

# *Research on the Impact of Financial Agglomeration on the Consumption Structure of Urban Residents*

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**Abstract:** This paper uses the panel data of 30 provinces in China from 2011-2021 as a sample, measures the level of financial agglomeration in each province by using the financial location entropy and constructs a fixed-effects model to explore the influence of financial agglomeration on the optimization of urban residents' consumption structure by stepwise regression. The results of the analysis shows that the increase of financial agglomeration in each province in China helps to increase the proportion of urban residents' expenditure on education, culture, entertainment, health care and transportation which is conducive to the improvement of urban residents' consumption quality. We propose policy recommendations for financial agglomeration to help urbanization and industrial structure upgrading, optimize the financial market environment and improve the regulation of the financial industry.

## 1. Introduction

The rapid development of the financial industry is inevitably accompanied by the phenomenon of financial institution system gathering in the region, while the study of the relationship between financial agglomeration and residents' consumption upgrading has not yet received much attention. If financial agglomeration can be beneficial to residents' consumption upgrading, the government should encourage the regional agglomeration of finance; if it is not beneficial to residents' consumption upgrading, the government should reasonably guide the decentralized layout of financial industry. Therefore, it is worthwhile to analyze the influence of financial agglomeration on residents' consumption upgrading, which can not only provide a theoretical basis for the government to formulate policies, but also find a suitable driving force for China's economic development and consumption promotion[1-2].

## 2. Literature Review

There are many studies on the relationship between financial agglomeration and economic growth. However, there are fewer studies on the impact of financial agglomeration on consumption. The relationship between financial agglomeration and income disparity is firstly studied from the macro perspective of financial development and financial industry. Greenwood (1990) and Kim Dong-Hyeon et al. (2011) explored the relationship between finance and the income gap between urban and rural residents and concluded that there is a positive and "inverted U" type relationship between the

two. If the state restricts the development of financial markets, it will increase income inequality (Jon Frost et al., 2018).

Scholars in China focus on this topic in two aspects: on the one hand, they study the relationship between financial agglomeration and the income gap between urban and rural residents. Scholars find that the development of China's financial industry will reduce the income gap between urban and rural residents, but there are differences in the promotion of farmers' income between developed and backward regions (Zhao Di, 2017, Xu Jiyan, 2019, Yang Xuefei, 2020, Zhang Liyan, 2021). The above research puts forward some views on the impact of consumption by exploring the relationship between financial agglomeration and income of urban and rural residents.

On the other hand, studies focus on the impact of financial agglomeration level on consumption structure, such as Zhang Mihong (2020), who finds that there is a significant difference in the effect of agglomeration of different financial sectors on residents' consumption. Banking and insurance agglomeration having a positive spillover effect on residents' consumption upgrade while securities agglomeration produces a negative inhibitory effect. A study by Xiao Liping and Hong Yan (2017) found that financial agglomeration in eastern China has a significant promotion effect on local residents' consumption, while it is insignificant in central and western regions. Ma Jianhui (2018) introduced house price mediating variables to analyze the non-linear beneficial effects of financial agglomeration on residential consumption. Dong Xiuliang et al. (2019) studied the impact of rural financial agglomeration on rural residents' consumption. Financial agglomeration has a significant promotion effect on residents' consumption when the house price is below a certain threshold. Then Dong Xiuliang et al. (2022) used a spatial Durbin model to further investigate how farmers' consumption in a specific region is associated with financial agglomeration in the region and neighboring regions. They found that rural financial development has a significant impact on farmers' consumption and low farmers' income weakens the consumption-promoting effect of financial development[3-6].

