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JAPANESE FDI IN CHINA – DETERMINANTS AND PERFORMANCE

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Japanese FDI in China: determinants and performance

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Abstract
Japanese foreign direct investment (FDI) into China is an important aspect of one of the largest bilateral economic relationships in the world. The bilateral FDI is analysed using an FDI model combined with stochastic frontier analysis to explain the determinants of FDI, measure the performance of FDI using the frontier, and to measure all unobservable or difficult to measure barriers to investment. The FDI frontier is estimated using core determinants and a second stage of the modelling allows for explaining some of the barriers that FDI face. The choice of variables for both stages is made clear using a model derived from theory and on multinational enterprise behaviour. Both stages allow for an overlap of two important yet independent streams of FDI literature. The analysis allows for the inclusion of a measure of political closeness between countries which is another innovation in the analysis of FDI flow.
The influence of politics and other barriers (or resistances) on a FDI relationship can best be understood in the context of the other determinants of investment flows. Political closeness between countries is shown to affect FDI. An improvement in political relations is associated with an increase in FDI by reducing uncertainty in the investment environment.
The performance of Japanese FDI into China is shown to be high relative to its potential since 1986, the year China started its negotiations to join the GATT in 1986. That year saw a policy shift in China which opened many doors for foreign firms to enter and operate in China. Japanese FDI performance in China was high from 1986 until the Asian financial crisis in 1997/98, including through Chinese domestic political turbulence in 1989. Japanese FDI faces less resistance in China than any other major investing source and since WTO entry has bounced back from the post Asian financial crisis slump to be at the level predicted by the average performance worldwide after accounting for the determinants of FDI. China's WTO accession in 2001 helped reduce uncertainty and gave confidence in bilateral investment, with the effect of mitigating the effects of increased uncertainty from rising bilateral political tensions after 2001.

Keywords: FDI; Investment frontier; Sino-Japan relations; frontier analysis; spatial FDI

Introduction

Foreign direct investment (FDI) is one of the most important dimensions of the economic relationship between Japan and China. China's economic rise has been achieved in large part because of its openness to the rest of the world, and importantly through its policies aimed at attracting foreign firm participation, first in production for export and later in its domestic economy as well. At the same time, Japanese MNEs in key manufacturing industries such as electronics have been able to stay competitive by moving much of their production to China and the rest of East Asia.

China's rapid economic growth and openness have attracted FDI to China on a large scale, most of which is from Hong Kong and Taiwan but increasingly from Japan, the United States and Europe as well. Japanese FDI in China has seen remarkable growth. In 1982 the total stock of Japanese FDI in China was roughly US $72 million[1] which had increased to US$30.3 billion by 2006[2]. Although FDI flows are 'lumpy' with big projects some years making the FDI stock growth less smooth than trade numbers, the average annual growth rate has been over 55 per cent in the entire period. The growth in FDI stock understates the growth in FDI flows as the stock values include depreciation of the capital stock. What explains this rapid growth and how does it compare to other sources of FDI to China? This paper sets out to explain the determinants of FDI in China and growth FDI from Japan to China.

The rapid growth in FDI from Japan to China has occurred with the backdrop of fluctuating political tensions. The two neighbouring countries have ongoing territorial disputes, unresolved historical issues and a political rivalry that occasionally flares up. It is important to investigate whether the political distance affects the investment relationship. Political distance is a measure of how 'close' two countries are politically, or geopolitically and how

[1] Author's calculation based on the perpetual inventory method (see Appendix) and the earliest available bilateral FDI data in 1985.
[2] Ministry of Finance, Japan.

well they get along. Two countries who are political and security allies can be described as being close in terms of political distance whereas two nations that are political rivals, can be described as politically distant. Between these two extremes there is a wide range of degrees of closeness and distance in the relationships between traders and investors. This is best done in the context of other factors that determine and influence FDI. Understanding all relevant factors and the relative importance of those different factors is important to understanding what exactly is driving FDI.

Is the rapid growth and large stock of Japanese FDI in China to be expected given the proximity of the two economies, their respective scales and their economic structures? This paper will measure of how well FDI is performing between Japan and China against other bilateral relationships, Japanese FDI overall and other sources of FDI into China. It will do so with the estimation of an FDI frontier which combines stochastic frontier analysis with FDI modelling. The FDI frontier allows a measure of FDI performance against a frontier which can be thought of as a measure of economic distance. The economic distance, comprised of different resistances, can be measured over time. On average, FDI will flow to countries which are less distance, not necessarily or only in terms of geography as, in them, they face lower (explicit and implicit) barriers to investment. Economic distances vary due to the ease or resistance to capital flows and other economic transactions between countries.

This paper includes a measure of political distance into the analysis and explanation of FDI performance. FDI is potentially more sensitive to political distance then trade is, as bilateral political tensions can erode confidence in the investment environment and increase uncertainty. FDI requires a presence in another country and requires a larger commitment than arms length trade. The paper will measure the influence of political factors on flows of investment worldwide with a focus on the relationship between Japan and China.

The paper is organised as follows. The first section is an explanation of the frontier FDI model. Then the model to be estimated and the data are explained. Then the results are

presented for the estimation of the frontier and the FDI performance results are discussed with a focus on Japanese FDI into China. The analysis then proceeds to estimate the effect of resistances that explain the performance of FDI relationships before concluding.

The frontier FDI model

The earlier general equilibrium models of FDI by Markusen (1984) and Helpman (1984) set the foundations for the current understanding of MNE behaviour. Markusen developed a model of horizontal FDI where MNEs produce offshore from the country of their headquarters to avoid trade costs such as transportation and tariffs. This form of FDI can be characterised as market-seeking FDI where a firm will set up a plant to produce and sell in that host market. This development in the literature came concurrently with Helpman's model of vertical FDI where MNEs take advantage of different factor prices across countries to cut production costs. Simply put, vertical FDI is trade-increasing and horizontal FDI is often seen as reducing.

Recognition of the existence of a combination of both vertical and horizontal types of FDI within MNEs led to later studies' combining the two models into a *knowledge capital* (or knowledge-based) model of FDI (Carr et al., 2001; Markusen, 2002; Markusen and Maskus, 2002). Knowledge capital models describe FDI operations where the research and development, as well as other skilled labour-intensive, or knowledge-intensive activities, are geographically separated from production (Carr et al., 2001). The knowledge capital models also recognise FDI decisions are made based not only on home and host country characteristics, but also on other country characteristics.

In estimating factors affecting FDI flows, multilateral resistances are especially important, perhaps more so than in the case of explaining trade flows (Blonigen et al, 2004; Baltagi et al, 2007; Dee, 2007; Davies, 2008). Third country factors may influence FDI more than trade for vertically motivated and knowledge capital type FDI because FDI host countries are

'competitors' for FDI. A casual hypothesis would be that trade and horizontally motivated FDI are affected by third country factors in similar ways. There is evidence from Altomonte (2002) who, in analysing the location choice of FDI firms, suggests that the power of a country to attract FDI comes from the surrounding countries. Third country effects can act as positive or negative forces in FDI decisions in a bilateral setting and recent theoretical models (Egger and Pfaffermyer, 2004) account for the dependency of alternative investment destinations (Blonigen et al, 2004). Third country effects can increase FDI if the FDI is of a knowledge capital type and plants are spread across more than two countries to take advantage of finer degrees of specialisation. Third country effects can reduce FDI if FDI is concentrated in one country and is an exclusive competitor host market. These third country effects are often included in the modelling by using econometric techniques that control for spatial correlation (Blonigen et al, 2004; Baltagi et al, 2007). The empirical work in FDI studies, which takes account of multilateral resistances, confirms the importance of third country effects. FDI studies that include multilateral resistances usually include these as third country effects of each determinant of FDI weighted by a measure of distance.

The strong interdependencies between trade and investment led to many studies in which FDI was modelled using gravity model determinants of trade, and these models were relatively successful at explaining FDI (see for example, Eaton and Tamura, 1994; Brenton and Di Mauro, 1999; Razin et al., 2002; and Eichengreen and Tong, 2005). Empirical studies have confirmed that the cross country pattern of FDI is well approximated by the gravity relationship (Barba Navaretti et al., 2004, p.32). However, as some studies (Blonigen and Davies, 2000) show, the knowledge capital models of FDI, and models that include third country effects allowing for such multilateral factors, explain FDI better than the gravity model type FDI models. This is not to say that the determinants are different, but that the method for incorporating multilateral resistances, the measures of scale (the difference between separate GDP variables, and other measures such as similarities in scale or multiplicative scale variables) and relative factor endowments are different. Perhaps more importantly, gravity type FDI models are not theoretically based (Bloningen, 2005).

Theoretical derivations of models which estimate FDI are based on firm decisions where the choice to trade or invest is endogenous and depends on economies of scale, factor prices, country risk and transportation costs (Dee, 2007).

Studies that model FDI and estimate its determinants use geographic distance to proxy economic distance, as is the case in explaining trade. Economic distance in this case is not the cost of transit of a good from one country to another, but similar in concept. Capital will flow more easily between two locations with lower economic distance (fewer resistances) compared with two locations that are the same geographic distance apart but have more economic distance between them. An example of this at the limit is a barrier to investment in a country that is designated as a political rival or enemy. Another example is where there is high perceived country risk. The economic distance between Japan and North Korea is much greater than that between Japan and Taiwan despite Taiwan being geographically further away. There are much higher resistances to investment in North Korea.

