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Mode of Entry and the Regional Distribution of Foreign Direct Investment in China

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ABSTRACT *In this paper we re-examine the regional determinants of FDI in China using both total FDI flows, and FDI flows disaggregated by entry mode. Building on both the FDI location and entry mode choice literatures, we argue for the existence of mode-specific location advantages, and test for their existence. We first specify and estimate a location model of aggregate FDI flows to Chinese regions. Using the aggregate model as a benchmark, we then estimate separate equations for each of three different entry modes (wholly-owned subsidiaries, equity joint ventures and cooperative joint ventures), and compare the results with the aggregate model. The results indicate that mode-specific location advantages do exist, at least within China, but they are limited to a small number of factors. In particular, we identify the accumulated stock of FDI as being more likely to attract high control modes of entry, while existing policies to attract FDI are more likely to attract lower control modes of entry.*

KEY WORDS: Foreign Direct Investment, location choice, entry modes, China

Introduction

In 1979, the Chinese government began to welcome international investment through its 'open door' policy (*kaifang zhengce*). Since that time, capital inflows increased rapidly making China the largest recipient of FDI in 2003 (OECD, 2004). Foreign enterprises now account for a substantial percentage of employment and trade in China (Pan, 2003). The approach to FDI was initially cautious and restrictions were placed on both the mode and location of foreign entry. In the early stages, most approved projects were equity joint ventures (EJVs), and location was restricted to designated special economic zones (SEZs) (Chadee & Qui, 2001; Chadee *et al*., 2003). However, these restrictions have been successively relaxed, and continue to be relaxed with China's accession to the WTO.

As a consequence of these liberalization measures, foreign enterprises in China now face a broader set of strategic choices regarding location and mode of entry. In this paper we investigate the regional determinants of FDI inflows in China, using

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data on both total FDI and FDI disaggregated by entry mode. Specifically, we focus on the regional distribution of FDI achieved by equity joint venture (EJV), cooperative (or contractual) joint venture (CJV) or wholly-owned subsidiary (WOFE), for the period 1997–2000.[1] The basic research question to be addressed is whether the regional determinants of FDI in China differ by entry mode. We therefore seek to determine whether there are mode-specific location determinants.

The international business and economics literature has, for the most part, tended to analyze separately the location and mode choice decisions of firms. There is significant recent literature on the determinants of FDI flows both across countries, and across regions within countries (Cantwell & Iammarino, 2000; Globerman & Shapiro, 2002, 2003; Mudambi & Navarra, 2003). This literature has revealed much about the location determinants of aggregate FDI flows, and therefore about the factors that give rise to national and regional location advantages. While this literature has been quite successful in identifying the factors that determine the geographic distribution of FDI flows, it has used primarily *aggregate* FDI flows or stocks as the dependent variable, and has therefore ignored the specific mode of foreign entry. Thus, previous studies on the determinants of FDI in China and elsewhere have for the most part not examined these flows by mode of entry, and have therefore not fully explored the degree to which mode-specific location advantages exist. This gap may be important because the literature on entry mode discussed below suggests that the decision regarding the form of investment may be related to location.

If mode-specific location advantages exist, previous location studies may be misleading. For example, as we document below, there has been a shift in China towards entry via wholly owned subsidiaries. To the extent that some regions possess characteristics that make WOFE more attractive, these locations will be favoured, and will experience larger FDI flows as the entry-mode mix varies. FDI forecasts based on previous aggregate flows will understate the flows towards regions with mode-specific advantages. In addition, as we discuss further below, policies that are successful in attracting one type of FDI may be less successful in attracting other forms.

There have been a few recent studies that have examined the locational determinants of specific modes of FDI. All of these studies have focused on M&A activity, or the comparison between M&A and greenfield investment as an entry mode, using cross-country data (Rossi & Volpin, 2003; Di Giovanni, 2003; Globerman & Shapiro, 2005). These studies suggest that countries with strong records of investor protection and well-developed capital markets are more likely to attract cross-border M&As. At the regional level, Roberto Basile (2004) finds that locational determinants of FDI among Italian regions differ by foreign entry mode (acquisition or greenfield). Thus, there is some limited evidence suggesting that mode-specific location advantages exist, at least with respect to choices between M&A and greenfield entry.

At the same time, recent evidence from the mode choice literature indicates that location affects foreign entry mode choice between joint venture and wholly owned subsidiary (Pan & Tse, 2000; Luo, 2001; Yiu & Makino, 2002; Chadee *et al.*, 2003; Somlev & Hoshino, 2005), and between greenfield versus entry via M&A (Brouthers & Brouthers, 2000). These studies use firm-level data to investigate the question of mode choice, while including location measures as explanatory variables.

Brouthers & Brouthers (2000) and Yiu & Makino (2002) both find that institutional and cultural differences across countries can affect entry mode choice. At the regional level, Pan & Tse (2000), Luo (2001), and Chadee *et al*. (2003) all provide evidence that entry mode choice in China has been influenced by locational differences across regions.

