

# The Births of New Private-owned Enterprises in an Environment of State-owned Enterprises: Evidence from Agglomeration Economics

[Very Preliminary Draft]

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## Abstract

This paper analyzes the impact of the incumbent State-owned enterprise (SOEs) on the births of new private-owned enterprises (POEs) in China. We apply agglomeration theories to distinguish the linkages between SOEs and POEs. Using 2008 economic census, 2007 Input-Output Table and 2005 population census, we measure the formation of the new POEs at city-industry level, agglomeration forces of distance proximity to inputs, outputs, and labor, i.e. we measure the extent to which local SOEs provide relevant inputs, consume outputs, require similar inputs, produce similar outputs, and employ similar labor. Our findings indicate that overall the incumbent SOEs hinder the formations of new POEs. For manufacturing, the entry of new POEs is significantly lower in the places where concentrate more SOEs that employ similar labor. For services, the entry of new POEs is significantly lower in the places where concentrate more upstream SOEs, downstream SOEs, and SOEs that employ similar labor. However, the agglomeration effects from the incumbent POEs are significantly positive.

**Keywords:** New Firm Formation, State-owned Enterprise, Firm Ownership, Agglomeration

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# 1 Introduction

The formation of new firms is an important indicator for the dynamics of an economy. In China, after the economic reform started in 1978, especially since the retrenchment of the state-owned enterprises (SOEs) in the middle 1990s, the importance of the private sector keeps increasing. The mixed ownership becomes a hallmark of Chinese economy; in 2014 the private sector employed more than sixty percent of total labor force. However, the growth of private sector and the births of new private-owned enterprises (POEs) are inevitably influenced by the SOEs and other factors, e.g., Guo et al. (2014) investigate the effect of political connections on POEs, and find that POEs with political connections have enjoyed significant rent after 2002 China Constitution amendment.

Nonetheless, private sector does not grow evenly neither along time nor across regions. There are significant regional variations. In this paper, we explore a potentially important factor behind the regional variations of the POEs formations. We focus on the impact of the incumbent SOEs on the births of new POEs in China. Intuitively, upstream and downstream SOEs should have different impacts. SOEs that produce similar outputs or require similar inputs can generate competition or spillover effect. The direction of the impact of the SOEs on the formations of the POEs is not unambiguous.

In this study, we rely on agglomeration economics to distinguish the linkages between SOEs and new POEs. Marshall (1890) emphasizes that the concentration of firms in a particular location could gain the increasing returns arising from input sharing, labor market pooling, and knowledge spillover. More specifically, we analyze whether the entry of POEs is related to the extent to which local SOEs provide relevant inputs, consume outputs, and employ similar labor.

Although Marshall's proposition is intuitive, the empirical tests of the existence and specific channels of agglomeration face a great of challenges.<sup>1</sup> A growing body of literature attempt to disentangle the agglomeration channels using the information on inter-industry relations (e.g., input-output table and metrics of occupational similarity). One of the focused consequences of agglomeration is the clusters of entrepreneurship and new firm births.<sup>2</sup> Glaeser and Kerr (2009) is the first to explore specific agglomeration mechanism on entrepreneurship measured as new firms. They find that distance proximity to input suppliers and output consumers has modest effects on U.S. manufacturing startups, while proximity to suitable labor encourages more startups. Using Spanish data, Jofre-Monseny

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<sup>1</sup>Recent literature reviews refer to Rosenthal and Strange (2004), Glaeser and Gottlieb (2009), and Puga (2010). Chatterji et al. (2014) offer an excellent review on the clusters of entrepreneurship.

<sup>2</sup>Rosenthal and Strange (2003) points out that using new firms as a indirect test of agglomeration poses both advantages and disadvantages. The positive side is that new firms are less likely to be constrained by previous decisions and alleviate the concern of reverse causality. The negative side is that many new firms are absent in many places, which causes a truncated econometric issues. In this paper we compare the results using OLS and Tobit model in the robustness check section.

et al. (2011) finds that input sharing and labor market pooling appear to be the more important for the location of new firms. Other works include Ghani et al. (2014), which finds the existence of Marshallian agglomeration effects on manufacturing and service startups in India. These studies suggest that the Marshallian agglomeration forces may differ by industries and countries.

Previous studies also suggest that the agglomeration effects may differ by the types of firms. First and most important, there has been a long-term debate on whether the benefits of agglomeration come from firms within the same industries (localization economics) or firms in other industries (urbanization economics). Past studies have not given conclusive evidences of localization and urbanization economics. Second, the gains from agglomeration may attenuate across firm location. For example, Rosenthal and Strange (2008) show that workers' wage premiums are more strongly generated by nearby workers within five miles relative to workers located outside of five miles.

The third dimension of heterogeneous agglomeration is firm size. Chinitz (1961) emphasizes the effects of firm size on the entry of new firms. Large firms may have limited effects on the births of new firms since large firms provide and need less goods and services from other firms. Rosenthal and Strange (2010) find that small firms generate greater agglomeration externalities. This has important implication to China. After the privatization of small SOEs in the late 1990s, the SOEs tend to be large firms and may arrange their inputs and outputs at the national level and then have limited impact on the births of new local firms. Indeed we find upstream and downstream SOEs have almost no significant impact on the entry of the new POEs.

Fourth, firm affiliation status matters. Henderson (2003) distinguishes non-affiliate and corporate plants and finds that non-affiliate plants generate stronger agglomeration externalities. Fifth, the characteristics of firm owners have impact on the benefits of agglomeration. A related work is Ghani et al. (2013), where they show that female entrepreneurship is strongly correlated with the incumbent female firms.

Past studies show that agglomeration economics vary with industry type, firm location, characteristics of firm owners, and so on, while the ownership remains unexplored, and we know little about the role of firm ownership. This paper focuses on firm ownership dimension, and adds this aspect to the agglomeration economics literature. We shed light on whether the entry of POEs is higher in places where concentrate more SOEs that provide inputs, consume outputs, or employ similar workers. To the best of our knowledge, no previous studies tests agglomeration theories in this regard. This is the first contribution. The mixed ownership is not only important to China, but also to many other countries, such as India, as well. On a substantive side, this paper is one of the first studies to analyze the effects of the SOEs on new POEs formations. Our results are relevant to the policy makers who aim at reforming the SOEs and promoting

entrepreneurship. Recently, the China Communist Party's Central Committee and the State Council issues guideline to deepen SOE reforms, and this bring the study of SOE back to the center stage in China again. This is our second contribution.

Overall, we find that the incumbent SOEs hinders the births of the POEs. For manufacturing, the entry of new POEs is significantly lower in the places where concentrate more SOEs that share similar labor input. For services, the entry of new POEs is significantly lower in the places where concentrate more upstream SOEs, downstream SOEs, and SOEs that share similar labor input. However, the agglomeration effect from the incumbent POEs on the formations of the new POEs is significantly positive. For manufacturing, the upstream POEs can facilitate the births of the new private firms. For both manufacture and service sectors, POEs have similar labor demand exhibits positive spillover effects.

The remaining of the paper is organized as follows: section 2 briefly introduces the institutional background, section 3 describes data sets and key variables, sections 4 and 5 are empirical model and main results. We conclude the paper with section 6.

## 2 Institution Background

The development of the private enterprises in the People's Republic of China can be roughly divided into four phrases.

The first phrase is the transformation, diminution and abolition of the private enterprises from 1949 to 1956. After the founding of the People's Republic of China in 1949, China initially adopted mixed economy policy, i.e. allowing for co-existence of multiple ownership economy. However, the government rapidly changed its policy, and adopted a central planning economy policy. In the 1953, there were 3.67 million people employed by private enterprises plus 8.98 million self-employed, and accounted for 46% of urban labor force; in 1956, these numbers drastically reduced to 0.03 million, 0.16 million, respectively, and only accounted for 0.6% of urban labor force (see Hu, 2014).

The second phrase is from 1956 to 1978. Along with the establishment of the socialist economic system, the private sector was vanished in China. In the rural area, the farmers were organized into commune system, and in the urban area, State-owned and collective enterprises controlled almost the whole economy. Economically, in 1956, the State-owned enterprises produced more than 90% of industrial output; legally, the private sector was outlawed formally in this period. This situation remained unchanged until the China's economic reform started in 1978.

The third period is from 1978 to 1992. Chinas economic reform started from rural area. The most fundamental change in the rural area is the household responsibility system, which emerged at the end of 1970s and eventually replaced the commune system

in early 1980. This reform restored the central role of family in productive activity in rural China, and returned economic freedom to the farmer. In contrast with the rural areas, in the urban areas the reform was carried out piece by piece. As an exploratory project, the government first created special economic zones in four coastal cities in 1979. Besides preferential treatment, such as special tax laws, for the special economic zones, government also allowed foreign direct investment and permitted the operation of firms in these zones in accordance with the principles of a market economy instead of a planned economy.

