Housing Disparity and Income Inequality in Urban China

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This paper measures and compares the housing disparity and income inequality of urban households and migrant households using a dataset drawn from the 1999 CASS urban household survey conducted in 13 cities —— the first time in which rural migrant households were included in China's urban household income survey. Furthermore, it estimates the influence of migrant households on the overall inequality with the Theil index by compartmentalising inequality into three components: the share of inequality within urban registered households (urban hukou), the share of inequality within migrant households (rural hukou), and the share of inequality between the two types of households. The result shows that income inequality and housing disparity within migrant households have become important components of income inequality in urban China.

Ⅰ. Introduction

China has been successful at stimulating economic growth since the late 1970's. However, this rapid growth has also brought problems. Urban income inequality and housing disparity are the most notable of these.

Regarding urban income distribution, the income distribution of rural migrants (i.e. migrants from rural areas) has not been paid enough attention in most studies. This is partially due to the lack of statistical data on the income of rural migrants who have no urban registration status (i.e. urban hukou) and thus have not attracted enough attention from the government and society. Under China's urban registration system, migrants from rural areas, except those who are fortunate enough to enter the public-owned higher education institutes as student and those lined-up to be military officials after joining the army, almost have no chance to get urban registration status. Instead, they are treated as temporary residents, no matter how long they have been living in the cities. However, in recent years, rural labors have been rushing into the cities and merging into urban society. As a result, migrant households have increasing influence on the overall urban income distribution. Thus, if migrant households have been continuously overlooked in the studies of urban income inequality, the real situation in China is likely to have been masked. The goal of this paper is to estimate the Gini coefficient and the Theil index on overall income inequality

and housing disparity in urban China using a CASS survey dataset, which includes income information of both urban-registeredhouseholds and rural migrant households without urban registration status. Meanwhile, the paper will measure the influence of rural migrant households on income inequality in urban China.

The dataset used in this paper is drawn from the *1999 CASS survey*, which was conducted in 2000 by the Institute of Economic Research of Chinese Academy of Social Sciences (CASS) with cooperation of National Bureau of Statistics (NBS) of China and an international research team from China, Japan, UK, USA and Australia. The reasons for conducting this kind of survey were that there was no micro data at the household level in the officially published data, and questionnaires on migrant households were not included in urban household income surveys in the past (Xue and Wei, 2003). Therefore, this survey (simplified as the *1999 CASS survey* hereafter) took 4500 samples of households with urban hukou and 801 samples of rural migrant households with rural hukou from 13 cities in 6 provinces.

The paper is organized as follows: Section 2 surveys the previous studies. Section 3 explains the data set and the inequality measurements used in the study. Section 4 measures the income inequality and housing disparity within urban-registered households and within migrant households separately. Section 5 measures urban income inequality of all households, and decomposes the overall inequality into three components: the share of inequality within urban-registered households, the share of inequality within rural migrant households, and the share of inequality between the two types of households. Section 6 summarizes the main findings.

Ⅱ. Survey of the previous studies

As described in previous studies (World Bank 1997, Nakagane 2000), income inequality in China can be divided into four types: rural-urban gap, inter-regional disparity, intra-urban inequality (i.e. urban inequality), and intra-rural inequality (i.e. rural inequality). Because of the availability of aggregated data on provinces and urban/rural regions from official publications, as well as concerns with China's regional development issues, there have been many studies on the rural-urban and inter-regional disparity. In contrast, studies on urban inequality and rural inequality remain limited. According to the data sources, we can divide the previous studies on urban inequality into two groups: one consists of studies based on official household incomes surveys conducted by the NBS, and the other consists of studies based on the survey by the CASS.

