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Urban Amenities in Chinese Cities: A Geographical Analysis of Social Group Disparities

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Abstract

This study investigates inter-city disparities in the distribution of social amenities for four demographic groups across mainland China, moving beyond the conventional focus on knowledge-economy amenities to include relatively disadvantaged populations. It further explores the relationship between amenity distribution and China's urban hierarchy at multiple geographical scales. Results show that amenities are disproportionately concentrated in cities with larger populations, stronger economies, and higher administrative status, reflecting the influence of demographic, economic, and political structures. Consequently, substantial geographical disparities align with regional economic imbalances. However, inequality levels vary by amenity type and social group: commercially oriented amenities, such as those targeting high-skilled professionals and women, exhibit greater inequality, whereas publicly supported amenities for older adults and children exhibit comparatively lower disparities. The study further reveals that in many smaller cities, the provision of high-skilled labor amenities tends to outstrip local demand, indicating that the role of such amenities in shaping location choices may be overestimated in less central regions. These findings highlight the need for context-sensitive urban amenity policies and greater governmental attention to mitigating inequalities in essential public amenities to promote urban equity and competitiveness.

Keywords: amenity; spatial disparity; social group; urban system; China

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1. Introduction

Over recent decades, amenities have garnered substantial scholarly, planning, and policy interest. Initially conceived as 'pleasant living conditions'—particularly referring to favorable natural environments [1]—the notion of amenities has since broadened to encompass a range of cultural and recreational facilities, as well as intangible social qualities that fulfill higher-level psychological needs [2,3]. Amenities are understood as location-specific, nonexportable goods and services that primarily serve local residents or commuters [4]. Accordingly, they are regarded as key drivers in shaping migration decisions and residential choices [5]. This amenity-driven mobility is especially evident within knowledge- and creativity-intensive economic sectors, where highly skilled workers and managerial professionals often prioritize quality of life and consequently cluster in high-amenity locales [6,7]. In response, many regional economic development initiatives have adopted an 'amenities

strategy' aimed at attracting talent with high human capital, thereby indirectly influencing the location decisions of technology-intensive firms [8,9].

In geography and urban studies, considerable scholarly attention has been devoted to examining the geographical patterns and localized effects of urban amenities. Existing research has extensively documented spatial disparities in amenity provision, the role of amenities in shaping immigration, labor markets, and housing dynamics, as well as their association with the concentration of human capital, enterprises, and innovation activities [10–15]. However, inter-city differences in access to amenities across social groups, particularly between high-skilled labor and more vulnerable groups, remain largely underexplored. To address this gap, this study systematically investigates disparities in the distribution of social amenities among four groups—women, children, older adults, and high-skilled labor—across cities on China's mainland. In doing so, we seek to contribute to the academic discourse on urban amenities in two key ways.

First, we attempt to advance understanding of the diversity of amenity distribution by focusing on spatial disparities in how such resources are provided to high-skilled labor and vulnerable social groups. Although the original concept of amenities was formulated to address the needs of diverse populations, including older adults, retirees, and tourists [1], subsequent research has increasingly concentrated on a narrower demographic— highly educated technical professionals, given their perceived importance in post-industrial economic transitions [7,16,17]. This overemphasis on the economic utility of amenities runs the risk of overlooking the needs of other social segments, particularly more vulnerable groups. Reflecting these academic trends, policy makers in many localities have adopted amenity-based strategies that primarily target professional classes (e.g., the "creative class" initiatives), potentially undermining broader urban social equity [18]. Accordingly, the first objective of this study is to conduct a comparative geographical analysis of amenity provision across three disadvantaged groups and high-skilled labor, thereby offering a more comprehensive understanding of the social-group differences in amenity availability.

Second, this study aims to re-evaluate the relationship between amenity distribution and urban hierarchy across different geographic scales—a longstanding concern in geographical inquiry. Prior research has often noted that major metropolitan areas tend to excel in offering artificial amenities, such as shopping, entertainment, education, and recreational facilities [6,19,20], while rural and peripheral regions are generally more endowed with natural or environmental amenities [21–23]. As previously indicated, this unevenness in amenity provision is frequently cited to explain the sustained vitality of large cities in the knowledge-based economy. However, much of the existing literature has paid insufficient attention to the demand side when assessing amenity supply across urban systems. For example, do larger cities still outperform smaller ones in amenity provision when demographic factors are taken into account? How does the relationship between city size and amenity availability differ across amenity types? These questions constitute the second key focus of the present study.

The remainder of this paper is structured as follows. Section 2 traces the evolution of the conceptualization of amenities, examining its shift from a relatively broad notion to a more narrowly focused one, and identifies research gaps concerning the uneven provision of amenities. Section 3 details the data and methodology employed to measure and compare the distribution of amenity provision across different social groups. Section 4 presents the findings, including the overall distribution of amenities across China's urban system and their disparities at multiple spatial scales. Finally, Section 5 summarizes the main conclusions and discusses their implications for urban policy.

2. Literature Review

2.1. Conceptualization of Amenities

The scholarly literature largely traces the origin of amenities research to the American geographer Edward Ullman. In his seminal paper, Ullman [1] introduced the concept to describe 'pleasant living conditions,' primarily associated with natural amenities, notably a favorable outdoor climate. He further contended that amenities were supplanting narrowly defined economic advantages as key drivers of migration, regional population growth, and economic development. Subsequent contributions from urban economists and geographers have expanded this concept. For instance, Bartik and Smith [24] (p. 207) defined amenities as 'location-specific goods, services, or characteristics' that could exert either positive or negative effects. Such amenities may be supplied by either public or private institutions. Similarly, Power [25] characterized amenities as place-specific public goods that enhance a location's appeal for residential or commercial purposes, broadly categorizing them into natural (e.g., landscapes and climate) and social amenities (e.g., social, cultural, and human-made environments). In Power's view, natural amenities predominantly attract temporary visitors (e.g., tourists), while social amenities hold greater importance for local residents. Accordingly, he argued that in rural areas experiencing a decline in traditional economic sectors, high amenity value could offer alternative or supplementary support for local economic growth [26]. Building upon this natural-social distinction, Brueckner et al. [27] further differentiated between 'endogenous amenities' (modern, human-made amenities) and 'exogenous amenities' (natural and historical amenities). Drawing on case studies of American and European cities, they demonstrated that the spatial distribution of different income groups was largely shaped by the geography of a city's exogenous amenities.

