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# Foreign Direct Investment in China: Reward or Remedy?

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**FOREIGN DIRECT INVESTMENT IN CHINA: REWARD OR REMEDY?**

**SUMMARY**

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 the second largest FDI recipient in the world after the United States. Economists usually agree that FDI flows to countries that have 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.

The main reason why China attracts more FDI than needed were reforms in all sectors to proceed simultaneously is inefficiency of its banking industry. Private Chinese companies are often discriminated against in terms of market opportunities and the protection of property rights in comparison to state or foreign enterprises. Despite the large size of the banking sector, many private enterprises are excluded from the credit market because lending by state banks is determined by political rather than commercial motives. Such an uneven playing field motivates private entrepreneurs to look for a foreign investor. In this case, 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 Chinese companies of all types of ownership had equal rights, for example equal access to bank credit, 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. In the present paper we analyze FDI determinants for 26 Chinese provinces and 3 municipalities between 1990 and 2003 with the intent of testing the above hypothesis. In addition to the traditional FDI determinants, such as agglomeration effect, market power, wage and productivity, we include determinants that capture the distortive nature of the inefficient banking sector. To do so we include the following variables: the share of state-owned banks in the total banking sector as a proxy of private sector access to finance; and the ratio of loans to deposits, as a proxy of the central bank funds redistribution. We find support for our hypothesis that private enterprises are forced to look for a foreign investor in order to escape constrains imposed by the state dominated banking sector.

**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 enterprises. 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. We propose to analyze determinants of FDI in Chinese provinces to test the above hypothesis. 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.

**INVESTISSEMENT DIRECT ETRANGER EN CHINE : RECOMPENSE OU REMEDE?**

**RÉSUMÉ**

D'une économie virtuellement sans investissement étranger à la fin des années 1970, la Chine est devenue la première destination d'investissement direct étranger (IDE) parmi les pays en développement et, depuis plusieurs années, la seconde destination mondiale derrière les Etats-Unis. Les économistes s'accordent sur le fait que les IDE affluent vers des pays caractérisés par un environnement macroéconomique stable, un engagement dans des réformes économiques et des conditions favorables comme une productivité élevée, des coûts de main d'œuvre faibles, des infrastructures de qualité, etc. Quoi qu'il en soit, Huang (2003) affirme que le fort afflux des IDE en Chine n'est pas forcément un signe positif dans la mesure où il correspond en partie aux distorsions existant dans le système bancaire.

La principale raison pour laquelle la Chine attire plus d'IDE que ce dont elle aurait besoin si elle procédait à des réformes globales est l'inefficacité de son industrie bancaire. Les entreprises privées chinoises sont souvent discriminées en termes de protection des droits de propriété et d'opportunités de marché en comparaison avec les entreprises publiques et étrangères. Malgré la grande taille du secteur bancaire, de nombreuses entreprises privées sont exclues du marché du crédit dans la mesure où les prêts des banques d'état sont déterminés par des raisons politiques plutôt que par des motifs commerciaux. De telles pratiques partiales incitent les entrepreneurs privés à rechercher un investisseur étranger. Dans ce cas, les bénéfices de l'investissement étranger ne sont pas associés à un transfert technologique, à l'apport de compétences de gestion ou à l'apport de capitaux. Dans de nombreux cas, le rôle des investisseurs étrangers pourraient être joué par des entrepreneurs chinois s'ils en avaient la possibilité et l'incitation. Ainsi, si les entreprises chinoises avaient les mêmes droits quelque soit leur type de propriété, par exemple un traitement égalitaire au crédit, l'afflux d'IDE serait moindre. Dans ce contexte, nous pouvons parler de coûts économiques associés à l'investissement étranger, en particulier la perte de revenus par les entreprises chinoises privées et les budgets gouvernementaux, et, plus généralement la mauvaise allocation des fonds dans l'économie mondiale.

