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Agglomeration Economies, Government Intervention and the Location of New Firms

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Abstract

This article starts from the perspective of spatial economics and discusses how urban agglomeration economy influence location of new firms. Theoretical research reveals that specialization and diversity externalty both promote enterprise entry. This theoretical inference is supported by empirical evidence based on the matching of corporate micro-data and city data. From 2001 to 2008, China specialized agglomeration economy and diversified agglomeration economy had a significant positive impact on the creation of new enterprises. In addtion, the degree of administrative monopoly of the government and its preference for state-owned enterprises will weaken the positive externality of agglomeration on the creation of enterprises. After controlling for the missing variables and using instrumental variable to control endogeneity problems, the results are still robust. On this basis, the further analysis of its mechanism show that input and output sharing, labor pooling, and technology spillover effects are all important channels for agglomeration of externalities to promote the establishment of new firms. Similarly, government intervention has a negative moderating effecton the above three mechanisms.

Keywords

Agglomeration; New firm; Specializatio; Diversity; Goverment intervention.

1. INTRODUCTION

A city is a place where enterprises and various elements are highly concentrated. The spatially concentrated distribution of enterprises and various factors has produced agglomeration economies, including the specialized externalities proposed by Marshall and the diversified externalities proposed by Jacobs. The externalities generated by these agglomerations affect the flow and dissemination of intermediate inputs and outputs, labor factor flexibility and technologies required by new enterprises (Glaser & Kerr, 2009), affecting the expected profits and market space of new enterprises and thus changing the entry' willingness of new enterprises. Therefore, the urban agglomeration economy is undoubtedly an important factor explaining the formation and development of new enterprises.

The creation of a new enterprise is not only affected by its own business decisions, but also restricted by the external environment. The new geo-economic theory believes that regional agglomeration strengthens connections between enterprises. This kind of connection will produce externalities to the location of enterprises, which will enable cities to gain comparative advantages different from traditional regional endowments (Porter, 1998), and attract more new enterprises to enter continuously. Marshall (1890) first proposed three mechanisms for externalities of industrial agglomeration, input-output effects, labor pooling effects, and technology spillover effects. Jacobs (1969) believes that the agglomeration of manufacturers in different industries helps companies obtain labor with different professional backgrounds, enables them to enjoy low-cost public infrastructure, and cross-industry knowledge spillover.

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From the perspective of spatial economics, the research on the effect of the establishment new firms has just started in China, and there are only a handful of relevant documents analyzing the regulatory role of the government in it. Glaeser and Kerr (2009) using data from the US Corporate Census separately examined the impact of Marshall's specialization externalities and the agglomeration of related industries on the growth of start-ups. Ghani et al. (2013) based on the research framework of Glaeser and Kerr (2009), studied impact of specialization externalities on the entry of new firms in India and the establishment of businesses by women. Delgado et al. (2010) found that specialization within a location can result in a convergence effect and presence of related industries will lead to increase of entrepreneurship. Han and Li (2019) analyzed the moderating effect of urban population size and the provision of government public services on agglomeration, and found that the supply of public services not only increases the population size of the city and surrounding cities, but also forms a synergistic effect with industrial agglomeration in the growth of urban population. It can be said that under the political system with Chinese characteristics, it is a relatively new topic to discuss how government intervention affects the role of agglomeration externalities. For the emerging market economy, which is in the process of system transformation and rapid urbanization like China, how to create a business environment suitable for enterprise entry and production is undoubtedly a matter of concern in current research. Based on the perspective of a relatively new urban agglomeration economy, the purpose of this article is to discuss the problem of uneven geographical distribution of the establishment of enterprises mentioned above from both theoretical and empirical aspects. We are focusing on what type of industrial agglomeration can stimulate the entry of enterprises and how government intervention adjust the influence of agglomeration externalities on location of new firm.

2. METHODOLOGY

2.1. Model Construction

This paper draws on the ideas of Jofre-Monseny et al. (2011) and the research on the mechanism of inter-industry linkage on regional agglomeration, based on witch, new companies location choice is determined by the principle of profit maximization. More narrowly, if company f belonging to industry i decide to builds a factory in city j, the expected profit obtained in year t is:

$$\pi_{fikt} = \beta' a_{ikt} + \delta policy_{ikt} + \gamma' a_{ikt} policy_{ikt} + \varphi' x_{ikt} + \varepsilon_{fikt} \quad (1)$$

