Measuring Urban Poverty

Case study Wuhan

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Measuring Urban Poverty
Case study Wuhan
by
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Abstract

Although poverty in China was mostly confined to the countryside until very recently, there has been an increasing concern on urban poverty in the wake of urban reforms in the 1990s.

The trend of growing up urban poverty has caused policymakers great concern recently because a widening amount of urban poverty poses a threat to social stability. There’s coming the problem of urban poverty measurement. How many urban poor are there and what is the urban poverty rate? Many measurements of urban poverty, including the official measurement of poverty in China are all limited mainly on one dimension of urban poverty—income or expenditure needs deprivation, which might not be enough to measure urban poverty in an overall picture and multi-dimensional way. In China, the universally and simplest method adopted is the poverty line index, which can identify both the poverty headcount and incidence.

The objective of this method is to develop and apply an alternative method for measuring urban poverty in China.

The study based itself on a literature review of various existing alternative poverty measurement methods as well as on a review of the present practice of poverty measurement in China. Data for the application of the alternative method came from a case study of Wuhan.

The results of the study confirmed in the first place the severance of poverty in Wuhan (53.3% were classified as poor) as well as some, although not large differences with the results of the present way of measuring poverty.

The applied method can be considered strong in exploring a comprehensive way for measuring urban poverty, considering different aspects of deprivation to identify those really need help in other deprivation except income and provides a basis to target poverty alleviation on specific aspects; weaker elements of the method are: data collection is difficult and costly, requires cooperation and sensitization of policy-and decision makers; and the result doesn’t make great difference from the poverty line measurement.

Overall it is suggested to stick to the income-based poverty line measurement for urban poverty as used presently by the government, but to explore further possibility of measurement, e.g. launching a superior database of urban households or individuals including multi-dimensional information for urban poverty statistic and management.

Urban poverty measurement is primarily an up-front activity and needs more study up on. It’s quite a challenge of developing an alternative measurement for urban poverty in China because of the complexity of urban poverty situation, also in its spatial dimensions this paper explored.
Acknowledgements

Now the thesis is almost ready for my Master Degree in the International Institute for Geo-information Science and the Earth Observation (ITC) in the Netherlands. It’s time to express my deepest gratitude to all the people who have supported and helped me in the completion of this research work.

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Many thanks go to those people who gave me a lot of support and help; they are Mr. Zhan qingming, Mrs. Xiao yinghui, Mr. Tang Xingming, Mrs. Wang lichun, Mr. Zhu Sicai, and Mrs. Yao qingyan.

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1. Introduction

1.1. Statement of research problem

Although poverty in China was mostly confined to the countryside until very recently, there has been an increasing concern on urban poverty in the wake of urban reforms in the 1990s (Economist 2001; Khan and Riskin 2001). Until the 1980s, China implemented a strong urban-bias development policy through various implicit and explicit transfer programs in pursuit of industrial development strategy (Lin, Cai et al. 1996). The rationing system introduced in the 1950s enabled urban residents to have equal access to food and other necessities at much lower prices. Almost all urban residents in the working age group had guaranteed jobs in the state- or collective-owned sectors. Because these jobs were permanent (“iron rice bowl”), urban unemployment was virtually nonexistent. These jobs also provided urban residents with many benefits such as free or subsidized housing and healthcare. As a result, income distribution was more equitable among urban residents than among rural residents. Also, because of these welfare arrangements, many people’s livelihoods were intertwined with the fate of state-sector jobs. Not surprisingly, poverty alleviation in urban areas was not on the policy agenda until recently, and China’s antipoverty program, first initiated in 1986, mainly focused on rural areas.

Since the late 1970s, China has carried out a transformation from a planned to a market economy with a series of reforms. One key element of the economic reforms is to allow private-, individual-, and foreign-owned enterprises to compete with state-owned enterprises (SOEs). After two decades of reforms, the share of industrial gross output value by non-SOEs swelled from less than 20% in 1980 to about 75% in 2000 (NSB 2001). The development of non-state sector greatly augments economic growth and provides enormous job opportunities. But it also poses fierce competitions to SOEs, which have been plagued with heavy burdens of welfare provisions. To provide new impetus to SOEs, the government launched an enterprise-restructuring plan in 1996. The central theme of the plan was to transfer welfare provision obligations such as healthcare and housing from enterprises to social insurance agencies and individuals (China Development Report, 1997).

These reforms have reduced workers’ lifetime welfare ties to their employers, thereby providing them with a higher degree of freedom to change jobs and achieve higher earning potential. The reforms allow market forces to determine workers’ pay that is more consistent with their ability. The efficiency gains from urban reform are evidenced by a dramatic increase in per capita urban income with an annual growth rate of about 6% in the 1990s.

On the other hand, however, urban reforms and severe competition from other sectors have resulted in soaring financial losses of SOEs and collective-owned enterprises, and an increasing number of urban workers have been laid off. As a social safety net was largely not in place, the liberalization of the

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1 This bias still exists today, but in different forms (for example, government spends more in urban than rural, universities have higher admission scores for rural students, and there are still visible and invisible restrictions on migration from rural to urban).
welfare system may have made some disadvantaged groups more vulnerable to sudden shocks such as catastrophic illness. The two opposite forces of urban reforms may have contributed to the great emergence of urban poverty in China. The state sector and urban collective enterprises that have traditionally been the sources of employment for the urban labor force have been losing jobs, a trend that is expected to continue for some years. The non-state sector has grown, but not rapidly enough to absorb both the rural labor surplus and the redundant urban labor.

The trend of growing urban poverty has caused policymakers great concern recently because of the threat that the increasing amount of urban poverty poses to the social stability (Economist 2001). Although the problem of urban poverty has got recognition, the estimate of the actual magnitude of urban poverty (how many urban poor are there and what is the urban poverty rate?) is faced with the question on how to measure urban poverty. Most previous studies on poverty measurement focused more on the rural sector with a few exceptions. The World Bank (1992, 2001) found that the incidence of urban poverty in China is less than 1% but increased during 1990s. However, Khan and Riskin (2001) argued that the World Bank’s urban poverty line is too small a percentage of average income to be realistic, and they estimate an urban poverty rate of 8.0% in 1995.

In China, organizations like National Statistics Bureau (NSB), the Ministry of Civil Affairs (MOCA) and the Institute of Forecasting of Chinese Academy of Sciences all developed their own urban poverty line in terms of income or expenditure needs to measure urban poverty. According to a survey conducted in August-September, 2000 by the MOCA (the Ministry in charge of urban poverty relief), there were around 14 million urban residents with an income below the local poverty line. The number is certainly large enough to highlight the seriousness of the problem of urban poverty whether it is reliable or underestimated.

However, these studies on urban poverty measurement, including the official measurement of poverty in China are all limited to focus on only one dimension of urban poverty—i.e. income or expenditure needs deprivation, which could be argued is not enough to measure urban poverty in an overall picture and multi-dimensional way. This paper looks at an alternative method to measure urban poverty from a multi-dimensional deprivation of urban population to identify potential or marginal poor population groups. It uses an urban household survey in Wuhan as a case study to provide a basis for possible policy implications for urban poverty alleviation.

1.2. Study area

Wuhan is the largest city in Central China and is the capital of the Hubei Province with a total municipal area of 8,467 Square km. About 82 percent of the total area or 6,943 square km, is a plain area along the Yangtze River and Han River in the south and middle of the city relatively. As the Yangtze River and the Beijing-Guangzhou railway line cross here, Wuhan is a focal point for water, railway and other traffic in China.

The Yangtze and Han River converge at Wuhan, dividing the city into three towns: Hankou, Hanyang and Wuchan. Currently, Wuhan city is divided into the following seven urban administrative districts: Jianggan, Jianghan, Qiaokou, Hanyang, Wuchang, Qingshan, Hongshan district that are again divided in subdistricts (street committees or townships) and neighbourhoods (organized by resident committees). In this study, five street committees in Wu-chang district are taken as sample areas. Figure 1.1 represents the location of Wuhan and study area.
At the end of 2001, the total area was 888.42 square kilometres and the total population was 3.9 million persons. Table 1.1 gives more detailed distribution of the area and population in Wuhan. There are 4.18 million employed persons among 2 million urban staff and workers, and 1.38 million other employees. In the past, Wuhan was the most important heavy industrial city in China, where many state-owned enterprises set up by the national government were located. In 1990s, with the reform and restructuring of SOE, a lot of laid-off workers and unemployed appeared, especially in recent years. At the end of 2000, the urban unemployed went to 161,600 persons and the reemployed was 62,000 persons. The Minimum Living Allowance (MLA) of Wuhan in 2001 improved from 202 to 220 RMB per capita / monthly. 17.6% of urban habitants received the MLA benefits by the end of 2002, among which the laid-off workers occupied 37.8%. The statistic figure of Wu_chang district may underestimate the number of people who need social benefits for living, even the number of laid-off workers. These figures also leave out those who are not eligible or have no access of social benefits (Wuhan statistic bureau, 2002).

Table 1.1 Area and population distribution in Wuhan

<table>
<thead>
<tr>
<th>Districts</th>
<th>Area (Sq km)</th>
<th>Population (Person)</th>
<th>Population Density (Person/sq km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>8467.11</td>
<td>8,312,600</td>
<td>982</td>
</tr>
<tr>
<td>Urban district</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jiang_an</td>
<td>888.42</td>
<td>3,905,106</td>
<td>4,396</td>
</tr>
<tr>
<td>Jiang_han</td>
<td>64.24</td>
<td>626,598</td>
<td>9,740</td>
</tr>
<tr>
<td>Qiao_kou</td>
<td>33.43</td>
<td>4,577</td>
<td>13,693</td>
</tr>
<tr>
<td>Han_yang</td>
<td>46.39</td>
<td>535,294</td>
<td>11,539</td>
</tr>
<tr>
<td>Wu_chang</td>
<td>108.34</td>
<td>386,665</td>
<td>3,569</td>
</tr>
<tr>
<td>Qing_shan</td>
<td>81.22</td>
<td>858,983</td>
<td>10,576</td>
</tr>
<tr>
<td>Hong_shan</td>
<td>45.80</td>
<td>4,314</td>
<td>9,420</td>
</tr>
<tr>
<td>Suburban district</td>
<td>7578.69</td>
<td>4,407,494</td>
<td>582</td>
</tr>
</tbody>
</table>
1.3. Objectives and research questions

Main objective
To develop an alternative method for measuring urban poverty in Wuhan, China

Sub-objectives and questions (See table 1.2)

Table 1.2 Sub-objectives and questions of the study

<table>
<thead>
<tr>
<th>Sub-objectives</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>To review on poverty definition and measurement</td>
<td>• What’s definition of poverty?</td>
</tr>
<tr>
<td></td>
<td>• Why pay attention to urban poverty in China?</td>
</tr>
<tr>
<td></td>
<td>• What’s urban poverty measurement in China?</td>
</tr>
<tr>
<td></td>
<td>• What are poverty measurements in the world?</td>
</tr>
<tr>
<td>To develop an alternative method for measuring urban poverty in Wuhan</td>
<td>• How to select criteria and indicators to measure urban poverty?</td>
</tr>
<tr>
<td></td>
<td>• How to identify weights for each criterion?</td>
</tr>
<tr>
<td></td>
<td>• How to calculate urban poverty score?</td>
</tr>
<tr>
<td></td>
<td>• How to classify urban poverty level?</td>
</tr>
<tr>
<td>To identify and describe urban poverty in Wuhan</td>
<td>• How much urban poverty is there in survey of Wuhan?</td>
</tr>
<tr>
<td></td>
<td>• What are social-economic characteristics of urban poverty in Wuhan?</td>
</tr>
<tr>
<td></td>
<td>• What are spatial distributions of urban poverty in Wuhan?</td>
</tr>
</tbody>
</table>

1.4. Methodology of the research

The methodology of research of the thesis are divided into eight parts:

- Research problem proposed
- Sample survey and data collection
- Review on “urban poverty and measurement” in China
- Review on poverty definition and measurement in the world
- Develop an alternative method for measuring urban poverty in Wuhan
- Measurement application in survey and data analysis
- Discuss and conclusion of findings

A detailed conceptual framework of this research was given below (Figure 1.2):
1.5. Research process

1.5.1. Inventory and preparation

The inventory stage started with formulation of a preliminary research proposal and preparation of the fieldwork in Wuhan. The work was conducted at SUS, Wuhan and ITC between; the following research tasks were carried out:

- Fieldwork and data collection;
- Review and reading the literature in library and Internet;
- Review and reading the GIS and SPSS literature in the library and on the Internet;
- Data inputting and processing in ITC;
- Thesis objective identification;
- Proposal writing.

1.5.2. Fieldwork survey

The fieldwork lasted about 40 days from November 2nd until December 10th, 2003. The purpose was to collect social economic data and by households’ survey, and view of urban poverty and measurement by visiting key officials and local government organizations, such as social security bureau, labour bureau and re-employment centre in Wuhan, etc.

The fieldwork lasted about 40 days from November 2nd until December 10th, 2003. The purpose was to collect social economic data by households survey, visit relative officers and local government, such as Wu-chang municipal government, Wu-chang labor bureau and Wu-chang statistic bureau, etc.

- Schedule for fieldwork;
- Visit to the Wu-chang municipal government for Wuhan street maps;
- Visit to the Wu-chang social security bureau, labor bureau and re-employment center and meet with some officers;
1.5.3. Develop a method of measuring urban poverty

The paper firstly reviews on the urban poverty situation and measurement in China and argues the limitations of the official poverty line measurement; Secondly, categorizes different methods of poverty measurement of different organizations (Rowntree Foundation, UNDP, the World Bank) or individuals (FGT) in the world, then evaluates the strength and weak points of those measurements. Especially by review on various poverty measurement methods, the paper here develops an alternative method to measure urban poverty in Wuhan. Finally, the paper applies the proposed measurement in the survey data and analyses the findings.

The measurement proposed includes four general steps:

- Identify criteria and indicators for measuring urban poverty on China’s context, give scores to each indicator and standardize scores;
- Identify the appropriate weights of each criterion by using different methods;
- Calculate an aggregated poverty score of each household;
- Classify urban poverty level by different poverty score ranges.

A detailed description of developing the method will be given in Chapter 3.

1.5.4. Data processing and analyses

This stage includes:

- Input statistic data and sample survey data in SPSS tables;
- Proposed measurement application in survey data;
- Describe and analyse the social-economic characteristics of urban poverty in Wuhan;
- Describe spatial distributions of urban poverty in Wuhan;
- Discussion and conclusion.

1.6. Structure of the thesis

Chapter 1: Contains the research problem, research objectives and questions, methodology, research process and thesis structure.

Chapter 2: Gives a literature review on urban poverty situation and measurement in China, various poverty measurements in the world and evaluates the strong and weak points of those methods.

Chapter 3: Develops an alternative measurement of urban poverty which includes four general steps.

Chapter 4: Focus on the urban household survey in Wu_chang district, applying proposed urban poverty measurement in survey data and analyse findings of this survey.

Chapter 5: Presents conclusion of findings.
2. Poverty Definition and Measurement

2.1. Poverty definition

Poverty is a term with negative connotation. Poverty is associated with words such as deprivation and lack. To be poor is to be deprived. To be poor is to lack what others – the rich, the ‘comfortable’- possess. The definition of poverty is a dynamic concept with evolvement.

2.1.1. Evolvement of poverty definition

Some of the definitions of poverty that were put forward over the years are the following:

In a classic study about poverty first published in 1901, Seebohm Rowntree defined poverty as “a level of total earnings insufficient to obtain the minimum necessities for the maintenance of ‘merely physical efficiency’ including food, rent, and other items, through his survey in English city of York in 1899.” (The World Bank, WDR, 2000)

In 1990, World Bank experts defined poverty as “the inability to attain a minimal standard of living.” (The World Bank, WDR, 1990)

“Poverty is lack of necessary economical materials for basic living needs. The poor are people who are deprived of rights to attain the appropriate standard of social living.” (Scott, poverty and wealth, 1994, pp 17)

Citro, F. defined “poverty as economic deprivation. A way of expressing this concept is that it pertains to people’s lack of economic resources (e.g., money or near money income) for consumption of economic goods and services (e.g., food, housing, clothing, transportation). Thus, a poverty standard is based on a level of family resources (or, alternatively, of families’ actual consumption) deemed necessary to obtain a minimally adequate standard of living.” (Citro, F. et al. 1995).

“In 1997, the UNDP defined poverty as opportunities and choices most basic to human development are denied.” (UNDP, 1997)

In 2000, the World Bank experts broadened the definition of poverty. Poverty is a multidimensional phenomenon. Except material deprivation, the WDR 2000/1 defined poverty as consisting broadly speaking, of three key features of the lives of people: lack of opportunity, powerlessness and vulnerability to risks (The World Bank 2000).

Quoted from Strategy paper of Asia Development Bank (ADB 2000), “…poverty is a deprivation of essential assets and to which every human is entitled. Everyone should have access to basic education and primary health services. Poor households have the right to sustain themselves by their labour and be reasonably rewarded, as well as having some protection from external shocks. Beyond income and basic services, individuals and societies are also poor - and tend to remain so - if they are not empowered to participate in making the decisions that shape their lives.”
From the evolution of the above definitions of poverty, we can see that poverty was defined as “an income/material deprivation” (deprivation of minimum standard of living) originally, and was developed to a definition including both the income and non-income deprivation. The improvement lies that various non-income dimensions was added to define poverty, and these various types of deprivation encompassed education, health, housing, access to services and infrastructure and suffering from voicelessness and powerlessness. The measurement of poverty then changed consequently as a following up, which will be discussed later.

2.1.2. Some terms relative to poverty and measurement

Before we went to the part of poverty measurement, let me take a moment to explain some terms relative to poverty and measurement.

Poverty line
The critical cut off in income or consumption below which an individual or household is determined to be poor (The World Bank, 2000). For example, 1$ or 2$ which the World Bank takes to measure the world poverty is a kind of poverty line.

Poverty incidence
The key “crude” indicator poverty incidence, that is, the number of individuals and households above or below the upper and lower poverty lines (Moster, Gatehouse et al. 1996).

Poverty headcount index
By far the most widely used measure is the headcount index, which simply measures the proportion of the population that is counted as poor, often denoted by P0 with formula:

\[
p_0 = \frac{1}{N} \sum_{i=1}^{N} I(y_i <= z) = \frac{N_p}{N}
\]

Where: - N is the total population, I is an indicator function that takes on a value of 1 if the bracketed expression is true, and 0 otherwise. So if expenditure \(y_i\) is less than the poverty line \(z\), then \(I(.)\) equals to 1 and the household would be counted as poor. \(N_p\) is the total number of the poor.

The great virtue of the headcount index is that it is simple to construct and easy to understand. These are important qualities. The disadvantages of this measure is that it doesn’t take the intensity of poverty into account (e.g. expenditure in province A lower than province B) and neither indicates how poor the poor are, and, hence, does not change if people below the poverty line become poorer.

Poverty gap and inequality
The distance of poor people from the poverty line (the poverty gap) and the degree of income inequality among poor people (the squared poverty gap) can be readily calculated. In comparing poverty estimates across countries or over time, it is important to check the extent to which conclusions vary with the selection of poverty measure.

Gini coefficient
The Gini coefficient is a commonly used statistical gauge that measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative percentage of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of zero represents perfect equality, and an index of 100 perfect inequality.
2.2. Justification for special attention to urban poverty in China

Urban poverty is a poverty problem occurring in urban areas; is a multidimensional phenomenon, and the poor suffer from various deprivations, e.g., lack of access to employment; adequate housing and services; social protection; and lack of access to heath, education and personal security. (The World Bank, 2001)

Urban poverty, which is rapidly increasing, is due to receive more attention although the research on poverty in the world is still mainly concentrated in rural areas. With the escalation in urban poverty in recent years, urban dwellers are faced with constraints quite different from that of their rural counterparts. For example, urbanites pay higher rent for accommodation and transportation, seek work where employment opportunities are scarce and deal with abysmal sanitation facilities. In addition the urban poor pay higher prices for urban land when it is available at all – even land that receive no services. Many urban poor people have no access to formal land markets in peri-urban areas. The influx of rural poor people into the cities coupled with inadequate planning and provision of employment opportunities lead to increased poverty in cities (The World Bank, 1997).