The NBS has been annually conducting sampling surveys on incomes and expenditures of rural and urban households since the early 1980s. The average income and population data by income-level groups (5-7 groups) are published in the *China Statistical Yearbook* and some provincial level statistical yearbooks annually. Because this is the only available yearly data, the NBS Survey data are used by many researchers and international institutes. Based on the data of the NBS Survey and other official statistics, for example, the World Bank measured rural-urban gap, inter-regional disparity, intra-urban inequality, intra-rural inequality and their trends in the period 1981-1995 (the World Bank, 1997). The findings on intra-urban inequality are as follows:

(1) The Gini coefficient for intra-urban income inequality has been smaller than intra-rural inequality for the period 1981-1995. However, the Gini coefficient for intra-urban inequality has increased from 0.18 in 1981 to 0.28 in 1995, while intra-rural inequality increased from 0.24 in 1981 to 0.33 in 1995.

(2) The level of inequality is influenced by the definition of income. Estimated at market prices, the average percentage of *in-kind* income as part of total income of urban households, including housing subsidies, pensions, medical care, education subsidies, communication subsidy and etc., was considerably larger before 1995. The urban income inequality with the in-kind income included would be a little lower if the in-kind income were not included. In other words, in-kind income has the effect of equalizing urban income distribution.

However, the NBS data published in China statistics yearbook are not original data but grouped data, meaning there is no way to do detailed analysis. For this reason, the CASS has began to carry nation-wide household income surveys since 1988 periodically. These surveys contain more question items and thus more detailed information on individual households, though the number of households surveyed is smaller than that of NBS's. The main results of these studies based on two earlier surveys (1988 survey and 1995 survey) are reflected in Griffin and Zhao (1993), Zhao, Li, and Riskin (1999), Nakagane and Miwa (1999), Li and Zhang (2000), Riskin and Li (2001) and Xue and Wei (2003). The trend of intra-urban income inequality described in the above studies is similar to that of the World Bank (1997) and other studies based on the NBS data. However, studies based on the CASS survey data are more detailed and contain more analysis.

Although the CASS survey-based studies are much more detailed than other studies, there remains a common problem: the non-inclusion of migrant households. This is because the household

samples in both the NBS survey and the 1988 and 1995 CASS surveys came from only urban-registered households. As the number of migrant households in urban areas increase rapidly (reaching about 20% of total urban population[1]), it is inappropriate to ignore the existence of migrant households. Meanwhile, unlike urban residents, migrants living in the city receive neither access to public housing, nor housing subsides, there by inducing a large gap in housing between urban registered households and migrant households.

In order to solve the above problem, CASS conducted a new type of nation-wide survey in 2000, the *1999 CASS survey*, in which rural migrant households were included for the first time[2]. In this paper, in contrast to previous studies, we will pay special attention to the income distribution and housing disparity of rural migrant households and its influence on income inequality in urban China. Moreover, we will measure housing inequality within households, which can be regarded as a referential indicator for understanding the real inequality situation in urban China.

Ⅲ. Data and measurements of inequality

1. Data

The data used in this paper are from the *1999 CASS survey*. One outstanding feature of the 1999 survey is that it includes rural migrant households who have lived in urban areas for over 6 months with a stable residency status, employment and income. The 5301 sample households (including 801 rural migrant households) in the survey are chosen from 13 cities in 6 provinces, giving consideration to the population and the share of migrants in total city population (see Table 1).

The *1999 CASS survey* questionnaires contain a lot of micro information on employment, income, and housing (location, house type, floor space, and condition of house structure and amenities such as bathroom, kitchen, gas supply, air conditioner). Given the decreasing importance of *in-kind* income as the Chinese economic system shifts to a market-oriented one (Zhang, 1999), in this paper, we use per capita household cash income data to measure the income inequality in 13 cities[3]. In addition, as a referential indicator, housing inequality is also estimated in terms of per capita floor space of households. However, the floor space used for measurement has been adjusted according to the housing condition (see Appended Table A).

2. Indexes of inequality

Two indexes of inequality, the Gini coefficient and the Theil index are used in this paper.