The profit π_{fikt} of company f is related to the agglomeration level (a_{ikt}) of industry i in the city j at that year. Brülhart and and Sbergami (2009) believe that the creation of new enterprises is based on the phenomenon of regional agglomeration, which is a kind of inter-firm interaction generated through market action. China's market economy is in the development stage, in addition to the role of market forces, policy factors such as local protectionism and domestic market segmentation have caused significant regional differences in industrial layout and agglomeration. In addition to the agglomeration of the industry itself, the entry of new enterprises is likely to be subject to administrative intervention by local governments ($policy_{ikt}$). Local governments usually use administrative monopoly, differentiated subsidies and other economic control measures to directly affect the factor allocation of company, which in turn affects the company's expected profit and willingness to enter. In addition, government will also indirectly affects enterprise entry decisions by adjusting the agglomeration mechanism between urban industries ($a_{ikt} policy_{ikt}$). x_{ikt} represents other related control variables.

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202105_7(5).0016

Assuming that firm f is established in city j where the expected maximum profit can be obtained, and the random disturbance term ε_{fikt} has an extreme-value type 1 distribution, the probability of firm f being established in city j can be transformed into a conditional Logit model:

$$\Pr(y_{fikt}=1)=\frac{\exp(\beta' a_{ikt}+\delta policy_{ikt}+\gamma' a_{ikt}policy_{ikt}+\varphi' x_{ikt})}{\sum_c \exp(+\beta' a_{ikt}+\delta policy_{ikt}+\gamma' a_{ikt}policy_{ikt}+\varphi' x_{ikt})} \quad (2)$$

According to the study of Guimarães et al (2003), the following Poisson model (3) can be used to estimate the conditional logit model (2) equivalently:

$$E(N_{ikt})=exp(\beta' a_{ikt}+\delta policy_{ikt}+\gamma' a_{ikt}policy_{ikt}+\varphi' x_{ikt}) \quad (3)$$

$N_{ikt}$is the number of new enterprises entering city j in industry i, which obeys Poisson distribution. The level of agglomeration (a_{ikt}) that this article focuses on mainly includes: specialized agglomeration (spe_{ikt}) and diversified agglomeration (div_{ikt}). To a certain extent, these two agglomeration methods internalize the efficient connections between urban enterprises into the advantages of improving efficiency and reducing costs. At the same time, in order to ensure the independence of random items and reduce the interference of missing variables, industry fixed effects (ω_i), urban fixed effects (μ_j), and year fixed effects (θ_{t-1}) were added to the original model.

In addition to the problem of missing variables, model (3) also has the potential to simultaneity bias (Ellison et al, 2010; Jofre-Monseny et al, 2011). New enterprises are not only the result of urban enterprise agglomeration, but at the same time, new enterprises will strengthen agglomeration effect. On one hand, government intervention and regulation can affect the number of new entrants in the city, and the increase of new entrants in the city will change the intervention and strategy of local government. According to the practice of Jofre-Monseny et al (2011), this paper lags the explanatory variables by one year, and uses the agglomeration effect and the level of government intervention of $t-1$ year to estimate the number of new entrants in t year to reduce reverse causality, so the benchmark model is shown in equation (4):

$$E(N_{ijt})=exp\big(\beta_1 spe_{ijt-1}+\beta_2 div_{ijt-1}+\delta policy_{ijt-1}+\gamma_1 spe_{ijt-1}\times policy_{ijt-1}+\gamma_2 div_{ijt-1}\times policy_{ijt-1}+\varphi' x_{ijt-1}+\omega_i+\mu_j+\theta_{t-1}\big) \quad (4)$$

2.2. Variables Used

The number of new enterprises in the city-industry for each year is calculated from the data of industrial enterprise. With reference to the practice of Zhang and Shen (2020), this article uses the information of opening date provided by the industrial enterprise database to confirm whether the enterprise is a new enterprise in parlitica year.

Agglomeration indicators we are interested in include:

(1) Specialization (spe_{ikt-1}). Following the practices of Combes (2000) and Han and Li (2019), the paper use the city-industry employment location entropy, that is, the ratio of the employment share of industry i in city j divided by this ratio at the national level as the proxy variable of specialization:

$$spe_{ijt}=\frac{emp_{ikt}/emp_{kt}}{emp_{it}/emp_t}$$

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202105_7(5).0016

Where emp_{kt} and emp_t are the total employment in city level and national level and emp_{ikt} and emp_{kt} are the sectoral employment in city and the whole country, respectively.

