Foreign Direct Investment in China: Reward or Remedy?

Olena Havrylchyk[1] *and Sandra Poncet*[2]

[1]*CEPII, Paris and* [2]*Université Paris 1 and CEPII*

1. INTRODUCTION

FROM being an economy with virtually no foreign investment in the late 1970s, China has become the largest recipient of foreign direct investment (FDI) among developing countries. FDI inflows exploded from $2 billion to $53.5 billion between 1985 and 2003 and China has overtaken the US as the world's largest recipient of FDI. Since 1994, China has attracted about one-third of total FDI to emerging markets each year and about 60 per cent of flows to Asian emerging markets (Prasad and Wei, 2005).

Economists usually agree that FDI flows to countries having a stable macro-economic environment and commitment to market reforms as well as high productivity, low costs of labour and good infrastructure among other favourable conditions. In the case of China, Huang (2003) argues that the large inflow of FDI is not only the consequence of good policies, but also results from certain distortions in the Chinese banking market and in state investment policies. He states that

> Primary benefits of China's FDI inflows have less to do with the provision of marketing access and know-how transfers, technology diffusion, or access to export channels, the kind of firm-level benefits often touted in the literature. Instead, the primary benefits associated with China's FDI inflows have to do with the privatization functions supplied by the foreign firms in a context of political opposition to an explicit privatization program, venture capital provisions to private entrepreneurs in a system that enforces stringent credit constraints on the private sector.

The above argument is consistent with Harrison et al. (2004), according to which firms in countries with greater FDI inflows suffer less from financial constraints, as incoming foreign investment provides additional sources of capital. At the

same time, it is crucial to stress that the Chinese context differs dramatically from the general case investigated by Harrison et al. (2004).[1] The main reason why FDI may serve as a way to alleviate credit constraints in most developing countries is capital scarcity. Indeed, the 'capital scarcity' channel is at odds with China's specific case. The problem in China is not the lack of savings but their inefficient allocation.

After the opening of the market for foreign investors, the discrimination against Chinese private firms continued, leading to the weak protection of property rights and a lack of market opportunities. As early as 1982, the adopted Chinese constitution protected the legal rights of foreign enterprises. Only in 1999 was there an amendment made to acknowledge that the Chinese private sector was an integral part of the economy, putting it on an equal footing with state-owned enterprises. A major problem in China's corporate sector is a political pecking order of firms which leads to the allocation of China's financial resources to the least efficient firms – state-owned enterprises – while denying the same resources to China's most efficient firms – private enterprises. Private firms are discriminated against in terms of access to external funding, property rights protection, taxation and market opportunities. Park and Sehrt (2001) show that lending by state banks is determined by policy reasons, rather than by commercial motives. Such distortions may force private Chinese firms to look for a foreign investor.

Another reason for high FDI in China is the participation of foreign investors in the privatisation process of state-owned enterprises (SOEs). Very often, public enterprises that are privatised possess good technology, human capital, extensive distribution networks and access to finance. However, due to the repeated interventions of state authorities in the investment process and other types of mismanagement, SOEs are unprofitable and have to be privatised. As for the choice of potential buyers, private enterprises are again discriminated against, as state bureaucrats favour foreign owners over private Chinese ones. Such 'insolvency-induced FDI' also raises the share of foreign investment in China.

In both cases described above, the benefits of foreign investment are not associated with technology transfer, managerial skills or access to finance. In many cases, the role of foreign owners could be played by local Chinese entrepreneurs if they were given economic freedom and incentives. Hence, if there were a level playing field for companies of all types of ownership, then the scale of FDI would be smaller. In this context, we can talk about the economic costs of foreign investment, namely forgone revenues by private Chinese enterprises and government budgets, and, more generally, about misallocation of funds in the world economy.

---

[1] In an earlier paper, Harrison and McMillan (2003), using firm-level data from the Ivory Coast for the period 1974–87, find that borrowing by incoming foreign firms exacerbates the credit constraints of domestic firms. A comparable empirical methodology is applied to China by Héricourt and Poncet (2007). Their findings suggest that FDI eases firms' financial constraints.

We propose to analyse determinants of FDI in Chinese provinces to test the hypotheses of Huang (2003). The literature on FDI determinants in China is large (Cheng and Kwan, 2000; Coughlin and Segev, 2000; and Sun et al., 2002). It finds that the most important determinants that attract FDI are market size, output growth, education, productivity, infrastructure and preferential treatment of FDI in special economic zones. Among the deterring factors, these papers emphasise the role of high wages and political risks.

In our study, we analyse determinants of FDI in 26 Chinese provinces and three municipalities between 1990 and 2003. Our work contributes to the FDI literature by including factors that capture the distortions and inefficiencies of economic policies and institutions across Chinese provinces, namely restrictions on credit access for private enterprises, and the persistent mismanagement of state enterprises due to state interventions into investment planning.

The paper is structured as follows: Section 2 develops a model that incorporates FDI determinants drawn from the traditional literature and those that control for allocative inefficiencies. In Section 3, we discuss our dataset construction. Section 4 presents empirical results and Section 5 concludes.

2. MODEL DEVELOPMENT

This paper extends the traditional model of FDI determinants by integrating factors that control for private enterprises' access to credit and intervention of authorities into the investment process.

