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Article

Industry-related diversity, unrelated diversity and urban aggregate employment creation——Adjustment based on urban absorptive capacity and entrepreneurship level

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Abstract: Employment is the biggest livelihood of the people. What kind of industrial structure is more conducive to employment creation is an important issue for the government to consider when adjusting the industrial structure. Using enterprise and city data, using a spatial dynamic panel model that takes into account both the dynamic change of dependent variables and the spatial spillover effect, and can overcome the endogenous problem between variables, this paper examines the impact of industry-related diversity and unrelated diversity on urban aggregate employment creation. The study finds that both types of diversity are conducive to urban aggregate employment creation, but the role of related diversity is more prominent in comparison. Urban heterogeneity plays an important role in regulating the employment creation effect of industrial diversity. Among them, urban absorptive capacity strengthens the employment creation effect of the two types of industrial diversity, and is more conducive to promoting the employment creation effect of related diversity. However, the level of Urban Entrepreneurship is only positive for the employment creation effect of unrelated diversity.

Keywords: industrial structure; diversity; urban employment; entrepreneurship level

The report of the 19th National Congress of the Communist Party of China pointed out that employment is the greatest livelihood of the people. China has added 15million new employees every year. In the shifting period of economic growth, the employment pressure is even greater. Therefore, it is of great significance to explore the influencing factors of employment creation and take targeted optimization measures to promote employment creation and improve the quality of economic development. The important role of regional industrial structure in regional innovation and economic growth has been confirmed by a large number of literatures [1,2]. However, there is a great controversy about what kind of knowledge externality of industrial structure has more prominent significance for economic growth. Jacobs [3] believes that diversified industrial structure is more conducive to stimulating enterprise innovation and better boosting economic growth than specialized industrial structure due to diversified knowledge externalities. So, what kind of industrial structure is more conducive to China's employment creation? Will the diversified industrial structure be conducive to promoting employment creation? Which heterogeneous attributes of cities can regulate the employment creation effect of industrial structure? This study attempts to answer this question, so as to provide policy reference for the government to take targeted measures to promote employment creation.

The distinguishing features of this paper from the existing literature are as follows:

firstly, based on the reality of China's diversified industrial structure, this paper divides the diversity into related diversity and unrelated diversity, deeply investigates the impact of the diversity of industrial structure at the urban level on aggregate employment creation, and provides a reliable perspective for understanding the positive significance of the diversity of industrial structure to developing countries from the perspective of employment creation. Secondly, the influence of urban absorptive capacity and entrepreneurial level on the employment creation effect of industrial structure diversity is considered to investigate the regulatory effect of urban heterogeneity on employment creation effect. Thirdly, in terms of measuring urban aggregate employment creation, we adopt the method of [4]. This method adopts the aggregation of micro enterprise employment data, and comprehensively considers the entry, exit and survival of enterprises. This method can better reflect the evolution of enterprises and their contribution to employment creation than the traditional use of regional aggregate employment growth indicators. At the same time, in the empirical method, we use the spatial dynamic panel data model. This method can not only consider the dynamic changes of dependent variables and spatial spillover effects, but also overcome the endogenous problem between variables, making the estimation results more authentic and reliable.

1. Theoretical hypothesis

There have been empirical studies on the effects of specialization externalities and diversification externalities on employment growth, and there are inconsistent conclusions. Glaeser et al. [5]. This paper analyzes the environment of employment growth in American cities from 1956 to 1987. The results show that diversified industrial structure is more conducive to employment growth, while specialized industrial structure restricts employment growth. However, Henderson et al. [1] came to a different conclusion. They found that the specialized industrial structure was more conducive to employment growth using the U.S. data from 1970 to 1987, with the only exception of the high-tech industry. Combes [2] studied the economic development of France and believed that diversification was more conducive to the employment growth of service industry, but had less effect on the employment growth of manufacturing industry.