(2) Diversity(div_{ikt-1}).Following what Combes (2006) did, we use the inverse of Herfindahl Index of industry concentration based on the share of all industrys, except the one considered.

$$div_{ijt} = \frac{1/\sum_{i'=1,i'\neq i}^{n}(emp_{i'kt}/(emp_{kt} - emp_{ikt}))}{1/\sum_{i'=1,i'\neq i}^{n}(emp_{i't}/(emp_t - emp_{it}))}$$

Among them, $emp_{i'kt}$and $emp_{i't}$are the total employment of any industry i' except for industry i at the city level and the national level, respectively, $(emp_{kt} - emp_{ikt})$and $(emp_t - emp_{it})$ are the total employment of all industries at the city level and at the national level except for industry i. This indicator can effectively reflect the industry diversity in the region , and not necessarily negatively related to the degree of local specialization of industry i. div_{ikt} is larger, the degree of industry diversification of surface city k is in a relatively advantageous position across the country. The larger the div_{ikt}, the higher the industry diversification of city j, compared to other cities in the country.

Government intervention means that local governments directly or indirectly control state-owned enterprises through various means, by granting state-owned enterprises certain production and sales privileges,in order to regulate local economic development and adjest the industrial structure (Ni and Lu, 2016). On the other hand, since the income of state-owned enterprises is an important source of government revenue, local governments tend to protect state-owned enterprises, neglecting the interests of non-state-owned enterprises has led to distortions in the factors, which harmed the interests of new non-state-owned enterprises to a certain extent. Bai et al.(2004) called this kind of government intervention that favor state-owned enterprises as local protectionism. Under the influence of administrative barriers to entry and local protectionism, the intervention and abuse of administrative power will undoubtedly increase the difficulty of entering new enterprises, especially the small and medium-sized private enterprises. It is difficult for upstream small and medium-sized suppliers, which provide low-priced inputs for new enterprises, to thrive under the monopolistic competition of state-owned enterprises without increasing the price of intermediate inputs. This phenominone will weaken the upstream input linkage mechanism, and increase the entry cost of new enterprises (Gleaser and Kerr, 2009).

On the other hand, compared with private enterprises, state-owned enterprises have the features of high degree of central government control, strong bargaining power with government officials, and easier manipulation of political privileges. Therefore, it is easier for state-owned enterprises to obtain financial resources or financing privileges to obtain operating funds. On the contrary, because of the lack of corresponding political connections, private enterprises not only have to consider market factors when entering a certain market, but also need to take into account political factors such as political connections, making their entry barriers greater than that of state-owned enterprises. For example, in order to obtain initial funds, private enterprises often have to spend more energy and cost to manage political relations. The lower the level of regional financial development and the degree of market economy development, the greater the influence of political connections on the financing capacity of private enterprises (Luo and Zhen, 2008), the relatively high cost of "rent-seeking" makes the original agglomeration advantage and entry motivation no longer exist.

In general, local government administrative intervention will have different effects on state-owned and non-state-owned new entrants. This article mainly follows the practices of Bai et al.

ISSN: 2472-3703 DOI: 10.6911/WSRJ.202105_7(5).0016

(2004) and Jin et al. (2015), using the following variables as proxy variables for government administrative intervention:

(1) Monopoly power of state-owned enterprises ($lnmon_{ikt}$). Local government often directly controls state-owned enterprises to intervenes in the economic behavior of market entities. Therefore, the market power of state-owned enterprises often reflects the intensity of government intervention in the market (Han and Zheng, 2014). This paper uses the proportion of the industrial value added of state-owned enterprises in each city-industry to the total industrial value added of all enterprises to measure the degree of monopoly of state-owned enterprises.

(2) Degree of preference of state-owned enterprises ($lnpre_{ikt}$). The operation of state-owned enterprises is directly linked to the performance of local governments. On the one hand, the profits and taxes of state-owned enterprises are important and direct sources of local fiscal revenue. Bai et al. (2004). Furthermore, local governments often directly intervene the investment of state-owned enterprises to participate in the performance evaluation centered on the GDP competition (Tang et al., 2010). Therefore, local governments have greater incentives to favor state-owned enterprises. In this paper, the proportion of subsidies received by state-owned enterprises to all subsidies received by all enterprises is used as the proxy variable of the degree of government preference to state-owned enterprises.

In order to reduce the estimation error caused by the problem of missing variables, and according to the imbalanced characteristics of China's agglomeration development, we refer to the ideas of previous related studies and control the following control variables:

(3) Level of foreign investment ($lnfdi$) : FDI will change the industrial structure of the region, which in turn affect the regional-industry agglomeration economy, and the logarithm of the proportion of total foreign direct investment in GDP was taken as the proxy variable.

