are two main disadvantages with the GMM estimators. First, because their properties hold asymptotically, it would be safer to use this methodology with a very large number of observations.⁸ As robustness test, we run all regressions as a fixed-effect panel with robust standard errors. The results do not differ too much. The other disadvantage is that we cannot include time-invariant regressors since their coefficients are not identifiable with this methodology. This does not imply however that there is a problem of omitted variables since they are all included in the time-invariant country-specific effects.

We also tackle any potential omitted variable problem in an additional way. We, first estimate a general equation including all control variables considered [column (1) of Tables 1 and 2]. We, then, test – through a Wald test – the joint hypothesis that the coefficients of the variables that are not significant individually are equal to zero. If not rejected, we re-estimate the model only with the controls which were significant in the general regression. Otherwise, we test a less restrictive hypothesis but still trying to reduce the number of regressors to the maximum extent possible. This is a sequential – from general to specific⁹ – strategy, which we follow until we reject that the remaining set of coefficients of the control variables is equal to zero [Column (2) of Tables 1 and 2]. In this way, we achieve more efficient coefficients of the remaining parameters, including that of the variable of interest, 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 Latin American countries [Column (3) of Tables 1 and 2].

7. As a robustness test we also instrumented for the bilateral nominal exchange rate. The results do not change.

8. In any event, the small sample problem is less acute for the Arellano-Bover estimator than the Arellano-Bond one, since 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 our case.

9. See Hendry (2000) for details on the general to specific strategy.

5 Results

As previously described, we regress the six largest Latin American countries' *inward FDI on bilateral FDI to China* and control for the all aforementioned regressors in the unrestricted model.

As a first step, we use our whole sample from 1984 to 2001. This captures developments shortly after China started its open door policy until the most recent data, namely China's entry into WTO. When all controls are introduced, we find no evidence of a substitution effect from Latin American FDI to China (Table 1, column 1). The same is true for FDI to Hong Kong. When, then, proceed to reducing the number of control variables and the lack of a significant impact of Chinese inward FDI is confirmed (Table 1, column 2).

We also look into the impact of China on the inward FDI of each of the Latin American countries considered. Argentina and Colombia are negatively affected at a 5% and 10% significance level, respectively, but the parameters are very small (Table 1, column 3). In addition, we cannot 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, we 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 concentrate on the restricted model since the estimators are more efficient.¹⁰ First, we find a strong and significant complementarity effect between FDI and other private capital flows since the coefficient for *total capital flows over GDP* is positive and highly significance. This result supports the hypothesis of an elastic supply of FDI. Second, there is a certain degree of "regional behaviour" of investors, since an increase in FDI to a certain Latin American country from a given home raises investment in other countries of the region. This is shown in the highly significant, albeit small, coefficient of *bilateral FDI to Latin America*. Third, the amount of *bilateral exports* also appears to foster FDI, which supports the hypothesis of a complementarity – and not substitution – between the two. One possible interpretation is that the 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. This causal link is probably not so much the banking crisis itself but rather the privatization and opening-up to foreign competition which have followed these crises in virtually all Latin American countries in our sample.¹¹ Finally, it should be noted that the fixed effects estimated for each home-host pair are also picking up the information of the regressors which barely change over time. This could explain why they are not found significant.

In a second exercise, we restrict the panel to a more recent time span, from 1995 to 2001. There are a number of reasons to choose this shorter time span. 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, until it finally entered the club

¹⁰. The *bilateral nominal exchange rate*, the *debt service* and *GDP growth* in the host country are only significant in the first specification with all regressors. The non-significance in the restricted model may be due to the increased number of observations and degrees of freedom.

¹¹. The fact that this result is only found for the dummy which considers all crisis years, and not only the burst of the crisis, supports this interpretation.

