

Article

City Size and Household Consumption in China

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Abstract: Agglomeration and dispersion forces fundamentally determine urban and regional development. While traditional views on agglomeration forces are primarily from a production perspective, the growing literature focuses on the consumption perspective and suggests that larger cities may generate better consumption amenities. This paper joins the discussion by examining whether and to what extent city size increases household expenditure on such non-tradable goods and services, as restaurants, entertainment, health and fitness, housekeeping services and clothes. We hypothesize that city size raises the marginal utility of these consumers by increasing the variety of their products or services, supporting certain sectors that have substantial scale economies, or expanding the number of their specialized retail stores, so that households in larger cities want to spend more on these items. The data we use are from the China Household Finance Survey that documents the income, expenditure and demographic information of more than 8000 households from 85 cities in 2011, 2013 and 2015. Our results indicate that city size significantly raises household expenditure on restaurants, entertainment and health and fitness. These sectors have either quite differentiated products or services, or significant fixed costs, so that they rely heavily on scale economies.

Keywords: city size; consumption amenities; household expenditure



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1. Introduction

Urbanization is a global phenomenon. At present, more than half of the global population (over four billion people around the world) lives in cities. This trend is expected to continue. According to the World Bank [1], by 2050, it is estimated that, with the urban population more than doubling its current size, about seven in 10 people in the world will live in cities. Rapid urbanization yields a great influence on consumption. The McKinsey Global Institute [2] pointed out that “The move to urban living is lifting the incomes of millions of people around the world. In cities, one billion people will enter the global ‘consuming class’ by 2025, with incomes high enough to become significant consumers of goods and services” (p. 1). Consumption constitutes the most important component of the GDP in many developed countries, and cities are quickly becoming the center of consumption. Understanding how household consumption responds to the growing sizes of cities is of the first order of economic significance.

In urban economic theories, two types of forces—agglomeration forces and dispersion forces—fundamentally determine urban and regional development. The former typically consists of agglomeration economies, scale economies in production, home market effect, natural advantages, etc. [3–5]. The latter includes congestion forces and competition effects [6,7]. The literature also recognizes the role of trade (transportation) costs that may encourage agglomeration or dispersion in a specific context [3].

While these forces are raised primarily from a production perspective, agglomeration forces from the consumption perspective have been presented in the recent two decades. It suggests that larger cities can provide better consumption amenities that attract people for

the following reasons [8–15]. First, a greater variety of differentiated goods in larger cities could raise the quality of life of the local residents. Second, sufficient scale economies are satisfied for sectors including professional sports teams, concert halls and museums, which are seldom found in small agglomerations. Third, more specialized retail stores, such as clothing boutiques, niche toy stores and specialty bookstores, may facilitate comparisons in the shopping experience. These discussions resonate well with stylized facts emerging in recent decades that high-amenity cities attract more migrants, and a growing population lives close to the city center where consumption facilities usually cluster [9,12].

Although empirical evidence for agglomeration economies in consumption in large cities exists, most of it is indirect. For instance, empirical analyses in the United States and Japan indicated that rent increases with city size, faster than nominal wage, which is interpreted as evidence that people may give up real wages to enjoy consumption amenities in large cities [6,9,11]. In addition, recent studies on the consumption-side explanation for the urban wage premium, have attributed the high wages in large cities to the selection of high-skill workers living in large cities, driven by the taste for consumption amenities, which points to the consumption benefits of large cities [12,16].

Glaeser and Gottlieb [11] examined the linkage between agglomerative economies and consumer behaviors. They concluded that city size matters in influencing residents' consumption preferences by using the U.S. survey data. More specifically, they showed that central-city residents visit concert halls, restaurants, museums and movies more frequently than residents in the suburbs, small cities or outside of the cities. This conclusion was echoed by Borck [17], who found strong evidence for the agglomerative effects on consumption in Germany. He demonstrated that an individual's probability of going to bars, restaurants, cinemas, concerts, theatres and museums is significantly higher in large cities than that in small cities, even after controlling for the effect of sorting and individual heterogeneity. The analysis also showed that, while overall life satisfaction does not vary with city size, individuals in large cities experience a higher satisfaction with consumption and a lower satisfaction with housing, whereas the opposite holds for individuals in small cities. The results lend support to the equilibrium hypothesis that large-city residents should be compensated for high housing costs by agglomeration economies in consumption.

There is, however, a gap in the literature related to the understanding of agglomerative economies, in relation to consumption. The gap arises as few studies use micro-level household data to examine the impact of urbanization on the patterns of consumer spending, in the context of developing countries. In addition, the existing literature primarily focuses on developed countries. To our knowledge, there are no studies focused on developing countries on the matter.

This study directly examines the link between city size and the various categories of household consumption expenditures, in the context of China, to fill this research gap. Specifically, the objective of this paper is to investigate whether and to what extent city size increases household expenditure on restaurants, entertainment, housekeeping services, health and fitness and clothing. If city size enhances the consumption of amenities and increases the marginal utility of consumption in these sectors, then residents in larger cities should purchase a larger quantity of such goods and services. We test this hypothesis by using household-level survey data that covers 85 cities in China during 2011–2015.

Three features of China's urban development are worth noting for this research. The first is its great urbanization. By 2015, 771.2 million people (56.1 percent of the total) lived in cities, whose sizes range dramatically from a few thousand (some county seats) to 24.2 million (Shanghai). This is expected to have a significant influence on consumption patterns if cities foster consumption amenities. The second is the growing importance of consumption in the Chinese economy. The share of household consumption in the GDP increased from 35.6 percent in 2010 to 39.2 percent in 2016, reversing a nearly four-decade decline. The third is the robust growth of household income. During 2013–2016, for instance, the average disposable income of urban residents increased by 27.0 percent. Since

what the consumption amenities facilitate are mostly luxury goods (income elasticity above one), their demands are expected to grow disproportionately with income. Indeed, during the same period, urban residents' expenditures increased by 43.5 percent on medical care and health services, 36.9 percent on transportation and communication, and 32.6 percent on education, cultural and entertainment activities. In sum, China serves as an interesting case through which to explore the impact of city size on urban household consumption.

