Foreign Direct Investment in China: Reward or Remedy?

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Abstract

In his book "Selling China" Huang (2003) states that a high level of foreign direct investment (FDI) in China is not necessarily a sign of strength, but can be partly attributed to the distortive nature of state policies that put restrictions on private and public enterprises. First of all, the Chinese financial system allocates resources to the least efficient firms – state-owned enterprises – while denying the same resources to Chinese private enterprises, forcing them to look for a foreign investor. Second, the inefficient system of state investment planning leads to mismanagement of public enterprises, increasing "insolvency induced FDI". We propose to analyze determinants of FDI in Chinese provinces to test the above hypotheses. We control for traditional determinants of FDI such as market access, labor costs, productivity, infrastructure, reform advances and banking sector size in order to assess the impact of inter-provincial heterogeneity in terms of the access that private enterprises have to credit and the distortive management in state-owned firms.

Keywords: China, Banking sector, FDI, Government intervention.

JEL Codes: F15, F22, G28.

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 and, for many years, has been second only to the United States in terms of FDI receipts. FDI inflows exploded from $5.9 billion to $115 between 1985 and 2003. Since 1994, China has attracted about one third of total FDI to emerging markets each year and about 60% of flows to Asian emerging markets (Prasad and Wei, 2005).

Economists usually agree that FDI flows to countries having a stable macroeconomic environment and commitment to market reforms as well as high productivity, low costs of labor and good infrastructure among other favorable 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".

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 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 privatization process of state-owned enterprises (SOEs). Very often, public enterprises that are privatized 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 privatized. As for the choice of potential buyers, private enterprises are again discriminated against, as state bureaucrats favor 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.

We propose to analyze determinants of FDI in Chinese provinces to test the hypotheses of Huang (2003). The literature on FDI determinants in China is large (Coughlin and Segev (2000), Cheng and Kwan (2000), 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, the papers emphasize the role of high wages and political risks.

In our study, we analyze determinants of FDI in 26 Chinese provinces and 3 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 data set 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 investment process.

We estimate the following FDI equation:

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

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.

2-1 FDI determinants drawn from the literature

One of the main characteristics attracting FDI in a province is its *market size or growth*, measured by a provincial GDP, GDP growth, per capita income, or population. All 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; Zhang, 2001).

Hypothesis 1. The cumulative stock of FDI is positively related to market size.

Equally important in attracting FDI are low *labor costs*. 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. At the same time, labor quality is also shown to be very important in most studies (with the exception of Cheng and Kwan (2000)). As proxies for *labor quality* authors use alternatively the number of research engineers, scientists and technicians as a percent of the total employees (Sun et al., 2002; Wei and Liu, 2001), the percentage of population with primary, junior secondary, and senior secondary school education (Cheng and Kwan, 2000), or the overall labor productivity (Coughlin and Segev, 2000).

Hypothesis 2. The cumulative stock of FDI is negatively related to labor costs and positively related to labor quality.

Another factor that plays an important role is *infrastructure development*. To measure its impact, the most commonly used proxies are the ratio of railway and highway length per km^2 of surface area (Sun et al., 2002; Berthélemy and Démurger, 2000; Zhang, 2001; Cheng and Kwan, 2000). Other variables include GDP per km^2, staff and workers in airway transportation per thousand people (Coughlin and Segev, 2000), freight-handling capacity by seaport and also postal and telecommunication values (Gong, 1995). All studies find that these variables are significant determinants of provincial FDI (with the exception of Coughlin and Segev, 2000).

Hypothesis 3. The cumulative stock of FDI is positively related to infrastructure development.

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, specialized labor and intermediate

inputs. Thus high FDI today implies high FDI tomorrow. The methodologies used to test the hypothesis of agglomeration effect vary from one paper to another. 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.

Hypothesis 4. The cumulative stock of FDI is positively related to agglomeration effects.

It is also important to control for the progress of market reforms, which is usually proxied in the literature by the share of state output or investment. Berthélemy and Démurger (2000) find that foreign investors are more likely to invest in the provinces where the industrial sector is less dominated by state-owned enterprises. In addition, this variable controls for the privatization process.