Until the beginning of the 1990s, poverty in China was regarded largely as a rural phenomenon and the rural poor were the focus of anti-poverty policies. However, there were poor people in urban areas and the living standard was generally low. Especially since the mid-1990s, restructuring of state-owned enterprises and substantial layoffs of workers has created significant dislocation for many workers. Urban poverty that was regarded as a minor affliction confined to a small minority has since emerged as a major social issue and seen as a threat to social stability. Growing urban poverty thus has become a very real prospect that will demand measuring and policy response from government.

The emergence of new urban poverty has three characteristics mainly; it is large in numbers, it raises the inequality in urban areas; and a large percentage of the “new urban poor” are jobless.

The first two are related. The rise in urban poverty is partly due to a changing perception of poverty. Poverty, which in the past was barely distinguishable from the then prevalent average living standard, now stands out against the background of a comparative high and rising average living standard. The third reflects a fundamental change in the urban economic environment, especially since 1994. The state sector and urban collective enterprises that traditionally were the sources of employment for the urban labour force have been losing jobs over the past few years, instead of creating new jobs. In just five years from 1995, the state sector lost 31 million jobs, which amounted to 28 percent of the jobs in the sector in 1995.

2.3. Urban poverty measurements in China

“How many urban poverty are there?” (Urban poverty headcount); and “What percentage of the urban population do they represent?”(Urban poverty rate) are the immediate questions that arise? According to a survey conducted in August-September, 2000 by the MOCA (the Ministry in charge of urban poverty relief), there were around 14 million urban residents with an income below the local poverty line. The number is certainly large enough to highlight the seriousness of the problem of urban poverty. But the estimate begs two questions before it can be accepted as reliable:

- What is the definition of the urban population?
- What is the urban poverty line?

The “urban population of China” can be defined in various ways and both the headcount of the poor and poverty rate implied by an estimate can vary widely depending on the definition. For instance, the
estimates of 14 million poor implies a poverty rate of 3.1 or 5.3 per cent depending on whether the urban population is equated with the population settled in urban districts or the official definition of “urban”. Both definitions of the urban population have their particular deficiencies and both exclude a large number of migrants working and living in cities who face a greater risk of falling below the urban poverty line than permanent residents (The difference between the two: population settled in urban districts and the official definition of “urban” will be discussed in section 2.3.1). As for the urban poverty line, this can vary depending on locality and what it is used for. Given the almost exclusive focus on rural poverty over a decade and a half, there was until the second half of the 1990s - since the beginning of economic reforms, neither an urban poverty line nor any attempt at estimating the headcount of the urban poor.

2.3.1. Definition of “urban” population

The Chinese population is divided along two ways, first, urban-rural and second, permanent residents-migrants. These divisions are founded in the government control on population movement that dates back to the 1950s and still survives. For the present purposes these divisions matter for two reasons. First, the rural and urban poverty lines are wide apart. Whether a person is regarded as poor depends crucially on the status of the person as urban or rural. Second, the social security cover is very different for the rural and urban population and generally migrants are excluded from social security schemes.

The conventional definition of “urban” refers jointly to a high population density, on the one hand, and industry and services accounting for most of local income on the other. Furthermore, under the usual classification the population resident in an urban locality is regarded as all urban and similarly for rural localities. In China, the spatial and demographic divisions coexist and do not coincide. Spatially, Chinese cities divide into urban district (shi qu) and rural counties (xian). Paralleling this, the population is classified by the personal registration status into “agricultural (nongye)” and “non-agricultural (fei nongye) ”, which is what the official category “urban” refers to. The spatial and the demographic divisions overlap, but only partially. The official designation “urban” in China does not denote usual place of residence, such as urban districts of cities, but the label “non-agricultural” on the personal register (HUKOU). That is, “urban” is a personal attribute not a spatial designation. Migrants from rural to urban are not recognized as “urban population”, although they live in urban areas, because they hold an “agricultural” HUKOU. In 2000, the ratio of urban and rural Chinese population was 36:64 (China Statistic yearbook 2001). In fact, around 30 percent of the rural labor force is employed full time in non-farming activities and many of the rural counties around cities derive all but a small percentage of income from non-farming activities and resemble urban conurbation in terms of population density. In terms of the usual socio-economic criteria of population density and sources of livelihood, the percentage of the urban population in China is substantially higher than the official 36 percent.

2.3.2. Urban poverty line in currency

To date, the government has released no official poverty line or poverty headcount for urban populations. However, the rising urban unemployment and poverty in the mid-1990s prompted a number of Chinese organizations to calculate an urban poverty line in terms of expenditure needs for a socially acceptable subsistence. These include the NSB, MOCA and the Institute of Forecasting of the Chinese
Academy of Sciences. The method of calculation varies across organizations and there is as yet not agreed framework for calculation. The national poverty lines currently in use falls in the range of Y 1,700 to Y 2,400 per year per head and is used only for estimating the number of the urban poor.

For the practical purpose of providing social relief or assistance to poor urban households, each city sets its own poverty line (or benefit line). The state council regulations governing the urban “Minimum Living Allowance” (MLA) delegate local governments to set poverty lines for their jurisdiction. There are two justifications for decentralizing the determination of poverty line. First, prices, the pattern of consumption and average income per capita vary widely across localities. Second, the poverty line determines assistance under the MLA, which is financed principally by city governments. In principle, cities set the poverty line (benefit line) (See Figure 2.1) by the direct method of costing the 20 items of goods and services for basic subsistence (the so-called “the basic needs” approach). But there is as yet no detailed national framework to guide local governments in setting the poverty line. Methods vary across cities.

<table>
<thead>
<tr>
<th>City poverty (benefit) lines, per year/person, September 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y2,400 - 3,828</td>
</tr>
<tr>
<td>Beijing, Shanghai, Tianjin</td>
</tr>
<tr>
<td>4 provincial capital cities</td>
</tr>
<tr>
<td>5 cities with individual planning power</td>
</tr>
<tr>
<td>Y1,680 - 2,400</td>
</tr>
<tr>
<td>Chongqing</td>
</tr>
<tr>
<td>23 provincial Capital cities</td>
</tr>
<tr>
<td>Y1,320 - 1,880</td>
</tr>
<tr>
<td>Prefecture level cities</td>
</tr>
<tr>
<td>Below Y1,320</td>
</tr>
<tr>
<td>County level towns</td>
</tr>
<tr>
<td>With a minimum of Y930</td>
</tr>
</tbody>
</table>

Figure 2.1 Urban poverty line of cities in China
Source: Ministry of Civil Affairs

The salient feature of the above pattern is that the height of the poverty line varies with the administrative status of the city. Broadly the higher the status of the city the higher the local poverty line. The status of a city is correlated with its size: association between city size and the height of the poverty line reflects not only higher living standard and cost in larger cities but also cities with a higher status are on average more populous than cities with a lower status. Besides, larger and higher status cities have less constrained public finances.

2.3.3. Urban poverty measurement in China

Early estimates of urban poverty by the World Bank (1992) found insignificant poverty incidence through 1990. The World Bank has used 2150 calorie/day as the minimal energy intake to calculate poverty lines in rural and urban China and found urban poverty incidence to be far less than 1% up to 1990. A recent World Bank publication (2001) claimed urban poverty was still less than 1% but increased during 1990s.

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2 These 20 items are listed in the “Circular on Strengthening the Investigation and Control of Necessary Goods and Services” issued by the State Council in 1994.
An alternative to the calorie-based poverty line is the US $1.0 per day initiated by the World Bank. Poverty measures of US $1.0 per day have been regularly reported by the World Bank and widely used in cross-country studies. Under the poverty line of US $1.0 per day, Chen and Wang (2001) reported that the urban poverty incidence was 1% in 1998 for China as a whole. However, Khan (1996) estimates that the urban poverty headcount fell from 20% in 1981 to 13% in 1985 to only 5% in 1991. Khan and Riskin (2001) came up with much higher figure of urban poverty using the same calorie requirement as the World Bank (1992) 2150 calorie/day. The headcount index was 6.8% in 1988 and 8.0% in 1995. Even with a lower threshold at 2100 calorie/day, the incidence of urban poverty was reported at 2.7% and 4.1% for the two years, much higher than the World Bank figures. They argue that the World Bank’s urban poverty line is too small a percentage (23%) of average income to be realistic.

**Urban poverty headcount and urban poverty rate**

Poverty is normally measured with reference to either expenditure or income required for meeting basic needs—the poverty line. Once the urban poverty line is set, the urban poverty headcount and rate can be estimated.

A household is poor if it falls below the poverty line, but it can do so in two different ways:

- Either its income per head is lower than the poverty line.
- Or its expenditure per head is lower than the poverty line.

The time patterns of income and expenditure diverge. For any given time period, for example a year, income per head would be different from expenditure per head in most households, including those with a low income. As a consequence, the headcount of the poor would differ, possibly by a wide margin, depending on whether income or expenditure per head is used as the poverty indicator. The difference between income and expenditure over a period such as a year consists in net savings. If a household has a positive net saving then its income will exceed its expenditure. As a result, it may be above the poverty line in terms of its income per head but below in terms of its expenditure per head. Conversely, when a household has a negative net savings then it may be below the poverty line in terms of income per head but above in terms of expenditure per head. The net impact of the choice of income or expenditure head on the headcount of the poor and the poverty depends crucially on the balance between savers and dis-savers amongst low-income households.

Hussain (2003) estimated the urban poverty line in China based on the data from the 1998 urban household survey conducted by NSB for each of the 31 provinces and for the whole country in terms of RMB$^{3}$ per head per year. He also calculated the urban poverty headcount and headcount rates using both income and expenditure per head as measures.

Figure 2.2 below presents the 31 provincial urban poverty line, headcount and headcount rates of urban poverty using income per head and expenditure per head respectively as the indicator of poverty.$^{4}$ And the national headcount of the poor is the sum of the provincial total and the national poverty rate is the weighted average of the provincial rates, with provincial population shares as weights. Here,

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$^{3}$ Here RMB is the money unit used in China, and 1$ is equally about 8.2 RMB.

$^{4}$ The findings on urban poverty here are based on the data from the 1998 urban household survey conducted by the NSB. The original sample consists of 40,000 households, from which a sub-sample of 17,000 is drawn.
income refers to income net of taxes (disposable income per head) and, in turn, expenditure is net of expenditure on consumer durables.

<table>
<thead>
<tr>
<th></th>
<th>General Poverty Line (GPL)</th>
<th>Headcount of the poor</th>
<th>% Ratio (1)/(2)</th>
<th>Poverty rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(% of National Line)</td>
<td>Income p/h (1)</td>
<td>Expenditure p/h (2)</td>
<td></td>
</tr>
<tr>
<td>Beijing</td>
<td>3.118 (13.0%)</td>
<td>54,000</td>
<td>422,000</td>
<td>0.73</td>
</tr>
<tr>
<td>Tianjin</td>
<td>2.953 (12.9%)</td>
<td>380,000</td>
<td>259,000</td>
<td>0.77</td>
</tr>
<tr>
<td>Guangdong</td>
<td>2.509 (12.8%)</td>
<td>151,000</td>
<td>2,010,000</td>
<td>30.89</td>
</tr>
<tr>
<td>Shanghai</td>
<td>1.937 (7.0%)</td>
<td>1,637,000</td>
<td>215,000</td>
<td>7.17</td>
</tr>
<tr>
<td>Anhui</td>
<td>1.884 (7.0%)</td>
<td>1,778,000</td>
<td>340,000</td>
<td>16.46</td>
</tr>
<tr>
<td>Zhejiang</td>
<td>2.203 (9.4%)</td>
<td>1,298,000</td>
<td>207,000</td>
<td>6.13</td>
</tr>
<tr>
<td>Jilin</td>
<td>1.771 (6.3%)</td>
<td>683,000</td>
<td>152,000</td>
<td>7.64</td>
</tr>
<tr>
<td>Heilongjiang</td>
<td>1.878 (6.3%)</td>
<td>2,743,000</td>
<td>238,000</td>
<td>6.92</td>
</tr>
<tr>
<td>Shanghai</td>
<td>3.686 (15.7%)</td>
<td>694,000</td>
<td>180</td>
<td>3.24</td>
</tr>
<tr>
<td>Jiangsu</td>
<td>2.288 (9.2%)</td>
<td>248,000</td>
<td>633,000</td>
<td>1.22</td>
</tr>
<tr>
<td>Zhejiang</td>
<td>2.365 (12.2%)</td>
<td>153,000</td>
<td>302</td>
<td>1.62</td>
</tr>
<tr>
<td>Anhui</td>
<td>2.138 (9.2%)</td>
<td>1,090,000</td>
<td>304</td>
<td>2.89</td>
</tr>
<tr>
<td>Fujian</td>
<td>2.418 (10.4%)</td>
<td>145,000</td>
<td>219</td>
<td>2.14</td>
</tr>
<tr>
<td>Jiangxi</td>
<td>1.899 (7.3%)</td>
<td>310,000</td>
<td>407</td>
<td>3.42</td>
</tr>
<tr>
<td>Shandong</td>
<td>2.368 (11.1%)</td>
<td>1,172,000</td>
<td>410</td>
<td>5.06</td>
</tr>
<tr>
<td>Henan</td>
<td>1.904 (7.2%)</td>
<td>1,388,000</td>
<td>210</td>
<td>8.38</td>
</tr>
<tr>
<td>Hebei</td>
<td>2.283 (9.8%)</td>
<td>954,000</td>
<td>189</td>
<td>5.62</td>
</tr>
<tr>
<td>Henan</td>
<td>2.146 (9.0%)</td>
<td>462,000</td>
<td>299</td>
<td>3.61</td>
</tr>
<tr>
<td>Guangdong</td>
<td>3.061 (13.2%)</td>
<td>176,000</td>
<td>157</td>
<td>0.68</td>
</tr>
<tr>
<td>Guangxi</td>
<td>2.507 (10.6%)</td>
<td>248,000</td>
<td>262</td>
<td>3.01</td>
</tr>
<tr>
<td>Hainan</td>
<td>2.465 (10.7%)</td>
<td>418,000</td>
<td>278</td>
<td>7.04</td>
</tr>
<tr>
<td>Sichuan</td>
<td>2.004 (6.9%)</td>
<td>711,000</td>
<td>156</td>
<td>4.72</td>
</tr>
<tr>
<td>Guizhou</td>
<td>2.137 (9.5%)</td>
<td>854,000</td>
<td>333</td>
<td>5.06</td>
</tr>
<tr>
<td>Yunnan</td>
<td>2.359 (10.2%)</td>
<td>595,000</td>
<td>254</td>
<td>3.69</td>
</tr>
<tr>
<td>Tibet</td>
<td>2.237 (9.6%)</td>
<td>550,000</td>
<td>138</td>
<td>11.31</td>
</tr>
<tr>
<td>Chongqing</td>
<td>2.214 (9.6%)</td>
<td>548,000</td>
<td>211</td>
<td>4.60</td>
</tr>
<tr>
<td>Shaanxi</td>
<td>2.914 (87.2%)</td>
<td>932,000</td>
<td>138</td>
<td>11.95</td>
</tr>
<tr>
<td>Guizhou</td>
<td>1.819 (78.7%)</td>
<td>792,000</td>
<td>260</td>
<td>6.44</td>
</tr>
<tr>
<td>Qinghai</td>
<td>1.484 (54.2%)</td>
<td>131,000</td>
<td>173</td>
<td>5.63</td>
</tr>
<tr>
<td>Ningxia</td>
<td>2.853 (90.6%)</td>
<td>430,000</td>
<td>192</td>
<td>13.51</td>
</tr>
<tr>
<td>Xinjiang</td>
<td>1.771 (7.6%)</td>
<td>925,000</td>
<td>133</td>
<td>6.16</td>
</tr>
<tr>
<td>Whole China</td>
<td>2.310 (100.0%)</td>
<td>14,700,000</td>
<td>251</td>
<td>4.75</td>
</tr>
</tbody>
</table>

**Figure 2.2 Urban poverty line and headcount rate by province in China**

Source: Hussain calculated 2003

There are two notable features of Table 2.1:

- Focusing on household income per head, the average urban poverty rate for whole China (4.73 per cent) is very low by the standards of developing economies. However, the provincial rates vary widely. The inclusion of long-term migrants in the urban population would increase the poverty rate but not by a large enough margin to overturn the conclusion;
- The choice of the poverty indicator (income or expenditure per head) makes huge difference to the headcount of the poor.

Focusing on the second, the national headcount of the poor shoots up by just over 2.5 times, from 14.7 million to 37.1 million, if the poor are identified in terms of expenditure per head instead of income per head. A straightforward explanation that low-income households tend to have positive savings such that they have a higher income per head but a lower expenditure per head than the relevant poverty line. For this to be the case, it is not necessary that households have large savings relative to their income but simply that their incomes per head are only slightly higher than the poverty line.
2.3.4. Limitations of urban poverty measurement in China

Selection of income or expenditure per head

The method for poverty measurement in China stresses that poverty is an inability to meet certain basic needs. This method, and has several disadvantages. First, basic needs vary with individuals or households. For example for individuals suffering from a chronic illness the need for medical care is of different order of magnitude from that differences in basic needs across individuals and refers to a representative individuals.\(^5\) Second, the relative between income/expenditure and goods and services for satisfying basic needs differ between individuals because they do not enjoy the same access to, for example, in Chinese cities migrants do not enjoy the same access to, for example, housing and schooling as registered residents do.

There are arguments both for and against using either income or expenditure per head as the measurement of the poor. Neither side is decisive enough to rule out the alternative. The argument in favor of using income per head is that it indicates whether the household is financially capable of financing the expenditure indicated by the poverty line without resorting to borrowing, an option that may not be available. However, there are instances where policy may be more concerned with expenditure, such as that on schooling or healthcare, and less with income per head.

More focus on one dimension of urban poverty

This poverty line method focused more on the deprivation of the income/expenditure dimension of urban population. Although the income/expenditure indicator as measuring urban poverty is very important, it is just one of the multi-dimensions of deprivation. Identifying a household or individual as a “poor”, by looking if the income/expenditure level is below a set poverty line is to some degree arbitrary. It ignored other dimensions’ deprivation of urban population, like… Furthermore, households or individuals may suffer different types of deprivation, such as education or health, but the poverty line measurement can’t differentiate between these discrepancies by setting one single poverty line, and it can’t help the policymaker to give different priorities to different population or household groups.

2.4. Poverty measurement in the world

As a multidimensional phenomenon, however, the most important to establish at the outset is that focusing on income alone is not enough, either for an understanding of a measurement standard of poverty or for the construction of policies to fight it. The following is a review on various poverty measurements by different organizations or individuals in different ways.

Income poverty means that you are poor if you have less money than the defined poverty line for your country. And the income poverty measurement can date back to Seebohm Rowntree’s classic study of poverty in the English city of York in 1899. In 2002, The Rowntree Trust / New Policy Institute uses 50 indicators with which to measure poverty in Britain.

Human poverty takes into account other factors, such as life expectancy, infant malnutrition, illiteracy and lack of food or clean water. Basic needs definitions also go beyond money, to include all the things that a person needs in order to survive – including employment and participation in society. UNDP adopted this approach to develop a measurement of poverty.

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\(^5\) This statement draws on the discussion in Sen, 1992
According to the multi-dimensional definition of poverty, The World Bank used national poverty line as measurement of economic deprivation on the one hand, and other type of deprivation such as income, education, health and vulnerability of powerlessness on the other. Thus can someone be said to be “impoverished” because his or her both “economic and social exclusion” of any given society.

2.4.1. Rowntree Foundation’s measurement

The Joseph Rowntree Foundation\(^6\) is one of the largest social policy research and development charities in the UK. It spends about £7 million a year on a research and development programme that seeks to better understand the causes of social difficulties and explore ways of better overcoming them. The Foundation places great emphasis on disseminating the findings of its work and engaging with policymakers and practitioners to develop better policies and practices.