Stochastic frontier analysis is used to measure production efficiency. This analysis was developed by Aigner, Lovell and Schmidt (1977) and Meeusen and van den Broeck (1977). In the production literature, the argument is that the '[production] process is subject to two economically distinguishable disturbances, with different characteristics' (Aigner et al. 1977:24) and so the error term is 'composed' into a non- negative term which captures production inefficiencies and a more conventional symmetric error term which captures random disturbances. The ability to split the disturbance terms allows that a farmer (producer) who experiences a drought (random disturbance) is unlucky, not inefficient (Aigner et al. 1977).

A similar concept can be applied to measuring FDI potential and resistances. The resistances such as protectionist resistances or those institutional effects that both increase and decrease FDI, that affect FDI in a bilateral relationship which are captured in the unobservable term in the conventional gravity model, are captured as a cause for reducing trade in a stochastic

frontier gravity model. Drysdale and Garnaut (1982) recognised that this distinction is blurred, as unmeasurable disturbances make it difficult to get an accurate estimate of 'potential trade'.

This study measures the resistances to FDI flows by combining two important streams of literature which have sought to analyse FDI relationships. One is the international business or global strategy literature that concerns itself with cultural differences, institutional differences and the choice of mode of entry of MNEs given uncertainty caused by those and other resistances (Hymer, 1960; Kogut and Singh, 1988; Ghemawat, 2007). The other is younger and less established than the international business or international trade literature and is concerned with modelling MNE activity with such factors as country resource endowment differences reflecting comparative advantage, spatial effects in a multilateral sense and also scale of economies (Helpman, 1984; Markusen, 1984; Carr et al., 2001; Markusen, 2002; Egger and Pfaffermayr, 2004; Davies, 2008). This literature does not often justify inclusion of resistances on which the international business literature focuses.

Combining analysis of both strands of FDI literature allows modelling consistent with different modes of FDI and accounting for resistances similar to those on which there has been more focus in the international business literature (see Ghemawat, 2007). A frontier FDI model allows the explanation of the determinants and structure of FDI and the measurement of a counterfactual amount of FDI. FDI performance, relative to the counterfactual, of Japanese FDI into China are compared to overall Japanese outward FDI as well as FDI from the United States and Europe, the other main sources of FDI into China. Then a second stage analysis can explain these performance results using resistances. The second stage will include variables from the international business literature.

The model used in Baltagi et al. (2007) allows for four types of FDI: vertical, horizontal, export platform and complex vertical. All four modes of FDI include third country effects. The export platform and complex vertical modes of FDI are knowledge capital-type FDI. As communications technology has progressed, MNEs have increasingly employed both in

complex production and supply networks. Export platform FDI describes FDI where an MNE sets up a plant in its home country and another country, *i*, with the final goods traded from country *i* to a third country, *j*. The MNE uses country *i* as an export platform base (Egger and Pfaffermayr, 2004). Complex vertical type FDI describes the pattern of an MNE building plants and producing in two host countries, *i* and *j*, with trade of final goods from *j* to the source, or MNE home, country. FDI flows and stock between source country and host country *i* have to be modelled with all other country *j* effects.

Many studies model a two factor world, some with skilled and unskilled labour (see for example Davies (2008)) and others with capital and labour. Results found in studies such as Egger and Pfaffermayer (2004), Baltagi et al. (2007) and Dee (2007) show that a three factor world with skilled labour (or human capital), unskilled labour and physical capital, gives a better explanation of FDI flows. This study builds on the models of Baltagi et al. (2007) and Dee (2007). The model used here to estimate a frontier differs from Baltagi et al. in two important ways. First, Baltagi et al. do not include a measure of distance as they implicitly control for distance in the spatially correlated error term. They do this by using the Gauss-Markov estimator to control for spatially correlated error terms. Spatially correlated error terms capture the fact that a shock to one country affects other countries, and affects those closest the most. This study follows Dee (2007) in its treatment of potentially spatially correlated error terms deterministically with the inclusion of an FTA variable and a weighted FTA variable. The FTA variable would usually be included in the second stage of explaining the performance results but is used in the first stage to estimate performance to control for spatially correlated error terms. Relative distance and the FTA variables are used in this study to estimate the frontier and deterministically account for spatially correlated error terms.

Secondly, a measure of risk is included in Baltagi et al. (2007) without theoretical justification. The inclusion is justified as it relates to the empirical evidence of uncertainty increasing in one country affecting all FDI to that country. The increase in uncertainty increases resistance to FDI. Dee (2007) follows this approach and both studies find that the measure of risk is a significant explanator of FDI. In this study a measure of risk and other

measures that affect uncertainty such as language, trade and investment protection and other policy variables are not included in the estimation of an FDI frontier but instead in explaining why some FDI relationships perform closer to their potential and others do not.

Model and data

The model used in this study follows closely that of Dee (2007) which is based on Baltagi et al. (2007). The difference from Dee's model is that it does not include a risk variable and that a non-negative disturbance term is included that makes it a stochastic frontier model.

$$\begin{aligned}(1)\quad \mathbf{F}_t = {} & \beta_0 + \beta_1\mathbf{dist} + \beta_2\mathbf{G}_t + \beta_3\mathbf{S}_t + \beta_4\mathbf{k}_t + \beta_5\mathbf{h}_t + \beta_6\mathbf{l}_t + \beta_7\mathbf{\Gamma}_t + \beta_8\mathbf{\Theta}_t + \beta_9\mathbf{FTA}_t \\ & + \beta_{10}\mathbf{WG}_t + \beta_{11}\mathbf{WS}_t + \beta_{12}\mathbf{Wk}_t + \beta_{13}\mathbf{Wh}_t + \beta_{14}\mathbf{Wl}_t + \beta_{15}\mathbf{W\Gamma}_t + \beta_{16}\mathbf{W\Theta}_t \\ & + \beta_{17}\mathbf{WR}_t + \beta_{18}\mathbf{WFTA}_t + \mathbf{v}_t + \mathbf{u}_t\end{aligned}$$

Where

$\mathbf{F}_t$ is the log of FDI (for FDI stock – FDI flows are also tested)

dist is the log of the great circle distance between capital cities of *d* and *i*.

$\mathbf{G}_t$ is the log of the sum of country *d* and country *i* GDPs: $\ln(GDP_d + GDP_i)$

$\mathbf{S}_t$ is a measure of GDP similarity: $(1 - s_d^2 - s_i^2)$

where $s_d = GDP_d /(GDP_d + GDP_i)$ and $s_i = GDP_i /(GDP_d + GDP_i)$

$\mathbf{k}_t$ is the log of the ratio of source country to destination country capital stock: $\ln(K_d/K_i)$

$\mathbf{h}_t$ is the log of the ratio of source country to destination country human capital: $\ln(H_d/H_i)$

$\mathbf{l}_t$ is the log of the ratio of source country to destination country unskilled labour: $\ln(L_d/L_i)$

$\mathbf{\Gamma}_t$ is an interaction term between $\mathbf{G}_t$ and $\mathbf{k}_t$: $\mathbf{G}_t\,\mathbf{k}_t$

$\boldsymbol{\Theta}_t$ is an interaction term between distance and the difference in capital and labour ratios:

$$\mathbf{dis}(\mathbf{k}_t - \mathbf{l}_t)$$

$\mathbf{FTA}_t$ is a variable that takes the value of one if country d and i have a free trade agreement in force in year t.

$\mathbf{W}$ is a measure of multilateral effects interacted with each term. $\mathbf{WG}_t$, for example, is the inverse distance weighted average of $\mathbf{G}_t$ between the source country and all third country markets.

$\mathbf{v}_t$ is an independently and identically distributed normal residual term that captures the usual model disturbance from measurement error and other shocks that are no associated with resistances to FDI.

$\mathbf{u}_t$ is an independently and identically distributed non-negative variable that captures the resistances to FDI. $\mathbf{u}_t$ is an independent and identically distributed non-negative variable which usually has a half normal, truncated normal or exponential distribution (Kumbhakar and Lovell, 2000). The non-negative (or one sided) disturbance term, $\mathbf{u}_t$, measures the difference between potential FDI and actual FDI. More precisely, it is the amount of FDI that falls short of the frontier for FDI from country *i* to *j* at time *t*

This model fits the core determinants as follows. Economic distance consists of **dist** and $\mathbf{u}_t$ of which $\mathbf{u}_t$ captures all resistances other than geographic distance. $\mathbf{G}_t$ and $\mathbf{S}_t$ are the economic scale variables and $\mathbf{k}_t$, $\mathbf{h}_t$ and $\mathbf{l}_t$ capture the relative factor endowments. $\boldsymbol{\Gamma}_t$ is an interaction term between scale and a factor endowment while $\boldsymbol{\Theta}_t$ is an interaction term between distance and another dimension of the factor endowments. The multilateral resistances are all accounted for by the inverse distance weighted terms.

The initial analysis will estimate an FDI frontier (Equation 1) which then gives results for the performance of FDI, defined as the actual amount of FDI relative to the frontier. Those FDI relationships between source and host countries that perform well have lower resistances compared to those that do not perform well which face higher resistances. The second stage

of the analysis explains some of the performance results with various resistances including political distance. The second stage estimation and results are discussed later in this paper.