We estimate the following FDI equation:

$$CFDI_{it} = \alpha X_{it} + \beta F_{it} + u_i + \theta_t + \varepsilon_{it}, \qquad (1)$$

where $CFDI_{it}$ is the real cumulated stock of FDI of province i at time t, X is a vector of control variables, F is a vector of market distortion indicators encompassing pitfalls of a state-dominated financial system and state investment planning, u is a province fixed effect, θ is a time fixed effect, ε is the error term, and i and t are, respectively, the provincial and time subscripts.

a. FDI Determinants Drawn from the Literature

One of the main characteristics attracting FDI to a province is its *market size*. All previous studies find support for market-seeking FDI motive in China (Cheng and Kwan, 2000; Coughlin and Segev, 2000; Gong, 1995; Sun et al., 2002; Wei and Liu, 2001; and Zhang, 2001). Equally important in attracting FDI are low *labour costs and high labour quality*. Cheng and Kwan (2000), Coughlin and Segev (2000), Sun et al. (2002) and Wei and Liu (2001) find that higher real

average wages have a negative impact on FDI flows. Another factor that attracts FDI is the level of *infrastructure development* (Berthélemy and Démurger, 2000; Cheng and Kwan, 2000; Sun et al., 2002; and Zhang, 2001).

Most recent studies control for *agglomeration effects*, which stem from positive spillovers from investors already producing in the area. This gives rise to economies of scale and positive externalities, including knowledge spillovers, specialised labour and intermediate inputs. Thus high FDI today implies high FDI tomorrow. The methodologies used to test the hypothesis of agglomeration effect vary from paper to paper. Zhang (2001) and Sun et al. (2002) proxy agglomeration effect by a level of manufacturing output and a level of foreign investment, respectively. Coughlin and Segev (2000) rely on a spatial error model to take into account potential spatial dependence which may bias their estimated coefficients.

Economic reforms have had particular implications for SOEs, boosting enormously total factor productivity largely by improving incentives for managers and workers and decentralising economic decision making. At the same time, their importance has declined rapidly over the last two decades, both because of the emergence of the private sector, and the massive privatisation programme launched at the end of the 1990s which aimed at selling all but the largest 300 or so SOEs (Gong et al., 2006). To control for the progress of market reforms we rely on a proxy which is often used in the literature – the share of state investment. This indicator is referred to as *Lack of market reforms*. Berthélemy and Démurger (2000) find that foreign investors are more likely to invest in the provinces where the industrial sector is less dominated by SOEs. It should be mentioned that the local government was the decisive actor in the privatisation process as it was the owner of most SOEs, which explains the large heterogeneity between the provinces (Guo and Yao, 2005).

b. Determinants Capturing Market Distortions

Huang (2003) claims that the above-mentioned factors do not correctly explain FDI flows to Chinese provinces. He formulates a 'demand perspective' on FDI, which stresses that private Chinese enterprises are forced to look for foreign investors because they are constrained in their activity owing to, amongst other things, distortions in the state-dominated financial system.

Despite the large size of the banking sector in China, most bank credit, until recently, was directed to inefficient state enterprises, leaving good private enterprises without access to external funding. Until 1998, the four state-owned commercial banks (SOCBs) (the Bank of China, China Construction Bank, Industrial and Commercial Bank of China, and Agricultural Bank of China) were instructed to lend to state-owned enterprises (SOEs), whereas smaller credit cooperatives were instructed to lend to private enterprises. The Chinese state enterprises

submitted investment plans and funding requests that had to be approved at the provincial and central authority level. Based on this, the lending quotas were issued to enterprises. Since private enterprises were excluded from submitting investment plans, they were, naturally, also excluded from lending quotas. The system was liberalised towards the end of the 1990s and theoretically it is no longer in place. However, in practice, banks consider private enterprises to be riskier than their public counterparts either owing to their short credit history or lower chance of being bailed out by the government.

The literature on discrimination against private firms in the bank credit market is very extensive. Park and Sehrt (2001) show that economic fundamentals have little effect on the direction of bank lending; loans by state banks are mostly determined by political interests, such as SOE output and profitability. Moreover, they find that this effect has increased in recent years. They also provide evidence that among the growing group of urban and rural cooperative banks, national and regional commercial banks increasingly lend in areas with good economic fundamentals and seem to respond to commercial motives. Brandt and Li (2003) use firm-survey data and show that private firms are less likely than township enterprises to obtain credit from a bank. Even though they note a small improvement in the probability of obtaining a loan for a private firm between 1994 and 1997, the gap in loan size between private and township enterprises has doubled in the same period. They also find that the lack of bank credit motivates private enterprises to look for alternative sources of credit which are more expensive, such as trade credit. Cull and Xu (2000, 2003) investigate sources of funds for state enterprises. They find that the reforms of the state sector that started in the 1980s improved allocation of credit. However, in the 1990s, when the direct fund transfers to SOEs by the government were phased out, banks took up the responsibility to bail out unprofitable SOEs, which decreased efficiency of credit allocation by SOCBs. Huang (2003) also emphasises the difficulties of obtaining credit for private companies and suggests that another alternative to bank credit is to look for a foreign investor. If this hypothesis is correct, we would expect a positive association between the lack of credit access to the private sector and the level of FDI.

H₁: *The cumulative stock of FDI is positively related to the restricted access to external funding by private enterprises.*

Huang (2003) challenges another conventional wisdom about FDI, namely that foreign investors finance mainly greenfield projects. The author claims that they often acquire existing institutions. Surprisingly, SOEs are frequent targets because they possess good technology, equipment and distribution network, but are operating at low or negative profits. The reason for what seems like such a startling situation is the mismanagement of resources that consequently leads to SOEs' insolvency. Bureaucrats that approve investment plans for enterprises are

not guided by profit motives, but rather evaluate enterprises in terms of the quantity and quality of their tangible assets. Despite heavy investment, many resources are misallocated and profits of SOEs are very low. Therefore, in provinces where market forces are not allowed to influence operations of SOEs, and where bureaucrats make all the management decisions, we can expect much 'insolvency-induced' FDI.[2]

H₂: *The cumulative stock of FDI is positively related to mismanagement of state enterprises.*

3. THE DATA

The dataset consists of economic and financial statistics for 26 Chinese provinces and three municipalities directly under central government control, between 1990 and 2003. The data comes from *China Statistical Yearbooks* and *Almanac of China Finance and Banking*.