Thus, both the location choice and the entry mode choice literatures provide some evidence that mode-specific location advantages exist, at both national and regional levels. Much of the evidence on regional location effects comes from China, but has been obtained using models of mode-choice estimated at the firm level. Previous studies on the regional determinants of FDI in China have not considered the mode of entry. In this paper, we approach the problem from the vantage point of the location choice literature. However, we use the mode choice literature to motivate the analysis, to inform the interpretation of a traditional location choice model, and to explore alternative model specifications. Our review of the mode choice literature leads us to offer the broad conjecture that that mode-specific location advantages exist, and that higher control modes of entry are preferred in regions that attract highly specific assets, and in regions that facilitate access to complementary assets and knowledge.

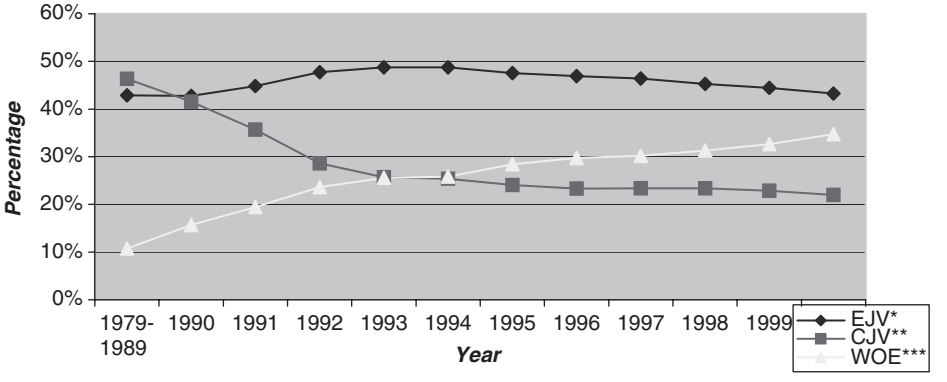
We examine these issues by estimating a traditional FDI location model, applied to different entry modes across regions within a single country. We first specify and estimate a location model of aggregate FDI flows to Chinese regions over the period 1997–2000. Using the aggregate model as a benchmark, we then estimate separate equations for each of three different entry modes, and compare the results with the aggregate model, a method similar to that employed for Italy by Roberto Basile (2004). The results indicate that the determinants of location within China do differ by entry mode. In particular, FDI flows associated with joint ventures are explained by factors similar to those that determine aggregated FDI flows. However, FDI flows associated with wholly owned subsidiaries are explained by very few of these factors.

The specification employed in most aggregate FDI location models is implicitly based on the assumption that firms first choose their mode of entry, and then locate in the most advantageous location. We therefore also consider a different specification, which is consistent with an alternative choice mechanism, that firms first choose location and then entry mode. The alternative specification fails to reveal important mode-specific location advantages.

The paper proceeds as follows. In the next section, we provide an overview of the distribution of FDI in China, focusing on both entry mode and region. We then review the relevant literature in order to establish the potential importance of mode-specific location advantages. This is followed by a discussion of our methodology, including the specification of our empirical models, and in the final sections we present and discuss the results.

Modes of FDI in China

There are three major categories of FDI in China: equity joint ventures (EJV), cooperative joint ventures (CJV) and wholly owned foreign enterprises (WOFE). An equity joint venture is an independent registered legal entity whose shares are owned



Sources: Data from 1979-1997: Lee & Houde (2000), Table 4.
Data for 1989-1999: China Foreign Economic Statistical Yearbook (2000), (CSP)
Data for 2000: Almanac of China's Foreign Economic Relations and Trade (2001), (MOFERT 2001)

Figure 1. Share of three types of FDI in amount (1979–2000)
Notes: *EJV: FDI amount in equity joint ventures.*
CJV: FDI amount in cooperative joint ventures.
WOFE: FDI amount in wholly foreign-owned enterprises.

by both the foreign investors (at least 25% according to the Chinese joint venture law) and the Chinese partners. A wholly owned enterprise is a corporation in which the foreign investors own 100% of its shares. A cooperative joint venture (CJV) involves joint activities but without the necessary creation of a separate legal entity. Although the cooperative venture can be registered as a limited liability company similar to an EJV, the business often operates using the business license of the Chinese partner, and the participation of each party is arranged by contract. There is no minimum foreign participation level for a CJV, and the contribution of each party may or may not be monetary. Profits in a CJV are not divided according to investment share, but are determined by contractual arrangement. Generally speaking, equity joint ventures and wholly foreign enterprises are more formally structured and long-term in orientation, whereas cooperative joint ventures are more flexible in structure and focus on the short-term.

As indicated in Figure 1, the share of WOFEs in total FDI rose continuously from 1979 to 2000 when it reached nearly 35% of total FDI. By contrast, the share of CJVs fell quite rapidly until 1995, and has continued to decline, albeit slowly. The EJV share has been more stable, but has also declined modestly since 1995, and in 2000 accounted for some 43% of FDI. These changing patterns suggest that it is important to consider disaggregated FDI flows in China.

Literature Review: FDI Location and Entry Mode

In this section, we first review the relevant literature on FDI location models, emphasizing those that consider intra-country (regional) factors, many of which focus on China. We then examine the literature on mode choice, emphasizing two

major theoretical approaches, the transaction costs and resource-based views, and indicate how location variables have affected mode choice.