Until middle 1980s, the Chinese urban economy was still dominated by the SOEs and Collective Enterprises. The breakthrough of industrial structure is the expansion of Town and Village Enterprises (TVEs) in the 1980s. Unlike the old styled SOEs, the TVEs rely on market instead of planning for input and output, but TVEs still belongs to collective sector. Meanwhile, small POEs start to emerge but grow slowly because of institutional and ideological discrimination against private sectors.

The private sector did not obtain its legal status in China until 1988 when China amended its constitution. The amended constitution states that the state permits the private sector of the economy to exist and develop within the limits prescribed by law. The private sector of the economy is a complement to the socialist public economy. The state protects the lawful rights and interests of the private sector of the economy, and exercises guidance, supervision and control over the private sector of the economy. In 1992 the 14th Congress of the Communist Party of China formal adopted socialist market economy as its long-term policy. At this year, there were 2.32 million people employed by private sector plus 24.68 million self-employed; compared with virtually no private enterprises and only 0.14 million self-employed in 1978 (Quan, updated)

The last phrase is from 1992 to now. This phrase embarked on a significant corporation and privatization of SOEs. The economic reform in the urban China until 1995 failed to improve the SOEs' competitiveness and profitability. Most of SOEs, especially the small ones, continued to lose money, which intensified financial risks and jeopardized economic growth (Wu 2005). As a result, central and local governments were more anger to get rid of these lose-making SOEs. The SOEs reform was conducted at different levels of governments. Small and medium-sized SOEs were generally controlled by local governments (county and city governments), while large SOEs by central governments. The 15th Communist Party Congress adopted an important policy, grasping the large, and letting the small go, that guided the reform of this period. Under this guidance, many large SOEs started to convert into corporations. The milestone is the promulgation of the Company Law in 1994, which provides a legal frame to diversify state firms' ownership structure.

In contrasts, small and medium-sized SOEs were transformed into private enterprises,

for example, by selling firms to employees or outside investors. The process of privatizing small SOEs firstly started in some pioneering counties and then spread over the whole nation. Evidences showed that most small SOEs have been privatized by the late 2000s (Bai et al. 2009; Cao et al. 1999).

At this period, both SOEs and private sector have become inseparable components of Chinese economy, though SOEs still enjoy preferential treatments from the government, such as market monopoly power protected by the government and concession loan from the State-owned banks.

## 3 Data and Key Variables

### 3.1 Primary Data

To measure the incumbent SOEs and the births of new POEs, our primary data are drawn from the second economic census of China carried out by the National Bureau of Statistics of China (NBS) in 2008. The economic census data for our study cover all legal units in all sectors at the end of 2008.<sup>3</sup> Legal units (faren in Chinese) include corporation legal units (qiye faren), nonprofit public-service legal units (shiyue faren), etc.<sup>4</sup> Two points are worthy of noting. First, this paper studies the entry of corporation legal units, which are equivalent to the standard concept of profit-making firms. Second, since a number of SOEs are nonprofit public-service legal units in services, this paper measures incumbent industrial conditions using all types of legal units. To keep notation simple, we continue to use the term firms in the following sections and firms refer to legal units.<sup>5</sup>

For each firm, the data provide a wide range of firm characteristics, including firm location, type of industry, status of registration, total employees, year of entry, type of share holding, etc. One caveat of this firm-level data is that all employees in the multi-unit firms are assigned to the location of their headquarters, which may cause a measurement error issue. Since the number of these multi-unit firms just account for about three percent of the total, this issue should not have a significant effect on our main results.

Our definitions of SOEs and POEs are based on both registration status and share

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<sup>3</sup>According to the NBS, China's economy is divided into three sectors. The primary sector consists of agriculture, forestry, animal, husbandry, and fishery. The secondary sector consists of mining, manufacturing, construction, and production and supply of electricity, gas, and water. The tertiary sector, i.e., service sector, includes all other industries not in the primary and secondary sectors.

<sup>4</sup>The NBS defines legal units as follows: legal unit refers to economic unit meeting the following criteria: a) established by law with its own name, internal organization and locations, and capable of fulfilling independently its civil obligations; b) with independent ownership or rights (or authorized with rights) of using assets and bearing liabilities, with authority to sign contracts with other units; and c) with independent financial accounting, capable of compiling assets and liability tables.

<sup>5</sup>This paper uses the term firm and enterprise interchangeably.

holding. Based on registration status, the main types of firm ownership forms include SOEs, collective-owned firms, POEs, foreign-owned firms, and a range of mixed-ownership firms. Our measure of SOEs or POEs includes mixed-ownership firms which are controlled by the state or private sector, respectively. New firms are defined as those created in the last twelve months by the end of 2008. One concern is that central government implements particular policies to halt the entry of private sector into particular industries. To address this concern, we drop the industries with no entry of POEs at any city. We conduct our analysis separately for manufacturing and services. Our sample consists of 287 cities—283 prefecture-level cities and 4 municipalities, 160 three-digit manufacturing industries, and 163 three-digit service industries.<sup>6</sup> In total, there are 45,920 and 46,781 city-industry pairs for manufacturing and services, respectively. While we focus on new POEs, our analysis covers a large percentage of all new firms. For those firms created in the last twelve months, POEs account for about 70 percent of employment in manufacturing firms and 60 percent in service firms. Table 1 gives the summary statistics. The average number of workers in new POEs in a city-industry are 65 for manufacturing and 54 for services.

### 3.2 Proximity to Input Suppliers and Output Consumers

To explain the spatial variation of new POEs formation, this paper tests two kinds of local industrial conditions. Sections 3.2 and 3.3 discuss the metrics of Marshall’s agglomeration theories. We test whether new firms may tend to locate in the places that concentrate more upstream and downstream firms and firms that employ similar labor. Besides, we are interested in whether the entry of new firms is higher or lower in the places that concentrate more firms that require similar inputs and produce similar outputs, which will be discussed in Section 3.4. We construct these metrics separately for all firms, SOEs, and POEs.

Marshall (1890) pioneers the analysis of the concentration of firms in particular locations and suggests three main advantages of agglomeration. First, firms benefit from the reduction of shipping costs by locating near input suppliers and output consumers. We use the 2007 Input-Output Table of China to capture the strength of input-output linkage. The input-output table classifies economic activities into 135 product sectors, each of which consists of one or several three-digit industries.<sup>7</sup> Let  $Input_{i \leftarrow j}$  labels the share of industry  $i$ ’s inputs that provided by industry  $j$ , and  $Output_{i \rightarrow j}$  labels the share of industry  $i$ ’s outputs that consumed by industry  $j$ . These shares range from zero (no

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<sup>6</sup>The prefecture-level city contains a city proper and surrounding rural areas.

<sup>7</sup>The 135 product sectors contain 5 primary sectors, 90 secondary sectors (including 81 manufacturing sectors), and 40 service sectors.

dependence in inputs or outputs) to one (complete dependence).<sup>8</sup> Using these input or output shares as weights, we construct weighted sums of incumbent employment as follows:

$$Input_{ic} = \sum_j \left( \frac{Emp_{jc}}{Emp_j} input_{i \leftarrow j} \right) \quad \text{and} \quad Output_{ic} = \sum_j \left( \frac{Emp_{jc}}{Emp_j} output_{i \rightarrow j} \right), \quad (1)$$

where  $Emp_j$  is the total incumbent employment (in all legal units) in industry  $j$ , and  $Emp_{jc}$  is the total incumbent employment (in all legal units) for industry  $j$  in city  $c$ .  $Input_{ic}$  measures the strength to which local firms provide the main inputs for industry  $i$  in city  $c$ , and  $Output_{ic}$  measures the strength to which local firms are main consumers for industry  $i$  in city  $c$ .

Following the same spirit, we construct  $Input_{ic}^{SOE}$  and  $Output_{ic}^{SOE}$  to measure the extent to which city  $c$  concentrate upstream and downstream SOEs:

$$Input_{ic}^{SOE} = \sum_j \left( \frac{Emp_{jc}^{SOE}}{Emp_j} input_{i \leftarrow j} \right) \quad \text{and} \quad Output_{ic}^{SOE} = \sum_j \left( \frac{Emp_{jc}^{SOE}}{Emp_j} output_{i \rightarrow j} \right), \quad (1')$$

where  $Emp_{jc}^{SOE}$  is the incumbent employment in SOEs (including all types of legal units) for industry  $j$  in city  $c$ . Similarly, we construct  $Input_{ic}^{private}$  and  $Output_{ic}^{private}$  to measure the extent to which city  $c$  concentrate upstream and downstream POEs:

$$Input_{ic}^{private} = \sum_j \left( \frac{Emp_{jc}^{private}}{Emp_j} input_{i \leftarrow j} \right) \quad \text{and} \quad Output_{ic}^{private} = \sum_j \left( \frac{Emp_{jc}^{private}}{Emp_j} output_{i \rightarrow j} \right), \quad (1'')$$

where  $Emp_{jc}^{private}$  is the incumbent employment in POEs (including all types of legal units) for industry  $j$  in city  $c$ .