a. Dependent Variable

The stock of FDI is defined as the amount of cumulative FDI in yuan. Before summation, the yearly levels are adjusted to reflect constant prices, in 1990 yuan. Thus, the resulting sums are not biased towards any part of the observation period. While FDI stock figures are available from the beginning of 1982, most provinces started to have positive stocks only in 1983 and some did not have a positive stock until as late as 1985. Xizang (Tibet) had no FDI at all throughout the entire period, and thus is excluded from our analysis. For the sake of consistency, Sichuan and Chongqing have been re-aggregated. Because of data availability (especially for the financial intermediation indicators), we confine our analysis to a balanced panel of 29 regions over a 14-year period from 1990 to 2003.

b. Control Variables

The vector of control variables *X* is defined according to the literature on FDI determinants presented in the previous section. We compute the market potential (based on real GDP) as an indicator of the size and attractiveness of the local market. As emphasised by Head and Mayer (2004), the market potential is related not only to the domestic market, but also to the markets of all the neighbouring economies. As such, this is the variable about which a multinational is probably

---

[2] Gong et al. (2006) analyse 901 privatisation deals, among which 104 enterprises were privatised with the participation of a foreign investor. Of course, there is no way to say how many of these deals were 'insolvency-induced' FDI.

the most concerned. The market potential of a given province is computed following Harris's (1954) formula, as the average of the real GDP of all neighbouring markets weighted by the inverse distance measure: $MP_{it} = \sum_j (GDP_{jt}/distance_{ij})$, where distance is measured based on the real distance by road that separates the capital cities of the provinces i and j.[3]

To measure the impact of agglomeration we use the ratio of FDI to total investment. This is the best ratio to capture the nature of FDI, which involves high sunk costs and is often accompanied by physical investment that is irreversible in the short run (Kinoshita and Campos, 2004).

A province's real wage cost is given by its average nominal wage of staff and workers deflated by its retail price index. As a proxy for the quality of workers, we introduce the real labour productivity computed as the ratio of total industrial output of a province in 1990 prices divided by the number of staff and workers. We take into account regional infrastructure density based on the ratio of the total lengths of highways and railways per km^2 of surface area.

Next we compute the share of state-owned units in total investment in fixed assets. This measure is often used in studies as an indicator of structural macro-economic differences, such as the difference in the degree of goods and labour market flexibility, differences in the progress of reforms, and more generally of the extent to which market climate prevails in the provinces. It broadly captures the lack of market reforms.

c. Indicators of Market Distortions

The primary indicator of the access of private enterprises to bank credit is the ratio of credit granted by SOCBs to total banking credit. Chinese statistics do not provide any information on credit allocation between state and non-state enterprises. However, given that the state banks' primary function was to channel savings to SOEs, the ratio of the SOCBs credit to total bank credit can be interpreted as a proxy for the credit channelled to the state-owned sector. For instance, conservative estimates suggest that 80 per cent of the total amount of credit by the SOCBs was extended to the SOEs in the late 1990s (Boyreau-Debray, 2003). Even with the recent emphasis on profit maximisation and management responsibility, state banks may still favour the SOEs with which they have a long customer history and which are more likely to be bailed out by the government than non-state enterprises in the case of financial troubles. By contrast, projects in the non-state sector are perceived as more risky because of higher information costs and moral hazard.

---

[3] We assume that the domestic market is limited by transportation costs inside a province, and thus we compute internal distance following the formula defined by Head and Mayer (2000).

The existence of large cross-regional variations in credit discrimination is confirmed by the World Bank investment climate survey of 2003.[4] A total of 2,400 firms were interviewed across 15 provinces and they had to answer, *inter alia*, the question 'Do you have a loan from a bank or financial institution?'. Approximately a quarter of firms responded negatively to the above question, but this share varies greatly across provinces (from 12 per cent in Guangxi to 40 per cent in Zhejiang). Moreover, this share, which can be held as a proxy for the absence of credit constraints, turns out to be significantly negatively correlated with our indicator of restricted access to credit, the share of state banks in the total banking sector. We measure a correlation of −0.54 between these two variables which in our eyes confirms the appropriateness of our proxy.

While assessing the importance of state intervention in the intermediation of funds, it is essential to control for the size of the local banking sector. We use the ratio of the banking system's total credit to GDP as an indicator of the size of the local banking sector.

An additional control variable is designed to capture the interventionism of the central bank. Following Dayal-Gulati and Husain (2002), Lardy (1998) and Boyreau-Debray (2003), we use the ratio of loans to deposits of the SOCBs as a proxy for central bank lending to the provinces. In China, while the volume of deposits is determined by economic activity, the volume of lending is largely determined by policy objectives and is set through a credit plan independently of the ability of branch banks in each region to finance the lending target from local deposits (Lardy, 1998). As pointed out by Boyreau-Debray (2003), some rapidly growing provinces could therefore have a low credit quota and be constrained in their lending relative to the rapid growth of their deposits. Alternatively, branch banks in slower growing regions could be assigned high quotas with insufficient local deposits to finance their lending; and these provinces would depend on the central bank to lend them additional funds. We therefore follow the literature and consider the ratio of SOCB credit to SOCB deposits as a measure of the central bank's credit to local branch banks in order to meet their lending quotas. In recent years, the administrative targets have been phased out and replaced by a maximum ratio between loans and deposits.[5] The ratios apply to total national lending by individual banks but allow the headquarters to alter credit allocation for specific provinces. Boyreau-Debray (2003) therefore suggests that the ratio of loans to deposits can also be interpreted as a measure of interregional fund allocation, as state banks are provided with greater flexibility to use within-bank transfers to adjust to regional needs.

