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Institutional Impact of Foreign Direct Investment in China

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Summary. — We provide firm level empirical evidence that the presence of foreign direct investment (FDI) has positively affected the institutional quality of the host regions in China. Specifically, Chinese domestic firms located in regions with a higher level of FDI tend to enjoy a lower level of tax and fee burdens, less arbitrariness in such burdens, as well as better legal protection. To address the potential issue of endogeneity, we adopt the instrumental variable approach. In addition, we explore the specific mechanisms through which the institutional impact is materialized and provide various extensions of the empirical findings that offer further support for the FDI-induced institutional improvement argument.
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1. INTRODUCTION

China's success in attracting high levels of foreign direct investment (FDI) has drawn a lot of attention from around the world, and so has the fast growth of Chinese regions that have enjoyed the lion's share of the FDI inflow. The specific mechanisms through which FDI has benefited the country's economic development, however, are less clear than the spectacular growth in both the capital flow and the economy.

While the conventional wisdom in FDI research explains FDI's contribution to the host country's economic development through increased financial resources and advanced technological or managerial expertise embodied in foreign investment, these two channels may not capture the full story in the context of China. In this paper, we propose a new channel through which foreign direct investment affects the local economy, namely, the inflow of FDI helps improve the quality of local institutions, which are crucial to local economic growth (Acemoglu & Johnson, 2005). In particular, we explore how the presence of FDI affects two types of local institutions for Chinese domestic firms: their tax and fee burdens, as well as the quality of legal protection they experience.

To preview the results, we find that a higher level of FDI inflow is significantly correlated with lower tax and fee burdens, less arbitrariness in such burdens, as well as a higher level of legal protection for domestic firms in the same region. Given that these findings are not only consistent with the causality from FDI to institutional improvement but could also reflect reverse causality or merely simultaneity, we address the potential endogeneity issue by instrumenting FDI level and obtain similar results. We also explore additional extensions and robustness tests, with findings consistent with the causality going from FDI to institutional improvement. These findings thus provide support for the argument that FDI inflow has led to institutional improvement in the host region (referred to as the FDI-induced institutional improvement argument henceforth).

Our study is closely related to several strands of literature that study economic effects of FDI on the host economy. It is argued that the advantages embodied by multinational firms such as superior technologies, management techniques, and marketing strategies can benefit the host country by generating spillover effects to domestic firms, in addition to bringing in capital. The first relevant body of literature concentrates on the productivity spillover effects of FDI on domestic firms, which have been studied extensively. [1] Although economic theory suggests that FDI can enhance the productivity of domestic firms through a number of channels, for instance, labor mobility (Fosfuri, Motta, & Rønde, 2001), technology transfer (Liu, 2008; Wang & Blomström, 1992), and competition (Markusen & Venables, 1999), the recent empirical literature has provided mixed results (Görg & Greenaway, 2004). Some studies provide evidence that FDI benefits domestic firms by providing easier export marketing access (Greenaway, Sousa, & Wakelin, 2004), enhancing innovation (Cheung & Lin, 2004), transmitting technological information (Branstetter, 2006), and ultimately boosting productivity (Blomström and Sjöholm, 1999; Haskel, Pereira, & Slaughter, 2007), while others have found that there is no evidence that multinational firms have a positive effect on the productivity growth of local firms in general (Harrison & Aitken, 1999; Haddad & Harrison, 1993; Hale & Long, 2012). The positive productivity spillovers, if any, are only enjoyed by a very small group of domestic firms in specific sectors or regions (Keller & Yeaple, 2009; Kokko, Tansini, & Zejan, 1996; Sinani & Meyer, 2004).

A related but distinct strand of literature attempts to identify how FDI affects economic growth both at the regional level and the national level. As in the case of productivity spillover effects, the impact of FDI on economic growth remains contentious in empirical studies. While some studies find that FDI has a positive impact on economic growth (Blomström, Lipsey, & Zejan, 1996; Li & Liu, 2005), other studies fail to detect a positive relationship between FDI and economic growth (Carkovic & Levine, 2005; Durham, 2004). Empirical studies also suggest that the impact of FDI on economic growth depends on the absorptive capacity of the host country such as economic development level (Xu, 2000), human capital (Bengoa &

Sanchez-Robles, 2003; Borensztein, De Gregorio, & Lee, 1998), financial development (Hermes & Lensink, 2003), and economic liberalization (Balasubramanyam, Salisu, & Sapsford, 1996; Basu, Chakraborty, & Reagle, 2003).

Compared to the large number of studies on productivity and growth spillovers of foreign direct investment, there is a smaller literature attempting to understand the interactive relationship between FDI and local institutions, with the existing studies mostly focusing on how local institutions, for example, property right protection (Coe, Helpman, & Hoffmaister, 2009) and the efficiency of financial markets (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004), affect the degree of FDI spillovers.

But as the profitability of foreign firms largely depends on the local business environment, they may behave strategically to influence local institutions and policy making processes in their favor (Hillman & Hitt, 1999; Malesky, 2009). Prior studies, for example, suggest that FDI can directly influence the level of trade barriers in host countries through lobbying (Blonigen & Figlio, 1998; Gawande, Krishna, & Robbins, 2006; Grossman & Helpman, 1994; Hillman & Ursprung, 1993), significantly lower corruption level by bringing in competition (Ades & Di Tella, 1999; Larrain & Tavares, 2004). Prior studies also find that FDI has a positive and highly significant impact on property right protection in the host country (Ali, Fiess, & Macdonald, 2011), gives local firms more confidence in contracts enforcement (Ahlquist, 2008), and even exerts a positive effect on reform choices in transition countries through lobbying and information provision (Hewko, 2003; Lewis, 2005; Malesky, 2009). In a recent empirical study, Dang (2013) investigates the effects of a rising level of foreign direct investment on economic institutions across the provinces of Vietnam and finds that more FDI inflow is associated with better institutional outcomes including provincial competitiveness index, regulation in business environment, property rights, and accountability.

The following patterns thus summarize the related literature: First of all, there lacks unambiguous evidence for FDI's positive spillovers in influencing indigenous firms' productivity both in China and in other developing countries. Secondly, there is evidence of foreign investment's impact on local institutions in the host country, but additional supporting evidence is still needed. In particular, only a few studies address the impact of FDI in China from this perspective. Tuan and Ng (2004) document that the introduction of FDI plays an important role in reshaping the local institutional settings in the host country. And in a pioneering paper, Héricourt and Poncet (2009) provide evidence that FDI presence helps domestic private firms in China to bypass the financial obstacles that they face at home. Finally, the continued trend to provide preferential policies to foreign investors around the world begs for more theoretical justifications.

To help address the gap in the literature and to shed light on the important issue of evaluating and improving the role of FDI in the host country's economic development, we empirically study how the presence of FDI influences the quality of institutional environment experienced by Chinese domestic firms. This is particularly relevant in the context of China, given the criticisms raised by commentators against China's FDI policies. For example, Huang (2005) has argued that policy preferences toward foreign firms have negative implications for indigenous firms in the host economy, because domestic firms lose both market share as well as access to finances and other material and policy resources in competing with foreign firms.

The structure of the paper is as follows: In Section 2, we provide background information on FDI and FDI policies in China, with a focus on those impacting the business environment. Section 3 describes the data sets used in the paper and provides some preliminary patterns. The main empirical findings are presented in Section 4, with a focus on the strategy for addressing the issue of endogeneity. Section 5 offers results regarding potential mechanisms through which FDI impacts institutional quality and provides additional findings based on alternative data sources. The final section concludes and discusses directions for future research.

2. BACKGROUND INFORMATION ON FDI AND FDI POLICIES IN CHINA

Since 1993, China has become the largest recipient of FDI inflow among developing countries, and since 2009 it has been ranked second (after the U.S.) in the annual amount of foreign capital attracted into the country. The two conventional mechanisms that link FDI and economic growth in developing countries, increased capital stock and advanced technology and managerial expertise, however, do not seem as relevant in China.

First of all, China has been running a trade surplus with the rest of the world since 1994 comparable to the annual amount of FDI inflow, implying that at the same time of attracting a large amount of foreign capital inflow, the country is sending a similar amount of capital out in the form of foreign sovereign debt (Ju & Wei, 2010). Furthermore, although empirical studies generally find supporting evidence for foreign invested firms' superior performance, results are mixed regarding the spillover effects of FDI presence on Chinese domestic firms. Hale and Long (2012) explore multiple data sets and investigate FDI spillovers in China from various aspects in a book-long project, finding no convincing evidence that FDI presence has uniformly positive spillover effects on Chinese domestic firms' performance, whether measured in labor productivity, total factor productivity, exports, or new product development. [2]

As the large inflow of FDI in China is generally accompanied by rapid economic growth in the host region, these findings are puzzling. Figure 1 shows a clear positive correlation between the regional GDP (in logs) and the percentage of total industrial asset owned by foreign invested firms in the same region, which is statistically significant and numerically substantial at 0.523. [3] Although the correlation is not conclusive evidence for causality, the commonly held belief that FDI inflow has made positive contributions to regional development warrants additional investigations into the various impacts of FDI on its regions in China.

To help reconcile the seemingly contradictory facts discussed above, the current paper looks at the impact of FDI in China from a new perspective, i.e., how foreign direct investment inflow affects the institutional environment for Chinese indigenous firms. By helping improve the business environment for domestic firms in China, FDI may have produced positive spillovers for its host country in a potentially more important way. If empirically supported, these spillover effects will provide justifications along a different dimension for the numerous policy preferences awarded to foreign investors in China, which would not have been warranted if no positive externalities have resulted from their investment.