This paper is organized as follows. Section 2 reviews the relevant literature. Section 3 presents the theoretical framework as well as the empirical approach. Section 4 presents the data and variables. Section 5 displays and discusses our empirical results, and Section 6 is the conclusion.

2. Related Literature

The growing literature focuses on the consumption-side advantage of cities, since the pioneer study of Glaeser et al. [9]. The spatial equilibrium theory suggests that agglomeration economies should compensate for agglomeration diseconomies, such as congestion and high housing prices. More specifically, the effect of agglomeration on housing rents (and other disamenities) should be offset by the effect of agglomeration on productivity plus the effect on consumption [9]. This leads to three distinct, but related, theoretical implications of agglomeration for consumption, regarding urban wage premium, urban growth and household consumption patterns, which in turn provide various empirical evidence on agglomeration economies regarding consumption.

2.1. Implications for Urban Wage Premiums

The first implication is that, if agglomeration economies in consumption exist, individuals would accept lower real wages to live in bigger cities and enjoy more consumption amenities. The real income level reflects the net effect of agglomeration economies and diseconomies, since households would pay implicitly through both the labor and housing markets, to live in a more amenable urban area. If consumption amenities compensate residents in large cities for high living costs, rents would increase with city size faster than nominal wage, and real wage decreases with city size. Indeed, Tabuchi and Yoshida [6] reported evidence in Japan that doubling the city size is associated with a 7–12% decrease in the real wage. Glaeser et al. [9] found that urban rents rise faster than urban wages in some large cities in both Europe and the United States, for which consumption opportunities are the most obvious factor. These findings suggest that, while agglomeration economies in production enhance productivity, cities also provide a large variety of consumption benefits. In addition, Glaeser and Gottlieb [11] found that real wage and city size were positively correlated during the decline in big cities in 1970 in the US, but they became negatively correlated during the resurgence of cities in 2000. This implies that it was the increasing desire of people to live in large cities to enjoy abundant consumption opportunities that led to the resurgence of cities in the United States.

More recent literature on the consumption-side explanation for the urban wage premium suggests that a high urban nominal wage in large cities is, in part, due to highly-skilled workers being disproportionately sorted in large cities, driven by the taste for consumption amenities [12,16]. The emergence of 'creative cities', where production, work, leisure, the arts and the physical milieu, exist in varying degrees of mutual harmony, is echoed in the expansion of creative classes, especially in large cities [18]. A testable implication would be that, even as workers in larger cities may earn more on average than their otherwise equal counterparts in small cities, the urban wage differential should decrease with workers' skills and education levels. This implication is supported by Adamson et al. [16], who found that net returns to education attainments decline with urban scale, and Lee [12], who found that, in the healthcare sector, the urban wage gap between large cities and small cities sharply decreases as the skill level rises, and at top skill levels, the urban wage premium even becomes negative.

2.2. Implications for Urban Growth

The second implication is that cities with better consumption amenities should grow faster. The internal organization and evolution of cities depend critically on how the three essential dimensions (internal, ambient and exogenous) of urban materiality are intertwined with one another [19]. Agglomeration economies in consumption imply that a large urban scale would enhance consumption amenities, which in turn can make cities more attractive and promote urban growth. In both the USA and Europe, a city's population growth rate is positively associated with consumption amenities, such as live performance venues and restaurants [9]. Shapiro [20] suggested that the concentration of skilled workers in a city encourages the growth of consumer services, such as restaurants and bars, which in turn makes the cities more attractive to migrants. This study found that about 40% of the employment growth is attributed to the increase in those consumption benefits. This paper is in line that of Carlino and Saiz [21], who concluded that leisure consumption opportunities significantly facilitate population and employment growth in metropolitan areas in the USA.

2.3. Implications for Consumption Behavior

The third implication is that, if agglomeration economies in consumption exist, large cities can enhance consumption.

From the consumer's perspective, the literature on consumer behavior suggests that the high consumption of certain goods in large cities may be attributed to residents' high demand for social contact. Residents in large cities have a relatively high demand for goods and services that can facilitate social interaction [9,22]. Indeed, Banta [23] found that large-city households spend more on out-of-home activities, while small-city households spend more on television sets. Glaeser and Gottlieb [11] reported that residents of central cities (greater than 50,000 population) visit concerts, restaurants, museums and movies more frequently than other people. Borck [17] compared German people living in cities smaller than 5000, between 5000 and 100,000, and greater than 100,000, and found that living in larger cities increases the probability of frequenting bars, restaurants, cinemas, theatres and museums.

With regard to the supply side, large cities facilitate consumption mainly through four fundamental ways. First, because of fixed costs, some types of goods, services and even industrial sectors that need substantial scale economies can only be found in large cities. Examples include professional sports teams, museums and rare cuisines [12–14]. Second, larger cities provide a greater variety of goods than small cities. The population size of cities has a substantially positive effect on the variety of restaurants and groceries [14,15]. Regarding the two markets of broadcasting and television, Waldfogel [8,10] suggested that consumers in larger markets enjoy a greater programming variety and more channels, so that more people would listen to the radio and watch television in larger cities. Third, larger cities also provide higher-quality products. George and Waldfogel [24] concluded that newspaper quality, measured by page length and reporters per newspaper, increases with market size, while the price does not change because the quality of the newspaper is tied to fixed costs. This leads to a higher consumer satisfaction and higher subscription rates in larger cities. Fourth, consumers in larger cities may also benefit from lower prices. Using transaction-level data in the United States, Handbury and Weinstein [15] found that the price index for groceries is lower in larger cities after controlling for purchaser characteristics, store amenities and differences in the number of varieties available.