### 3.3 Proximity to Labor

The second advantage of agglomeration is that concentrations of firms provide a thick labor market, which promotes the efficient matches between employees and employers, and reduces the risks for workers and firms from negative shocks. This argument implies that proximity to suitable labor market may increase firms' productivity and influence the location choice of new firms. Following past studies (e.g., Glaeser and Kerr 2009; Jofre-Monseny et al. 2011), we look at the occupation similarity among industries as a proxy for labor similarity. We draw data from 2005 1% population census to construct occupation similarity. In total, the 2005 census classifies workers into 73 two-digit occupations and

<sup>8</sup>These shares are measured using all intermediate inputs and outputs (including intermediate and final use) in the 2007 Input-Output Table of China.

95 two-digit industries.<sup>9</sup> The variable  $LS_{ij}$  measures the occupation similarity between industries  $i$  and  $j$ :

$$LS_{ij} = -\frac{1}{2} \sum_o |L_{io} - L_{jo}|,$$

where  $L_{io}$  is the share of industry  $i$ 's employment in occupation  $o$ . The aggregate index is multiplied by a negative one, which makes a higher value present higher level of occupation similarity. Dividing this index by two makes this index ranges from -1 to 0. A higher value indicates a higher level of labor similarity between two industries. The mean value is -0.745, with a standard deviation of 0.146.

The variable  $Labor_{ic}$  measures the strength to which local firms employ similar laborers for industry  $i$  in city  $c$ :

$$Labor_{ic} = \sum_j \left( \frac{Emp_{jc}}{Emp_j} LS_{ij} \right), \quad (2)$$

where a higher value indicates that incumbent firms employ more similar laborers.

Same as above, we construct  $Labor_{ic}^{SOE}$  and  $Labor_{ic}^{private}$  to measure the extent to which city  $c$  concentrates SOEs or POEs the employ similar labor for industry  $i$ :

$$Labor_{ic}^{SOE} = \sum_j \left( \frac{Emp_{jc}^{SOE}}{Emp_j} LS_{ij} \right), \quad (2')$$

$$Labor_{ic}^{private} = \sum_j \left( \frac{Emp_{jc}^{private}}{Emp_j} LS_{ij} \right), \quad (2'')$$

### 3.4 Proximity to Firms that Need Similar Inputs or Produce Similar Outputs

We next consider another question: whether the emergence of new POEs is affected if there are more firms that require similar inputs and produce similar outputs. The direction of such impact may not be a priori knowledge. On the one hand, competitions for inputs and outputs may hold back the development of new startups. On the other hand, if incumbent firms may have attracted substantial upstream and downstream firms and developed potential markets for their goods and services, new firms may purchase inputs and sell outputs more easily.

Using the 2007 Input-Output Table, the variables  $IS_{ij}$  and  $OS_{ij}$  measure input and

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<sup>9</sup>Persons aged 15 and above are required to report their occupations and industries where they work. We proceed as follows: (1) drop missing and miscoded data on industry and occupation; (2) For each industry. we calculate the share of employment in each occupation.

output similarity between two industries:

$$IS_{ij} = -\frac{1}{2} \sum_w |input_{i \leftarrow w} - input_{j \leftarrow w}|,$$

$$OS_{ij} = -\frac{1}{2} \sum_w |output_{i \rightarrow w} - output_{j \rightarrow w}|,$$

where  $w$  represents input or output  $w$ . These two indexes range from -1 to 0, with a higher value indicating greater similarity between two industries. The variables  $Input_{ic}^{IS}$  and  $Output_{ic}^{OS}$  measure the strength to which incumbent firms need similar input produce similar outputs as industry  $i$  in city  $c$ :<sup>10</sup>

$$Input_{ic}^{IS} = \sum_j \left( \frac{Emp_{jc}}{Emp_j} IS_{ij} \right), \quad \text{and} \quad Output_{ic}^{OS} = \sum_j \left( \frac{Emp_{jc}}{Emp_j} OS_{ij} \right), \quad (3)$$

where those two variables are weighted sums of employment across industries, with weights equal to input or output similarity index. We also construct these two indexes using incumbent SOEs or POEs.

## 4 Empirical Model

The preceding section constructs a set of metrics that measure local industrial conditions characterized by all firms, SOEs, and POEs. To exploit the impact of SOEs on the entry of new POEs, our approach is to estimate:

$$\ln(Entry_{ic}) = \alpha_0 + \alpha_e \ln(Emp_{ic}) + \alpha_e^s \ln(Emp_{ic}^{soe}) + Metrics_{ic} \alpha_m + Metrics_{ic}^{soe} \alpha_m^s + \lambda_i + \theta_c + \epsilon_{ic}, \quad (4)$$

where  $\ln(Entry_{ic})$  is the log employment in new POEs for industry  $i$  in city  $c$ ,  $\ln(Emp_{ic})$  is the log employment in all incumbent firms for industry  $i$  in city  $c$ ,  $\ln(Emp_{ic}^{soe})$  is the log employment in incumbent SOEs for industry  $i$  in city  $c$ .  $Metrics_{ic}$  is a vector of general metrics constructed for all incumbent firms,  $Metrics_{ic}^{soe}$  is a vector of metrics constructed for incumbent SOEs,  $\lambda_i$  and  $\theta_c$  are industry and city fixed effects, respectively.  $\alpha_0$ ,  $\alpha_e$ ,  $\alpha_e^{soe}$ ,  $\alpha_m$  and  $\alpha_m^{soe}$  are parameters to be estimated, and  $\epsilon_{ic}$  is the error term.

Since there are roughly two thirds of city-industry pairs without new private employment, we estimate equation (4) using a Tobit specification to account for the censoring of entry employment at zero. Standard errors are clustered at the city level. In robustness analysis, we also present the results using ordinary least squares.

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<sup>10</sup>We first measure input and output similarity index for 135 sectors using 2007 Input-Output Table and then assign these indexes to three-digit industries.

## 5 Empirical Results

This section reports our main results. We first discuss the general metrics constructed for all incumbent firms (Tables 2a and 2b) and then move on to discuss the metrics constructed for incumbent SOEs (Tables 3a and 3b) and POEs (Tables 4a and 4b).

### 5.1 Results on the General Metrics for All Incumbent Firms

Tables 2a and 2b analyze the general metrics constructed for all incumbent firms. Table 2a presents the results for manufacturing. Column 1 includes just the incumbent city-industry employment within the same industry, which is found to be positively correlated with private manufacturing entrants. The strong impact from the own industries on entry has been confirmed as an important stylized fact by past studies (Glaeser and Kerr 2009; Ghani et al. 2014). Columns 2-4 incorporate the three Marshallian agglomeration metrics of proximity to input suppliers, outcome consumers, and labor. The entry of private manufacturing firms is found to be higher in cities where concentrate more upstream and downstream firms and firms that employ similar labor.

We construct two metrics to measure the extent to which local industries need similar inputs and produce similar outputs. Those two metrics are highly correlated with the metric of proximity to labor.<sup>11</sup> Therefore, columns 5-6 add those metrics one by one. Both coefficients are positive and significant. The last column combines all variables and the results are unchanged except for proximity to labor.

Table 2b presents the results for services. This table is organized as same as Table 2a. As compared with the manufacturing result, the existing firms within the the same industries continue to be important for private service entrants. The particular difference is that the entry of private service startups is not associated with local input suppliers and output consumers. However, the existence of firms that employ similar labor predict higher level of entry. Besides, the entry of private service startups will be higher if there are more firms that need similar inputs.

### 5.2 Results on the Metrics for Incumbent SOEs

Tables 3a and 3b analyze the metrics constructed for incumbent SOEs. Table 3a shows the results for manufacturing. Since one place with particular advantages may attract more SOEs and POEs of the same industries, it is necessary to take into account the overall industrial conditions. With regard to this concern, the common controls in each specification contain the existing employment from own industries and the general metrics

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<sup>11</sup>We run a regression using ordinary least squared and test variance inflation factor (VIF). The VIF value is larger than 10 for these three metrics.

in Table 2a. To help interpret our results, imagine that there are two cities with the same amount of employment in each industry, but one city has more workers employed in SOEs. We are testing whether this difference in employment landscape will have an impact on the entry of new POEs.

Column 1 adds the incumbent SOEs within the same industries. This coefficient is negative and insignificant; this shows that existing SOEs within the same industries have no impact on the private manufacturing entry. Columns 2-4 add the three Marshallian metrics constructed for SOEs and find that proximity to upstream and downstream SOEs is not correlated with private manufacturing entry. By contrast, we find significant negative coefficient on proximity to labor employed in SOEs. This coefficient is interpreted as follows: conditional on overall industrial environments, new private manufacturing firms will decrease in cities where more local SOEs employ workers with similar skills. A 1 standard deviation increase in labor similarity correlates with a roughly 140 percent decrease in employment of new private manufacturing firms. Columns 5-6 further tests the metrics of similarity in inputs and outputs. Both coefficients are negative and significant.

Table 3b shows the results for services. This table is organized as the same as Table 3a. The existing firms within the same industries are found to be significantly reduce private service entry. Three agglomeration metrics of SOEs are all negative and almost significant in each specification. This result contrasts with weak links between consumers and suppliers found in manufacturing. Turning to the metrics of similarity in inputs and outputs, both coefficients appear to be insignificant after adding all controls in column 7.