A brief review of China's FDI policies is in order at this point to provide background information for the later analysis. In terms of geographic regions and sectors open to foreign direct investment, China's FDI policies changed from restrictive before 1978 to tolerating in the early 1980s, then to encouraging between the mid-1980s and the mid-1990s, and finally
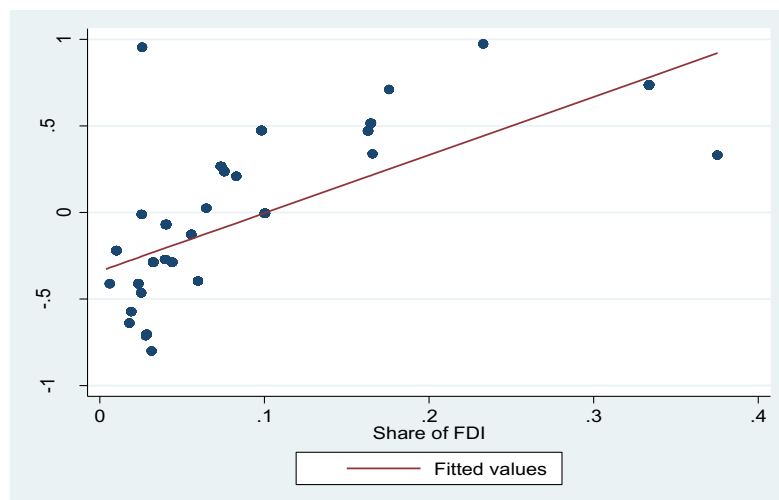
Figure 1. *% of industrial asset owned by foreign firms versus log(GDP). Data source: China Statistical Yearbook, various years.*

matured in the mid-1990s to link FDI to domestic development priorities. For example, more favorable policies are now granted to FDI in top priority sectors including agriculture, energy, raw materials, and communications, as well as to foreign investment made in the western regions. Regardless of the geographic and sectoral scope, until recently China had to rely on preferential policies to attract FDI, and such policies focused on taxation, foreign exchange provision, land use, and licensing procedures during most of the period of 1980–2000. It is worth pointing out that such preferential policies enjoyed by foreign firms in China are *NOT* equivalent to higher institutional quality for Chinese domestic firms. For example, lower tax rates for foreign firms oftentimes imply higher tax burdens for indigenous firms. And the different treatments for foreign *versus* domestic firms, accompanied by the substantial amount of discretion in the process, are opposite to equality and transparency, the very features of a friendly business environment.

Starting at the turn of the century, China has made substantial changes to its FDI policies largely to unify the treatment of domestic and foreign firms, in preparation for the country's accession into the World Trade Organization (WTO) in 2001.[4] Subsequently, Chinese regions can no longer rely on offering preferential policies to attract FDI. As pointed out by an astute observer, "The main attraction to foreign investors will no longer be favorable tax rates but equal market access, and what are more valuable to multinationals will be stable policies rather than preferential treatment."[5] This implies that foreign investors will now have more incentives to push for a better overall institutional environment.

Many Chinese regions have since held international business forums with the aim to collect recommendations from foreign investors on how to improve institutional environment. And examples of Chinese cities that excelled in providing overall superior investment environment include Kunshan and Suzhou, which have not only implemented uniform, transparent, and simplified licensing procedures for investors, but have also provided continuous and timely responses to business complaints. Wang (2009) cites an example where the city government of Suzhou purchased the "2003 Investment Environment and Risk Evaluation in the Mainland," a report compiled by the Taiwan Electric and Electronics Business Association, and responded to the complaints made in the report, even before the report was made available to the local government in Taiwan. The new era thus has provided greater access to foreign investors for influencing local business environment.

From the perspective of foreign investors, it is always in their own interest to have a good business environment. But given the substantial policy advantages in taxation, foreign exchange provision, land use, and licensing procedures enjoyed by foreign firms in the early years, they did not have much incentive to push forward institutional improvement in the host region. The above discussion suggests that since the turn of the century, however, it has become both more important and more feasible for foreign investors to focus on improvement in their overall institutional environment by urging local governments to improve infrastructure quality, update government and legal services, revise cumbersome rules and regulations, and reduce tax and regulatory burdens. Specific examples of foreign firms exerting important influence on China's policy making include their roles in lobbying the central government during the drafting of the Direct Selling Law and the Anti-Trust Law, as well as promoting IP protection at both the national and local levels.

Another example relating to the quality of rule of law at the local level is from the realm of international commercial arbitration. In 1980, China's International Economy and Trade Arbitration Commission (hereafter, CIETAC) was reformed from a Soviet style organization to provide a venue separated from the rest of China's legal system, where foreign firms' legal actions could be heard and ruled on. When foreign invested firms bring cases to CIETAC for arbitration, they continue to discover discrepancies between China's arbitration and enforcement mechanisms and international norms. In objecting to such discrepancies, they indirectly help push China to reform its legal system. In particular, although CIETAC is a national organization, the implementation of the arbitration rulings usually relies on the local courts, highlighting the role of foreign invested firms in impacting the quality of local rule of law.[6]

Although it is possible to provide improved business environment only to foreign investors, it is more likely that the demand by foreign investors for more uniformity and greater transparency in government policies and better rule of law would bring about improvement in various aspects of domestic firms' business environment as well, especially after China's entry into WTO, which requires uniform treatments of all firms. Thus, lobbying by foreign investors in the pursuit of

their own best interests will also end up helping Chinese domestic firms, as long as the foreign sector and the domestic sector are not completely insulated from each other. The discussion above thus illustrates the main mechanism through which FDI impacts the local business environment. In the following sections of the study, we will explore empirically whether and how FDI presence affects local institutional quality in reality.

3. MEASURES AND DATA DESCRIPTION

To evaluate the quality of local institutions, we focus on the time period after China's WTO accession in 2001, when the requirement of uniform treatments has led to both greater incentive and more access for foreign investors to impact institutional quality. [7] Specifically, we use two sets of measures for institutional quality: the tax and fee burden and the quality of legal protection experienced by Chinese domestic firms located in the region. These are important aspects of the business environment in influencing firm investment decisions and local economic growth prospect.

We make use of three sets of data in this study. The main data used come from the firm-level survey conducted jointly by the World Bank and the Enterprise Survey Organization of the National Bureau of Statistics (NBS) of China in 2005, which includes 12,400 firms located in 120 cities covering all Chinese provinces except Tibet. The provincial capital of each province, usually the most populous city, is automatically covered in the survey, as well as additional cities according to the province's economic size. One hundred firms from each city are included in the survey, except for the four provincial-level cities of Beijing, Shanghai, Tianjin, and Chongqing, where two hundred firms each are selected.

The survey consists of two questionnaires, one filled up by the senior manager of the main production facility of the firm, while the other filled up by the accountant or personnel manager of the firm. And the responses given during the survey provide a wide range of information on the firms' production capacity and their business environment. The firms were requested to provide information as of year 2004, but for many accounting measures, information from up to three previous years was also collected. Panel A in Table 1 gives the sectoral distribution of the sample, showing that the survey covers a wide range of manufacturing firms in terms of sectors.

The main variables of interest from the World Bank data set are those measuring tax and fee burden and the quality of legal protection experienced by Chinese domestic firms located in the region. In particular, for tax burden we look at firm responses to the following two questions: How much was the actual amount of total tax and what is the number of fee items the firm paid to various governments in 2004? We use the ratio between the total amount of tax and the total revenue for each firm and the number of fee items as two measures for firms' business environment quality, assuming that a lower tax rate and a smaller number of fee items (henceforth, referred to as tax rate for short) imply better business environment. One may doubt the validity of the measure as there are other dimensions of the tax collection process that are at least as important as the average rate, for example, the uniformity of the tax rate. But reassuringly, we find that the coefficient of variation of the tax rate for firms in each region is significantly and negatively correlated with the average tax rate in the same region (with a correlation coefficient of 0.733, significant at 1% level), implying that regions with lower tax rates also have more uniform tax rates.

We use two indicators to measure the quality of legal protection experienced by Chinese domestic firms based on firms' responses to two questions. The first measure is based on the question inquiring about the firm's confidence in the local legal system by asking their opinions on the likelihood of getting a fair treatment in the local legal system in the case of commercial disputes with the suppliers, clients, or subsidiaries. In addition, we construct another more objective measure about how well the firms' property rights and legal contracts can be protected by the local legal system based on firms' responses to the following question: Regarding commercial or other legal disputes, in what percent of cases were your company's legal contracts or properties protected when a verdict was given and enforced? With these two measures in hand, we will explore how FDI presence affects the local legal system from different perspectives. [8]

As our focus is on how the presence of FDI affects the institutional environment faced by domestic firms, we exclude all firms that are registered as foreign firms from our sample of study. [9] Table 2 gives the summary statistics of the main variables used in our empirical analysis, showing substantial variations across regions in most variables.