In a classic study first published in 1901, Seebohm Rowntree calculated that 10 percent of the population of the English city of York in 1899 was living in poverty (below minimum needed expenditures). Rowntree’s classic poverty study was to conduct a survey covering nearly every working-class family in York to collect information on earnings and expenditures. He then defined poverty as a level of total earnings insufficient to obtain the minimum necessities for the maintenance of “merely physical efficiency,” including food, rent, and other items. He calculated that for a family of five—a father, mother, and three children—the minimum weekly expenditure to maintain physical efficiency was 21 shillings, 8 pence. He proposed other amounts for families of different size and composition. Comparing these poverty lines with family earnings, he arrived at his poverty estimate.

Despite Rowntree’s primarily income-based approach to measuring poverty, he also devoted an entire chapter of his study to the relation of poverty to health and went on to argue that the death rate is the best instrument for measuring the variations in the physical well-being of people. Classifying his sample into three groups ranging from poorest to richest, he found that the mortality rate was more than twice as high among the very poor as among the best-paid sections of the working classes. Calculating infant mortality, he found that in the poorest areas one child out of every four born dies before the age of 12 months. According to this argument, mortality could be used as an indicator both of consumption poverty and of ill being in a broader sense.

In 2002, the Rowntree Trust, the annual monitoring report by researchers at the New Policy Institute brings together the latest available statistics for Britain to construct a comprehensive picture of trends in tackling poverty and social exclusion. This includes poverty figures for the Government’s term in office. This report provides updated statistics for 50 indicators that between them portray the key features of poverty and social exclusion today in Great Britain. Whilst income is the focus of many of the indicators, they also cover a wide range of other subjects including health, education, work, and engagement in community activities.

The indicators adopted by Rowntree Foundation (Palmer, Rahman et al. 2002) (See Figure 2.3) are grouped into six different groups, with four central parts dividing the population by age (children, young adults, adults and older people), with an initial part on income and a final part on communities. Within each part, the indicators are grouped by theme, as summarized in the table below.

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\(^6\) Please reference to the URL address: [http://www.jrf.org.uk/home.asp](http://www.jrf.org.uk/home.asp)
Figure 2.3 The indicators of the Rowntree Foundation

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Income</th>
<th>Children</th>
<th>Young adults</th>
<th>Adults</th>
<th>Older people</th>
<th>Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income levels</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income dynamics</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic circumstances</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Health and well-being</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Education</td>
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</table>

Source: report of monitoring poverty and social exclusion 2002 (Rowntree Foundation)

Merits and limitations
The merits of Rowntree’s method lie that it proposed a typical income-based poverty measurement and devote to the justification of infant mortality rate as an indicator to measure poverty that was adopted by the World Bank later. The New Policy Institute of Rowntree Foundation had constructed the first set of indicators to present a wide view of poverty and social exclusion in Britain.

The main limitations are the indicators divided by different groups can’t reflect an overall picture of every individual household including both the young and the old. The poverty indicators and household poverty degree have rarely been linked together. No aggregated indicators were developed to reflect the general poverty situations and comparisons by household level.

2.4.2. UNDP’s measurement
A recent measure of economic and social deprivation, and one that has received much international attention, is the “Human Development Index” (HDI) proposed by the United Nations Development Programme (UNDP). This is a composite index and it seeks to combine data on three features of the quality of life, namely, adequate levels of income, good health and education into a single index (HPI).

2.4.2.1. Definition of human poverty
Poverty in the human development perspective is defined as follows:
Poverty is the deprivation of the lives that people can lead that poverty manifests itself. Poverty can involve not only the lack of the necessities of material well-being, but also the denial of opportunities for living a tolerable life.

Since its launch in 1990 the Human Development Report has defined human development as the process of enlarging people’s choice. The most critical ones are to lead a long and healthy life, to be educated and to enjoy a decent standard of living.

Human poverty means the denial of choices and opportunities for a tolerable life in non-income aspects, human poverty includes many aspects, such as deprivation of leading a long, healthy, creative
life and enjoying a decent standard of living, freedom, dignity, self-respect and the respect of others. (Human Development Report 1997)

2.4.2.2. The three indicators of the human poverty index

The HPI presented in the Report concentrated on the deprivation in three essential elements of human life—longevity, knowledge and a decent living standard.

The first, deprivation relates to survival—the vulnerability to death at a relatively early age—and is represented by the percentage of people expected to die before age 40.

The second dimension relates to knowledge—being excluded from the world of reading and communication—and is measured by the percentage of adults who are illiterate.

The third aspect relates to a decent standard of living—is represented by a composite of three variables—the percentage of people with access to health services and to safe water, and the percentage of malnourished children under five (UNDP 1997).

Merits and limitation

Human Development Report introduces a human poverty index (HPI) in an attempt to bring together in a composite index the different features of deprivation in the quality of life to arrive at an aggregate judgment on the extent of poverty in a community.

The HPI can be used in at least three ways:

(1) As a tool for advocacy. The HPI can help summarize the extent of poverty along several dimensions, the distance to go, the progress made.

(2) As a planning tool for identifying areas of concentrated poverty within a country. The HDI has been used in many countries to rank districts or countries as a guide to identifying those most severely disadvantaged in terms of human development.

(3) As a research tool the HDI has been used especially when a researcher wants a composite measure of development. For such uses, other indicators have sometimes been added, such as unemployment.

The limitations of HPI index are also apparent:

(1) HPI index adopted by UNDP is so limited an index

As a concept, human poverty includes many aspects that HPI cannot be measured, especially with a quick evolvement of poverty definition in the world. It’s difficult to reflect them in a composite measure, such as lack of political freedom, inability to participate in decision-making, lack of personal security, etc.

(2) Different scale of indicators in HPI had better be used between developed and developing countries

The nature of the main deprivations varies with the social and economic conditions of the community in question. The choice of indicators in the HPI should be different between developed and developing countries according to the sensitivity to the social context of a country. Issues of poverty in the developing countries involve hunger, illiteracy, epidemics and the lack of health services or safe water that may not be so central in the more developed countries. For example, an index that concentrates on illiteracy, and premature mortality may be able to discriminate between Pakistan and Srilanka more easily than it can between, say, France and Germany.
Further work is merited to explore how the HPI could be enriched and made more robust in situations where a wider range of data on different aspects of poverty and human development are available.

2.4.3. Poverty measurement of the World Bank

In 1990, the World Bank experts defined poverty as the inability to attain a minimal standard of living which is measured by household incomes and expenditures per capita. However, income or consumption-based poverty cannot measure such dimensions of welfare as health, life expectancy, literacy and access to public goods. In 2000, the World Bank broadens the definition of poverty as encompassing not only material deprivation (measured by an appropriate concept of income or consumption) but also low achievements in education and health. Low levels of education and health are of concern in their own right, but they merit special attention when they accompany material deprivation. The world development report (2000) also broadens the notion of poverty to include vulnerability and exposure to risk—and voicelessness and powerlessness. All these forms of deprivation severely restrict what Amartya Sen calls the “capabilities that a person has, that is, the substantive freedoms he or she enjoys to lead the kind of life he or she values.”

2.4.3.1. Income poverty

Using monetary income or consumption to measure poverty has a long tradition. Though separated by a century, Seebohm Rowntree’s classic study of poverty in the English city of York in 1899 and the World Bank’s current estimates of global income poverty share a common approach and a common method. The World Bank calculates that a fourth of the population of the developing world—about 1.2 billion people—is living in poverty (below $1 a day).

Money-based poverty assessment provided a standard scale so that different population groups can be compared. Through the empirical survey of different areas scale such as national, local and municipal scale, income- or consumption based measurement allows inferences contrasting the conditions and evolution of poverty at the different scale level.

Income poverty measurement of the World Bank

Poverty estimates are based on consumption or income data collected through household surveys. Consumption is conventionally viewed as the preferred welfare indicator. Then establishing a minimum acceptable standard of money-based income or consumption indicator to separate the poor and the non-poor—often known as a poverty line—the critical cut off in income or consumption below which an individual or household is determined to be poor (the World Bank 2000). In 1990, the new international poverty line is equal to $1.08 a day in 1993 PPP (World Bank’s purchasing power parity) prices, referred to as “$1 a day”. The upper poverty line (referred to as “$2 a day”) was calculated by doubling the amount of the lower poverty line. Once a poverty line has been specified, the most straightforward way to measure poverty is to calculate the percentage of the population with income or consumption levels below the poverty line. This “headcount” measure is by far the most commonly calculated measure of poverty.

Merits and limitations

The internationally comparable lines are useful for producing global aggregates of poverty, not to assess progress at the country level or to guide country policy and program formulation. Such a universal line is generally not suitable for the analysis of poverty within a country. An alternative is, a country-specific poverty line needs to be constructed, reflecting the country’s social and economic circumstances. Similarly, the poverty line may need to be adjusted for different areas, such as urban and rural,
within the country if prices or access to goods and services differs. Furthermore, the headcount measure fails to reflect the fact that among poor people there may be wide differences in income levels. The distance of poor people from the poverty line (the poverty gap) and the degree of income inequality among poor people (the squared poverty gap) can’t be reflected.

2.4.3.2. Health and education deprivation

Measurement
Measuring deprivation in dimensions of health and education has a tradition that can be traced back to such classical economists as Malthus, Ricardo, and Marx, especially Rowntree’s devotion of his study to the relation of poverty to health. The indicators, such as public expenditure on health, access to improved water source, access to sanitation, infant mortality rate, are used by the World Bank to measure deprivation in health. The indicators such as the public expenditure on education, net enrollment ratio, percentage of cohort reaching grade 5, expected years of schooling are used by the World Bank to measure education deprivation. (See Appendix 2)

Limitations
Data on these non-income indicators have their own problems. For example, infant and under-five mortality rates derived mostly from census and survey information are available for most countries only at periodic intervals. For the period between censuses or surveys, estimates of vital rates are derived by interpolation and extrapolation based on observed trends and models. Education data are also far from satisfactory. The most commonly available indicator, the gross primary enrollment rate, is only a proxy for actual school attendance, the much-preferred net primary enrollment rate (showing the ratio of enrolled primary-school-age children to all primary-school-age children) is available for only around 50 developing countries—not enough to make reliable aggregations by region.

2.4.3.3. Vulnerability

In the dimensions of income and health, vulnerability is the risk that a household or individual will experience an episode of income or health poverty over time. But vulnerability also means the probability of being exposed to a number of other risks, such as violence, crime, natural disasters or injury and being crop failures.

Measurement
Since vulnerability is a dynamic concept, its measurement centers on the variability of income or consumption or on the variability of other dimensions of well-being, such as health or housing. Needed are indicators that can identify at-risk households and populations beforehand. Many indicators of vulnerability have been proposed over the years, such as physical assets, human capital, income diversification, links to networks, participation in the formal safety net and access to credit markets. (See Appendix 2)

Limitations
Assessing vulnerability is over a length of time not like measuring poverty at a point in time and may well differ across people and circumstances. It can’t be measured merely by observing households once. Only with household surveys that follow the same households over several years can the basic information be gathered to quantify the vulnerability—which poor households say is so important. Furthermore, measuring vulnerability requires data on household assets (physical, human and social capital) in combination with data on formal safety nets, the functioning of markets, and the economic policies. Many of today’s household surveys do not provide the needed information.
2.4.3.4. **Voicelessness and powerlessness**

In the World Bank’s definition, voicelessness means lack of opportunity to participate in and contribute to economic growth and development; powerlessness refers to over key decisions that affect their lives.

**Measurement**

Voicelessness and powerlessness can be measured using a combination of participatory methods, polls and national surveys on qualitative variables such as the extent of civil and political liberties. In small group discussions, poor people discussed the range of institutions important in their daily lives and then identified the criteria that were important in rating institutions.

**Limitations**

Measuring these dimensions of poverty should be in an accurate, robust and consistent way so that comparisons can be made across countries and over time will require considerable additional efforts on both the methodological and data-gathering fronts.

2.4.4. **Other measurements**

2.4.4.1. **FGT measurement**

Once a welfare indicator (e.g. income) and a minimum level for this indicator (the poverty line) have been set, one immediately calculates two basic measures the head count ratio and the poverty gap index. The first is the ratio of poor individuals to the total population and second is the average poverty deficit of the poor relative to the poverty line.

Following Sen’s (Sen 1976, 1981) axiomatic framework, many authors claim that reasonable aggregation schemes should minimally include both the depth of poverty and income inequality among the poor (relative deprivation), in addition to the headcount. Foster, Greer and Thorbecke (1984) propose generic classes of decomposable measures (FGT\(^7\) measurement) that meet the axioms proposed by Sen. The FGT indexes are notable for their intuitive structure, ease of calculation, and attractive theoretical properties.

The general FGT class of poverty measures can be written as Formula 2.2:

\[
P_a = \frac{1}{n} \sum_{i=1}^{q} \left( \frac{Z - Y_i}{Z} \right)^a \]

Where \(n\) is the total number of households, \(q\) is the number of poor households (income below the poverty line), \(Y_i\) is income of the \(i\)th household and \(Z\) is a predetermined poverty line. And \(a\) is a parameter measuring “aversion to poverty”, with a higher \(a\) indicating greater aversion.

Equation (1) allows a range of aggregation procedures that depends on \(a\). Attention is restricted to values of \(a\) equal to 0, 1 and 2. When \(a=0\), the poverty headcount or poverty rate \((p=q/n)\) is obtained, \(P_0\). For \(a=1\), equation (1) is the average proportionate poverty gap \(P_1\) and for \(c\), equation (1) produces a weighted average proportionate of income among poor households \(P_c\).

The FGT measures have several desirable properties. For example, both \(P_1\) (poverty gap) and \(P_c\) are strictly decreasing in the living standard of the poor (the lower your standard of living, the poorer you

---

\(^7\) FGT is the abbreviation of Foster, Greer and Thorbecke who proposed the measures.
are deemed to be). $P_2$ has the further desirable property that the increase in your measured poverty due to a fall in standard of living will be deemed greater the poorer you are.

### 2.4.4.2. Poverty thresholds measurement

The literature often distinguishes between “absolute” and “relative” poverty thresholds. Absolute thresholds are fixed at a point in time and updated solely for price changes; relative thresholds are updated regularly (usually annually) for changes in real consumption. Absolute thresholds generally carry the connotation that they developed by “experts” with reference to basic physiological needs (e.g. nutritional needs). In contrast, relative thresholds, as commonly defined, are developed by reference to actual expenditures (or income) of the population (Citro, F. et al. 1995). A typical approach is to select a cutoff point in the distribution of total family expenditures or income adjusted for family composition—say, one-half the median—and designate that dollar amount as the poverty threshold for a reference family, with thresholds for other family types developed by use of an equivalence scale.

One criticism of relative thresholds is that choice of the expenditure or income cutoff is arbitrary or subjective, rather than reflecting an objective standard of economic deprivation. It is also argued that relative poverty thresholds do not provide a stable target against which to measure the effects of government progress because they change each year in response to increase or decrease in real consumption levels instead of remaining fixed in real terms.

**The US Experience: expert budgets of poverty threshold**

Expert budgets typically involve the development of standard for a large number of goods and services (e.g. food, clothing, shelter, utilities, transportation, personal care) with perhaps a small “other” or “miscellaneous” category, the original US poverty thresholds were based on the USDA estimates of the cost of the Economy Food Plan with a multiplier to account for other consumption items. Poverty thresholds developed according to expert standards of need cannot eschew a great deal of relativity and subjectivity. Poverty standards developed by experts have historically been conditioned by their time and place. Of course, people will argue about which commodities should be part of the budget and which should be left out. There still remains the problem of setting the specific dollar value for each named commodity and for the multiplier and determine how (and how often) to update those values: most expert budgets rely heavily on people’s actual spending patterns.

**“Subjective” poverty threshold measurement**

There are still other ways of determining poverty thresholds. One approach, particularly in Europe, is to ask a representative sample of the population to specify a minimum necessary income or to evaluate the adequacy of various income levels.

Subjective poverty thresholds are sensitive to question wording and from survey data—particularly a time series derived from consistent questions and procedures—can provide information that helps determine the extent to which other kinds of threshold are more or less in agreement with broad public perceptions. It has also some negative features. There tends to be wide variation in respondents’ answers to consistent questions. One alternative is to compare the subjective estimates of the poverty threshold with a time series of relative estimates based on median family income to see if they are in close agreement to help to decision-making.

**Deprivation index measurement**

Another method of identifying poverty threshold has been proposed. That is, identifying a list of specific activities, items of ownership, and types of consumption that are believed to be essential for people to be able to participate normally in their society. In the United Kingdom, Townsend (1979) developed a “deprivation index” that included 12 components, including qualitative items such as not
having taken a vacation in the past year and having gone through one or more days in the past year and having gone through one or more days in the past fortnight without a cooked meal. He used the scores on this index to attempt to determine income levels (poverty thresholds) below which the deprivation scores raised markedly. Other researchers refined the Townsend index by including only those elements that at least one-half of the respondents to a national survey claimed to be “necessary” for a minimal standard of living in the United Kingdom and by asking those lacking a given item whether they lacked it because they could not afford it or because they did not want it (Mack and Lansley 1985). The resulting deprivation index was used directly as a measure of poverty: those experiencing “enforced lack” due to budget constrain of 3 or more of the 22 items in their list were deemed poor.

A conceptual underpinning for a deprivation index approach has been proposed that posits a normative standard, in terms of a fixed set of needed capabilities—for example, the ability to obtain a job, literacy, good health (Sen 1983; Atkinson 1989). The standard is then made operational in a relative manner by determining items that are necessary to achieve these capabilities in a particular time and place.

Deprivation indexes have their advantages and disadvantages. Like poverty thresholds expressed in monetary terms, they, too, involve difficult questions of choice—How many and which items to include in the list? — And inevitably embody a large element of subjectivity and relativity. Deprivation indexes appear less useful than monetary thresholds as an official measure of poverty for such purposes as determining eligibility for government assistance. But they can broaden understanding of what it means to have less resource than the official thresholds.

2.5. Poverty mapping

Poverty measurements mentioned above compare different dimensions of human well being to a standard (e.g. a poverty line), and then classifies a person or household as poor or non-poor. This standard can be defined in absolute or relative terms. For example, an absolute standard could be all households that do not have the means for human survival. A relative standard simply compares different households according to their degree of deprivation.

Poverty measurement captures deprivation and poverty mapping looks at the spatial distribution of poverty identified. More sophisticated poverty measures usually incorporate the distributional aspects of poverty.

2.5.1. Poverty mapping process

Poverty analysis is often based on national level indicators that are compared overt time or across countries. The broad trends that can be identified using aggregate information are useful for evaluating and monitoring the overall performance of a country. For many policy and research applications, however, the information that can be extracted from aggregate indicators may not be sufficient, since they hide significant local variation in living conditions within countries. For example, poverty within a region can vary across districts. This makes small-area estimates of poverty very appealing. Policy makers and researchers therefore increasingly demand for poverty maps that provide information about the spatial distribution of poverty (The World Bank 2000; Huyen 2003).

The detailed poverty maps capture the heterogeneity of poverty within a country. That is, areas that are better-off and those that are worse-off will be more clearly defined. Sometimes regions that have less
poverty overall may have substantial pockets of poverty that are lost in the aggregated poverty statistics.

Here to create an urban poverty map, firstly, detailed household survey should be done in study area; secondly, the household-level measures of urban poverty should be identified (see section 4.3.2.); then the estimated household-level of urban poverty may aggregate for small pockets, such as districts or neighbourhoods (Henninger 1998).

### 2.5.2. Spatial analysis of poverty

For policy purposes, the important reason for measuring poverty is not the need for a descriptive number, but to make poverty comparisons in order to develop antipoverty programs. Poverty comparisons often show spatial clustering in a few geographic areas. Analysts examining the causes and spatial clustering of poverty, generally point to individual or structural explanation. Individual explanations concentrate on human capital (e.g. education, skills, etc.) and endowments of productive resources. Structural explanations focus on structural factors that constrain opportunities. They include constrains imposed by the economy, social system and geography, for example limited job supply, discrimination, and poor natural resource endowments (Huyen 2003).

Explanations for poor areas are summarized into two theoretical models for poverty analysis; one named individualistic model and the other is geographic model (Henninger 1998).