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, there is a clearly negative and significant effect of Chinese inward FDI on that to Latin America (Table 2, column 1 and 2). When analyzing the impact country by country, Mexico and Colombia are negatively affected by a reduction in Chinese inward FDI in a significant way, particularly in the case of Mexico at a 99% confidence level (95% for Colombia). As Table 2 shows, when Chinese inward FDI increases by \$100 million, Colombian and Mexican inward FDI is reduced by \$84 and \$29 million, respectively. Notwithstanding the relatively large difference in the parameters, the impact could be similar since we cannot reject the hypothesis that both coefficients are statistically equal. This result is particularly interesting in the case of Mexico since its free trade agreement with the US (NAFTA) was in place during the whole time span and inward FDI generally increased. In fact, it only started to fall more recently, in 2002, but this does not imply that China had no effect. Our 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, if we exclude the impact on Mexico and Colombia, no dislocation can be found from the other Latin America countries to China.¹²

Results for control variables are very similar to the longer panel except for two. The *bilateral nominal exchange depreciation* is now clearly significant in increasing FDI to Latin American countries, which hints to the fact that a 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 to the existence of a large share of FDI geared towards domestic demand for Latin American countries as a group. If consider this result together with the previously found complementary of exports, it could well be that the complementary of exports stems from those countries which receive more export-oriented FDI, such as Mexico, and the substitutability of imports from some of the South American countries. In any event, this hypothesis cannot be tested since we only have Latin American aggregate coefficients for the control variables

Finally, we conduct a number of robustness tests, which do not change our results.¹³ The first one tackles the close relation between Hong Kong's and Chinese inward FDI. We, thus, take as objective variable the sum of FDI to China and Hong Kong. Second, we test the extreme hypothesis of complete substitution from Latin American inward FDI to that of China. As could be expected, from our results, the hypothesis is rejected. Third, we run the regressions taking logs for all variables for which this is possible. Fourth, we account for the potential endogeneity of the bilateral exchange rate by taking instruments. Fifth and last, we control for the potential endogeneity of the externality associated to total FDI to Latin America excluding the FDI of the host country in point.

12. In other words, we can not reject that coefficients of Argentina, Brazil, Chile and Venezuela are the same and equal to 0.

13. The results of these tests are available by request.

Table 1. Results for long time span. Sample 1984-2001

	(1)		(2)		(3)	
	Common effect for all Latin America countries		(1) + Jointly non-significant coefficients removed		(2) + Individual effect for each Latin America country (a)	
Dependent variable: Bilateral FDI flow from home to host	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Objective variables						
Latin America as whole						
<i>Bilateral FDI to China</i>	-0.068	(0.234)	-0.062	(0.245)		
<i>Bilateral FDI to Hong Kong</i>	-0.033	(0.574)				
Country specific (b)						
<i>Impact on FDI to China on FDI to Argentina</i>					-0.095**	(0.043)
<i>Impact on FDI to China on FDI to Brazil</i>					-0.131	(0.383)
<i>Impact on FDI to China on FDI to Chile</i>					0.075	(0.489)
<i>Impact on FDI to China on FDI to Colombia</i>					-0.228*	(0.091)
<i>Impact on FDI to China on FDI to Mexico</i>					-0.068	(0.295)
<i>Impact on FDI to China on FDI to Venezuela</i>					-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)
<i>Lag of Bilateral FDI</i>	0.259	(0.258)	0.221	(0.172)	0.312	(0.140)
OECD FDI to China	0.003	(0.329)				
OECD FDI to Hong Kong	0.006	(0.398)				
OECD FDI to Latin America	-0.001	(0.308)				
Total FDI of OECD countries	0.000	(0.448)				
<i>Bilateral FDI to Latin America</i>	0.061***	(0.002)	0.060***	(0.004)	0.051***	(0.003)
<i>Bilateral FDI to OECD</i>	0.002	(0.156)	0.001	(0.149)	0.001	(0.118)
Bilateral variables						
Bilateral nominal exchange rate (increase indicates depreciation of host)	0.398**	(0.018)	0.082	(0.134)	0.099*	(0.067)
Host home interest rate differential	0.164	(0.414)				
<i>Exports</i>	0.074**	(0.012)	0.038***	(0.007)	0.037***	(0.007)
<i>Imports</i>	-0.029	(0.409)				
Similarity in productive 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 over GDP	-18.733	(0.199)				
Real Effective Exchange Rate (increase indicates an appreciation)	-0.831	(0.495)				
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 crisis	-94.170	(0.448)				
Banking crisis	459.129***	(0.007)	147.731***	(0.009)	135.266**	(0.010)
Currency crisis	-157.281	(0.232)				
Home country variables						
GDP growth in home country	-31.985	(0.138)	-4.837	(0.219)	-3.288	(0.334)
GDP per capita in home country	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	
Sample	1984-2001					
Robust p values 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.						
The categorical variables <i>rating</i> and <i>civil and political liberties</i> are also included as regressors						
(a) Although control variables' coefficients differ numerically with column (2), qualitatively, the results are the same.						
(b) These variables result from multiplying FDI to China and a dummy variable which takes the value of 1 for the observations of each of the host countries.						