Table 1 Sample distribution by regions

City	Number of samples	Average population (persons)	Average floor space (m^2)	Per capita floor space (m^2)	Average yearly income (yuan)	Per capita yearly income (yuan)
Kaifeng	230	2.9	34.6	11.9	12146	4145
Pingliang	230	3.0	38.7	13.1	13460	4486
Zigong	230	2.8	42.9	15.4	13541	4632
Jindou	240	2.9	32.2	11.0	14999	5050
Nanchong	230	2.7	49.4	18.2	14640	5290
Lanzhou	440	2.9	36.0	12.3	15997	5328
Zhengdou	340	2.8	44.5	15.7	16485	5469
Pingdingsha	230	2.9	49.2	16.9	16741	5636
S hengyang	490	2.9	39.4	13.5	16792	5651
Chengdu	440	2.7	44.9	16.6	18405	6360
Xudou	240	2.8	31.2	11.3	18768	6759
Nanjing	490	2.7	33.5	12.6	23102	8346
Beijing	670	2.9	30.3	10.5	28628	9475

Note: Chengdu, Lanzhou, Nanjing, Shengyang, Zhengzhou are 5 provincial capitals and Beijing is China's capital. Provinces underlined are coastal regions.
Source: The 1999 CASS survey.

1) The Gini coefficient

The Gini coefficient, developed by Gini (1912), is an index usually used to measure income inequality. The value of Gini coefficient lies between 0 and 1, where 0 corresponds with perfect equality (where everyone has the same income) and 1 corresponds with perfect inequality (where one person has all the income, and everyone else has zero income). There are many forms of formula for calculating the Gini coefficient, although the basic principle is the same. In this paper, we estimate Gini coefficient as follows.

$$Gini = \left(\frac{2}{\mu n^2}\sum_{k=1}^{n} kw_k\right) - \frac{n+1}{n} \qquad (1)$$

Where, W_k, being ranked in order from the lowest to the highest, stands for per capita income (or floor space in counting the housing disparity) of the k-th household, μ is the average value of household income and n is the number of households (Economic Research Institute, 1998).

2) The Theil index

The Theil index, which is based on the information entropy concept, is defined by Theil (1967) as follows[4].

$$T_n(X) = \log n - \sum_{i=1}^{n} x_i \log\frac{1}{x_i} = \sum_{i=1}^{n} x_i \log n x_i \qquad (2)$$
$$\left(x_i = E_i / \sum_{i=1}^{n} E_i\right)$$

Where, E_i stands for the average level of per capita income (or floor space in counting the housing disparity) of a household, and n is the number of households. The Theil index shares some characteristics with the Gini coefficient, and it ranges from 0, perfect equality, to log n, perfect inequality. However, the

Theil index is relatively easy (as below) for decomposition so that the contribution of intra-group inequality and inter-group inequality to overall inequality can be identified.

If the households in a city, $X=(x_1, x_2 \cdots\cdots, x_h, x_{h+1}, \cdots\cdots, x_n)$, are constituted by two groups, urban-registered households, $X_h=(x_1, x_2, \cdots\cdots, x_h)$, and migrant households, $X_{n-h}=(x_{h+1}, \cdots\cdots, x_n)$, the Theil index $T_n(X)$ for X can be decomposed into three components as follows.

$$T_n(X)=h\mu_h T_h(X_h)+(n-h)\mu_{n-h}T_{n-h}(X_{n-h}) + T_n(X_h, X_{n-h}) \quad (3)$$

Where, $T_h(X_h)$ and $T_{n-h}(X_{n-h})$ measures the income inequality in the two groups, X_h and X_{n-h} respectively, while $T_n(X_h, X_{n-h})$ measures the income inequality between the two groups, which have an assumed income distribution as $(\mu_h, \cdots\cdots, \mu_h, \mu_{n-h}, \cdots\cdots, \mu_{n-h})$. μ_h and μ_{n-h} is the average value of X_h and X_{n-h} respectively.