The negative (statistically significant or insignificant) correlation between new local POEs entry and existing upstream and downstream SOEs is not too surprising. There are several possible reasons. First, firm size may matter. Chinitz (1961) compares the industrial structure of New York and Pittsburgh and emphasizes that new firms tend to emerge in the places with many small diversified firms (like New York) relative to the places with dominant large firms (like Pittsburgh), because large firms may have limited input-output linkage with local firms and then may not help cater for newcomers. SOEs tend to be large firms and may organize their production activities across cities. As a result, SOEs may not be willing to buy and sell goods and service from/or local firms. Second, firm ownership may matter. SOEs are controlled by the State and may receive orders from the State to buy or sell goods or services from particular markets. Meanwhile, SOEs may continue to have a soften budget and do not perform as profit-maximizing firms, therefore, they have weak motivations to connect with local firms.

The results on occupational similarity between new POEs and existing SOEs lead to the conclusion that SOEs may compete with POEs for workers. SOEs may have several competitive advantages over POEs. SOEs may offer a stable job with economic and social benefits such as local *Hukou*. Meanwhile, workers employed in SOEs have almost no risk

of being unemployed. Compared with POEs, SOEs may pay higher wages for the same skill in some industries. Wage differential between SOEs and POEs are demonstrated by previous studies (e.g., Wei et al. 2012). Hence the POEs are in a disadvantage position to compete with the SOEs in the same labor market, and this hinders the formations of the new POEs.

### **5.3 Results on the Metrics for Incumbent POEs**

Tables 4a and 4b turn to the incumbent POEs, and analyze the metrics constructed for incumbent POEs. Table 4a shows the results for manufacturing. As before, we first take into account the overall industrial conditions. With regard to this concern, the common controls in each specification contain the existing employment from own industries and the general metrics in Table 2a.

Column 1 adds the incumbent POEs within the same industries. This coefficient is positive and significant; this implies a positive agglomeration effect. Columns 2-4 add the three Marshallian metrics constructed for POEs and find that proximity to upstream POEs facilitates the private manufacturing entry, but proximity to the downstream POEs has no effect.

In contrast with SOEs, we find that there is significant spillover effect if the new and incumbent POEs share similar labor input. Columns 5-6 further test the metrics of similarity in inputs and outputs. Both coefficients are positive and significant. These results suggest the spillover effects (or externalities) among POEs dominate.

Table 4b shows the results for services. This table is organized as the same as Table 4a. The existing firms within the same industries are found to be significantly increase private service entry. Results from the three agglomeration metrics of POEs show that the linkage between upstream or downstream POEs to the new POEs entry is insignificant. However, as in manufacturing, there is significant positive spillover effect in the labor market.

When turning to the consumer market, we see that the incumbent POEs hinders the births of new POEs which produce similar output. It is not surprising, compared with manufacturing, the consumer market for service sector is more localized.

### **5.4 Heterogeneous Effects by Firm Size**

As previously discussed, Chinitz (1961) points out that firm size may matter for new firm formation and local growth. This section explores whether the entry pattern is sensitive to firm size. In our analysis of the impact of existing SOEs on new POEs entry, we use

firm size to construct three Chinitz metrics:

$$Chinitz_{ic}^{Input,SOE} = \sum_j \left( \frac{Emp_{jc}^{SOE}}{Firms_{jc}^{SOE}} input_{i \leftarrow j} \right),$$

$$Chinitz_{ic}^{Output,SOE} = \sum_j \left( \frac{Emp_{jc}^{SOE}}{Firms_{jc}^{SOE}} output_{i \rightarrow j} \right),$$

$$Chinitz_{ic}^{Labor,SOE} = - \sum_j \left( \frac{Emp_{jc}^{SOE}}{Firms_{jc}^{SOE}} LS_{ij} \right),$$

where  $Firms_{jc}^{SOE}$  is the number of incumbent SOEs in industry  $j$  in city  $c$  and other notations follow previous interpretation. These three Chinitz metrics estimate the weighted average firm size of upstream SOEs, downstream SOEs, and SOEs that use similar labor. A higher positive value indicate that the size of relevant firms is greater on average. We estimate equation (4) by adding the logarithm of three Chinitz metrics that are interacted with their respective agglomeration metrics.<sup>12</sup> Symmetrically, we take the same approach to test whether the impact of incumbent POEs on new POEs entry varies with firm size.

Table 5 gives the results for incumbent SOEs and POEs, respectively. To save space, we drop the estimates for the general metrics of overall industrial conditions. Let's focus on the interaction terms. Columns 1 and 2 show that in most cases, the impact of incumbent SOEs on new POEs appears not to vary with the sizes of SOEs. Most of the coefficients on the interaction terms are not statistically significant for both manufacturing and services. One exception is the effect from downstream SOEs for manufacturing. This interaction term is negative and statistically significant at the 10 percent level, which show that larger downstream SOEs are worse for the entry of new private manufacturing enterprise. In contrast, the Chinitz effects appear to matter more for the link between new and incumbent POEs. Columns 3 and 4 show that four out of six interaction terms are statistically significant, and three out of four significant interaction terms are negative. Surprisingly, we find that larger upstream POEs may have greater positive impacts on the entry of new service POEs. This coefficient is positive and statistically significant at the 10 percent level. These results also suggest that the Chinitz effects may differ by sectors and firm ownership.

## 5.5 Robust Analysis

Tables 6 and 7 conduct robustness checks. Table 6 focuses on the links between new POEs and incumbent SOEs that provide inputs, consume outputs and employ similar

<sup>12</sup>The three interaction terms are  $Input_{ic}^{soe} \log(Chinitz_{ic}^{Input,SOE})$ ,  $Output_{ic}^{soe} \log(Chinitz_{ic}^{Output,SOE})$ , and  $Labor_{ic}^{SOE} \log(Chinitz_{ic}^{Labor,SOE})$ , where  $Input_{ic}^{soe}$ ,  $Output_{ic}^{soe}$ , and  $Labor_{ic}^{SOE}$  are defined in sections 3.2 and 3.3.

workers. To save space, we drop the estimates for overall industrial conditions. Panels A and B consider manufacturing and services, respectively. Column 1 gives our baseline estimates, which are taken from Columns 4 in Tables 3a and 3b. In Column 2, we drop four provincial municipalities (Beijing, Shanghai, Tianjin and Chongqing) and cities in minority regions, Xinjiang, Xizang, Qinghai provinces, and in Hainan province, a special economic zone. These places are provincial level municipalities or cities in minority regions or special economic zone, which may implement particular policies toward local industries. In Column 3, we drop industries with very low entries, which account for ten percent of total industries.

One concern is that local governments may promote or protect particular industries. To address this concern, we focus on more competitive industries, which may be less affected by local governments. Local competition of an industry in a city is measured as the number of firms per worker in this industry in this city. An industry in a city is more competitive if the average firm size of that industry is smaller. We calculate average firm size for each city-industry pair. Column 4 gives the results that drop city-industries with average firm size greater than 50.<sup>13</sup> In column 5, we use the numbers of new POEs as an alternative dependent variable. And finally in Column 6, we present OLS estimates instead of estimates from Tobit model. Overall, the emphasized results are robust and remain qualitatively similar. In particular, columns 4-6 in panel A show positive and significant coefficients on employment in incumbent SOEs in own industries, and this coefficient is not particularly robust.

Table 6 focus on the links between new POEs and incumbent POEs that provide inputs, consume outputs and employ similar workers. The table is organized as the same as Table 6. As before, the pattern of baseline results change slightly. In particular, dropping less competitive industries lead to an insignificant link between new service POEs and incumbent POEs that employ similar worker, but lead to a positive and significant link between new service POEs and incumbent downstream POEs.

Previous regressions based on equation (4) do not control for omitted or unobserved factors that vary by city-industries. For example, as previously noted, local governments may take policies to promote the entry of a particular industry and attract this industry's relevant upstream and downstream state-owned and private-owned industries. As a result, such policies may reinforce a positive connection or mitigate a negative connection between new births and the concentration of upstream and downstream industries. To further explore causality, we employ the 2004 and 2008 economic census to do a first-difference analysis. Unfortunately, we only obtain manufacturing firms from the 2004 economic census, so we need to recalculate the metrics of local industrial conditions just

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<sup>13</sup>In unreported results, we rerun regressions that drop city-industries with firm size greater than 20 or 100. The main results are more or less close to that shown in 4 columns of Table 6 and 7.

using manufacturing samples. We estimate the following first-difference regression using OLS:

$$\begin{aligned} \Delta \ln(Entry_{ic}) = & \beta_0 + \beta_e \Delta \ln(Emp_{ic}) + \beta_e^s \Delta \ln(Emp_{ic}^{soe}) + \Delta Metrics_{ic} \beta_m + \\ & \Delta Metrics_{ic}^{soe} \beta_m^s + \eta_i + \xi_c + v_{ic}, \end{aligned} \quad (5)$$

where for example  $\Delta \ln(Entry_{ic}) = \ln(Entry_{ic2008}) - \ln(Entry_{ic2004})$ . For an industry  $i$  in city  $c$ ,  $Metrics_{ic}$  calculate the extent to which this city concentrate all manufacturing firms that provide inputs, consume outputs, and need similar workers, inputs, and outputs.  $Metrics_{ic}^{soe}$  is constructed for state-owned manufacturing firms.  $\eta_i$  and  $\xi_c$  capture city and industry fixed effects, respectively.  $\beta_0$ ,  $\beta_e$ ,  $\beta_e^s$ ,  $\beta_m$  and  $\beta_m^s$  are parameters to be estimated, and  $v_{ic}$  is the error term. We are unable to control for omitted or unobserved factors that vary with time, city, and industry. We also do the parallel analysis for incumbent POEs.