In view of the complexity and subtlety of the concept of industrial diversity, Frenken et al. [7] raised a very key question, that is, are the diversified industries related or unrelated, which is easier to promote economic growth? Their conclusion is that the cost of relevant diversity in promoting local knowledge spillovers between industries is relatively low. This is because the cognitive distance between these related industries is small, so there is complementarity; this includes the ability to share, which makes it possible to effectively link industries, and it is easier for these related industries to share knowledge and information. On the contrary, among industries unrelated to diversity, there are prominent cognitive differences due to the large differences among industries, which may hinder the dissemination of knowledge among industries. Because they are completely different, the inconsistent knowledge base makes it more difficult for them to participate in reorganization innovation, thus hindering the emergence of regional incremental innovation. However, due to the strong portfolio effect, uncorrelated diversity can reduce the impact of external asymmetric shocks and help reduce economic volatility [6]; therefore, it can restrain the rise of regional unemployment rate. Frenken et al. [7] used the data of the Netherlands and found that the relevant diversity had a significant positive effect on economic growth, but the irrelevant diversity was not significant.

This conclusion has been confirmed in several countries, such as Boschma and Iammarino [8] in Italy, Boschma et al. [9] in Spain, Hartog et al. [10] in Finland, which have obtained conclusions similar to those of frenken et al. However, van Oort et al. [11] found that relevant diversity and irrelevant diversity had no different impact on regional employment growth by using data at the European national level. In addition to these results, [12] found that unrelated diversity affects the development of radical innovation, that is, unrelated diversity tends to rely on radical innovation and can diversify technology in different ways. Therefore, we believe that these two forms of diversity may be conducive to economic growth and thus to employment creation. However, due to the related diversity, it increases the possibility of knowledge spillover and is conducive to incremental innovation (mainly incremental), which is more conducive to employment creation.

Therefore, we propose hypothesis 1: both related diversity and unrelated diversity have a positive effect on urban aggregate employment creation, but the role of related diversity is more prominent.

The knowledge spillover from industrial diversity is transformed into the driving force to promote local economic development and employment growth, which is closely related to the absorptive capacity of cities; the stronger the absorptive capacity of a city, the more it can absorb the knowledge spillovers of industrial diversity. However, the same absorptive capacity has different effects on different kinds of knowledge spillovers. Cohen and Levintha [13] emphasized the importance of knowledge relevance to absorption. They believed that the learning objects were all related, which was more conducive to improving the learning effect. This is mainly because the cognitive distance between related industries is small, and the difficulty and cost of absorption are lower. However, there is a prominent cognitive gap between no related industries, which leads to higher absorption costs and greater difficulty. That is to say, compared with the unrelated diversified industrial structure, the absorptive capacity of cities is easier to obtain knowledge spillovers, thus promoting regional economic growth and employment creation.

Hypothesis 2: compared with unrelated diversity, urban absorptive capacity is more conducive to strengthening the urban aggregate employment creation effect of related diversity.

Because new knowledge is not easy to be accepted or traded by others in the market, employees who put forward some new knowledge and ideas often become the founders of start-ups. For the founders of these start-ups, starting their own business is often the only way to turn these innovations into productivity. Otherwise, these innovative ideas are ignored by the incumbents and can only remain dormant and shelved [14].

And because the economic value of incremental innovation is easier to evaluate than radical innovation (or fundamental innovation), incumbent enterprises tend to choose incremental innovation in order to reduce risks; radical innovation is more easily accepted by start-ups. Baumo [15] also found this economic reality by observing the operation of American industrial economy. Because of the cognitive distance, radical innovation is more likely to occur in the unrelated industrial structure; incremental innovation is more likely to occur among related industries [12]. The significant role of start-ups in introducing radical innovation makes their spillover effects in unrelated knowledge fields and industries particularly important. Therefore, the role of entrepreneurial enterprises in transforming knowledge into employment creation should be more prominent in the highly unrelated diversity regions.

Hypothesis 3: the level of Urban Entrepreneurship is more conducive to the employment creation effect of unrelated diversity, but has no significant impact on the employment creation effect of related diversity.

2. Empirical models, variables and data

2.1. Empirical model

As the urban aggregate employment creation is dynamic, the current level of urban aggregate employment creation is not only subject to the current conditions, but also inevitably affected by the previous conditions; at the same time, the cross spatial mobility and competitiveness of urban employment make it possible for urban aggregate employment creation to have spatial interaction. Therefore, we also take into account the spatial correlation of urban aggregate employment creation. We use the spatial lag dynamic panel model to examine the impact of industrial diversity on urban aggregate employment creation. The outstanding feature of the spatial dynamic panel model is that it can not only consider the dynamic change of regional aggregate employment creation and spatial spillover effect, but also overcome the endogenous problem between variables, making the estimation results more authentic and reliable. Spatial dynamic panel model is becoming more and more popular in economic research because of its obvious advantages. It combines the advantages of time series measurement, spatial measurement and panel data measurement. Spatial dynamic panel data model estimation overcomes the estimation bias of dynamic but non spatial or spatial but non dynamic panel data models. So there are models:

$$JC_{ct} = \alpha_1 JC_{ct-1} + \rho \sum_{m=1}^{n} W_{cm} \times JC_{ct} + \beta_1 lnRV_{ct} + \beta_2 lnURV_{ct} + \gamma_1 X_{ct} + \eta_C + \eta_t + \varepsilon_{ct} \quad (1)$$

$$JC_{ct} = \alpha_1 JC_{ct-1} + \rho \sum_{m=1}^{n} W_{cm} \times JC_{ct} + \beta_1 \ln RV_{ct} + \beta_2 \ln URV_{ct} + \mu_1 \ln RV_{ct} * INT_{ct} + \mu_2 \ln URV_{ct} * INT_{ct} + \gamma_1 X_{ct} + \eta_c + \eta_t + \varepsilon_{ct} \quad (2)$$

$$\varepsilon_{ct} = \lambda \sum_{m \neq c}^{N} w_{\backslash cm} \varepsilon_{cm} + \mu_{ct}$$

(2) Compared with Equation (1), Equation (1) takes into account the interaction between the city’s absorption capacity, innovation level and the industrial diversity index. In the model, the JC_{ct} dependent variable is the measurement index of the aggregate employment creation of City *C* in year *t*, *rv* is the relevant diversity index, urv is the uncorrelated diversity index, and int is the attribute of urban heterogeneity,

that is, the adjustment variable. We consider two indicators: the absorptive capacity (absorber) and the level of Entrepreneurship (lnentership). X is the control variable vector. According to the existing literature, we mainly control the city's trade openness (OP), population density (lnpop), per capita wage (lnwave) and other variables. H C is the urban fixed effect, which is used to control the influence of unobservable urban attributes; η T is the year fixed effect, which is used to control the influence of unmeasurable time changes. P, λ They are spatial lag coefficient and spatial error coefficient respectively. When $p = 0$, the model degenerates into the traditional dynamic panel data model; ε Is a random error term.

W_{cm} The spatial weight matrix is used to reflect the spatial relationship between different cities. In the spatial weight matrix, we use binary adjacent weights, and we consider the real economic links between cities; on the basis of commonly used binary adjacent weights, the W_{cm}influence of regional economy is added, including; among them, it $W_{cm}^{E} = W_{cm} * T_{cm}$can T_{cm}reflect the economic differences between cities, and is $T_{cm} = ln\left(\frac{y_c}{y_m}\right)$the $\bar{y}_c = \frac{1}{t_k - t_0 + 1}\sum_{t_0}^{t_k} y_{ct}$GDP y_{ct} of City C in year t. Generally speaking, the demand structure between cities with smaller economic differences is similar, and the labor flow is more frequent. In the study, we standardized each weight matrix before introducing spatial lag variables. Because the spatial dynamic panel data model has the dynamic change of dependent variables and spatial lag, the traditional OLS estimation will be biased for this kind of estimation. Jacobs et al. [16] expanded the system generalized moment estimation of [17] to account for spatial effects. Due to the use of instrumental variables to overcome the endogenous nature of variables, this method has obvious advantages over the traditional spatial maximum likelihood estimation. More importantly, they found that the system generalized moment method can reduce the bias of spatial lag parameters better than the difference generalized moment method. Therefore, we also use the generalized moments of the system to estimate the spatial dynamic panel model.

2.2. Calculation of urban aggregate employment creation

Using Haltiwanger et al. [4] and other methods for reference, and using the enterprise data of the "statistical database of China's industrial enterprises" from 2000 to 2012, this paper constructs a measurement method for the comprehensive employment creation rate index including the entry, exit and survival of enterprises, including:

$$g_{et} = \begin{cases} 2\left(e_t - e_{t-1}\right)/\left(e_t + e_{t-1}\right) & if\ \ e_{t-1}, e_t > 0 \\ -2 & if\ \ e_{t-1} > 0, e_t = 0 \\ 2 & if\ \ e_{t-1} = 0, e_t > 0 \end{cases} \tag{3}$$

$$JC_{ct} = \sum_{e \in E_{st}, g_{et} > 0} \left(\frac{x_{et}}{X_{ct}}\right) g_{et} = \frac{\sum_{e \in E_{st}, g_{et} > 0} \left(e_t - e_{t-1}\right)}{X_{ct}} \tag{4}$$

JC_{ct} Is the aggregate employment creation rate index of City C in year t, e is the enterprise employment, t is the year, g is the comprehensive growth rate, X_{ct} is the total employment of City C in year t, and is the aggregate of the employment scale of each enterprise.