(4) Urban population density($lnpopul$): We use the logarithm of the urban non-agricultural population to represent the population density of an area.

(5) City average salary level($lnwage$): Since companies will consider labor costs when selecting locations, this article uses the average salary data of employees in the industrial enterprise database to calculate the average salary at the city level.

(6) Urban infrastructure level($lninfra$): The larger the urban per capita road area, the higher the level of urban infrastructure level, and the convenience of transportation will help attract new enterprises.

(7) The market potential of the city ($lngdp$): The level of economic development of the city is an important factor that affects the location of enterprises. This article uses the logarithm of city's GDP to measure market size of city.

(8) The city-industry tax rate ($lntax$) : Local governments attract enterprises through tax policies, in order to improve local market vitality and regional competitiveness. In this paper, the city-industry tax rate is calculated from the industrial enterprise database, and the tax rate is equal to the city-industry total tax divided by the city-industry total output.

2.3. Data Source

The city-industry level data used in this article comes from the "Annual Survey Database of Manufacturing Enterprises" of the National Bureau of Statistics, which includes all state-owned enterprises nationwide and non-state-owned industrial enterprises with sales of more than 5 million yuan. For the problem of data missing and data outliers, referring to the existing literature, this article deals with the data as follows: (1) The first step is to eliminate missing or negative observations of relevant key indicators (salaries, benefits, total industrial output, industrial value added, number of employees, main business revenue, original value of fixed assets, intermediate input). (2) In the second step, this article refers to the Cai and Liu (2009)

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method to eliminate some observations that do not meet accounting standards (current assets, original value of fixed assets or net fixed assets are less than total assets). (3) In order to eliminate the influence of outliers as much as possible, enterprises with fewer than 8 employees were deleted, and we also discard values at the 5% tails of the distribution, that is, 5 % of the lowest and the highest values of a variable are removed from the data. For some missing key variables such as industrial added value in 2004, refer to the method of Liu and Li (2008) and Nie et al. (2012), this article calculates the approximate value through two equations: industrial value added = total sales + inventory-total industrial intermediate input + value added tax, and total output value= industrial added value+intermediate input value- value added tax.

At different geographic scales, there are obvious differences in the effects of agglomeration externalities. In general, the intensity of input-output sharing mechanisms tends to be greater at the state or inter-provincial level; on the contrary, due to the invisibility and timeliness of production technology and knowledge, the technology similarity spillover mechanism works in a smaller geographic scope (Rosenthal and Strange, 2001; Tao et al., 2018). At the same time, considering the heterogeneous impact of institutional differences on agglomeration externalities, this article mainly focuses on the impact of agglomeration externalities at the prefecture-level on the creation of new enterprises.

In addition, the externalities of agglomeration is based on the two-digit industry labor data of individual firms of database of manufacturing enterprises. In order to be consistent with the new "National Economic Industry Standard Classification Code GB/T4754-2002" promulgated by China in 2002, according to the practice of Pan et al. (2011),we merge the Chinese input-output tables in 1997, 2002, and 2007 into 38 sectors, and use existing data to get a simple weighted average and calculate the approximate value of the input-output ratio in 2001, 2003-2006 and 2008.

The city-level control variable in this article are all from the "China City Statistical Yearbook", and we use linear interpolation to complement the missing values of particular cities in a certain year. The final sample used for regression analysis in this article includes observations at the city-industry-year level from 2001 to 2008. There are a total of about 84,512 observations, and these observations come from 283 cities (excluding the one from Tibet) and 38 two-digit industrial sectors.

3. EXTERNALITIES OF AGGLOMERATION AND ESTABLISHMENT OF NEW ENTERPRISE: EMPIRICAL ANALYSIS

We begin by estimating our baseline model including fixed effect of industry, year and cities The first panel (1) of Table 1 reports estimates of baseline effect of specialization agglomeration externalty and diversity agglomeration externalty on new firm establishment in particlular city. To jump straight to the min result, focusing on the two-digit regression runs: while, as expected, the the coefficient on the new firm entry index is statistically significantly positive, both of the specialization agglomeration externalty and diversity agglomeration externalty. After including the control variable, the coefficient of specialization and diversity on the new firm entry index is also statistically significantly positive, and the marginal effect of specialization seems to be larger while the one of diversity seems to be smalller from the result shown in estimate(2). And the positive effect of both externalty is still solid when considerating the effect of policy variable, as it is shown in estimate (3). The estimates imply that a 1% specialization externalty increase in industries will increases firm births by 0.67%, while 1% specialization externalty increase in industries will increases firm births by 0.19%. While the relationship between policy effect of monopoly power of state-owned enterprises ($lnmon_{ikt}$) and firm births is negative and statistically significant at the 1 percent level, this relationship turns smaller, although not statistically significant, for state-owned enterprises preferrence ($lnpre_{ikt}$). These estimations

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therefore confirm the hypothesis the paper trying to test: location choices of new firm is less spatially concentrated under the government differentiated policies. And direct effect of monopoly power of state-owned enterprises ($lnmon_{ikt}$) is much more solid, while the direct effect of state-owned enterprises preferrence ($lnpre_{ikt}$) is not statistically significant.