2.4. Household Consumption in China

There is a growing number of empirical studies examining the determinants of urban household consumption in China. Jussaume [25] examined the factors associated with modern urban Chinese food consumption patterns. Based on a household survey in the city of Qingdao, the author found that a modern culture–ideology of food consumption is being built around high-income household consumers. Using data from the 2000 survey of

Urban Households, Yen, Fang and Su [26] investigated household food consumption in urban China and found that prices and changing demographics play important roles in the household food demand. Cai, Chen and Zhou [27] used the nationally representative Urban Household Income and Expenditure Survey (UHIES) to identify a steadily rising trend in income and household consumption inequality during the period from 1992 to 2003 in urban China. Using the Chinese Urban Household Survey data between 1997 and 2006, Jin, Li and Wu [28] found that, after controlling for household incomes, rising income inequality stimulated the household educational investment and decreased conspicuous household consumption. Recently, He, Ye and Shi [29] explored the causal effect of housing wealth on Chinese urban household consumption, using both two-stage least squares (2SLS) and regression discontinuity designs. Their estimate showed that a 10 percent increase in home wealth raises the overall urban household consumption by nearly 3 percent. To the authors' best knowledge, no empirical study has to date attempted to capture the impact of city size on urban household consumption in China. Our research is one of the first studies to study the relationship between city size and consumption patterns in Chinese urban households using a large Chinese household survey dataset.

3. Theory

Why would one expect larger cities to have different urban household consumption patterns than those of small towns? There are at least four theoretical perspectives on the relationship between city size and household consumption patterns.

First, the traditional economic theory assumes that individuals face the same consumption choice set no matter where they live. However, this assumption may not hold in reality. Large cities provide more consumption choices and leisure activities in terms of variety, quality, and prices of goods and services than small cities. Since the consumption choice set is larger in a large city, one individual could obtain a higher utility level given the same income [9]. Suppose every individual consumes two goods, and the quantity of the consumption is x_1 and x_2 , respectively. Let good one be non-tradable, due to extremely high shipping costs, so individuals can only buy good one that is produced in the local city. Good two has no shipping costs, and every consumer can access good two, which is produced anywhere. City size enhances the consumption amenities for good one by, for instance, providing a larger number of varieties. So, at a given level of x_1 , the marginal utility of consuming good one increases with city size, which suggests:

$$\partial MU_1 / \partial L > 0 \quad (1)$$

where L represents city size. Since city size does not affect the consumption amenities for good two, we have $\partial MU_2 / \partial L = 0$.

A consumer's optimal choice must satisfy the condition $MU_1 / MU_2 = p_1 / p_2$, where p_1 and p_2 denote the price of good one and good two, respectively. Combined with (1), this condition suggests that individuals living in larger cities consume more of good one, i.e., $\partial x_1 / \partial L > 0$. If city size does not change prices, it should also increase a consumer's expenditure on good one:

$$\partial p_1 x_1 / \partial L > 0 \quad (2)$$

We believe that it is not unrealistic to assume the independency between city size and prices. From a theoretical point of view, although larger cities may bring more expensive goods and services, due to higher prices for housing and real estate, larger cities may also generate a stronger pro-competitive effect that lowers the prices of goods [30]. Empirical evidence, though handful, finds a very weak relationship between city size and prices. Simon and Love [31] used the average price for 193 individual goods and services from 38 U.S. metropolitan areas in 1971 and found the estimated price elasticity has a median value of 0.7 percent and a range between −2.1 percent and 6.4 percent. Some papers, including that by Albouy [32], suggest that consumer prices rise with city size. However, these estimates may be higher than the true values because of the three types of heterogeneity

biases: (1) larger cities may have better varieties (e.g., brand); (2) larger cities may have more high-amenity stores (e.g., nicer shopping experiences); and (3) customers in larger cities may search less intensely for the lowest price (e.g., rich people spend less time on searching for discounts) [15]. Following the correction of these three biases, Handbury and Weinstein [15] found almost no relationship between city size and prices in grocery stores, since the estimated price elasticity is only 0.6 percent.

Second, the influence of city size on household consumption can be commonly linked to changes in income. Income is probably the most important driving force for urban household consumption. Rising income not only increases funds available for purchasing consumer goods and services, but it can also increase the demand for high-quality and tasty consumer products [33]. Rappaport [34] found that the rise in real income results in the increased household demand for luxury goods, such as meals in gourmet restaurants and live performances, which are more plentiful in large cities. Costa [35] argued that people spend more on travel and tourism as income increases. Thompson and Tinsley [36] revealed that income is statistically significant and positively related to household expenditure on recreation (including spending on vacation, club dues, sporting and tickets for sporting and movies) among 104 households in South Carolina, in the period from 1955 to 1975. Davies and Mangan [37] found a positive effect of income on household hotel and holiday expenditures. Huang and Gale [38] used Chinese food consumption and expenditure surveys for urban households from 2002 to 2005 and contended that, as household incomes increase, Chinese consumers demand not only a great quantity of food but also higher food quality with high unit values (nutritional content and perceived safety) at all income levels. Households in large cities generally have a higher income than households in smaller cities [39]. Since city size affects household income, it is reasonable to expect city size also affects the consumption patterns of urban households.

Third, household consumption is traditionally modelled as a function of household income and preferences. However, it can also be influenced by the consumption behavior of peers. An increasing number of economic studies provide empirical evidence about social interaction or peer effects in consumption. For instance, Kuhn et al. [40] employed a natural experiment associated with the Dutch postcode lottery (PCL) to explore social spillovers in household car consumption and provided empirical evidence on social interaction effects on consumption. Moretti [41] found that social learning and peer effects exist in the household consumption of movies. For three reasons, peer effects or social interaction in consumption are stronger in larger metropolitan areas [42]. First, large cities offer a wide variety of places for social interactions, such as museums, restaurants, bars, movie theaters and concert halls. In addition, urban density generates low transport costs and facilitates social contact. As city size grows, people interact more intensely with each other [9]. Glaeser and Sacerdote [43] asserted that individuals who reside in large cities are more likely to socialize with their neighbors. Rorck [17] argued that people interact with their friends more when they live in large cities. Second, Schlapfer et al. [44] contended that large cities facilitate the diffusion of information and exchanging ideas, and the total number of contacts and the total communication activity grow superlinearly with city size. Third, people who live in bigger cities are more likely to have a larger social network. The greater size of social networks is, the greater volume of human interaction. Arun, Annim and Arun [45] found that Indian households participating in social networks, improve their consumption levels.