---

[4] Enterprise surveys data can be accessed at http://www.enterprisesurveys.org/
[5] State banks do not appear, however, to conform to these ratios – as evidenced by ratios of outstanding loans to total deposits that remain well above the authorised ceiling (Boyreau-Debray, 2003).

In order to verify the hypothesis of 'insolvency-induced' FDI and capture the impact of mismanagement of SOEs on the amount of incoming FDI, we compute an indicator of quarterly fluctuations in investment spending. This indicator measures the seasonality of investment, an important indicator of state intervention. As emphasised in Rawski (2005), China is characterised by Soviet-style seasonality in investment spending that corresponds to high upswings of investment in the last months of the year owing to approval of investment plans, credit quotas and budgetary appropriations by bureaucrats. We argue that greater volatility of investment emanates from enterprises that are characterised by repeated interventions of state authorities into the investment process and other types of mismanagement. These features are likely to result in low profits, making these firms easy targets for foreign investors. It should also be mentioned that the variable that we use to capture the 'insolvency-induced' FDI – seasonality of investments – accounts for a much wider phenomenon of intervention of bureaucrats into economic decision making, which can also motivate Chinese enterprises to look for a foreign investor as a way to avoid these constraints.

To calculate this measure of investment seasonality, we rely on quarterly data on investment by all enterprises excluding urban and rural collectives and individuals at the provincial level. Then we compute the yearly ratio of provincial investment made in the fourth quarter over that in the first two quarters of the year. Again we observe large heterogeneity across provinces and, even though the seasonality of investment has decreased over time, still the investments made in the fourth quarter of 2003 roughly equal the investment made in the first half of the year.

The summary statistics of variables with mean, standard deviation and minimum and maximum values are presented in Table 1 for all provinces together, and average values for each province are given in Table 2.

The correlation matrix of our variables is presented in Table 3. Most of our variables are not highly correlated, with the exception of strong co-movement between wages and productivity. A closer look at these variables shows us that in provinces with low labour productivity, wages have grown faster than productivity, whereas in provinces with higher labour productivity the opposite is true. Despite this, the wage difference between poor and rich provinces has increased in relative and absolute terms owing to higher productivity and wage growth. When it comes to correlation coefficients, we observe that in some poor provinces there is no or very low correlation between wages and productivity. Given such different evolutionary paths of the above variables across provinces, we choose to include both of them in our estimation.

To absorb unobserved heterogeneity and to control for factors that are difficult to measure such as differences in fiscal benefits granted to foreign investors, we include provincial dummies in our regressions. This approach helps to mitigate the problem of endogeneity due to omitted variables. We furthermore include

TABLE 1
Summary Statistics

Determinant	Proxy	Obs.	Mean	Std. Dev.	Min.	Max.	Units
Explained variable: FDI stock	FDI stock	366	3.83	8.45	0.00	66.79	10 billion yuan (price 1990)
Explanatory variables							
Labour costs	Real wage	366	3.90	2.14	1.73	13.59	1,000 yuan (price 1990)
Agglomeration effect	Relative accumulation of FDI to domestic investment	366	0.07	0.08	0.00	0.33	Ratio
Market potential	Market potential	366	1.40	1.22	0.07	8.12	100 billion yuan (price 1990)
Labour productivity	Real output divided by employed persons in the industry	366	0.37	0.22	0.08	1.85	100,000 yuan per person (price 1990)
Infrastructure	Highways and railways over km^2	366	0.31	0.21	0.02	1.13	km over km^2
Lack of market reforms	Share of state investment	366	0.62	0.16	0.28	0.94	Ratio
Restricted access to credit	Share of state-owned banks in credit	366	0.65	0.13	0.41	0.94	Ratio
Central bank funds redistribution	Ratio of credit over deposit	366	1.02	0.31	0.42	2.30	Ratio
Investment seasonality	Share of fourth quarter to first half of year investment	366	2.47	1.39	0.48	8.39	Ratio
Banking sector size	Banking sector size to GDP	366	0.92	0.36	0.38	3.09	Ratio