Building on these foundational contributions, several key characteristics of amenities can be distilled. First, amenities encompass a wide spectrum of both natural conditions and social facilities. While early studies largely emphasized natural amenities, subsequent research has progressively shifted attention toward social amenities. Second, scholars widely highlight the immobile and non-exportable nature of amenities, implying that their benefits can only be accessed by living in or near the areas where they are provided. Amenities are thus understood as place-specific attributes that primarily serve local residents and commuters [4]. Third, amenities are recognized as possessing substantial economic value. Because they generate well-being and cannot be traded across locations, many researchers view high-level amenities as new locational assets that complement or even replace traditional economic drivers (e.g., job opportunities or wage levels) in attracting visitors and migrants, thereby fostering local economic growth [1,8]. Notably, these early conceptualizations of amenities were relatively inclusive in terms of the social groups considered. Given the initial focus on natural amenities, much of the research centered on the preferences of older adults, retirees, and tourists. Since the late 1990s, however, scholarly attention has increasingly narrowed to the demands and influence of a specific demographic: professionals in high-tech and creative industries.

2.2. Amenities and High-Skilled Labor

The shift in research focus toward high-skilled labor coincided with the rise in post-industrial and knowledge-based economies. This trend is notably reflected in three influential theoretical frameworks: Florida's 'creative class,' Glaeser's 'consumer city,' and Clark and Bartlett's 'city as an entertainment machine'. The creative-class theory highlights the central role played by creative professionals, those in occupations that specialize in synthesizing knowledge and ideas to solve problems or generate new value, in driving regional economic vitality. According to Florida, the creative class contributes to local economic growth by fostering innovation and stimulating the expansion of technology-intensive

industries. Members of this group exhibit strong preferences for diverse urban amenities, including accessible facilities, an inclusive social environment, and cultural diversity, which in turn influence the location decisions of high-tech firms [7]. Glaeser's consumer-city theory, on the other hand, underscores the growing importance of cities as centers of consumption in contemporary urban development. As incomes rise and technologies advance, residents increasingly choose to live in cities offering high-quality amenities, such as a wide range of services and consumer goods, appealing aesthetics and physical settings, efficient public services, and convenient transportation [6]. Similarly, the 'entertainment machine' concept proposed by Bartlett et al. [28] posits that urban social amenities serve to meet the leisure-oriented demands of highly skilled workers. In post-industrial societies, skilled professionals are thought to prioritize access to leisure-related infrastructure and services. Consequently, the development of such amenities enhances a city's appeal and supports the accumulation of human capital. Inspired by these foundational contributions, numerous subsequent studies have examined the relationship between urban amenities and the concentration of skilled labor and high-tech enterprises [17,29–31].

In summary, recent scholarship has increasingly framed highly skilled labor as a novel driver of economic growth, underscoring the role of urban amenities, particularly those catering to leisure, in attracting this knowledge-oriented workforce, who may opt for quality of life in amenity-rich locations even at the expense of higher wages [32]. Accordingly, urban and regional policymakers are urged to align with the preferences of the skilled labor by expanding experiential leisure offerings, such as participatory sports, outdoor festivals, performance and gallery venues, upscale dining and entertainment, and walkable, socially conducive urban design [7]. While this talent-centered perspective has stimulated valuable research on amenities and amplified academic voice in policy discourse, it has also led to a narrowed conceptualization of amenities—one that often privileges elite interests over the varied needs of broader social groups. The pursuit of such an exclusionary 'amenity strategy' risks entrenching or intensifying urban and regional inequities in access to infrastructure and services [18]. As critical scholars note, the creation of urban landscapes and amenities tailored to elite tastes can adversely affect disadvantaged groups, including women and people of color [18,33]. Together, these critiques point to the need to move beyond a purely economic framing of amenities and to deepen scholarly attention to spatial inequalities in their provision.

2.3. Spatial Disparities of Amenities

Social science research has increasingly acknowledged the pervasive and accelerating social and spatial inequalities within and between cities [34]. Yet, disparities in the distribution of urban amenities remain underexplored, as existing literature has predominantly focused on their environmental aspects. This body of environmental equity research examines both positive urban attributes, such as green spaces, trees, and public parks [23], and environmental disamenities, including pollution, hazards, and other negative environmental conditions [10]. Empirical studies consistently show that minority and socioeconomically disadvantaged groups have comparatively limited access to beneficial environmental amenities while facing greater exposure to environmental burdens [35,36].

A related but distinct strand of urban inequality research investigates public service provision—essential infrastructure and services like street cleaning, emergency response, and waste collection, which are critical to daily urban life [10]. These studies often employ spatial statistical methods to assess the accessibility of service facilities or the alignment between service supply and demographic demand [37,38]. Their findings reveal significant inequities in service distribution across cities, which tend to exacerbate existing racial, ethnic, and socioeconomic divides [39,40] and mirror discriminatory policies and social

mechanisms that influence residential patterns [11]. Ultimately, the cumulative impact of unequal access to urban amenities is intrinsically linked to the broader concept of spatial justice [41].

While existing research on environmental amenities and public services has highlighted issues in the distribution of urban amenities, a deeper understanding of their spatial disparity remains necessary. First, inequality in amenity distribution exists both within and between cities. However, most studies have focused on disparities in residents' access to amenities at the intra-city level [37,42], whereas differences in amenity provision across cities with varying economic and demographic characteristics have received far less attention. In geographical research, inter-city disparities have long been examined in relation to urban systems. Variations in resource concentration and the divergent attractiveness of cities are key drivers of inter-city migration and factor mobility, which significantly contribute to regional inequality [43]. As important place-based assets, amenities arguably play a major role in shaping urban hierarchies. Therefore, policies designed to reduce regional disparities should take into account the uneven distribution of urban amenities. Although many scholars suggest that large cities and metropolitan areas offer superior amenities, empirical evidence supporting this claim remains limited. Further research is needed to examine the unequal patterns of amenity distribution across cities in different national and regional contexts.

Secondly, amenities encompass a wide spectrum of goods and services designed to meet the needs of diverse social groups. Research has identified significant disparities in the distribution of different types of amenities [10], meaning that accessibility to relevant urban amenities varies substantially across social groups, resulting in distinct spatial inequalities. However, existing literature has largely overlooked the spatial inequalities in amenity provision for different social groups, as scholarly attention has been predominantly directed toward the demands of high-skilled labor. On one hand, even when urban amenity strategies primarily target high-skilled labor, they often lead to increased overall investment in urban infrastructure, thereby raising the general level of amenities available to other social groups. Thus, cities that offer abundant amenities for high-skilled labor may also excel in providing other types of amenities for different segments of society. On the other hand, an excessive focus on catering to high-skilled labor may divert investment away from other urban infrastructure and services, potentially lowering the relative level of amenity provision for other social groups, particularly vulnerable populations. Further empirical research is needed to determine which of these scenarios more accurately reflects reality. In the following section, we examine these questions through a case study of amenity distribution among different social groups in China.