Hypothesis 5. The cumulative stock of FDI is positively affected by the advances in market reforms.

2-2 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 due to, inter alia, distortions in the state-dominated financial system.

Despite the large size of the banking sector in China, until recently most bank credit 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 liberalized in the end of 1990s and theoretically it is not in place any more. However, in practice, banks consider private enterprises to be riskier than their public peers either due 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 increased in the recent period. 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 a firm-survey data and show that private firms are less likely to obtain credit from a bank than township enterprises. Even though they note a small improvement in probability of obtaining a loan for a private firm between 1994 and 1997, the gap in a 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 emphasizes 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.

Hypothesis 6. 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 mainly finance greenfield projects. The author claims that they 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 many "insolvency induced" FDI.

Hypothesis 7. The cumulative stock of FDI is positively related to mismanagement of state enterprises.

3- The Data

The data set consists of economic and financial statistics for 26 Chinese provinces and 3 municipalities directly under the central government control, between 1990 and 2003.

Dependent variable

The stock of FDI is defined as the amount of cumulative FDI in yuans. Prior to summation, the yearly levels are adjusted to reflect constant prices, in 1990 yuans. Thus, the resulting sums are not biased towards any part of the observation period. While FDI stocks figures are available since the beginning of 1982, most provinces started to have positive stocks only in 1983 and some did not have a positive stock 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 13-year period from 1990 to 2003.

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 emphasized by Head and Mayer (2004), the market

potential is not only related to the domestic market, but also to the markets of all the neighboring economies. As such, this is the variable about which a multinational is probably the most concerned. The market potential of a given province is computed following Harris (1954)'s formula, as the average of the real GDP of all neighboring markets weighted by the inverse distance measure : $MP_{it} = \sum_j \frac{GDP_{jt}}{dis\tan ce_{ij}}$, where distance is measured based on the real distance by road that separates the capital cities of the provinces *i* and *j*[1].

To measure the impact of agglomeration we use the ratio of foreign direct investment 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 labor 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.

We also introduce a measure of the share of state-owned units in total investment in fixed assets. This measure is often used in studies as an indicator for structural macroeconomic differences, such as the difference in the degree of goods and labor market flexibility,

[1] 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).

differences in the progress of reforms, and more generally for the extent to which market climate prevails in the provinces.

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 channeled to the state-owned sector. For instance, conservative estimates suggest that 80 percent 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 maximization and management responsibility, state banks may still favor 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.

While assessing the importance of state interventionism in the intermediation of funds, it is essential to control for the size of the local banking sector. We simply 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 Lardy (1998), Dayal-Gulati and Hussain (2002) 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[2]. 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.

In order to capture the impact of mismanagement of SOEs, we compute an indicator of quarterly fluctuations in investment spending. We rely on quarterly data on investment by all enterprises excluding urban and rural collectives and individuals at the provincial level. We calculate the yearly ratio of provincial investment made in the fourth quarter over that in the first two quarters of the year. This indicator measures the volatility of investment, an important indicator of state intervention. As emphasized in Rawski, (2005), China is characterized by Soviet-style seasonality in investment spending that corresponds to high

[2] 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 authorized ceiling (Boyreau-Debray, 2003).

upswings of investment in the last months due to approval of investment plans, credit quotas, and budgetary appropriations by bureaucrats. We argue that greater volatility of investment emanates from enterprises that are characterized by repeated interventions of state authorities into investment process and other types of mismanagement. These features are likely to result in low profits, making these firms easy targets for foreign investors.

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 labor productivity, wages have grown faster than productivity, whereas in provinces with higher labor productivity the opposite is true. Despite this, the wage difference between poor and rich provinces has increased in relative and absolute terms due to higher productivity and wage growth in later provinces. When it comes to correlation coefficients, we observe that in some poor provinces there is no or very low correlation between wages and productivity. Due to such different evolution 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 yearly fixed effects to capture global

developments such as the total supply of FDI, central government policies and nation-wide regulations and events.