### 3. Empirical Analysis

#### 3.1. Empirical Model Design

Based on the panel data of 30 provinces, this paper empirically analyzes the effect of financial aggregation on consumption structure. The econometric model is constructed as follows:

$$\begin{aligned} Consume_{it} = & \alpha + \beta Finance_{it} + \gamma_1 Income_{it} + \gamma_2 Capital_{it} \\ & + \gamma_3 Tech_{it} + \gamma_4 Gov_{it} + \gamma_5 City_{it} + \gamma_6 Old_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

In equation (1),  $i$  denotes the provincial administrative regions;  $t$  denotes the time;  $\alpha$  denotes the constant term;  $\varepsilon_{it}$  denotes the error term of the estimation equation;  $Consume_{it}$  represents the dependent variable, i.e., consumption structure;  $Finance_{it}$  is the core independent variable, representing the entropy of financial agglomeration location. The control variables, including the income level of urban residents ( $Income_{it}$ ), capital level ( $Capital_{it}$ ), technology level ( $Tech_{it}$ ), government support ( $Gov_{it}$ ), urbanization level ( $City_{it}$ ), and aging level ( $Old_{it}$ ). In addition,  $\alpha$ ,  $\beta$ ,  $\gamma_i$  ( $i = 1, 2, \dots, 6$ ) are coefficients to be estimated.

## 3.2. Variable selection and data sources

### 3.2.1. Dependent variable

Referring to Yuan Cheng (2022), this paper takes urban residents' consumption structure as the dependent variable in this paper. This paper uses the sum of enjoyment-oriented consumption expenditure as a proportion of total consumption expenditure to measure. Enjoyment-oriented consumption expenditure includes education, culture and entertainment, health care, transportation and communication, and household goods and services expenditure, which reflects the degree of improvement of consumption quality.

### 3.2.2. Core independent variable

The core independent variable of this paper is financial agglomeration, which refers to the process of financial resources forming densely in a certain geographical space with the development of geographical conditions, i.e., the phenomenon of various enterprises in the financial industry gathering in a certain area. In this paper, the location entropy of financial output is used as a measure of financial agglomeration:

$$LQ_{ji} = \left( X_{ji} / \sum_j X_{ji} \right) / \left( \sum_i X_{ji} / \sum_i \sum_j X_{ji} \right) \quad (2)$$

In equation (2),  $j$  is the  $j$  industry,  $i$  is the  $i$  region;  $LQ_{ji}$  denotes the regional entropy of the  $j$  industry in the  $i$  region;  $X_{ji}$  denotes the output index of the  $j$  industry in the  $i$  region.  $\sum(j) X_{ji}$  is the sum of the output of all industries, i.e., the regional GDP of the  $i$  region.  $\sum(i) X_{ji}$  is the sum of the output of all regions, i.e., the total GDP of  $j$  industry in all regions.  $\sum(ij) X_{ji}$  is the sum of the output of all regions and all industries, i.e., the regional GDP of the whole range. Generally speaking, the higher the  $LQ_{ji}$  is, the higher the degree of agglomeration of industry  $j$  in region  $i$ . When the  $LQ_{ji}$  is greater than 1, it indicates that the degree of agglomeration of industry  $j$  in region  $i$  is higher than the overall average. The  $j$  industry in this paper is the financial industry, and  $X_{ji}$  represents the financial output of  $i$  province. The other control variables were selected and described in Table 1.

Table 1 Variable selection and description

Variable type	Variable name	Symbol	Variable definition
Dependent variable	Consumption structure of residents	Consume	Total consumption expenditure on enjoyment as a share of total consumption expenditure
Independent variable	Financial agglomeration	Finance	Location entropy (Details as above)
Control variables	Resident income level	Income	Urban residents' annual disposable income per capita
	Capital investment level	Capital	Per capita investment in fixed assets of the whole society
	Technology investment level	Tech	Expenditure on research and experimental development as a proportion of regional GDP
	Government support	Gov	Local fiscal expenditure as a share of regional GDP
	Urbanization level	City	Urban resident population as a proportion of regional resident population
	Aging level	Old	Proportion of population over 65 years old in total population

### 3.2.3. Data source

The panel data of 30 provinces, autonomous regions and municipalities of China from 2011 to 2021 are selected as the sample for empirical evidence. The data of regional indicators that have more outliers and thus affect the accuracy of the regression estimation of the model are excluded. The indicator data are obtained from the official website of the National Bureau of Statistics, the official websites of regional statistical bureaus, and the Wind database[7-13].