3. Data and Methods

This study examines inter-city disparities in amenity provision across four social groups on China's mainland: women, children, older adults, and high-skilled labor. The first three groups were selected primarily because of their relatively disadvantaged social positions. For instance, women and children are widely recognized as among the most vulnerable populations across diverse national contexts, including well-resourced ones, as highlighted in the United Nations Sustainable Development Goals [44]. In addition, each group has distinct gender- or age-specific needs for particular types of amenities [45]. Other vulnerable groups, such as persons with disabilities, migrants, and refugees, were not included in this study due to a lack of available data. China's official statistics do not disaggregate data on these populations, and many of these groups are not associated with easily identifiable amenity types. The specific methodological steps are outlined in the following sections.

3.1. Selecting Amenity Types

As urban amenities encompass a broad spectrum of public and private goods and services, this study first sought to identify which types of amenities best reflect the needs of the four social groups under examination. Through a review of existing literature and a preliminary assessment of available data, 16 categories of amenities were selected for analysis (Table 1). While these categories do not exhaust all amenities that may influence each group's quality of life, further expansion of the sample was constrained primarily by data availability, given the limited official statistics on city-level amenities in China. To address this gap, we turned to internet-based sources to compile the dataset. Furthermore, some amenity types, such as beauty and barber shops, cultural and science centers, parks and green spaces, and museums, may serve multiple social groups simultaneously. In such cases, amenities were weighted using the Analytic Hierarchy Process (AHP) to reflect their relative importance for specific groups, as detailed in Section 3.3.

Table 1. Selection of amenity types.

Amenity Type	Indicator	Data Source	Source of Literature
Beauty and barber	Amount of amenities	Amap (POI)	[13,46]
Cosmetics	Amount of amenities	Amap (POI)	[13,14]
Yoga	Amount of amenities	Dianping	[13,19,47]
Maternity service	Amount of amenities	Dianping	[13,47]
Amusement park	Amount of amenities	Amap (POI)	[14,17,37]
Kindergarten	Amount of amenities	Amap (POI)	[17,48]
Primary & middle school	Amount of teachers	China City Statistical Yearbook	[15,37,48]
Cultural and science center	Amount of amenities	Amap (POI)	[13,19,48]
Nursing home	Amount of beds	Ministry of Civil Affairs of China	[37,48]
Park and green space	Area of spaces	China Urban Construction Statistical Yearbook	[10,35,36]
Public square	Amount of amenities	Amap (POI)	[14,36,40]
Market	Amount of amenities	Amap (POI)	[13,48]
Café and bar	Amount of amenities	Amap (POI)	[13,17,49]
Theater	Amount of amenities	Amap (POI)	[15,17,49]
Museum	Amount of amenities	China City Statistical Yearbook	[15,17,50]
Gallery	Amount of amenities	Amap (POI)	[15,17,50]

3.2. Collecting Amenity Data

Amenities data were compiled from multiple sources (Table 1), including statistical yearbooks, official government reports, point of interest (POI) data from digital map platforms (e.g., Amap), and open data from online lifestyle platforms (e.g., Dianping). The data primarily span the period from 2022 to 2023. To ensure reliability, different sources were cross-checked and their validity was manually verified through spot-checking in selected cities. Since this study focuses on inter-city disparity in amenity distribution, all collected data were aggregated to reflect the total number of amenities (or relevant indicators) at the prefectural level or above. To measure per capita amenity availability, demographic data for women, children (aged 0–14), older adults (aged 65 and over), and high-skilled labor—defined as those employed in information technology and software services, scientific research and technological services, and culture, sports, and entertainment industries—were drawn from the 2020 National Population Census for urban areas of each

city (see Table S1 in Supplementary). It should be noted that these demographic groups are not mutually exclusive, as they are classified by different social characteristics. In total, 296 mainland Chinese cities were included as samples for analysis.

3.3. Analyzing the Spatial Disparity of Amenities

This study first employed the AHP to weight amenities and assess their varying importance across different social groups. AHP is a multi-criteria decision-making method that structures complex problems into a hierarchical framework and quantifies subjective judgments through pairwise comparisons [51,52]. Five experts with extensive experience in amenity or equity research were invited to assess the relative importance of different amenities through pairwise comparisons. Using the standard 1–9 scale (see Table S2 in Supplementary), each expert constructed a pairwise comparison matrix (PCM). The geometric mean method was then applied to aggregate the five individual PCMs into a consolidated matrix, from which the final weights of each amenity for different population groups were derived. To ensure the reliability and validity of the expert-derived weights, a consistency check was performed on each PCM. All matrices showed a consistency ratio (CR) below the 0.10 threshold, confirming acceptable consistency (see Table S3 in Supplementary). The resulting weights are reported in Table 2. All amenity data were standardized—expressed as the proportion of amenities in a city relative to the national total—to eliminate dimensional differences. Composite amenity provision levels for each group within each city were then calculated using weighted sums of these standardized values. Per capita amenity provision levels were subsequently derived by dividing each group's composite score by its corresponding population. Finally, Geographic Information System techniques were employed to visualize and spatially analyze the distribution of amenities across cities.

Table 2. Weights of amenities for different social groups.

Amenity Type	Women	Children	Older Adults	High-Skilled Labor
Beauty and barber	0.134	0.063	0.037	0.039
Cosmetics	0.131	0.000	0.021	0.024
Yoga	0.122	0.000	0.035	0.071
Maternity service	0.179	0.000	0.000	0.000
Amusement park	0.017	0.109	0.019	0.020
Kindergarten	0.000	0.184	0.000	0.000
Primary & middle school	0.000	0.196	0.000	0.000
Cultural and science center	0.049	0.108	0.057	0.084
Nursing home	0.000	0.000	0.223	0.000
Park and green space	0.084	0.093	0.160	0.068
Public square	0.076	0.036	0.125	0.066
Market	0.027	0.044	0.136	0.045
Café and bar	0.044	0.028	0.026	0.195
Theater	0.049	0.019	0.059	0.151
Museum	0.047	0.070	0.054	0.120
Gallery	0.041	0.050	0.048	0.117