Although the World Bank firm survey offers detailed and comprehensive information on firms and their business environment, it has two limitations. The survey was only conducted in a single year and thus only provides cross-sectional information, and it only includes manufacturing firms. Our second data source, the private entrepreneur survey, complements the World Bank survey in the two aspects discussed above. The private entrepreneur survey was conducted by the All China Industry and Commerce Federation, the China Society of Private Economy at Chinese Academy of Social Sciences, and the United Front Work Department of the Chinese Communist Party (the CCP) in 2006 and 2008. The sampling method used in the survey was multistage-stratified random sampling that achieves a balanced representation of private firms across all regions and industries. Thus the sample comprises of both large firms and individual household enterprises randomly drawn from 19 sectors and 31 provinces in mainland China. The survey collected detailed information about the business environments of private firms in China, including conventional tax and fee burdens as well as extralegal payments to the government, referred to as special assessment.

We include all firms from the private entrepreneur survey in our sample of analysis as they are all domestic Chinese firms. But in certain specifications, we exclude manufacturing firms from the sample to focus on firms in the service sector. Table 3 provides summary statistics for variables included in the survey and used in the study. We measure the quality of business environments by four variables provided in the survey. The first variable is the ratio between the total amount of extralegal payments to the local government and the total revenue for each firm, which we denote as *special assessment rate.* In addition, the ratio between the total amount of tax and the total revenue is used to measure the firm's tax burden and the ratio between the total amount of fee payment and the total revenue is used to measure the firm's extra fee burden, respectively. The sum of the three ratios above is used to measure the total extent of local government expropriation.

The third set of data provides us with information at the provincial level. To measure the presence of FDI, we utilize the industrial survey data from the National Bureau of Statistics of China and compute each province's foreign share of total industrial asset in year 2000 at the FDI level. We will also use two variables at the provincial level as instrumental variables

Table 1. *Sectoral distribution of firms Data sources: World Bank Business Environment Survey of 2005 and National Surveys of Privately Owned Enterprises in China in 2006 and 2008*

Industry sector	No. of firms	Percent
Panel A: World Bank survey data		
Chemical material and products	1,441	11.62
Non-metallic mineral products	1,299	10.48
Common machines	1,077	8.69
Traffic equipment	989	7.98
Foodstuff processing industry	969	7.81
Spinning industry	952	7.68
Electrical machines and equipment	864	6.97
Electronic and communication equipment	598	4.82
Smelting and pressing of ferrous metals	491	3.96
Special equipment	486	3.92
Pharmaceutical and medicine manufacturing	426	3.44
Metal products	366	2.95
Smelting and pressing of non-ferrous metals	345	2.78
Plastic products	329	2.65
Foodstuff manufacturing industry	243	1.96
Paper makers and paper products	235	1.9
Manufacturers of clothes and other fiber products	206	1.66
Oil processing and refining	182	1.47
Beverage manufacturing industry	178	1.44
Timber processing and bamboo, cane, palm, straw products	141	1.14
Leather, fur, feather and other products	139	1.12
Art Articles and other manufacturing industries	109	0.88
Printing and record medium reproduction	62	0.5
Instruments, culture and office devices	60	0.48
Furniture	55	0.44
Chemical fibers	47	0.38
Tobacco processing	46	0.37
Teaching and sport products for daily use	41	0.33
Rubber products	21	0.17
Waste resources and materials recycling industry	3	0.02
Panel B: Privately owned enterprises survey data		
Agriculture, forestry, animal husbandry and fisheries	449	6.7
Extractive industries	141	2.1
Manufacturing	2,912	43.45
Electricity, gas and water	75	1.12
Construction industry	379	5.66
Transportation	158	2.36
Information services	310	4.63
Wholesale, retail, accommodation, food and catering	1,350	20.14
Accommodation, food and beverage/catering industry	280	4.18
Finance	15	0.22
Real estate	177	2.64
Leasing	66	0.98
Science and technology	93	1.39
Public facility	21	0.31
Residents services	151	2.25
Education	22	0.33
Health	44	0.66
Culture and sports	54	0.81
Public administration	5	0.07

in the 2SLS analysis, which are highway density in Chinese provinces in 1937 and the number of worldly renowned tourist sites, namely, *World heritage sites* in each province. Panel C in Table 2 and Panel B in Table 3 give the summary statistics for provincial variables used in the study.

As a preliminary check, we first look at the simple correlations between FDI presence and the various institutional measures. The correlation coefficients shown in Panel A and Panel B, Table 4 are all in line with our expectations, with higher FDI level correlated with lower tax and fee incidence and higher levels of legal protection based on data from the World Bank firm survey, although statistically insignificant sometimes. Private firm survey data are explored in Panel B, where all of the expropriation measures are significantly and negatively correlated with FDI presence.

4. ESTIMATION STRATEGY AND MAIN FINDINGS FROM THE WORLD BANK SURVEY

In this section, we will discuss the estimation strategy, with the focus on how to address the potential issue of endogeneity.

Table 2. *Descriptive Statistics for main variables in the World Bank survey analysis Data sources: World Bank Business Environment Survey of 2005. Road density in 1937 is form Highway History in China and number of World heritage sites is from World Heritage List*

Variable	Obs.	Mean	Std. Dev.	Min	Max
Panel A: Firm-level variables					
Tax rate	9,978	0.0504	0.0565	0	0.995
Number of fee	9,940	1.63	2.96	0	64
Local protection	10,012	0.78	0.259	0	1
PR & contract protection	10,012	0.628	0.35	0	1
Firm age (Year)	10,012	13.6	14.1	2	62
Export rate	10,011	0.102	0.246	0	1
Log asset	10,012	9.25	2.37	−9.21	18.7
Log employment	10,008	5.54	1.5	1.79	13.5
Panel B: City-level variables					
Education level	119	0.266	0.311	0.0103	1.86
Net fiscal income	120	327,619	1,923,133	−1,442,000	1.93E+07
Road density	120	0.0255	0.0229	0.00155	0.134
Technology density	118	0.469	0.221	0	1
Average tax rate	120	0.0494	0.0126	0.0165	0.0819
Average No. of fees	120	1.650	1.130	0	5.430
Average local protection	120	0.785	0.109	0.424	0.988
Average PR & contract protection	120	0.638	0.167	0.286	0.985
Coefficient of variation (tax rate)	120	1.010	0.275	0.559	1.920
Coefficient of variation (No. of fees)	119	1.960	1	0.596	6.290
Panel C: Province-level variables					
FDI (2000)	31	0.096	0.107	0.005	0.428
Road density in 1937	31	259.316	235.821	0	867.536
World heritage sites	31	0.871	1.335	0	6

Table 3. *Descriptive Statistics for main variables in private firm survey analysis Data sources: Nationwide Survey of Privately Owned Enterprises in China in 2006 and 2008*

Variable	Obs	Mean	Std. Dev.	Min	Max
Panel A: Firm-level variables					
Special assessment rate	2,937	0.00735	0.0386	0	1
Tax rate	4,092	0.0606	0.0684	0	0.923
Fee rate	3,158	0.0256	0.08	0	0.95
Total exportation/sale	2,395	0.0919	0.118	0	1
Log asset	4,211	5.61	2	−11.5	12.4
Log employee	4,211	3.94	1.58	0	9.39
Firm age	4,211	7.84	4.62	1	28
Export rate	4,211	0.0504	0.169	0	1
Panel B: Province-level variables					
FDI (2006, 2008)	62	0.1125	0.127	0.000964	0.507

We will also present the main results from both the OLS and the 2SLS estimations, using data from the World Bank firm survey.

(a) *OLS estimation results*

We begin with the OLS estimation of how a region's institutional quality depends on the level of FDI in the same region. To allow for potential effects of other variables on the institutional quality experienced by Chinese domestic firms, we control for other firm-level characteristics as well as city-level features. Specifically, we conduct the following OLS estimation in obtaining the benchmark results:

$$y_{ijk} = a_k + \beta \mathrm{FDI}_j + \gamma X_{ijk} + \Phi Z_j + \varepsilon_{ijk}, \tag{1}$$

where y_{ijk} is the institutional quality measure in city j sector k as experienced by firm i (such as tax rate, number of fee items, satisfaction with local courts, or evaluation of rule of law

quality), FDI_j is the level of total FDI presence in city j, X_{ijk} is a set of firm characteristics for firm i in city j sector k, Z_j is a vector capturing city-level features for city j, while ε_{ijk} is the random error term.