Location Determinants of FDI

The location literature is primarily empirical, and has developed widely accepted methods for examining the factors that favor one location over another, both inter- and intra-country (Dunning, 1998; Globerman & Shapiro, 2003). Two of the most widely-studied countries for regional FDI location decisions are Italy (Mudambi & Navarra, 2003; Roberto Basile, 2004) and China (Wei *et al*., 1999; Cheng & Kwan, 2000; Sun *et al*., 2002). Although there are differences among them, these studies suggest that *aggregate* FDI flows to regions within a country depend on market size and growth, regional wealth, infrastructure, human capital, preferential investment policies and subsidies, and labour costs, although the relative importance of each factor may change over time (Sun *et al*., 2002).

FDI Entry Mode Choice

At the theoretical level, there are a number of approaches to mode choice. Arguably the most important are the transaction costs and resource-based approaches (Andersen, 1997; Luo, 2001; Chen & Chen, 2003).[2] The transaction cost approach (Anderson & Gatignon, 1986; Hennart, 1988) focuses on the characteristics of assets being transferred abroad. Thus, mode choice is driven by the need to minimize transaction costs, which in turn arise from the costs of finding trading partners, and the costs of negotiating, writing and enforcing contracts. High transaction costs are associated with asset specificity, and transaction frequency, uncertainty and complexity (Andersen, 1997). Where these costs are high, firms will prefer high control solutions to safeguard their investment, and thus locations that attract investments with high transaction costs are more likely to observe entry via a wholly owned subsidiary (Anderson & Gatignon, 1986; Chen and Hu, 2002).

The resource-based view (Madhok, 1997; Das & Teng, 2000; Hitt *et al*., 2000; Anand & Delios 2002; Unlenbruck *et al*. 2003) focuses on the characteristics of the firm, and in particular on organizational resources and capabilities, including learning and knowledge. When entering foreign markets, firms often seek to supplement or complement their own capabilities (Madhok, 1997). The entry mode issue is how best to combine resources owned by the investor with those available in the local environment, and specifically whether to use high control or low control entry modes. In general, high control entry modes are more likely to be chosen when entrant firms possess capabilities that are strongly embedded, when entrant firms are attempting to acquire complementary assets that are generic, and when entrants are able to learn from past experience (Madhok, 1997; Tse *et al*., 1997). Importantly, this literature has drawn an explicit connection between entry mode choices and location, since location may affect the relationship between the firm's internal resources and those available in its external environment (Madhok, 1997; Luo, 2001).

Thus, both the transaction costs and resources perspectives suggest that mode-specific location advantages exist. Specific locations may: (a) be more attractive for

companies with intangible assets that are optimally transferred internally; (b) lower the transactions costs associated with obtaining complementary assets through market transactions by reducing the degree to which such assets are imbedded in local firms; and (c) facilitate learning that helps firms overcome the cultural and other disadvantages of operating abroad. All of these conditions would favor entry via wholly owned subsidiaries, as opposed to entry via joint venture.

Specification of the FDI Models

We first specify a general model of the regional determinants of FDI flows, based on the existing location literature (Globerman & Shapiro, 2002, 2003; Fung *et al*., 2002, 2003; Wei *et al*., 1999). The model may be written as:

$$\begin{aligned}\ln \mathrm{FDI}_{itj} = {} & \alpha_0 + \alpha_{1j}\ln(\mathrm{GDP}_{it-1}) + \alpha_{2jl}\mathrm{n}(\mathrm{GDP/Capita}_{it-1}) + \alpha_{3j}\ln(\mathrm{Wage}_{it-1}) \\ & + \alpha_{4j}\ln(\mathrm{FDIstock}_{it-1}) + \alpha_{5j}\ln(\mathrm{Infrastructure}_{it-1}) + \alpha_{6j}(\mathrm{Incentives}_{it-1}) \\ & + \alpha_{7j}(\mathrm{SEZ}_{it}) + \alpha_{8j}(\mathrm{OCC}_{it}) + \alpha_{9j}(\mathrm{TechZone}_{it}) + \alpha_{10j}(\mathrm{Age}_{it}) \\ & + \alpha_{11j}(\mathrm{Education}_{it}) + \varepsilon_{itj} \qquad (1)\end{aligned}$$

where $i = 1, 2, \ldots, 30$, represents the regions of China, including provinces and large city regions,[3] $t = 1,2, \ldots, 4$ represents the year (1997–2000), and j represents one of four measures of FDI ($j = 1, \ldots, 4$). We therefore work with panel data comprising data for 30 regions of China over 4 years. ln(FDI) is the natural logarithm of the dollar value of annual FDI inflows to different regions in China, and ε is a random error. We use the same models with the same sets of independent variables for each of four dependent variables: total FDI, FDI in equity joint ventures (EJV), FDI in cooperative joint ventures (CJV), and FDI in wholly foreign-owned firms (WOFE). The dependent variables are discussed below. To reduce causality problems, we use lagged independent variables in the model where possible. The dependent variables are measured from 1997 to 2000 and the independent variables from 1996–1999. The years were determined by the availability of disaggregated FDI data.

The specification indicated by equation (1) is based on location choice models, where it is assumed that firms first decide to invest abroad, and then decide where to locate the investment (Globerman & Shapiro, 2003). While such a specification is appropriate for aggregate FDI flows, and has been widely used in studies of China (Fung *et al*., 2002, 2003; Wei *et al*., 1999), it is possibly less appropriate for the disaggregated flows considered in this paper. Specifically, it may not be plausible to argue that firms first decide what form of entry they will employ, and then decide where to enter.