The Dagum Gini coefficient was employed to measure and compare multiscale disparities in the distribution of different amenity types. While the conventional Gini coefficient is commonly applied to assess income inequality, it can be generalized to evaluate disparities in any distribution [53]. Its value ranges from 0 to 1, where 0 represents perfect equality and 1 indicates maximum inequality. Unlike the conventional Gini coefficient, the Dagum Gini coefficient decomposes overall disparities into between-region and within-region components, enabling analysis across multiple spatial scales [54]. This method has been

widely used in studies of regional equality. Based on levels of economic development, we divided China's mainland into four sub-regions—eastern, western, central, and northeastern (Figure 1)—following the classification of China's National Bureau of Statistics, allowing comparison of inter-city disparities both within and across these regions. The formula for the Dagum Gini coefficient (G) is presented as follows:

$$G = \frac{\sum_{j=1}^{k}\sum_{h=1}^{k}\sum_{i=1}^{n_j}\sum_{r=1}^{n_h}|y_{ji} - y_{hr}|}{2n^2\overline{u}}. \quad (1)$$

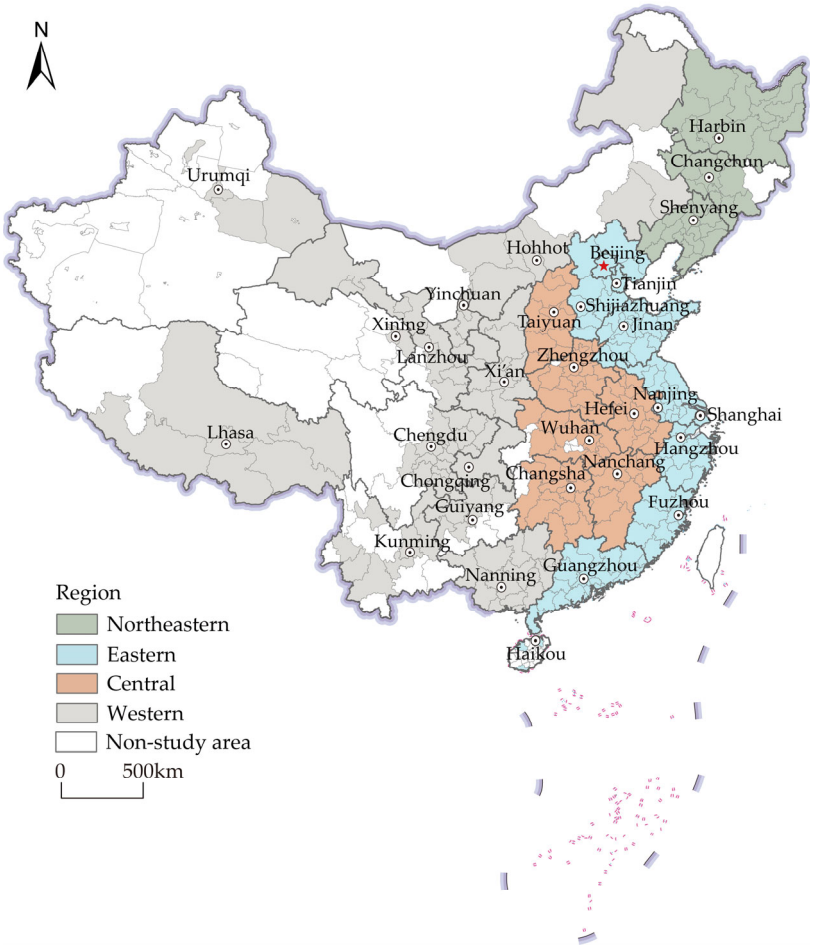


Figure 1. Division of the four sub-regions of China's mainland.

In this formula, y_{ji} and y_{hr} represent the value of city i in region j and city r in region h on a type of amenity, respectively. $\bar{u}$ represents the average value of all cities. n represent the number of all cities. k represents the number of sub-regions. n_j and n_h represent the number of cities in region j and region h, respectively.

The intra-regional difference (G_w) is calculated as:

$$G_w = \sum_{j=1}^{k} \frac{\sum_{i=1}^{n_j}\sum_{r=1}^{n_j}|y_{ji} - y_{jr}|}{2n_j^2\overline{u}_j}\frac{n_j}{n}\frac{n_j\overline{u}_j}{n\overline{u}}, \quad (2)$$

where n_j represents the number of cities in region j. $\bar{u}_j$ represents the average value of all cities in region j. y_{jr} represents the value of city r in region j.

The inter-regional difference (G_{jh}) is calculated as:

$$G_{jh} = \frac{\sum_{i=1}^{n_j} \sum_{r=1}^{n_h} |y_{ji} - y_{hr}|}{n_j n_h (\overline{u}_j + \overline{u}_h)}, \quad (3)$$

where n_j and n_h represent the number of cities in region j and region h. $\bar{u}_j$ and $\bar{u}_h$ represent the average value of all cities in region j and region h, respectively.

4. Results and Discussion

4.1. Spatial Distribution of Overall Amenity Provision Levels

We began by comparing the overall distribution of amenity provision levels across different social groups in cities on China's mainland. As illustrated in Figure 2, amenities for all four groups tend to concentrate in cities with larger populations and stronger economies, highlighting the influence of urban scale on amenity provision. Results from Pearson correlation coefficients analysis further confirm the strong association between amenity provision levels and urban population size as well as Gross Domestic Product (GDP) (Table 3). Consistent with previous studies, larger populations generate greater demand for diverse amenities, while stronger economic bases facilitate higher investment in such facilities and services [20]. Moreover, cities with higher administrative status, such as centrally administered municipalities (Chongqing, Shanghai, Beijing, and Tianjin) and provincial capitals (e.g., Chengdu, Guangzhou, Zhengzhou, Wuhan), emerge as leading centers of amenity concentration. In the Chinese institutional context, these cities function not only as key demographic and economic hubs but also as seats of government at various levels [55]. Consequently, they attract a disproportionate share of state-funded or state-supported public infrastructure, including museums, theaters, and cultural and science centers, which significantly enhances their overall amenity provision. These findings indicate that the quantitative distribution of amenities not only reflects the demographic and economic structures embedded in the urban system, but is also substantially shaped by political arrangements of different national contexts.