Poverty analysts using an individualistic model try to identify poverty at the individual level. They do not attribute any causal significance to spatial inequalities in resource endowments (geographical capital), although they see differences in geographic endowment as the sorting mechanism that leads to spatial poverty concentrations. Consequently, they would target their anti-poverty measures toward improving the endowment of individuals, for example by providing training opportunities.

In geographic model, the mobility of individuals is restricted and poverty has a causal link to geography. Local factors such as climate, soil type, infrastructure, and access to social services change the marginal returns of investments, for example to a given level of education. Barriers to migration ensure that these differences persist.

The degree to which individual or geographic factors are causing poverty has implications for developing strategy aimed at improving the situation of the poor. In practice, poverty analysis usually needs combination of both models to identify the causes of poverty and its spatial concentration (Henninger 1998).

### 2.6. Summary

The poverty line of urban poverty is a main criterion used for measuring urban poverty headcount and poverty headcount rates and for targeted receipt of poverty alleviation investment funds (e.g. MLA) and other policy support. The inadequacies of an income-measure of poverty are apparent enough. Quite apart from the problem of determining the level of income that should constitute poverty, an income measure more focuses on the deprivation of the income/expenditure level of population and does not capture many important features of economic and social deprivation. It is now generally accepted that the living standard and thus poverty is a multi-dimensional notion that is only imperfectly captured by a poverty line in terms of measured expenditure/income.
However, evaluation of non-income dimensions in measuring urban poverty is a particularly difficult challenge. According to the review on various measurements of poverty in the world, here I developed a new method of measuring urban poverty multi-dimensionally that uses income/expenditure as one of the criterions. Four steps need to be taken in developing the measurement of urban poverty, which will be presented in detail in next chapter.

3.1. Introduction

There are national or city level surveys of households and population in China, but only situation of various dimensions of all population by different item. For example, Item of “Housing conditions of urban households” can’t reflect the special focus on group of urban poverty. Other official statistic figures also didn’t give special attention to urban poverty group on its expenditure, education and living condition, etc. In order to measure an overall picture of urban poverty and compare different deprivation of urban households, here I develop a method to measure urban poverty. The proposed method includes both quantitative indicators (such as indicator “Income per household per person”) and qualitative indicators (such as, indicator “education level of household head”) to measure multi-dimensional deprivation of urban poverty, such as income, consumption, education, health and physical assets, etc. The method is mainly composed of four steps, firstly, to identify the criteria and indicators for measuring urban poverty on China’s context and give score to each indicator; Secondly, to identify the appropriate weights of each criterion by using different method; Thirdly, to calculate an aggregated poverty score of each household; Finally, to classify urban poverty level by different poverty score ranges from up to bottom. The chart below of developing the method (Figure 3.1) described clearly the four steps which will be discussed in detail in following sections.

**Figure 3.1 Steps of developing the measurement method**

---

**Step 1**
To identify the criteria and indicators for measuring urban poverty on China’s context

**Step 2**
To identify the weights of each criteria by different methods

**Step 3**
To calculate an aggregated poverty score of each household

**Step 4**
To classify different urban poverty level

Scoring each indicator and standardize scores

Stakeholder analysis for ranking criteria; developing weights by ranking method and AHP
3.2. Identify criteria and indicators for measuring urban poverty

3.2.1. Selection of categories for criteria

Despite of the multidimensional nature of poverty, poverty measurement must focuses on some indi-
cators. The choice of indicators may respond to philosophical preconceptions, to data limitations or as
the results of analysis. Poverty measures range from statistical techniques to participatory studies
where poverty indicators are revealed with the population being studied. These measures can be
grouped into four major categories (Henninger 1998):

**Economic.** These include monetary indicators of household well-being, particularly food and non-
food consumption or expenditure and income. These also include non-monetary proxies of household
well-being, such ownership of productive assets or durables.

**Social.** These include other non-monetary indicators of household well being, such as quality and ac-
cess to education, health, other basic services, nutrition, and social capital.

**Demographic.** These indicators focus on the gender and age structure of households, as well as
household size.

**Vulnerability.** These indicators present the level of exposure of households to shocks, which can
affect poverty status, such as environmental endowment and hazard, physical insecurity, and the
diversification and riskiness of alternative livelihood strategies. Many indicators of vulnerability have
been proposed over the years, such as physical assets, human capital, income diversification, links to
networks, participation in the formal safety net and access to credit markets.

According to the four major categories proposed by Henninger, here selection of criteria for urban
poverty measurement can be grouped into three major categories: economic, social and physical.
Since vulnerability is a dynamic concept, it can’t be measured merely by observing households once.
Only with household surveys that follow the same households over several years can the basic infor-
mation be gathered to measure the vulnerability. Consideration the data limitation, here only physical
assets were included in three major categories.

3.2.2. Selection of criteria and Indicators

Measurement of urban poverty that would differ poor from non-poor of urban population is not an
easy task. There are no universally accepted standards for measuring urban poverty, let alone all its
multi-dimension aspects. Efforts were, therefore, made to develop context specific direct and proxy
indicators with regard to the definitions and evolvement of poverty (See section 2.1). Both UNDP and
the World Bank are measuring poverty at a country level or at global level, some indices, for example,
poverty gap and inequality, poverty incidence are also used on national scale.

Poverty measurement is quite complicated because of poverty multidimensionality and ambiguity of
criteria for poverty definition. However, it is important for policymakers and researches to qualify
suspected regional disparities in living standards and identify which areas are falling behind in the
progress of economic development. For this purpose, poverty measurement must rely on common and
concrete criteria that reflect essential characteristics of socio-economic situation of certain country or
region or cities. In China, poverty is identified by poverty line in national or city level to define poor
population or qualify persons of application for social benefits.

There are many indicators adopted by government for statistic and information extracting purpose in
China. Two main types of welfare-related information sources are available to policy-makers. *House-
hold survey* often includes a detailed income and/or consumption expenditure module. *Census data*
MEASURING URBAN POVERTY

(and sometimes large household sample surveys) are available for all households (or very large samples of households) and can provide reliable estimates at highly disaggregated levels such as small municipalities, towns and villages. But censuses do not contain the income or consumption information necessary to yield reliable indicators of the level and distribution of welfare such as poverty rates or inequality measures. Census analysts usually use a large number of criteria/indicators, but these should be compiled and translated into the criteria/indicators for urban poverty measurement purpose. This research tries to develop an alternative measurement of urban poverty at a household level in the context of China. And all the criteria and indicators used here are just a possible try of urban poverty measurement applied to a city in China.

3.2.2.1. Identification of criteria

Indicators are selected to identify urban households or individuals who are in or at-risk into urban poverty beforehand. Based on this hypothesis, urban poverty level of a household or individual can be measured by various indicators.

For instance, the housing criterion is used to reflect the quality of his or her dwelling. Some programs (e.g. housing subsidy scheme) use a housing criterion as their only means of measuring poverty, it is notable that housing criterion is measured and scored independently in this method and only as one dimension for measuring urban poverty. Housing criterion with other criteria makes up an overall measure for urban poverty identification of surveyed households.

Considering China’s situation and reference to mostly Wuhan statistic yearbook and Census, I made a selection of criteria and indicators for urban poverty measurement in Wuhan. Because the multidimensional definition of poverty, it is difficult to encompass all indicators for measuring poverty in one method. And data collection and availability of some of indicators are impracticable by only one survey, such as vulnerability criteria. This alternative measurement is designed with 15 indicators grouped into 9 criteria. All the 9 criteria were grouped in three major categories: economic, social, and physical, as presented in table 3.1. And the rationale behind selection of indicators and thresholds\(^8\) are discussed in following sections in detail.

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<th>Criteria</th>
<th>Indicators</th>
<th>Thresholds</th>
<th>Scoring</th>
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<td>Income (In)</td>
<td>1.Monthly income per household per capita (I) below 40% of mean income (\bar{I})</td>
<td>(40% \bar{I} &lt; I \leq \bar{I} )</td>
<td>(I \leq 40% \bar{I} = “3”), (40% &lt; I \leq \bar{I} = “2”), (I &gt; \bar{I} = “1”)</td>
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<td></td>
<td>Expenditure (C)</td>
<td>2.Food expenditure to total living expenditure ratio (per capita per month)</td>
<td>(38.5%, 50%)</td>
<td>(C \geq 50% = “3”,), (38.5% &lt; C \leq 50% = “2”,), (C &lt; 38.5% = “1”)</td>
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\(^8\) Most thresholds here used are relative threshold reference to Wuhan Statistic Yearbook and Census 2000.
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<th>Description</th>
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<td></td>
<td>Holding three to seven durable products = “2”,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Holding more than seven durable products = “1”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Employment (Em)</td>
<td>4. Employment status</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unemployed/retired, Part-time informal employment</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unemployed/laid-off = “3”,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Part-time informal employment = “2”,</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other forms of job = “1”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Education (Ed)</td>
<td>5. Burden of the employed-----Numbers of persons supported by each employed including employer himself or herself (N) (persons)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1, 2, 3</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N ≥ 3 = “3”, N = 2 = “2”, N = 1 = “1”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Without access to professional training</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes or no</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes = “1”, No = “0”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social</td>
<td>7. Educational level of household head</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Illiterate, primary school, Junior secondary school, senior school, college and above</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Illiterate = “5”, Primary school = “4”, Junior secondary school = “3”, Senior secondary school = “2”, College and above = “1”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Health (He)</td>
<td>8. No attending school of school-age children above 7 years old</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes or no</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes = “1”, No = “0”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Welfare (W)</td>
<td>9. Without access to health service</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes or no</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes = “1”, No = “0”</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. Long-standing illness or disability</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes or no</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes = “1”, No = “0”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Physical</td>
<td>11. In receipt of social benefits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Housing (Ho)</td>
<td>12. Usable floor area per person (A) (sq m/person)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 sq m/person, 15 sq m/person</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A ≤ 9 = “3”, 9 &lt; A ≤ 16 = “2”, A &gt; 16 = “1”</td>
<td></td>
</tr>
</tbody>
</table>
13. Household size (S) (persons per household)

- S ≥ 4 = “3”,
- S = 3 = “2”,
- S = 1 or 2 = “1”

14. Way of accessing to water supply

- Without access to water = “3”,
- Public use of tap water = “2”,
- Private use of tap water = “1”

15. Way of accessing to sanitary facilities

- Without sanitary facilities = “4”,
- Public sanitary facilities = “3”,
- With lavatory but without bathroom = “2”,
- With lavatory and bathroom = “1”

3.2.2.2. Identification of indicators and thresholds

Economic aspects

- **Income**
  1. **Monthly income per household per capita I below 50% or 30% of mean income**

Income indicator is used widely and globally as an important standard to measure poverty, it is used here as one of the indicators of the method. The unit selected to measure income level of households is income per household per month. There is, however, no doubt about the “headline” indicator of low income like both the United Kingdom government and the EU, the “headline” indicator here is “50 percent of mean income”. This threshold is widely agreed to be right in principle and is, the main threshold that was used by all the interested parties when the income numbers were published in April (2000/2001). The threshold “30 percent of mean income” is always used to divide the very poor from the poor. In Wuhan, the mean monthly disposable income per capita is 563.39 RMB, and then the 50 percent and 30 percent of this standard is respectively about RMB 280 and RMB 170. The MLA (Minimum Living Allowance) to the laid-off workers in Wuhan is RMB 220 per month per capita, is about 40% of the mean monthly disposable income. Here the threshold selected equals RMB 220 and RMB 560 on context of Wuhan.

- **Expenditure**
  2. **Food expenditure to total living expenditure ratio**

If expenditure (excluding deposit) is higher or lower than income in a period of time (for example, one year), it can’t illustrate the existence of poverty. Expenditure is determined by one’s expenditure habit, a wealthy preferred to deposit whose expenditure in a substantial time may not reach the half percentage of social mean expenditure, but he or she is not poor. Food expenditure to total living expenditure ratio, that is, the Engel’s Coefficient (K) is an effective indicator to measure the living situation from consumption views, \[ K = \left( \frac{\text{Food expenditure}}{\text{Total living expenditure}} \right) \times 100\% \]. The
FAO of UK is generally defined that, $K \geq 59\%$ is defined as “extreme poor” (absolute poverty), $50\% < K < 59\%$ is defined as “poor” (enough to eat and wear), $40\% \leq K < 50\%$ is defined as “affluent” and $20\% \leq K < 40\%$ is defined as “Wealthy”. The average Engel’s Coefficient of Wuhan is 38.5 percent, and the that of the poorest (income) 10% and the richest 10% of households is 56.7 % and 28.3 % (Wuhan statistic yearbook 2001) which means that the poorest 10% population is still in the stage of “enough to eat and wear” and suffering the physiological deprivation in some degree. The thresholds used here equal 38.5% and 50% of K value to divide the poor from the non-poor on the view of food consumption.

- **Durable assets**

3. **Holding numbers out of the total 14 durable products**

Physical assets here mostly refer to durable products in currency in China. The 14 selected durable products are as following: sectional furniture; bicycle; washing machine; refrigerator; TV; VCD or DVD; video recorder; computer; music center; camera; air-condition; gas cooker; water heater; telephone. According to the living situation of households in 1990s, and set threshold as holding two and seven of the total 14 durable products to divide the most deficiency of physical assets (holding two or less of the 14) from the relatively deficiency (holding three to seven of the 14).

**Social aspects**

- **Employment**

4. **Employment status**

“Unemployment rate” is used by the World Bank to measure income poverty in a regional or national level. This indicator is measuring qualitatively employment status in a household level. This indicator considers job is the main resource of income; people who are unemployed or laid-off dependent on unemployment insurance or MLA are more vulnerable when sick than those with a job income (even a low-income job). The official figures of laid-off from state-owned enterprises was 70 thousands (Wuhan Statistic Bureau 2001) and the figure has rapidly increased in recent years. The threshold here is set as “unemployed or laid-off”, “Part-time informal employment” and “with other forms of job” to differ the disparity of employment situation.

5. **Burden of the employed**

The indicator “Dependency burden” measured by the ratio of working members to non-working members was used by the World Bank (1996) as one of the key urban poverty indicators. This indicator is measured by numbers of persons supported by each employed including employer himself or herself and reflect the extent of financial burden on working members of the household to provide food and other basic essentials for daily living. For example, the burden of a household with an employed supporting 3 members is more severe than a household with two employed supporting 3 members. According to the figure of Wuhan Statistic Yearbook 2001, the burden of the employed of the lowest-income household is 2.34 in a city level, and the average burden of the employed is 1.97. The threshold here is defined at 1, 2, and 3 in a household level, and considers the household with burden of 3 numbers is more prone to poverty than those with a burden below 3.
6. Without access to professional training
This indicator was adopted by Rowntree Foundation’s New Policy Institute as one of the 50 indicators (see table 3.6) to measure poverty in Britain (Palmer, Rahman et al. 2002). On China’s context, because of the state-owned enterprise restructured, most workers of state-owned unit are laid-off or unemployed. They then registered into the re-employment center, and only few of them found new jobs by receiving professional training (surveyed in Labor Bureau of Wuchang, 2002). That means professional training is directly related to a new job finding. In accordance to the figure of Wuhan Labor Bureau 2000, there were 2859 persons who receiving professional training for re-employment occupied only 11.17 percent of the total unemployed. The threshold is defined as existence the situation of “Without access to professional training” or not.

◆ Education
7. Educational level of household head
Education deprivation is added by the World Bank to measure poverty comparison with urban poverty indicators prompted in 1996. The HPI of UNDP used “the percentage of adults who are illiterate” to measure level of knowledge exclusion from the world of reading and communication. The survey by Zhang and Li shows that residents’ monetary income per capita is in proportion to employer’s education level, and an employer with primary school education is 1.9 times more likely to enter into poverty than an employer with college education (Zhang and Li 1992). The educational level of individuals is indirectly related to poverty incidence: the lower level of education, for example, illiteracy, the easier individuals are vulnerable to poverty (Chen 1997). The threshold here is divided into illiterate, primary school, junior secondary school, senior school, and college and above.

8. No attending school of school-age (6-14 years) children
The World Bank used indicator “Access to education” as one of the urban poverty indicators, measured by the percentage of children of poor households attending school, which is associated with upward mobility and future income-earning possibilities among the poor (Moser, Gatehouse et al. 1996). The World Development Report (2000) used “the gross primary enrollment rate as an indicator to measure education deprivation in a national level (see section 2.4.3). Here in city or household level the indicator is developed as “no attending school of school-age children”, here school age children refer to 6-14 years old children according to the nine-year Compulsory Education Code of P.R.C. The threshold here is defined as “existence of the situation” or not.

◆ Health
9. Without access to health service
The indicator “Access to health service” as an urban poverty indicator adopted by the World Bank is measured by the percentage of poor households in which any member visited a doctor or nurse in the previous year. This indicator is also measured in the HPI of UNDP by the percentage of people with access to health services to reflect a decent standard of living. Both the WB and HPI consider only a national level situation. At a household level here implication of this indicator is somewhat different, mainly described that household have no money for medical care when family members get sick and households can’t support the regular medical checking and cure service expenditure in the past year. The threshold is defined as “existence of the situation” or not.
10. Long-standing illness or disability
The indicator “Limiting long-standing illness or disability” as one of indicators to measure “Adults aged 25 to retirement” of measuring poverty in Britain is used by the Rowntree Foundation (Palmer, Rahman et al. 2002). Here the indicator is used to measure deprivation in health and normal working ability. And refers to individuals on working age who are experiencing long-standing illness or disability. In China, working age refers to adults below 60 of male and 50 of female. (Endowment Insurance Department of Ministry of labor and social security of P.R.C) The threshold is defined as “existence of the situation” or not.

♦ Welfare
11. In receipt of social benefits
In order to measure income of measuring poverty in Britain, Rowntree Foundation uses the indicators “In receipt of means-tested benefits” and “Long-term recipients of benefits”. The benefits on China’s context are more approximate to unemployment insurance or the Minimum Living Allowance (MLA). From 2001 in China, all laid-off workers entered into unemployment insurance directly, after receiving two years benefits and still found no new job, then the laid-off can apply for the MLA benefits, which is about 20 percent lower than the unemployment insurance (China State Department Research Center), that means individuals or households who in receipt of MLA is more vulnerable than those in receipt of unemployment insurance. The population in receipt of MLA in Wuhan is officially 255,507 (2000) and 471,000 (2001) persons. The threshold here is set as household in receipt of MLA or unemployment insurance benefits and other form of social benefits.

Physical aspects

♦ Housing
12. Usable floor area per person
This indicator is used by the World Bank (Moser, Gatehouse et al. 1996). and measured by the adequacy of living space in dwellings. A low value for the indicator is a sign of overcrowding. The mean usable floor area per person of Wuhan survey (2001) is 9 sq m/person and 16 sq m in a national level. So we use 9 and 16 sq m as two thresholds to divide different degree of deficiency of housing area.

13. Household size (persons per household)
The indicator “Household size” (persons live (sleep and eat) in the house) is used by the World Bank and measured by the number of persons per household. The growth of household size shows the changes of household formation over time. Zhang and Li conclude that poverty incidence is in proportion to household size, that is, when household size improves a standard deviation, the opportunity of this household to become poor is doubled (Zhang and Li 1992). In 1995, the poverty households by different household size, the households with 1-2 persons occupied 3.8 percent of total poverty, and households with 3 and 4 (and above) occupied respectively 39.7% and 56.5% (Chen 1997). The threshold used here are 1or 2 persons, 3 persons and 4 persons to divide different vulnerability to be poverty of different size of households.
Infrastructure

14. Way of accessing to water supply
The indicator “access to water supply” is used by the World Bank at a national level and is measured by the percentage of poor households with various means of obtaining water supply. Those households having access to water supply may differ in the way of accessing which reflect the situation of basic living conditions, those without access to water supply is more deprivation in basic living conditions than those with access. This indicator proposed is to measure the degree of this kind of deprivation of basic living conditions. The threshold is divided into three degrees: without access to water supply, with public use of tap water and with private use of tap water.