Nous analysons les déterminants des IDE pour 26 provinces et 3 municipalités chinoises entre 1990 et 2003 en vue de tester l'hypothèse qui précède. A côté des déterminants traditionnels des IDE tels que les effets d'agglomération, l'accès au marché, les coûts de la main d'œuvre, la productivité, les infrastructures et l'avancée des réformes, nous incluons des déterminants qui captent la nature distorsive du secteur bancaire inefficace. Pour cela, nous incluons les variables suivantes : la part des banques d'Etat dans le secteur bancaire comme proxy de l'accès privé au crédit et le ratio des prêts sur dépôts comme proxy de la redistribution des fonds de la banque centrale. Nos résultats corroborent l'hypothèse selon laquelle les entreprises privées sont obligées d'avoir recours à un investisseur étranger pour échapper aux contraintes imposées par le secteur bancaire dominé par l'état.

**RÉSUMÉ COURT**

Dans son ouvrage "Selling China" Huang (2003) affirme que le fort afflux d'investissement direct étranger (IDE) en Chine n'est pas forcément un signe positif dans la mesure où il correspond en partie aux distorsions des politiques publiques qui pèsent sur les entreprises privées. Le système financier chinois alloue des ressources aux entreprises les moins efficaces - les entreprises d'état - tout en les refusant aux entreprises privées les contraignant à s'adresser à un investisseur étranger. Nous nous proposons d'analyser les déterminants des IDE dans les provinces chinoises en vue de tester l'hypothèse qui précède. Nous contrôlons pour les déterminants traditionnels des IDE tels que l'accès au marché, les coûts de la main d'œuvre, la productivité, les infrastructures, l'avancée des réformes ainsi que la taille du secteur bancaire pour évaluer l'impact de l'hétérogénéité interprovinciale en matière d'accès des entreprises privées au crédit.

*Classement JEL :*    :    F15, F22, G28.
*Mots Clés :*    :    Chine, secteur bancaire, IDE, intervention étatique.

**FOREIGN DIRECT INVESTMENT IN CHINA: REWARD OR REMEDY ?**

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## 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 high market potential, 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 growing market and 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.

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In this case, 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 hypothesis 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 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.

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 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 in 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; Fung et al., 2005; 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. In addition, this variable controls for the privatization process. 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. Fung et al. (2005) also find that better market climate, which they call "soft" infrastructure, is more important in attracting FDI, than hard infrastructure. This is especially economically meaningful for FDI flows from such countries as US and Japan, whereas the impact has a smaller magnitude for flows from Hong Kong and Taiwan.

*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 longer. 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 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.*

## 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 yuan. Prior to summation, the yearly levels are adjusted to reflect constant prices, in 1990 yuan. 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's (1954) formula, as the average of the real GDP of all neighboring

markets weighted by the inverse distance measure : $MP_{it} = \sum_j \dfrac{GDP_{jt}}{dis \tan ce_{ij}}$ , 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. Due to high correlation between the above two variables we also construct labor unit costs, which is a ratio of the average wage to total industrial output per person.

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

INDICATORS OF BANKING INDUSTRY 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.

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[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).

We also design an additional variable that captures another distortion of the Chinese banking sector, namely 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. This indicator can also be viewed as a measure of access of private sector to credit, since high central bank redistribution inevitably leads to higher share of loans to the state sector or to favored industries and companies. 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.

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.

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 baseline estimation. However, our findings show that it is preferable to substitute these two explanatory variables with unit labor costs.

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[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).

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. We also test our models for autocorrelation of residuals with Wooldridge's (2001) 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 estimation with Newey-West standard errors and an AR1 process in the error terms.

The results are presented in columns 1-5 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 include unit labor costs instead of variables for wage and productivity. In columns 3-5 we add variables to account for developments in the banking sector to our baseline equation: indicator of the access of private enterprises to credit (proxied by the share of SOCBs in credit), size of the banking sector, central bank funds' redistribution. All explanatory variables are lagged.

The results of our estimation are mostly in line with the literature. 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. A puzzling finding is that FDI flows to provinces with higher growth of wages. This could be due to high correlation between wages and productivity, and thus we substitute the above variables with unit labor costs. The sign of the new variables is correct and we find that FDI flows to provinces with lower growth of unit labor costs. In such specification we also find a positive impact of infrastructure. 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. To sum up, we find support for our hypotheses 1-5.