Despite these shared patterns of spatial concentration, clear disparities exist between amenities for high-skilled labor and those for other social groups. The provision of amenities for high-skilled labor shows a more pronounced concentration in top-tier cities, particularly in Beijing and Shanghai—China's two leading economic centers (Table 4). The Pearson correlation coefficient between these amenities and city GDP (0.962) is substantially higher than that with urban population size (0.886), indicating that the provision of high-skilled labor amenities depends more heavily on cities' economic prosperity (Table 3). In contrast, the distribution of amenity provision levels for women, children, and older adults is less strictly tied to economic hierarchy. For example, Chongqing—a major inland metropolis—ranks second in amenity provision for children, surpassing Shanghai. Prefecture-level cities with moderate economic performance, such as Linyi, also appear within the top 20 in rankings for these three groups. These distinct spatial patterns suggest that high-skilled labor is disproportionately concentrated in economically advanced cities, generating stronger localized demand for corresponding amenities [10]. By comparison, the distribution of amenities for women, children, and older adults aligns more closely with cities' underlying demographic structures than with economic standing alone. The theoretical implication is that the improvement in urban amenity primarily targeting high-skilled labor does not directly increase the overall level of amenities available to other social groups.

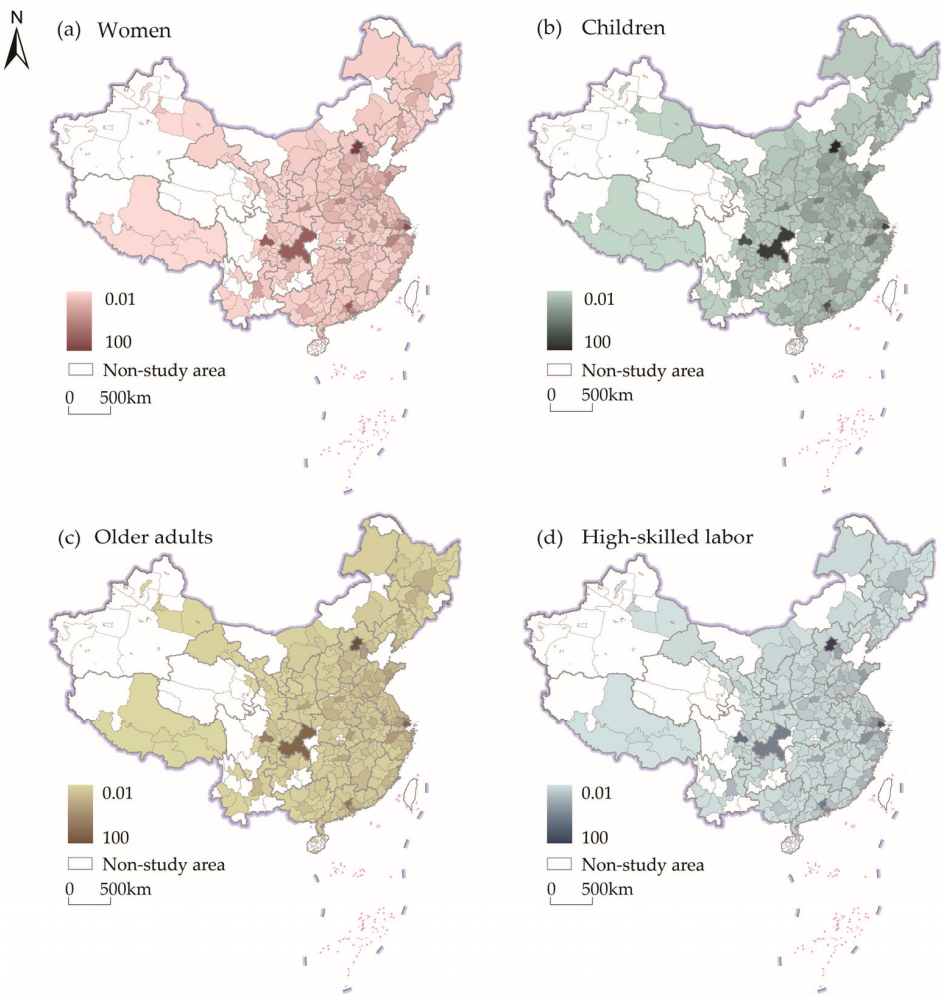


Figure 2. Distribution of amenity provision levels across social groups.

Table 3. Pearson correlations of amenity provision levels with urban population size and GDP.

Social Group	Population Size	GDP
Women	0.932 ***	0.954 ***
Children	0.963 ***	0.931 ***
Older adults	0.937 ***	0.954 ***
High-skilled labor	0.886 ***	0.962 ***

Note: *** indicates the result is significant at the 0.1% level.

The per capita distribution of amenity levels reveals more pronounced geographic disparities (Figure 3). High-value areas of amenity provision for women are concentrated in cities in the eastern coastal region, particularly within the Pearl River Delta (e.g., Zhuhai, Dongguan, Guangzhou, Shenzhen). This pattern is largely driven by the predominantly commercial nature of women-oriented amenities (e.g., cosmetics, yoga, beauty and barber), as private providers are attracted to areas with higher demand and greater purchasing power. Conversely, amenities primarily used by older adults, such as nursing homes, parks, and public squares, are largely public or semi-public and depend on government investment. Their provision is therefore less tied to direct economic returns. As a result, high per capita availability for older adults is observed not only in some coastal cities but also in several less populous western cities (e.g., Lhasa, Linzhi, Jiayuguan, Wuhai). In contrast, populous but economically moderate cities in the central region tend to lag behind. Amenities for children exhibit a geographic pattern intermediate to those for women and

older adults. These findings suggest that the commercial or public nature of amenities is an important factor influencing spatial disparities in their provision levels.

Table 4. Top 20 cities with the highest gross value of amenity provision levels.

City	Women	City	Children	City	Older Adults	City	High-Skilled Labor
Beijing	100.00	Beijing	100.00	Beijing	100.00	Beijing	100.00
Shanghai	88.49	Chongqing	88.64	Shanghai	85.32	Shanghai	84.64
Chengdu	79.73	Shanghai	79.42	Chongqing	84.65	Chengdu	62.76
Guangzhou	78.41	Chengdu	72.85	Guangzhou	68.76	Guangzhou	58.38
Chongqing	78.11	Guangzhou	71.88	Chengdu	63.16	Chongqing	54.60
Shenzhen	67.48	Shenzhen	53.49	Shenzhen	47.16	Shenzhen	49.18
Hangzhou	50.23	Hangzhou	45.78	Hangzhou	42.37	Hangzhou	43.71
Suzhou	48.31	Qingdao	43.63	Wuhan	39.96	Suzhou	36.79
Zhengzhou	46.22	Zhengzhou	42.19	Qingdao	38.38	Qingdao	34.43
Dongguan	45.18	Wuhan	41.04	Suzhou	37.78	Wuhan	33.52
Qingdao	43.79	Tianjin	40.97	Dongguan	37.27	Xi'an	32.57
Wuhan	43.67	Dongguan	39.79	Tianjin	36.45	Dongguan	32.42
Xi'an	42.69	Suzhou	39.09	Zhengzhou	35.08	Nanjing	29.81
Nanjing	37.20	Xi'an	37.99	Nanjing	34.61	Zhengzhou	29.24
Tianjin	36.30	Changsha	33.65	Xi'an	33.79	Tianjin	28.93
Changsha	35.93	Nanjing	32.92	Changsha	28.91	Changsha	26.82
Foshan	33.03	Linyi	31.82	Ningbo	27.99	Ningbo	24.83
Ningbo	32.39	Hefei	31.23	Hefei	26.30	Foshan	23.89
Hefei	31.59	Ningbo	31.15	Wuxi	26.23	Wuxi	23.83
Jinan	29.90	Jinan	31.01	Jinan	25.83	Jinan	22.27