We therefore consider another specification that is consistent with an alternative decision making process whereby investors first decide on a location, and then, conditional on that choice, they choose an entry mode. In this model, we estimate the *share* of each mode in total FDI received by region i in time t, using the same independent variables as equation (1). There are therefore three share equations, one for each of EJV, CJV and WOFE. This model may be understood as an aggregate probability model, reflects an underlying choice of entry mode for each location. The FDI shares represent the probability of choosing mode j, given that the firm will invest in location i.

Of course, it is most likely that the underlying choice model is such that location choice and entry mode choices are made jointly. However, it is not possible to model, estimate and interpret such simultaneous choices using aggregated data. With 30 regions and three entry choices, there are 90 possible choices, but only 120 observations (30 regions over 4 years).

In all equations we assume that the error terms, (ε_{itj}), are i.i.d. with zero mean and constant variance. Because the data are panel data, we estimate all equations by both OLS and random effects methods.[4] In the random effects models, we include unobserved region-specific effects in the equations, and these are also assumed to be i.i.d. with zero mean and constant variance. Although it is likely that the equations are influenced by common random shocks, and are therefore related, estimation by Seemingly Unrelated Regression (SUR) methods is unnecessary when the set of regressors is identical in all equations (Dwivedi & Srivastava, 1978).

Dependent and Independent Variables

The dependent variables in this study include aggregate total FDI and disaggregated FDI by entry mode in the 30 regions in China. In all cases, FDI is measured in realized value terms. The independent variables included in both specifications are summarized in Table 1 and discussed below.[5] In Table 1, we also indicate the hypothesized impact of the independent variable in a model of aggregate FDI. These hypotheses are standard to the literature. Given the exploratory nature of this study we do not offer specific hypotheses about how these might be altered when different modes of entry are considered. However, below, we do consider some possible differences in the signs and magnitudes of the coefficients.

Table 1. Independent variables

Variable	Measurement	Expected Sign (Total FDI)
GDP	Gross domestic product in a region, in yuan	Positive
GDP/Capita	Gross domestic product per person, in yuan	Positive
Wage	Average wage of staff and workers, in yuan	Negative
FDI Stock	Total accumulated foreign direct investment up to date, in US dollars	Positive
Infrastructure	Total mileage of railway, highway and waterway per square kilometer	Positive
Age	Number of years since a region started receiving foreign direct investment	Positive
Education	Percentage of the population with secondary education	Positive
Incentive	Dummy variable, = 1 with government tax preferential policies; = 0 otherwise	Positive
SEZ	Dummy variable = 1 if the region includes special economic zones; = 0 otherwise	Positive
OCC	Dummy variable = 1 for open coastal cities in the region; = 0 otherwise	Positive
TechZone	Dummy variable = 1 for economic and technological zones; = 0 otherwise	Positive

Market size and wealth are measured by regional GDP and GDP/Capita. GDP is the standard measure of market size and is typically found to be the single most important determinant of FDI flows (Globerman & Shapiro, 2002). Larger markets are expected to attract more FDI because demand, production and distribution capacity are greater in regions with high GDP, and large markets may create or accentuate agglomeration economies. GDP per capita represents the level of economic development and productivity in a particular area. As a firm's final profit and return on investments depend largely on productivity, foreign investors will be most likely to invest in a region with high GDP per capita. One expects that FDI will be attracted to regions with lower labor costs, other things equal, particularly in emerging markets (Singh & Jun, 1995). Labor costs are measured by the annual average *wage* of staff and workers in a region (Broadman & Sun, 1997).

There is evidence, in China and elsewhere, that past FDI can affect future flows through the transmission of knowledge and experience that is valuable to all foreign investors (Cheng & Kwan, 2000). Accumulated FDI may also be seen as an indicator of past performance in attracting FDI by a region and a reflection of the overall business and investment conditions. It may also reflect the existence of FDI-specific infrastructure and agglomeration effects (Zhou *et al*., 2002). We measure these effects by the *FDI stock* which is the accumulated FDI that a region received up to the end of year. We expect that accumulated FDI will have a positive influence on total FDI flows.

For similar reasons, we also include a variable measuring the number of years that the region has been receiving FDI. *Age* of FDI may measure experience and knowledge in ways that FDI stock does not because it includes a temporal dimension. Regions with a longer history of FDI may be associated with lower degrees of uncertainty as investors become more familiar with the region. This may be particularly important in China where connections and relationships are important, but take time to develop. Thus, more experience in the region may lead to more investment leading to the expectation that age of FDI is positively associated with FDI inflows. The age of FDI in a region is measured by the number of years since a region started to receive FDI.

Physical infrastructure has been widely considered a major determinant of FDI flows (Cheng & Kwan, 2000). Advanced transportation facilities will reduce operating and distribution costs, as well as operating and distribution risks. We measure *infrastructure* as the total mileage of railways, highways and waterways in a region, with the expectation that infrastructure has a positive impact on FDI.[6]

Human capital may also attract FDI. The availability of a trained and educated workforce raises productivity and lowers costs. We therefore include a variable measuring the *education* of the population, and expect its impact on FDI to be positive. The variable is measured as the percentage of the region's population with a secondary school education.