Ⅳ. Estimate of Income inequality of urban-registered households and migrant households

1. Income level and housing condition

We separate all urban households into two groups, permanent resident households with urban registration status (i.e. urban-registered households) and temporary resident households without urban registration status (i.e. rural migrant households). Tables 2 and 3 show us the average income level and housing conditions (floor space) of the two household groups.

We can draw out some facts from Tables 2 and 3.

Table 2 Income level and housing condition of urban register households

City	Number of samples	Average population (persons)	Average floor space (m^2)	Per capita floor space (m^2)	Average yearly income (yuan)	Per capita yearly income (yuan)
Kaifeng	230	2.9	34.6	11.9	12146	4145
Pingliang	230	3	38.7	13.1	13460	4486
Zigong	230	2.8	42.9	15.4	13541	4632
Jinzhou	240	2.9	32.2	11	14999	5050
Nanchong	230	2.7	49.4	18.2	14640	5290
Lanzhou	440	2.9	36	12.3	15997	5328
Zhengzhou	340	2.8	44.5	15.7	16485	5469
Pingdingshan	230	2.9	49.2	16.9	16741	5636
Shengyang	490	2.9	39.4	13.5	16792	5651
Chengdu	440	2.7	44.9	16.6	18405	6360
Xuzhou	240	2.8	31.2	11.3	18768	6759
Nanjing	490	2.7	33.5	12.6	23102	8346
Beijing	670	2.9	30.3	10.5	28628	9475

Source: The CASS survey 1999.

(1) Due to the "one-child policy", the average size of urban-registered households is 2.7 to 3.0 persons per household. However, the average size of migrant households is rather small, ranging from 1.6 to 2.4 persons per household. The reason for this is that some migrants live and work in the cities as singletons, leaving their family members behind in their hometowns.

(2) Although the average level of per capita income of migrant households is higher than that of urban-registered households in almost all cities, the average per capita floor space of migrant households is much smaller. There are probably two reasons for this. First, in the case of migrant households, remittance to family members back home is very common. Further, migrant households have to pay some extra costs that are not required of urban-registered households, such as "administration charge of temporary residence", cost for job hunting, "school enrollment fees" for their children, etc. Thus, the actual disposable income of migrant households is actually much lower than the earned income. Second, since the acquisition of official urban registration status is quite difficult for migrant households, many migrants will have to return to their hometowns. Thus, most migrant households prefer to skim on housing because of their eventual return.

(3) The cities with higher average income levels are not necessarily the ones with better housing conditions. For example, although Beijing has the highest income level within the 13 cities surveyed, the average floor space for urban-registered households is the lowest, and that of migrant households is the 3rd lowest in all cities surveyed.

Table 3 Income levels and housing conditions of migrant households

City	Number of samples	Average population (persons)	Average floor space (m^2)	Per capita floor space (m^2)	Average yearly income (yuan)	Per capita yearly income (yuan)
Pingliang	50	2.6	12.4	4.8	6996	2661
Zhengzhou	60	2.3	12.9	5	9507	4103
Zigong	50	2.1	13	5.5	892-8	4316
Pingdingshan	50	2.4	19.3	7.4	11248	4723
Kaifeng	50	1.6	15.1	9.1	8300	5171
Nanchong	50	2.1	15.7	7.1	12549	5867
Shengyang	70	2	5.5	2.7	12790	6311
Lianzhou	60	1.6	9.6	5.5	10415	6316
Xuzhou	60	2.2	12.4	5.2	14481	6503
Jinzhou	60	2.1	12.3	5.1	13837	6584
Chengdu	70	1.6	15.7	9.6	11275	6942
Nanjing	71	1.9	13.8	8.1	18424	9515
Beijing	100	1.6	7.4	4.9	21983	14069

Source: The CASS survey 1999.