TABLE 2
Summary Statistics: Average by Province

Province	FDI Stock	Wage	Agglomeration Effect	Market Potential	Labour Productivity	Infrastructure	Lack of Market Reforms	Restricted Access to Credit	Banking Sector Size	Central Bank Funds Redistribution	Investment Seasonality
Unit	10 b y	1,000 y		100 b y	100,000 y	km over km^2					
Beijing	4.53	6.00	0.10	1.12	0.46	0.78	0.56	0.60	1.63	0.50	1.81
Tianjin	4.40	5.43	0.15	0.75	0.61	0.60	0.84	0.75	1.13	1.15	1.87
Hebei	2.38	3.44	0.04	2.26	0.27	0.31	0.46	0.63	0.62	0.88	4.24
Shanxi	0.40	3.34	0.01	0.86	0.22	0.29	0.70	0.62	0.95	0.94	1.93
InnerMong	0.12	3.09	0.01	0.66	0.30	0.05	0.70	0.72	0.91	1.21	1.71
Liaoning	4.92	3.67	0.07	2.09	0.31	0.33	0.62	0.54	0.90	1.13	3.34
Jilin	0.90	3.50	0.04	0.90	0.36	0.20	0.76	0.61	1.28	1.48	3.26
Heilongjiang	1.29	3.17	0.03	1.51	0.33	0.12	0.72	0.64	0.92	1.11	2.49
Shanghai	8.84	6.37	0.12	1.83	0.82	0.79	0.57	0.58	1.18	0.97	2.87
Jiangsu	13.55	4.42	0.12	3.93	0.54	0.34	0.38	0.62	0.57	0.89	2.00
Zhejiang	3.72	5.18	0.05	2.71	0.43	0.38	0.41	0.57	0.59	0.86	2.93
Anhui	1.02	3.11	0.03	1.61	0.30	0.31	0.50	0.68	0.64	1.14	1.77
Fujian	9.91	4.48	0.26	1.60	0.51	0.40	0.46	0.63	0.53	0.86	2.75
Jiangxi	0.96	3.22	0.04	1.03	0.17	0.25	0.56	0.74	0.79	1.16	2.62
Shandong	7.41	3.83	0.07	4.13	0.52	0.40	0.46	0.57	0.53	1.01	1.97
Henan	1.19	3.45	0.02	2.14	0.29	0.35	0.52	0.62	0.67	1.00	2.28
Hubei	1.96	3.15	0.04	1.92	0.36	0.32	0.62	0.52	0.81	1.25	2.81
Hunan	1.44	3.04	0.04	1.55	0.15	0.31	0.56	0.70	0.52	1.11	2.52
Guangdong	31.28	6.45	0.27	2.25	0.59	0.49	0.48	0.50	1.66	0.81	2.45
Guangxi	1.97	3.51	0.08	1.07	0.35	0.20	0.52	0.73	0.64	0.89	2.23
Hainan	2.40	3.42	0.23	0.28	0.38	0.48	0.87	0.62	1.10	0.90	2.66
Guizhou	0.13	3.29	0.01	0.50	0.25	0.21	0.67	0.75	0.89	1.16	2.28
Yunnan	0.39	3.87	0.02	0.88	0.34	0.25	0.68	0.74	0.76	0.87	2.31
Shaanxi	0.96	3.20	0.04	0.79	0.25	0.22	0.67	0.63	1.00	1.08	2.98
Gansu	0.16	3.66	0.01	0.49	0.20	0.08	0.73	0.70	1.02	0.96	2.03
Qinghai	0.08	4.17	0.01	0.14	0.32	0.03	0.78	0.78	1.34	1.28	1.69
Ningxia	0.06	3.80	0.01	0.14	0.26	0.15	0.71	0.79	1.20	1.14	2.56
Xinjiang	0.13	3.37	0.01	0.56	0.39	0.02	0.79	0.70	0.96	0.88	2.06
Sichuan	1.73	3.50	0.03	2.43	0.23	0.21	0.56	0.58	0.72	1.17	2.39

TABLE 3
Summary Statistics: Correlation Matrix

	FDI Stock	Wage	Agglomeration Effect	Market Potential	Labour Productivity	Infrastructure	Lack of Market Reforms	Restricted Access to Credit	Central Bank Funds Redistribution	Investment Seasonality
FDI stock	1.00									
Wage	0.62	1.00								
Agglomeration	0.69	0.48	1.00							
Market potential	0.61	0.48	0.32	1.00						
Labour productivity	0.62	0.80	0.60	0.50	1.00					
Infrastructure	0.47	0.60	0.61	0.40	0.63	1.00				
Lack of market reforms	−0.45	−0.41	−0.25	−0.70	−0.38	−0.33	1.00			
Restricted access to credit	−0.41	−0.44	−0.43	−0.56	−0.48	−0.40	0.45	1.00		
Central bank funds redistribution	−0.36	−0.58	−0.43	−0.41	−0.49	−0.44	0.47	0.60	1.00	
Investment seasonality	−0.23	−0.50	−0.17	−0.25	−0.38	−0.13	0.20	0.25	0.25	1.00
Banking sector size	0.29	0.46	0.18	−0.21	0.28	0.26	0.26	−0.08	−0.08	−0.15

yearly fixed effects to capture global developments such as the total supply of FDI, central government policies and nationwide regulations and events.

4. ESTIMATION RESULTS

We start our econometric estimation with a fixed-effects model, controlling for province- and time-specific effects. Since a modified Wald test for groupwise heteroscedasticity rejects the null hypothesis of homoscedasticity, we rely on robust standard errors to infer about the significance of our results. The results are presented in columns 1–4 of Table 4. The model estimated in column 1 closely follows the literature on determinants of FDI. It includes such explanatory variables as ratio of FDI to total investment, market potential, wage, productivity of labour, density of infrastructure, and a proxy for the lack of market reforms. In column 2, we add control variables to account for developments in the banking sector in our baseline equation. Indicators of the restricted access of private enterprises to credit (proxied by the share of SOCBs in credit) and of the size of the banking sector are included. Column 3 additionally controls for central bank funds' redistribution, while column 4 further introduces the indicator of seasonality in investment spending. All explanatory variables are lagged. Because of high correlation between the last two variables, we do not introduce them simultaneously in the regression.

Such a simple econometric estimation does not take into account potential problems of endogeneity. This could lead to some of our variables being insignificant or having the wrong sign. For example, FDI is known to increase wages and improve productivity. Furthermore, we can also hypothesise that high FDI might postpone reforms of the banking sector, since the problem of credit access for private enterprises would be partly alleviated. Therefore, we additionally estimate our model with instrumental variables (IV), which are lags of our explanatory variables. In order to test the validity of our instruments with the Sargan test of over-identifying restrictions, we have included one more extra instrument – special economic zones, constructed as the sum of the number of special economic zones, coastal open cities and economic and technological development zones in each province. This indicator is constructed based on the chronology provided by Démurger et al. (2002).[6]

Columns 5–8 report results of IV estimation with robust standard errors. We also test our models for autocorrelation of residuals with Wooldridge's (2001) test for serial correlation; the statistics obtained indicate that there is autocorrelation of order one (i.e. an AR1 process) in the residuals. Consequently,

---

[6] It should be noted that this variable does not enter significantly into our baseline regressions, but it proves to be a good instrument.