4-Estimation results

4-1 Fixed effect estimation

We start our econometric estimation with a fixed effect model, controlling for province- and time-specific effects. Since a modified Wald test for groupwise heteroskedasticity rejects the null hypotheses of homoskedasticity 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 a ratio of FDI to total investment, market potential, wage, productivity of labor, density of infrastructure, and a proxy for market reforms. In column 2, we add control variables to account for developments in the banking sector in our baseline equation. Indicators of the 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. Due to high correlation between the last two variables we do not introduce them in the same regression.

The results of our estimation are mostly in line with the literature with the exception of the sign of the wage variable. First of all, we confirm the existence of a very strong agglomeration effect. Second, we observe that FDI is market seeking since the size of the market exerts a significant and positive attraction for foreign investments. Increased

productivity of labor 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. Contrary to the existing literature, we do not find a positive impact of infrastructure development. To sum up, we find support for our hypotheses 1, 4, 5, and partly for 2.

Our findings (columns 2 to 4) show that limited access of private enterprises to credit, proxied by higher ratio of SOCBs credit, leads to higher level of FDI. This supports Huang (2003)'s hypothesis 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 due to the 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 done in the literature for other countries), especially when state banks dominate the market.

Column 3 introduces an indicator of the redistribution of central bank funds to control for the state interventionism in the credit market. Even though this variable turns out to be positive, it is not statistically significant.

The introduction of the measure of investment planning in column 4 allows us to test hypothesis 7, namely that foreign investors often acquire non-profitable SOEs in provinces with high intervention of bureaucrats in the investment process. Since the variable does not turn out statistically significant, our prior is not supported.

4-2 IV estimation

The simple econometric estimation that was used by us so far does not take into account potential problems of endogeneity. This could lead to some of our variables being not significant or having the wrong sign. For example, FDI is known to increase wages and improve productivity. Furthermore, we can also hypothesize 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 models with instrumental variables (IV), which are lags of our explanatory variables. Columns 5-8 report results of IV estimation with robust standard errors. We also test our models for autocorrelation of residuals with Wooldridge (2001)'s test for serial correlation; the obtained statistics indicate that there is autocorrelation of order 1 (i.e. an AR1 process) in the residuals. Consequently, 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 our decision to do estimation with IV, 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 endogenous regressors have a meaningful effect on 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 overidentifying restrictions. The obtained test statistics 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 IV estimations confirm our previous findings of strong agglomeration effects and the positive impact of market potential, high labor productivity, and market reforms. Also, our new results support our hypothesis of the distortive nature of the Chinese banking sector, which excludes private enterprises from access to credit.

Besides confirming our previous results, estimation with IV seems to correct endogeneity problems and renders such variables as wage and infrastructure significant and with the correct sign. Hence, we find support for our Hypothesis 2 – that wage increase has a negative impact on FDI, and our Hypothesis 3 – that improvements in roads and railway attract additional investments.

In our IV estimation the variable C*entral 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 another 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 Planning* to be positive and significant. Thus, if reforms are speeded up in a province, and investment decisions are shaped by market forces, rather then by bureaucrats, the inflow of FDI to such a province slows down. Recall that the regression already controls for the privatization process through the indicator of share of public investment, so that the positive impact of the variable *Investment Planning* on FDI can not 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 utilization 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 (13) as our best estimate of the various effects, a 390 yuans increase in real wage (corresponding to a 10 percent of the average real wage across provinces over the period) ultimately produces a decrease in FDI stock of 12 billion yuans (corresponding roughly to 30 percent of the average stock across provinces over the period). A similar decrease (to be more exact, 11 billion yuans) would be induced by a decrease of 7 percent in the share of SOCB's in total credit[3]. This is the average difference between Zhejiang and Guangdong over 1990-2003.