Fourth, social media and advertising contribute to shaping consumer preferences and choices [46]. Since we cannot simply extract spatial distance from its entanglement with the other three dimensions of distance (temporal distance, social distance and hypothetical distance) [47], household consumers are more exposed to international and modern advertising strategies in larger urban markets. TV, radio and billboard advertising can reach more people in large cities. Advertising and social media in larger cities increase brand and modern lifestyle exposure to urban households and could result in the high consumption of luxury goods and entertainment services. Kearney [48] found that a greater access to

modern international mass media has a significant effect on household food consumption and results in the consumption of many types of Western-style foods.

4. Methods, Data and Variables

4.1. Empirical Methods

Based on this theoretical framework, we examined the effects of city size on the expenditure of non-tradable goods, by estimating the following model:

$$Exp_i = \alpha * City Size_i + X_i \beta + \varepsilon_i \quad (3)$$

where Exp_i denotes the log of household i 's consumption expenditure on a non-tradable good or service; $City Size_i$ measures the log size of the city where household i lives; X_i is a row vector representing household demographic characteristics variables. The key coefficient is α , which is expected to be positive and significant if city size raises consumption amenities.

4.2. Data Sources

We used a survey data at the household level from the China Household Finance Survey (CHFS) in 2011, 2013 and 2015. This dataset contains detailed information on various expenditures, income, employment status, demographic characteristics, etc. The baseline survey was directed by the Survey and Research Center for China Household Finance at the Southwestern University of Finance and Economics. The survey employed a stratified three-stage Probability Proportional to Size (PPS) random sampling design, and hence collected quite representative samples.¹ In every round of the survey, they not only revisited former households but also incorporated additional new households. In the first year of 2011, included in the survey were 8438 households; in 2013, it included 28,000 households; and in 2015, it had 40,000 households. Since we only had location information for those households surveyed in 2011, we could not use the new households that entered the survey in 2013 and 2015. As a result, the panel data that we finally used included 8438 households in 2011, approximately 7000 (that were interviewed for the second time) in 2013, and approximately 6000 (that were interviewed for the third time) in 2015.

We examined five types of household expenditure on non-tradable goods and services. The first was eating in restaurants. The second was entertainment, including household expenditure on books, newspapers, magazines, cinemas, theaters, dancing halls and internet bars. While some goods, such as books and magazines are tradable, many of them (e.g., cinemas and theaters) are non-tradable and likely cost more money. The third was housekeeping services, including household expenditures on baby-sitters, drivers, cleaners, plumbers, etc. The fourth was health and fitness, including household expenditure on the gym, swimming and health products, but excluding medical care. Although health products, such as vitamins are usually tradable goods, a significant number of non-tradable services, such as the gym and swimming are reflected in this category. The fifth was clothes. While they are tradable goods, their special retail stores are non-tradable.

We measured city size as follows.² For the city proper of prefecture cities and county-level cities, we used a total population of its urban district (*chengqu*) to measure its city size. The urban district covers most of the urban areas and excludes most of the rural areas in the city proper. The data came from China Urban Statistical Yearbook. For counties, we used a total population of its county seat (*xiancheng*), which covers most of the urban areas and excludes most of the rural areas in a county. The data source was the China County Seat Statistical Yearbook [49].

4.3. Summary Statistics

We report the descriptive statistics for household consumption, household characteristics and city size in Table 1. Among the five expenditures we examined, households

spend more than CNY 200, per month, on health and fitness (medical care not included), restaurants and clothes, which account for approximately 5 percent of the average household income per month. Households spend much less on entertainment and housekeeping services, only CNY 51 and CNY 25, per month. At the mean level, a household earns about CNY 62.3 thousand, per year, and has 3.6 members. For all household heads, 78.1 percent are male, the average age is 52, the average education level is between middle school and high school, 88 percent are married, 69.6 percent are employed, and 25.1 percent work in agricultural production. The key regressor, city size, ranged from 31 thousand to 24.2 million people (Shanghai), and had a mean value of 2.98 million.

Table 1. Descriptive statistics.

	Obs	Mean	Std. Dev.	Min	Max
Dependent variables: household expenditure (CNY) on					
Restaurant per month	20,653	284.398	1321.552	0	100,000
Entertainment per month	20,821	51.036	337.361	0	25,000
Housekeeping services per month	21,001	25.382	419.453	0	30,000
Health and fitness per month	15,246	354.159	1965.649	0	100,000
Clothes, whole year	20,349	2459.449	4416.769	0	159,092
Independent variables					
City population size (10,000)	21,037	297.790	627.804	3.102	2415.270
Household income (CNY), whole year	21,037	62,337.620	147,623.500	−1,000,000	5,000,000
Household size	21,037	3.578	1.626	1	18
Household head is male	21,037	0.781	0.413	0	1
Age of household head	21,035	52.152	13.762	18	113
Nine levels of education attainment	20,949	3.368	1.625	1	9
Household head is married	21,037	0.880	0.325	0	1
Household head has a job	21,037	0.696	0.460	0	1
Household head works on agricultural production	21,037	0.251	0.434	0	1
Average temperature in January 2008	21,037	−1.229	8.199	−20.538	14.202
Average temperature in July 2008	21,037	25.605	2.914	14.589	30.819
Precipitation in 2008	21,037	1003.893	494.982	285	2346

5. Results

5.1. Main Results

Table 2 reports the results of the OLS regression of household expenditures on city size. The results had strong correlations for all of five consumption categories. Household expenditures on restaurants and entertainment have the strongest correlation with city size, while housekeeping expenditure has the lowest correlation. The results imply that residents in larger cities have higher expenditures on goods and services that can facilitate social interaction, such as restaurants and entertainment.