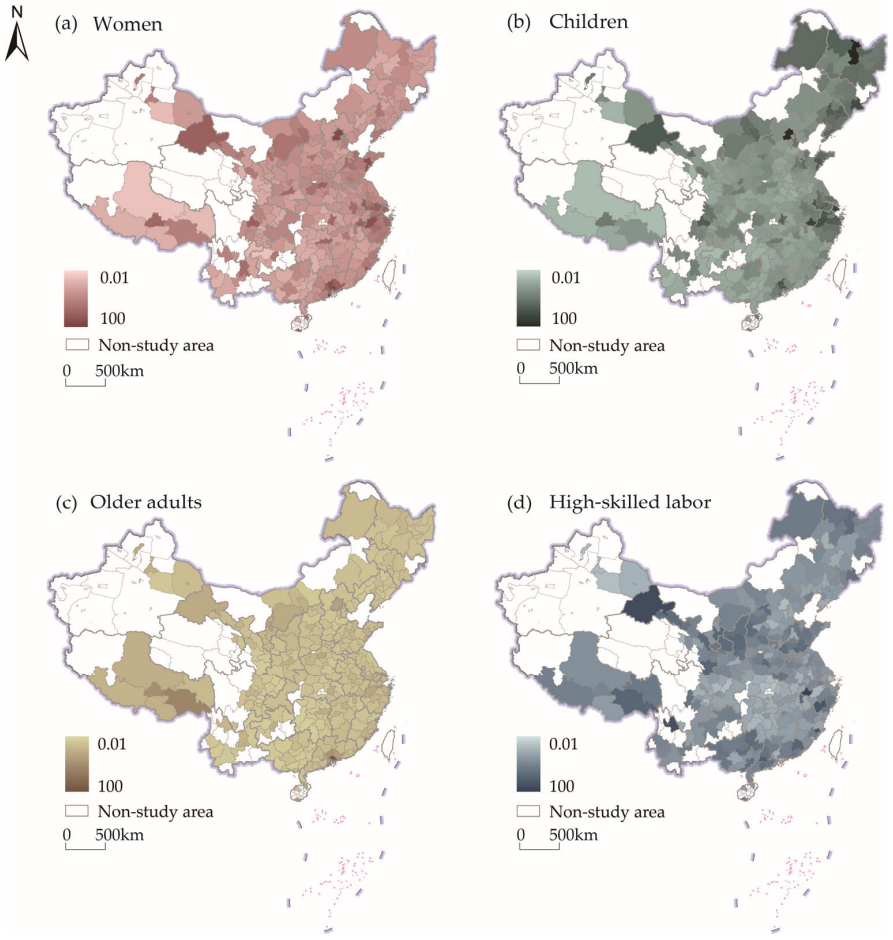


Figure 3. Per capita distribution of amenity provision levels across social groups.

In contrast to the concentrated pattern observed for gross amenity volume, the per capita provision of amenities for high-skilled workers exhibits a more decentralized distribution. Smaller cities across various regions rank highest on a per capita basis (Table 5). Although their absolute amenity supply is limited, the relatively small high-skilled labor force in tech and creative industries results in a favorable per capita ratio. Conversely, major centers such as Beijing, Shenzhen, and Guangzhou paradoxically rank lower, as their dense concentrations of high-skilled workers dilute per capita availability. While previous research frequently emphasizes the advantages of top-tier cities in catering to high-skilled labor, our findings suggest that this perceived advantage may be overstated when local demand intensity is taken into account, revealing latent under-demand in many smaller and peripheral locations. These results indicate that the presumed role of amenities in shaping the locational preferences of professional and creative workers may require re-evaluation in prevailing urban theory. Furthermore, considering demand-side characteristics is essential when assessing amenity provision across urban systems and designing place-specific amenity development strategies.

Table 5. The top 20 cities with the highest per capita value of amenity provision levels.

City	Women	City	Children	City	Older Adults	City	High-Skilled Labor
Zhuhai	100.00	Yichun	100.00	Dongguan	100.00	Huangshan	100.00
Dongguan	98.50	Beijing	96.86	Shenzhen	83.77	Jiuquan	92.78
Beijing	92.72	Huangshan	86.11	Linzhi	58.69	Lijiang	89.38
Xiamen	89.43	Shanghai	81.82	Zhuhai	57.40	Putian	84.73
Guangzhou	88.28	Zhoushan	81.75	Xiamen	52.81	Lishui	83.75
Qingdao	87.93	Baishan	77.34	Lhasa	50.71	Yunfu	78.92
Hangzhou	87.10	Hangzhou	73.96	Guangzhou	46.75	Chaozhou	77.79
Shenzhen	85.10	Dongguan	72.74	Huizhou	39.58	Meizhou	73.89
Sanya	81.09	Jiayuguan	70.70	Sanya	38.99	Jingdezhen	73.38
Nanjing	80.91	Qingdao	70.56	Jiayuguan	36.25	Linzhi	73.21
Wuxi	80.18	Huzhou	70.54	Zhongshan	35.97	Longnan	73.08
Suzhou	78.67	Guangzhou	69.65	Foshan	34.79	Zaozhuang	71.64
Jiayuguan	77.49	Nanjing	69.57	Yinchuan	34.11	Wuzhong	71.22
Jiuquan	76.76	Jiuquan	69.07	Beijing	34.09	Yan'an	70.57
Huizhou	76.64	Shaoxing	68.49	Wuhai	31.21	Baiyin	70.50
Chengdu	75.93	Wuhai	68.45	Zhengzhou	30.80	Pingdingshan	70.21
Foshan	75.57	Zhuhai	68.01	Hangzhou	30.23	Tongchuan	68.67
Huangshan	75.57	Ningbo	67.78	Haikou	29.85	Yichun	68.43
Zhengzhou	74.74	Wuxi	67.59	Ordos	29.54	Heze	68.42
Zhongshan	73.58	Shenyang	67.03	Jiuquan	28.24	Guilin	68.31