TABLE 4
Results of Panel Regressions

	Within				Within and Instrumental Variables				Within and Instrumental Variables (Newey–West)			
	1	2	3	4	5	6	7	8	9	10	11	12
Wage	1.76***	0.83	0.86	0.84	−0.86**	−2.80***	−2.53***	−3.07***	−0.86	−2.80***	−2.53**	−3.07***
	(0.62)	(0.55)	(0.56)	(0.55)	(0.41)	(0.79)	(0.76)	(0.87)	(0.54)	(1.07)	(1.02)	(1.17)
Agglomeration effect	54.42***	54.57***	54.06***	54.63***	63.15***	73.30***	69.28***	72.76***	63.15***	73.30***	69.28***	72.76***
	(8.69)	(8.50)	(8.62)	(8.48)	(10.98)	(13.60)	(13.35)	(13.85)	(15.02)	(18.81)	(18.42)	(19.19)
Market potential	3.63***	4.22***	4.17***	4.20***	3.89***	5.09***	4.93***	5.60***	3.89***	5.09***	4.93***	5.60***
	(0.44)	(0.43)	(0.44)	(0.44)	(0.41)	(0.46)	(0.47)	(0.53)	(0.55)	(0.61)	(0.61)	(0.70)
Labour productivity	1.59	3.50*	3.49*	3.47*	8.88***	10.93***	10.78***	11.02***	8.88***	10.93***	10.78***	11.02***
	(2.06)	(1.80)	(1.81)	(1.80)	(2.43)	(2.73)	(2.63)	(2.77)	(3.09)	(3.56)	(3.44)	(3.61)
Infrastructure	3.64	4.92	4.58	4.92	13.54**	13.71***	12.37***	14.62***	13.54*	13.71**	12.37*	14.62**
	(4.15)	(3.69)	(3.66)	(3.70)	(5.34)	(5.04)	(4.78)	(5.30)	(6.99)	(6.65)	(6.31)	(6.97)
Lack of market reforms	−10.29**	−8.87**	−8.76**	−8.84**	−15.53**	−15.05**	−13.94**	−15.60**	−15.53*	−15.05*	−13.94*	−15.60*
	(4.24)	(4.00)	(3.99)	(4.00)	(6.18)	(6.52)	(6.36)	(6.70)	(8.24)	(8.60)	(8.44)	(8.85)
Restricted access to credit		9.81***	8.79**	9.71***		16.35***	12.25**	16.29***		16.35**	12.25**	16.29**
		(3.37)	(3.41)	(3.37)		(5.40)	(5.46)	(5.66)		(7.31)	(7.25)	(7.67)
Size of the banking sector		4.06**	3.41*	4.04**		11.12***	9.14***	11.12***		11.12***	9.14***	11.12***
		(1.88)	(2.02)	(1.88)		(2.72)	(2.73)	(2.77)		(3.72)	(3.66)	(3.78)
Central bank funds redistribution			1.73				4.65**				4.65	
			(1.40)				(2.27)				(2.85)	
Investment seasonality				−0.01				1.00**				1.00**
				(0.02)				(0.44)				(0.55)
Observations	405	386	386	386	404	366	366	366	404	366	366	366
R^2	0.86	0.88	0.88	0.88	0.86	0.87	0.87	0.86	0.86	0.87	0.87	0.86
Hausman test	31.76**	32.04*	32.54*	30.80*								
Sargan test					0.97	0.67	0.48	0.45	0.97	0.67	0.48	0.45
Durbin–Wu–Hausman					66***	64***	62***	63***	66***	64***	62***	63***

Notes:
All regressions include provinces' and years' fixed effects. Robust standard errors in parentheses. Newey produces Newey–West standard errors for coefficients estimated by OLS regression. The error structure is assumed to be heteroscedastic and possibly autocorrelated up to some lag. ***, **, * significant at the 1 per cent, 5 per cent, 10 per cent levels, respectively.

we choose the IV estimation with Newey–West standard errors and an AR1 process in the error terms. The findings are shown in columns 9–12.

In order to test the appropriateness of relying on the IV estimator, we perform the Durbin–Wu–Hausman test, which tests the endogeneity in a regression estimated with IV. The rejection of the null hypothesis – that an ordinary least squares estimator of the same equation would yield consistent estimates – means that the endogeneity of the regressors has a meaningful effect on the estimated coefficients and we have to rely on the IV estimation. Our next step is to check the validity of our instruments with the Sargan test of over-identifying restrictions. The test statistics obtained do not reject the orthogonality of the instruments and the error terms, and thus we can conclude that our choice of instruments was appropriate.

The results of our estimation are mostly in line with the literature. The results estimated with IV succeed in correcting endogeneity problems and therefore we focus our discussion on IV findings. First of all, we find that low labour costs attract foreign direct investments, but this result has a correct sign only when we use IV estimation. Second, we confirm the existence of a very strong agglomeration effect. Third, we observe that FDI is market seeking since the magnitude of the market potential exerts a significant and positive attraction for foreign investments. Increased productivity of labour also turns out to foster FDI. In addition, our proxy of poor business environment and lack of market reforms, namely the ratio of state investment, enters negatively and significantly in the regression, attesting to the crucial role of market climate in order to attract FDI. Also in line with the existing literature, we find a positive impact of infrastructure development, but only in the IV estimations.

Our findings give support to Hypothesis 1, which states that limited access of private enterprises to credit, proxied by higher ratio of SOCBs credit, leads to a higher level of FDI. This supports Huang's (2003) claim that private enterprises often seek a foreign investor because they are excluded from the banking sector in their province. In such cases, FDI serves only as a source of capital and not as a source of new technology or managerial skills. Since the Chinese banking sector is extremely large, one can assume that what we observe is not caused by lack of funds, but rather to their misallocation. Numerous studies have shown that Chinese banks grant loans to inefficient state-owned enterprises, whereas good private companies are excluded from credit markets. In order to properly assess the importance of China's banking market distortions, we control for the size of the banking sector. It is difficult to interpret the positive sign of this determinant in the Chinese context, since a large banking sector is not associated with better access to credit for private enterprises (as it is in the literature for other countries), especially when state banks dominate the market.