## 3.3. Empirical model estimation and result analysis

### 3.3.1. Description of sample statistics

Before conducting the empirical model estimation and analysis, descriptive statistics were conducted on the variables of the study to grasp the overall situation of the variables. The results of the sample statistical description of each variable are shown in Table 2.

Table 2 Variable descriptive statistics

Variable	Obs	Mean	Std. dev	Min	Max
Consume	330	38.93	3.139	30.67	46.31
Finance	330	0.963	0.394	0.420	2.420
Income	330	3.290	1.174	1.500	8.240
Capital	330	4.168	2.029	-7.560	9.350
Tech	330	1.801	1.143	0.180	6.640
Gov	330	26.14	11.32	10.66	77.73
City	330	59.59	12.14	35.03	89.60
Old	330	10.87	2.649	5.470	18.80

Source: The official website of the National Bureau of Statistics, the official websites of regional statistical bureaus and Wind database.

Table 2 shows that the average consumption structure is 38.93%, the minimum is 30.67%, and the maximum is 46.31%, indicating that there are certain differences in the consumption structure of different provinces. The average financial agglomeration is 0.96, the minimum is 0.42, and the maximum is 2.42, indicating that there are significant differences in the level of financial agglomeration in different provinces. The average per capita income of urban residents is RMB 32,902.14/person. The minimum of RMB 14,988.68/person and the maximum of RMB 82,429/person, indicating that there are significant differences in the income levels of different provinces. The rest of the descriptive statistical results of the variables are detailed in Table 2.

### 3.3.2. Pearson correlation analysis

In order to test whether there is serious multicollinearity in the model, Pearson correlation test is conducted for each variable in this paper. The correlation coefficient matrix is detailed in Table 3.

Table 3 shows that the correlation coefficient between financial agglomeration and urban residents' consumption structure is -0.108 at the 1% significant level, indicating that financial agglomeration has a negative correlation with urban residents' consumption structure. There are high correlations between financial agglomeration and urban residents' income, financial agglomeration and technology level, financial agglomeration and urbanization level, urbanization level and technology level and other variables. Therefore, it is necessary to further test whether the model has multicollinearity problem.

Table 3 Pearson correlation test

	Consume	Finance	Income	Capital	Tech	Gov	City
Consume	1						
Finance	-0.108*	1					
Income	-0.182***	0.625***	1				
Capital	-0.008	0.078	0.302***	1			
Tech	-0.134**	0.755***	0.682***	0.233***	1		
Gov	0.159***	0.039	-0.319***	-0.034	-0.375***	1	
City	-0.103***	0.777***	0.773***	0.246***	0.820***	-0.313*	1
Old	-0.058	0.174***	0.537***	0.202***	0.318***	-0.370***	0.374***

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , and \*  $p < 0.1$ .

### 3.3.3. Variable multicollinearity test

If there is multicollinearity among the variables, it will have an impact on the accuracy of the model, so the variables need to be tested for multicollinearity before regression. The test results are shown in Table 4.

Table 4 Tests for multicollinearity of variables

	Finance	Income	Capital	Tech	Gov	City	Old
VIF	4.96	3.27	1.25	4.49	2.01	5.07	1.55
1/VIF	0.20	0.31	0.80	0.22	0.50	0.20	0.64

In general, if VIF is greater than 10 or 1/VIF is less than 0.1, there is multicollinearity among the variables. As shown in Table 4, the VIF of all variables is less than 10 and 1/VIF is greater than 0.1. Therefore, there is no serious multicollinearity among the variables and subsequent regression analysis can be carried out.

### 3.3.4. Regression analysis

In this paper, the LM test and Hausman test were conducted for the mixed-effects model, random-effects model and fixed-effects model for the sample data, and the final p-value was 0.000, which rejected the original hypothesis. Thus, the fixed-effects model was chosen to be used for estimation. For the robustness of model parameter estimation, this paper first imported the core independent variable into the regression, and then imported the control variables one by one. The basic regression estimation results are shown in Table 5.