FDI source countries are the United States, Japan, Canada, Germany, France, the United Kingdom and the Netherlands comprising seven of the largest eight FDI sources globally[3]. The share of world FDI covered by this set of countries ranges from half to 70 per cent depending on the year[4]. These source countries were chosen to minimise the missing data problems and to make the panel as balanced as possible. There are ninety recipient countries used and they are listed in the Appendix (Appendix A). Both FDI stocks and flows were used and FDI data are from OECD which has FDI data reported by OECD countries to OECD and non-OECD member countries. The panel is highly unbalanced from 1982 to 2006. Dummy variables for time are included and results for OLS and the frontier using maximum likelihood estimation are presented.

GDP at purchasing power parity is used and is from the World Development Indicators along with labour force and gross fixed capital formation data. Capital stock is calculated from the perpetual inventory method from Leamer (1984) and explained in the Appendix. The human capital data, from the International Labour Organisation and various national statistical agencies, is the absolute number of graduates from tertiary institutions, such as universities, in that country. The sum of the unskilled labour population and the population with a tertiary qualification is equal to the total labour force.

Before the results are presented, it is worth reproducing the hypothesised signs of coefficients based on the theoretical model developed in Egger and Pfaffermayr (2004) as set out in Baltagi et al. (2007). This will allow a comparison of results to the theoretical model.

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[3] Switzerland ranks higher than the Netherlands but is not used as the coverage of recipient countries was not as wide ranging as Dutch FDI.

[4] Source: OECD Stata and UNCTAD FDI data.

Table 1 Hypothesised signs of variable coefficients in FDI model

Explanatory variable	Mode of FDI			
	Horizontal	Export-platform	Vertical	Complex vertical
Bilateral size of d + i (g)	+	+	+	+
Similarity in size (d, i) (s)	+/-	+	-/+	+/-
Capital ratio (K_d/K_i) (k)	+	+	+	+
Human K ratio (H_d/H_i) (h)	+	+	+	+
Labour ratio (L_d/L_i) (l)	-	-	-	-
Bilateral size* K_d/K_i (Γ)	+	+	+	-
$(K_d/L_d)/(K_i/L_i)$*t (Θ)	+	+	-	+/-
	Multilateral effects			
Bilateral size of d + j (wg)	+	+	+	+
Similarity in size (d, j) (ws)	+	+	+/-	+/-
Capital ratio (K_d/K_j) (wk)	-	+	+	-
Human K ratio (H_d/H_j) (wh)	+	+	-	-
Labour ratio (L_d/L_j) (wl)	+	-	+	-
Bilateral size* K_d/K_j (wΓ)	+	+	-	+
$(K_d/L_d)/(K_j/L_j)$*t (wΘ)	+	+	+/-	+

Source: Baltagi et al. (2007).

Results

The results for estimating FDI stock are presented in Table 2. Columns (1) and (2) are for the OLS model with (1) only including bilateral variables and (2) including multilateral variables as well. Columns (3) and (4) are estimates for the frontier MLE model with (3) only estimating the bilateral variables and (4) estimating the model with multilateral variables.

Most variables are statistically significant at a high degree of significance in explaining FDI stock, All bilateral variables are statistically significant. The similar Baltagi et al. (2007) specification and even closer specification of Dee (2007) did not have as many variables with statistical significance as do the results in Table 2. This could be due to the different country

coverage and time period in the Dee model or the different model specifications – no distance and a Gauss-Markov estimator in the Baltagi et al. model – as the frontier model fits the data better than an OLS or fixed effects model (see Appendix B). As was the case in Baltagi et al. (2007) the multilateral variables (those weighted by inverse distance) are jointly significant, confirming their importance in explaining FDI. A simple F test on the multilateral variables in the OLS model confirm joint statistical significance and a likelihood ratio test comes to the same conclusion using for the frontier case.

The unbalanced panel was tested for autocorrelation using the method described in Arellano and Bond (1991), and the existence of autocorrelation was rejected. Tests for the appropriateness of a frontier model and tests for the statistical distribution of the one-sided, non-negative error term are presented in detail in Appendix B. The first test confirms that a significant proportion of the variation is due to the non-negative term and that a stochastic frontier is suitable for the data. The result of the second test is that a truncated normal distribution is chosen instead of a half normal distribution.

In Table 2 distance is negative and highly significant. Baltagi et al. (2007) do not include distance as they are implicitly controlling for it in the spatially correlated error terms. The inclusion here explicitly confirms previous empirical studies that distance matters[5]. Bilateral economic size and similarity of GDPs are positive and significant, lending support to horizontal models of FDI (Markusen, 1984). Scale is a significant explanator of FDI.

[5] see, for example, Carr et al. (2001) and Egger and Pfaffermayr (2004), and Blonigen (2005) for a survey.

Table 2 Stochastic frontier outward FDI determinants

	OLS		Frontier (MLE)	
	(1)	(2) with 3rd country	(3)	(4) with 3rd country
Log of distance	-0.77***	-0.82***	-0.78***	-0.83***
	(0.05)	(0.05)	(0.05)	(0.05)
Bilateral GDPs (g)	2.28***	2.24***	2.19***	2.35***
	(0.06)	(0.11)	(0.05)	(0.05)
GDP similarity (s)	4.44***	3.97***	4.43***	4.11***
	(0.3)	(0.31)	(0.28)	(0.29)
Rel. capital ratio (k)	2.6***	2.43***	2.19***	1.91***
	(0.4)	(0.43)	(0.38)	(0.35)
Rel. human K ratio	0.09***	0.17***	0.06**	0.16***
	(0.03)	(0.03)	(0.03)	(0.03)
Rel. labour ratio (l)	0.46***	0.38***	0.48***	0.42***
	(0.04)	(0.04)	(0.04)	(0.04)
Gt.Kt (Γ)	-0.11***	-0.11***	-0.1***	-0.09***
	(0.01)	(0.02)	(0.01)	(0.01)
Dist(kt-lt) (Θ)	0.22***	0.21***	0.21***	0.2***
	(0.04)	(0.04)	(0.03)	(0.03)
FTA	0.63***	0.57***	0.53***	0.48***
	(0.09)	(0.09)	(0.08)	(0.08)
		Multilateral variables		
wg		0.1**		0.07*
		(0.05)		(0.04)
ws		-7.23*		-2.52
		(4.24)		(1.6)
wk		0.76**		0.83***
		(0.32)		(0.28)
wh		-1.18***		-1.21***
		(0.13)		(0.12)
wl		0.23*		0.22***
		(0.12)		(0.09)
wΓ		-0.02		-0.02**
		(0.01)		(0.01)
wΘ		-0.13*		-0.12***
		(0.07)		(0.05)
wFTA		2.23***		1.41***
		(0.8)		(0.41)
Constant	-53.74***	-52.79***	-50***	-54.3***
	(1.68)	(3.2)	(1.5)	(1.25)
Sigma-squared			13.24	13.26
			(1.64)	(1.93)
Gamma (γ)			0.9	0.9
			(0.01)	(0.01)
Mu			-6.89	-6.92
			(1.42)	(1.58)
Log likelihood fn	-8464	-8396	-8364	-8295
R-squared	0.537	0.5513		
N	4397	4397	4397	4397

Standard errors are in parentheses. *, ** and *** indicate significance at the 10 percent level, 5 percent and 1 percent levels.

The source to destination fixed capital ratio is positive and significant across all model specifications. This is what is expected for all modes of FDI according to the theoretical hypothesised signs in Table 1.

The human capital ratio between source and destination is positive and statistically significant which is consistent with all four modes of FDI. Unskilled labour ratios are a significant explanatory factor in FDI meaning FDI from countries with low endowments of unskilled labour, such as Japan, are aimed at countries with abundance of low skilled labour once all else is controlled for. The result is consistent with the fixed effects results of Baltagi et al. (2007)[6]. However, the spatially weighted unskilled labour variable is statistically significant and has a positive effect across both specifications (OLS and frontier MLE) consistent with modes of horizontal FDI and vertical FDI but not knowledge capital FDI (Table 1). This may be a result of the length of the time period considered which dates back to 1982, before MNEs had complex network behaviour in their FDI and trade patterns. A substantial period after 1982, up to the latest data available, 2006, was covered and the statistical significance of the other spatially weighted variables and the joint significance for all spatially weighted variables is evidence of complex FDI. The joint significance of the multilateral resistances shows that importance of accounting for third party influences on bilateral FDI. Japan's FDI to China depends on influences of other countries, acting both to increase and decrease FDI from Japan to China. The bilateral economic relationship is nested in a multilateral world and therefore the bilateral analysis is conducted in a multilateral setting.

The GDP and capital ratio interaction term is negative meaning the positive impact of a capital endowment difference diminishes with market size. That pattern of FDI is consistent with vertical FDI (Baltagi et al., 2007).

[6] Baltagi et al. (2007) produce results for both fixed effects and random effects estimation and the random effects results show the unskilled labour ratio as not statistically significant.