Table 2. Results for shorter time span. Sample 1995-2001

	(1)		(2)		(3)	
	Common effect for all Latin America countries		(1) + Jointly non-significant coefficients removed		(2) + Individual effect for each Latin America country (a)	
Dependent variable: Bilateral FDI flow from home to host	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Objective variables						
Latin America as whole						
Bilateral FDI to China	-0.154*	(0.065)	-0.157**	(0.024)		
Bilateral FDI to Hong Kong	-0.084	(0.299)				
Country specific (b)						
Impact on FDI to China on FDI to Argentina					-0.083	(0.244)
Impact on FDI to China on FDI to Brazil					-0.219	(0.260)
Impact on FDI to China on FDI to Chile					0.035	(0.737)
Impact on FDI to China on FDI to Colombia					-0.844**	(0.013)
Impact on FDI to China on FDI to Mexico					-0.287***	(0.007)
Impact on FDI to China on FDI 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 Hong Kong	0.023**	(0.018)				
OECD FDI to Latin America	-0.004**	(0.013)				
Total FDI of OECD countries	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						
Bilateral nominal exchange rate (increase indicates depreciation of host)	0.621**	(0.020)	0.179**	(0.045)	0.276***	(0.008)
Host home interest 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 productive 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 over GDP	29.968	(0.507)				
Real Effective Exchange Rate (increase indicates an appreciation)	-1.911	(0.530)				
General characteristics						
Size	0.000	(0.450)				
Natural Resources	1.702**	(0.044)	0.677**	(0.022)	0.621**	(0.032)
Institutional characteristics						
Capital account restrictions						
Creditor rights	47.222	(0.410)				
Literacy	193.501**	(0.026)	46.056*	(0.085)	35.217	(0.189)
Occurrence of Crises						
Sovereign crisis	-195.527	(0.347)				
Banking crisis	-398.843	(0.128)	222.233***	(0.000)	217.170***	(0.001)
Currency crisis	53.805	(0.773)				
Home country variables						
GDP growth in home country	-7.787	(0.702)				
GDP per capita in home country	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 group (home host)	60		99		99	
Sample	1995-2001					
Robust p values 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), qualitatively, the results are the same.						
(b) These variables result from multiplying FDI to China and a dummy variable which takes the value of 1 for the observations of each of the host countries.						

6 Conclusions

In this paper we investigate how Chinese inward FDI affects FDI flows to Latin American countries. Over a long time span, from 1984 to 2001, we hardly find any evidence of FDI dislocation from Latin American countries to China but it seems to be present in a more recent time span, which focus on the years when FDI flows grew more rapidly worldwide and negotiations for China's WTO membership accelerated (namely, from 1995 to 2001). This is due to the significant in the case of Mexico's and Colombia's negative impact while the rest of Latin America countries are not affected. Given that FDI generally increased during the period considered, these results should be read in terms of the counterfactual: Had Chinese inward FDI not been so strong, these countries could have attracted more FDI.

This would suggest that competing in the same sectors as China increases the likelihood of a substitution of FDI. Having a cursory look at the sector structure of FDI in Mexico and Colombia, we find that manufacturing accounts for 56% of total in the case of Mexico (the largest of all sectors) and 21% in the case of Colombia (the largest after financial services). By contrast, Brazil has a much smaller share of FDI in manufacturing (about 10%) while most of it concentrates on telecommunications and financial services.¹⁴ In any event, this interpretation of the results should be taken with care since we do not have enough evidence that this is the main channel through which China affects Latin American FDI. In fact, since the focus of our paper was the behaviour of global investors, we have opted for bilateral rather than sectoral data so that not much can be said about the channels in which China may influence other host countries. Both bilateral and sectoral data would be ideal but they are not available.