2．Inequality of income and housing within urban-registered households

Table 4 shows income inequality and housing inequality within urban-registered households in each of 13 cities measured by the Gini coefficient (the Gini coefficient of Income, omitted as Gi, and the Gini coefficient of housing, omitted as Gh) and the Theil index (the Theil index of income, omitted as Ti and the Theil index of housing, omitted as Th).

The following features can be drawn from Table 4.

(1) Although income inequality within urban-registered households in 13 cities is still not as large as those in some international cities such as Hong Kong [5], it rose rapidly from an extremely low level (0.18 in the 1980s [World Bank, 1997]).

(2) In most cities, the housing inequality is larger than income inequality. Notably, in the case of Beijing and some provincial capitals, the ratio of the housing inequality to income inequality is fairly large. In other words, housing disparity is larger than income disparity particularly in these cities.

3．Inequality of income and housing within migrant households

Table 5 shows the inequalities of income and housing measured by the Gini coefficient (Gi and Gh) and the Theil index (Ti and Th) within migrant households in each of the 13 cities. In comparison with Table 4, we can find the following features.

(1) In almost all cities, both income inequality and housing inequality within migrant households are much higher than that of urban-registered households.

(2) In almost all cities, housing inequality is much higher than income

Table 4 Income and housing inequality within urban-registered households

City	Ti	Th	Th/Ti	Gi	Gh	Gh/Gi	Average yearly income (yuan)
Kaifeng	0.16	0.18	1.13	0.31	0.32	1.01	4145
Pingliang	0.12	0.13	1.16	0.27	0.28	1.05	4486
Zigong	0.17	0.22	1.30	0.32	0.37	1.16	4632
Jinzhou	0.12	0.08	0.69	0.28	0.22	0.80	5050
Nanchong	0.13	0.13	1.01	0.28	0.28	0.99	5290
Lanzhou	0.13	0.13	1.02	0.28	0.28	1.01	5328
Zhengzhou	0.15	0.15	1.01	0.30	0.29	0.99	5469
Pingdingsha	0.14	0.12	0.88	0.28	0.27	0.96	5636
Shengyang	0.13	0.13	1.04	0.28	0.28	1.02	5651
Chengdu	0.14	0.22	1.54	0.30	0.33	1.11	6360
Xuzhou	0.14	0.13	0.96	0.28	0.28	0.98	6759
Nanjing	0.10	0.14	1.31	0.25	0.28	1.12	8346
Beijing	0.12	0.23	2.01	0.26	0.38	1.44	9475

Note: Here h stands for housing and i stands for income.
Source: The 1999 CASS survey.

Table 5 Income inequality and housing inequality within migrant households

City	Ti	Th	Th/Ti	Gi	Gh	Gh/Gi	Average yearly income (yuan)
Pingliang	0.14	0.42	3.03	0.27	0.48	1.75	2661
Zhengzhou	0.41	0.39	0.94	0.48	0.48	1.00	4103
Zigong	0.21	0.34	1.60	0.36	0.45	1.25	4316
Pingdingsha	0.19	0.51	2.66	0.33	0.53	1.61	4723
Kaifeng	0.23	0.72	3.17	0.37	0.60	1.62	5171
Nanchong	0.14	0.36	2.63	0.29	0.46	1.61	5867
Shengyang	0.25	0.29	1.16	0.34	0.39	1.14	6311
Lanzhou	0.36	0.68	1.89	0.43	0.59	1.37	6316
Xuzhou	0.35	0.75	2.17	0.44	0.60	1.37	6503
Jinzhou	0.33	0.18	0.55	0.41	0.33	0.81	6584
Chengdu	0.14	0.53	3.85	0.29	0.54	1.89	6942
Nanjing	0.26	0.79	3.00	0.39	0.58	1.47	9515
Beijing	0.74	0.73	0.99	0.59	0.60	1.01	14069

Source: The 1999 CASS survey.

inequality within migrant households. However, in the case of Beijing, both income inequality and housing inequality within migrant households are very large.