FTAs between source and destination countries have a positive and significant effect on FDI. The negative sign of the inverse-distance-weighted FTA variable, **WFTA**, in the results controlling for country pair effects means that FTAs between source country and third party countries, increase FDI from the source country to the destination country which is unexpected. FTAs may be causing trade diversion but be causing FDI to increase between source and third party countries. Dee (2007) found that investment provisions in FTAs and other agreements did not impact on FDI patterns in the Asia Pacific region and is consistent with this positive parameter estimated in this study. The destination countries are not aggregated into regions and detailed investment provisions in FTAs are not included as in Dee (2007) so that these agreements are not directly comparable.

Results for FDI flows are similar to those of FDI stock estimation but the number of observations is less for FDI flows than FDI stock as the FDI data in the OECD data set was sparser for flows. Results for FDI flows are included in the Appendix (Appendix C) where other sensitivity and robustness tests are conducted. They show the similarities in variable significance and consistency between stock and flow variables. FDI stock data are used in Baltagi et al. (2007) and Dee (2007) as is common in modelling FDI activity. The results from Table 2 column (4), will be the focus of the rest of the study.

Performance

FDI performance is defined as a ratio of actual to potential FDI and ranges between 0 and 1 – performance of 1 means full potential is reached and the actual FDI lies on the frontier. The absolute level of performance is not important; it is the relative positions that are important. The higher the performance, the less the economic distance that FDI relationship experienced. Table 3 shows results for source country average FDI performance and selected host country average FDI performances.

Table 3 Average FDI performance results

	1982-86	1987-91	1992-96	1997-01	2002-06
FDI source country					
Canada	0.36	0.37	0.36	0.37	0.41
France		0.36	0.36	0.40	0.43
Germany	0.40	0.44	0.45	0.44	0.45
Japan	0.44	0.52	0.44	0.43	0.46
Netherlands	0.61	0.55	0.39	0.47	0.47
UK	0.42	0.47	0.38	0.47	0.46
USA	0.24	0.36	0.40	0.42	0.41
Selected FDI destinations					
Australia	0.59	0.61	0.62	0.60	0.62
Brazil	0.48	0.50	0.53	0.52	0.52
China	0.13	0.26	0.29	0.34	0.32
France	0.22	0.38	0.38	0.28	0.48
Hong Kong	0.57	0.61	0.63	0.57	0.56
Mexico	0.30	0.35	0.39	0.39	0.39
Russia		0.03	0.27	0.41	0.45
Singapore			0.68	0.66	0.63
South Korea	0.43	0.40	0.32	0.34	0.40
Taiwan	0.38	0.40	0.40	0.40	0.46
Thailand		0.52	0.53	0.54	0.57
UK		0.49	0.52	0.53	0.57
USA	0.62	0.57	0.50	0.51	0.49
World	**0.40**	**0.44**	**0.40**	**0.42**	**0.44**

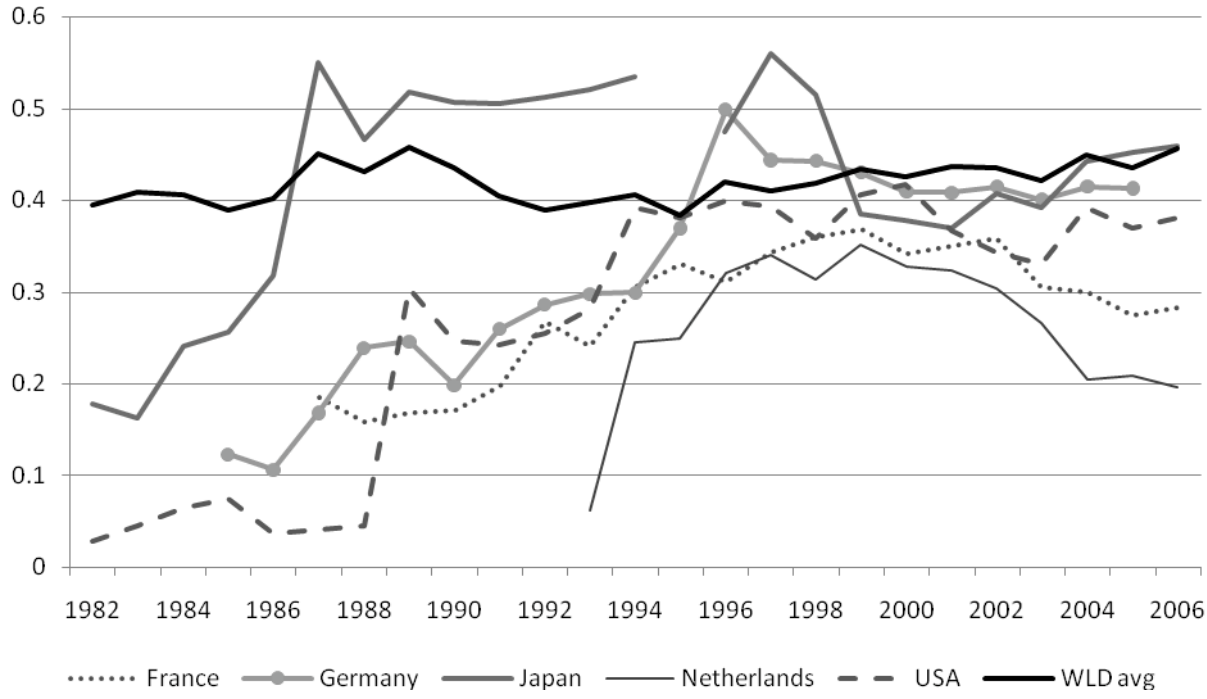
The FDI frontier allows a measure of what FDI would be in a world of no resistances, given the determinants of FDI. The frontier is defined by the characteristics of the most liberal and free flowing FDI relationships in the sample. The actual to potential FDI provides a measure of all non-random resistances (both observable and unobservable) that are faced in that relationship. In Figure 1 lower values of performance face higher resistances as the other determinants – scale, relative factor endowments, multilateral resistances geographic distance – have already been controlled for.

Of the FDI source countries, Dutch outward FDI faced, on average, the least resistances in the 1980s but the performance falls rapidly in the 1990s before rising again to achieve the

same level as average German, Japanese and British FDI. Canadian, American and French FDI perform below world average of between 40 and 45 per cent of potential. Of the FDI host countries presented, Australia and Singapore are the most open while transitional economies like China and Russia have the fastest improving FDI performance. The resistances and barriers to receiving FDI fell rapidly in the period analysed. Hong Kong and Thailand are two East Asian economies that have higher than average performance, as does the United Kingdom.

Figure 1 shows the performance of FDI in China by Japanese, French, Dutch, German and US firms, as well as world average bilateral FDI performance. There is a structural break in Japanese FDI data between 1994 and 1996 which is controlled for using structural dummy variables.

Figure 1 FDI performance into China, 1982-2006



World average FDI performance for all source to destination bilateral pairs ranges from roughly 40 per cent to 45 per cent over the sample period. Japanese FDI to China is the highest performing in 2006, after controlling for the determinants, and is in fact the highest performing for most of the 1990s. The only two FDI source countries investing in China to exceed the world average are Japan and Germany. Since the 1990s direct investment to China has been performing at around the level expected by determinants of FDI.

Trade and FDI are known to have gone through Hong Kong to avoid barriers that stopped direct investment in China (Feenstra et al., 2004). This is especially the case earlier on and before 1986. Ideally, FDI from Hong Kong to China should be included in Figure 1 or at least China plus Hong Kong, less intra Hong Kong-China FDI, could be considered as a destination. Data paucity and reliability prevents this.

It is useful to review Japanese FDI performance in China in three sub-periods. The first was a period in which there was considerable underperformance, in the early 1980s, the second is the high performance period in the 1990s and lastly the final period from 2001.

The 1980s

Japanese FDI was well below what the determinants predicted until 1986. The rise occurred after the Plaza Accord and the subsequent rapid appreciation of the Japanese yen. The sudden appreciation of the Japanese yen made Japanese exports less competitive and so many Japanese MNEs shifted production offshore. However this is not the relevant change for Japanese FDI into China. Judging from Figure 3, the Plaza Accord was not the cause of Japanese FDI increasing in China as Japanese FDI to Hong Kong and elsewhere was performing close to what determinants would predict throughout this period. The Plaza Accord affected all Japanese outward FDI in a similar way as it was not just an appreciation vis-à-vis the Chinese currency but against the US dollar and most international currencies.

Figure 1 shows performance of German FDI which also rose in this period which confirms that the Plaza Accord alone was not the cause of the rise in performance.

The under-utilisation of FDI potential was related to the still relatively closed Chinese domestic market. Japanese firms were risk averse in investing in China when there was little access to the domestic markets and they feared that Chinese partners would appropriate their technology for production directed at their home and other international markets (the so called 'boomerang effect') (Fukuda, 1998; Luo, 2001). Only 16 per cent of Japanese FDI in China was by large MNEs in 1986 with FDI being dominated by small and medium enterprises (Luo, 2001, p.74).

There was a fundamental change in Japanese perceptions of investment in China around 1986 in response to a strategic shift in investment policy in China as access to domestic markets by foreign investors was opened up. 1986 was the year that Chinese policy changed in two significant ways. Firstly, fiscal and financial incentives were offered to attract foreign companies in a move to open up China to the rest of the world[7]. In fact this was the year in which solely foreign-owned enterprises were legalised in China (National People's Congress, 1986). Secondly, and perhaps more significantly, it was the year that talks resumed for China to enter the GATT. The bandwagon effect (Knickerbocker, 1973) where MNEs will follow rivals into a foreign market can be seen by the sudden flood of Japanese FDI inflow at that time.