The regression estimation results in Table 5 show that the estimated coefficient of location entropy is not significant before the inclusion of control variables and is significantly positive after the inclusion of control variables. At the significant level of 1%, the degree of urban residents' consumption structure optimization increases by 4.189% when the locational entropy increases by 1 unit, indicating that the higher the level of financial agglomeration, the degree of China's urban residents' consumption structure optimization increases to a certain extent. Control variables such as the level of urbanization are significantly and positively correlated with the degree of optimization of urban residents' consumption structure. While the level of residents' income is significantly negatively correlated with the degree of optimization of urban residents' consumption structure, which may be due to the fact that with the rapid development of China's economy over the years, the level of residents' total consumption expenditure has grown faster than the growth rate of enjoyment consumption expenditure. The level of technology, government support and the degree of optimization of urban residents' consumption structure are significantly negatively correlated, probably due to the fact that with the increase in research and experimental development expenditure

and government financial expenditure crowding out the share of local GDP. It reduces urban residents' consumption expenditure on education, culture and entertainment, health care and transportation and communication to some extent, which are to be confirmed by further theoretical and empirical studies. The parameter estimates of capital level are significantly positively correlated in models (4) and (5) and insignificant in the parameter estimates of the remaining three models. In addition, the parameter estimates for the level of aging are also insignificant[14-16].

Table 5 Basic regression estimation results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Finance	1.387	2.525**	2.365*	2.481**	3.715***	4.164***	4.189***
	(1.327)	(2.097)	(1.955)	(2.126)	(3.051)	(3.998)	(4.014)
Income		-0.357*	-0.475**	0.036	-0.067	-2.192***	-2.332***
		(-1.880)	(-2.252)	(0.157)	(-0.294)	(-7.782)	(-6.344)
Capital			0.130	0.311***	0.299**	0.002	0.022
			(1.279)	(2.969)	(2.893)	(0.025)	(0.226)
Tech				-3.376***	-3.445***	-2.787***	-2.811***
				(-4.819)	(-4.986)	(-4.693)	(-4.717)
Gov					-0.168***	-0.152***	-0.155***
					(-3.096)	(-3.272)	(-3.310)
City						0.508**	0.500**
						(10.478)	(9.922)
Old							0.081
							(0.593)
_cons	37.590***	37.668***	37.671***	41.200***	44.930***	20.859***	20.924***
	(37.007)	(37.209)	(37.252)	(33.779)	(26.394)	(7.670)	(7.680)
N	330	330	330	330	330	330	330
adj. R <sup>2</sup>	-0.094	-0.085	-0.082	-0.007	0.021	0.285	0.283

t statistics in brackets; \*\*\* p<0.01, \*\* p<0.05, and \* p<0.1.

#### 4. Conclusions and Policy Implications

This paper explores the impact of financial agglomeration on the optimization of urban residents' consumption structure by using the panel data of 30 provinces, autonomous regions and municipalities in China from 2011-2021 as a sample and using a fixed-effects model. The following conclusions are drawn: with the continuous agglomeration and development of the financial industry of China, it increases the local capital investment and the scale of enterprise investment and financing, thus optimizing the resource allocation ability of capital, especially having a strong promotion effect on the upgrading of industrial structure, helping to generate wealth effects, forming urban residents' expectations of income growth, and thus stimulating the growth of enjoyment-oriented consumption.

In order to further optimize the consumption structure of China's residents, improve people's quality of life, and promote the pulling effect of consumption on economic development in the direction of high quality, this paper draws the following theoretical insights based on the results of empirical research: 1) Rational allocation of financial resources, so that financial agglomeration can help the coordinated development of urbanization construction, industrial structure upgrading, and innovation and creation of industry, academia and research, thus enhancing the influence of finance on residents' income. 2) Optimize the financial market environment, formulate policies to promote the healthy development of the financial industry, such as creating a favorable legal environment and improving the financial industry regulatory policies to ensure the healthy and orderly development of the financial industry and effectively guarantee the role of the financial industry development in improving the consumption quality of urban residents. 3) Cultivate financial talents and promote the

benign circulation flow of financial talents, institutions, technologies and resources between developed and backward regions, so as to narrow the income gap between urban and rural residents, and solve the problems of weak consumption and slow upgrading of consumption structure.

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