Except for FDI, which is measured for year 2000, all other measures are valued in year 2004. Firm characteristics include firm age, log of asset, log of employment, export to sales ratio, as well as ownership type. The log of asset and the log of employment are both included to control for firm size, which may impact tax rate and other institutional quality experienced by the firm due to potential policy preferences toward large firms. The export to sales ratio is included to control for potential policy preferences toward exporters. And the ownership-fixed effects are to capture potential ownership biases in policies. At the city level, we include the following variables that may also affect a region's institutional quality: the percentage of local population receiving high school education to capture the quality of human capital, the difference between local government fiscal revenue and expenditure

Table 4. *Correlations between FDI level and institutional measures Data sources: World Bank Business Environment Survey of 2005 and Nationwide Survey of Privately Owned Enterprises in China in 2006 and 2008*

Variables	Correlation	p-Value	Number of observations
Panel A: World Bank survey data: firm level			
Tax rate	−0.055	(0.000)	9,978
No. of fee items	−0.0112	(0.2621)	9,940
Local legal protection	−0.0964	(0.000)	10,012
PR & contract protection	0.1082	(0.000)	10,012
Panel B: World Bank survey data: city level			
Average tax rate	−0.3279	0.0003	120
Average No. of fees	0.0481	0.6018	120
Average local protection	0.2084	0.0223	120
Average PR & contract protection	0.2587	0.0043	120
Coefficient of variation (tax rate)	−0.2405	0.0081	120
Coefficient of variation (No. of fees)	−0.1181	0.2010	119
Panel C: Privately owned enterprises survey data			
Special assessment rate	−0.0244	(0.1139)	2,937
Tax rate	−0.0384	(0.0019)	4,092
Fee rate	−0.0249	(0.0904)	3,158
Total expropriation/sales	−0.0592	(0.0008)	2,395

Table 5. *OLS estimation on impact of FDI*

Variables	(1)	(2)	(3)	(4)
	Tax and fees		Rule of law	
	Tax rate	No. of fee items	Local court	PR & contract protection
FDI	−0.0141[*]	−0.118	0.302[***]	0.456[***]
	(0.00774)	(0.894)	(0.0779)	(0.115)
Firm age	0.000120[***]	−0.00108	−0.000810[***]	−0.000634
	(4.07e−05)	(0.00396)	(0.000237)	(0.000389)
Export/sales ratio	−0.0149[***]	−0.206	0.0145	0.0173
	(0.00270)	(0.168)	(0.0136)	(0.0184)
Log asset	−0.000133	−0.0288	0.0108[***]	0.0124[***]
	(0.000412)	(0.0200)	(0.00232)	(0.00334)
Log employment	0.000102	0.158[***]	0.0136[***]	0.0219[***]
	(0.000605)	(0.0423)	(0.00409)	(0.00589)
Education level	−0.00367	0.465	0.0693[*]	0.0779
	(0.00317)	(0.528)	(0.0397)	(0.0523)
Net fiscal income	8.76e−10[***]	2.97e−08[*]	−6.25e−09[***]	−8.70e−09[***]
	(1.33e−10)	(1.56e−08)	(2.28e−09)	(3.27e−09)
Road density	0.0274	2.056	0.0495	1.266[*]
	(0.0339)	(5.957)	(0.568)	(0.674)
Technology density	0.00704[*]	−0.219	−0.00641	−0.0253
	(0.00371)	(0.427)	(0.0450)	(0.0682)
Ownership dummy	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes
Constant	0.0263[***]	1.096[**]	0.582[***]	0.355[***]
	(0.00489)	(0.435)	(0.0454)	(0.0605)
Observations	9,785	9,748	9,818	9,818
R-squared	0.233	0.020	0.052	0.061

Notes: Standard errors are clustered at province level and reported in parentheses.

Significance levels 0.1, 0.05 and 0.01 are noted by [*], [**], and [***], respectively.
All regressions control for industrial and ownership fixed effects.

(referred to as net fiscal income) to capture government fiscal capacity, per capita road length to control for infrastructure quality, and the percentage of large- and medium-sized firms that have positive R & D expenditure (referred to as technology density) to control for technological capacity. We also include industry-fixed effects, α_k, in our estimation to control for any potential variations across sectors.

Table 5 presents the results from the OLS estimations based on the equation above. The significant correlation between FDI presence and institutional quality remains after various factors are controlled for, which is evidence for the beneficial impact of FDI presence on the quality of institutional environment for Chinese domestic firms.[10] In addition, the magnitudes of the effects are economically large.

For several reasons, the positive correlation between FDI presence and institutional quality shown above may not provide convincing evidence for the FDI-induced institutional improvement argument outlined previously. First of all, the causality may be from institutional quality to FDI (Busse & Hefeker, 2007; Gastanaga, Nugent, & Pashamova, 1998; Morrissey & Udomkerdmongkol, 2012; Wei, 2000). In fact, it is equally if not more plausible that a superior investment environment has led to more foreign direct investment than the reverse case, where the higher FDI level has prompted the host region to further improve its overall institutional environment. [11] In addition, it is possible that other local factors are the common causes of both the region's success in attracting FDI and its better institutional environment, including local business history and culture, for instance. In other words, the preliminary patterns shown in the previous section may suffer from the problem of endogeneity.

To partially address the endogeneity issue, we have already taken the following measures. First of all, to mitigate the possibility of reverse causality (i.e., Chinese regions with better institutions attract more foreign direct investment), we use the lagged values of FDI presence from year 2000 as our explanatory variable. And we focus on the impact on Chinese domestic firms by excluding foreign firms from our sample. Secondly, to address the possibility of simultaneity (i.e., other factors are correlated with both institutional quality and FDI level), we include various local-level control variables that may simultaneously explain the institutional quality measures and the FDI level in each region.

But to better address the endogeneity issue, we will adopt several additional strategies in the analysis that follows. In this section, we utilize the IV approach to replicate the main findings, using instrumental variables that are correlated with the FDI level, but not directly correlated with regional tax rate or other institutional quality measures. In the next section, we will conduct various robustness tests, which will provide additional evidence consistent with the argument that the inflow of FDI has positively influenced the institutional quality of its host region.

To choose the proper instrumental variables, we first resort to the following historical data, the highway density in Chinese provinces in 1937, the year before the full-scale outbreak of the second Sino-Japanese War. As the design and construction of highway infrastructure both reflect local geological and geographic conditions and leave a historic legacy, the road density in 1937 is crucially correlated with the current quality of infrastructure in the same region. As the present-day infrastructure quality affects the level of foreign direct investment, the 1937 road density is correlated with FDI inflow, thus satisfying the relevance criterion for instrumental variables. On the other hand, the road density in 1937, which is more than seven decades ago and over fifty years prior to the beginning of economic reforms in China, should not have any direct effects on the local institutional environment in 2004, which is the sample period of our study.

Hence, we believe that the road density measure also satisfies the excludability standard for instrumental variables. The summary statistics of road density in 1937 shown in Panel C, Table 2 suggest that there is much variation among regions in the value of the variable, making it an informative measure. And the first-stage results from the 2SLS estimation, where the level of FDI is instrumented by road density in 1937, show a highly significant positive relationship between higher road density and FDI inflow, in support of the relevance assumption (see Panel B, Table 6).

The main results from the 2SLS estimation are presented in Panel A, Table 6, where road density in 1937 is used as the instrumental variable. As shown in columns (1) and (2), both the tax rate and the number of fee items have been significantly reduced by the level of FDI. Based on the FDI coefficient in column (1), if the FDI level increases by 100%, the tax rate faced by domestic firms will drop by slightly over 4%, a substantial amount compared with the average tax rate (5.04%). When it comes to the number of fee items, a doubling in the FDI level will help reduce the number of fee items by close to one. Given that the average number of fee items actually paid is 1.6, FDI has a very large impact on fee burden for firms (with a reduction rate close to 50%)

Columns (3) and (4) present results on how FDI can affect the legal environment for Chinese domestic firms, with the highly significant positive coefficients confirming our expectation that FDI presence in a region can improve the local legal environment. The effect on the legal environment is also economically important, with a 10 percent increase in the FDI level raising the probability of getting a fair treatment in the local legal system by 7% and increasing the probability of receiving legal protection for contract and properties in the case of commercial disputes by 9.5%.

One potential concern with our approach is that the instrumental variable used is weakly correlated with the endogenous variable, especially since the IV estimates are often substantially larger than the OLS estimates (although accompanied by larger standard errors). To check this possibility, we adopt the Conditional Likelihood Ratio (CLR) test (Moreira, 2003). Given that for all the estimates the confidence region constructed based on the CLR test never includes the value of zero, this is supporting evidence that the weak IV problem is not so severe in our study as to challenge our qualitative findings.

In addition, we choose another variable as the instrumental variable, the prevalence of world renowned tourist sites, measured by the number of World heritage sites in each province in year 2000. The main rationale for this instrumental variable is that foreign investment decisions require detailed information on the host region regarding the existence and number of potential competitors, the size of the local market, conditions of the regulatory environment, as well as human capital, work ethics, and cultural values of the local people. The existence of a world renowned tourist site, such as a World heritage site, will help facilitate information gathering by attracting foreign visitors, who are also potential investors. The familiarity gained by potential foreign investors through tourism thus will ultimately help increase foreign investment, satisfying the relevance criterion of an instrumental variable (Sanford & Dong, 2000). On the other hand, the number of tourist sites are largely determined by historical or geographic conditions which per se are not likely to directly affect the local business environment, thus satisfying the exogeneity criterion of an instrumental variable.

Table 7 gives estimation results when the number of World heritage sites in each province in year 2000 is used as the instrumental variable, with the first-stage results in Panel B and the second-stage results in Panel A. The estimated coefficients in the second stage are similar to those presented in Table 5, suggesting that FDI presence significantly improves the institutional quality faced by local domestic firms. And the first-stage results confirm the significant and positive correlation between the number of World heritage sites and the level of FDI.