Finally, we include a number of variables to reflect the various preferential foreign investment policies introduced in China (Zhou *et al*., 2002; Demurger *et al*., 2002; Huang, 2003). These polices include preferential tax treatment in designated regions (*Incentives*), and various tax exemptions, reduced corporate tax rates, and reductions of import duties on imported equipment and raw materials for firms locating in special economic zones (*SEZ*), open coastal cities (*OCC*) and economic and

technological zones (*ET Zone*). Accordingly, we include four separate dummy incentive variables in the models to account for each of these policies, and expect each to carry a positive sign.[7]

As noted, the hypothesized impacts recorded in Table 1 are based on the assumption that total FDI is the relevant dependent variable. The question is whether there is any reason to believe that the signs and magnitudes of the coefficients will change when FDI flows are disaggregated by entry mode. We find no reason to believe that there will be sign changes, but the literature on entry mode surveyed above suggests that coefficient magnitudes may differ. In general, the literature suggests that joint ventures or low control entry modes will be preferred in regions where the entry costs and risks are higher, in part because information and complementary assets are harder to obtain without a local partner. High control entry modes are likely to be chosen when information and complementary assets are more easily obtained, and when regional characteristics favor the transfer of firm-specific assets.

The existing location literature provides little guidance as to where mode-specific location advantages are likely to arise. However, Chen & Hu (2002) argue that large markets favor high control entry modes because fixed set up cost are reduced in such markets. Kogut & Singh (1988) suggest that a long history of FDI and substantial previous FDI in a region is more likely to attract wholly foreign owned investment. Large FDI stocks provide access to information and complementary assets of the kind not always available in emerging markets (Anand & Delios, 2002). In addition, we propose that high GDP per capita should favor the transfer of knowledge intensive firm-specific assets (brands sold to high income customers and technology intensive products). We therefore suggest that among the independent variables listed in Table 1, the ones most likely to favor high control entry modes (WOFE) are the GDP, FDI stock and age variables (based on the existing literature) and possibly the GDP per capita variable.

Data

The data were obtained from various sources. The primary data source is the *Almanac of China's Foreign Economic Relations and Trade* 1997/1998, 1999/2000 (China National Economy Publishing House Economic Information & Agency), and 2001 (Chinese version, Ministry of Foreign Economic Relations and Trade Press), from which we obtained the three types of FDI data for the Chinese regions. Our second source is the *2000 China Foreign Economic Statistical Yearbook* (China Statistics Press, 2001), where we obtained total FDI data.

The *China Statistical Yearbook* 2000 (China Statistics Press, 2000) provided annual data for GDP, FDI stock, average labor costs, education and physical infrastructure for 1999. For previous years, we used the *Comprehensive Statistical Data and Materials on 50 Years of New China* (China Statistics Press, 1999). Finally, we identified locations that enjoy preferential federal tax policies from the Pricewaterhouse website, general information section (now reorganized). The data on the different policy zones come from Fung *et al.* (2003).

The correlation matrix for all variables is reported in Table 2. It can be seen that when FDI is measured in natural logarithms, there is a fairly strong positive

Table 2. Correlation matrix

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. fdi	1.00																	
2. ejv	0.96	1.00																
3. cjv	0.83	0.73	1.00															
4. wofe	0.92	0.87	0.72	1.00														
5. sejv	−0.26	−0.09	−0.41	−0.31	1.00													
6. scjv	−0.15	−0.23	0.15	−0.24	−0.50	1.00												
7. swofe	0.42	0.30	0.31	0.55	−0.63	−0.35	1.00											
8. gdp	0.77	0.79	0.72	0.67	−0.13	−0.08	0.22	1.00										
9. gdppc	0.73	0.69	0.66	0.69	−0.15	−0.19	0.34	0.48	1.00									
10. wage	0.33	0.88	0.37	0.37	−0.33	0.06	0.31	0.17	0.73	1.00								
11. fdi stock	0.95	0.90	0.80	0.91	−0.34	−0.11	0.46	0.73	0.74	0.44	1.00							
12. infrastructure	0.71	0.62	0.62	0.62	−0.35	0.03	0.35	0.40	0.61	0.49	0.71	1.00						
13. age	0.41	0.30	0.32	0.44	−0.42	0.01	0.45	0.18	0.36	0.35	0.58	0.43	1.00					
14. education	0.32	0.29	0.31	0.27	−0.02	−0.01	0.03	0.01	0.73	0.65	0.30	0.40	0.05	1.00				
15. sez	0.40	0.28	0.28	0.44	−0.32	−0.15	0.48	−0.01	0.21	0.06	45	0.26	0.54	−0.06	1.00			
16. occ	0.67	0.64	0.60	0.62	−0.22	−0.11	0.33	0.58	0.58	0.36	0.68	0.45	0.44	0.08	0.24	1.00		
17. techzone	0.51	0.57	0.41	0.47	0.13	−0.30	0.13	0.51	0.61	0.34	0.52	0.21	0.10	0.39	0.09	0.37	1.00	
18. incentive	0.71	0.65	0.58	0.69	−0.27	−0.10	0.39	0.37	0.70	0.50	0.75	0.61	0.46	0.35	0.43	0.83	0.34	1.00

Notes: fdi, ejv, cjv and wofe are measured in natural logarithms; sejv, scjv and swofe are measured as shares of total FDI. $N = 119$.

correlation between total FDI and its three components (EJV, CJV and WOFE), as well as among the components. Thus, regions that attract large amounts of FDI tend to do so for all types of FDI. These correlations are considerably lower when considering shares. It is of some interest to note that the correlation of EJV and CJV shares with total FDI is negative, whereas it is positive for the share of WOFE. Regions that attract large amounts of FDI tend to have a higher share of wholly-owned firms.