The further opening up of China in 1986 and the subsequent large inflow of Japanese FDI necessitated the signing of the bilateral investment treaty (BIT) of 1988 as an investment framework did not exist between the two countries to manage the investment relationship. By 1987 FDI performance had become positive and high (above world average). The BIT helped increase confidence in Japanese investing enterprises as well as on the Chinese side. Japanese

[7] National People's Congress (1986), Promulgated by Order No. 39 of the President of the People's Republic of China and effective as of April 12, 1986.

investing enterprises had an agreement that put certain constraints on Chinese policy makers (having to abide by the framework set out in the BIT) and both sides had a mechanism for dispute settlement, as primitive and undeveloped as it was.

It appears Japanese FDI was the first to react to the opening of the Chinese economy in such a way with other major investing countries slow to respond (Figure 1). The United States took until the early 1990s to reach world average performance, roughly the same time as Germany and before other major investors[8].

The period leading up to 1986 can be characterised as one in which Japanese FDI faced high resistances in moving to China because of an FDI policy environment that limited access to domestic markets and caused particular uncertainty about investing in China within Japanese (and other source country) firms. Other resistances, such as certain barriers to foreign firm entry that could be overcome at a cost, such as by entry into the Chinese market via Hong Kong, also played a role but the high level of uncertainty about Chinese policy and the asymmetric information from a less open market would have been the resistances that dominated.

The 1990s

Performance in the 1990s was very high as Japanese FDI into China accelerated and was significantly higher (closer to the frontier) than for other country FDI into China. It stayed roughly over 50 per cent throughout most of the 1990s until 1997 and 1998 when it started to drop significantly around the time of the Asian financial crisis. The 1990s were when China embarked on large scale trade liberalisation and other reforms aimed at WTO accession (Drysdale and Song, 2000; Lardy, 2002). Commitment to the global trading system through unilateral trade liberalisation and reforms that were difficult, if not impossible, to reverse

[8] Germany's investment in the Automobile industry in China is probably an exception.

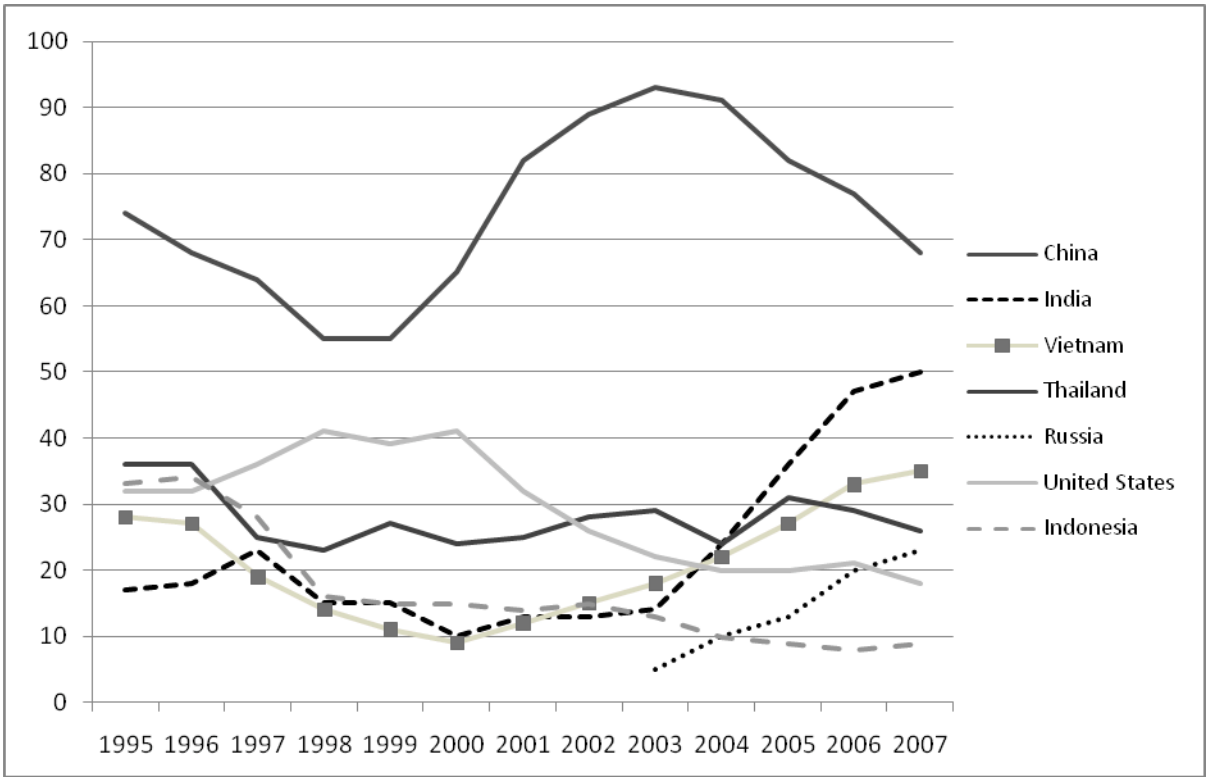
(Drysdale and Song, 2000) gave Japanese and other firms confidence in investing in China. Trade liberalisation would have reduced tangible resistances such as barriers to trade, but again, intangible resistances would seem to have played a larger role as China's reforms aimed at moving towards a market economy system closer to what the Japanese firms were used to would have reduced uncertainty. The gradual opening up of the Chinese domestic market would also have reduced asymmetric information.

Survey results of potential destinations for Japanese FDI have consistently ranked China as number one. The *Survey Report on Overseas Business Operations by Japanese Manufacturing Companies* undertaken every year (since 1989) by the Japan Bank for International Cooperation Institute (JBICI) is a comprehensive survey with an average of around 600 Japanese MNEs surveyed a year in the last five years involving over 10,000 overseas affiliates. Figure 2 shows the destinations which Japanese investors see as most promising countries/regions for overseas business operations and their relative rank.

In the 2007 JBICI survey 80 per cent of companies cited 'future growth potential of local market' as a reason for operating in China. China has been ranked number 1 every year since at least 1995 but its relative position peaked in 2003 and has been falling since. India and Vietnam have been gaining, as has Russia, in relative terms.

Resistances to FDI were low during most of the 1990s as the BIT and Chinese institutional reforms reduced resistances which continued to fall as China further liberalised trade. The JBICI survey reveals the growth of confidence that Japanese firms had in investing in China throughout the 1990s.

Figure 2 Promising countries/regions for Japan overseas business operations over the medium term, 1995-2007



Source: JBICI, various years.

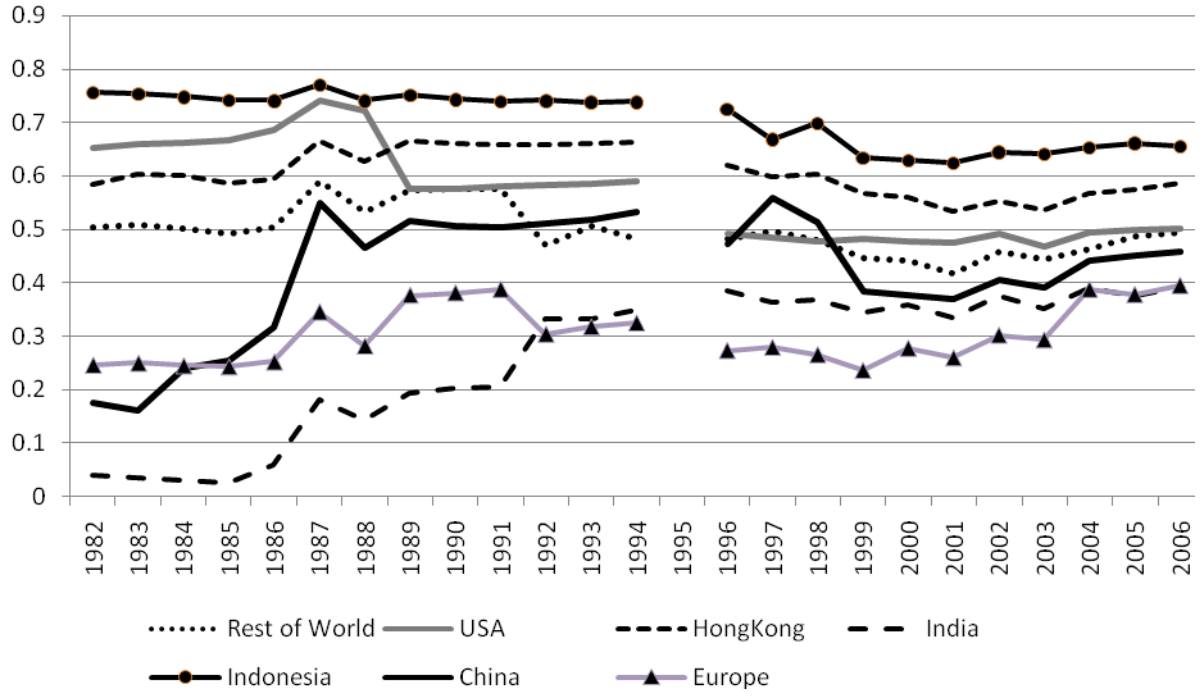
The 2000s

The period from 1997 is of particular interest for Japanese FDI into China as there is a significant and large fall and then, in 2001, a small yet significant trend upwards. The few years from 1999 shows Germany perform better than Japan (Figure 1), with both Germany and the United States narrowing the economic distance to China.