Tables 8 and 9 gives the first-difference results for incumbent SOEs and POEs, respectively. The results are encouraging. The first-difference results generally confirm earlier findings that the entry of new manufacturing POEs are negatively affected by industrial condition defined over SOEs and positively affected by industrial conditions defined over POEs. These coefficients are statistically significant in most specifications.

## 6 Conclusion

This paper analyzes the impact of incumbent SOEs on the births of new POEs in China. In particular, we use agglomeration theories to distinguish the linkages between SOEs and new POEs. Using 2008 economic census, 2007 Input-Output Table and 2005 population census, we measure the formation of new POEs at city-industry level, agglomeration forces of distance proximity to inputs, outputs, and labor. More specifically, we construct metrics to measure the extent to which local SOEs provide relevant inputs, consume outputs, employ similar labor, require similar inputs, and produce similar outputs.

Our main results are summarized in Table 10. They indicate that there exist significant agglomeration effects, and the effects vary by sectors, ownership, upstream and downstream. Overall, the incumbent SOEs hinders the births of the POEs. For manufacturing, the entry of new POEs is significantly lower in the places where concentrate more SOEs that share similar labor. For services, the entry of new POEs is significantly lower in the places where concentrate more upstream SOEs, downstream SOEs, and SOEs that share similar labor.

However, the agglomeration effects from the incumbent POEs on the formations of the new POEs is significantly positive. For manufacturing, the upstream POEs can facilitate

the births of the new POEs. For both manufacture and service sectors, POEs that have similar labor demand exhibits positive spillover effects.

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Table 1: Summary Statistics

Variables	Manufacturing		Services	
	Mean	Std. Dev.	Mean	Std. Dev.
Employment in new POEs	65	276	54	280
Employment in all incumbent firms	2108	9371	1753	7049
Proximity to all upstream firms	0.033	0.058	0.034	0.062
Proximity to all downstream firms	0.021	0.044	0.017	0.029
Proximity to all firms that use similar labor	-2.278	3.292	-2.322	3.288
Proximity to all firms that need similar inputs	-3.381	4.673	-3.348	4.562
Proximity to all firms that produce similar outputs	-2.326	3.111	-1.947	2.498
Employment in incumbent SOEs	208	1666	786	3711
Proximity to upstream SOEs	0.009	0.025	0.011	0.023
Proximity to downstream SOEs	0.005	0.015	0.006	0.010
Proximity to SOEs that use similar labor	-0.918	1.385	-0.880	1.315
Proximity to SOEs that need similar inputs	-1.025	1.546	-0.924	1.379
Proximity to SOEs that produce similar outputs	-0.678	1.011	-0.548	0.788
Employment in incumbent POEs	1249	5107	608	3215
Proximity to upstream POEs	0.017	0.027	0.013	0.023
Proximity to downstream POEs	0.011	0.021	0.007	0.012
Proximity to POEs that use similar labor	-0.865	1.178	-0.926	1.233
Proximity to POEs that need similar inputs	-1.553	1.898	-1.607	1.940
Proximity to POEs that produce similar outputs	-1.120	1.345	-0.959	1.117

*Notes:* Each proximity metric constructed for incumbent all firms, incumbent SOEs, or incumbent POEs is multiplied by 10 for presentation. Data come from the 2008 economic census, the 2007 Input-Output Table, and the 2005 population census.

Table 2a: The Effects of Incumbent all Firms on the Births of New Manufacturing POEs

	DV: ln(Employment in new POEs)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Employment in all incumbent firms)	0.747*** (0.015)	0.714*** (0.014)	0.711*** (0.014)	0.710*** (0.014)	0.704*** (0.014)	0.703*** (0.014)	0.700*** (0.014)
Proximity to all upstream firms		4.430*** (0.514)	4.125*** (0.494)	3.894*** (0.471)	2.591*** (0.477)	3.378*** (0.496)	2.418*** (0.486)
Proximity to all downstream firms			1.534*** (0.464)	1.424*** (0.445)	1.565*** (0.439)	2.636*** (0.497)	2.294*** (0.469)
Proximity to all firms that use similar labor				0.163* (0.096)			0.012 (0.076)
Proximity to all firms that need similar inputs					0.368*** (0.068)		0.284*** (0.070)
Proximity to all firms that produce similar outputs						0.138*** (0.021)	0.093*** (0.020)
Constant	-2.795*** (0.206)	-2.920*** (0.203)	-2.967*** (0.204)	-2.201*** (0.466)	-0.160 (0.525)	-2.110*** (0.236)	-0.162 (0.570)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-55130.004	-55048.110	-55042.279	-55038.492	-55009.653	-55017.555	-55000.103
Pseudo $R^2$	0.238	0.239	0.239	0.239	0.240	0.240	0.240
Censored observations	27009	27009	27009	27009	27009	27009	27009
Observations	45920	45920	45920	45920	45920	45920	45920

*Notes:* For the metrics of proximity to firms that are suppliers or consumers, firms that need similar types of inputs, or firms that provide similar types of outputs, they are calculated from the 2007 input-output table and the 2008 economic census. For the metrics of proximity to firms that use similar types of labor, they are calculated from the 2005 population census and the 2008 economic census. Other variables are calculated from the 2008 economic census. Dependent variable is the log employment in new POEs by industry-city. The industry-city pair with zero employment is recoded to have one employment. Estimations use Tobit model. Standard errors clustered by city are reported in parentheses.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < .01$ .

Table 2b: The Effects of Incumbent all Firms on the Births of New Service POEs

	DV: ln(Employment in new POEs)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Employment in all incumbent firms)	0.540*** (0.014)	0.540*** (0.014)	0.541*** (0.014)	0.539*** (0.014)	0.540*** (0.014)	0.541*** (0.014)	0.539*** (0.014)
Proximity to all upstream firms		-0.105 (0.454)	-0.049 (0.453)	-0.197 (0.433)	-0.620 (0.453)	-0.046 (0.449)	-0.650 (0.434)
Proximity to all downstream firms			-0.535 (0.644)	-1.305** (0.574)	-0.482 (0.705)	-0.592 (0.754)	-0.881 (0.767)
Proximity to all firms that use similar labor				0.100*** (0.039)			0.072** (0.035)
Proximity to all firms that need similar inputs					0.156*** (0.047)		0.133*** (0.044)
Proximity to all firms that produce similar outputs						-0.003 (0.018)	0.007 (0.018)
Constant	-2.834*** (0.433)	-2.787*** (0.471)	-2.713*** (0.486)	0.505 (1.214)	2.216 (1.468)	-2.746*** (0.550)	3.889** (1.885)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-45428.755	-45428.723	-45428.437	-45424.094	-45420.991	-45428.433	-45418.988
Pseudo $R^2$	0.335	0.335	0.335	0.335	0.335	0.335	0.335
Censored observations	29092	29092	29092	29092	29092	29092	29092
Observations	46781	46781	46781	46781	46781	46781	46781

Notes: See the notes under Table 2a

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < .01$ .