The existence of multiple instrumental variables also allows us to further test the validity of these IVs. Table 8 presents the estimation results when both *road density in 1937* and

Table 6. *2SLS estimation on impact of FDI (road density in 1937 as IV)*

	(1)	(2)	(3)	(4)
Panel A: Second-stage results				
Variables	Tax and fees		Rule of law	
	Tax rate	No. of fee items	Local court	PR & contract protection
FDI	−0.0430***	−1.243	0.742***	0.948***
	(0.0142)	(1.510)	(0.201)	(0.265)
Firm age	0.000119***	−0.00124	−0.000829***	−0.000657
	(4.20e−05)	(0.00403)	(0.000244)	(0.000397)
Export rate	−0.0134***	−0.164	−0.00691	−0.00449
	(0.00283)	(0.172)	(0.0176)	(0.0229)
Log asset	−9.68e−05	−0.0279	0.00995***	0.0114***
	(0.000415)	(0.0205)	(0.00239)	(0.00342)
Log employment	6.86e−05	0.163***	0.0147***	0.0232***
	(0.000613)	(0.0431)	(0.00431)	(0.00600)
Education level	−0.00465	0.426	0.0844**	0.0947*
	(0.00309)	(0.529)	(0.0407)	(0.0534)
Net fiscal income	1.12e−09***	3.53e−08*	−9.88e−09***	−1.25e−08***
	(1.65e−10)	(1.88e−08)	(2.98e−09)	(4.44e−09)
Road density	0.0287	1.529	0.0381	1.302
	(0.0383)	(5.495)	(0.646)	(0.838)
Technology density	0.00695*	−0.190	−0.00562	−0.0268
	(0.00378)	(0.434)	(0.0472)	(0.0694)
Ownership dummy	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes
Constant	0.0282***	1.140**	0.551***	0.320***
	(0.00509)	(0.445)	(0.0498)	(0.0650)
Observations	9,607	9,575	9,640	9,640
R-squared	0.231	0.019	0.029	0.046
Panel B:First-stage results				
Variables	FDI	FDI	FDI	FDI
High way density in 1937	0.000246***	0.000248***	0.000247***	0.000247***
	(4.16e−05)	(4.15e−05)	(4.16e−05)	(4.16e−05)
Firm attributes	Yes	Yes	Yes	Yes
City attributes	Yes	Yes	Yes	Yes
First-stage F statistics	11.60	10.93	11.61	11.61
Constant	0.00694	0.00580	0.00628	0.00628
	(0.0313)	(0.0313)	(0.0313)	(0.0313)
Observations	9,607	9,575	9,640	9,640
R-squared	0.394	0.395	0.395	0.395

Notes: Standard errors are clustered at province level and reported in parentheses.
Significance levels 0.1, 0.05 and 0.01 are noted by *, **, and ***, respectively.
All regressions control for industrial and ownership-fixed effects.

the number of world heritage sites are used as instrumental variables. The estimation results are consistent with those using a single instrumental variable, showing a significantly negative impact of FDI level on tax rate and a positive impact on the quality of local legal system. The over-identification test does not reject the null hypothesis that both instrumental variables are exogenous, which further bolsters the validity of our identification strategy. The Hausman test shows that OLS estimates are significantly different from the IV estimates, which suggests that OLS estimates may not be consistent estimates in our case.[12]

(c) *City-level evidence*

The firm-level evidence presented in the previous subsections suggests that firms in areas with more FDI generally enjoy better institutions in terms of tax fee burdens and legal protection. The firm-level institution measures, however, do not capture the uniformity of various institutions in each region, which is at least as important as the average level in studying the impact of FDI on local institutional environments. To examine how FDI affects the variations as well as the average level of institution measures, we conduct an additional set of estimations at the city level. We calculate the coefficient of variation as well as the means of tax rate and the number of fees for firms in each city, and use them as dependent variables to conduct multiple regressions at the city level. The regression results are reported in Table 9. Consistent with our firm-level evidence, the regression results from both OLS and 2SLS estimations show that FDI presence is significantly and negatively correlated with both the coefficient of variation as well as the means of tax rate and fee items at the city level, suggesting that domestic firms tend to enjoy more uniform tax and fee levels besides a lower burden in regions with more foreign investment. Similarly, we find that FDI is significantly and positively associated with the city-level legal quality

Table 7. *2SLS estimation (No. of world heritage sites as IV)*

	(1)	(2)	(3)	(4)
Panel A: Second-stage results				
Variables	Tax and fees		Rule of law	
	Tax rate	No. of fee items	Local court	PR & contract protection
FDI	−0.0347	0.875	0.454[*]	1.155[***]
	(0.0240)	(2.416)	(0.267)	(0.320)
Firm age	0.000119[***]	−0.00125	−0.000828[***]	−0.000657[*]
	(4.16e−05)	(0.00400)	(0.000239)	(0.000398)
Export	−0.0138[***]	−0.273	0.00786	−0.0151
	(0.00298)	(0.214)	(0.0189)	(0.0247)
Log asset	−0.000117	−0.0330	0.0106[***]	0.0109[***]
	(0.000416)	(0.0210)	(0.00230)	(0.00353)
Log employment	9.54e−05	0.170[***]	0.0138[***]	0.0239[***]
	(0.000618)	(0.0435)	(0.00391)	(0.00606)
Education level	−0.00436	0.500	0.0745[*]	0.102[*]
	(0.00321)	(0.529)	(0.0400)	(0.0524)
Net fiscal income	1.04e−09[***]	1.68e−08	−7.37e−09[**]	−1.43e−08[***]
	(2.42e−10)	(2.79e−08)	(3.42e−09)	(4.57e−09)
Road density	0.0278	1.275	0.0708	1.278
	(0.0361)	(6.423)	(0.577)	(0.927)
Technology density	0.00699[*]	−0.177	−0.00723	−0.0256
	(0.00372)	(0.426)	(0.0449)	(0.0705)
Ownership dummy	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes
Constant	0.0276[***]	0.988[**]	0.571[***]	0.305[***]
	(0.00523)	(0.443)	(0.0441)	(0.0681)
Observations	9,607	9,575	9,640	9,640
R-squared	0.232	0.019	0.050	0.030
Panel B: First-stage results				
Variables	FDI	FDI	FDI	FDI
No. of World heritage sites	0.0289[***]	0.0290[***]	0.0289[***]	0.0289[***]
	(0.00582)	(0.00585)	(0.00583)	(0.00583)
Firm attributes	Yes	Yes	Yes	Yes
City attributes	Yes	Yes	Yes	Yes
First-stage F statistics	25.02	24.89	24.98	24.98
Constant	0.0857[***]	0.0852[***]	0.0850[***]	0.0850[***]
	(0.0298)	(0.0298)	(0.0298)	(0.0298)
Observations	9,607	9,575	9,640	9,640
R-squared	0.237	0.237	0.238	0.238

Notes: Standard errors are clustered at province level and reported in parentheses.
Significance levels 0.1, 0.05 and 0.01 are noted by [*], [**], and [***], respectively.
All regressions control for industrial and ownership-fixed effects.

measures. The city-level evidence thus further supports the argument that FDI substantially helps improve the local business environments in China.

5. MECHANISMS, IMPACT HETEROGENEITY, AND PRIVATE FIRM RESULTS

In this section, we first explore one of the mechanisms through which FDI impacts the local institutional environment to derive some empirical test, which may help provide further supporting evidence for the argument that FDI presence has helped improve overall institutional quality in the host region. We then explore the differences in how FDI presence impacts different types of tax and fee rates, where empirical findings are consistent with the FDI-induced institutional improvement argument. Finally, we make use of the private entrepreneur survey data to obtain additional supporting evidence. The alternative data set not only provides information on firms from outside manufacturing sectors, but also allows us to explore time variations in FDI presence, thus further bolstering our argument.

(a) *Mechanism for FDI impact on institutions*

As discussed previously, foreign investors can affect the institutional environment in a region by lobbying or negotiating individually or collectively with other foreign firms to influence the local government (Hahn, 1999; Hillman & Hitt, 1999). In the process of securing favorable rules and regulation for themselves, greater uniformity and transparency may also result for other local firms (Dang, 2013). As suggested by Hewko (2003), two mechanisms seem crucial for their success: the ability to provide the local policy maker with information on laws and regulations in other countries and the ability to coerce policy-makers by threatening to leave for more hospitable investment environments, which may substantially lower local employment and tax revenue (Olarreaga, 1999). As a

Table 8. *2SLS estimation (road density in1937 and number of world heritage sites as IVs)*

	(1)	(2)	(3)	(4)
Panel A: Second-stage results				
Variables	Tax and fees		Rule of law	
	Tax rate	No. of fee items	Local court	PR & contract protection
FDI	−0.0420***	−0.988	0.707***	0.973***
	(0.0142)	(1.473)	(0.187)	(0.253)
Firm age	0.000119***	−0.00124	−0.000829***	−0.000657*
	(4.17e−05)	(0.00400)	(0.000242)	(0.000394)
Export	−0.0135***	−0.177	−0.00513	−0.00577
	(0.00281)	(0.172)	(0.0169)	(0.0225)
Log asset	−9.92e−05	−0.0285	0.0100***	0.0114***
	(0.000413)	(0.0204)	(0.00235)	(0.00340)
Log employment	7.18e−05	0.164***	0.0146***	0.0233***
	(0.000610)	(0.0428)	(0.00422)	(0.00596)
Education level	−0.00461	0.435	0.0832**	0.0956*
	(0.00308)	(0.525)	(0.0401)	(0.0529)
Net fiscal income	1.11e−09***	3.31e−08*	−9.57e−09***	−1.27e−08***
	(1.65e−10)	(1.91e−08)	(2.88e−09)	(4.36e−09)
Road density	0.0286	1.498	0.0420	1.299
	(0.0378)	(5.562)	(0.630)	(0.843)
Technology density	0.00695*	−0.188	−0.00582	−0.0266
	(0.00375)	(0.430)	(0.0466)	(0.0691)
Ownership dummy	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes
Constant	0.0281***	1.122**	0.553***	0.318***
	(0.00506)	(0.437)	(0.0484)	(0.0646)
Observations	9,607	9,575	9,640	9,640
R-squared	0.231	0.019	0.032	0.045
Panel B: First-stage results				
Variables	FDI	FDI	FDI	FDI
High way density in 1937	0.000222***	0.000224***	0.000223***	0.000223***
	(4.60e−05)	(4.60e−05)	(4.61e−05)	(4.61e−05)
No. of World heritage sites	0.00899*	0.00897*	0.00897*	0.00897*
	(0.00474)	(0.00476)	(0.00474)	(0.00474)
Firm attributes	Yes	Yes	Yes	Yes
City attributes	Yes	Yes	Yes	Yes
First-stage F statistics	25.38	25.59	25.37	25.37
Hansen's J statistic	0.167	0.835	0.966	0.481
P value for Hansen's J statistic	0.6825	0.3610	0.3258	0.4882
Constant	0.0175	0.0164	0.0168	0.0168
	(0.0306)	(0.0305)	(0.0306)	(0.0306)
Observations	9,607	9,575	9,640	9,640
R-squared	0.402	0.403	0.403	0.403