In the (4) column, new firms are regressed on the variables of interest, the urban surface of the municipality, monopoly power ($lnmon_{ikt}$) and interaction term of monopoly power and agglomeration externalty. The results reported in the (4) shows that, moderating effect of monopoly power of state-owned enterprises ($lnmon_{ikt}$) of specialization and diversity are statisically significantly negetive on new firms' birth. Similarly, the results reported in the (5) shows that, both moderating effect of state-owned enterprises preferrence ($lnpre_{ikt}$) of specialization and diversity are statisically significantly also negetive on new firms birth, in line with expectations.

Table 1. The effect of agglomeration on city new enterprises and the moderating effect of policies

Variable	Dependent variable: the number of new enterprises				
	Without control Variable	Including control Variable	Including policy Variable	interaction term of lnmon	interaction term of lnpre
	(1)	(2)	(3)	(4)	(5)
lnspe	0.645***	0.677***	0.680***	0.671***	0.672***
	(160.820)	(162.851)	(162.933)	(160.653)	(161.177)
lndiv	0.196***	0.190***	0.185***	0.182***	0.172***
	(16.649)	(15.960)	(15.515)	(15.287)	(14.453)
lnfdi		-0.370***	-0.431***	-0.481***	-0.471***
		(-11.408)	(-13.207)	(-14.739)	(-14.442)
lnwage		-0.118***	-0.116***	-0.092***	-0.085***
		(-10.321)	(-10.176)	(-8.096)	(-7.473)
lninfra		0.177***	0.174***	0.166***	0.166***
		(10.151)	(9.944)	(9.502)	(9.496)
lngdp		0.185***	0.200***	0.225***	0.230***
		(5.682)	(6.149)	(6.913)	(7.061)
lntax		-1.742***	-1.710***	-1.845***	-1.760***
		(-7.947)	(-7.801)	(-8.432)	(-8.045)
lnpopul		0.171***	0.173***	0.157***	0.156***
		(7.465)	(7.547)	(6.872)	(6.820)
lnmon			-0.470***	1.128***	-0.394***
			(-9.574)	(16.659)	(-8.046)
lnpre			-0.033	-0.797***	0.761***
			(-0.538)	(-12.436)	(11.737)
lnspe×policy				-0.624***	-0.700***
				(-33.607)	(-35.328)
lndiv×policy				-0.067***	-0.074***
				(-2.701)	(-2.733)
_cons	-2.310***	-6.056***	-6.270***	-6.611***	-6.740***
	(-56.506)	(-13.270)	(-13.731)	(-14.501)	(-14.781)
Year_FE	Y	Y	Y	Y	Y
Fixed_Effect	Y	Y	Y	Y	Y
Industry_FE	Y	Y	Y	Y	Y
N	337450	331955	331955	331955	331955
R^2	0.398	0.398	0.399	0.401	0.401

t statistics in parentheses, and * p < 0.1, ** p < 0.05, *** p < 0.01

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4. ROBUST TEST

4.1. Problem of Missing Variables

Although our benchmark regression results show that government intervention adjustments can significantly reduce the sensitivity of new entrants to agglomeration externalities, there are still other factors that simultaneously affect policies, agglomeration economies, and the number of new entrants. In order to reduce the biases caused by these possible missing variables to the regression results, at the city level, we use the degree of financial deepening to control the impact of financial friction on enterprise entry. In addition, this article uses the proportion of the service industry to control the bias caused by the industrial structure in the estimation of the company's location.

At the city-industry level, this paper also covers the control of the proportion of subsidies in the city industry. On the one hand, local government subsidies attract corporate finance. On the other hand, government subsidies also increases the possibility of corporate rent-seeking. The increase in transaction costs reduces the probability of corporate entry. We also controlled the initial industrial development foundation at the city-industry level, using the number of urban-industry employment in period t as a proxy variable to control the industrial development endowments of different regions and different industries. Columns (1) and (2) contain all the control variables we have discussed above. And on this basis this paper also controls the interactive fixed effects of city-year and industry-year.