15. Way of accessing to sanitary facilities
The indicator here is used by the Wuhan statistic yearbook as one of the indicators measuring conditions of dwellings of urban households. Such access indicators are very important since they determine the degree to which city programs are available to different population groups—especially the poor population—maybe not a sufficient, but often a necessary condition for improving the lives of the poor. Here the threshold is divided into four degrees: without access to sanitary facilities, with public sanitary facilities, with lavatory but without bathroom and with lavatory and bathroom, the same as the Wuhan statistic yearbook 2000.

Scoring and standardization

While doing the fieldwork, each interviewee was asked simple questions, each one representing an indicator of urban poverty measurement proposed (Questionnaire is attached in Appendix 4). The corresponding answer of each question is assigned a score. Scoring for some answers is as simple as 1 point for “yes”, 0 for “no”; other answers (e.g. income, food expenditure) earn points based on numerical cutoffs. Each indicator is accompanied by specialized scoring, (e.g. monthly income: <220 RMB = “3”, 220-560 RMB = “2”, >560 RMB = “1”), with possible scores ranging from 5 to 0.

If the score for the criteria are measured on different measurement scales, they must be standardized to common dimensionless unit before weighted summation can be applied. Various way to convert the original criterion scores into standardized criterion scores are given by Voogd (1983) and Massam (1988). Three of the most used standardization procedures are discussed below: maximum standardization, interval standardization and goal standardization.

Interval standardization is evident when a relative scale is used here. The scores are normalized with a linear function between absolute lowest score and the highest score. The absolute highest score is indicated with “1”, and the absolute lowest with “0”. The result of this standardization is positive scores between 0 and 1.

Formula 3.1 used for the standardization of scores got by table 3.1 are displayed as follows:

$$\frac{Score - Lowest score}{Highest score - lowest score}$$

Then a composite poverty score can be calculated by assigning different weights to various criteria.
3.3. Identify weights of each criterion

The proposed method for measuring urban poverty involves many criteria. It is necessary to assign appropriate weights to different criterion for purpose of comparisons across households or individuals. Because the interests and objectives of poverty-focused stakeholders are different, they have different view of criteria ranking by importance when measuring urban poverty. This will have influence on weights of each criterion.

By stakeholder analysis below, different criteria ranking order can be attained by different poverty-focused stakeholders. After identifying ranking order of each criterion, weights can be assigned to criteria proposed.

3.3.1. Stakeholder analysis for urban poverty measurement

Stakeholders or multi-stakeholder analysis can be defined as “an approach and procedure for gaining an understanding of a system by means of identifying the sky actors or stakeholders in the system, and assessing their respective interests in that system” (Grimble, Chen et al. 1994). Stakeholder analysis assists in decision-making situations where various stakeholders have competing interests.

In this study stakeholder analysis was carried out as an approach for ranking criteria proposed. There was need to categorise multi poverty-focused stakeholders as groups. In this study, I grouped them into primary stakeholders, secondary stakeholders and external stakeholders. Primary stakeholders are those urban residents who directly benefit from poverty alleviation or social benefit policies, secondary stakeholders are government decision-maker, and those private or public fund or organizations that interested in poverty alleviation program are external stakeholders.

Because of the difficulty and cost problem of data collection in private research, here only analyze the primary and secondary stakeholders. Urban residents, who as a group affected or affect the poverty alleviation or social benefit policies, were considered as an important stakeholder during stakeholder analysis for urban poverty measurement.

Stakeholders analysis for criteria ranking

An analysis of the stakeholders was done, after the identification of the stakeholders. The aim was to develop ranking order of criteria proposed by understanding the interest, objectives and influence on poverty alleviation program of primary and secondary stakeholders identified.

Stakeholder analysis was done during fieldwork and interviews were used for identifying criteria ranking. Different methodologies were executed in doing this, depending on the type of stakeholder. Questionnaires were used during the fieldwork and some residents were interviewed individually. From this kind of interviews, the residents were able to say more about their own experiences and the relative ranking order they give to criteria proposed (different aspects of deprivation) for urban poverty measurement. And short-talk interviews with government officers were used to collect information of decision-maker.
Table 3.2 Stakeholder analysis table on urban poverty

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Key interests</th>
<th>Objective</th>
<th>Influence on poverty alleviation program</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban residents</td>
<td>-Income&lt;br&gt;-Employment&lt;br&gt;-Housing&lt;br&gt;-Infrastructure&lt;br&gt;-Medical care&lt;br&gt;-Social welfare&lt;br&gt;-Low commodity price</td>
<td>-Increase income&lt;br&gt;-Increase employment opportunities&lt;br&gt;-Improving housing conditions&lt;br&gt;-Improving infrastructure conditions&lt;br&gt;-Decrease medical care expenditure&lt;br&gt;-Increase social welfare</td>
<td>-Low.&lt;br&gt;-Will only co-operate, participation and cannot intervene.&lt;br&gt;-Information providing for urban poverty research</td>
</tr>
<tr>
<td>Government decision-makers</td>
<td>-Financial fund&lt;br&gt;-Anti-poverty program or project&lt;br&gt;-Income equity&lt;br&gt;-Increase employment opportunity&lt;br&gt;-Housing providing&lt;br&gt;-Infrastructure supply&lt;br&gt;-Price control</td>
<td>-Increase financial fund on poverty alleviation program&lt;br&gt;-Improve social welfare to help the poor out of poverty&lt;br&gt;-Keep income balance and equity&lt;br&gt;-Providing adequate housing&lt;br&gt;-Insure infrastructure service supply&lt;br&gt;-Control commodity price</td>
<td>-High&lt;br&gt;-Will have influence on all aspects of policies on poverty alleviation&lt;br&gt;-Availability of financial funding&lt;br&gt;-Determines type of social welfare</td>
</tr>
</tbody>
</table>

(Source: author collected by interviews 2002)

From stakeholder analysis, we can see that the primary stakeholder urban residents as participators in anti-poverty programs or projects have low influence on poverty alleviation programs.

As secondary stakeholder, government decision-makers here refer to the social security bureau, labour bureau of local government and re-employment centre in Wuhan that were relative to urban poverty alleviation program (the Minimum Living Allowance Scheme and re-employment training and profession introductions).

Because urban poverty is still a sensitive problem in China, during the fieldwork, many local government officials are unwilling to accept interviews, they appeared an indifferent and implicit attitude to the problem of urban poverty. I can only have a short-talk interview with some of them. Even during the short interviews, I can’t get positive answer to some key questions. The most mentioned and dwelt upon by them are official poverty line and official statistic figures of poverty under the line in Wuhan. They are aware of the multi-dimensional deprivation of urban residents currently, but they stick to the poverty line in use and said it was not practicable and feasible to execute other ways for poverty measurement, especially in large areas or large cities as Wuhan. Even the government itself also faces the problem of data collection and availability and they are not sure about the quality and credibility of census and sample surveys.

For the reason mentioned above, the research here only takes consideration of the interview statistics of urban residents in Wuhan. And develop the weights for various criteria from the view of primary stakeholder identified as urban residents.
In the survey, interviewees were asked to rank criteria (different aspects of deprivation) in order of importance for urban poverty measurement. When ranking of urban poverty criteria, the highest occupied percent of “order” for the criterion as the “order” of importance. For example, the importance of criterion “employment” ranked by interviewees order “3”, 53.9%, order “4” 25.7% and order “5” 20.4%. Then assign the order “3” to criterion “employment” in the ranking order of all criteria. By the same token, all criteria are listed in order of priority below (Figure 3.2). The order from most to least important is: income, expenditure, employment, assets, education, housing, health, welfare and infrastructure.

![Figure 3.2 Ranking orders of criteria selected](image)

### 3.3.2. Different weighting method for criteria

After ranking order of criteria was obtained, weights can be assigned to each criteria proposed. Several methods exist to translate the ordinal ranking into quantitative weights. An ordinal ranking of criteria determined that ranking method or using methods like AHP are the simplest method for identifying weights of each criterion. Other method can be used while using different scoring scale for indicators, such as nominal, interval, and ratio and binary numbers.

#### 3.3.2.1. Ranking method

Ranking method can be used if the stakeholder is able to rank the criteria in order of importance. Ranking method treat this ordering as information on the unknown quantitative weights and try to make optimal use of this information. Assume that a complete ordering of J criteria is given such that criterion 1 is the most important criterion, followed by criterion 2, then criterion 3, etc., until criterion J, the least important criterion is reached. Let $W_1, \ldots, W_J$ denote a set of quantitative weights in accordance with this ordering and impose the conditions that the quantitative weights are non-negative and add up to 1. Then the weights are elements of the following set:

$$ S = \left\{ w \left| w_1 \geq w_2 \geq \ldots \geq w_J \geq 0; \sum_j w_j = 1 \right. \right\} $$

The set of weights of a problem with three criteria ($X_1, X_2, X_3$) that are non-negative and add up to one is represented as triangle ABC in Figure 3.4a. If criterion $X_i$ is more important than criterion $X_2$ and criterion $X_i$ is more important than criterion $X_3$, then the set of feasible weights equals triangle AED in Figure 3.4b. This shows that the information contained in the ordering is substantial. From the set of weights that non-negative and add up to 1 only 1/6 proves to remain feasible.
In this section one method is included for using the information on the set \( S \) of feasible weights to produce quantitative weights: the Expected Value method (Rietveld 1984a, 1984b).

**Expected Value method**

This method assumes that each set of weights within \( S \) that fits the rank order of criteria has equal probability. The weight vector is calculated as the expected value of the feasible set (Rietveld 1984b). The expected value is found as the centroid of set \( S \). This method results in a unique weight vector. In combination with, for example, weighted summation it also results in a complete ranking of the alternatives. The Expected Value method gives rise to a convex relationship between ordinal and quantitative weights: the difference between two subsequent weights is larger for more important criteria.

The expected value method calculates the weight, \( w_k \) for criterion \( k \) according to Formula (3.2) where \( n \) is the number of criteria. The weights fit the rank order of criteria defined by set \( S \), meanings that \( w_1 \geq w_2 \geq \ldots \geq w_n \geq 0 \).

\[
 w_k = \frac{1}{n(n+1-i)} \sum_{i=1}^{n+1-k} \frac{1}{n(n+1-i)} \text{Formula (3.2)}
\]

Table 3.3 shows the weight vectors for various numbers of criteria according to Formula (3.2)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>J</th>
<th>Expected value of criterion weights</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E(w1)</td>
<td>E(w2)</td>
</tr>
<tr>
<td>2</td>
<td>0.75</td>
<td>0.25</td>
</tr>
<tr>
<td>3</td>
<td>0.61</td>
<td>0.28</td>
</tr>
<tr>
<td>4</td>
<td>0.52</td>
<td>0.27</td>
</tr>
<tr>
<td>5</td>
<td>0.46</td>
<td>0.26</td>
</tr>
<tr>
<td>6</td>
<td>0.41</td>
<td>0.26</td>
</tr>
</tbody>
</table>

The expected value method, combined with a multi-criteria method, always leads to complete ranking. The rank order is not always in agreement with all the possible quantitative weights, the weights of set \( S \), and is therefore not entirely certain.

**Weights developed by ranking method (expected value)**

After got ranking of all criteria, the weights fit the rank order of all criteria can be developed according to Formula (3.2). Weights obtained by direct ranking or using methods like AHP are standardized to 0 and 1, which is shown in Table 3.4.

Table 3.4 Criteria’s weights by ranking method (expected value)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Income</th>
<th>Expenditure</th>
<th>Physical assets</th>
<th>Employment</th>
<th>Education</th>
<th>Health</th>
<th>Welfare</th>
<th>Housing</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>0.314</td>
<td>0.203</td>
<td>0.111</td>
<td>0.148</td>
<td>0.083</td>
<td>0.042</td>
<td>0.026</td>
<td>0.061</td>
<td>0.012</td>
</tr>
</tbody>
</table>

**3.3.2.2. Analytical Hierarchy Process (AHP)**

The weighting method AHP developed by Saaty (1980) is based on criteria that are measured on an ordinal or ratio scale. In AHP the stakeholders have to make a comparison for every pair of criteria: first qualitative which is then quantified on a scale from 1 to 9. The method then creates a matrix con-
taining the pairwise comparison judgements for the criteria, from which a priority vector is derived representing the relative weights of such elements (the principal eigenvector of the matrix). Moreover, due to the fact that more information than is necessary is retrieved from the stakeholders, the method can deliver an inconsistency measures. AHP is especially designed to assess weights within a hierarchical structure of the criteria. However, due to the fast-growing number of pairwise comparisons it is not sensible to use the method for a large set of criteria. Moreover, AHP only works if things are comparable that is, if they are within a scale of 1-9.

The aim of this method is to derive quantitative weights from qualitative statements on the relative importance of criteria obtained from comparison of all pairs of criteria. Saaty (1980) proposes the following nine-point scale (Table 3.5) to express differences in importance:

<table>
<thead>
<tr>
<th>Degree</th>
<th>The explanation of importance comparing criteria pairwise</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Criterion i is equally important as criterion j, or comparing i with i, or j with j.</td>
</tr>
<tr>
<td>3</td>
<td>Criterion i is moderately more important than criterion j.</td>
</tr>
<tr>
<td>5</td>
<td>Criterion i is strongly more important than criterion j.</td>
</tr>
<tr>
<td>7</td>
<td>Criterion i is very strongly more important than criterion j.</td>
</tr>
<tr>
<td>9</td>
<td>Criterion i is extremely more important than criterion j.</td>
</tr>
<tr>
<td>2,4,6,8</td>
<td>The importance is between the upper criterion and lower criterion.</td>
</tr>
<tr>
<td>Reciprocal</td>
<td>The importance is contrary to above, that is, the importance of criterion j comparing with criterion i.</td>
</tr>
</tbody>
</table>

Intermediate values (2, 4, 6, 8) can be used if it is too difficult to choose between two successive classes. The decision maker is asked to compare all pairs of criteria. This results, for each pair (j,j’), in a values of $a_{jj}$ that expresses the difference in important of the two criteria. Note that $a_{jj}$ is 1 for all criteria, and that for each pair $a_{jj} = 1/ a_{jj'}$. This result in a pairwise comparison matrix $A$. Saaty proposes to interpret the values of $a_{jj'}$ as relative weights:

$$a_{jj'} = W_j / W_{j'}$$

If the judgements supplied by the decision maker were completely consistent, one row of the comparison matrix $A$ would be enough to produce all relative weights. Complete consistency implies that relationships of the type $a_{13} = a_{12} a_{23}$ hold for all sets of three criteria. This is almost never the case. Therefore an approximation of the weights needs to be made that makes optimal use of the (inconsistent) information available in the comparison matrix. Saaty proposes to derive the weight vector as the Eigenvector of $A$ with the largest Eigenvalue (Saaty 1990; Kok and Lootsma 1985; Dyer 1990). A consistency index is calculated that represents the extent to which the judgements supplied by the decision maker are consistent with triangular relationships described above. A value of this index of 0 indicates that all triangular relations hold, a value of 1 result if judgements are made at random. The number of pairwise comparisons to be made increases rapidly with the number of criteria. Saaty (1980) therefore proposes a hierarchical structure of goals, sub-goals and criteria. The AHP method cannot only be used to assess weights but can also be used to assess the performance of alternatives by pairwise comparison of the alternatives.
Pairwise comparisons
Pairwise comparisons are basic to the AHP methodology. When comparing a pair of “criteria”, a ratio of relative importance, preference or likelihood of the criteria can be established. This ratio need not be based on some standard scale such as feet or meters but merely represents the relationship of the two “criterion” being compared.

Most individuals would question the accuracy of any judgement made without using a standard scale. Yet, it has been verified that a number of these pairwise comparisons taken together form a sort of average, the results of which are very accurate. This “average” is calculated through a complex mathematical process using eigenvalues and eigenvectors. The results of this method have been tested experimentally and have been found to be extremely accurate. This method is used in AHP and many software such as Expert Choice allowing one to use both subjective and objective data in making pairwise comparisons.

Weights developed by AHP (hierarchy analysis of 9 degree)
After the importance order of all criteria got by ranking method, the weights can also be developed by hierarchy analysis of 9 degree. According to the method introduced above, the judgement matrix of the nine criteria can be structured as follows. First step is to compare nine criteria pairwise. For example, if comparing income \( r_1 \) with education \( r_4 \), the criterion \( r_1 \) \( (i=1) \) is strongly more important than criterion \( r_4 \) \( (j=4) \), the quantification degree will be “5”. Likewise, the judgment matrix of the nine criteria (Table 3.6) can be structured based on Table 3.5.

Table 3.6 Structure judgment matrix of the nine criteria (nine-degree analysis)

In the Table 3.7, all the values are 1 in the main diagonal of the judgement matrix (self comparison). The corresponding values between the upper triangle and the lower triangle are reciprocals (the upper triangle is comparing \( i \) with \( j \) and the lower triangle is comparing \( j \) with \( i \)). After standardization to 1, the maximal eigenvector of the judgement matrix (Table 3.7) \( \bar{W} = (0.317, 0.235, 0.157, 0.073, 0.032, 0.019, 0.105, 0.046, 0.016) \).

Therefore, these nine criteria’s weights are determined by the above maximal eigenvector (Table 3.7).
Table 3.7 Criteria’s weights by AHP (hierarchic analysis of nine-degree)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Income</th>
<th>Expenditure</th>
<th>Physical assets</th>
<th>Employment</th>
<th>Education</th>
<th>Health</th>
<th>Welfare</th>
<th>Housing</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>0.317</td>
<td>0.235</td>
<td>0.105</td>
<td>0.157</td>
<td>0.073</td>
<td>0.032</td>
<td>0.019</td>
<td>0.046</td>
<td>0.016</td>
</tr>
</tbody>
</table>

The merits and limitations of the two method

Weights obtained by direct ranking method or using methods like AHP are determined after getting an ordinal ranking of criteria. These two method are widely used to set weights when using ordinal number for indicator scoring. Other method can be used while using different scoring scale for indicators, such as nominal, interval, and ratio and binary numbers.

**Ranking method**

It’s the simplest method for assessing the importance of priorities or orders of multi elements. And its disadvantage is also apparent that priorities or orders are sometimes given arbitrarily.

**AHP method**

The advantage of AHP method is easy to determine the importance of degree while comparing two criterions. The hierarchic analysis of nine-degree is widely used to determine the weights of multi criteria (9 and above). By using the AHP pairwise comparison process, weights or priorities are derived from a set of judgements; it is relatively easy to justify judgements and the basis (hard data, knowledge, experience) for the judgements.

**Inconsistency**

The theory of AHP does not demand perfect consistency. AHP allows inconsistency, but provides a measure of the inconsistency in each set of judgements. This measure is an important by-product of the process of deriving priorities based on pairwise comparison. It is natural for people to want to be consistent. Being consistent is often thought of as a prerequisite to clear thinking. However, the real world is hardly ever perfectly consistent, and we can learn new things only allowing for some inconsistency with what we already know.

3.4. Calculate urban poverty score

After developing weights for each criterion, the aggregated urban poverty score of each household can be calculated. Before that, score of each criterion can be calculated as follows:

Score of Criterion 1 = “score of indicator 1.” * weighting + “score of indicator 1.” * weighting + …
Score of Criterion 2 = “score of indicator 2.” * weighting + “score of indicator 2.” * weighting + …

……

Score of Criterion 9 = “score of indicator 9.” * weighting + “score of indicator 9.” * weighting + …

(Where, _i_ refers to the indicators of the criterion)

About the score of each criterion, here adopt the method of HPI (UNDP 1997), that is, give the equal weights to each indicator of a criterion and sum. Using criterion “Housing” as an example, suppose scores of two indicators given to a household are respectively 3 and 2. After standardization, score of
the two indicators are respectively 1 and 0.5. Then the score of criterion “Housing” is calculated as Formula (3.3):

\[ H_o = \frac{1}{2} * (A + S) \]  

Formula (3.3)

Where, \( H_o \) refer to score of criterion “Housing”, \( A, S \) respectively represent the score of indicators “Usable floor area per person” and “Household size. And only one indicator of a criterion, the weight is equal to 1. Likewise, score of each criterion can be calculated. Then the aggregated score of each household can be calculated as:

Score of household \( i \) = Score of Criterion 1 * weight 1 + Score of Criterion 2 * weight 2 + \ldots + Score of Criterion 9 * weight 9

\( i \) is the \( i \) th household of total surveyed households.