Table 3a: The Effects of Incumbent SOEs on the Births of New Manufacturing POEs

	DV: ln(Employment in new POEs)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Employment in all incumbent firms)	0.699*** (0.015)	0.698*** (0.015)	0.697*** (0.015)	0.697*** (0.015)	0.697*** (0.015)	0.696*** (0.015)	0.696*** (0.015)
Proximity to all upstream firms	2.412*** (0.486)	3.180*** (0.945)	2.993*** (0.903)	2.689*** (0.830)	2.526*** (0.790)	2.558*** (0.860)	2.222*** (0.768)
Proximity to all downstream firms	2.288*** (0.470)	2.087*** (0.469)	2.652*** (0.547)	2.394*** (0.526)	2.643*** (0.554)	3.155*** (0.586)	2.882*** (0.557)
Proximity to all firms that use similar labor	0.011 (0.076)	0.015 (0.075)	0.025 (0.076)	0.470*** (0.124)	0.053 (0.077)	0.029 (0.076)	0.443*** (0.127)
Proximity to all firms that need similar inputs	0.284*** (0.070)	0.259*** (0.066)	0.261*** (0.067)	0.211*** (0.063)	0.371*** (0.097)	0.248*** (0.066)	0.223** (0.095)
Proximity to all firms that produce similar outputs	0.093*** (0.020)	0.088*** (0.021)	0.093*** (0.021)	0.091*** (0.021)	0.091*** (0.022)	0.180*** (0.029)	0.172*** (0.029)
ln(Employment in incumbent SOEs)	0.003 (0.008)	0.004 (0.008)	0.004 (0.008)	0.006 (0.008)	0.006 (0.008)	0.005 (0.008)	0.006 (0.008)
Proximity to upstream SOEs		-1.696 (1.252)	-1.455 (1.220)	-0.922 (1.150)	-0.634 (1.102)	-0.882 (1.183)	-0.281 (1.087)
Proximity to downstream SOEs			-2.185* (1.285)	-1.554 (1.246)	-1.753 (1.238)	-2.919** (1.341)	-2.210* (1.277)
Proximity to SOEs that use similar labor				-1.057*** (0.276)			-0.969*** (0.302)
Proximity to SOEs that need similar inputs					-0.621*** (0.224)		-0.114 (0.267)
Proximity to SOEs that produce similar outputs						-0.287*** (0.088)	-0.268*** (0.085)
Constant	9.504*** (3.054)	8.703*** (3.121)	9.240*** (3.159)	4.371 (3.128)	3.673 (3.198)	7.918*** (2.924)	2.525 (3.151)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-55000.021	-54998.004	-54996.343	-54989.946	-54992.130	-54991.997	-54985.645
Pseudo $R^2$	0.240	0.240	0.240	0.240	0.240	0.240	0.240
Censored observations	27009	27009	27009	27009	27009	27009	27009
Observations	45920	45920	45920	45920	45920	45920	45920

Notes: See the notes under Table 2a

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < .01$ .

Table 3b: The Effects of Incumbent SOEs on the Births of New Service POEs

	DV: ln(Employment in new POEs)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Employment in all incumbent firms)	0.607*** (0.016)	0.606*** (0.016)	0.606*** (0.016)	0.605*** (0.016)	0.607*** (0.016)	0.606*** (0.016)	0.606*** (0.016)
Proximity to all upstream firms	-0.611 (0.403)	0.726* (0.373)	0.518 (0.388)	0.039 (0.421)	-0.123 (0.461)	0.531 (0.396)	-0.289 (0.472)
Proximity to all downstream firms	-0.566 (0.750)	-0.622 (0.789)	0.967 (1.227)	0.381 (1.190)	0.991 (1.259)	1.027 (1.252)	0.609 (1.254)
Proximity to all firms that use similar labor	0.072** (0.035)	0.069** (0.033)	0.073** (0.035)	0.309*** (0.096)	0.080** (0.037)	0.072** (0.034)	0.264** (0.105)
Proximity to all firms that need similar inputs	0.129*** (0.043)	0.099** (0.044)	0.098** (0.045)	0.089** (0.042)	0.242*** (0.072)	0.098** (0.045)	0.191** (0.074)
Proximity to all firms that produce similar outputs	0.010 (0.018)	0.015 (0.018)	0.015 (0.018)	0.019 (0.020)	0.016 (0.018)	0.020 (0.026)	0.027 (0.029)
ln(Employment in incumbent SOEs)	-0.098*** (0.009)	-0.097*** (0.009)	-0.097*** (0.009)	-0.097*** (0.009)	-0.097*** (0.009)	-0.097*** (0.009)	-0.097*** (0.009)
Proximity to upstream SOEs		-4.579*** (1.372)	-3.972*** (1.433)	-3.132** (1.430)	-2.575* (1.510)	-3.963*** (1.434)	-2.317 (1.490)
Proximity to downstream SOEs			-5.745** (2.884)	-4.571* (2.718)	-5.921** (2.971)	-6.049* (3.229)	-5.404* (3.172)
Proximity to SOEs that use similar labor				-0.483*** (0.163)			-0.385** (0.187)
Proximity to SOEs that need similar inputs					-0.460** (0.186)		-0.321 (0.196)
Proximity to SOEs that produce similar outputs						-0.028 (0.100)	-0.044 (0.105)
Constant	3.940** (1.897)	3.405* (1.869)	3.601* (1.983)	3.211 (1.998)	1.700 (2.084)	3.439* (1.933)	1.709 (2.292)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-45355.996	-45348.215	-45345.882	-45341.774	-45342.103	-45345.848	-45339.922
Pseudo $R^2$	0.336	0.336	0.336	0.336	0.336	0.336	0.337
Censored observations	29092	29092	29092	29092	29092	29092	29092
Observations	46781	46781	46781	46781	46781	46781	46781

Notes: See the notes under Table 2a

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < .01$ .

Table 4a: The Effects of Incumbent POEs on the Births of New Manufacturing POEs

	DV: ln(Employment in new POEs)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Employment in all incumbent firms)	0.329*** (0.024)	0.332*** (0.024)	0.333*** (0.024)	0.336*** (0.023)	0.335*** (0.023)	0.334*** (0.024)	0.336*** (0.023)
Proximity to all upstream firms	2.363*** (0.448)	1.165** (0.476)	1.263*** (0.474)	1.594*** (0.463)	2.051*** (0.487)	1.450*** (0.474)	2.054*** (0.493)
Proximity to all downstream firms	2.112*** (0.456)	1.800*** (0.457)	1.168** (0.553)	1.526*** (0.536)	1.555*** (0.502)	0.989* (0.545)	1.540*** (0.514)
Proximity to all firms that use similar labor	0.027 (0.074)	0.032 (0.076)	0.034 (0.076)	-0.429*** (0.125)	0.048 (0.075)	0.033 (0.075)	-0.209 (0.150)
Proximity to all firms that need similar inputs	0.254*** (0.070)	0.231*** (0.068)	0.235*** (0.067)	0.208*** (0.061)	-0.131 (0.102)	0.236*** (0.066)	-0.024 (0.102)
Proximity to all firms that produce similar outputs	0.087*** (0.019)	0.082*** (0.019)	0.084*** (0.020)	0.086*** (0.020)	0.084*** (0.020)	-0.023 (0.043)	0.036 (0.041)
ln(Employment in incumbent POEs)	0.419*** (0.023)	0.411*** (0.024)	0.410*** (0.024)	0.406*** (0.023)	0.404*** (0.024)	0.408*** (0.024)	0.403*** (0.024)
Proximity to upstream POEs		4.708*** (1.371)	4.227*** (1.387)	3.174** (1.305)	1.986 (1.337)	3.340** (1.308)	1.751 (1.316)
Proximity to downstream POEs			1.994 (1.501)	0.765 (1.423)	1.044 (1.411)	2.828* (1.674)	1.072 (1.559)
Proximity to POEs that use similar labor				1.516*** (0.412)			0.824* (0.450)
Proximity to POEs that need similar inputs					0.963*** (0.232)		0.643*** (0.241)
Proximity to POEs that produce similar outputs						0.306** (0.132)	0.140 (0.124)
Constant	8.731*** (2.992)	8.092*** (3.042)	8.372*** (3.057)	4.300 (2.752)	4.584 (2.849)	7.835*** (2.930)	3.384 (2.842)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-54757.822	-54747.391	-54746.390	-54738.551	-54734.922	-54742.863	-54732.845
Pseudo $R^2$	0.243	0.244	0.244	0.244	0.244	0.244	0.244
Censored observations	27009	27009	27009	27009	27009	27009	27009
Observations	45920	45920	45920	45920	45920	45920	45920

Notes: See the notes under Table 2a

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < .01$ .

Table 4b: The Effects of Incumbent POEs on the Births of New Service POEs

	DV: ln(Employment in new POEs)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
ln(Employment in all incumbent firms)	0.234*** (0.017)	0.235*** (0.017)	0.235*** (0.017)	0.235*** (0.017)	0.236*** (0.017)	0.235*** (0.017)	0.236*** (0.017)
Proximity to all upstream firms	-0.439 (0.384)	-1.003 (0.627)	-0.858 (0.589)	-0.735 (0.571)	-0.538 (0.599)	-0.909 (0.587)	-0.607 (0.584)
Proximity to all downstream firms	-0.237 (0.647)	-0.168 (0.652)	-1.715 (1.169)	-1.423 (1.161)	-1.781 (1.188)	-1.053 (1.182)	-1.019 (1.190)
Proximity to all firms that use similar labor	0.048 (0.030)	0.048 (0.030)	0.053* (0.031)	-0.149*** (0.051)	0.056* (0.032)	0.054* (0.031)	-0.113** (0.054)
Proximity to all firms that need similar inputs	0.073* (0.038)	0.061* (0.037)	0.058 (0.037)	0.044 (0.036)	-0.100 (0.098)	0.059 (0.037)	-0.045 (0.098)
Proximity to all firms that produce similar outputs	0.023 (0.017)	0.021 (0.017)	0.030* (0.017)	0.028 (0.017)	0.031* (0.017)	0.091*** (0.033)	0.075** (0.034)
ln(Employment in incumbent POEs)	0.407*** (0.015)	0.406*** (0.015)	0.406*** (0.015)	0.403*** (0.015)	0.405*** (0.015)	0.405*** (0.015)	0.403*** (0.015)
Proximity to upstream POEs		2.576 (2.205)	2.382 (2.128)	1.471 (2.077)	1.087 (2.067)	2.453 (2.131)	0.922 (2.073)
Proximity to downstream POEs			4.414 (2.832)	2.380 (2.704)	4.418 (2.869)	2.429 (3.040)	1.251 (2.992)
Proximity to POEs that use similar labor				0.766*** (0.214)			0.638*** (0.230)
Proximity to POEs that need similar inputs					0.450** (0.227)		0.262 (0.240)
Proximity to POEs that produce similar outputs						-0.177* (0.095)	-0.131 (0.102)
Constant	1.582 (1.569)	1.163 (1.545)	1.329 (1.593)	0.557 (1.578)	0.157 (1.712)	1.649 (1.565)	0.240 (1.698)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-44816.471	-44815.436	-44814.285	-44809.009	-44812.478	-44813.242	-44808.061
Pseudo $R^2$	0.344	0.344	0.344	0.344	0.344	0.344	0.344
Censored observations	29092	29092	29092	29092	29092	29092	29092
Observations	46781	46781	46781	46781	46781	46781	46781

Notes: See the notes under Table 2a

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < .01$ .