Notes: Standard errors are clustered at province level and reported in parentheses.
Significance levels 0.1, 0.05 and 0.01 are noted by *, **, and ***, respectively.
All regressions control for industrial and ownership-fixed effects.

result, one would expect the composition of FDI in the region to play an important role (Prakash & Potoski, 2007; Luo, 2001). In line with the logic of collective action (Olson, 1971), the lobbying effectiveness or coercing effectiveness will depend on the degree of concentration of foreign firms in a region. The more important the largest foreign firms are to the region, the more effective their joint effort will be (Malesky, 2009).

We thus construct the asset share of the largest firm among all foreign firms that have investment in a certain region and study whether this measure correlates positively with the magnitude of the region's institutional changes in response to FDI presence. Panels A and B in Table 10 provide results showing that indeed regions with a larger asset share of the largest foreign firm will see a greater impact of the same level of FDI presence on local institutions, be they tax and fee burdens or

quality of rule of law. To test the difference in the estimated coefficients of FDI in areas with different degrees of FDI concentration, we introduce a high concentration dummy (which equals one if the asset share of the largest firm among all foreign firms in a region is above the national average, and zero otherwise) and its interaction with FDI as covariates in the estimation. We find that the FDI has a significantly larger impact on the quality of local legal system in areas with high FDI concentration, as the interaction term is positive and significant. On the other hand, the estimated coefficients of FDI in distinct areas are not significantly different with respect to tax and fee items, although the coefficients of interaction terms are in the predicted direction, i.e., negative. [13] As these findings are in line with the argument outlined above, they provide additional support for the FDI-induced institutional improvement hypothesis.

Table 9. *City-level regression results*

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Tax		Fees		Local court Satisfaction	PR & contract protection
	CV	Mean	CV	Mean	Mean	Mean
Panel A: OLS regression results						
FDI	−0.581**	−0.0396***	0.691	−1.475*	0.255***	0.440***
	(0.228)	(0.0100)	(0.963)	(0.889)	(0.0897)	(0.135)
Education level	−0.0667	−0.00549	0.402	−0.122	0.0663*	0.0756
	(0.0867)	(0.00382)	(0.366)	(0.326)	(0.0341)	(0.0514)
Net fiscal income	−1.11e−08	7.74e−10	1.76e−08	5.09e−09	−4.94e−09	−7.95e−09
	(1.38e−08)	(6.08e−10)	(5.82e−08)	(5.13e−08)	(5.43e−09)	(8.18e−09)
Road density	0.496	0.0472	4.300	−8.430*	−0.100	0.912
	(1.167)	(0.0514)	(4.925)	(5.013)	(0.459)	(0.692)
Technology density	−0.0865	0.00597	−0.389	−0.230	0.00901	−0.00246
	(0.114)	(0.00501)	(0.480)	(0.425)	(0.0448)	(0.0675)
Constant	1.129***	0.0513***	1.554***	2.464***	0.739***	0.549***
	(0.0746)	(0.00329)	(0.315)	(0.292)	(0.0293)	(0.0442)
Observations	117	117	117	116	117	117
R-squared	0.073	0.148	0.031	0.047	0.090	0.118
Panel A: IV regression results (road density in 1937 and number of world heritage sites as IVs)						
FDI	−0.723*	−0.0857***	0.631	−1.643	0.581***	0.848***
	(0.374)	(0.0180)	(1.577)	(1.453)	(0.156)	(0.230)
Education level	−0.0737	−0.00782*	0.399	−0.128	0.0827**	0.0961*
	(0.0859)	(0.00413)	(0.363)	(0.321)	(0.0358)	(0.0530)
Net fiscal income	−1.04e−08	1.18e−09*	1.66e−08	6.77e−09	−7.74e−09	−1.13e−08
	(1.37e−08)	(6.61e−10)	(5.80e−08)	(5.10e−08)	(5.72e−09)	(8.47e−09)
Road density	0.378	0.0438	3.987	−8.494*	−0.0700	0.975
	(1.144)	(0.0551)	(4.831)	(5.041)	(0.477)	(0.706)
Technology density	−0.0866	0.00411	−0.375	−0.242	0.0218	0.0122
	(0.112)	(0.00539)	(0.473)	(0.421)	(0.0466)	(0.0691)
Constant	1.152***	0.0580***	1.570***	2.489***	0.692***	0.489***
	(0.0848)	(0.00408)	(0.358)	(0.342)	(0.0353)	(0.0523)
First-stage F statistics	30.03	30.03	30.03	30.22	30.03	30.03
Sargan statistic	0.762	0.401	0.332	0.000	0.489	0.481
P value for Sargan statistic	0.3828	0.5264	0.5644	0.9846	0.4843	0.4881
Observations	116	116	116	115	116	116
R-squared	0.071	−0.014	0.029	0.045	−0.018	0.048

Notes: Significance levels 0.1, 0.05 and 0.01 are noted by *, **, and ***, respectively.
The dependent variables are calculated at city level.
The instrumental variables include road density in 1937 and number of world heritage sites.

Table 10. *FDI effects versus FDI composition (2SLS estimation using road density in 1937 and number of world heritage sites in 2000 as IVs)*

Variables	(1)	(2)	(3)	(4)
	Tax and fees		Rule of law	
	Tax rate	No. of fee items	Local court	PR & contract protection
Panel A: High FDI concentration				
FDI	−0.205	−8.166	4.737*	5.538*
	(0.135)	(11.71)	(2.373)	(2.783)
Firm attributes	Yes	Yes	Yes	Yes
City attributes	Yes	Yes	Yes	Yes
Observations	4,617	4,595	4,630	4,630
R-squared	0.258	0.032	0.092	0.122
Panel B: Low FDI concentration				
FDI	−0.0392**	−1.264	0.0265	0.123
	(0.0161)	(1.630)	(0.170)	(0.328)
Firm attributes	Yes	Yes	Yes	Yes
City attributes	Yes	Yes	Yes	Yes
Observations	4,990	4,980	5,010	5,010
R-squared	0.192	0.024	0.048	0.062

Notes: Standard errors are clustered at province level and reported in parentheses.
Significance levels 0.1, 0.05 and 0.01 are noted by *, **, and ***, respectively.
All regressions control for industrial and ownership fixed effects.

(b) *Heterogeneous impact of FDI on tax and fee rates*

Next, we explore the different effects of FDI on tax and fee rates by the type of taxes and fees. Suppose the causality is from lower tax and fee burden to larger FDI inflow. Then we would expect higher correlations between FDI level and the rates of value-added tax and corporate income tax (Devereux & Griffth, 1998; Hansson & Olofsdotter, 2010; Devereux, Griffth, & Klemm, 2002), compared to those between FDI level and the rates of other taxes and fees that are more informal and more arbitrary (Buettner & Ruf, 2007). The main reason is that local governments would be able to better publicize such institutional benefits to potential investors with respect to standard and formal taxes such as value-added tax and corporate income tax. An additional reason is that revenues from value-added tax and corporate income tax are shared between the central government and the local government, thus giving the latter a greater incentive to lower their rates (Liu, 2006).

In contrast, if the causality is from FDI to tax rate, then we would expect to see a larger correlation coefficient between FDI level and the rate of less important taxes such as land tax, resource tax, and housing tax, as well as various fees. The reason is that these taxes/fees are both collected and dispensed by the local taxation authority, thus giving the local government more discretion in actually setting their rates, as compared to other types of taxes that are in the charge of the central taxation authority such as value-added tax, corporate income tax, and consumption tax (Jin, 2006).