Table 2. The effect of city size on household expenditures; bivariate regressions.

	Restaurants	Entertainment	Housekeeping	Health and Fitness	Clothes
Log	0.4528	0.3904	0.0847	0.2595	0.2272
(city size)	(0.0886) ***	(0.0460) ***	(0.0347) **	(0.0532) ***	(0.0526) ***
Controls	NO	NO	NO	NO	NO
Obs.	20,653	20,821	21,001	15,246	20,349
R ²	0.0490	0.0750	0.0169	0.0241	0.0156

Note: in parentheses are the robust standard errors clustered at the city level; ** denotes statistical significance at 5 percent level, and *** at 1 percent level.

Then, we included the control variables that may affect household consumption and estimated Equation (3). The control variables included (1) the income and size of households; (2) gender, educational attainment, marriage status, employment status and whether working in an agricultural job, all related to the household head; and (3) the average temperature in January and July of 2008, and precipitation of 2010, in the local

city as well as year, dummies. We controlled the first two variables because they could be influenced by city size. We controlled temperature and precipitation because they can affect household consumption by changing people's habits and outdoor activities, but they also affect city size since the weather might be incorporated into immigration decisions.

The estimated results in Table 3 suggest the following findings. First, the explanatory power of our empirical model expanded significantly. The R^2 for restaurants, entertainment and clothes rose from 2–7 percent in Table 2 to 21–37 percent in Table 3. Second, city size coefficients shrunk significantly, compared to Table 2. The coefficient of city size dropped by approximately 60 percent for clothes, 50 percent for health and fitness, and 40 percent for restaurants, entertainment and housekeeping services. This might indicate that factors, such as household income and size, strongly influence expenditures on clothes and health and fitness. Third, city size still has positive and statistically significant coefficients. The elasticity of household expenditure with respect to city size ranged between 5 percent (for housekeeping) and 28 percent (for restaurants). For every 1% increase in city size, household expenditures on restaurants increase by about 27.8%, household expenditures on entertainment increase by about 23.6%, household expenditures on housekeeping increase by about 5.2%, household expenditures on health and fitness increase by about 13% and household expenditures on clothes increase by about 9.5%. Fourth, the effect of city size on expenditures on out-of-home activities was stronger. The elasticity of household expenditure on restaurants and entertainment with respect to city size, is larger than that of household expenditures on housekeeping, health and fitness and clothes. The results are in line with the theoretical and empirical studies that indicate that large cities can facilitate social interaction and households in large cities visit bars, restaurants, cinemas, theatres and museums more frequently [9,17].

Table 3. Effect of city size on household expenditures; control variables are included.

	Restaurants	Entertainment	Housekeeping	Health and Fitness	Clothes
Log (city size)	0.2779 (0.0496) ***	0.2360 (0.0252) ***	0.0524 (0.0216) **	0.1306 (0.0364) ***	0.0953 (0.0336) ***
Controls	YES	YES	YES	YES	YES
Obs.	20,563	20,731	20,911	15,161	20,259
R^2	0.2155	0.3743	0.0433	0.0622	0.2628

Note: Control variables include household income, household size, gender of the household head, education level of the household head, marriage status, employment status of the household head, agricultural job, January temperature, July temperature, rainfall and year fixed effects. In parentheses are the robust standard errors clustered at the city level; ** denotes statistical significance at 5 percent level, and *** at 1 percent level.

5.2. Robustness Check

The robustness check addresses the econometric issue related to censored data and the potential endogeneity of the city size.

5.2.1. Tobit Model Estimates

OLS estimation may be inconsistent because the survey data on household expenditure is left-censored to zero. There is a significant portion of households with zero expenditure on different types of consumption. Therefore, the Tobit model is more appropriate to address this issue, as the presence of zero expenditures on consumption is regarded as an optimal choice made by households. For example, a household spends nothing on entertainment, because zero expenditure is optimal for that household. The Tobit model assumes a single decision-making process through which households choose the level of expenditure to maximize their welfare. Zero expenditure represents a corner solution to a constrained utility maximization problem, in which the preference for consumption is so low that spending nothing is the best for the household. Table 4 reports the results of the estimation of the Tobit model. The findings for the positive relationship between city size and household consumption expenditures were rather robust. The coefficients of city size were all positive and statistically significant for all five household expenditures.

Table 4. Tobit model estimates on the effect of city size on household expenditures; control variables are included.

	Restaurants	Entertainment	Housekeeping	Health and Fitness	Clothes
Log (city size)	168.9014 (36.3043) ***	48.5937 (9.1647) ***	316.4280 (116.7158) ***	331.3877 (99.0857) ***	260.0742 (85.9781) ***
Controls	YES	YES	YES	YES	YES
Obs.	20,563	20,731	20,911	15,161	20,259
Log pseudolikelihood	−80,492.857	−62,674.998	−6681.450	−30,423.693	−175,661.390
Controls	YES	YES	YES	YES	YES

Note: Control variables include household income, household size, gender of the household head, education level of the household head, marriage status, employment status of the household head, agricultural job, January temperature, July temperature, rainfall and year fixed effects. In parentheses are the robust standard errors clustered at the city level; and *** denotes statistical significance at 1 percent level.

5.2.2. IV 2SLS Estimates

The second issue is related to the endogeneity of the city size to household consumption expenditures, due to the simultaneity bias or reversing causality. There may be omitted variables and unobserved factors that influence both city size and household consumption expenditures; hence, the city size variable may be correlated with the error term. In addition, it is possible that households that originally had a high consumption demand and expenditure were more likely to be located in large cities with high consumption amenities, leading to the reverse causality. Therefore, the previous estimates may overestimate the effects of city size because this variable could be endogenous.