2.3. Diversity index

1. Unrelated diversity index

We use the methods of [7] and others to calculate the entropy value of two-digit industries. Whether there is relevant diversity index (urv) is:

$$URV_{ct} = \sum_{c=1}^{I} pg_{ct} \log(\frac{1}{pg_{ct}}) \tag{5}$$

where pg_{ct} is the proportion of two-digit industry employment of City C in year t, and I is the largest number of two-digit industries of City C in year t, and the logarithm is taken in the model.

2. Relevant diversity index

Since the industrial enterprise database, we use is only detailed to four-digit industries, according to [7], four-digit industries belonging to the same two-digit industry have high technical correlation, and these industries have the same cognitive complexity. This is mainly because many of the technologies and product characteristics used between the four-digit industries subordinate to the same two-digit industry are similar, including:

$$RV_{ct} = \sum_{g=1}^{G} p\, g_{ct} H g_{ct}, \text{ including:} g_{ct} = \sum_{i \in Sg} \frac{pi_{ct}}{pg_{ct}} log_2 \left(\frac{1}{pi_{ct}/pg_{ct}}\right) \tag{6}$$

where $pi_{ct}$is the employment proportion of four-digit industries in City C in year t, and G is the largest number of two-digit industries in the city, and the logarithm is taken in the model.

2.4. Adjusting variables

1. Urban absorptive capacity

The knowledge base of cities is the main influencing factor to absorb industrial externalities. We use the proportion of urban science and technology employees in the total employment to measure.

2. Lnentership

The internationally accepted practice, that is, the number of new private enterprises established in the city each year, is adopted to measure the entrepreneurial level of the city. Due to the limited availability of data, we use the number of new private enterprises established in the manufacturing industry in the city each year as an agent and take the logarithm.

2.5. Control variables

1. Trade Openness (lnop)

Trade opening can benefit economic growth and promote employment creation through technology spillovers, capital investment and trade competition effects. At the same time, the opening of trade means that regional enterprises are facing broader market demand, making enterprises profit from economies of scale, thus promoting employment creation. We use the ratio of the city's total import and export trade to GDP, and take logarithm in the model.

2. Population density (lnpop)

This variable is used to control the spatial agglomeration effect of economic behavior. In areas with high population density, the urban economies of scale are more obvious. The more professional service facilities can be provided for residents, such as universities, business services, convenient transportation facilities, etc., so as to better promote the production and dissemination of knowledge, facilitate economic development, and promote employment creation. However, when the population density is too large, that is, when there is overcrowding, the cost of enterprises will increase, which is not conducive to employment creation, that is, the scale is not economic; and take logarithm in the model.

3. Per capita wage (lnwave)

As high regional wages reflect higher labor costs of enterprises, it also means higher barriers to entry of enterprises, which may hinder regional economic growth, and then go against the employment creation of enterprises. However, from another perspective, higher wages can reflect the higher skill level of the city, which may be more conducive to economic growth and promote employment creation. Therefore, the impact of per capita wage on employment creation depends on the comparison of positive and negative effects. For this variable, we use the per capita wage of industrial enterprises in the same city in the same year in the enterprise database, and take 2000 as the base period, deflate it with the price index, and take the logarithm.