Higher income inequality within migrant households compared to that within urban-registered households is probably due to the differences of employment status between the two household groups. According to the aggregated statistical results of the *1999 CASS survey* (Xue and Wei, 2003), most members of migrant households are working in informal sectors. Some of this group, such as owners of private stores, restaurants and small factories, have much higher incomes than the average income of urban-registered householders who usually work in state-owned enterprises or public institutes. However, the income level of the rest of this group is very low, even below the official minimum wage as regulated by the local governments[6]. Consequently, the income inequality within migrant households is much higher than that within urban-registered households.

It is not difficult to explain why housing inequality is much worse than income inequality within migrant households. First, since migrant households have to rent or buy their houses at market prices, the housing inequality is affected by income inequality within these households. Secondly, the greater variance in household size, population structure, and their planned period of stay in the cities may contribute to a higher housing inequality.

Ⅴ. Influence of migrant household on urban income inequality

1. Inequality of income and housing of all households

Section 4 measured the level of income and housing disparity within urban-registered households and within migrant households. This section will measure overall inequality in relation to income and housing within all households of each city surveyed, including both urban-registered household and migrant households.

Figure 1 and Figure 2 show income inequality and housing inequality of all households in 13 cities. From the two figures and Table 4 and 5 in section 4, we can observe the following facts:

(1) In all 13 cities, both income inequality and housing inequality of all households are obviously larger than those of urban-registered households only. This means that the income inequality of migrant households does influence urban income distribution.

(2) In almost all the cities, housing inequality of all households is larger than income inequality of all households.

(3) Both in terms of income and housing, inequality of all households in Beijing is outstandingly high compared to the other 12. Given the relatively lower income inequality within urban-registered households in Beijing, this implies that the influence of migrant households on overall inequality is particularly large in big cities.

2. Decomposition of income inequality and housing inequality

In order to clarify the influence of migrant households on urban inequality, it is useful to decompose the inequalities.

Figure 1 Income inequality of all households

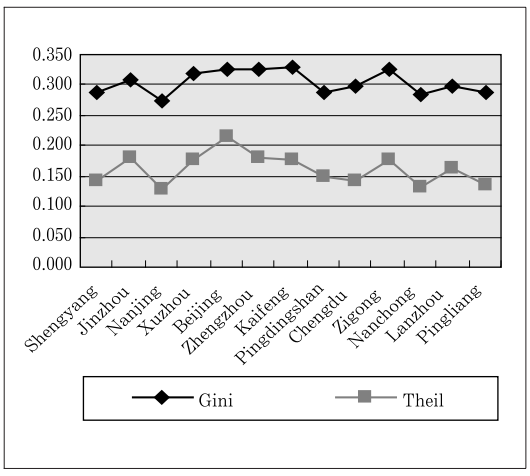
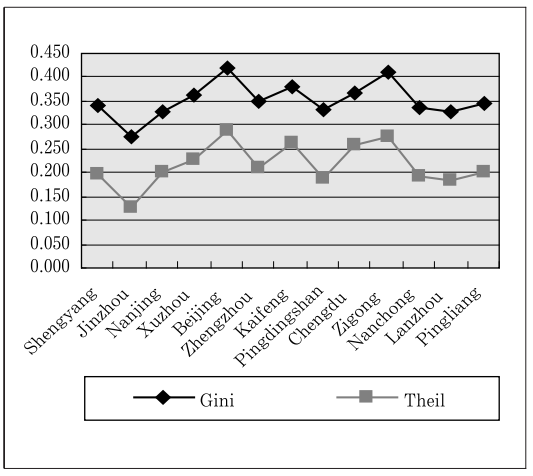


Figure 2 Housing inequality of all households



Source: The 1999 CASS survey.