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

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 has grown from 2 to 89.9 billion yuans. Computations are based on coefficient estimates reported in the final column of table 4. The traditional FDI determinants, such as wage, 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 known an additional increase of 37 and 25 billion yuans, 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% (77.2 billion yuans) of the average increase in FDI stock during the analyzed 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 labor productivity and low labor 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 do 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: (1) 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 acquired access to credit from SOCBs; and (2) Foreign investors acquire SOEs if there are frequent intervention by state bureaucrats into the investments decisions. Again, state enterprises could have been saved from insolvency by local entrepreneurs, had they been given more freedom of decision making. Therefore, further state disengagement from credit allocation and investment decisions should diminish the demand for FDI in China and free for more efficient use in other regions.

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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 yuans (price 1990)
Explanatory variables							
Labor costs	Real Wage	366	3.90	2.14	1.73	13.59	1 000 yuans (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 billions yuans (price 1990)
Labor productivity	Real output divided by employed persons in the industry.	366	0.37	0.22	0.08	1.85	100 000 yuans per person (price 1990)
Infrastructure	Highways and Railroads over km^2	366	0.31	0.21	0.02	1.13	km over km2
Market reforms	Share of State investment	366	0.62	0.16	0.28	0.94	Ratio
Credit access for private enterprises	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 planning	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	FDI to investment	Market Potential	Productivity	infrastructure	Share of state investment	Share of State Owned bank	Banking sector Size	Central bank funds Redistribution	Investment planning
unit	10 b y	1 000 y		100 b y	100 000 y	km over km2					
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	FDI to investment rate	Market Potential	Productivity	infrastructure	Share of state investment	Share of State Owned bank in credit	Central bank funds Redistribution	Investment planning
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						
Productivity	0.62	0.80	0.60	0.50	1.00					
Infrastructure	0.47	0.60	0.61	0.40	0.63	1.00				
Market Reforms	-0.45	-0.41	-0.25	-0.70	-0.38	-0.33	1.00			
Access to credit	-0.41	-0.44	-0.43	-0.56	-0.48	-0.40	0.45			
Central bank funds Redistribution	-0.36	-0.58	-0.43	-0.41	-0.49	-0.44	0.47	0.60	1.00	
Investment planning	-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

Table 4 : Results of panel regressions (fixed effects by year and province)

	Within				Within & Instrumental Variables				Within & 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	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)
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)
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)
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 planning				-0.01				1.00**				1.00**
				(0.02)				(0.44)				(0.55)
Constant	-7.62**	-9.88	-25.10***	-9.68	-8.2***	-16.0***	-15.9***	-15.8***	7.8	-11.6**	-23.6***	-23.2***
	(3.52)	(6.17)	(5.12)	(6.23)	(2.60)	(4.10)	(4.01)	(4.14)	(7.82)	(5.40)	(7.38)	(8.17)
Observations	405	386	386	386	404	366	366	366	404	366	366	366
R-squared	0.86	0.88	0.88	0.88	0.86	0.87	0.87	0.86	0.86	0.87	0.87	0.86
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***

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 heteroskedastic and possibly autocorrelated up to some lag.

Table 5 : Impact analysis

	coefficient on variable		impact of 10% increase on stock of FDI in billion yuans		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 yuans		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%
Relative accumulation of FDI to domestic investment	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%
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%
Share of State investment	-13.94	-15.6	-9	-10	-23%	-25%	-11	-12	-29%	-32%
Share of State Owned Banks in 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 Planning	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

	2002	1990	Difference	Coefficient	Predicted value
FDI stock (dependent variable) 10 billion yuans	8.99	0.20	8.78		7.72
Explanatory variables					
Wage	7.80	2.12	5.67	-3.07	-17.4
Relative accumulation of FDI to domestic investment	0.09	0.02	0.07	72.76	4.9
Market Potential	2.74	0.62	2.12	5.6	11.8
Productivity	0.61	0.18	0.43	11.02	4.7
Infrastructure	0.42	0.24	0.18	14.62	2.6
Share of State investment	0.47	0.70	-0.23	-15.6	3.5
Share of State Owned Banks in 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 Planning	1.07	3.59	-2.52	1.00	-2.5