When 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 in a large privatization process, which has already been announced for some sectors. In addition, the wage differential with Latin American countries will probably be maintained 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 be along with purchasing power for a very large population. This will make China a particularly attractive country for FDI targeting domestic demand.

This scenario, where China continues to attract a large share of world FDI, may seem worrisome for Latin American countries, particularly those with a more similar productive structure to that of China. However, it only reflects one side of the coin. At the same time, it provides tremendous opportunities in the medium term. Due to geographical reasons, Latin American countries are not in such good position as Asian economies to reap some of these benefits, such as assembling and re-exporting of manufactured products. However, they will clearly benefit from China's increasing demand for raw materials in a scenario where China continues to grow fast. This is not only true for Latin American exports but also for 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 material. This is why the

¹⁴. This has been estimated using FDI flows from the three main investors to Brazil, namely the US, Spain and Japan. Unfortunately, we cannot compare Mexico and Colombia with the other Latin American countries included in our analysis since we could not find sectoral information.

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.

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Appendix: List of Tables

Table A - 1. List of countries considered

Home country	Host country	Additional countries or areas
Australia	Argentina	China
Austria	Brazil	Hong Kong
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		
United States		

Table A - 2. Variables and data sources

Variable type	Name	Description	Units	Source
	Bilateral FDI	Bilateral FDI	Millions of USD	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 of USD	Direction of Trade Statistics, IMF
Bilateral	Bilateral imports	Bilateral Import flows	Millions of USD	Direction of Trade Statistics, IMF
Bilateral	Host home interest rate differential	Host home differential in short term interest rates	Percentage	IFS, IMF
Bilateral	Similarity in productive structure		Index	UNIDO
Capital flows	Bilateral FDI to China	Level of FDI flows of each home country in China	Millions of USD	OECD
Capital flows	Bilateral FDI to Hong Kong	Level of FDI flows of each home country in Hong Kong	Millions of USD	OECD
Capital flows	Bilateral FDI to Latin America	Level of FDI flows of each home country in the six Latin American countries included	Millions of USD	OECD
Capital flows	Bilateral FDI to OECD	Level of FDI flows of each home country in OECD	Millions of USD	OECD
Capital flows	OECD FDI into OECD	FDI of all OECD's countries in OECD area	Millions of USD	OECD
Capital flows	OECD FDI to China	Level of FDI of all OECD's countries in China	Millions of USD	OECD
Capital flows	OECD FDI to Hong Kong	FDI of all OECD's countries in Hong Kong	Millions of USD	OECD
Capital flows	OECD FDI to Latin America	Level of FDI of all OECD's countries in Latin America	Millions of USD	OECD
Capital flows	Total FDI of OECD countries	FDI of all OECD's countries in the world	Millions of USD	OECD
Global	Oil Price	Brent Crude	Current Month, fob USD/BBL	Datastream
Home	GDP growth in home country	Gross domestic product at constant prices	Percentage	WEO, IMF
Home	GDP per capita in home country	Gross domestic product per capita, current prices	US dollars	WEO, IMF
Host	Capital account restrictions	Dummy: 1 if the country had capital account restrictions. 0 Otherwise		Milesi-Ferretti (1998)
Host	Creditor rights	Contract Viability, Profits Repatriation, Payment Delays		PRS Group
Host	Debt service to GDP	Interest expenditures plus amortizations	Percentage of GDP	World Bank
Host	Domestic Investment over GDP	Fixed capital investment	Percentage of GDP	World Bank
Host	Export growth	Annual growth in exports in USD	Percentage	World Bank
Host	External Debt to GDP	Total external debt	Percentage of GDP	World Bank
Host	External Reserves	Total reserves minus gold	Millions USD	IFS, IMF
Host	Fiscal balance	Public sector balance (positive indicates surplus and negative deficit)	Percentage of GDP	IFS, IMF
Host	GDP growth	Real GDP annual growth rate	Percentage	IFS, IMF
Host	Inflation	CPI annual growth rate	Percentage	IFS, IMF
Host	Literacy	Adult Literacy rates (% of people older than fifteen)	Percentage	World Bank
Host	Natural Resources	Natural resources valuation	Millions of USD (PPP)	Hausmann (2001)
Host	Occurrence of banking crisis	Dummy. 1 if the country has undergone a banking crisis in a certain year.		Diaz, García-Herrero and Molina (2004)
Host	Occurrence of exchange crisis	Dummy. 1 if the country has undergone a currency crisis in a certain year.		Diaz, García-Herrero and Molina (2004)
Host	Occurrence of sovereign crisis	Dummy. 1 if the country has been under default in that year.		Diaz, García-Herrero and Molina (2004)
Host	Other capital flows over GDP	Portfolio and other foreign investment flows	Percentage 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		Percentage	IFS, IMF
Host	Size	Product of GDP per capita and total GDP		WEO, IMF