Is the fall in Japan's FDI performance to China to below world average during that time because Japanese firms faced more resistances (and hence faced higher economic distance) compared to firms from other source countries? The rise of China as by far the most attractive destination for FDI from Japan over that period shows an inconsistency with the performance of Japanese FDI in China which falls in that period.

Figure 3 shows Japanese FDI performance to selected destinations as well as the rest of the world. Japan experiences very little economic distance in FDI to Indonesia and Hong Kong. FDI performance of FDI to Hong Kong is relatively stable and it does not appear that Hong Kong was a major substitute destination for FDI into China in the early 1980s.

Figure 3 Japanese FDI performance, selected destinations



Japanese FDI to China performed better than FDI to Europe, India and was close to the average of its FDI to the rest of the world since the early 1990s. It has been slightly below FDI to the United States since the time of the Asian financial crisis in 1997. The fall in Japan's FDI performance to China in 1997 was sharper than its fall elsewhere but there can be seen falls in FDI performance to Indonesia, Hong Kong and the rest of the world. Japan's FDI to China has not experienced significantly higher resistances than to other destinations since the late 1980s (Figure 3) and is close to the world average performance (Figure 1) since

then. For FDI into China, there is a turning point around 2001 and a steady rise in Japanese FDI performance since (Figure 1 and Figure 3).

The year 2001 was an interesting year for the Japan-China relationship as it marked the beginning of a period of high political tensions which resulted in suspension of leadership visits for six years and it coincided with China's becoming a member of the World Trade Organisation (WTO). The performance of Japanese FDI into China from 2001 improved in this period so it is likely that the positive effect of WTO entry dominated the negative political developments or that political distance did not affect FDI. This issue is explored in the next section.

Resistances to FDI

Before proceeding to the discussion and estimation of the effects of political distance on FDI, this next section reviews some of the relevant features of the international business literature which is involved with the study of resistances (barriers) to FDI.

The MNE international business literature focuses on differences between countries and the implications for the modes of entry into markets by MNEs. Resistances have a significant impact on the scale and structure of FDI (Ghemawat, 2007).

Trust and measures of cultural similarity, determined by religion, history of conflicts and genetic similarities, are all factors that have been identified as having an effect on economic linkages, including FDI (Guiso et al., 2004; Ghemawat, 2007). These resistances have also been termed cultural distance and used to describe the uncertainty that a firm faces in investing in another country (Erramilli and D'Souza, 1995). Uncertainties can be separated into internal and external uncertainty where internal uncertainty is related to a firm's

uncertainty about the potential host market and external uncertainty is volatility in the host market itself and is unrelated, or external, to the home country of the firm deciding to invest.

An increase in political distance between Japan and China, which increases uncertainty and therefore resistance, is an internal risk and should only affect Japanese firms and not other sources of FDI. This characterisation of uncertainty into internal and external uncertainty is useful for understanding the effects of resistances on FDI performance.

The measure of risk which is included in other studies is not bilateral relationship specific and therefore can be thought of as a measure of external uncertainty – involving risk external to a bilateral relationship. The measure of host country risk introduced in Baltagi et al. is not found to be statistically significant in explaining FDI stocks or foreign affiliate sales in their model but the same variable is significant in Dee (2007). This study uses a measure of risk in the second stage of explaining FDI performance and not in the first stage of estimating it.

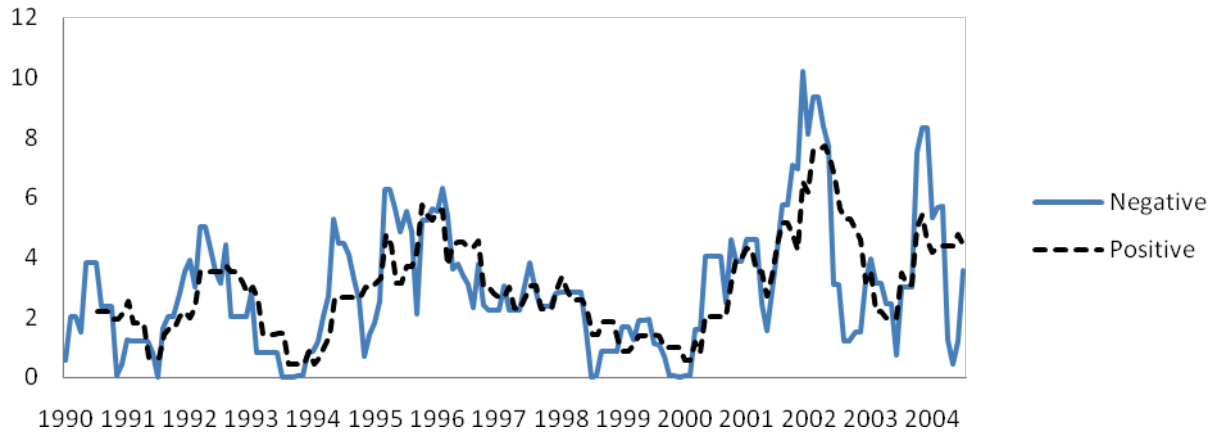
In this study the *Economic Freedom Index* of the Fraser Institute[9] is used and is expected to have a positive effect on FDI. The risk variable used by Baltagi et al. and Dee had a negative coefficient. Sensitivity tests are conducted using the Transparency International Corruption Perceptions Index[10] and the World Bank Worldwide Governance Indicators[11] with the assumption that all three variables are indicators of country risk. These country specific risk variables all affect external uncertainty and are external to (not exclusive to) bilateral relationships. An increase in the measure of host country risk will affect all source country FDI.

[9] http://www.freetheworld.com/
[10] http://www.icgg.org/corruption.index.html
[11] http://info.worldbank.org/governance/wgi/index.asp

Political distance is one measure of internal uncertainty. A bilateral measure of political distance has not been included in any cross country analysis of FDI flows but a measure or host country domestic political risk has been in studies such as Baltagi et al. (2007). The interaction between trade and a measure of political distance has a rich literature (See Polachek, 1980; Pollins, 1989a; Pollins, 1989b; Polachek, 1997; Reuveny and Kang, 2003). This study introduces the analysis of the influence of political distance on FDI.

The political distance variable is shown in Figure 4 and shows Japanese 'sentiment' towards, separated into both positive and negative, comprised of event coding from newspaper articles. The data are from King (2003) which is updated to 2004 data in the new IDEA dataset. The data is explained in more detail in the Appendix. The scale on the vertical axis is an index (used as a relative measure).

Figure 4 Japanese political distance towards China, 1990-2004



Note: Measurements of political distance are from King (2003). Negative events are a 6 month moving average and positive events are a 12 month moving average.

The net effect of the political positives and negatives are difficult to determine from Figure 4 alone. As in many conflict and cooperation event data, which is a measure of political distance, events are weighted according to a scale to reflect severity and significance of events. Given the Goldstein (1992) weighting of events, used in thies data from King (2003), Figure 4 shows China's WTO accession offsetting the rising negative political sentiment with

positive economic sentiment. The positive line continues after that as economic news continues to be positive. The next section investigates the effect of political distance, and other resistances, on FDI.

The negative events are subtracted from the positive events to obtain a measure of net political closeness. As in utility theory the assumption here is that positive events cancel out negative events to a certain extent. Therefore a positive value for the political variable indicates political closeness and a negative value indicates widening political distance. A movement in a positive direction implies a narrowing political distance. The variable that will be used will be based on the FDI source country reporting news events towards the FDI host country. Event data based on news reported in the source country vis-à-vis the destination country will reflect the sentiment and political distance experienced by the parent firm choosing to invest in the host nation.

The effect of political distance on explaining FDI performance and the economic distance between FDI source and host is measured beside other variables that capture resistances. These include variables that reflect resistance that are both internal and external to that bilateral relationship.

Actual to potential performance is given by the value $\exp(-u_{ij})$ and is explained here by

$$(2) \quad \exp(-u_{ij}) = \beta_0 + \beta_1 \mathbf{freedom_t} + \beta_2 \mathbf{Language} + \beta_3 \mathbf{tariff_t} + \beta_4 \mathbf{WTO_t} + \beta_5 \mathbf{APEC_t} + \beta_6 \mathbf{PoliticalDist_t}$$

where $\mathbf{freedom_t}$ is an index of economic freedom of the FDI host nation in year t and drawn from the Fraser Institute (Gwartney et al., 2008).

Language is a language index is based on Ferrantino (1997) and is an index that takes a value of 0 if none of the population of country i speaks the same language as in country j and a value of 10,000 if all of the population in both countries speak the same language. Due to data availability, the language similarity index does not change over the sample period.

$tariff_t$ is the average tariff rate for the FDI host country at time t and is also extracted from the index of economic freedom by the Fraser Institute (Gwartney et al., 2008).

WTO_t is a variable that takes the value 1 if China was in the WTO in year t and zero otherwise.

$APEC_t$ is a variable that takes the value 1 if the host country is a member of APEC in year t.

$PoliticalDist_t$ is a measure of political distance between FDI source and host countries in year t. Further details on this variable are given below.