Table 5: Heterogeneous Effects by Firm Size

	DV: ln(Employment in new POEs)			
	Incumbent SOEs		Incumbent POEs	
	Manufacturing (1)	Services (2)	Manufacturing (3)	Services (4)
ln(Employment in all incumbent firms)	0.696*** (0.015)	0.606*** (0.016)	0.336*** (0.023)	0.235*** (0.017)
ln(Employment in incumbent SOEs)	0.005 (0.008)	-0.097*** (0.009)		
Proximity to upstream SOEs	-2.895 (2.708)	-6.364** (2.740)		
Proximity to downstream SOEs	5.276 (3.576)	0.092 (7.270)		
Proximity to SOEs that use similar labor	-1.805*** (0.675)	-0.708** (0.352)		
ln(Average firm size of upstream SOEs) × (Proximity to upstream SOEs)	0.547 (0.605)	1.279 (1.005)		
ln(Average firm size of downstream SOEs) × (Proximity to downstream SOEs)	-1.796* (1.018)	-1.978 (2.424)		
ln(Average firm size of SOEs that use similar labor) × (Proximity to SOEs that use similar labor)	0.286 (0.253)	0.110 (0.156)		
ln(Employment in incumbent POEs)			0.403*** (0.023)	0.403*** (0.015)
Proximity to upstream POEs			4.985*** (1.887)	-0.339 (2.043)
Proximity to downstream POEs			2.970 (2.138)	0.511 (3.979)
Proximity to POEs that use similar labor			1.831*** (0.553)	1.061*** (0.242)
ln(Average firm size of upstream POEs) × (Proximity to upstream POEs)			-3.302*** (0.924)	3.496* (2.010)
ln(Average firm size of downstream POEs) × (Proximity to upstream POEs)			-2.093** (0.982)	1.368 (1.185)
ln(Average firm size of POEs that use similar labor) × (Proximity to POEs that use similar labor)			-0.848 (0.534)	-0.323** (0.153)
Constant	-0.805 (5.356)	2.642 (2.379)	11.055* (6.470)	3.162* (1.890)
General Metrics	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes
Log likelihood	-54986.892	-45339.794	-54719.565	-44804.257
Pseudo $R^2$	0.240	0.337	0.244	0.344
Censored observations	27009	29092	27009	29092
Observations	45920	46781	45920	46781

*Notes:* This table considers whether the impact of incumbent SOEs or POEs on new private entry differs by firm size. The construction of independent variables is described in text. Columns (1) and (2) consider the impact from incumbent SOEs on the births of new private manufacturing and service firms, while columns (3) and (4) consider the impact from incumbent POEs on the births of new private manufacturing and service firms. Dependent variable is the log employment in new POEs by industry-city. The industry-city pair with zero employment is recoded to have one employment. Estimations use Tobit model. Standard errors clustered by city are reported in parentheses. Data come from the 2008 economic census, the 2007 Input-Output Table, and the 2005 population census.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < .01$ .

Table 6: Robust Estimation for incumbent SOEs

	Base estimation (1)	Drop particular cities (2)	Drop industries with low entry (3)	Drop Less competitive industries (4)	Use firm counts as DV (5)	OLS regression (6)
Panel A: Manufacturing						
ln(Employment in all incumbent firms)	0.697*** (0.015)	0.699*** (0.015)	0.708*** (0.015)	0.777*** (0.017)	0.261*** (0.010)	0.234*** (0.008)
ln(Employment in incumbent SOEs)	0.006 (0.008)	0.005 (0.008)	0.005 (0.008)	0.038*** (0.010)	0.016*** (0.003)	0.062*** (0.006)
Proximity to upstream SOEs	-0.922 (1.150)	-0.265 (1.196)	-1.156 (1.114)	-3.915*** (1.322)	-1.016* (0.609)	-2.057** (0.978)
Proximity to downstream SOEs	-1.554 (1.246)	-2.154 (1.464)	-1.528 (1.243)	-1.207 (1.364)	-2.582*** (0.556)	-5.495*** (1.003)
Proximity to SOEs that use similar labor	-1.057*** (0.276)	-0.845** (0.331)	-1.066*** (0.268)	-1.165*** (0.381)	-0.736*** (0.122)	-1.097*** (0.200)
Constant	-0.848 (0.574)	0.417 (0.883)	-1.272** (0.585)	-1.578*** (0.582)	-0.423 (0.314)	1.996*** (0.463)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-54989.946	-53242.043	-52971.287	-34158.476	-30475.623	
Pseudo $R^2$	0.240	0.236	0.227	0.284	0.414	
Adjusted $R^2$ )						0.538
Censored observations	27009	26108	22873	21205	27009	
Observations	45920	44320	41328	33278	45920	45920
Panel B: Services						
ln(Employment in all incumbent firms)	0.605*** (0.016)	0.600*** (0.017)	0.615*** (0.017)	0.647*** (0.017)	0.316*** (0.011)	0.226*** (0.008)
ln(Employment in incumbent SOEs)	-0.097*** (0.009)	-0.097*** (0.010)	-0.096*** (0.009)	-0.070*** (0.009)	-0.028*** (0.004)	-0.036*** (0.007)
Proximity to upstream SOEs	-3.132** (1.430)	-3.000* (1.753)	-3.090** (1.418)	-2.086* (1.218)	0.081 (0.674)	-1.185 (0.723)
Proximity to downstream SOEs	-4.571* (2.718)	-5.003 (3.390)	-3.863 (2.748)	-6.764*** (2.529)	-8.192*** (1.422)	-10.503*** (1.947)
Proximity to SOEs that use similar labor	-0.483*** (0.163)	-0.693*** (0.212)	-0.418** (0.171)	0.091 (0.149)	-1.037*** (0.146)	-1.783*** (0.224)
Constant	-2.911*** (0.585)	-2.041*** (0.790)	-2.972*** (0.585)	-2.829*** (0.656)	-0.831** (0.421)	2.467*** (0.456)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-45341.774	-43407.989	-44912.239	-37797.142	-27679.343	-71760.686
Pseudo $R^2$	0.336	0.334	0.316	0.364	0.498	
Adjusted $R^2$ )						0.675
Censored observations	29092	28312	24569	23877	29092	
Observations	46781	45151	42189	39524	46781	46781

*Notes:* Panels A and B consider manufacturing and services, respectively. For each panel, Column 1 is taken from Columns 4 in Tables 3a and 3b. Column 2 drops four provincial municipalities (e.g., Beijing and Shanghai) and cities in Xinjiang, Xizang, Qinghai, and Hainan provinces. Column 3 drops city-industries with the low entry of new POEs. Column 4 drops less competitive city-industries with average firm size greater than 50. Column 5 use firm counts as alternative dependent variables. Estimations use Tobit model, except that Column 5 reports OLS estimates.. Standard errors clustered by city are reported in parentheses. Data come from the 2008 economic census, the 2007 Input-Output Table, and the 2005 population census.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < .01$ .