Table A - 3. Correlation among variables

	Bilateral FDI to Hong Kong	Bilateral FDI to Latin America	Bilateral FDI to Latin America	Bilateral exports	Bilateral imports	OECD FDI to China	OECD FDI to Hong Kong	OECD FDI to Latin America	OECD FDI Total FDI of OECD countries	External debt to OECD	Export growth	GDP growth	Sib	Inflation	Fiscal balance	Debt service to OECD	Natural resources	Capital account restic.	Total capital flows over GDP	Domest. invest over GDP	Sovereign debt over GDP	Banking crises	Currency crises	Creditor rights	Similar product structure	Home GDP per capita	Home GDP growth	Effective Exchange Rate	Bilateral exchange rate	Host home interest rate differential	Oil price							
1.00	1.00																																					
0.44	0.55	1.00																																				
0.24	0.55	1.00	1.00																																			
0.17	0.33	0.35	0.16	1.00																																		
0.15	0.32	0.32	0.15	0.99	1.00																																	
0.23	0.06	0.13	0.19	0.05	0.04	1.00																																
0.11	0.11	0.18	0.30	0.07	0.05	0.71	1.00																															
0.09	0.09	0.22	0.35	0.07	0.06	0.71	0.90	1.00																														
0.03	0.07	0.19	0.39	0.06	0.06	0.52	0.75	0.89	1.00																													
-0.06	-0.04	-0.06	-0.09	-0.06	-0.05	-0.28	-0.25	-0.21	-0.20	1.00																												
0.08	0.04	0.12	0.19	0.12	0.10	0.59	0.60	0.61	0.52	-0.35	1.00																											
0.04	0.02	-0.01	0.04	0.01	0.01	0.08	0.05	0.01	0.06	-0.08	-0.01	1.00																										
0.02	0.01	0.01	0.03	0.03	0.00	0.08	0.02	0.05	-0.05	-0.12	0.99	0.00	1.00																									
0.19	0.04	0.10	0.05	0.15	0.05	0.08	0.12	0.08	0.04	0.02	0.89	0.02	0.02	1.00																								
-0.04	0.00	-0.03	-0.05	-0.02	-0.01	-0.14	-0.03	-0.08	-0.11	-0.05	-0.01	0.00	0.07	0.07	1.00																							
0.02	0.00	0.00	0.00	0.00	0.00	0.11	0.08	0.03	0.01	0.06	-0.07	0.10	0.18	-0.18	-0.21	1.00																						
-0.02	-0.01	0.01	0.03	0.01	0.01	-0.09	-0.08	0.00	0.07	0.69	-0.12	-0.08	-0.09	-0.20	-0.32	0.11	1.00																					
0.00	0.00	0.00	0.00	0.06	0.07	0.00	0.00	0.00	0.00	-0.25	0.46	0.02	-0.05	0.52	0.29	-0.53	-0.22	1.00																				
0.00	0.01	0.03	0.05	0.01	0.02	0.06	0.13	0.17	0.13	0.09	0.06	-0.18	0.04	0.02	0.09	-0.08	0.06	0.06	1.00																			