The choice of variables follows the separation of the streams of FDI literature mentioned earlier with resistances and other distances such as cultural distance and institutional distance factors used in this second stage. The OLS estimation results are presented in Table 4. The dependent variable is the FDI performance results found earlier.

Since FDI performance is thought to be a measure of economic distance, it captures and is influenced by all resistances other than geographical factors. The low R-squared is a reflection of the significant proportion of resistances that are difficult to measure or even unobservable. The inclusion of a set of time dummy variables or a time trend does not change the results in any significant way except to nullify the effect of host country tariff level. Tariff reductions in the sample seem to follow a downward trend which is approximately linear which explains this result.

The economic freedom of the host country has a positive and significant effect, as would be expected. Estimations are conducted using indexes of governance and corruption instead of economic freedom to test the sensitivity of the variables that proxy for risk (Appendix C). The statistical significance of both the corruption and governance measures, and comparable results for other variables, show the model is not particularly sensitive to the kind of measure used for risk. This is not surprising as Baltagi et al. (2007) include ‘a measure of risk’ as an

afterthought in their model derivation and could have just as easily included a measure of economic freedom or governance.

Table 4 Explaining FDI performance

Dependent variable: actual/potential FDI		
	(1)	(2)
Host freedom	0.0364***	0.0346***
	(0.00267)	(0.00303)
$Language_{ij}$	0.0000154***	0.0000146***
	(0.00000210)	(0.00000210)
Host tariff	0.00263*	0.00208
	(0.00112)	(0.00118)
China WTO	-0.137***	-0.141***
	(0.0349)	(0.0307)
Host APEC	0.0641***	0.0502***
	(0.00753)	(0.00751)
Political dist	0.000175***	
	(0.0000380)	
Lagged Political dist		0.000162***
		(0.0000393)
Constant	0.134***	0.163***
	(0.0172)	(0.0202)
R-squared	0.1656	0.1327
N	2643	2441

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

There is ample evidence that causality runs both ways between trade and political distance and that the lag lengths of causation vary (Pollins 1989a; Pollins, 1989b; Reuveny and Kang, 2003). To account for this in the link between FDI and political distance, a lagged political distance variable is included. The one year lag is roughly consistent with other findings and

more appropriate than a two year lag (Reuveny and Kang, 2003) and also controls for causality running from economic distance to political distance. There is much evidence that changes in economic relations influence political relations (Polachek, 1980; Mansfield and Pollins, 2003). Improvements in a political relationship would not be expected to have impacts on the economic relationship, and vice versa, immediately, but often with a lag as economic agents and foreign policy stances adjust. The results with a lagged political distance variable are shown in column 2. The results do not vary significantly.

A measure of improving political relations is associated with a reduction in economic distance and an increase in actual achievement of potential FDI. The inverse-distance weighted political distance variable was not found to be statistically significant. The results in Table 4 only include the political distance measure for source country event analysis reporting on the FDI host country. For example, it shows that an increase in positive news reports from a source country which mention the host country – an indicator of the source country warming to the host country – is associated with an increase in FDI from source to host. Appendix C sets out sensitivity test results where FDI from country A to country B is similarly affected by political distance measures based on reports in country B towards country A, as well as the sum of both directions of political distance. The results do not differ significantly and suggest that a measure of one country's perceptions towards another is correlated to the other country's perceptions of it.

Language similarity increases performance and this is also of the expected sign. This is a resistance (reducing) measure that is internal to a bilateral relationship and can be seen to reduce uncertainty.

The average tariff level for the host country is positive but only statistically significant in one of the specifications. This is perhaps because different FDI modes are affected by tariff levels in different ways. Higher tariffs often increase horizontal FDI as FDI becomes a way to sell

to that domestic market and avoid tariffs (Markusen, 1984). More complex forms of FDI which include trade in parts and components favour lower tariffs.

The dummy variable indicating China's WTO membership is negative and statistically significant. This is an unexpected result as overall, FDI increased into China following WTO accession. One reason could be that the sample countries are the large FDI sources that would have either already had a significant presence in China, or had anticipated and pre-empted the WTO accession, or most likely, taken different lag times to get large scale investments on board. This is a puzzle and perhaps the small number of source countries (7) is not providing the data enough variation to identify the coefficient.

Conclusions

An FDI frontier for seven of the world's largest eight FDI source countries was modelled with multilateral effects. The results confirm the importance of including multilateral effects that are inverse distance weighted effects of third country variables, which is a recent development in the literature. The importance of other determinants – scale, distance and relative factor endowment – was confirmed.

The estimated FDI frontier showed that some FDI relationships face much higher resistances, and therefore economic distances in FDI, than others. Japanese FDI to China faced very high resistance in the early 1980s and vastly underperformed. In that period risk averse Japanese firms faced a high degree of uncertainty in investing in China and MNEs did not start to enter in any substantial scale until Chinese policy shifted in the mid 1980s. In 1986 China relaxed foreign ownership regulations and also started its negotiations to enter the WTO.

The rapid inflow of Japanese FDI into China necessitated a bilateral investment treaty which facilitated and managed the growing relationship. Such measures reduced uncertainty and

gave investing firms a framework which increased confidence in committing resources in China. Most of the 1990s saw Japanese FDI into China perform above what could be expected compared to other FDI relationships given the determinants of FDI.

Chinese trade liberalisation and domestic reform in the 1990s – which continued China's opening up and was aimed at WTO accession – resulted in Japanese FDI performing highly through most of the 1990s until the Asian financial crisis. The commitment from China to the international trading system as well as a gradual reforms towards a well functioning market economy, through difficult to reverse reforms, reduced resistances by increasing confidence and reducing uncertainty. The Asian financial crisis saw all Japanese FDI fall, but especially to China.

A measure of political distance is included to capture uncertainty and shown to have a significant effect on FDI. A worsening of the political relationship, or widening of political distance, has the effect of reducing FDI between those two countries, holding all else constant.

Bilateral political tensions rose significantly in 2001 but the measure of political distance did not widen significantly as China's WTO accession offset negative political sentiment with positive economic sentiment. The result was a turning point in Japanese FDI performance which had been trending downwards. There was no significant underperformance in the period 2001-2006 when political tensions were high. In fact compared to Japanese FDI performance overall, Japanese FDI into China performed at the level that is expected given the scale of the Chinese economy, Japanese economy, their proximity to one another and their economic structures.

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Appendix A Data Annex

Capital stock

Following Leamer (1984) and common practice (see Dee, 2007 and Baltagi et al. 2007) the capital stock is calculated using the perpetual inventory method. This is calculated using gross fixed capital formation, K, at time t with the formula $K_t = 2\sum^{t+2}_{t-2} I_t$, where I is investment with t sufficiently less than 1982, the period under study.

FDI destination (or host) economies

Albania, Algeria, Argentina, Australia, Austria, Azerbaijan, Belgium, Belize, Benin, Bolivia, Brazil, Bulgaria, Canada, Central African Republic, Chad, Chile, China, Costa Rica, Croatia, Czech Republic, Denmark, Dominican Republic, Ecuador, El Salvador, Estonia, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Hong Kong, Hungary, Iceland, India, Indonesia, Iran, Ireland, Italy, Japan, Jordan, Latvia, Lithuania, Luxembourg, Macau, Malaysia, Mauritius, Mexico, Morocco, Namibia, Netherlands, New Zealand, Nicaragua, Norway, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Syria, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Tunisia, Turkey, UAE, UK, Ukraine, Uruguay, USA.

Political distance data

The measure of political distance is from conflict/cooperation data from King's (2003) dataset of Integrated Data for Events Analysis (IDEA) which is an extension and refinement of the World Events Interaction Survey (WEIS) data set. There are more categories of conflict and cooperation in IDEA than in WEIS or Conflict and Peace Data Bank (COPDAB). Monthly bilateral conflict and cooperation variables for Japan-China, Japan-United States and United States-China were extracted for the period 1990-2004. A net cooperation variable constructed by differencing conflict from cooperation and results below show that this

practice, which is common in the literature, places too much of a restriction on the data, when compared to results of analysing conflict and cooperation separately.

Cooperation is represented by positive political or non-political event in a relationship, generally from one country towards another. A report of 'Japan increasing overseas development aid (ODA) to China' would be a cooperative event from Japan towards China. Conflict is represented by a negative political or non-political event such as 'nation-wide protests in China against Japanese interests' or 'Japanese Prime Minister's visit to Yasukuni shrine angers China'. For the net cooperation variable, a value of zero means no event or the weighted positive event (cooperation) has cancelled out the equally weighted negative event (conflict).

The events are machine coded from Reuters Business Briefs using Virtual Research Associates (VRA) software and the results are shown to be more accurate and consistent than high skill human coders (King and Lowe, 2003). The events covered report most actions from one country towards another including such events categorised as comment, consult, approve, promise, grant, reward, agree, request, propose, reject, accuse, protest, deny, demand, warn, threaten and demonstrate. All events are given weights consistent with Goldstein (1992) to capture severity and extended from WEIS.

Net cooperation is used in this study. The assumption here is that a positive event will to some extent cancel out, or have the opposite effect on, a negative effect. The variables are analysed separately to confirm the importance of a net measure. Net conflict (conflict minus cooperation as opposed to the other way around) is used in other studies (Polachek, 1980; Pollins 1989a).