Here we breakdown the Theil index of overall inequality of all households into three components: the share of inequality within the registered household group, the share of inequality within the migrant household group, and the share of inequality between the two groups. The results of income inequality and housing inequality are shown in Table 6 and Table 7, respectively.

Table 6 and Table 7 give the following interesting results:

(1) Among the three components associated with income inequality, the share of income inequality within urban-registered household groups in all cities except Beijing is the largest one. Meanwhile, in spite of the small amount of migrant households, the share of inequality within migrant household groups to overall income inequality is also rather large. In the case of Beijing, the share of income inequality of the migrant household group even exceeds that of the urban-registered household group. On the other hand, in almost all cities, the share of income inequality between the two household groups is very small, reflecting the small gap between average incomes of the two groups.

(2) Among the three components associated with housing inequality, the share of housing inequality of the urban-registered household group is also the largest one. However, the combined share of the other two migrant-related inequalities is relatively large, ranging from 22.7-48.7%. In comparison with the three components of overall income inequality in each city, the share of inequality between the two groups in the

Table 6 Decomposition of overall income inequality

City	Theil Index	A: Within registered household	B: Within migrant household	C: Between 2 groups	Share of A %	Share of B %	Share of C %
Shengyang	0.14	0.11	0.03	0.001	75.64	23.87	0.49
Jinzhou	0.18	0.09	0.08	0.006	51.58	44.95	3.48
Nanjing	0.13	0.09	0.04	0.001	69.96	29.25	0.79
Xuzhou	0.18	0.11	0.07	0.000	62.13	37.81	0.07
Beijing	0.21	0.10	0.11	0.002	45.88	52.96	1.16
Zhengzhou	0.18	0.13	0.05	0.005	70.98	26.49	2.53
Kaifeng	0.18	0.12	0.05	0.004	70.40	27.38	2.22
Pingdingsha	0.15	0.12	0.03	0.002	78.54	20.02	1.43
Chengdu	0.14	0.12	0.02	0.000	85.13	14.53	0.34
Zigong	0.18	0.14	0.04	0.000	79.63	20.17	0.20
Nanchong	0.13	0.10	0.03	0.001	79.44	19.94	0.62
Lanzhou	0.16	0.11	0.05	0.002	68.09	30.89	1.02
Pingliang	0.13	0.10	0.02	0.016	76.31	11.92	11.77

Source: The 1999 CASS survey.

overall housing inequality is quite notable, while the share of housing inequality of migrant households is relatively small.

Ⅵ. Conclusion

Using data of the *1999 CASS survey*, this paper estimated and analyzed income inequality and housing inequality in 13 cities in China. The main findings can be summarized as follows.

(1) Income inequality of urban-registered households in urban China has risen considerably since the early 1980s. Meanwhile, in a few large cities such as Beijing and other provincial capital cities, housing inequality of urban-registered households is distinctly larger than income inequality. This implies that the distribution of disposable income is probably more unbalanced than the distribution of gross cash income, particularly in some large cities with political power.

(2) Although the average income of migrant households is a little higher than that of urban-registered households in almost all the cities, the average housing condition of migrant households is much worse than that of urban-registered households. Furthermore, both income inequality and housing inequality within migrant households are much higher than those within urban-registered households.

(3) The increase of rural migrant households has become an important factor in the rising income inequality and housing inequality in urban China. Although the share of inequality within urban-registered household groups is still the largest factor among the three components of overall income inequality and housing inequality, the combined