As it is shown in estimate (1) and (2) from Table 2, after including more control variables, the regression results show that the interaction terms of specialization, diversity, and government intervention are still significantly negative, and the result still solid after considering the the interactive fixed effects of city-year and industry-year in estimate (3) and (4).

Table 2. The problem of missing variables

Variable	Dependent variable: the number of new enterprises			
	More control variable & monopoly power SOE as policy	More control variable & goverment preference of SOE as policy	Including city_year fixed effect & monopoly power SOE as policy	Including industry_year fixed effect & goverment preference of SOE as policy
	(1)	(2)	(3)	(4)
lnemp1	0.181***	0.176***	0.171***	0.167***
	(18.343)	(17.787)	(18.851)	(18.345)
lnsubsidy	0.230***	0.248***	-5.798***	-5.552***
	(8.572)	(9.206)	(-26.680)	(-25.542)
lnfin	-1.376***	-1.370***		
	(-20.791)	(-20.701)		
lnservice_share	0.523***	0.523***		
	(12.641)	(12.652)		
lnspe×policy	-0.626***	-0.696***	-0.606***	-0.663***
	(-33.254)	(-34.573)	(-34.445)	(-34.747)
lndiv×policy	-0.063**	-0.077***	-0.120***	-0.186***
	(-2.522)	(-2.784)	(-5.065)	(-6.897)
_cons	-8.680***	-8.964***	69.363***	66.263***
	(-15.673)	(-16.179)	(25.857)	(24.694)
Year_FE	Y	Y	Y	Y
Fixed_Effect	Y	Y	Y	Y
Industry_FE	Y	Y	Y	Y
N	337450	331955	331564	331564
R^2	0.398	0.399	0.399	0.400

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t statistics in parentheses, and * p < 0.1, ** p < 0.05, *** p < 0.01

4.2. Endogeneity Problems and Instrumental Variables

In this paper, the 2SLS estimation method is used to further deal with the endogenous problem of the model. In terms of instrumental variables, the interaction terms of one-period lag independent variable and the average ground slope are used as instrumental variables for specailiztion externalty and diversity externalty. Since the average altitude is a variable that does not change with time, this paper uses the average altitude and one-period lag specailiztion externalty or diversity externalty interaction terms as instrumental variables to deal with the endogeneity .

As it is shown in Table 3, when the interaction term between the lagging dependent variable and the average urban slope is used as the instrumental variable for specialization and diversity agglomeration, the regression coefficient remains significantly negative, and the marginal effect of specialization on new firms' entry is slightly large than the baseline estimation, while the marginal effect of diversity got smaller. The the interaction term for government intervention and specialization and diversity agglomeration is still significantly negative. The results remain consistent with the baseline regression when applying the instrumental variable, although the size of the regression coefficient has changed.

Table 3. Endogeneity problems and instrumental variables

Variable	Dependent variable: the number of new enterprises		
	Instrument : lag_spe×slope and lag_div×slope as	Instrument : lag_spe×slope×lnmon and lag_div×slope×lnmon	Instrument : lag_spe×slope×lnpre and lag_div×slope×lnpre
	(1)	(2)	(3)
lnspe	0.703***	0.735***	0.730***
	(111.126)	(100.726)	(98.967)
lndiv	0.089***	0.130***	0.122***
	(4.241)	(6.095)	(5.718)
spe_mon		-0.337***	
		(-8.061)	
div_mon		-0.420***	
		(-8.845)	
spe_pre			-0.342***
			(-7.510)
div_pre			-0.510***
			(-10.060)
_cons	-9.614238***	-10.03107***	-10.17903***
	(-17.98)	(-18.78)	(-19.04)
Year_FE	Y	Y	Y
Fixed_Effect	Y	Y	Y
Industry_FE	Y	Y	Y
N	324531	324531	324531
R^2	0.397	0.399	0.399

t statistics in parentheses, and * p < 0.1, ** p < 0.05, *** p < 0.01

5. FURTHER ANALYSIS OF THE MECHANISM

The above empirical research shows that urban agglomeration has a significant role in promoting the entry of enterprises. This section will further conduct empirical research on its mechanism. Specifically, based on the analysis of the previous literature, this article will start from input and output sharing, labor pooling, and technology spillover to test how these three influence mechanisms are working in China.