Table 7: Robust Estimation for incumbent POEs

	Base estimation (1)	Drop particular cities (2)	Drop industries with low entry (3)	Drop Less competitive industries (4)	Use firm counts as DV (5)	OLS regression (6)
Panel A: Manufacturing						
ln(Employment in all incumbent firms)	0.336*** (0.023)	0.342*** (0.024)	0.343*** (0.024)	0.537*** (0.044)	0.111*** (0.009)	0.048*** (0.008)
ln(Employment in incumbent POEs)	0.406*** (0.023)	0.397*** (0.024)	0.409*** (0.025)	0.257*** (0.041)	0.172*** (0.010)	0.236*** (0.010)
Proximity to upstream POEs	3.174** (1.305)	3.178** (1.409)	3.135** (1.330)	3.990** (1.722)	2.984*** (0.739)	4.194*** (1.278)
Proximity to downstream POEs	0.765 (1.423)	1.834 (1.478)	0.902 (1.438)	0.412 (1.623)	1.766** (0.838)	5.424*** (1.817)
Proximity to POEs that use similar labor	1.516*** (0.412)	1.681*** (0.509)	1.604*** (0.396)	1.431*** (0.477)	1.088*** (0.185)	1.631*** (0.292)
Constant	-0.418 (0.585)	0.699 (0.730)	-0.799 (0.567)	-0.521 (0.623)	-0.030 (0.305)	2.641*** (0.442)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-54738.551	-53007.094	-52728.414	-34134.856	-30054.743	
Pseudo $R^2$	0.244	0.240	0.231	0.285	0.422	
Adjusted $R^2$						0.546
Censored observations	27009	26108	22873	21205	27009	
Observations	45920	44320	41328	33278	45920	45920
Panel B: Services						
ln(Employment in all incumbent firms)	0.235*** (0.017)	0.235*** (0.017)	0.244*** (0.017)	0.273*** (0.020)	0.144*** (0.009)	0.066*** (0.005)
ln(Employment in incumbent POEs)	0.403*** (0.015)	0.398*** (0.015)	0.401*** (0.015)	0.394*** (0.017)	0.193*** (0.008)	0.244*** (0.008)
Proximity to upstream POEs	1.471 (2.077)	4.722* (2.448)	1.816 (2.041)	-0.425 (1.881)	0.803 (1.073)	1.336 (1.428)
Proximity to downstream POEs	2.380 (2.704)	3.722 (3.037)	1.862 (2.722)	5.687** (2.703)	3.760** (1.752)	10.349*** (2.078)
Proximity to POEs that use similar labor	0.766*** (0.214)	1.117*** (0.298)	0.760*** (0.224)	0.153 (0.199)	1.777*** (0.173)	2.599*** (0.271)
Constant	-2.615*** (0.532)	-2.024*** (0.703)	-2.655*** (0.525)	-2.722*** (0.561)	0.007 (0.427)	3.038*** (0.407)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Log likelihood	-44809.009	-42913.841	-44398.116	-37422.068	-27062.109	
Pseudo $R^2$	0.344	0.341	0.324	0.370	0.509	
Adjusted $R^2$						0.695
Censored observations	29092	28312	24569	23877	29092	
Observations	46781	45151	42189	39524	46781	46781

Notes: See the notes under Table 6

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < .01$ .

Table 8: First-difference estimates for incumbent SOEs

	DV: $\Delta \ln(\text{Employment in new POEs})$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta \ln(\text{Employment in all incumbent firms})$	0.099*** (0.005)	0.098*** (0.005)	0.098*** (0.005)	0.097*** (0.005)	0.097*** (0.005)	0.098*** (0.005)	0.097*** (0.005)
$\Delta(\text{Proximity to all upstream firms})$	1.674 (1.347)	4.693*** (1.435)	4.031*** (1.519)	2.703* (1.581)	3.379* (1.721)	4.123*** (1.569)	2.783* (1.685)
$\Delta(\text{Proximity to all downstream firms})$	0.419 (2.107)	-0.219 (2.010)	2.335 (2.978)	0.394 (2.790)	1.250 (2.523)	2.350 (2.962)	0.155 (2.534)
$\Delta(\text{Proximity to all firms that use similar labor})$	1.285** (0.628)	1.252** (0.591)	1.281** (0.584)	2.893*** (0.658)	1.308** (0.583)	1.278** (0.582)	2.765*** (0.694)
$\Delta(\text{Proximity to all firms that need similar inputs})$	0.059 (0.464)	0.067 (0.487)	0.058 (0.486)	0.041 (0.516)	0.398 (0.749)	0.062 (0.478)	0.189 (0.730)
$\Delta(\text{Proximity to all firms that produce similar outputs})$	-0.260* (0.140)	-0.283** (0.142)	-0.276* (0.141)	-0.285** (0.141)	-0.272* (0.142)	-0.331 (0.232)	-0.423** (0.211)
$\Delta \ln(\text{Employment in incumbent SOEs})$	0.014** (0.007)	0.016** (0.007)	0.016** (0.007)	0.016** (0.007)	0.016** (0.007)	0.016** (0.007)	0.016** (0.007)
$\Delta(\text{Proximity to upstream SOEs})$		-9.107*** (2.314)	-7.730*** (2.198)	-4.246* (2.173)	-5.546** (2.479)	-7.986*** (2.157)	-4.306* (2.394)
$\Delta(\text{Proximity to downstream SOEs})$			-7.379** (3.722)	-2.488 (3.602)	-4.712 (3.165)	-7.385** (3.725)	-1.827 (3.276)
$\Delta(\text{Proximity to SOEs that use similar labor})$				-4.653*** (1.049)			-4.274*** (1.090)
$\Delta(\text{Proximity to SOEs that need similar inputs})$					-1.111 (0.838)		-0.447 (0.910)
$\Delta(\text{Proximity to SOEs that produce similar outputs})$						0.163 (0.409)	0.416 (0.373)
Constant	0.054 (1.783)	-0.026 (1.884)	-0.068 (1.897)	0.426 (1.997)	0.724 (1.787)	-0.148 (1.752)	0.500 (1.701)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted $R^2$	0.234	0.234	0.234	0.235	0.235	0.234	0.235
Observations	46207	46207	46207	46207	46207	46207	46207

*Notes:* Dependent variable is the difference in the log employment in new POEs by industry-city between 2004 and 2008. Estimations use OLS model. Standard errors clustered by city are reported in parentheses. Data come from the 2004 and 2008 economic census, the 2007 Input-Output Table, and the 2005 population census.

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < .01$ .

Table 9: First-difference estimates for incumbent POEs

	DV: $\Delta \ln(\text{Employment in new POEs})$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta \ln(\text{Employment in all incumbent firms})$	0.041*** (0.005)	0.042*** (0.005)	0.042*** (0.005)	0.041*** (0.005)	0.041*** (0.005)	0.041*** (0.005)	0.040*** (0.005)
$\Delta(\text{Proximity to all upstream firms})$	1.671 (1.313)	-1.098 (1.484)	-1.087 (1.470)	0.042 (1.491)	0.739 (1.417)	-0.569 (1.390)	0.910 (1.438)
$\Delta(\text{Proximity to all downstream firms})$	0.870 (2.065)	0.124 (2.072)	0.080 (2.343)	0.736 (2.469)	-0.393 (2.431)	-0.914 (2.349)	-0.398 (2.484)
$\Delta(\text{Proximity to all firms that use similar labor})$	1.409** (0.575)	1.590*** (0.581)	1.590*** (0.581)	0.493 (0.498)	1.433** (0.561)	1.664*** (0.577)	0.923* (0.527)
$\Delta(\text{Proximity to all firms that need similar inputs})$	0.144 (0.453)	0.144 (0.402)	0.144 (0.403)	0.165 (0.359)	-0.178 (0.368)	0.128 (0.391)	-0.041 (0.353)
$\Delta(\text{Proximity to all firms that produce similar outputs})$	-0.232* (0.132)	-0.228* (0.127)	-0.228* (0.130)	-0.199 (0.129)	-0.183 (0.124)	-0.299** (0.121)	-0.226** (0.115)
$\Delta \ln(\text{Employment in incumbent POEs})$	0.103*** (0.006)	0.097*** (0.006)	0.097*** (0.006)	0.095*** (0.006)	0.093*** (0.005)	0.095*** (0.006)	0.093*** (0.005)
$\Delta(\text{Proximity to upstream POEs})$		8.738*** (2.410)	8.696*** (2.328)	5.115** (2.161)	2.705 (2.191)	6.070*** (2.325)	1.680 (2.221)
$\Delta(\text{Proximity to downstream POEs})$			0.157 (2.708)	-3.062 (2.732)	-0.438 (2.607)	3.147 (2.807)	-0.282 (2.783)
$\Delta(\text{Proximity to POEs that use similar labor})$				3.421*** (0.624)			1.926*** (0.632)
$\Delta(\text{Proximity to POEs that need similar inputs})$					1.642*** (0.286)		0.956*** (0.322)
$\Delta(\text{Proximity to POEs that produce similar outputs})$						0.633*** (0.132)	0.364*** (0.132)
Constant	-0.895 (1.732)	-1.191 (1.493)	-1.190 (1.503)	0.174 (1.417)	0.547 (1.320)	-0.904 (1.432)	0.754 (1.362)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted $R^2$	0.243	0.244	0.244	0.245	0.245	0.244	0.246
Observations	46207	46207	46207	46207	46207	46207	46207

Notes: See the notes under Table 8

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < .01$ .

Table 10: Main Results

	Incumbent SOEs		Incumbent POEs	
	Manufacturing	Services	Manufacturing	Services
Proximity to inputs	No	-	+	No
Proximity to outputs	No	-	No	No
Proximity to labor	-	-	+	+

*Notes:* “+” and “-” denote that the impact is significant positive and negative, respectively. “No” denotes that the impact is insignificant.