Our findings (columns 3 and 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 5 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.

## 4.2   Instrumental variable estimation

The simple econometric estimation that has been implemented so far does not account for 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. In addition we have correlation between our regressors, for example between market reforms and market potential, share of state banks and central bank funds redistribution. Therefore, we additionally estimate our models with instrumental variables (IV). For each variables, we use the lags of all other explanatory variables as instruments. The findings are shown in columns 6-8.

In order to test our decision to do estimation with IV, we perform the Wu-Hausman  and Durbin-Wu-Hausman tests, which test 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 and market reforms, and a negative impact of growing labor unit costs. Also, our new results support our hypothesis of the distortive nature of the Chinese banking sector, which excludes private enterprises from access to credit.

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

dependent from central bank credit redistribution, it also attracts more 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.

Table 5 provides some interesting results obtained from an impact analysis. If we consider the point estimates in column (6) as our best estimate of the various effects, a 10 percent increase of the productivity adjusted average real wage across provinces over the period ultimately produces a decrease in FDI stock of 2 billion yuan (corresponding roughly to 5 percent of the average stock across provinces over the period). A similar decrease would be induced by a decrease of 1 percent in the share of SOCB's in total credit[3].

## 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 and the redistribution of central bank funds. 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 demonstrate the distortive impact of some imperfections in the banking sector. 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 hypothesis that 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. Therefore, further state disengagement from credit allocation should diminish the demand for FDI in China and free for more efficient use in other regions.

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[3] Since the share of state owned banks in credit is 65% on average in our sample, a decrease of 1% (from 65 to 64%) corresponds to a 2% change in the ratio.

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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 yuan (price 1990) |
| *Explanatory variables* | | | | | | | |
| Productivity adjusted labor costs | Real Wage divided by Real output by employed persons in the industry | 366 | 0.12 | 0.05 | 0.05 | 0.38 | 1 000 yuan per person (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) |
| 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 | Productivity adjusted Wage | FDI to investment | Market Potential | 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 | km over km2 | | | | | |
| Beijing | 4.53 | 0.13 | 0.10 | 1.12 | 0.78 | 0.56 | 0.60 | 1.63 | 0.50 | 1.81 |
| Tianjin | 4.40 | 0.09 | 0.15 | 0.75 | 0.60 | 0.84 | 0.75 | 1.13 | 1.15 | 1.87 |
| Hebei | 2.38 | 0.13 | 0.04 | 2.26 | 0.31 | 0.46 | 0.63 | 0.62 | 0.88 | 4.24 |
| Shanxi | 0.40 | 0.18 | 0.01 | 0.86 | 0.29 | 0.70 | 0.62 | 0.95 | 0.94 | 1.93 |
| InnerMong | 0.12 | 0.10 | 0.01 | 0.66 | 0.05 | 0.70 | 0.72 | 0.91 | 1.21 | 1.71 |
| Liaoning | 4.92 | 0.12 | 0.07 | 2.09 | 0.33 | 0.62 | 0.54 | 0.90 | 1.13 | 3.34 |
| Jilin | 0.90 | 0.10 | 0.04 | 0.90 | 0.20 | 0.76 | 0.61 | 1.28 | 1.48 | 3.26 |
| Heilongjiang | 1.29 | 0.10 | 0.03 | 1.51 | 0.12 | 0.72 | 0.64 | 0.92 | 1.11 | 2.49 |
| Shanghai | 8.84 | 0.08 | 0.12 | 1.83 | 0.79 | 0.57 | 0.58 | 1.18 | 0.97 | 2.87 |
| Jiangsu | 13.55 | 0.08 | 0.12 | 3.93 | 0.34 | 0.38 | 0.62 | 0.57 | 0.89 | 2.00 |
| Zhejiang | 3.72 | 0.12 | 0.05 | 2.71 | 0.38 | 0.41 | 0.57 | 0.59 | 0.86 | 2.93 |
| Anhui | 1.02 | 0.09 | 0.03 | 1.61 | 0.31 | 0.50 | 0.68 | 0.64 | 1.14 | 1.77 |
| Fujian | 9.91 | 0.09 | 0.26 | 1.60 | 0.40 | 0.46 | 0.63 | 0.53 | 0.86 | 2.75 |
| Jiangxi | 0.96 | 0.20 | 0.04 | 1.03 | 0.25 | 0.56 | 0.74 | 0.79 | 1.16 | 2.62 |
| Shandong | 7.41 | 0.07 | 0.07 | 4.13 | 0.40 | 0.46 | 0.57 | 0.53 | 1.01 | 1.97 |
| Henan | 1.19 | 0.11 | 0.02 | 2.14 | 0.35 | 0.52 | 0.62 | 0.67 | 1.00 | 2.28 |
| Hubei | 1.96 | 0.11 | 0.04 | 1.92 | 0.32 | 0.62 | 0.52 | 0.81 | 1.25 | 2.81 |
| Hunan | 1.44 | 0.20 | 0.04 | 1.55 | 0.31 | 0.56 | 0.70 | 0.52 | 1.11 | 2.52 |