4.2. Spatial Disparities in Amenity Provision Levels

4.2.1. Disparities at the National Scale

We further examined multi-scalar disparities in the spatial distribution of amenity provision levels across China. The Dagum Gini coefficient analysis indicates that amenity provision levels for all four social groups exhibit an imbalanced distribution at the national scale, with Gini coefficients ranging from 0.45 to 0.54 (Table 6). Moreover, the extent of inequality differs across amenity types and social groups. In terms of total quantity, amenities associated with stronger commercial attributes, such as those catering to high-skilled labor and women, show higher levels of spatial inequality. In contrast, amenities with substantial governmental support, such as those for elders and children, display relatively lower disparities. This pattern suggests that the provision of commercially oriented amenities largely reflects local market purchasing power. Consequently, due to stronger agglomerative economies, these amenities tend to concentrate disproportionately

in economically advanced large cities. On the other hand, public-welfare-oriented amenities, including primary and middle schools, nursing homes, and public squares, are less spatially concentrated. Their supply is often shaped by governmental involvement and urban planning standards. As China's urban planning system sets baseline requirements for the population and territorial coverage of many public facilities, the distribution of these amenities must account for urban demographic size and structure, rather than purely economic returns [56]. Cities with abundant primary and middle schools and nursing homes, such as Nanyang, Baoding, Handan, and Zhoukou, are typically characterized by large populations and expansive administrative jurisdictions within provinces like Hebei and Henan. Thus, policy intervention plays a mitigating role in reducing inequalities in amenity provision.

Table 6. National Gini coefficients of amenity provision levels across social groups.

Social Group	Gini Coefficient (Total)	Gini Coefficient (per Capita)
Women	0.5159	0.1976
Children	0.4585	0.2166
Older adults	0.4801	0.2464
High-skilled labor	0.5337	0.1976

The per capita distribution of amenity provision levels across all social groups shows significantly lower inequality than that based on gross quantities. This finding further confirms that the advantage of large metropolises in amenity provision diminishes when urban population size is taken into account. Disparities also vary across groups. As shown in Table 6, the national per capita Gini coefficients for children and older adults exceed those for high-skilled workers and women, indicating higher inequality for the former. This pattern is largely attributable to the salient issues of left-behind children and accelerated population aging in central and western inland cities, driven by the outmigration of younger labor [57]. Such demographic imbalances dilute per capita amenity availability for children and older adults in these regions, widening the gap with more economically developed cities in eastern China. Overall, the per capita distribution of amenities highlights that urban demographic structure also plays a critical role in shaping the relative equity of amenity provision. Compared with commercially oriented amenities, the spatial inequality in public amenities for more vulnerable groups warrants greater attention and targeted intervention from local policymakers.

4.2.2. Inter-Regional Disparities

Examining the total Gini coefficients across regions (Table 7) reveals that areas with larger economic disparities tend to exhibit greater inequality in the distribution of amenity provision levels. The most pronounced inequality is observed between the economically advanced eastern region and the less developed western and northeastern regions. In contrast, disparities between the moderately developed central region and other parts of the country are relatively lower. Economic conditions serve as a fundamental driver, shaping both the demand for various amenities and the local capacity to supply them. Consequently, economically prosperous regions tend to concentrate more amenities than their less developed counterparts. These inter-regional disparities in total Gini coefficients across social groups are largely consistent with the patterns observed at the national level.

Table 7. Gini coefficients of amenity provision levels for four social groups across regions.

Region	Gini Coefficient (Total)				Gini Coefficient (per Capita)			
	Women	Children	Older Adults	High-Skilled Labor	Women	Children	Older Adults	High-Skilled Labor
Eastern-Central	0.4856	0.4175	0.4465	0.5272	0.2019	0.2226	0.2527	0.2144
Eastern-Western	0.6088	0.5458	0.5871	0.6197	0.2356	0.2368	0.2927	0.1912
Eastern-Northeastern	0.6189	0.5719	0.5436	0.6460	0.2159	0.1858	0.2459	0.1703
Central-Western	0.4907	0.4413	0.4641	0.4797	0.1886	0.1989	0.2314	0.2204
Central-Northeastern	0.4838	0.4499	0.4133	0.4857	0.1380	0.2554	0.1431	0.1853
Western-Northeastern	0.5149	0.4697	0.4709	0.5263	0.1790	0.2560	0.2176	0.1777

However, the patterns observed in the per capita Gini coefficients do not fully correspond to regional economic disparities. For example, the highest per capita inequality in amenity provision for high-skilled labor was found between the western and central regions, rather than between these regions and the more economically advanced eastern region. Similarly, the per capita Gini coefficient for children is notably higher between the western and northeastern regions. Many cities in the central and northeastern regions are characterized by high population density but constrained public budgets, limiting their capacity to supply amenities in proportion to local demand. In contrast, the western region, although economically less developed than the east and northeast, has a relatively smaller population, resulting in lower overall demand for such amenities. Consequently, per capita availability of certain amenities in the central and northeastern regions is, in some cases, even lower than in the western region. These findings suggest that inter-regional per capita Gini coefficients capture the intersecting influences of both economic and demographic disparities across regions. An important implication is that amenity policies targeting specific groups should carefully consider spatial variations in population-based demand and formulate more spatially sensitive development strategies.

4.2.3. Intra-Regional Disparities

Lastly, we examined disparities in amenity distribution at the intra-regional scale. Based on total Gini coefficients across cities within each region (Table 8), the central region exhibits the lowest internal inequality, followed by the eastern and northeastern regions, while the western region shows the highest. This pattern suggests that intra-regional inequality in amenity distribution is closely linked to regional economic development. In less developed regions such as the west, population and resources tend to cluster disproportionately in a few hub cities—typically provincial capitals [58]—leading to a polarized distribution of both demand for and supply of amenities. By contrast, cities in more developed regions like the east and center display smaller demographic and economic gaps, thereby mitigating internal inequality in amenity access. Notably, despite its higher economic development, the eastern region shows greater internal inequality than the central region. This can be attributed to the broader geographical and administrative span of the eastern region, which encompasses ten provinces and municipalities ranging from northern (e.g., Tianjin) to southern (e.g., Hainan) China. In comparison, the central region consists of six geographically contiguous provinces, resulting in relatively smaller inter-city disparities. This finding underscores the importance of considering regional territorial scope when analyzing intra-regional disparities in amenity distribution.