To fix this problem, we found an instrumental variable for city size and used the two-stage least square estimator (2SLS). We selected city size 25 years ago (in 1986, 1988, and 1990), as the instrument. The city size in 1986–1990 and 2011–2015 should be strongly correlated, due to the persistence of the distribution of city size over time [50]. The instrument should be exogenous to the omitted variables that are correlated with city size in 2011–2015, such as people's preferences and tastes, for the following reasons. First, most households in China in the 1980s were relatively low-income. It made the consumption amenities of cities not important as they were usually related to luxury goods. Second, the hukou system in the 1980s strongly prohibited migration across cities, so that households that strongly preferred consumption amenities in large cities had considerable difficulties to move. Third, China, in the 1980s was dominated by a planning economy, but in the 2010s, it was dominated by a market economy. As local economies were fundamentally reshaped during the past three decades, the omitted factors in the error term that influenced household consumption in the 2010s should be uncorrelated with city size in the 1980s.

Table 5 reports the results of the IV 2SLS estimates. First, the results substantiate the main findings for the positive effect of city size on household consumption expenditures for restaurants, entertainment, health and fitness and clothes. However, it shows that the coefficients of city size became lower than those from the OLS estimates. Comparing Tables 3 and 5, we find that the coefficient drops from 27.8 percent to 20.2 percent for restaurants, from 23.6 percent to 20.7 percent for entertainment, from 13.1 percent to 8.5 percent for health and fitness and from 9.5 percent to 6.3 percent for clothes. The impact on the estimates is consistent with our expectation that the IV 2SLS estimates will help to reduce the upward bias in the OLS estimates. Second, the coefficient becomes insignificant for housekeeping services. It implies that consumption amenities provided by city size may not exist for this sector. Possible reasons include that variety is not important for housekeeping services that perform similar tasks and have small-scale economies.

Table 5. IV 2SLS estimates on the effect of city size on household expenditures; control variables are included.

IV 2SLS	Restaurants	Entertainment	Housekeeping	Health and Fitness	Clothes
Log	0.2017	0.2070	0.0164	0.0848	0.0625
(city size)	(0.0454) ***	(0.0242) ***	(0.0149)	(0.0327) ***	(0.0336) *
Controls	YES	YES	YES	YES	YES
Obs.	20,563	20,731	20,911	15,161	20,259
Underidentification	25.947	26.030	25.999	26.179	26.124
test: Chi-sq(1)	0.0000	0.0000	0.0000	0.0000	0.0000
Weak IV test	597.103	598.116	598.605	531.966	598.247
Controls	YES	YES	YES	YES	YES

Note: Control variables include household income, household size, gender of the household head, education level of the household head, marriage status, employment status of the household head, agricultural job, January temperature, July temperature, rainfall and year fixed effects. In parentheses are the robust standard errors clustered at the city level; * denotes statistical significance at 10 percent level, and *** at 1 percent level.

6. Discussion

First, the results provide some evidence of agglomeration economies in consumption. The results are in line with the theoretic expectation that households in larger cities enjoy higher consumption amenities, and thus *ceteris paribus* consume more. In contrast with Glaeser and Gottlieb [11] and Borck [17], who found evidence that residents in larger cities may visit concerts, restaurants, museums and movies more frequently, the significantly positive coefficients of city size on household consumption expenditures in this study can be interpreted as direct evidence on agglomeration economies in consumption. Second, the results also highlight the potential importance of agglomeration economies in social interaction. Glaeser et al. [9] argued that one of the main advantages of cities is social interaction and face-to-face contact among people. The results of this study indicate that the positive effect of city size on household consumption expenditures on restaurants is stronger than the effect on spending on in-home activities, such as housekeeping. Therefore, it is plausible to believe that residents in large cities have a relatively high demand for goods and services that can facilitate social interaction.

In addition, the evidence on agglomeration economies in consumption provides another explanation for the divergent growth of large cities in China [51]. Agglomeration economies in consumption imply a positive relationship between amenity levels and population growth [9,20]. Similar to many other developing countries, large cities are the preferred destinations of rural-city migration during the rapid urbanization in China, as large cities have high amenities, attracting businesses, workers and consumers. An individual can be both more productive and enjoy better consumption amenities, in terms of both quality and quantity, in large cities. The divergent growth of large cities in China may continue into the next one or two decades.

7. Conclusions and Policy Implications

7.1. Conclusions

Although many empirical studies look at the differences in the consumption patterns between rural and urban households, little is known about the impact of urban size on household consumption. This study directly contributed to the emerging literature on agglomeration economies in consumption. Using the Chinese household survey dataset that covers 85 cities from 2011 to 2015, this paper investigated whether larger cities provide better consumption amenities for non-tradable goods and services. We found strong empirical evidence that city size increases the household consumption of restaurants, entertainment, health and fitness, and clothes using different estimation methods. This evidence is consistent with the hypothesis that large cities can enhance consumption.

The nature of the data limited the analysis of this study. Different categories of household expenditures may be influenced by similar unobserved factors, which leads to a loss of efficiency of the OLS estimation. However, the limitations of the available control variables and difficulties in satisfying identification conditions, make it unfeasible to apply econometric models, such as seemingly unrelated regression or simultaneous equation models. In addition, we noted that missing the variable of housing price in the empirical

model might make the effects of the city size smaller than the true values. Future research may shed more light on this topic by using different data.

7.2. Policy Implications

The results point to the potential importance of large cities in enhancing consumption and social interaction. While larger cities in China seem more productive, they can also facilitate consumption. Both workers and consumers can benefit from co-locating with each other through agglomeration economies in both production and consumption. When people migrate from rural to urban areas, changes do occur in their consumption patterns. Urban centers are becoming the larger drivers of future economic growth and consumer spending. The mass migration of Chinese households from rural to urban areas has influenced Chinese aggregate consumption growth. Thus, current urbanization strategies in China that encourage rural–urban migration to smaller cities and limit migration to large cities may lead to welfare loss from both the production and consumption sides. A more market-driven urbanization process would be more efficient. To meet the growing demands of new city consumers and stimulate future urban growth, urban policymakers need to implement creative development strategies and offer a great variety of consumption amenities, such as art and cultural events.