**(to be continued)**

**Table 2 :  (continued)**

| province | FDI Stock | Productivity adjusted Wage | FDI to investment | Market Potential | 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 | km over km2 | | | | | |
| Guangdong | 31.28 | 0.11 | 0.27 | 2.25 | 0.49 | 0.48 | 0.50 | 1.66 | 0.81 | 2.45 |
| Guangxi | 1.97 | 0.09 | 0.08 | 1.07 | 0.20 | 0.52 | 0.73 | 0.64 | 0.89 | 2.23 |
| Hainan | 2.40 | 0.10 | 0.23 | 0.28 | 0.48 | 0.87 | 0.62 | 1.10 | 0.90 | 2.66 |
| Guizhou | 0.13 | 0.15 | 0.01 | 0.50 | 0.21 | 0.67 | 0.75 | 0.89 | 1.16 | 2.28 |
| Yunnan | 0.39 | 0.11 | 0.02 | 0.88 | 0.25 | 0.68 | 0.74 | 0.76 | 0.87 | 2.31 |
| Shaanxi | 0.96 | 0.12 | 0.04 | 0.79 | 0.22 | 0.67 | 0.63 | 1.00 | 1.08 | 2.98 |
| Gansu | 0.16 | 0.18 | 0.01 | 0.49 | 0.08 | 0.73 | 0.70 | 1.02 | 0.96 | 2.03 |
| Qinghai | 0.08 | 0.14 | 0.01 | 0.14 | 0.03 | 0.78 | 0.78 | 1.34 | 1.28 | 1.69 |
| Ningxia | 0.06 | 0.14 | 0.01 | 0.14 | 0.15 | 0.71 | 0.79 | 1.20 | 1.14 | 2.56 |
| Xinjiang | 0.13 | 0.09 | 0.01 | 0.56 | 0.02 | 0.79 | 0.70 | 0.96 | 0.88 | 2.06 |
| Sichuan | 1.73 | 0.13 | 0.03 | 2.43 | 0.21 | 0.56 | 0.58 | 0.72 | 1.17 | 2.39 |

**Table 3 : Summary statistics: Correlation Matrix**

| | FDI Stock | FDI to investment rate | Market Potential | infrastructure | Share of state investment | Share of State Owned bank in credit | Central bank funds Redistribution | Size of the banking system |
|---|---|---|---|---|---|---|---|---|
| FDI Stock | 1.00 | | | | | | | |
| FDI to investment rate | 0.69 | 1.00 | | | | | | |
| Market Potential | 0.59 | 0.30 | 1.00 | | | | | |
| Infrastructure | 0.47 | 0.61 | 0.38 | 1.00 | | | | |
| Market Reforms | -0.45 | -0.25 | -0.70 | -0.33 | 1.00 | | | |
| Share of State Owned bank in credit | -0.41 | -0.43 | -0.56 | -0.40 | 0.45 | 1.00 | | |
| Central bank funds Redistribution | -0.36 | -0.43 | -0.40 | -0.44 | 0.47 | 0.58 | 1.00 | |
| Banking sector Size | 0.29 | 0.18 | -0.21 | 0.26 | 0.26 | -0.06 | -0.06 | 1.00 |
| Unit Labor Costs | -0.10 | -0.23 | -0.05 | -0.10 | -0.05 | 0.11 | -0.06 | 0.05 |