2.6. Data source and processing

The spatial units studied in this paper are cities above prefecture level. Due to the lack of data indicators in some cities, 275 cities above prefecture level are selected as the research objects. Our data is mainly based on China's industrial enterprise database from 2000 to 2012. The industrial enterprise database contains the administrative region code, industry code, registration type, sales output value of the corresponding year, year-end residual value of fixed assets, number of employees, opening time, intermediate input value, capital investment, wage expenditure, etc. Of the industrial enterprise, providing us with more comprehensive data for our research. We deleted and sorted out some enterprises with obvious errors and omissions in key variables such as industrial output value, and finally obtained the enterprise data to be estimated. On this basis, we match the enterprise data with its city. As the industrial enterprise industry code is refined to four-digit industry code, we will combine and classify the enterprises belonging to the same two-digit industry in the same city, so as to calculate the relevant diversity index and irrelevant diversity index of each city respectively. Other relevant data are from the China Statistical Yearbook, china Urban Statistical Yearbook, provincial statistical yearbooks and the database of China economic network in the corresponding years. **Table 1** below is the descriptive statistics of the main variables.

Table 1. Description and statistics of main variables.

Variable	Maximum	Minimum value	Mean value	Standard deviation
JC	0.191	0.094	0.143	0.022
RV	3.739	1.821	3.274	1.463
URV	1.428	0.219	0.655	0.287

3. Empirical test results

3.1. Basic measurement results

Table 2 reports the impact of industry related diversity and unrelated diversity of cities on aggregate employment creation using the spatial dynamic panel model. Before using the generalized moment estimation of spatially dynamic systems, the spatial correlation must be tested. Anselin et al. [18] developed two Lagrange multiplier tests (LM) to test the spatial lag and spatial error correlation between variables. We also use Lagrange multiplier test (LM) to test spatial lag and spatial error correlation. The statistical results of LM test are shown in **Table 2**. The results show that the LM lag robust panel test statistic is larger than its corresponding critical value (p = 0.000), and the LM error robust panel test statistic is also smaller than the corresponding critical value. This result means that the spatial interaction effect does exist. Focusing on the results of the system generalized moment (sys-gmm) test, we can see that the Hansen over identification test statistics cannot reject the null hypothesis, that is, these instrumental variables are valid. In addition, the P values of AR (1) are all between 0 and 0.1, indicating that there is a significant first-order autocorrelation in the residual term; all AR (2) P values are greater than 0.3, which means that the second-order autocorrelation of the residual term does not exist. The relevant statistics show that the estimation of spatial dynamic panel model using generalized moments of the system is effective and robust.

The spatial lag parameters in the results are significantly positive, indicating that the employment creation between cities has spatial correlation. It can be seen from the report results in columns (2), (3) and (4) that the coefficient of relevant diversity and the coefficient of unrelated diversity are positive and statistically significant; this shows that in China’s urban diversified industrial structure, both related diversity and unrelated diversity are conducive to urban aggregate employment creation. However, in comparison, the coefficient of related diversity is significantly greater than that of unrelated diversity, which indicates that the industrial structure of related diversity is easier to promote employment creation in Chinese cities than that of unrelated diversity. This conclusion confirms hypothesis 1. Our conclusion is similar to the research conclusion of frenken et al. [7], that is, the related diversity is due to the closer cognitive gap (or complementarity) between industries, which is more conducive to knowledge spillover, more conducive to promoting the generation of incremental innovation and better boosting economic growth, thus playing a more prominent role in promoting employment creation.

Table 2. Basic measurement results (spatial dynamic panel model-system generalized moment estimation).

Variable	**(1)**	**(2)**	**(3)**	**(4)**
Constant	1.872***	-2.066**	0.719***	0.034
	(4.465)	(-2.083)	(5.052)	(1.028)
Jc_{it-1}	0.649***	0.624***	0.686***	0.630***
	(4.350)	(4.073)	(4.419)	(4.252)
W*jclt	0.284***	0.249***	0.257***	0.268**
	(3.265)	(3.782)	(3.455)	(3.642)
Lnrv		0.349***		0.366***
		(5.084)		(5.427)
Lnurv			0.074**	0.059**
			(2.108)	(2.073)
OP	0.875***	0.882***	0.865***	0.791***
	(4.713)	(4.356)	(4.167)	(3.823)
Lnpop	0.054*	0.066**	0.058**	0.046**
	(1.937)	(2.174)	(2.099)	(2.059)
Lnwage	0.124	0.106	0.115	0.133
	(1.385)	(1.159)	(0.893)	(0.923)
City, year fixed effect	Have	Have	Have	Have
Observed value	3 575	3 575	3 575	3 575
LM error robustness test	[0.445]	[0.439]	[0.449]	[0.442]
LM lag robustness test	[0.000]	[0.000]	[0.000]	[0.000]
AR(1)	[0.023]	[0.034]	[0.026]	[0.022]
AR(2)	[0.388]	[0.376]	[0.354]	[0.363]
Hansen over identification test	[0.571]	[0.577]	[0.568]	[0.580]

Note: *, **, ***, respectively mean significant at the level of 10%, 5% and 1%, and t value in brackets.