Then using different weights identified in last section can develop an urban poverty score table. According the single scores in the table, I can classify different levels of urban poverty level.

3.5. classify urban poverty level

After an aggregated score of each household calculated, different urban poverty level can be classified. Single score has been classified in ranks to identify natural clusters. To do so, frequency distribution of the score values are analysed with the use of software SPSS. Urban poverty levels can be classified according to the natural boundaries of the visible clustering of their frequency distribution. We can analysis score values by using mathematical method to see the percentage of sample numbers which is within the range of Mean \( \pm 3 \times \text{Std. Dev} \) (standard deviation). The higher the percentage is, the more credible the sample collection. For example, if more than 95% of score values are within the range of Mean \( \pm 3 \times \text{Std. Dev} \), then we can divide the score value into four ranges by Mean \( \pm \text{Std. Dev} \) or Mean \( \pm 2 \times \text{Std. Dev} \) in terms of real situation. Here four level of urban poverty can be formed according to score range from up to low: “very poor”, “poor”, “normal ”and “non-poor”.

And urban poverty incidence can be assessed as follows:
Suppose the households surveyed is \( N \), and among them \( n \) are defined as “Extreme poverty” (or “poverty”), the poverty incidence (\( PI \)) is as Formula (3.4)

\[ PI = \frac{n}{N} \times 100\% \]  

Formula (3.4)

Then, an assessment of poverty line can be produced as following:
Among the \( n \) households, suppose the income of the \( i \) th household is \( I_i \), then poverty line (\( PL \)) assessment is as Formula (3.5):

\[ PL = \frac{\sum_{i=1}^{n} I_i}{n} \]  

Formula (3.5)

The poverty line calculated based on the sample survey data can compare with current national or city poverty line. If the latter is more than the former illustrate that the current poverty line do help to those the most needed population------especially the poor population with low income. Vice versa, the result implies that the current poverty line can’t cover all the poor population to leave out income deficiency. Then recommendations to local government programmes can be made to help improving
living standard of those poor or marginal out of poverty. For example, the government policy can give some priority to the relatively poor population group on re-employment and children’s entrance to school.

3.6. Summary

The proposed method has its own advantages comparing with the official poverty measurement in current China—a national poverty line measure. It proposed a comprehensive poverty measurement and considers multi-dimensions of urban poverty, not only one dimension of income level. Here in the proposed method, income level criterion is listed as one of the various criteria and give substantially more contribution (giving a high weight) to measuring overall urban poverty (various kind of deprivation). In China, there is no division of poverty measurement between urban and rural with only a national poverty line, while this method is focus on urban poverty, which is a relative poverty comparing with rural poverty, mostly an absolute one.

Every coin has two sides. This method also has its disadvantages mainly in three aspects. First, the indicators’ selection of urban poverty is an urban China’s context cannot make comparisons in a national level since every country or region has its special situation. Some qualitative indicators are only for a period of time and the thresholds of indicators will change when the sectoral or regional pattern of economic change. Second, weights identification of each criterion (Hierarchic analysis of nine-degree method used here) is very subjective. Sometimes it is difficult to identify which criterion is much important while comparing pairwise when the two criteria are approximate in importance. Thirdly, the method is limited by data availability. The method is more accurate and effective when using an overall data available than only a small data and for a comprehensive poverty comparison in a regional or city level. When using a small sample survey data, a big deviation may be appearing inconsistent with the reality. For example, a household is not in poverty according to the national or local living standard may be classified to “poverty” when comparing with other households surveyed. This situation is contributed because of the small sample size.

And I will discuss more detailedly after getting findings from survey data analysis in next chapter.
4. Measurement Application and Findings of the Survey

4.1. Survey design

It is important to select an appropriate data collection method that will extract useful information of measuring urban poverty. The social survey method is one of the most effective data collection methods in collecting socio-economic data (Frankfort-Nachmias and Nachmias 1992). In Wuhan fieldwork consisted of 152 questionnaires and included face-to-face interviews of 50 households in the sample area. Additional data was obtained from the fifth census of Wuhan (2000) and Wuhan statistic yearbooks (2000-2002).

4.1.1. Purpose

Following China’s economic reform in the 1990s and the restructure of state-owned enterprises, a lot of laid-off workers and unemployed appeared which consist of a great part of the new increasing urban poverty. From the Figure 4.1, we can see the households in receipt of MLA in Wu_chang (14 streets) increased greatly from 2000-2002. Urban poverty has become an important problem need to be paid attention to. In addition to secondary data sources, 152 questionnaires and 50 interviews have collected primary data. In order to measure urban poverty of the sample households and have an overall picture on the situation of urban poverty group, the survey focused mainly on nine aspects of the sample households such as income, expenditure, employment, education, health, welfare, physical assets, housing and infrastructure. The main purpose of the survey is to collect socio-economic data to measure urban poverty multi-dimensionally.

![Figure 4.1 Percentage of households in receipt of MLA in Wu_chang](Source: Wuhan 2000 census)
4.1.2. Sample strategy

- Sample area choosing

Data was collected from Wu_chang district in Wuhan. The district is one of the seven urban districts, which contains 14 streets (within which the Shi_dong street is located in Jiang_xia district separately and here not profiled). The population density of Wu_chang is 12,020 persons per square kilometre, which occupied the third share of the total 13 districts of Wuhan. On the basis of communication with district and street committee officers and the distribution analysis (the official figure shows 55.4% urban households in receipt of MLA in Wu_chang settled in these five streets) (see Figure 4.2), 5 areas within the district were selected as sample areas where the households in receipt of MLA are increasing greatly in three years from 2000 to 2002: Zhong_hua, liang_dao, Huang_helou, Zi_yang and Bai_shazhou streets.

Figure 4.2 Distribution of households in receipt of MLA in Wu_chang
(Source: Wuhan 2000 census)

From figure 4.1, we can see that Ji_yuqiao and Shi_dong Street also have a relatively high percentage of households in receipt of MLA, but here I didn’t choose them as study area. The main reason is below: first, Shi_dong street is located in Jiang_xia district separately and it was included in Wu_chang district in recent years, the situation there is different. Secondly, the five study areas selected are spatially connected, which makes sample survey easy and less time consuming. It’s easy to analysis spatial characteristics too.

Residential committees where poor households (urban poverty) clustered spatially constitute the study area chosen for this research. Some specific aspects of poor households could have been analysed. However, such a choice would have led to a fragmentary view of poverty. The case studies are holistic in the sense that they impinge on various aspects of the poor families’ life, and not just the economic aspects. Five residential committees are selected for this research: Zhong_hua street, Yan_zhi street, Hua_ti street, Shui_lu street and Mei_hua (see Figure 4.3).
Figure 4.3 Distribution of samples in Wu_chang

- Target population choosing
The main objective of the survey was to measure urban poverty level of 152 sample households. By design, the sample includes the long-term residents of urban districts with non-urban HUKOU and immigrants settling in urban districts with an urban or non-urban HUKOU for six months or more. The implication is that the data sample is a sample of the urban district population, which is the object of interest here.
Because of the bankrupt of state-owned enterprises in current years, residents settled in the neighbourhoods or districts built up nearby the state-owned factories are relatively poor or more possible into poverty in Wuhan. Interview with Social Security Bureau officers also proved this point that the residents who applied for the MLA are mostly laid-off or unemployed workers of state-owned factories. As a strategy of choosing study area, five residential committees are selected for this research: Zhong_hua street, Yan_zhi street, Hua_ti street, Shui_lu street and Mei_hua.
Initially, a target sample about 200 households was planned, but it was difficult to get response of the households who are unwilling to accept interviews. 152 questionnaires are actually collected, because some sensitive question such as “income” are difficult for some people to answer and they are unwilling to let others known about their real income. Face to face interviews were carried with 50 households living in these five streets of Wu-chang district.

- Survey method and distribution of cases
A questionnaire was designed (See Appendix 4) to collect useful information on households’ different dimensions of living status for urban poverty measuring, such as income, expenditure, employment, education and health aspects, etc. All interviews were conducted out of working time when most adult residents were at home.
200 questionnaires are designed initially, but only 152 were found valid. Other 48 were excluded with the reasons, such as person “have no time to answer” or some items of questionnaires are ignored or unavailable, e.g. the monthly income or living expenditure. Unstructured questions were designed for the research, as interviewees would allow a follow-up to all the questions.
A questionnaire can only get general information about the surveyed household. As a supplement, face-to-face brief interviews were carried out with households settling in these five streets of Wuchang district, for the purpose that interviewees have a chance to express any of their views with respect to multi-dimension aspects of poverty problem. And the 50 households interviewed were all included in the 152 questionnaires. The target population were drawn from the five selected areas. The distribution of case studies as follows: 29 for Bai_shazhou street, 28 for Zi_yang street, 32 for Liang_dao street, 31 for Zhong_hua street and 32 for Huang_helou street.

4.2. Data analysis and findings of the survey

4.2.1. Urban poverty identification by proposed measurement

According to the alternative measurement for urban poverty, four steps were developed. After identification of criteria and indicators, stakeholder analysis is done, and two methods were adopted to develop the weights by interviews from primary stakeholder urban residents. Then the next step is to develop an urban poverty score of all households surveyed and classify different poverty level by frequency distribution analysis of poverty score values in SPSS.

Developing urban poverty score table of each household

According to the alternative measurement proposed in Chapter 3, first, each criterion is assigned a score, after standardization, then multiplied by different weights developed by ranking method and AHP method (See section 3.3.2.). Accordingly, an aggregated score was calculated shown in Figure 4.4 below.
Using weights developed by ranking method

As discussed in section 3.3.2.1, the weights developed by ranking method are listed as Table 3.4 shows:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Income</th>
<th>Expenditure</th>
<th>Physical assets</th>
<th>Employment</th>
<th>Education</th>
<th>Health</th>
<th>Welfare</th>
<th>Housing</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>0.314</td>
<td>0.203</td>
<td>0.111</td>
<td>0.148</td>
<td>0.083</td>
<td>0.042</td>
<td>0.026</td>
<td>0.061</td>
<td>0.012</td>
</tr>
</tbody>
</table>

Here, by analysis in SPSS, the urban poverty score range from the value of 0.14 to 0.844, by frequency distribution analysis, natural boundaries of urban poverty level can be formed (see Figure 4.5).

Statistics (Ranking method)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Valid 152</td>
</tr>
<tr>
<td>Mean</td>
<td>0.523</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>0.143</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.140</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.844</td>
</tr>
</tbody>
</table>

Figure 4.5 Frequency distribution of urban poverty score and statistics (Ranking method)
(Source: calculated by author according to the survey)

Using weights developed by AHP (hierarchy analysis of 9 degree)

As discussed in section 3.3.2.2, the weights developed by AHP method is listed as Table 3.7 shows:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Income</th>
<th>Expenditure</th>
<th>Physical assets</th>
<th>Employment</th>
<th>Education</th>
<th>Health</th>
<th>Welfare</th>
<th>Housing</th>
<th>Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>0.317</td>
<td>0.235</td>
<td>0.105</td>
<td>0.157</td>
<td>0.073</td>
<td>0.032</td>
<td>0.019</td>
<td>0.046</td>
<td>0.016</td>
</tr>
</tbody>
</table>

Here, by analysis in SPSS, the urban poverty score range from the value of 0.133 to 0.86, by frequency distribution analysis, natural boundaries of urban poverty level can be formed (see Figure 4.6).

Statistics (AHP method)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>Valid 152</td>
</tr>
<tr>
<td>Mean</td>
<td>0.52</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>0.146</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.133</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.860</td>
</tr>
</tbody>
</table>

Figure 4.6 Frequency distribution of urban poverty score and statistics (AHP method)
(Source: calculated by author according to the survey)
**Classify different urban poverty level**

According to mathematical analysis, about 99% scores will range from Mean ± 3 * Std. Dev (standard deviation), in this case, we can see that mean poverty score developed by ranking method is 0.523, and standard deviation is 0.14. Accordingly, urban poverty score is naturally divided by Mean ± Std. Dev, which is 0.663 and 0.383, into 4 levels listed in Table 4.1. An urban poverty score of 0.663 or more is considered as “very poor”, 0.523-0.663 points indicates “poor”, and 0.383-0.523 points and 0.383 or less indicates “normal” and “not poor” respectively. Here those identified as “very poor” and “poor” are aggregated as “urban poverty”.

**Table 4.1 Urban poverty level by using weights of ranking method**

<table>
<thead>
<tr>
<th>Urban poverty score range</th>
<th>Urban poverty level</th>
<th>Numbers of households (Persons)</th>
<th>Percentage of households (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.663-0.844</td>
<td>Very poor</td>
<td>27</td>
<td>17.8%</td>
</tr>
<tr>
<td>0.523-0.663</td>
<td>Poor</td>
<td>56</td>
<td>36.8%</td>
</tr>
<tr>
<td>0.383-0.523</td>
<td>Normal</td>
<td>38</td>
<td>25.0%</td>
</tr>
<tr>
<td>0.140-0.383</td>
<td>Not poor</td>
<td>31</td>
<td>20.4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>152 (total)</td>
<td>100%</td>
</tr>
</tbody>
</table>

(Source: calculated by author according to the survey)

And the mean poverty score developed by AHP method is 0.52, and standard deviation is 0.15. Accordingly, urban poverty score is naturally divided by Mean ± Std. Dev, which is 0.67 and 0.37, into 4 levels listed in Table 4.2. An urban poverty score of 0.67 or more is considered as “very poor”, 0.52-0.67 points indicates “poor”, and 0.37-0.52 points and 0.37 or less indicates “normal” and “not poor” respectively.

**Table 4.2 Urban poverty level by using weights of AHP method**

<table>
<thead>
<tr>
<th>Urban poverty score range</th>
<th>Urban poverty level</th>
<th>Numbers of households (Persons)</th>
<th>Percentage of households (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.667-0.860</td>
<td>Very poor</td>
<td>22</td>
<td>14.5%</td>
</tr>
<tr>
<td>0.520-0.667</td>
<td>Poor</td>
<td>59</td>
<td>38.8%</td>
</tr>
<tr>
<td>0.373-0.520</td>
<td>Normal</td>
<td>47</td>
<td>30.9%</td>
</tr>
<tr>
<td>0.133-0.373</td>
<td>Not poor</td>
<td>24</td>
<td>15.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>152 (total)</td>
<td>100%</td>
</tr>
</tbody>
</table>

(Source: calculated by author according to the survey)

From the result, the household number of “very poor” and “poor” adds up to 83 identified by ranking method and 81 by AHP method. We can see that urban poverty number identified by ranking method is very approximate to number identified by AHP method. The difference lies that the percentage of urban poverty scores clustered in Mean ± Std. Dev of ranking method is 61.8% lower than 69.7% of AHP method. That is, the sample score is more clustered of AHP method within score value rang from Mean + Std. Dev to Mean − Std. Dev than that of ranking method.
4.2.2. **Contrast alternative method with income-based poverty measurement**

For the purpose of discussing the feasibility of applying the alternative method for urban poverty measurement, here I contrast the alternative method with income-based urban poverty measurements. According to the poverty line definition (See section 2.1.2.) and the poverty line in current use in Wuhan, 220 RMB per month per head, urban residents who hold non-agriculture HUKOU under the poverty line are identified as urban poverty.

<table>
<thead>
<tr>
<th>Urban poverty level</th>
<th>Ranking method (Persons/%)</th>
<th>AHP method (Persons/%)</th>
<th>Poverty line method (Persons/%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban poverty</td>
<td>83 54.6%</td>
<td>81 53.3%</td>
<td>73 48%</td>
</tr>
<tr>
<td>Normal</td>
<td>38 25.0%</td>
<td>47 30.9%</td>
<td>51 33.6%</td>
</tr>
<tr>
<td>Not poor</td>
<td>31 20.4%</td>
<td>24 15.8%</td>
<td>28 18.4%</td>
</tr>
<tr>
<td></td>
<td>152 100%</td>
<td>152 100%</td>
<td>152 100%</td>
</tr>
</tbody>
</table>

(Source: calculated by author according to the survey)

Applying the survey data in income-based poverty measurement (see Table 4.3), we can get result below: 48% people are identified as “urban poverty” (include “poor” and “very poor”). Comparing with the result got from the alternative urban poverty measurements, we can see that the figure is lower than both results got by different weighting method (54.6% and 53.3%). All the persons identified as urban poverty have a monthly income below the official poverty line – 220 RMB, but still some have an income above the poverty line are identified as “urban poverty”.

That is, about 5%-7% people is excluded from the group of “urban poverty” using the official poverty line measurement, which means this part of people are ignored social groups. They are not eligible or have no access of applying for social welfare (e.g. MLA) according to the standard of poverty line issued by local government. They have difficulty in getting social benefits or any subsidy when suffering both living difficulties and mental pressures.

The comparison of the result developed by different method shows that urban poverty level has a high correlation with income indicator. The strong points of poverty line lie that it can identify most part of those “income poverty”. It is a simple and effective way to identify “the poor” from “non-poor” in a short period of time with less cost and time consuming. And its week point is also apparent that the poverty line can’t reflect the other forms of deprivation except income and ignores those people who need help in other aspects, e.g. employment training, housing, infrastructure, etc. If the sample size is big enough, I suppose that the difference of urban poverty identified by the alternative method and poverty line will be more distinctive. That means a bigger part of people will be excluded from various anti-poverty programs and projects schemed by policy-makers.

4.2.3. **Social-economic analysis of urban poverty identified**

In order to compare the different urban poverty level and situation, I aggregated household-unit data by five residential committees: Zhong_hua street, Yan_zhi street, Hua_ti street, Shui_lu street and Mei_hua. As the reason discussed above, the sample score is more clustered of AHP method than that of ranking method, here use the result developed by AHP method to discuss the social-economic char-
acteristics of the urban poverty identified and comparison with total sample population (152 interviewees). That is, the 81 households identified as “urban poverty” by AHP method is adopted, among which the “very poor” 22 and “poor” 59.

♦ General characteristics of urban poverty

Age
In the survey, there were no persons in the 5-14 year group. Most interviewees (52.6%) are between 40-49 years old. And 15-39, 50-59 and above 60 years old occupied respectively 31.6%, 10.5% and 5.3%. Urban households identified as urban poverty, are mostly among 40-49 years old, and with a descending order of other range of age, from 15-39, 50-59, 60 and more years old (see Table 4.4). In fact, all interviewees are greater than 18 years old. For a manual labour the age 18 up to 49 is the best period in his/her working life, because by comparison with a young person he/she is more experienced and mature, and by comparison with older person he/she is physically stronger and more energetic. In the interview, 82.7 % of the persons who are identified as urban poverty in Wuhan belonged to the age groups of 15-49 years. People who have the labour ability are more likely to become urban poverty than those older age groups and the younger that supported by their parents before 18 years old in China. One reason is that the sample size is so small and the result can’t represent the whole situation in Wuhan. The other reason is that they have no job or being laid off or not getting paid from their work unit, either state-owned enterprises (SOE) or in private enterprises. The laid-off want job, but can’t get work opportunities. In the words of one interviewee: “They sent us home. We went home and had nothing to do. I need job, because I have to earn a living and pay for children’s education fees. But no factories need workers; many factories are bankrupt or cut off workers. My wife is still working in her factory, but wages are often unreliably paid”.

Table 4.4 Age distributions of the survey

<table>
<thead>
<tr>
<th>Age</th>
<th>15-39</th>
<th>40-49</th>
<th>50-59</th>
<th>&gt;60</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households (Persons/%)</td>
<td>48</td>
<td>31.6</td>
<td>80</td>
<td>52.6</td>
<td>16</td>
</tr>
<tr>
<td>Urban poverty (Persons/%)</td>
<td>22</td>
<td>27.2</td>
<td>45</td>
<td>55.5</td>
<td>8</td>
</tr>
</tbody>
</table>

Gender
From the interviews, we can see that the ratio of male to female was 55.3 to 44.7, which in 2000 Wuhan census was 51:49. In a small sample size, this situation could be the truth. And among the urban poverty identified, the ratio of male to female was 58 : 42, which illustrate that male are more vulnerable than female to become poor in the special group of urban poverty.