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5.1. Input-Output Sharing($inout_{ikt-1}$)

Ne enterprises are established in cities where upstream enterprises gather, so that they can be closer to suppliers and reduce transportation cost and shorten the transportation time. The agglomeration of upstream industries can also improve the quality of input materials to a certain extent by redusing the purchase price of raw materials, and promote the vertical overflow of production technology knowledge, which in turn leads to the innovation of processes and production innovation of the new firm (Glaeser and Kerr, 2009). In the same way, the agglomeration of downstream industries in cities will bring new entrants closer to the consumer market. On the one hand, a larger market scale can reduce the average production and transportation costs (Zhang and Shen, 2020); on the other hand, a huge consumer group and diverse demand has enabled new entrants to gain greater market space and survival rate (Zhang, 2018). Following the practices of Dumais et al (2009) and Jofre-Monseny et al (2011), input sharing and output sharing effects are defined as equations (5) and (6). Among them, $I_{ij} = \frac{in_{i\leftarrow j}}{total\ in_{i\leftarrow j}}$,$in_{i\leftarrow j}$ is equal to the share of industry i's total input from industry j, $O_{ij} = \frac{out_{i\rightarrow j}}{total\ \ out_{i\rightarrow j}}$, $out_{i\rightarrow j}$ is equal to the share the share of industry i's total output that flows to industry j :

$$input_{ik} = \sum_{i\neq j} I_{ij} \cdot \frac{L_{jk}}{L_j} \tag{5}$$

$$output_{ik} = \sum_{i\neq j} O_{ij} \cdot \frac{L_{jk}}{L_j} \tag{6}$$

As shown in equations (5) and (6), L_{jk} is the proportion of employment in industry j in the city k to the employment in industry j in the country. $input_{ik}$ measures the degree of agglomeration of input suppliers in the region k industry i, and $output_{ik}$measures the demand for the region k industry i.

Refer to the pratice of Glaeser and Kerr(2009), the variables that measure the input-output sharing between industries are defined as follows:

$$inout_{ik} = input_{ik} + output_{ik} \tag{7}$$

5.2. Labor Pooling($labor_{ikt-1}$)

First of all, the more intuitive labor pool effect means that, due to the larger labor market, the matching of enterprises and employees is more effective. In particular, companies that are more sensitive to heterogeneous impacts tend to be more likely to adjust the input of labor elements where large-scale labor forces with similar skills are concentrated, so as to maximize profits. Therefore, regions with a high concentration of firms are more likely to attract new firms (Marshall, 1920; Krugman, 1991; Duranton and Overman, 2008 ; Glaeser and Gottlieb, 2009; Puga, 2010) believe that the labor pool effect basically means that companies prefer places that can eliminate the impact on productivity through flexible adjustment of labor input, rather than areas that can only respond to shocks by adjusting wages. Therefore, we calculate the labor pool according to what they do and the calculation process is mainly divided into the following steps. The first step is to calculate the difference (absolute value) between the labor input changing rate of each enterprise and the labor input changing rate of the industry. According to the definetion, when the enterprise increases (decreases) labor input, other enterprises in the industry tend to reduced (increased), there is a labor pool effect. The greater the above

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difference, the greater is the labor pool effect. The second step is to calculate the city-industry-year-level average value of the heterogeneous labor demand of enterprises obtained from the first step. This average value is used to measure the flexibility of adjusting the input of labor in the face of shocks in each city-industry.

5.3. Technology Spillover Effect ($techspill_{ikt-1}$)

Technology spillover mainly affects the entry of new enterprises from two mechanisms. Firstly, companies share knowledge and skills through formal and informal interactions in areas where industries are concentrated, which may generate positive production externalities among employees, promoting the effective skills and knowledge exchange, and thereby improve innovation capabilities of the new firm. This mechanism is more important for some high-tech industries (Jaffe et al. 1993). Second, the gathering of new companies with many companies that use the similar technologies improves the external learning capabilities of new companies, strenthening the dissemination and sharing of new technologies among companies. Since technology spillovers often occur between industries with similar technologies and similar investment structures, this article follows the practice of Yin and Pin (2006), Pan et al. (2011) and Zhang (2018), we construct an industry technology similarity matrix , the use cosine of similarity matrix as the weight to measure the degree of technology spillover between industries.

$$techsim_{ij} = \frac{\sum_l a_{li} \cdot a_{lj}}{\sqrt{\sum_l a_{li}^2 \cdot \sum_l a_{lj}^2}} \tag{8}$$

The first step, as shown in equation (8), a_{li} and a_{lj} respectively represent the l element of the column vector of the direct consumption coefficient matrix of industry i and industry j. The value of $techsim_{ij}$ is between 0 and 1, and the larger its value is, the more similar the technology between i and industry j.

$$techspill_{ikt-1} = \sum_{j \neq i} \frac{techsim_{ij}}{\sum_{j=1}^{n} techsim_{ij}} \cdot \frac{L_{jk}}{L_j} \tag{9}$$

The second step, as shown in equation (9), for each industry i, divide the technical similarity of any two industries ij($techsim_{ij}$)by the sum of the technical similarities of industry i and all other industries ($\sum_{j=1}^{n} techsim_{ij}$), and the labor share is used as the weight to calculate the city-industry-year average, which is used as the technical similarity weight of industry i and industry j.