Among the control variables, the trade openness coefficient is significantly positive, that is, trade openness is conducive to promoting urban aggregate employment creation. Both export trade and import trade can promote economic growth and urban employment creation through competition effect, technology spillover effect, employment allocation effect and export market scale effect. This conclusion is consistent with the research conclusion of [19].

The population density coefficient is also significantly positive, indicating that in China, the positive effect of population density on urban economies of scale is greater than the negative effect of diseconomy of scale, and the overall positive effect on employment creation. In areas with high population density, the economies of scale in cities are obvious. The convenient facilities reduce the production costs of enterprises, and better promote the generation and dissemination of knowledge, which is conducive to economic development and employment creation. This is consistent with the reality that a large number of employment opportunities appear in large cities in China.

But the effect of per capita wage on employment creation is not significant. This shows that the positive and negative effects of per capita wage on employment creation are equal and offset each other, resulting in the overall impact on employment creation is not significant.

3.2. Adjustment of urban absorptive capacity and entrepreneurship level

Table 3 reports the adjustment effect of urban absorptive capacity and entrepreneurship level on the employment creation effect of industrial diversity investigated by using the spatial dynamic model. We also use the system generalized moment to estimate. As can be seen from columns (1), (2) and (3) in the table, first of all, the urban absorptive capacity measured by the proportion of urban science and technology employees in the total employment has a significant positive impact on the total employment creation. The higher the proportion of science and technology employees, the more conducive it is to promote economic growth, and then to the employment creation of industrial enterprises.

Focus on the interaction coefficient between urban absorptive capacity and related diversity and unrelated diversity index. It can be seen that the two coefficients are significantly positive, but the interaction coefficient between urban absorptive capacity and related diversity is stronger than the interaction coefficient between absorptive capacity and unrelated diversity index regardless of significance or size. The results show that the urban absorptive capacity enhances the employment creation effect of the two kinds of industrial diversity. However, due to the small cognitive distance between the related diversified industries, the knowledge spillovers are easier to be absorbed. The stronger the urban absorptive capacity is, the easier it is to transform the absorbed knowledge into a driving force to promote local economic development, and then promote employment creation; however, among industries without related diversity, the cognitive distance is large and the absorption cost is high. Therefore, the same urban absorption capacity has a relatively small positive effect on industries without related diversity than industries with related diversity to absorb and transform it into promoting employment creation. Therefore, hypothesis 2 has been confirmed.

Table 3. Adjustment of urban absorptive capacity and entrepreneurship level (spatial dynamic panel model - system generalized moment estimation).

Variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Constant	1.543 (1.429)	−0.275*** (−2.618)	2.466 (0.248)	1.872*** (4.465)	−2.066** (−2.083)	0.719*** (5.052)
Jcit−1	0.522*** (3.674)	0.576*** (3.425)	0.534** (3.861)	0.617*** (3.572)	0.603*** (3.249)	0.608*** (3.488)
W*jclt	0.209*** (5.128)	0.217*** (5.782)	0.214*** (5.473)	0.237*** (4.951)	0.229*** (4.387)	0.232*** (4.872)
Lnrv	0.327*** (5.001)	0.345*** (5.874)	0.319*** (5.690)	0.302*** (5.643)	0.308*** (5.370)	0.313*** (5.582)
Lnurv	0.046** (2.018)	0.040** (2.139)	0.033** (2.062)	0.061** (2.044)	0.057** (2.109)	0.066** (2.084)
Int	0.472*** (3.236)	0.328*** (3.652)	0.311*** (3.109)	0.245*** (2.866)	0.228*** (2.834)	0.234*** (3.007)
Lnrv × INT		0.043*** (3.559)			0.192 (1.457)	
Lnurv × INT			0. (1.834)			0.073*** (3.462)
OP	0.817*** (3.522)	0.834*** (4.009)	0.801*** (4.172)	0.872*** (4.013)	0.893*** (3.963)	0.867*** (3.888)
Lnpop	0.049*** (2.544)	0.041*** (2.863)	0.048*** (2.739)	0.039*** (2.870)	0.036*** (2.543)	0.041*** (2.925)
Lnwage	0.146 (0.895)	0.157 (1.406)	0.098 (1.066)	0.188 (1.249)	0.172 (0.945)	0.168 (1.350)