0.06	0.03	0.07	0.10	0.02	0.00	0.35	0.32	0.32	0.26	-0.50	0.27	-0.04	0.29	0.16	-0.34	0.29	-0.22	-0.20	0.16	1.00																		
0.05	0.03	0.00	-0.02	0.05	0.04	0.08	0.05	-0.02	-0.07	-0.34	0.06	0.10	0.40	0.07	-0.11	0.06	-0.16	0.04	0.20	0.12	1.00																	
-0.07	-0.04	-0.08	-0.15	-0.05	-0.03	-0.36	-0.32	-0.35	-0.27	-0.30	-0.30	-0.12	-0.20	-0.20	-0.36	-0.30	0.04	0.20	0.12	-0.56	-0.21	1.00																
0.03	-0.01	-0.03	-0.08	-0.15	-0.05	0.02	0.01	-0.16	-0.13	0.19	0.11	-0.10	-0.21	-0.21	-0.16	-0.04	0.19	0.01	-0.08	-0.20	-0.14	-0.05	1.00															
0.01	-0.01	0.01	-0.02	-0.02	-0.02	-0.06	-0.11	0.04	0.03	0.29	-0.21	-0.02	-0.32	-0.11	0.16	0.08	-0.21	0.18	-0.06	-0.35	-0.25	0.19	1.00															
0.01	0.02	0.04	0.05	0.08	0.07	0.19	0.32	0.28	0.17	-0.33	0.31	0.04	0.04	0.30	-0.18	0.34	-0.06	-0.10	-0.13	0.43	0.42	-0.35	-0.22	1.00														
-0.09	-0.13	-0.07	-0.13	0.03	0.02	-0.03	-0.05	-0.11	-0.12	-0.24	0.22	0.07	0.02	0.39	0.17	-0.21	-0.24	0.37	-0.12	-0.01	0.12	0.02	0.00	-0.29	1.00													
-0.06	0.05	0.08	0.04	0.00	0.01	0.15	0.14	0.17	0.16	0.06	0.07	0.10	0.01	0.07	0.00	-0.07	0.07	0.00	0.08	-0.05	-0.01	0.04	0.02	0.05	-0.10	-0.01	1.00											
-0.41	-0.28	-0.20	0.31	0.15	0.13	0.38	0.44	0.42	0.34	-0.13	0.29	0.05	0.07	0.25	0.00	0.08	-0.06	0.00	0.07	0.15	0.02	-0.16	-0.09	0.00	1.00													
-0.13	-0.24	-0.17	0.18	-0.08	-0.08	-0.13	0.16	0.16	0.16	0.06	0.04	0.01	-0.11	0.02	0.01	-0.07	-0.01	-0.03	-0.07	0.15	0.02	-0.16	-0.09	0.00	1.00													
-0.03	0.01	-0.02	-0.03	-0.01	0.03	0.03	0.15	0.17	0.17	0.04	0.04	0.01	0.01	0.01	-0.13	0.08	0.01	-0.03	-0.07	0.15	0.02	-0.16	-0.09	0.00	1.00													
-0.03	0.01	-0.02	-0.03	-0.01	0.03	0.03	0.15	0.17	0.17	0.04	0.04	0.01	0.01	0.01	-0.13	0.08	0.01	-0.03	-0.07	0.15	0.02	-0.16	-0.09	0.00	1.00													
-0.05	-0.02	-0.01	0.07	0.01	0.02	-0.21	-0.25	-0.17	0.12	0.01	-0.10	-0.05	-0.23	-0.07	0.04	0.96	-0.15	-0.24	0.20	0.05	-0.30	-0.26	0.21	-0.04	0.11	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	0.02	0.01	1.00		
0.05	0.03	0.06	0.13	-0.03	-0.04	0.34	0.41	0.42	0.35	0.15	0.00	-0.05	0.03	-0.01	-0.10	0.46	0.07	-0.72	0.04	0.17	-0.10	-0.10	0.06	0.21	-0.09	0.17	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02	-0.10			

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