Table 8. Gini coefficient of amenity provision levels for four social groups within regions.

Region	Gini Coefficient (Total)				Gini Coefficient (per Capita)			
	Women	Children	Older Adults	High-Skilled Labor	Women	Children	Older Adults	High-Skilled Labor
Eastern	0.4452	0.3833	0.4205	0.4702	0.1858	0.2060	0.2761	0.1852
Central	0.3840	0.3400	0.3449	0.3842	0.1472	0.1683	0.1644	0.2131
Western	0.5404	0.4872	0.5141	0.5374	0.2181	0.2219	0.2729	0.1959
Northeastern	0.4574	0.4131	0.4043	0.4783	0.1161	0.1126	0.1141	0.1412

Compared with total Gini coefficients, the per capita measures further highlight how demographic structure shapes intra-regional disparities in amenity distribution. Notably, the northeastern region, rather than the central region, exhibits the most equal per capita distribution across social groups. Despite its prolonged economic stagnation, the northeast has experienced significant population outflow, particularly from small and medium-sized cities [57]. This outflow has reduced overall demand for amenities in these cities relative to larger regional centers, thereby alleviating per capita inequality in service availability. Within both the eastern and western regions, the per capita Gini coefficient for amenities targeting children and older adults now exceeds that for high-skilled labor amenities, indicating greater inequality in the former. This divergence reflects varied levels of attractiveness to migrant populations across cities in these regions. Cities attracting large inflows of younger migrants—typically provincial capitals and major economic hubs—exhibit lower aging rates and a smaller proportion of children. Consequently, amenity needs for older adults and children in these cities are more readily met, supported by stronger public investment in facilities and services. In contrast, cities experiencing limited in-migration or net population loss tend to have higher shares of elderly residents and children, facing shortages of younger labor. Such demographic imbalances place greater pressure on local governments to provide adequate amenities for children and older adults. Compared with commercially driven amenities (e.g., those for high-skilled workers), which can be more easily adjusted by market mechanisms, publicly supported amenities targeting vulnerable groups display sharper spatial disparities that reflect the migration structure of specific localities. Therefore, the provision of these amenities warrants closer attention and higher investment from urban planners and policymakers. Otherwise, as discussed at the beginning of this paper, an excessive focus on the demands of high-skilled workers may divert resources away from other urban infrastructure and services, potentially harming vulnerable groups genuinely in need of public support.

5. Conclusions

This study examines inter-city disparities in the distribution of social amenities for four demographic groups across mainland Chinese cities. Moving beyond the conventional focus on post-industrial or knowledge-economy amenities, we aim to advance the understanding of differentiated inequalities in amenity provision, particularly between relatively disadvantaged social groups and high-skilled labor. We also explore the relationship between the distribution of social amenities and China's urban hierarchy at multiple geographical scales.

Our findings indicate that, in terms of gross quantity, amenity provision levels for all four social groups are disproportionately concentrated in cities with larger populations, stronger economies, and higher administrative status. This reflects how China's urban system, shaped by demographic, economic, and political structures, influences the spatial distribution of social amenities. Consequently, substantial geographical disparities exist across different spatial scales, largely mirroring regional economic disparities. Nevertheless,

distribution patterns and degrees of inequality vary across social groups. High-value areas of amenity provision for high-skilled labor are more strongly concentrated in higher-tier cities, whereas the distribution of amenities for other social groups is less hierarchical and less exclusively tied to economic factors. Amenities with clear commercial attributes, such as those primarily targeting high-skilled labor and women, exhibit higher levels of inequality, while publicly supported amenities for older adults and children display relatively lower disparities. These results suggest that disparities in amenity provision are not solely driven by local market demand and purchasing power but are also shaped and moderated through public policy interventions.

From a demand-side perspective, the per capita distribution of amenity provision across all social groups shows significantly lower disparities, indicating that the provision advantage of large metropolises is largely offset by their population bases. Furthermore, imbalances in urban demographic structure, such as workforce out-migration and population aging, also reshape local demand for different amenity types, creating complex, multi-scale effects on the relative inequality of service provision. Moreover, due to weaker market demand for high-skilled labor amenities in smaller cities and peripheral areas, the per capita availability of such amenities displays a more dispersed spatial pattern across China's urban system. While prevailing theories often highlight the link between premium amenities and the locational preferences of high-skilled and creative workers, the reality varies considerably across different regional and urban contexts.

This study offers important insights for urban development policies centered on amenities. First, while many cities have adopted amenity-based strategies to attract skilled labor and thereby lure high-tech or creative industries, the actual effectiveness of these policies remains widely debated. Our analysis shows that in many small and medium-sized cities, the supply of amenities targeting high-skilled labor may exceed local demand. This suggests that the influence of amenities on the location decisions of professional and creative workers has been overestimated in peripheral regions. Consequently, urban planners and policymakers in such areas should carefully assess local conditions, particularly labor market characteristics and consumer demand, to guide infrastructure development and adopt amenity strategies that align with their specific socioeconomic context.

Second, our findings indicate that amenities primarily serving vulnerable social groups, such as older adults and children, tend to be insufficient in cities and regions marked by underdeveloped economies, large populations, and imbalanced demographic structures. Given the non-commercial nature of such amenities, local government intervention plays a crucial role in their provision. Consequently, compared to commercially supplied amenities, urban policymakers should give greater attention to inequalities in publicly supported amenities, which are essential for meeting the needs of a broader segment of urban residents. Inadequate provision or high levels of inequality in these amenities may undermine a city's attractiveness and overall competitiveness.

This study has several limitations, primarily due to data constraints, which could be addressed in future research. First, the analysis relies predominantly on cross-sectional data. Incorporating time-series or panel data would allow for the capture of long-term dynamics in the spatial patterns of regional amenity provision. Second, the study examines only 16 representative types of amenities across four social groups. Expanding the scope to include a broader range of population groups (e.g., disabilities, migrants, and refugees) and amenity categories would enable a more comprehensive assessment of disparities and inequalities. Finally, international comparative studies could offer deeper insights into how national contexts influence regional variations in amenity provision.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/urbansci10020121/s1, Table S1: Demographic and economic

characteristics of different social groups for the four sub-regions within China's mainland; Table S2: Rules for quantifying the scale of materiality judgments; Table S3: The consistency test results of PCM.

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Abbreviations

POI	Point of Interest
AHP	Analytic Hierarchy Process
PCM	Pairwise Comparison Matrices
GDP	Gross Domestic Product

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