Table 7 Decomposition of overall housing inequality

City	Theil Index	A: Within registered household	B: Within migrant household	C: Between 2 groups	Share of A %	Share of B %	Share of C %
Shengyang	0.20	0.13	0.01	0.06	65.00	4,07	30.93
Jinzhou	0.13	0.08	0.02	0.03	59.01	14.43	26.56
Nanjing	0.20	0.13	0.07	0.01	62.17	33.63	4.20
Xuzhou	0.23	0.12	0.08	0.03	51.35	33.82	14.82
Beiiing	0.29	0.22	0.04	0.03	75.85	15.07	9.09
Zhengzhou	0.21	0.14	0.02	0.05	67.38	9,77	22.84
Kaifeng	0.26	0.15	0.10	0.00	58.81	39.35	1.83
Pingdingsha	0.19	0.11	0.04	0.03	58.45	23.52	18.03
Chengdu	0.26	0.20	0.04	0.01	77.32	17.42	5.26
Zigong	0.27	0.20	0.03	0.05	74.30	9.23	16.47
Nanchong	0.19	0.12	0.03	0.04	63.59	14.62	21.80
Lanzhou	0.19	0.12	0.04	0.02	66.75	21.38	11.86
Ping1iang	0.20	0.12	0.03	0.05	61.66	15.36	22.97

Source: The 1999 CASS survey.

share of the two migrant-related components, inequality within migrant household groups and inequality between the two groups (migrant households and urban-registered households), has reached a particularly high level in *all* 13 cities. In the case of income inequality, its share within migrant household groups shows a larger influence, while in the case of housing inequality, its share between the two groups is larger.

(4) In Beijing (China's capital), although income inequality within urban-registered households is relatively lower, both income inequality and housing inequality of all households are higher than in other cities. It means that the influence of migrant households on inequality in large cities is particularly remarkable.

APPENDIX

In this study, we use the data of per capita floor space to measure housing inequality within households. However, there are still many non-standard houses in urban China, such as houses without kitchens or bathrooms. In addition, there are also differences in location, house type, etc.. In order to measure housing inequality within households correctly, the first requirement is to make the data of floor space, H_0, to a comparable one, H, is as follows.

$$H = H_0 * (W_A * T_A) * (W_B * T_B) * (W_C * T_C) * (W_D * T_D) * (W_E * T_E) * (W_F * T_F)$$

Where, W_A, W_B, W_C, W_D, W_E, W_F are the weights of each item respectively, including toilet and bathroom, kitchen room, location, gas supply, air conditioner, and house type, while T_A, T_B, T_C, T_D, T_E, T_F are adjustment coefficients determined by the condition of each item. The valuations of these weights and coefficients are shown in Appended Table A.

Table A The weights of housing items and adjustment coefficients by condition

Adjustment Coefficient (T)	A : Bathroom and toilet (W_A=0.3)	B : Kitchen (W_B=0.2)	C : Location (W_C=0.2)	D : Gas supply (W_D=0.1)	E : Air conditioner (W_E=0.1)	F : House type (W_F=0.1)
1	Both available	Independent kitchen	Central city	Pipe gas	Fully air conditioned	Standard apartment
0.8	Only bathroom			LP gas	Heater only	Old styled apartment
0.6	Only toilet	Shared Kitchen	Near suburb			Simple house
0.4			Suburb			Other
0.2	Shared toilet					
0	Nothing	Nothing		Nothing	Nothing	

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Notes

1）In 1999, the total urban population (population in urban areas) in China was 437.5 million. Within them, more than 80 million are rural migrants without urban registration status (National Bureau of Statistics, various years).

2）Three years later, CASS conducted another nation-wide survey, *the 2002 CASS survey*, which also included migrant households.

3）To measure the income inequality within households, We can calculate the Gini or the theil index by either per capita household income or total household income. In this paper, we use the former.

4）It can also be written in other forms (see Erbiao DAI, "Migrant, Employment Discrimination and Income Inequality in Urban China: A Case Study of Shenzhen" (Dai, 2007)

5）For example, the Gini coefficient of income inequality in Hong Kong has been over 0.40 in recent years (United Nations, various years).

6）Almost all large cities in China have issued regulations on the minimum wage level. However, due to rising cost of hiring migrant workers, these regulations are not well implemented in the urban informal sectors.

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