Appendix B Model specification tests

Likelihood ratio tests, to determine the specification of the model, were performed to determine the appropriateness of the methodology for the data and the statistical distribution of the non-negative residual.

The first test for $\gamma = 0$ (the alternative is is $\gamma > 0$) to test whether a one sided error is appropriate for the data. Gamma is the proportion of total variation that is explained by variation in the non-negative disturbance and is given by

$$\gamma = \frac{\sigma_u^2}{\sigma_u^2 + \sigma_v^2}$$

where σ^2_v is the variance of v_{ij} and σ^2_u is the variance of u_{ij}. The results in Table 2 and Table B.1 confirm γ is significantly different from zero and suggest between 87 per cent and 89 per cent of the total variation is coming from the non-negative term that captures the influence of unobservable and manmade constraints on trade. The u_{ij} term measures the distance of individual countries/regions from the frontier. For more details, see Kalirajan and Singh (2007).

The second null hypothesis that the mean, $\mu = 0$ (alternative is $\mu \neq 0$) which means that the restricted folded normal distribution is preferred to unrestricted truncated normal distribution. This null is also rejected indicating a truncated normal distribution fits the non-negative error term better than a half normal distribution. This does not impact on the relative sizes of the trade efficiencies greatly but changes the absolute values. It is not the absolute distance of trade performance to the frontier that is important but the distance relative to other trade flows from the frontier.

The likelihood ratio test statistics are given by

$$LR = -2[\ln L(\text{restricted}) - \ln L(\text{unrestricted})]$$

with a mixed χ^2 distribution reported in Table 1 of Kodde and Palm (1986). Table B1 shows the results of the statistical tests for the last period only as all periods reach the same conclusion.

Table B.1 Specification Tests

Null Hypothesis	χ^2 statistic	Critical mixed-χ^2 value at 0.01	Decision	Conclusion
$\gamma = 0$	202	5.412	Reject null	The composite error specification is appropriate
$\mu = 0$	35	5.412	Reject null	The truncated normal distribution fits the data better than the special half normal distribution

Appendix C Alternative Specifications

Another sensitivity test that is conducted is for the strict functional form assumption, taking the log of the sum of both GDPs. In the theoretical derivations of Markusen (2002), Carr et al. (2001) and Baltagi et al. (2007), there is a consensus that the sum of source and destination GDPs are a determinant of FDI but a log-linear form is taken in most models for ease of estimation. Table A1 in the Appendix shows the result of sensitivity tests where GDPd and GDPi are included separately, and governance and corruption are substituted for economic freedom. The results show that relaxing the functional form of the GDP measures does not change the results significantly. This means that the ability to estimate the effects of host and

source country GDPs (and, indeed, third country GDPs) separately could give more flexibility in estimating and explaining the determinants of FDI.

Table C.1 Sensitivity tests of different risk variables

	(1) w governance	(2) w corruption	(3) separate GDPs
distance	-	-	-
g	2.307***	2.541***	
	(0.540)	(0.240)	
s	1.382	3.003***	0.138
	(1.490)	(0.693)	(0.801)
k	-7.493***	-4.177***	-3.507***
	(1.739)	(0.722)	(0.702)
h	0.115*	0.299***	0.334***
	(0.0563)	(0.0430)	(0.0396)
l	1.534***	2.679***	2.014***
	(0.198)	(0.150)	(0.136)
gamma	0.254***	0.143***	0.119***
	(0.0615)	(0.0250)	(0.0243)
phi	-0.0434	0.0372	0.0439
	(0.0425)	(0.0341)	(0.0341)
govern	0.603***		
	(0.120)		
wg	0.381	-0.0106	
	(0.343)	(0.0501)	
ws	-15.34	27.48**	26.71***
	(15.59)	(9.198)	(8.079)
wk	3.193**	-0.510	0.407
	(1.203)	(0.287)	(0.327)
wh	0.437	-0.505***	-0.456**
	(0.243)	(0.145)	(0.145)
wl	0.524	0.449***	0.602***
	(0.338)	(0.0970)	(0.0944)
wgamma	-0.107*	0.0159	-0.0106
	(0.0457)	(0.0119)	(0.0120)
wphi	-0.848***	0.129	-0.0120
	(0.209)	(0.0819)	(0.0811)
wgovern	5.094***		
	(1.356)		
fta	-0.0456	0.228**	0.315***
	(0.0939)	(0.0762)	(0.0740)
wfta	-2.210	-0.235	-2.173
	(1.285)	(0.927)	(1.213)
corrupt		-0.0867***	
		(0.0165)	
wcorrupt		-0.255	
		(0.184)	
GDP source			2.205***
			(0.624)
GDP destination			1.298***
			(0.116)
freedom			0.311***
			(0.0253)
whost			-2.27e-12*
			(9.22e-13)
wfreedom			0.117
			(0.213)
_cons	-68.83***	-72.87***	-98.83***
	(19.67)	(6.969)	(17.90)
N	2697	4025	4307

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table C.2 Sensitivity test of directional political distance on FDI for country specific fixed effects

	FDI flows			FDI stocks		
	(1)	(2)	(3)	(4)	(5)	6)
	Source toward destination	Destination toward source	Both	Source toward destination	Destination toward source	Both
distance	-0.533***	-0.536***	-0.536***	-0.794***	-0.798***	-0.797***
	(0.0819)	(0.0815)	(0.0816)	(0.0723)	(0.0721)	(0.0722)
g	1.690***	1.570***	1.612***	1.447***	1.363***	1.397***
	(0.185)	(0.187)	(0.186)	(0.156)	(0.158)	(0.157)
s	4.186***	4.107***	4.135***	5.100***	5.039***	5.063***
	(0.486)	(0.484)	(0.485)	(0.410)	(0.409)	(0.409)
k	3.000***	2.781***	2.779***	3.333***	3.114***	3.145***
	(0.720)	(0.716)	(0.720)	(0.575)	(0.576)	(0.577)
h	0.188***	0.195***	0.193***	0.294***	0.297***	0.297***
	(0.0471)	(0.0469)	(0.0470)	(0.0388)	(0.0387)	(0.0387)
l	-0.0405	-0.0595	-0.0491	-0.0461	-0.0584	-0.0517
	(0.0617)	(0.0615)	(0.0615)	(0.0547)	(0.0546)	(0.0546)
gamma	-0.113***	-0.106***	-0.106***	-0.135***	-0.127***	-0.129***
	(0.0248)	(0.0246)	(0.0248)	(0.0199)	(0.0199)	(0.0200)
phi	0.0563	0.0625	0.0599	0.201***	0.205***	0.203***
	(0.0538)	(0.0536)	(0.0537)	(0.0462)	(0.0461)	(0.0462)
freedom	0.595***	0.595***	0.598***	0.759***	0.762***	0.763***
	(0.0455)	(0.0451)	(0.0453)	(0.0400)	(0.0397)	(0.0398)
wg	0.418	0.234	0.359	0.0868	-0.0186	0.0434
	(0.683)	(0.687)	(0.682)	(0.639)	(0.650)	(0.642)
ws	-115.7***	-116.0***	-116.2***	-122.6***	-121.3***	-121.8***
	(24.74)	(24.69)	(24.68)	(22.87)	(22.84)	(22.82)
wk	0.767	-0.129	0.102	4.427	4.399	4.155
	(3.182)	(3.147)	(3.224)	(2.494)	(2.551)	(2.559)
wh	1.101	1.011	1.075	-1.198**	-1.223**	-1.194**
	(0.700)	(0.698)	(0.699)	(0.427)	(0.426)	(0.426)
wl	0.504	0.427	0.466	0.209	0.132	0.176
	(0.429)	(0.423)	(0.426)	(0.294)	(0.289)	(0.291)
wgamma	-0.0948	-0.0577	-0.0690	-0.234*	-0.230*	-0.223*
	(0.123)	(0.124)	(0.125)	(0.0972)	(0.101)	(0.100)
wphi	-0.660	-0.705	-0.669	0.225	0.191	0.206
	(0.516)	(0.514)	(0.515)	(0.235)	(0.238)	(0.236)
wfreedom	2.403	2.569	2.492	-1.601	-1.403	-1.490
	(1.678)	(1.644)	(1.662)	(1.302)	(1.290)	(1.296)
fta	0.458***	0.484***	0.470***	0.312**	0.329**	0.319**
	(0.135)	(0.135)	(0.135)	(0.119)	(0.119)	(0.119)
wfta	1.858	3.142	2.658	6.573	7.252	6.976
	(4.999)	(4.992)	(4.992)	(3.885)	(3.877)	(3.879)
politics	0.00531***	0.00736***	0.00333***	0.00445***	0.00642***	0.00283***
	(0.000798)	(0.000942)	(0.000447)	(0.000724)	(0.000890)	(0.000412)
wpolitics	0.00907	0.0174	0.00653	0.0108	0.0126	0.00653
	(0.0115)	(0.0163)	(0.00714)	(0.00895)	(0.0133)	(0.00568)
_cons	-48.90**	-43.14*	-46.07**	-11.95	-8.273	-10.24
	(17.25)	(17.57)	(17.24)	(14.66)	(14.79)	(14.70)
N	2026	2026	2026	2602	2602	2602

Standard errors in parentheses

$^{*}\ p < 0.05,\ ^{**}\ p < 0.01,\ ^{***}\ p < 0.001$