In our IV estimation the variable *Central bank funds redistribution* turns out to be significant and positive. The positive sign indicates that if a province

becomes more independent from central bank credit redistribution, it also attracts less FDI. Usually, the dependent provinces are poor provinces that cannot attract enough of their own deposits to fulfil the credit limits set by the central bank. Since we already control for market size, productivity and the share of state-ownership, the positive relationship can be interpreted as further proof that distortions in the financial market attract FDI. However, this result is not robust when we control for autocorrelation in the residuals.

Finally, we succeed in documenting the distortive impact of mismanagement of SOEs by state bureaucrats. The IV estimation renders the variable *Investment seasonality* to be positive and significant. Thus, if reforms are speeded up in a province, and investment decisions are shaped by market forces, rather than by bureaucrats, the inflow of FDI to such a province slows down. Recall that the regression already controls for the privatisation process through the indicator of share of public investment, so that the positive impact of the variable *Investment seasonality* on FDI cannot be attributed to the decline in the share of firms that are controlled by bureaucrats. Our results can be interpreted as further evidence that the inflated amount of FDI to provinces with highly regulated investment policies could substitute local investment. As Huang (2003) notes, SOEs often have much more equipment and machinery than foreign enterprises, but what foreign owners do bring is better management and utilisation of the above-mentioned capacities. However, better management could be achieved if state intervention was limited in the first place, even in SOEs. The significance of this coefficient indicates that, when Chinese entrepreneurs are given freedom to make investment decisions, the need for FDI diminishes.

Table 5 provides some interesting results obtained from an impact analysis. If we consider the point estimates in column 12 of Table 4 as our best estimate of the various effects, a 390-yuan increase in real wages (corresponding to 10 per cent of the average real wage across provinces over the period) ultimately produces a decrease in FDI stock of 12 billion yuan (corresponding roughly to 30 per cent of the average stock across provinces over the period). A similar decrease (to be more exact, 11 billion yuan) would be induced by a decrease of seven per cent in the share of SOCBs in total credit.[7] This is the average difference between Zhejiang and Guangdong during the period 1990–2003.

The impact of market distortions is not only statistically significant but also economically relevant. In Table 6 we present the impact of the various determinants considered in our empirical study on the change of FDI that took place between 1990 and 2003. During this period the average stock of FDI grew from 2 to 89.9 billion yuan. Computations are based on coefficient estimates reported in the final column of Table 4. The traditional FDI determinants, such as wage,

---

[7] Since the share of state-owned banks in credit is 65 per cent on average in our sample, a decrease of seven per cent (from 65 to 58 per cent) corresponds to a 10 per cent change in the ratio.

TABLE 5
Impact Analysis

	Coefficient on Variable		Impact of 10% Increase on Stock of FDI in Billion Yuan		Impact of 10% Increase on Stock of FDI in % of Average Over the Period		Impact of Half a Standard Deviation Increase on Stock of FDI in Billion Yuan		Impact of Half a Standard Deviation Increase on Stock of FDI in % of Average Over the Period	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Wage	−0.86	−3.07	−3	−12	−9%	−31%	−9	−33	−24%	−86%
Agglomeration effect	63.2	73.3	4	5	11%	13%	27	31	70%	81%
Market potential	3.89	5.6	5	8	14%	20%	24	33	62%	85%
Labour productivity	8.88	11.02	3	4	8%	11%	10	12	26%	32%
Infrastructure	12.37	14.62	4	5	10%	12%	13	16	34%	41%
Lack of market reforms	−13.94	−15.6	−9	−10	−23%	−25%	−11	−12	−29%	−32%
Restricted access to credit	12.25	16.29	8	11	21%	28%	8	10	20%	27%
Central bank funds redistribution	0	4.65	0	5	0%	12%	0	7	0%	19%
Investment seasonality	1.03	1	3	2	7%	6%	7	7	19%	18%
Banking sector size	9.14	11.12	8	10	22%	27%	16	20	43%	52%

TABLE 6
Predicted Impact Analysis

	2003	1990	Difference	Coefficient	Predicted Value
FDI stock (dependent variable) 10 billion yuan	8.99	0.20	8.78		7.72
Explanatory variables					
Wage	7.80	2.12	5.67	−3.07	−17.4
Agglomeration effect	0.09	0.02	0.07	72.76	4.9
Market potential	2.74	0.62	2.12	5.60	11.8
Labour productivity	0.61	0.18	0.43	11.02	4.7
Infrastructure	0.42	0.24	0.18	14.62	2.6
Lack of market reforms	0.47	0.70	−0.23	−15.60	3.5
Restricted access to credit	0.59	0.82	−0.23	16.29	−3.7
Banking sector size	1.20	0.86	0.34	11.12	3.7
Investment seasonality	1.07	3.59	−2.52	1.00	−2.5

market potential, agglomeration effect, productivity and infrastructure, have played an important role in determining the growth in the FDI stock. We can also see that if distortions in the banking sector and government investment policies had not been reduced, FDI stock would have shown an additional increase of 37 and 25 billion yuan, respectively. We furthermore note that the inclusion of these additional determinants to capture existing distortions in the Chinese banking market and in state investment policies beside traditional factors improves the explanatory power of our model, which explains 90 per cent (77.2 billion yuan) of the average increase in FDI stock during the analysed period.

5. CONCLUSIONS

This paper contributes to the literature on the determinants of FDI in China by including a number of new factors, such as the availability of external funding to private enterprises, the redistribution of central bank funds and investment planning by state authorities. Our findings are in line with the existing literature, which shows the positive impact of agglomeration, high labour productivity and low labour costs, market size, infrastructure density and market reforms on FDI.