Occupation
From the Table 4.5, we can see people working in industry occupied the main part of interviewees. And the people working in repast, commerce and retail industry ranked the twice and third order.

9 Note: All the tables of section 4.2.3 were calculated by the author according to the survey.
Table 4.5 Occupation distribution of the survey

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Industry</th>
<th>Construction</th>
<th>Transportation</th>
<th>Repast</th>
<th>Commerce and retail</th>
<th>Household help</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households</td>
<td>6.8</td>
<td>44.7</td>
<td>11.0</td>
<td>10.0</td>
<td>16.0</td>
<td>10.5</td>
<td>6.6</td>
<td>152</td>
</tr>
<tr>
<td>Urban poverty</td>
<td>3.6</td>
<td>44.4</td>
<td>5.0</td>
<td>7.0</td>
<td>13.0</td>
<td>11.3</td>
<td>7.4</td>
<td>81</td>
</tr>
</tbody>
</table>

We can find that urban poverty mostly happened in occupation of industry. In the past, people are proud of working in industry, which is the main support of national construction. Workers in state sector don’t need to worry about the health care, children’s schooling, pensions and housing. All these can benefit from the work unit. For a long period of time the development of heavy industry got priority in Wuhan, which led to a distorted industrial structure and population distribution. During the reform and restructure in 1990s, many state work units go bankrupt and lay off large numbers of employees. The loss of economic and social security previously afforded by the work unit leaves significant gaps between urban residents which directly make a substantial part of people from well-being into urban poverty group.

HUKOU status

The ratio of people holding a non-agricultural registration (HUKOU) to those holding an agricultural HUKOU was 72 to 28. Then we can see that people with an “urban” HUKOU settling in urban districts still occupied mainly in total population. The other 28 percent may be temporary immigrants who are living for six months or more and earn a living in Wuhan. The 2000 census figures indicate that temporary immigrants into Wu_chang was 288,400 persons and share 29.5 percent of the total population in Wu_chang. From the Table 4.6, interviews were consistent with this figure. About 32% of the urban poverty is holding a HUKOU of “non-urban”. They are from the suburban area near Wuhan and from other places in Hubei province. Wuhan is the greatest inner city in middle China, has both the economic and geographical attraction to migrants. With the decease of the agriculture share in national economy and the policy of dismissing of migrating restriction, a great part of rural surplus labourers with low income went to urban areas. The respondents give some reasons for migration to Wuhan including, better income, short distance and good environment. But they also mentioned that job finding is not so easy in Wuhan comparing with previous years. Because they can only do some small business or do what the “urbanite” are unwilling to do, such as household keeping, cleaning. They improve their income indeed after migration to Wuhan than before, but there is still big discrepancy with urban residents. People holding a non-urban HUKOU still have difficulty in many aspects. They have not only low salaries but also no social security benefits. It is estimated that in average the wage rate of rural-urban migrants is only half that of native labour (Zhao, M. 1995:45). In addition, private enterprises do not have to take responsibility for housing, health care and child education, which is why the private enterprises like to hire migrants.
Table 4.6 HUKOU distribution of the survey

<table>
<thead>
<tr>
<th>HUKOU</th>
<th>Urban</th>
<th>Non-urban</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households (Persons/%)</td>
<td>109</td>
<td>71.7</td>
<td>43</td>
</tr>
<tr>
<td>Urban poverty (Persons/%)</td>
<td>55</td>
<td>67.9</td>
<td>26</td>
</tr>
</tbody>
</table>

♦ Economic characteristics of urban poverty

Income

From Wuhan statistic yearbook (Figure 4.7), we can see that there is almost no improvement of disposable income of the poorest 10% comparison with that of the richest 10%. The income discrepancy is enlarging further as disposable income of the richest 10% continues increasing. We also find that the monthly disposable income of urban poverty almost near the poverty line, 220 RMB per month.

![Figure 4.7 Monthly disposable incomes (RMB per capita) comparison](image)

Examin the average monthly income of migrants from interviews in Wu_chang, the income surveyed seems much lower than anticipated. One reason that the result tends to be low is because personal income is such a sensitive question that many respondents were unwilling to give precise answers. In China, maybe because of custom and historical reasons, most people are afraid that other people will know how much money they earn and how rich they are. In this case study, the income was divided into 3 classes in the questionnaire, here adopted the range of income rather than being divided into exact income: class 1 (220 RMB and below), class 3 (220-560 RMB) and class 4 (560 RMB and above). From statistic, 81.6% of the interviewees were living with average monthly income below the city mean disposable income 560 RMB. And among which 48% were living below the MLA, 220 RMB per month.

In Table 4.7, the household with a monthly income below 220 identified as urban poverty occupied the biggest share (90.1%). There are no households identified as urban poverty owning an income over 560 RMB per month. From Table 4.7, we also find that the number of all interviewees with an
income below 220 RMB per month in total sample is the same as that of urban poverty, 73 persons. As discussed in section 4.3.2, the number of urban poverty identified by using the poverty line method is 73 persons too, which illustrate that the income has a high correlation with urban poverty. The poverty line adopted by government is a simple and effective way to identify “the poor”, especially in a short period of time.

**Table 4.7 Income distribution of the survey**

<table>
<thead>
<tr>
<th>Monthly income (RMB)</th>
<th>&lt;220</th>
<th>220-560</th>
<th>&gt;560</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households</td>
<td>73</td>
<td>51</td>
<td>28</td>
<td>152</td>
</tr>
<tr>
<td>(Persons/%)</td>
<td>48.0</td>
<td>33.6</td>
<td>18.4</td>
<td>100</td>
</tr>
<tr>
<td>Urban poverty</td>
<td>73</td>
<td>8</td>
<td>-</td>
<td>81</td>
</tr>
<tr>
<td>(Persons/%)</td>
<td>90.1</td>
<td>9.9</td>
<td>-</td>
<td>100</td>
</tr>
</tbody>
</table>

**Food expenditure**

From analysis of the Engel’s Coefficient’s variation (Figure 4.8), we can find the Engel’s Coefficient of the richest 10% had greatly decreased while that of the poorest 10% had slightly decreased. By calculation, the Engel’s Coefficient of urban poverty is 44.6%. According to the standard of FAO, 40-50% of Engel’s Coefficient is identified as “affluent”. Comparing with the poorest 10% in Wuhan, We can see the living standard had relatively improved by recent years.

![Figure 4.8 Engel’s Coefficient comparison](image)

In the interviews (See Table 4.8), the ratio of food expenditure to total living expenditure (Engel’s Coefficient) between 38.5% and 50% rank the first (60%), Engel’s Coefficient below 38.5% and above 50% were 25% and 14.5%. FAO released that Engel’s Coefficient above 50% as “poor”, the figure of both total sample and urban poverty indicates that the “food expenditure poor” is almost a very small section in urban district. Most people live above the level of “Enough to eat and wear” means that “the minimum living deprivation” are no longer a problem as severe as past in Wuhan.
### Table 4.8 Engel’s Coefficient of the survey

<table>
<thead>
<tr>
<th>Engel’s Coefficient</th>
<th>&gt;50%</th>
<th>38.5-50%</th>
<th>&lt;38.5%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households</td>
<td>22</td>
<td>14.5</td>
<td>92</td>
<td>60.5</td>
</tr>
<tr>
<td>(Persons/%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban poverty</td>
<td>17</td>
<td>21.0</td>
<td>52</td>
<td>64.2</td>
</tr>
<tr>
<td>(Persons/%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Among the households identified as urban poverty, there are 14.8% with an Engel’s Coefficient below 38.5, the mean level of Wuhan. I have introduced in section 3.2.3 that the Engel’s Coefficient is a ratio of food expenditure to total living expenditure. Part of the participants described poverty as “basic living expenses not secure” and “always bargain for food”. A possible reason of 14.8% urban poverty hold a relatively low Engel’s Coefficient (38.5%) lies that a very small expenditure is spent on food with a relatively low total living expenditure, which lead to a relatively low Engel’s Coefficient. But this part of households are identified as “urban poverty”, which means that the single indicator of “Engel’s Coefficient” is not accurate and enough for the identification of “urban poverty”. It’s only one indicator to the whole measurement for urban poverty.

### Holding of durable products

In proposed measurement for urban poverty 14 durable products are selected as below, sectional furniture, bicycle, washing machine, refrigerator, TV, VCD or DVD, video recorder, computer, music center, camera, air-condition, gas cooker, water heater, telephone. The percentage of households holding 3-7 durable products is 48.0%, those holding more than 7 and no more than 2 are 30.9% and 21.1%. Among urban poverty, most households (64.2%) holding three to seven of the selected 14 durable products, and households holding no more than two durable products are 35.8%. There are no households identified as urban poverty hold more than 7 of the durable products. (See Table 4.9)

### Table 4.9 Numbers of durable products of the survey

<table>
<thead>
<tr>
<th>Numbers of durable products</th>
<th>&lt;3</th>
<th>3-7</th>
<th>&gt;7</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households (Persons/%)</td>
<td>32</td>
<td>21.1</td>
<td>73</td>
<td>48.0</td>
</tr>
<tr>
<td>Urban poverty (Persons/%)</td>
<td>29</td>
<td>35.8</td>
<td>52</td>
<td>64.2</td>
</tr>
</tbody>
</table>

In comparison with Wuhan statistic yearbook, durable products holding by the urban poverty are mostly seven categories: bicycle, washing machine, refrigerator, TV, recorder, gas cooker and telephone. Durable products of bicycle and washing machine occupied the first and second share of total 14 durable products. (See Figure 4.9) The survey situation is basically consistent with the Wuhan statistics yearbook. During the survey, some perception of urban poverty was recorded as, “no money to buy electrical goods such as refrigerator, washing machine etc.; no computer, no telephone”.

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**MEASURING URBAN POVERTY**

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**Figure 4.9 Numbers of durable products holding comparison**

- **Social characteristics of urban poverty**

  **Employment status**

  From 2000 census in Wuhan, we can make comparison with employment status in five study areas with the interview (See Figure 4.10). We can find that the situation is quite match.

---

**Figure 4.10 Employment status comparison**

In questionnaire, the employment status is divided into 7 categories. (See Table 4.10) In the interview, we can see the percentage of laid-off workers and the unemployed adds up 46% of the survey respondents. The laid-off workers are the main part of the interviewees.
Table 4.10 Employment status of the survey

<table>
<thead>
<tr>
<th>Employment status</th>
<th>Full-time workers</th>
<th>Part-time informal employment</th>
<th>Self-employed</th>
<th>Laid-off workers</th>
<th>Unemployed</th>
<th>Retired</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households (Persons/%)</td>
<td>24</td>
<td>15.8</td>
<td>36</td>
<td>23.7</td>
<td>11</td>
<td>7.2</td>
<td>47</td>
<td>30.9</td>
</tr>
<tr>
<td>Urban poverty (Persons/%)</td>
<td>10</td>
<td>12.3</td>
<td>11</td>
<td>13.6</td>
<td>12</td>
<td>14.8</td>
<td>31</td>
<td>38.3</td>
</tr>
</tbody>
</table>

And the figure 38.3% of the urban poverty are laid-off workers explained that being laid-off and without income resource is an important reason leading to urban poverty. One laid-off worker interviewed said, “We are poor now…in the past, whatever happened, if you were a worker you could go to work and get a wage. Now you’re laid off, you are in poverty. You earn a little money, and compensation is often unreliable. You can’t buy any clothes, can just buy a bit to eat, and don’t even have what you need for the kid’s tuition.”

The percentage of self-employed is higher in urban poverty than that of total sample, which indicate that people without access of wage income or compensation from work unit have to do some business by themselves to earn a living. In theory laid-off workers should receive a laid-off worker’s permit that provides certain benefits, such as tax exemption when doing some small business, selling goods in the market and priority for re-employment. However, many laid-off works have difficulty obtaining such a permit. Even if one does obtain a laid-off permit, entitlements to tax or fee concessions and preferential employment options are not always respected. Most laid-off workers complain the laid-off permit can’t bring any benefits.

**Education**

From the interviews, we can see that 78.3% of the respondents had at least secondary school education. In other words, most interviewees are well educated and are well placed to hold a job in the city. From urban poverty analysis, we also can find their education level mainly was secondary school level which is consistence with the total sample. (See Table 4.11)

Table 4.11 Education status of the survey

<table>
<thead>
<tr>
<th>Education level</th>
<th>Illiterate</th>
<th>Primary school</th>
<th>Junior secondary school</th>
<th>Senior secondary school</th>
<th>College and above</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households (Persons/%)</td>
<td>1</td>
<td>0.6</td>
<td>32</td>
<td>21.1</td>
<td>67</td>
<td>44.1</td>
</tr>
<tr>
<td>Urban poverty (Persons/%)</td>
<td>1</td>
<td>1.2</td>
<td>25</td>
<td>30.9</td>
<td>33</td>
<td>40.7</td>
</tr>
</tbody>
</table>

In the survey, there only one household head is illiterate and most of them have at least junior secondary school education. From table 4.11, we can find the primary school level were higher among the
urban poverty compared to total sample. For senior secondary and junior secondary school levels situation were reversed. This indicates that the education level is related to urban poverty level, the less education, and the more vulnerable into urban poverty. During the survey, there is a great deal of respondents described poverty as “not educated, no technical skill”. Although the education has improved a lot since 1990s in China, to those who are no longer in school age persons, they have no access to improve their education level. The same problem exists in employment skills training. When they are laid-off or unemployed, they have difficulty in compete with the younger in labour market.

Health
Some of the interviewees say poverty is “bad health and health care, no health insurance, can’t afford to see the doctor…” From analysis in Table 4.12, “without access to health service” occupied higher both in the total sample and urban poverty. The majority of interviewees refer to lack of access to health care and high medical fees as a serious problem coinciding with increased pressure and sometimes illness since being laid-off. Interviewees frequently use the phrase “no money to see the doctor”. Their responses to the costs of health care are varied. Most say they treat illness by buying medicine, sometimes on the street where it is cheaper, or using medicine given by neighbors or friends. Many say they take medicine as soon they get ill in order to get cured more quickly, while some take less medicine due to the cost. “We are own doctors. We choose our own medicine and try folk cures”. Some described in more detail the problem of medical costs for the elderly: “The hospital costs 200 RMB/day. If we get sick, there’s nothing you can do. Bur if the old people get sick you have to find money…you just have to borrow money to pay.” It’s really a problem of supporting the old.

Table 4.12 Health care status of the survey

<table>
<thead>
<tr>
<th>Households Without access to health service</th>
<th>Non exist the problem</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households (Persons/%)</td>
<td>80</td>
<td>52.6</td>
</tr>
<tr>
<td>Urban poverty (Persons/%)</td>
<td>65</td>
<td>80.2</td>
</tr>
</tbody>
</table>

Welfare
In questionnaires, 6 main categories of social security benefits were defined. But 61.2% people answered to category 6 (nothing). And the similar situation happened among urban poverty (70.4%) who has received no social benefits. 12.3% of people have received the MLA (Minimum Living Allowance) and 9.9% received unemployment insurance (See Table 4.13).

Table 4.13 Persons in receipt of social benefits of the survey

<table>
<thead>
<tr>
<th>In receipt of social benefits</th>
<th>MLA</th>
<th>Unemployment insurance</th>
<th>Health care</th>
<th>Housing subsidy</th>
<th>Pensions</th>
<th>Nothing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households (Persons/%)</td>
<td>15</td>
<td>9.9</td>
<td>14 9.2</td>
<td>8 5.3</td>
<td>12 7.9</td>
<td>10 6.6</td>
<td>93</td>
</tr>
<tr>
<td>Urban poverty (Persons/%)</td>
<td>10</td>
<td>12.4</td>
<td>8 9.8</td>
<td>- -</td>
<td>3 3.7</td>
<td>3 3.7</td>
<td>57</td>
</tr>
</tbody>
</table>
From comparison with people in receipt of MLA of urban poverty and Wuhan census 2000 in five-study area, we can see that official statistic figure is extremely higher than the survey.\textsuperscript{10} (See Figure 4.11) The possible explanation is that the official figure is not so reliable for some reasons. Another reason of this kind of situation is that the sample size (152 interviews) is so small to illustrate the problem.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure4.11.png}
\caption{People in receipt of MLA comparison}
\end{figure}

People in receipt of no social benefits can’t illustrate that they are not “urban poverty”, although many urban households are no need of social benefits, but the fact is that many people who need social benefits can’t receive any help, let alone those have no access to application for the MLSS or other benefits.

Insurance and social security benefits are important social guarantees for workers. From the employment status analysis of urban poverty, 38.3% of the urban residents are laid-off workers. Workers laid off from state owned enterprises (SOE) lose more than their jobs. The “iron rice bowl” provided urban workers with “cradle to grave” security: pensions, health care, sick leave, and maternity benefits, cr\`{e}ches, schools, clinics and housing. State sector workers remained relatively insulated from the reform of the 1980s with some benefiting from rapid economic growth (Cook and Maurer-Fazio 1999). During the 1990s, however, the security of many has been shattered as enterprises go bankrupt, restructure and lay off large numbers of employees. The real urban unemployment level in 1998 was estimated to be around 16 million or over 8 per cent of the urban labor force, with significant new layoffs expected to lead to an overall increase to around 2.5 million people in 2000. According to the China Human Development Report, “the explosive increase in unemployment has become the most challenging issue in China’s economic and human development” (Rahman Khan, Griffin et al 1999: 58). The loss of economic and social security previously afforded by the work unit leaves significant gaps in social protection, summarized in Table 4.14 below.

\textsuperscript{10} Because the reason of difficult accessibility of data, here only use the survey data collected by author in 2002.
Table 4.14 Social benefits of SOE workers pre- and post-reform

<table>
<thead>
<tr>
<th></th>
<th>Pre-reform</th>
<th>Post-reform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>Work units often had own clinics or hospitals, providing subsidies care for workers.</td>
<td>Subsidies reduced or non-existent. Health insurance reforms in the pipeline for cost sharing between individual and employer.</td>
</tr>
<tr>
<td>Education</td>
<td>SOE financed primary and secondary schools affiliated to enterprise.</td>
<td>Rising tuition fees at all levels of education. Quality increasingly associated with cost.</td>
</tr>
<tr>
<td>Pension</td>
<td>Pensions provided through unfounded, enterprise-based scheme.</td>
<td>Pension reform in pipeline – employee and employer contributions. Pensions currently unpaid by some enterprises.</td>
</tr>
</tbody>
</table>

These dramatic changes in entitlements can be viewed as a renegotiation of the social contract between urban workers and the state (Tang and Parish 2000). Entitlements associated with urban employment were part of a contract by which workers had contributed labor to building the state since the 1950s. Workers gained privilege and the expectation that these would continue; they have now lost out not only economically but also in terms of their social and political status. Formerly celebrated as “heroes of the revolution”, laid off state sector workers are now more likely to be characterized as backward, unskilled, lazy and an obstacle to reform (Rofel 1999).

♦ Physical characteristics of urban poverty

Usable floor area per person
The Wuhan 2000 census contains a sample survey of living conditions in 278,660 households. From this we can see the difference between the living condition of the survey and interviews. Figure 4.12 illustrate that the 9-16 sq meters model of housing area is most common in urban poverty identified (61.7%).

![Figure 4.12 Housing area per capita comparison](image)
In Table 4.15, the biggest share (53.3%) of total interviews hold a household area of 9-16 sq meter per capita, 18.4% of household of 17-30 sq meter and 15.8% of household below 8 floor area per capita. The result is highly matched what is showed in the sample survey of Wuhan census 2000.