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Notes

- ¹ In 2011, for instance, in the first stage, 2585 counties/districts in 28 provinces (except Tibet, Xinjiang and Inner Mongolia) were divided into 10 groups, based on the per capita GDP, and eight counties/districts were randomly selected from each group. In the second stage, four communities were randomly selected from each county/district, based on the urban resident ratios. In the third stage, households were randomly drawn from each community, based on the local average housing price. The overall refusal rate was 11.6%, with a refusal rate of 16.5% in urban areas and 3.2% in rural areas. Detailed information about this project can be found at <http://www.chfsdata.org/> (20 May 2017) and Gan et al. [49].
- ² The order of China’s administrative units is (1) central government, (2) provinces, (3) prefecture cities, and (4) county-level cities and counties. A prefecture city has its own city proper, and may include some county-level cities and/or counties. The city proper of the prefecture cities and downtown of county-level cities and counties are approximately a unified labor market, but their administrative boundaries cover not only urban areas, but also broad rural areas.

References

1. World Bank. Urban Development. *World Bank*. 2019. Available online: <https://www.worldbank.org/en/topic/urbandevelopment/overview> (accessed on 24 October 2022).
2. Dobbs, R.; Remes, J.; Manyika, J.; Roxburgh, C.; Smit, S.; Schaer, F. Urban World: Cities and the Rise of the Consuming Class. 2012. Available online: <https://www.mckinsey.com/featured-insights/urbanization/urban-world-cities-and-the-rise-of-the-consuming-class> (accessed on 24 October 2022).
3. Krugman, P. Increasing Returns and Economic Geography. *J. Polit. Econ.* **1991**, *99*, 483–499. [CrossRef]
4. Duranton, G.; Puga, D. Micro-Foundations of Urban Agglomeration Economies. In *Handbook of Regional and Urban Economics*; Elsevier: Amsterdam, The Netherlands, 2004; Volume 4, pp. 2063–2117.
5. Rosenthal, S.S.; Strange, W.C. Evidence on the Nature and Sources of Agglomeration Economies. In *Handbook of Regional and Urban Economics*; Elsevier: Amsterdam, The Netherlands, 2004; Volume 4, pp. 2119–2171.
6. Tabuchi, T.; Yoshida, A. Separating Urban Agglomeration Economies in Consumption and Production. *J. Urban Econ.* **2000**, *48*, 70–84. [CrossRef]
7. Baldwin, R.E.; Okubo, T. Heterogeneous Firms, Agglomeration and Economic Geography: Spatial Selection and Sorting. *J. Econ. Geogr.* **2006**, *6*, 323–346. [CrossRef]