Table 4 shows the regression results of these three mechanisms. It is not difficult to see that the coefficients of the input-output linkage mechanism, the labor pool effect, and the technology spillover mechanism are significantly positive, which means that the externalities of urban agglomeration promote enterprise entry through these three mechanisms. In addition, The interaction terms of the three mechanisms with administrative monopoly and the preference of state-owned enterprises are all significantly negative.

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Table 4. Analysis of Mechanism

Variable	Dependent variable: the number of new enterprises		
	Without interation	interaction term of lnmon	interaction term of lnpre
	(1)	(2)	(3)
lninout	1.278***	1.269***	1.274***
	(142.103)	(141.272)	(141.792)
lnlabor	0.027***	0.039***	0.043***
	(5.229)	(7.348)	(8.036)
lntechsim	0.080***	0.014	-0.017
	(6.590)	(1.099)	(-1.362)
lnmon	-0.138***	0.013	-0.078
	(-2.773)	(0.270)	(-1.572)
lnpre	-0.246***	-0.678***	-0.704***
	(-3.973)	(-10.745)	(-11.187)
lninout×policy		-0.799***	-0.892***
		(-16.730)	(-17.068)
lnlabor×policy		-0.131***	-0.173***
		(-5.608)	(-6.831)
lntechsim×policy		-1.170***	-1.597***
		(-28.171)	(-32.609)
_cons	-0.424	-0.193	-0.098
	(-0.907)	(-0.413)	(-0.210)
Year_FE	Y	Y	Y
Fixed_Effect	Y	Y	Y
Industry_FE	Y	Y	Y
N	328499	328499	328499
R^2	0.383	0.386	0.386

t statistics in parentheses, and * p < 0.1, ** p < 0.05, *** p < 0.01

Combining the previous theoretical analysis, it can be seen that the agglomeration of upstream and downstream industries in a city can help stimulate the innovation of the industry and increase the entry of enterprises through the increase in demand for existing products or new requirements for products and technologies in the industry. It also provides a potentially flexible labor market for start-ups, thereby reducing the impact of economic shocks on new enterprises. Finally, technological connections and technological spillovers increase the willingness of enterprises to enter by increasing the influence of "learning by doing". At the same time, administrative intervention and preference for state-owned enterprises have weakened the positive effect of agglomeration on enterprise entry.

6. CONCLUSION AND RECOMMENDATIONS

In this paper, by constructing a unified analysis framework of industrial agglomeration, government intervention and the location of new enterprises, we use urban panel data from 2001 to 2008 to explores the comprehensive mechanism of industrial agglomeration and government intervention of the creation of new enterprises. The results show that both specialized agglomeration and diversified agglomeration have positive impact on enterprises entry. While government intervention, including administrative monopoly and preference to state-owned enterprises, not only directly weaken enterprise entry, but also indirectly affects the creation of urban enterprises by restraining the positive externality of industrial agglomeration. After the robustness test, the regression result is still significant.

Further research found that the more government intervenes, the smaller the marginal effect of agglomeration on the birth of new enterprises. From the mechanism analysis, industrial

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agglomeration will increase the willingness of new firm entry by strengthening the mechanism of input and output sharing, labor pooling and technology spillover. And both government's administrative monopoly and preference for state-owned enterprises have limited the positive effects of the above three mechanisms on enterprise entry.

According to the above analysis, this paper makes the following policy recommendations. On one hand, government intervention needs to be controled within a reasonable and proper range, and it should be set up on the basis of local industrial structure and comparative advantages in order to play a positive role in the agglomeration economy. On the other hand, the implementation of industrial policies needs to take into account the market forces of specialized agglomeration and diversified agglomeration, so that market incentives will then come into play as decisive part in efficient allocation. It is necessary to improve synergistic effect between government management and agglomeration on urban entrepreneurship. To achieve this goal, the government should devote itself to creating a business environment for enterprises with a free market and fair market competition rules, so that they can increase the agglomeration effect and attractiveness of the city to enterprises by complying with market rules.

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