Although some of the other correlation coefficients are high (in the 0.6 and 0.7 range), so is the adjusted R^2 of the estimated equations, which can exceed 0.9 (see below). As a consequence, we do not believe that multicollinearity is a general problem. However, GDP per capita tends to be highly correlated with a number of other variables (wages, FDI stock, infrastructure), and so we estimate equations with and without that variable.

Estimation and Results

Our empirical strategy is to establish a benchmark model for total FDI using variations of equation (1), and then apply that model to the entry mode variables, measured either in natural logarithms or in shares. We present two specifications, one with GDP per capita (but minus some terms that are correlated with it), and one without GDP per capita. Other specifications tested never produced results different from those reported. Fixed-effects estimation of the panel was not possible since the policy variables are time-invariant. We therefore estimated each specification using OLS and random effects GLS methods, and used the Breusch and Pagan (Lagrange Multiplier) test for unobserved effects to choose between them (Woolridge, 2002: 264). Results are reported for the preferred model only, but in fact are similar regardless of estimation technique. Time dummy variables were added, and specifications that include them are reported only when they were collectively significant. Again, exclusion of these variables does not affect the results.

The first two columns in Table 3 present the estimation results of models using total FDI as the dependent variable. Both models have very high explanatory power, most of the dependent variables are statistically significant and carry the hypothesized sign. In general, the benchmark model performs well and is consistent with what is known about FDI flows in general, and FDI flows within China in particular. FDI is attracted to regions with high GDP and GDP per capita, low wages, large investments in physical infrastructure, an educated population, and a large stock of previous foreign investment. In addition, FDI is attracted to regions that establish Special Economic Zones and Open Coastal Cities.

However, there are a few unexpected coefficients. One is the length of time since the first reported FDI in the region (Age). This variable was meant to measure FDI experience, and its expected sign is positive. However, the actual sign is negative, and statistically significant. One possibility is that the age variable simply measures time-variant effects across regions.[8] In addition, the variable is highly correlated with FDI Stock and its removal in favour of GDP per capita does not cause much change in the explanatory power of the model. Finally, as we discuss below, this variable is particularly sensitive to the mode of entry.

Table 3. Regression results

	Dependent Variable										
	(1) FDI (ln)	(2) FDI (ln)	(3) WOFE (ln)	(4) WOFE (ln)	(5) EJV (ln)	(6) EJV (ln)	(7) CJV (ln)	(8) CJV (ln)	(9) WOFE (Share)	(10) EJV (Share)	(11) CJV (Share)
GDP	0.436***	0.518***	−0.004	0.177	0.259*	0.500***	0.658	1.160***	−0.032	−0.066	0.112*
	(0.152)	(0.147)	(0.421)	(0.362)	(0.152)	(0.190)	(0.434)	(0.261)	(0.051)	(0.056)	(0.062)
GDP per capita		0.849***		0.503		0.844***		0.837*	−0.003	−0.082	0.080
		(0.251)		(0.606)		(0.282)		(0.469)	(0.085)	(0.090)	(0.101)
Wage	−10.33***	−1.78***	−0.389	−1.011*	−1.73***	−2.15***	0.359	−0.167	0.120	−0.249**	0.202
	(0.181)	(0.253)	(0.572)	(0.557)	(0.282)	(0.316)	(0.699)	(0.703)	(0.078)	(0.103)	(0.188)
Infrastructure	0.393***	0.385***	−0.119	−0.090	0.181*	0.239*	0.602*	0.681	−0.031	0.026	0.024
	(0.069)	(0.092)	(0.199)	(0.200)	(0.103)	(0.133)	(0.366)	(0.451)	(0.028)	(0.029)	(0.036)
FDI Stock	0.734***	0.540***	1.151***	0.896***	0.891***	0.557***	0.631*	0.072	0.036	0.040	−0.110*
	(0.083)	(0.112)	(0.300)	(0.252)	(0.139)	(0.151)	(0.346)	(0.227)	(0.035)	(0.044)	(0.064)
Age	−0.058***		−0.097		−0.112***		−0.174**				
	(0.016)		(0.068)		(0.027)		(0.083)				
Education	4.546***		2.339		4.190***		4.465*				
	(0.706)		(3.140)		(1.188)		(2.524)				
Incentives	−0.463**	0.240	−0.185	0.513	−0.487	0.333	−1.424*	−0.090	0.030	−0.032	0.003
	(0.193)	(0.353)	(0.981)	(0.866)	(0.290)	(0.256)	(0.748)	(0.622)	(0.122)	(0.082)	(0.089)
SEZ	0.857***	0.483*	0.854	0.518	0.443***	0.013	1.334***	0.837*	0.146	−0.256***	0.147*
	(0.127)	(0.261)	(0.711)	(0.641)	(0.217)	(0.250)	(0.374)	(0.443)	(0.090)	(0.072)	(0.085)
OCC	0.674***	−0.095	0.588	−0.085	0.806***	−0.156	1.512**	0.136	−0.001	0.042	0.076
	(0.186)	(0.299)	(0.864)	(0.748)	(0.237)	(0.214)	(0.607)	(0.572)	(0.106)	(0.067)	(0.081)
ET Zone	−0.144*	0.077	−0.067	0.049	0.127	0.246	−0.829**	−0.623**	0.025	0.172***	−0.120**
	(0.079)	(0.172)	(0.427)	(0.421)	(0.116)	(0.153)	(0.255)	(0.279)	(0.059)	(0.041)	(0.046)
Constant	7.798***	6.087***	1.243	1.593	11.751***	9.448***	−8.821	−10.300*	−0.793	3.218***	−1.842**
	(1.338)	(1.820)	(4.542)	(4.071)	(2.235)	(1.758)	(5.429)	(5.862)	(0.571)	(0.553)	(0.568)
Year dummies	No	No	No	No	No	No	No	No	Yes	Yes	Yes
Estimation	OLS	RE	RE	RE	OLS	OLS	OLS	OLS	RE	OLS	OLS
R^2	0.96	0.95	0.85	0.84	0.93	0.91	0.73	0.68	0.35	0.34	0.22