In addition to the traditional FDI determinants, we show the distortive impact of some imperfections in the banking sector and state investment policies. As suggested by Huang (2003), we try to see beyond the positive sides of FDI in China. Unlike other developing countries, where FDI is associated with improvements in management, better technology and access to finance, in China FDI does not always bring the above-mentioned benefits, and high level of FDI in

China can be explained, *inter alia*, by the market distortions. We find support for the following two hypotheses. First, private enterprises are forced to look for a foreign investor in order to escape constraints imposed by the state-dominated banking sector. Ideally, these enterprises could have taken a loan from a bank, but despite the large size of the banking sector in China, private companies only recently gained access to credit from SOCBs. Second, foreign investors acquire SOEs if there are frequent interventions by state bureaucrats into the investment decisions. Again, state enterprises could have been saved from insolvency by local entrepreneurs, had they been given more freedom in decision making. Therefore, further state disengagement from credit allocation and investment decisions should diminish the demand for FDI in China and free part of it for more efficient use in other regions.

REFERENCES

Berthélemy, J.-C. and S. Démurger (2000), 'Foreign Direct Investment and Economic Growth: Theory and Application to China', *Review of Development Economics*, **4**, 2, 140–55.

Boyreau-Debray, G. (2003), 'Financial Intermediation and Growth: Chinese Style', World Bank Policy Research Working Paper No. 3027 (Washington, DC: World Bank).

Brandt, L. and H. Li (2003), 'Bank Discrimination in Transition Economies: Information, or Incentives?', *Journal of Comparative Economics*, **31**, 387–413.

Cheng, L. K. and Y. K. Kwan (2000), 'What are the Determinants of the Location of Foreign Direct Investment? The Chinese Experience', *Journal of International Economics*, **51**, 379–400.

Coughlin, C. C. and E. Segev (2000), 'Foreign Direct Investment in China: A Spatial Econometric Study', *World Economy*, **23**, 1, 1–23.

Cull, R. and L. C. Xu (2000), 'Bureaucrats, State Banks, and the Efficiency of Credit Allocation: The Experience of Chinese State-Owned Enterprises', *Journal of Comparative Economics*, **28**, 1–31.

Cull, R. and L. C. Xu (2003), 'Who Gets Credit? The Behavior of Bureaucrats and State Banks in Allocating Credit to Chinese State-Owned Enterprises', *Journal of Development Economics*, **71**, 533–59.

Dayal-Gulati, A. and A. M. Husain (2002), 'Centripetal Forces in China's Economic Takeoff', *IMF Staff Papers*, **42**, 3, 364–94.

Démurger, S., J. D. Sachs, W.-T. Woo, B. Shuming, G. Chang and A. Mellinger (2002), 'Geography, Economic Policy and Regional Development in China', *Asian Economic Papers*, **1**, 1, 146–97.

Gong, H. (1995), 'Spatial Patterns of Foreign Investment in China's Cities, 1980–1989', *Urban Geography*, **16**, 198–209.

Gong, Y., H. Görg and S. Maioli (2006), 'Employment Effects of Privatisation and Foreign Acquisition of Chinese State-Owned Enterprises', IZA Discussion Paper No. 2453 (Bonn, Germany: IZA).

Guo, K. and Y. Yao (2005), 'Causes of Privatization in China', *Economics of Transition*, **13**, 2, 211–38.

Harris, C. (1954), 'The Market as a Factor in the Localization of Industry in the United States', *Annals of the Association of American Geographers*, **64**, 315–48.

Harrison, A. E. and M. S. McMillan (2003), 'Does Direct Foreign Investment Affect Domestic Firms Credit Constraints?', *Journal of International Economics*, **61**, 1, 73–100.

Harrison, A., I. Love and M. McMillan (2004), 'Global Capital Flows and Financing Constraints', *Journal of Development Economics*, **75**, 269–301.

Head, K. and T. Mayer (2000), 'Non-Europe: The Magnitude and Causes of Market Fragmentation in the EU', *Weltwirtschaftliches Archiv*, **136**, 2, 285–314.

Head, K. and T. Mayer (2004), 'Market Potential and the Location of Japanese Firms in the European Union', *Review of Economics and Statistics*, **86**, 4, 959–72.

Héricourt, J. and S. Poncet (2007), 'FDI and Credit Constraints: Firm Level Evidence in China', CEPII Working Paper 2007-11 (Paris: CEPII).

Huang, Y. (2003), *Selling China: Foreign Direct Investment During the Reform Era* (New York: Cambridge University Press).

Kinoshita, Y. and N. Campos (2004), 'Estimating the Determinants of Foreign Direct Investment Inflows: How Important are Sampling and Omitted Variable Biases?', BOFIT Discussion Papers 10 (Helsinki: Bank of Finland).

Lardy, N. (1998), *China's Unfinished Economic Revolution* (Washington, DC: Brookings Institution Press).

Park, A. and K. Sehrt (2001), 'Tests of Financial Intermediation and Banking Reforms in China', *Journal of Comparative Economics*, **29**, 608–44.

Prasad, E. and S.-J. Wei (2005), 'The Chinese Approach to Capital Inflows: Patterns and Possible Explanations', IMF Working Paper No. 79 (Washington, DC: IMF).

Rawski, T. (2005), 'China's Growth Prospects. China's Economy: Retrospect and Prospect', Asia Program Special Report 129 (Washington, DC: Woodrow Wilson International Center).

Sun, Q., W. Tong and Q. Yu (2002), 'Determinants of Foreign Direct Investments across China', *Journal of International Money and Finance*, **21**, 1, 79–113.

Wei, Y. and X. Liu (2001), *Foreign Direct Investment in China: Determinants and Impact* (Cheltenham: Edward Elgar).

Wooldridge, J. M. (2001), *Econometric Analysis of Cross Section and Panel Data* (Cambridge, MA: MIT Press).

Zhang, K. H. (2001), 'What Attracts Foreign Multinational Corporations to China?', *Contemporary Economic Policy*, **19**, 3, 336–46.