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

| | Newey West and AR(1) | | | | | IV with Newey West and AR(1) | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Unit labor costs | | -13.01*** | -11.59*** | -11.47*** | -11.10*** | -14.11** | -14.71** | -14.41** |
| | | (4.34) | (4.35) | (4.35) | (4.05) | (6.58) | (6.42) | (5.77) |
| Wage | 1.76** | | | | | | | |
| | (0.78) | | | | | | | |
| Productivity | 1.59 | | | | | | | |
| | (2.42) | | | | | | | |
| Agglomeration | 54.42*** | 61.88*** | 62.88*** | 62.67*** | 65.73*** | 64.60*** | 62.09*** | 64.63*** |
| | (11.32) | (11.97) | (11.31) | (11.42) | (12.28) | (13.74) | (13.86) | (14.62) |
| Market potential | 3.63*** | 4.09*** | 4.53*** | 4.50*** | 4.29*** | 4.35*** | 4.26*** | 4.18*** |
| | (0.55) | (0.53) | (0.52) | (0.53) | (0.50) | (0.50) | (0.52) | (0.51) |
| Infrastructure | 3.64 | 12.83*** | 9.43** | 9.25** | 8.65** | 9.15* | 8.73* | 7.64 |
| | (5.16) | (4.67) | (3.98) | (3.93) | (3.98) | (4.95) | (4.85) | (4.84) |
| Market Reforms | -10.29* | -13.43** | -10.61** | -10.56** | -10.27* | -14.28* | -13.66* | -13.70* |
| | (5.45) | (6.03) | (5.24) | (5.24) | (5.22) | (7.54) | (7.47) | (7.64) |
| Size of the banking sector | | | 6.33** | 5.88** | 5.53** | 5.27** | 3.82* | 3.07 |
| | | | (2.55) | (2.73) | (2.69) | (2.13) | (2.23) | (2.14) |

**(to be continued)**

**Table 4 : (continued)**

| | | | Newey West and AR(1) | | | IV with Newey West and AR(1) | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| State bank ownership | | | 9.88** | 9.12** | | 13.68** | 9.33 | |
| | | | (4.51) | (4.58) | | (6.53) | (6.35) | |
| Central bank funds | | | 1.33 | 2.62* | | | 4.99* | 6.59** |
| redistribution | | | | (1.72) | (1.47) | | (2.76) | (2.63) |
| Wu-Hausman F test | | | | | | 5.79*** | 4.80*** | 5.61*** |
| Durbin-Wu-Hausman chi-sq test | | | | | | 42.36*** | 40.62*** | 41.12*** |
| Sargan test (p-value) | | | | | | 0.025(0.87) | 0.373(0.54) | 1.122(0.29) |
| Observations | 405 | 405 | 386 | 386 | 398 | 366 | 366 | 378 |

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 billions 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 billions 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 |
| Unit Labor cost | -11.1 | -14.71 | -1 | -2 | -3% | -5% | -3 | -4 | -7% | -10% |
| Relative accumulation of FDI to domestic investment | 54.42 | 65.73 | 4 | 5 | 10% | 12% | 23 | 28 | 60% | 73% |
| Market Potential | 3.63 | 4.53 | 5 | 6 | 13% | 17% | 22 | 28 | 58% | 72% |
| Infrastructure | 3.64 | 12.83 | 1 | 4 | 3% | 10% | 4 | 14 | 10% | 36% |
| Share of State investment | -10.27 | -14.28 | -6 | -9 | -17% | -23% | -8 | -11 | -21% | -30% |
| Share of State Owned Banks in credit | 9.33 | 13.68 | 6 | 9 | 16% | 23% | 6 | 9 | 16% | 23% |
| Central bank funds Redistribution | 1.33 | 6.59 | 1 | 7 | 4% | 18% | 2 | 10 | 5% | 27% |
| Banking sector Size | 3.07 | 6.33 | 3 | 6 | 7% | 15% | 5 | 11 | 14% | 30% |

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