Notes: Levels of significance: *** 1%, ** 5%, * 10%. OLS indicates ordinary least squares estimates, standard errors corrected for heteroscedasticity; RE indicates random effects GLS estimates. $N = 119$.

With respect to public policy, our results based on the column (1) specification are broadly consistent with previous studies where SEZ and OCC have been identified as the most important policy variables in China (Fung *et al*., 2002; Zhou *et al*., 2002). Both variables are statistically significant and carry the right sign. Although the OCC term has the wrong sign in the column (2) specification, it is not statistically significant. In general, the impact of all policy terms in the column (2) specification is reduced, and this is clearly related to the presence of the GDP per capita variable, which likely captures policy related effects (Demurger *et al*., 2002). Some of the policy variables (tax incentives and ET Zones) carry the wrong sign, although this depends on the specification. The tax incentive term may suffer from measurement problems, as it does not include provincial and local tax incentives. In general, the policy terms do not measure the extent of the benefit, only its existence. This may result in measurement bias if benefits differ in amount across regions.

The results by entry mode, using the same model specifications, are found in Table 3, columns (3)-(8). The basic conclusion to be drawn from these results is that there are important differences across entry modes, but that they are not necessarily systematic. In general, the EJV results most resemble the aggregate FDI results, perhaps not surprising given that EJVs are the largest single mode of FDI. The CJV results are somewhat similar to the aggregate results. However, the results for WOFEs are considerably different from the aggregate results, and therefore from the EJV results.

The results in columns (3) and (4) indicate that the only significant factor explaining the regional distribution of WOFE in China is the previous stock of FDI. In addition, the coefficient is larger than the comparable coefficients for EJV and CJV, and the differences are statistically significant. Thus, the information networks, support infrastructures, and FDI-related agglomeration effects associated with accumulated stocks of FDI favour the establishment of wholly owned subsidiaries.

The age coefficient, negative and statistically significant in all other equations, remains negative, but not statistically significant in the WOFE equation. Joint ventures are more likely in regions with a limited history of FDI, which is consistent with the idea that joint ventures are preferred when entry risk is high (Kogut & Singh, 1988).

Another important difference relates to the policy variables, none of which are statistically significant in the WOFE equation. By contrast, the SEZ and OCC variables are positive and statistically significant in EJV and CJV equations (5) and (7), results that are consistent with the total FDI equation. However, the magnitudes are quite different, with the impact on CJVs being much higher for these two coefficients. The two surprising negative coefficients on the incentives and ET Zone terms reported in the total FDI equation (1) are found to hold only for the comparable CJV equation in column (7). Thus, the policy variables, when they are significant (positive or negative), are more important for CJVs. To be sure, the relevant coefficients are not in general statistically significant when the second specification is employed (columns 2,4,6,8), but this is likely due to the confounding effects of the GDP per capita term. We conclude, therefore, that China's policies with respect to FDI affect primarily FDI undertaken through JVs of various kinds. The observed negative effects of some policies are due mainly to their impact on CJVs.

The remaining results provide little evidence of systemic mode specific location advantages, in particular with respect to WOFEs.. For example, GDP, GDP per capita, and infrastructure are not important determinants for WOFEs (columns 3 and 4), and the wage term is only marginally significant in one specification. It should also be noted that a random effects model is consistently chosen for the WOFE equations, but not for the EJV and CJV equations, suggesting that there are unmeasured regional attributes that affect the choices of wholly-owned subsidiaries. Nevertheless, we arrive at two substantive conclusions. One is that higher control entry modes are more likely in locations with larger accumulated stocks of FDI; another is that higher control modes are not affected by policy measures.

Finally, selected results obtained from estimating the FDI share equations are reported in Table 3, columns (9)–(11). We suggested above that this specification is consistent with a choice model in which firms choose their entry mode conditional on location. As can be seen, the results suggest that the shares are randomly distributed across the regions. Few explanatory variables are statistically significant, and add little to our understanding of the previous results. However, the very randomness of the results suggests that entry mode choices may well be firm-specific.