Fixed effect of city and year	Have	Have	Have	Have	Have	Have
Observed value	[0.482]	[0.469]	[0.472]	[0.455]	[0.449]	[0.457]
LM error robustness test	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
LM lag robustness test	[0.037]	[0.040]	[0.033]	[0.033]	[0.039]	[0.030]
AR (1)	[0.362]	[0.354]	[0.367]	[0.351]	[0.344]	[0.348]
AR (2)	[0.583]	[0.588]	[0.574]	[0.562]	[0.580]	[0.577]
Hansen over identification test	[0.482]	[0.469]	[0.472]	[0.455]	[0.449]	[0.457]

The values in brackets are t values, *, **, ***, which are significant at the level of 10%, 5% and 1% respectively.

From the results in columns (4), (5) and (6) of **Table 3**, it is found that the level of urban entrepreneurship has a prominent positive effect on urban aggregate employment creation. Haltiwanger et al. [4] found that the employment creation of new enterprises is more important than that of small enterprises, the main executor of employment creation in the traditional concept. We also pay attention to the interaction coefficient between Urban Entrepreneurship level and related diversity, unrelated diversity index. We can find that the interaction coefficient between Urban Entrepreneurship level and unrelated diversity is positive and significant; however, the coefficient of interaction term with correlation diversity is not significant. This shows that the level of Urban Entrepreneurship is conducive to promoting the employment creation effect of unrelated diversity, but has no significant impact on the employment creation effect of related diversity. The main reason is that entrepreneurial enterprises are more likely to accept radical innovation generated in unrelated diversified industrial structure, which has an important impact on urban aggregate employment creation, thus confirming hypothesis 3.

4. Research conclusions and policy implications

In the shift period of economic growth rate under the new normal, china is facing great employment pressure. Therefore, exploring the influencing factors of employment creation plays an important role in promoting sustained and stable economic development. Using the enterprise data from 2000 to 2012 and the data of 275 cities above prefecture level, this paper uses a spatial dynamic panel model that can not only consider the dynamic changes of dependent variables and spatial spillover effects, but also overcome the endogenous problems among variables to investigate the impact of industrial diversity on urban aggregate employment creation. We decompose industrial diversity into related diversity and unrelated diversity. The study found that both related diversity and unrelated diversity are conducive to urban aggregate employment creation. But in comparison, due to the small cognitive distance, the role of related diversity is more prominent. Urban heterogeneity plays an important role in regulating the employment creation effect of industrial diversity. Among them, urban absorptive capacity strengthens the employment creation effect of the two kinds of industrial diversity, and is more conducive to the employment creation effect of related diversity; however, the level of Urban Entrepreneurship only has a positive effect on employment creation unrelated to diversity.

The research of this paper contains certain policy significance: first, the government should promote the rational flow of factors by reducing the barriers to factor flow according to the actual situation of each city; encourage industries to gather reasonably and extend upstream and downstream to create a diversified industrial environment. In particular, for some advantageous industries, policies should be adopted to promote the development of relevant industries in the possible links of the industrial chain, so as to promote the formation of technology related and knowledge complementary urban leading industrial clusters, and thus promote the creation of urban aggregate employment. Second, the government should also consider the construction of urban absorption capacity when carrying out industrial layout. We must further strengthen the construction of scientific and technological talents, increase the proportion of scientific and technological service personnel in the total employed population, further break down the flow barriers of scientific and technological talents, and promote the rational flow of talents within and among industries, so as to enhance the absorption of knowledge spillovers by cities, especially among related industries. Third, the government should promote enterprises' entrepreneurship through financial incentives, institutional guarantees, tax incentives and other policies and measures among industries with large knowledge gaps in cities that have nothing to do with diversity; in particular, for some radical and disruptive innovations that have the potential to be transformed into productivity among such industries, we can support the transformation of these new ideas and knowledge into the driving force of entrepreneurial enterprises through the introduction of venture capital, angel funds and other measures.

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