Table 11 shows that among the various taxes paid by domestic firms, only the rates of land tax, resource tax, and housing tax are negatively and significantly affected by the presence of FDI. The above findings on land, resource and housing taxes, combined with the result of fewer fee items

Table 11. *2SLS estimation on impact of FDI (by type of taxes) (2SLS estimation using road density in 1937 and number of tourist sites in 2000 as IVs)*

Variables	(1)	(2)	(3)	(4)	(5)	(6)
			Dependent variables: tax rate			
	Resource	Land	Corporate income	VAT	Consumption	Housing
Panel A: Second-stage results						
FDI	−0.00129[*]	−0.00353[**]	0.00878	0.0212	0.000547	−0.00329[**]
	(0.000777)	(0.00139)	(0.00580)	(0.0382)	(0.00334)	(0.00155)
Firm age	3.82e−06[*]	2.32e−05[***]	−4.03e−05[***]	−4.15e−05	3.57e−05[**]	2.39e−05[***]
	(2.22e−06)	(8.43e−06)	(1.20e−05)	(8.78e−05)	(1.77e−05)	(7.91e−06)
Export	−0.000148[*]	−0.000187	−0.000621	−0.0291[***]	0.000636	−0.000304
	(7.93e−05)	(0.000146)	(0.000695)	(0.00565)	(0.00145)	(0.000217)
Log asset	2.81e−05	−2.89e−05	0.000310[**]	−0.00171[*]	0.000150	1.16e−05
	(2.14e−05)	(3.61e−05)	(0.000129)	(0.000949)	(0.000131)	(7.29e−05)
Log employment	−2.61e−05	−0.000189[**]	0.000234	−0.00396[**]	0.000279	−0.000134
	(4.75e−05)	(7.83e−05)	(0.000221)	(0.00153)	(0.000169)	(9.15e−05)
Education level	8.09e−05	0.000412	−0.000252	0.00382	−0.000164	−0.000118
	(0.000128)	(0.000324)	(0.000762)	(0.00721)	(0.000560)	(0.000338)
Net fiscal income	0	−0	2.21e−10[**]	1.08e−09[**]	−6.30e−11	−0[*]
	(0)	(0)	(1.01e−10)	(5.41e−10)	(0)	(0)
Road density	0.00146	−0.00745[*]	−0.0119	0.159	−0.0102	−0.00563
	(0.00176)	(0.00413)	(0.0127)	(0.0986)	(0.00807)	(0.00367)
Technology density	−0.000110	−0.000686[*]	0.00213[*]	0.0163[**]	0.00185[**]	−0.000510
	(0.000152)	(0.000350)	(0.00121)	(0.00780)	(0.000896)	(0.000354)
Ownership dummy	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−0.000131	0.00272[***]	−0.00359[**]	0.0951[***]	−0.00173	0.00267[***]
	(0.000194)	(0.000772)	(0.00143)	(0.0119)	(0.00110)	(0.000843)
Observations	9,636	9,635	8,145	9,640	9,636	9,634
R-squared	0.049	0.013	0.034	0.104	0.549	0.009
Panel B: First-stage results						
High way density in 1937	0.000223[***]	0.000223[***]	0.000205[***]	0.000223[***]	0.000223[***]	0.000223[***]
	(4.61e−05)	(4.61e−05)	(6.02e−05)	(4.61e−05)	(4.61e−05)	(4.60e−05)
No. of World heritage sites	0.00897[*]	0.00896[*]	0.0109	0.00897[*]	0.00897[*]	0.00898[*]
	(0.00474)	(0.00474)	(0.0105)	(0.00474)	(0.00474)	(0.00474)
Firm attributes	Yes	Yes	Yes	Yes	Yes	Yes
City attributes	Yes	Yes	Yes	Yes	Yes	Yes
First-stage F statistics	25.31	25.32	24.54	25.31	25.31	25.31
Hansen's J statistic	1.405	0.014	1.142	1.186	1.183	0.001
P value for Hansen's J statistic	0.2358	0.9054	0.2852	0.2762	0.2768	0.9821
Constant	0.0171	0.0170	0.0184	0.0168	0.0171	0.0170
	(0.0306)	(0.0306)	(0.0415)	(0.0306)	(0.0306)	(0.0306)
Observations	9,636	9,635	8,145	9,640	9,636	9,634
R-squared	0.403	0.403	0.364	0.403	0.403	0.403

Notes: Standard errors are clustered at province level and reported in parentheses.
Significance levels 0.1, 0.05 and 0.01 are noted by *, **, and ***, respectively.
All regressions control for industrial and ownership fixed effects.

Table 12. *FDI impacts on tax, fee, and special assessment burden*

Variables	(1) Special assessment rate	(2) Tax rate	(3) Fee rate	(4) Total expropriation/sale
FDI	−0.141**	0.0896	−0.361	−0.490
	(0.0673)	(0.147)	(0.230)	(0.330)
Log asset	−0.00100***	−0.00239**	−0.00328***	−0.00988***
	(0.000319)	(0.00107)	(0.000764)	(0.00248)
Log employee	−0.00165***	0.00130	−0.00163	0.00131
	(0.000536)	(0.00107)	(0.00124)	(0.00228)
Firm age	−0.000127	−0.000238	−0.000560*	−0.00108*
	(0.000134)	(0.000248)	(0.000309)	(0.000615)
Export rate	−0.000833	−0.00796	0.00980	0.00946
	(0.00123)	(0.00987)	(0.00746)	(0.0151)
Industry dummy	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Constant	0.0276***	0.0670***	0.0810***	0.179***
	(0.00555)	(0.0134)	(0.0207)	(0.0377)
Observations	2,937	4,092	3,158	2,395
R-squared	0.026	0.049	0.049	0.084

Notes: Standard errors are clustered at province level and reported in parentheses.
Significance levels 0.1, 0.05 and 0.01 are noted by *, **, and ***, respectively.
All regressions control for industrial, year, and province fixed effects.

(also largely levied by local governments) in response to FDI presence, provide yet another piece of supporting evidence for the FDI-induced institutional improvement theory.

(c) *Additional results from private entrepreneur survey*

As discussed previously, the World Bank survey data has two limitations: It is a cross-sectional data set thus lacks time variations, and the survey only includes manufacturing firms. To address these two issues, we resort to the private entrepreneur data set to conduct further analysis. And the new data set also has the additional advantage of offering information on special assessment rate, tax rate, and fee rate, which can be used to compute the total extent of expropriation.

Although the private entrepreneur survey is not a panel data set with respect to firms, the repeated cross-sectional data does include time variations in FDI presence in different provinces,

and we are able to control for provincial fixed effects to mitigate the potential endogeneity problem. In other words, we are able to explore how institutional quality changes in response to the changes in FDI level over time in each region, as long as firms surveyed in 2006 and 2008 are representative of the firms in their respective regions. [14] The results from Table 12 show that the argument of FDI-induced institutional improvement is still supported in the data set capturing FDI-level changes over time.

Table 13 further shows that the argument applies to non-manufacturing firms as well. In fact, as the main tax and fee burden on non-manufacturing firms comes from the local government, we expect to see a stronger correlation between FDI presence and tax and fee rates for these firms. And this expectation is supported by the comparison between Tables 12 and 13, where special assessment rate, fee rate, and total expropriation rate are all higher for the non-manufacturing firm sample than for the whole sample of firms.

Table 13. *FDI impacts on tax, fee, and special assessment burden (excluding manufacturing and extractive industries)*

Variables	(1) Special assessment rate	(2) Tax rate	(3) Fee rate	(4) Total expropriation/sale
FDI	−0.187*	0.0945	−0.839**	−1.027*
	(0.110)	(0.207)	(0.402)	(0.595)
Log asset	−0.00164***	−0.00388***	−0.00511***	−0.0155***
	(0.000531)	(0.00115)	(0.00138)	(0.00361)
Log employee	−0.00160*	0.00104	−0.000828	0.00343
	(0.000796)	(0.00117)	(0.00187)	(0.00240)
Firm age	−0.000200	−0.000411	−0.000622	−0.00133
	(0.000222)	(0.000287)	(0.000618)	(0.000845)
Export rate	−0.000774	0.00198	−0.00522	0.0396
	(0.00332)	(0.0167)	(0.00994)	(0.0458)
Industry dummy	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Province	Yes	Yes	Yes	Yes
Constant	0.0342***	0.0740***	0.127***	0.229***
	(0.00854)	(0.0160)	(0.0324)	(0.0547)
Observations	1,562	2,179	1,681	1,259
R-squared	0.024	0.074	0.063	0.118

Notes: Standard errors are clustered at province level and reported in parentheses.
Significance levels 0.1, 0.05 and 0.01 are noted by *, **, and ***, respectively.
All regressions control for industrial, year, and province fixed effects.

6. CONCLUSION

We have provided in the current paper numerous empirical results, which are all consistent with the following argument: The presence of foreign direct investment has helped Chinese regions improve their institutional environment for domestic firms.

To measure regional institutional environment, we rely on two sets of variables to evaluate, respectively, the tax and fee burden and the quality of rule of law experienced by Chinese domestic firms. Along these two dimensions, we find that a higher level of FDI presence (lagged by four years) is correlated with a higher level of institutional quality, as evidenced in lower tax and fee burden and better rule of law.

In order to address the potential issue of endogeneity, we use two instrumental variables (IV). The first IV is the highway density of Chinese regions in 1937, which is correlated with current FDI level through its impact on present-day infrastructure quality including road conditions, but not directly correlated with the institutional features of the locality. And our 2SLS results are consistent with the argument above. The second IV is the number of World heritage sites, which is correlated with FDI level through its attraction to foreign visitors who are potential investors, but not directly correlated with the institutional quality of the locality as the existence of tourist attractions is largely exogenous of local institutions.

In addition, we explore various subsamples of firms and various types of taxes to study how various factors affect the impact of FDI presence on regional institutional environment, and all the findings are consistent with the FDI-induced institutional improvement argument outlined above. In particular, we find that FDI in regions with a higher concentration of large foreign firms has a larger impact on its host region's institutional environment than that in regions with a lower FDI concentration. And the empirical analysis by types of taxes shows that more informal and more arbitrary types of taxes over which the local government has higher discretion experience larger reductions in rates in response to FDI presence, which

provides additional supporting evidence for the causality from FDI to institutional improvement rather than the reverse case.