Discussion and Conclusions

In this paper, we re-examine the regional determinants of FDI in China by considering both total FDI flows, and FDI flows disaggregated by entry mode. Building on the FDI location literature and, in particular, on the entry mode choice literature, we argued for the existence of mode-specific location advantages, and tested for their existence. The results confirm that for total FDI, regions with large and wealthy markets, large investment in infrastructure and education, large accumulated stocks of FDI, and low labour costs will, in general, be more attractive locations. In addition, we confirm the results of previous studies that Chinese policies creating Special Economic Zones and Open Coastal Cities have succeeded in attracting FDI to the regions housing them. However, the results also suggest that beneath the order of the total FDI location results, there is some chaos when the disaggregated results are considered. The results for equity joint ventures, the most prominent form of FDI in China, are similar to the aggregate results, while those for cooperative joint ventures are somewhat similar. For wholly owned subsidiaries, the fastest growing form of FDI in China, we find little similarity to the benchmark model.

We draw three broad conclusions from our results. The first emerges from the evidence identifying the accumulated stock of FDI as being more likely to attract high control modes of entry. The fact that high control modes of entry are likely associated with accumulated stocks of FDI is consistent with both the transaction costs and resource-based views. Large accumulated stocks of FDI are likely to increase the availability and transparency of complementary resources and capabilities, and also reduce the transaction costs of acquiring them. In other words, FDI stocks create agglomeration economies in the form of complementary assets useful to foreign firms. They also reduce the costs of entering a region where cultural and language barriers are high by enhancing information flows and shared experiences across foreign firms.

Although accumulated FDI appears to be the only factor favouring WOFEs, it is important. It suggests a cumulative process whereby regions that currently attract FDI will continue to do so, but to the extent that the trend toward WOFEs continues, regions with higher stock of FDI will become increasingly advantaged. Since most FDI is currently located in the richer coastal and eastern regions, they will become increasingly advantaged if foreign firms switch to higher control entry models.

The second conclusion emerges from the evidence indicating that important policies designed to attract FDI are more likely to attract lower control modes of entry. Previous studies indicate that the creation of SEZs and OCCs has been a successful strategy to attract FDI, and that this in turn has had an important positive impact on regional growth (Demurger *et al*., 2002). Our results suggest that the success of these policies has been limited to joint ventures. If the entry mode mix continues to move in favor of WOFEs, the future impact of these policies may be reduced, and the policies themselves may have to be reconsidered. In this regard, our results are consistent with those of Zhou *et al*. (2002) who suggest that the effect of these policy variables declines over time. Our results therefore suggest that the metropolis and coastal regions with significant levels of previous FDI (encouraged by previous preferential policies) will remain attractive to wholly foreign-owned investment, but the marginal benefits of the policies in these regions may be reduced over time if the entry mode mix changes.

Finally, the results suggest that the specification of an FDI location model may be problematic as one disaggregates FDI. Certainly, the fact that the WOFE results, and only the WOFE results, are best estimated by a random effects model suggests that there are unobserved regional characteristics that attract WOFEs, but not other entry modes. Future research should be directed at better understanding what these factors are likely to be. We suspect that they are related to agglomeration economies and geography, along the lines suggested by Roberto Basile (2004) and Demurger *et al*. (2002).

It is possible that the decision model underlying a standard FDI location model is not well-suited to disaggregated estimation. However, these criticisms should not be taken too far. Consider the case of high tech firms entering China. Transaction cost analysis will suggest that the firm should enter via high control methods since technology products tend to be complex and firm-specific, and should if possible be protected. Here, the choice of entry mode is likely given, and location choice is conditional on mode choice. The location model is appropriate, and our (failed) attempt to provide an alternative model, consistent with the mode choice literature, favors this view. Given that a firm with proprietary technology should invest through a wholly foreign-owned company, our results suggest that they will locate in regions of China where there is a large stock of FDI.

Nevertheless, the problem of reconciling the firm-level evidence that location matters in the choice of entry mode with the regional-level evidence presented here is not fully resolved. The resolution, and the way forward for future research, is likely to be found by examining more carefully the relationship between mode choice and location decisions.

Notes

[1] The distinction between EJVs and CJVs is discussed below, but both are recorded as FDI by China and UNCTAD.

[2] Both are related to the eclectic framework (Dunning, 1993) which suggests that mode choice is the result of configuring firm capabilities (ownership advantages), transaction characteristics (internalization advantages), and location advantages of specific markets.

[3] Beijing and Shanghai are among the 30 regions.

[4] Fixed effects estimation was not possible because several of the independent variables are time invariant.

[5] Initially, other independent variables were considered but have been excluded for various reasons. For example, population and export and import intensity measures were highly correlated with included variables such as GDP and GDP per capita. Their exclusion does not alter the basic results.

[6] Measures of telecommunications infrastructure were not available and so are not included. However, we believe that the telephone system in China is relatively uniform across regions, at least for business purposes.

[7] In China, FDI incentives are given by various levels of government. The policies of the lower level governments (provinces, municipalities) not only lack transparency but also keep changing. As a consequence, we only include the preferential investment policies set by the federal government.

[8] We thank an anonymous referee for pointing this out.

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