8. Waldfogel, J. *Preference Externalities: An Empirical Study of Who Benefits Whom in Differentiated Product Markets*; National Bureau of Economic Research, Inc.: Cambridge, MA, USA, 1999.
9. Glaeser, E.L.; Kolko, J.; Saiz, A. Consumer City. *J. Econ. Geogr.* **2001**, *1*, 27–50. [\[CrossRef\]](#)
10. Waldfogel, J. Who Benefits Whom in Local Television Markets? *Brook. Whart. Pap. Urban Aff.* **2004**, *2004*, 257–305. [\[CrossRef\]](#)
11. Glaeser, E.L.; Gottlieb, J.D. Urban Resurgence and the Consumer City. *Urban Stud.* **2006**, *43*, 1275–1299. [\[CrossRef\]](#)
12. Lee, S. Ability Sorting and Consumer City. *J. Urban Econ.* **2010**, *68*, 20–33. [\[CrossRef\]](#)
13. Hsu, W.-T. Central Place Theory and City Size Distribution: Central Place and City Size. *Econ. J.* **2012**, *122*, 903–932. [\[CrossRef\]](#)
14. Schiff, N. Cities and Product Variety: Evidence from Restaurants. *J. Econ. Geogr.* **2015**, *15*, 1085–1123. [\[CrossRef\]](#)
15. Handbury, J.; Weinstein, D.E. Goods Prices and Availability in Cities. *Rev. Econ. Stud.* **2015**, *82*, 258–296. [\[CrossRef\]](#)
16. Adamson, D.W.; Clark, D.E.; Partridge, M.D. Do Urban Agglomeration Effects and Household Amenities Have a Skill Bias? *J. Reg. Sci.* **2004**, *44*, 201–224. [\[CrossRef\]](#)
17. Borck, R. Consumption and Social Life in Cities: Evidence from Germany. *Urban Stud.* **2007**, *44*, 2105–2121. [\[CrossRef\]](#)
18. Scott, A.J. Beyond the Creative City: Cognitive–Cultural Capitalism and the New Urbanism. *Reg. Stud.* **2014**, *48*, 565–578. [\[CrossRef\]](#)
19. Scott, A.J. The Constitution of the City and the Critique of Critical Urban Theory. *Urban Stud.* **2022**, *59*, 1105–1129. [\[CrossRef\]](#)
20. Shapiro, J.M. Smart Cities: Quality of Life, Productivity, and the Growth Effects of Human Capital. *Rev. Econ. Stat.* **2006**, *88*, 324–335. [\[CrossRef\]](#)
21. Carlino, G.A.; Saiz, A. Beautiful City: Leisure Amenities and Urban Growth. *J. Reg. Sci.* **2019**, *59*, 369–408. [\[CrossRef\]](#)
22. Bacolod, M.; Blum, B.S.; Strange, W.C. Skills in the City. *J. Urban Econ.* **2009**, *65*, 136–153. [\[CrossRef\]](#)
23. Banta, S.M. Consumer Expenditures in Different-Size Cities. *Mon. Labor Rev.* **1989**, *112*, 44–47.
24. George, L.; Waldfogel, J. *Who Benefits Whom in Daily Newspaper Markets?* National Bureau of Economic Research, Inc.: Cambridge, MA, USA, 2000.
25. Jussaume, R.A., Jr. Factors Associated with Modern Urban Chinese Food Consumption Patterns. *J. Contemp. China* **2001**, *10*, 219–232. [\[CrossRef\]](#)
26. Yen, S.T.; Fang, C.; Su, S.-J. Household Food Demand in Urban China: A Censored System Approach. *J. Comp. Econ.* **2004**, *32*, 564–585. [\[CrossRef\]](#)
27. Cai, H.; Chen, Y.; Zhou, L.-A. Income and Consumption Inequality in Urban China: 1992–2003. *Econ. Dev. Cult. Change* **2010**, *58*, 385–413. [\[CrossRef\]](#)
28. Jin, Y.; Li, H.; Wu, B. Income Inequality, Consumption, and Social-Status Seeking. *J. Comp. Econ.* **2011**, *39*, 191–204. [\[CrossRef\]](#)
29. He, Z.; Ye, J.; Shi, X. Housing Wealth and Household Consumption in Urban China. *Urban Stud.* **2020**, *57*, 1714–1732. [\[CrossRef\]](#)
30. Ottaviano, G.; Tabuchi, T.; Thisse, J.-F. Agglomeration and Trade Revisited: Agglomeration and Trade Revisited. *Int. Econ. Rev.* **2002**, *43*, 409–435. [\[CrossRef\]](#)
31. Simon, J.L.; Love, D.O. City Size, Prices, and Efficiency for Individual Goods and Services. *Ann. Reg. Sci.* **1990**, *24*, 163–175. [\[CrossRef\]](#)
32. Albouy, D. *Are Big Cities Bad Places to Live? Estimating Quality of Life across Metropolitan Areas*; National Bureau of Economic Research, Inc.: Cambridge, MA, USA, 2012.
33. Jappelli, T.; Pistaferri, L. The Consumption Response to Income Changes. *SSRN Electron. J.* **2010**, *2*, 479–506. [\[CrossRef\]](#)
34. Rappaport, J. Consumption Amenities and City Population Density. *Reg. Sci. Urban Econ.* **2008**, *38*, 533–552. [\[CrossRef\]](#)
35. Costa, D.L. *American Living Standards: Evidence from Recreational Expenditures*; National Bureau of Economic Research, Inc.: Cambridge, MA, USA, 1999.
36. Thompson, C.S.; Tinsley, A.W. Income Expenditure Elasticities for Recreation: Their Estimation and Relation to Demand for Recreation. *J. Leis. Res.* **1978**, *10*, 265–270. [\[CrossRef\]](#)
37. Davies, B.; Mangan, J. Family Expenditure on Hotels and Holidays. *Ann. Tour. Res.* **1992**, *19*, 691–699. [\[CrossRef\]](#)
38. Huang, K.S.; Gale, F. Food Demand in China: Income, Quality, and Nutrient Effects. *China Agric. Econ. Rev.* **2009**, *1*, 395–409. [\[CrossRef\]](#)
39. Roca, J.D.L.; Puga, D. Learning by Working in Big Cities. *Rev. Econ. Stud.* **2017**, *84*, 106–142. [\[CrossRef\]](#)
40. Kuhn, P.; Kooreman, P.; Soetevent, A.; Kapteyn, A. The Effects of Lottery Prizes on Winners and Their Neighbors: Evidence from the Dutch Postcode Lottery. *Am. Econ. Rev.* **2011**, *101*, 2226–2247. [\[CrossRef\]](#)
41. Moretti, E. Social Learning and Peer Effects in Consumption: Evidence from Movie Sales. *Rev. Econ. Stud.* **2011**, *78*, 356–393. [\[CrossRef\]](#)
42. Roychowdhury, P. Peer Effects in Consumption in India: An Instrumental Variables Approach Using Negative Idiosyncratic Shocks. *World Dev.* **2019**, *114*, 122–137. [\[CrossRef\]](#)
43. Glaeser, E.L.; Sacerdote, B. Why Is There More Crime in Cities? *J. Polit. Econ.* **1999**, *107*, S225–S258. [\[CrossRef\]](#)
44. Schläpfer, M.; Bettencourt, L.M.A.; Grauwin, S.; Raschke, M.; Claxton, R.; Smoreda, Z.; West, G.B.; Ratti, C. The Scaling of Human Interactions with City Size. *J. R. Soc. Interface* **2014**, *11*, 20130789. [\[CrossRef\]](#)
45. Arun, S.; Ananim, S.; Arun, T. Do All Networks ‘Work’? The Mediating Role of Social Networks on Consumption Expenditure in India. *Sociology* **2016**, *50*, 522–541. [\[CrossRef\]](#)
46. Sama, R. Impact of Media Advertisements on Consumer Behaviour. *J. Creat. Commun.* **2019**, *14*, 54–68. [\[CrossRef\]](#)

-
47. Simandan, D. Proximity, Subjectivity, and Space: Rethinking Distance in Human Geography. *Geoforum* **2016**, *75*, 249–252. [[CrossRef](#)]
 48. Kearney, J. Food Consumption Trends and Drivers. *Philos. Trans. R. Soc. Lond. B Biol. Sci.* **2010**, *365*, 2793–2807. [[CrossRef](#)]
 49. Gan, L.; Yin, Z.; Jia, N. *Data You Need to Know about China: Research Report of China Household Finance Survey 2012*; Springer: New York, NY, USA, 2013.
 50. Davis, D.R.; Weinstein, D.E. Bones, Bombs, and Break Points: The Geography of Economic Activity. *Am. Econ. Rev.* **2002**, *92*, 1269–1289. [[CrossRef](#)]
 51. Ding, C.; Li, Z. Size and Urban Growth of Chinese Cities during the Era of Transformation toward a Market Economy. *Environ. Plan. B Urban Anal. City Sci.* **2019**, *46*, 27–46. [[CrossRef](#)]