To overcome the potential limitations of the World Bank survey data, we further resort to private entrepreneur survey data which cover a wider range of sectors as well as time variations in FDI presence. Consistent with our prior findings, the evidence from the private entrepreneur survey data reveals a similar pattern that FDI presence induces local institutional improvement by reducing the extent of government expropriation on domestic firms. Admittedly, the empirical findings summarized above still cannot provide definitive evidence that the relationship between FDI presence and institutional quality goes from the former to the latter. But we argue that combined together, the findings made in the current study provide a substantial amount of empirical evidence in support of the FDI-induced institutional improvement argument.

The findings made in the current study thus point to a novel channel through which foreign direct investment can affect the host country's economic growth. Instead of the conventional roles of increasing capital stock and producing positive technological spillovers, FDI may influence a nation's long-run economic growth by affecting its institutional environment. Given the importance of institutions in determining long-run development as well as the difficulty in institutional evolution, these results provide additional insights into the role of FDI in affecting the host country's economic growth.

In the context of China, the positive impact on institutional environment may be an important reason for why the fast inflow of foreign investment has accompanied the country's steady economic growth. More generally, policy makers in developing countries should not limit their attention to positive FDI spillovers only in the technological sphere. This switch in focus will have important implications for how developing economies should design and implement their FDI policies. For example, instead of giving more preferences to foreign investment projects that embody more advanced technologies, countries probably should focus on their potential impact on the host region's institutional environment.

NOTES

1. See the recent comprehensive review by Crespo and Fontoura (2007).

2. For other countries, studies have also found mixed evidence as to the spillover effects of FDI on domestic firms' productivity. See, for instance, Aitken and Harrison (1999).

3. Fung, Iizaka, and Tong (2004) provide similar evidence for the early period of 1992–2000.

4. See Fung et al. (2004) for a detailed review of the trend, policy, and impact of FDI in China till the early 2000s.

5. China Securities Journal.

6. In two cases involving Zidell Valve Corporation and Chinese companies in Beijing and Taiyuan, the Beijing defendant ultimately paid the principle and part of the interest on the damage award to Zidell, while the Taiyuan defendant failed to make any payment of the awarded damage (Wilson, 2008).

7. The above discussion suggests that the impact of FDI on institutional quality was probably much smaller or even non-existent during the pre-2000 era when Chinese regions mainly competed for FDI through

piece-meal preferential policies, thus leaving foreign investors little incentive to involve in institutional improvement. Lack of data for that period, however, prohibits us from empirically exploring the issue.

8. Ideally, we would like to use information on whether the firm has any experience in using the local court to measure the quality of the local legal system. Unfortunately, the survey does not collect such information. Admittedly, our current measure for the quality of local legal system can be interpreted as the firms' subjective evaluation and thus may suffer from the selection problem. Thus, the reader is advised to take caution in interpreting the related findings.

9. Thus foreign firms excluded include both totally foreign owned firms as well as firms with partial foreign ownership but registered as foreign firms.

10. Two potential concerns arising from the OLS results are related to the fractional data nature of our dependent variables for tax rate and legal quality and count data feature for the number of fee items. We follow Papke and Wooldridge (1996) and re-estimate the effects of the fractional variables using fractional logit model. And the effect of the number of fee items is re-estimated using zero-inflated negative binomial regression. We find very similar results from these estimations, as compared to the results obtained by the OLS estimation. The results from the fractional logit

model and the zero-inflated negative binomial regression are reported in Appendix A to save space. We thank an anonymous referee for pointing out these issues.

11.   But see Fan, Morck, Yeung, and Xu (2007), Fan, Morck, Xu, and Yeung (2009), for empirical findings that challenge the importance of institutional quality in explaining China's large FDI inflow.

12.   The results for Hausman test are reported in Table 15 in Appendix. We thank an anonymous referee for suggesting such a test.

13.   The regression are reported in Appendix A, Table 16 to save space. We thank an anonymous referee for pointing out this issue.

14.   As firms founded after 2006 are excluded from our sample, we do not need to worry about firms endogenously choosing their locations based on institutional environment quality.

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APPENDIX A.

See Tables 14–16.

Table 14. *Estimating FDI effects by alternative models*

Variables	(1)	(2)	(3)	(4)
	Tax and fees		Rule of law	
	Tax rate	No. of fee items	Local court	PR & contract protection
FDI	−0.288	−0.165	1.856***	2.165***
	(0.184)	(0.373)	(0.545)	(0.600)
Firm age	0.00235***	−0.00323	−0.00472***	−0.00287
	(0.000803)	(0.00202)	(0.00142)	(0.00176)
Export/sales ratio	−0.462***	−0.123	0.128	0.128
	(0.0697)	(0.0779)	(0.0824)	(0.0782)
Log asset	−0.00107	−0.00329	0.0678***	0.0540***
	(0.00912)	(0.00999)	(0.0103)	(0.0151)
Log employment	0.00437	0.0823***	0.0724***	0.0893***
	(0.0137)	(0.0183)	(0.0200)	(0.0263)
Education level	−0.0491	0.205*	0.436	0.359
	(0.0654)	(0.122)	(0.273)	(0.261)
Net fiscal income	1.83e−08***	1.26e−08**	−3.81e−08***	−4.17e−08***
	(2.76e−09)	(5.93e−09)	(1.12e−08)	(1.32e−08)
Road density	0.338	0.768	0.0910	5.672
	(0.672)	(1.877)	(3.486)	(3.467)
Technology density	0.148*	−0.174	−0.0317	−0.0704
	(0.0800)	(0.163)	(1.856***)	(0.0704)
Ownership dummy	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes
Constant	−3.775***	0.911***	0.128	−0.655**
	(0.134)	(.191)	(0.260)	(0.271)
Alpha		0.561		
		(.070)		
Z value for Vuong test		10.50		
Observations	9,335	9,748	9,368	9,368

Notes: Standard errors are clustered at province level and reported in parentheses.
Significance levels 0.1, 0.05 and 0.01 are noted by *, **, and ***, respectively.
All regressions control for industrial and ownership fixed effects.
The impact of FDI on tax rate and legal quality are estimated by fractional logit model. And the impact on number of fee items is from zero-inflated negative binomial regression.

Table 15. *Hausman test between OLS estimates and 2SLS estimates*

Variables	(1)	(2)	(3)	(4)
	Tax and fees		Rule of law	
	Tax rate	No. of fee items	Local court	PR & contract protection
FDI (OLS)	−0.0141[*]	−0.118	0.302[***]	0.456[***]
	(0.00774)	(0.894)	(0.0779)	(0.115)
FDI (IVs)	−0.0420[***]	−0.988	0.707[***]	0.973[***]
	(0.0142)	(1.473)	(0.187)	(0.253)
Hausman test statistic	19.14	28.62	106.37	119.90
p-Value	0.5129	0.0955	0.0000	0.0000

All regressions control for city attributes as well as industrial and ownership fixed effects.
Significance levels 0.1, 0.05 and 0.01 are noted by [*], [**], and [***], respectively.
The instrumental variables include road density in 1937 and number of world heritage sites.

Table 16. *Testing FDI effects in different areas (road density in 1937 and number of world heritage sites as IVs)*

Variables	(1)	(2)	(3)	(4)
	Tax and fees		Rule of law	
	Tax rate	No. of fee items	Local court	PR & contract protection
FDI	−0.0366[**]	0.116	0.103	0.317
	(0.0183)	(1.743)	(0.200)	(0.321)
FDI [*] high concentration	−0.140	−3.877	4.287[*]	5.122[*]
	(0.140)	(10.19)	(2.536)	(3.023)
High concentration	0.00613	0.444	−0.290[**]	−0.316[**]
	(0.00682)	(0.585)	(0.113)	(0.137)
Firm age	0.000115[***]	−0.00137	−0.000697[***]	−0.000500
	(4.18e−05)	(0.00407)	(0.000256)	(0.000403)
Export	−0.0135[***]	−0.169	−0.00338	−0.000559
	(0.00280)	(0.168)	(0.0160)	(0.0227)
Log asset	−6.50e−05	−0.0235	0.00762[***]	0.00903[**]
	(0.000407)	(0.0200)	(0.00260)	(0.00358)
Log employment	5.44e−05	0.171[***]	0.0120[***]	0.0209[***]
	(0.000645)	(0.0446)	(0.00461)	(0.00647)
Education level	−0.00378	0.449	0.0584	0.0636
	(0.00324)	(0.540)	(0.0428)	(0.0547)
Net fiscal income	1.07e−09[***]	3.22e−08[*]	−7.57e−09[***]	−9.98e−09[***]
	(1.79e−10)	(1.80e−08)	(2.26e−09)	(3.73e−09)
Road density	0.0128	0.943	0.584	1.939[***]
	(0.0423)	(5.490)	(0.529)	(0.669)
Technology density	0.00614	−0.228	0.0244	0.00741
	(0.00417)	(0.433)	(0.0621)	(0.0809)
Ownership dummy	Yes	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes	Yes
Constant	0.0291[***]	0.827	0.650[***]	0.401[***]
	(0.00637)	(0.522)	(0.0607)	(0.0876)
Observations	9,607	9,575	9,640	9,640
R-squared	0.224	0.020	0.115	0.059

Notes: Standard errors are clustered at province level and reported in parentheses.
Significance levels 0.1, 0.05 and 0.01 are noted by [*], [**], and [***], respectively.
All regressions control for industrial- and ownership-fixed effects.
The instrumental variables include road density in 1937 and the number of world heritage sites.