### Table 4.15 Housing area per head of the survey

<table>
<thead>
<tr>
<th>Housing area per head (sq. m)</th>
<th>&lt;9</th>
<th>9-16</th>
<th>17-30</th>
<th>31-50</th>
<th>&gt;50</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households (Persons/%)</td>
<td>24</td>
<td>81</td>
<td>53.3</td>
<td>28</td>
<td>18.4</td>
<td>11</td>
</tr>
<tr>
<td>Urban poverty (Persons/%)</td>
<td>10</td>
<td>50</td>
<td>61.7</td>
<td>14</td>
<td>17.3</td>
<td>7</td>
</tr>
</tbody>
</table>

### Household size

In the interviews (See Table 4.16), a household with three members is the most (53.9%) common composition the surveyed households, which will contribute to the national Bearing Scheme Policy executed from 1978. The households with over 4 persons rank the second (39.5%) and 1 or 2 persons the least one (6.6%). Households composed of 4 and above members hold a higher percentage in urban poverty than in total, which proves that the bigger family size, the more vulnerability into poverty.

### Table 4.16 Housing size of the survey

<table>
<thead>
<tr>
<th>Housing size (persons)</th>
<th>1-2</th>
<th>3</th>
<th>4 and above</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households (Persons/%)</td>
<td>10</td>
<td>6.6</td>
<td>82</td>
<td>53.9</td>
</tr>
<tr>
<td>Urban poverty (Persons/%)</td>
<td>4</td>
<td>5.0</td>
<td>41</td>
<td>50.6</td>
</tr>
</tbody>
</table>

Most interviewees live in housing provided by work units, either their own or assigned to relatives (usually male: husband, father or brother-in-law). Increasing rents were mentioned as a problem for some. Many aspired to improve the housing condition, especially those with a big family (more than 3 members). But many can’t afford the cost of buying their own apartment; this remains very difficult for most. Few however had done so. One woman explained how until 1995, five adult family members lived in one room. In 1995 they bought housing, now they share 3 rooms, each 11 sq meters, between them. A minority even lives in makeshift housing. They live in self-built housing without a “housing license” for the reason “can’t afford to rent or buy, so we live in shabby simple housing where you don’t have to pay”.

### Water supply

The Wuhan statistic yearbook in 2000 contains a survey of living conditions in 500 households (1558 persons). From this we can analyze the differences between the infrastructure conditions of sample survey done by statistic bureau in Wuhan and the interviews done by author (See Figure 4.13). The item of water supply in questionnaire is classified into three categories, “Without access to tap water”, “Public use of tap water” and “Private use of tap water”. In the interviews, there are 4% households without access to water, which illustrate water supply is no longer a severe problem of
urban population. Those households with “Private use of tap water” are 57.2% and with “Public use of tap water” 38.8% are mainly happened. By comparison, the situation of water supply of urban poverty is quite consistence with the statistic 2000 in Wuhan.

Figure 4.13 Way of water supply comparison
Table 4.17 indicate access of tap water supply is not a so important indicator leading to urban poverty; those households with private use of tap water are also possible to be “urban poverty”.

Table 4.17 Way of water supply of the survey

<table>
<thead>
<tr>
<th>Way of water supply</th>
<th>Without access to tap water</th>
<th>Public use of tap water</th>
<th>Private use of tap water</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households</td>
<td>6</td>
<td>59</td>
<td>87</td>
<td>152</td>
</tr>
<tr>
<td>(Persons/%)</td>
<td>4.0</td>
<td>38.8</td>
<td>57.2</td>
<td>100</td>
</tr>
<tr>
<td>Urban poverty</td>
<td>6</td>
<td>54</td>
<td>21</td>
<td>81</td>
</tr>
<tr>
<td>(Persons/%)</td>
<td>7.5</td>
<td>66.6</td>
<td>25.9</td>
<td>100</td>
</tr>
</tbody>
</table>

Sanitary facility
From analysis in Table 4.18, there were only 2 interviewees’ living places without sanitary facilities. The rest use public sanitary facilities (22.4%), lavatory without bathroom (36.2%) and both lavatory and bathroom (40.1%). By comparison, the situation of sanitary facility of urban poverty is quite consistence with the statistic 2000 in Wuhan (See Figure 4.14).
Table 4.18 indicate that those identified as urban poverty has a main way of sanitary facility as “with lavatory but without bathroom”, and the way of sanitary facility not so directly correlated with urban poverty level. A person may be urban poverty although he or she has a relatively good sanitary facility, with both lavatory and bathroom.

Table 4.18 Way of sanitary facility of the survey

<table>
<thead>
<tr>
<th>Way of sanitary facility</th>
<th>Without sanitary facilities</th>
<th>Public sanitary facilities</th>
<th>With lavatory but without bathroom</th>
<th>With lavatory and bathroom</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total households (Persons/%)</td>
<td>2</td>
<td>1.3</td>
<td>34</td>
<td>22.4</td>
<td>55</td>
</tr>
<tr>
<td>Urban poverty (Persons/%)</td>
<td>2</td>
<td>2.5</td>
<td>29</td>
<td>35.8</td>
<td>40</td>
</tr>
</tbody>
</table>

4.2.4. Spatial distribution of urban poverty identified

Urban poverty of different area has special cluster characteristics spatially. After I identified the urban poverty of urban households surveyed, I can analysis urban poverty distributions by group of five residential committees (See Table 4.19, Figure 4.15).

Table 4.19 Urban poverty distributions in five residential committees

<table>
<thead>
<tr>
<th>Residential Committee</th>
<th>Urban poverty</th>
<th>Normal</th>
<th>Not poor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zhong_hua(Persons/%)</td>
<td>23</td>
<td>28.4</td>
<td>5</td>
<td>10.6</td>
</tr>
<tr>
<td>Yan_zhi (Persons/%)</td>
<td>13</td>
<td>16.0</td>
<td>12</td>
<td>25.5</td>
</tr>
<tr>
<td>Hua_ti (Persons/%)</td>
<td>11</td>
<td>13.6</td>
<td>14</td>
<td>29.8</td>
</tr>
<tr>
<td>Shui_lu (Persons/%)</td>
<td>16</td>
<td>19.8</td>
<td>9</td>
<td>19.2</td>
</tr>
<tr>
<td>Mei_hua (Persons/%)</td>
<td>18</td>
<td>22.2</td>
<td>7</td>
<td>14.9</td>
</tr>
<tr>
<td>Total</td>
<td>81</td>
<td>100.0</td>
<td>47</td>
<td>100</td>
</tr>
</tbody>
</table>

First, in household level, I try to identify the urban poverty spatially at the household level. I do not attribute any causal significance to spatial inequalities and only have a look at the different spatial urban poverty clusters. From analysis, we can find that most urban poverty is found in residential committees of Zhong_hua, Mei_hua and Shui_lu located respectively in Zhong_hua street, Bai_shazhou street, Zi_yang street.

Secondly, in geographic level, I assumed that urban poverty has a causal link to geography. I try to explore the relationship between urban poverty and geographical locations. For example, the residential area located near the industrial area where the laid-off workers or unemployed clustered will make difference of urban poverty distribution. Here I want to do some exploration of the relationship with industrial area and urban poverty.
Relationship of urban poverty and industrial area

From the Figure 4.15, we can see that all the residential committees selected are near industrial districts. Those have a relatively high urban poverty rate committees (Zhong_hua, Mei_hua and Shui_lu) are all near large-scale clustered industry districts where state-owned enterprises have a relatively low economic production and benefits. Many interviewees lived in the house supplied by original work unit are now being laid-off workers or unemployed from factories.

Zhong_hua residential committee in Zhong_hua street located near an industry-clustered district, with factories, such as Wuhan No. 4 rice processing factory, Wuhan No.3 machine tool factory, etc. Those factories are all state-owned enterprises of small or middle size. Mei_hua committee located in one of the most important and big industry district called Bai_shazhou, which was built up during the period from 1958-1963, and the main function of Bai_shazhou industrial district were building materials, machine building, etc. Shui_lu committee located in Zi_yang street located near an industry district with main function of boatyard. Because of the first 30 years’ large-scale investment, manufacturing industry still forms the main part of Wuhan economy. For historical reasons, the industrial projects are over-concentrated in Wuhan, especially heavy industry had been emphasized for a long time.

Since the late 1970s, China has carried out a transformation from a planned to a market economy with a series of reforms. One key element of the economic reforms is to allow private-, individual-, and foreign-owned enterprises to compete with state-owned enterprises (SOEs). Because they could all contribute in various ways to economic production, to the standard of living and to employment. Since 1990s’ urban reforms, the situation has changed. Products of State-owned enterprises were allocated and distributed by the government mostly before the reform. The enterprises must assume sole re-
sponsibility for profits or losses. The share of industrial gross output value by SOEs declined from more than 80% in 1980 to about 25% in 2000. In Wuhan, the speed of state-ownership development is comparatively stable. After economic reform the small-size state-owned factory could not compete with large-scale state-owned enterprises, and the some of SOEs could not compete with other sector owned enterprises, because of their old equipment, high production cost and single-product variety.

The development of non-state sector greatly augments economic growth, but it also poses fierce competitions to SOEs, which have been plagued with heavy burdens of welfare provisions. In 1996, the government launched an enterprise- restructuring plan to reduce heavy burden of welfare provision such as healthcare and housing from enterprises to social insurance agencies and individuals. These reforms have reduced workers’ lifetime welfare ties to their employers. These dramatic changes in entitlements of welfare may have made some disadvantaged groups or individuals, such as the laid-off and unemployed more vulnerable to sudden shocks such as illness, housing. Explosive urban poverty increased has become the most challenging issue in current China.

4.3. Summary

This chapter described the interview survey and used the survey data to apply in proposed method for urban poverty measurement. After obtaining an urban poverty score of each household, urban poverty can be identified through aggregating interviews by different range of score value by four groups: very poor, poor, normal and not poor. Social-economic characteristics of urban poverty identified were explored and compared with total sample, Wuhan Statistic Yearbook and Census. Finally, spatial distribution of urban poverty in five study areas and possible explanations were discussed. From analysis of urban poverty, we can see half of the sample interviewees are identified as “urban poverty”.

In this study an attempt is made to measure urban poverty, focusing on the current situation in Wuhan municipal. The proposed method has its advantages comparing with the official poverty measurement in current China—a national poverty line. The strong points are distinctive; one is that the alternative measurement proposed can include more overall scope of poor people; another is that it can distinguish the different needs and ranking of these needs of poor people except income. However, the efficiency and effectiveness expected cannot be achieved unless some limitations and problems are resolved. The problems include the quality and accessibility of data, and data collection and updating are also costly. If these problems can be resolved properly, the proposed method is an alternative one for policy-maker. Otherwise, we had better stick to the income-based poverty line measurement.
5. Discussion and Conclusion

In this research, effort has been put on developing an alternative method for urban poverty measurement. Research questions have been set in Chapter 1 to achieve this major objective. The results for a sample survey conducted in Wuhan were used to apply the method and identify and describe urban poverty in Wuhan.

In the first part of this last chapter, we summarize and conclude upon the results of the application of the alternative poverty measurement method and in the in the second part of this chapter, some of the experiences findings and problems encountered in this research with developing an alternative method for poverty measurement are discussed.

5.1. Results and conclusions about urban poverty in Wuhan

Summing up findings reported above, some conclusions about urban poverty in Wuhan could be drawn as follows: From analysis of urban poverty, we can see half of the sample interviewees are identified as “urban poverty”.

- Application of the survey data in the proposed method for urban poverty measurement, we can find that half of the sample interviewees are identified as “urban poverty”, which is a very severe situation. Comparing with the poverty line measurement adopted by local government, the percentage is higher than urban poverty identified by poverty line (220 RMB per month). That is, about 5%-7% people is excluded from the group of “urban poverty” using the official poverty line measurement, which means that part of the people are ignored social groups. They are not eligible or have no access of applying for social welfare (e.g. MLA) according the standard issued by local government poverty line. They have no way of getting subsidy or any help when suffering both living difficulties and mental pressures.

- Urban poverty consists mainly of young people; interviewees identified as urban poverty are mostly among 40-49 years old, among which male occupied more than female. 44.4% hold an occupation in industry which means they are mostly industry workers. Although the effectiveness of the HUKOU system has been declined since 1980, people with non-urban HUKOU still occupy a relatively small proportion of urban residents. The percentage of those holding an urban HUKOU is higher than that of non-urban HUKOU. This proves the emergence of urban poverty increasing in urban areas especially in recent China.

- Urban poverty mostly (90%) has a monthly income below the poverty line in Wuhan (220 RMB per month). There are no households identified as urban poverty owning an income over the mean level of Wuhan (560 RMB per month). This illustrate that the income has a high correlation with urban poverty level. Engel’s Coefficient (the ratio of food expenditure to total living expenditure) of urban poverty is not so high as imagine. Comparing with the poorest 10% surveyed by Wuhan Statistic Yearbook 2000, we can see the living standard had relatively improved in recent years. Durable products holding by the urban poverty are mostly seven categories: bicycle, washing machine, refrigerator, TV, recorder, gas cooker and telephone, among which bicycle and TV are still the main durable assets of urban poverty.
38.3% of urban poverty is found among laid-off workers and 18.5% of unemployed. This can be explained that being laid-off and unemployed without income resource is an important reason leading to urban poverty. We can see that 68% of urban poverty had at least secondary school education. In other words, most interviewees are well educated and regarded as easy to find a job in the city. But actually the fact is contrary. The majority of urban poverty refers to lack of access to health care and high medical fees as a serious problem coinciding with increased pressure. Some said the cost of hospital is so expensive that they have to take medicine as soon when they got ill. Especially for those laid-off and unemployed, subsidies of health care provided by the original work unit are now reduced or non-existent. Health insurance reforms are in the pipeline for cost sharing between individual and employer. Many interviews surveyed live at an insufficient life standard; they expressed a strong need for social benefits or subsidy. But few of them received the various social benefits mentioned in questionnaire. More than two third of urban poverty received nothing.

Three members is the most (50.6%) common household composition of urban poverty, which will contribute to the national Bearing Scheme Policy executed from 1978. Housing condition measured by the usable area per capita is not so good among urban poverty, most of them (61.7%) used 9-16 sq meters per person. And the infrastructure condition is bad as well. Only 25.9% urban poverty use private tap water and 12.3% use private lavatory and bathroom. More than half of urban poverty still uses public tap water and bathroom.

As far as the spatial distribution of the urban poverty is concerned we can conclude that most urban poverty is found in residential committees of Zhong_hua, Mei_hua and Shui_lu which located respectively in Zhong_hua street, Bai_shazhou street, Zi_yang street, which can be explained mainly by these committee’s location near large-scale clustered industry districts where state-owned enterprises have a relatively low economic production and benefits. Many interviewees lived in the house supplied by original work unit are now being laid-off workers or unemployed from factories.

So from the above results, we can conclude that most of urban residents identified as “urban poverty” lived in a very hard life. They are suffering multi-dimensional deprivation, such as income, employment, housing, infrastructure, etc.

### 5.2. Results and conclusions about urban poverty measurement in Wuhan

The sub questions dealing with the specific objective of developing an alternative method for urban poverty measurement could be classified into four categories:

- How to select criteria and indicators to measure urban poverty?
- How to identify weights for each criterion?
- How to calculate urban poverty score?
- How to classify urban poverty level?

In the following sections, four aspects corresponding to the questions are discussed based on the results of this study: Selection of criteria and indicators; weights identification; urban poverty score calculation; and urban poverty level classification. Finally a comparison will be made with other poverty measurement methods, which were introduced in chapter 2.
Selection of criteria and indicators: why 9 criteria and 15 indicators

By universal review on poverty definitions and measurement developed till now in the world, and reference to the variables used and available in the Wuhan statistic yearbook and the Census, I made a selection of criteria and indicators for urban poverty measurement in Wuhan. Because the multi-dimensional definition of poverty it is difficult to encompass all indicators for measuring poverty in one method. Besides, data collection and availability of some of indicators are impracticable by one single survey, such as vulnerability criteria.

The study has explored one possibility of measuring urban poverty. 9 criteria and 15 indicators are adopted here to attempt to measure urban poverty. The challenge in this respect is to express the meaning of poverty as good as possible by a limited and manageable number of variables.

Weights identification: why no weight set for policy/decision-maker

In the method proposed, it is necessary to assign appropriate weights to different criteria for purpose of comparisons across households or individuals. Because the interests and objectives of poverty-focused stakeholders are different, they have different views on criteria ranking when measuring urban poverty. This will have influence on the weights for each criterion.

Before weights were set for criteria proposed, stakeholder analysis of poverty-focused groups were done to get a ranking order of 9 criteria. Questionnaire and short interviews were used during the fieldwork. Questionnaires and interviews were done to collect idea of primary stakeholder of urban residents, and short interviews were done to collect idea of secondary stakeholder of policy/decision maker. In this research, secondary stakeholder was selected as social security bureau, labour bureau of local government and re-employment centre in Wuhan relative to urban poverty alleviation program (the Minimum Living Allowance Scheme and re-employment training and profession introductions).

Because urban poverty is still a sensitive problem in China, during the fieldwork, many local government officials are unwilling to accept interviews; they appear to have an indifferent attitude to the problem of urban poverty. I could have only a short-talk interview with some of them. Even during the short interviews, I couldn’t get positive answer to some key questions. The most mentioned and dwelt upon the official poverty line and official statistic figures of poverty under the line in Wuhan. It was quite difficult to get a useful and representative ranking order of criteria proposed.

For the reasons mentioned above, the research here only takes consideration of survey statistics of urban residents in Wuhan. According to the ranking order of criteria aggregated from survey, weights could be set by different methods. Weights obtained by direct ranking method or using methods like AHP are determined after getting an ordinal ranking of criteria. These two methods are widely used to set weights when using ordinal number for indicator scoring.

Urban poverty score calculation and urban poverty level classification

After weights are set by ranking method and AHP method, an aggregated urban poverty score can be calculated for each household surveyed. After urban poverty scores have been calculated, different urban poverty levels can be classified. Single score has been classified in ranks to identify natural clusters. To do so, frequency distribution of the score values are analysed with the use of software SPSS. Urban poverty levels can be established according to the natural boundaries of the visible clustering of score’s frequency distribution. We can analyze score values by using mathematical method to see the percentage of sample numbers which is within the range of Mean ± 3 * Std. Dev (standard deviation). Here use Mean ± Std. Dev to get a good classification of urban poverty level.
Method evaluation and limitation

The proposed method has its advantages comparing with the official poverty measurement in current China—a national poverty line measure. It proposed a comprehensive urban poverty measurement and considers multi-dimensions of deprivation, not only one dimension of income level. Here in the proposed method, income is accounted as one of the various criteria holding some certain weight to measure urban poverty. The purpose is to balance the influence of income to total urban poverty level. The strong points are distinctive: one is that the alternative measurement proposed can include more overall scope of poor people; another is that it can distinguish the different needs and ranking of these needs of poor people except income. Particularly when income does not show a strong correlation with other aspects of poverty; the alternative multi-dimensional method for poverty measurement would gain more relevance.

In chapter 2 some selected methods for poverty measurement were introduced and discussed. In chapter 3 an alternative method is proposed, which is applied in chapter 4. The following table 5.1 gives a comparison of the various poverty measurements.

<table>
<thead>
<tr>
<th>Poverty measurement</th>
<th>Strong points</th>
<th>Weak Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>The HPI index (UNDP)</td>
<td>1. The HPI can help summarize the extent of poverty along several dimensions 2. Identify or rank districts or countries of human poverty 3. Useful for a composite measure of development.</td>
<td>1. HPI can’t measure many other aspects of human poverty identified by UNDP 2. Different scale of indicators in HPI had better be used between developed and developing countries</td>
</tr>
<tr>
<td>Measurements adopted by The World Bank</td>
<td>1. Include an overall measurement of poverty in various deprivations: income; health and education; vulnerability and exposure to risk; and voicelessness and powerlessness.</td>
<td>1. Measure poverty by separated aspects of deprivation</td>
</tr>
<tr>
<td>The poverty line measurement</td>
<td>1. Identify income poverty excellently 2. A simple and effective way for measuring poverty</td>
<td>1. Ignore other ways of deprivation of people except income 2. May exclude a lot of urban households or individuals who relatively poor and who need help in other deprivation of living</td>
</tr>
<tr>
<td>Proposed alternative measurement</td>
<td>1. Develop a comprehensive way for measuring urban poverty 2. Compare different aspects of deprivation 3. Identify those really need help in other aspects of deprivation except income deprivation 4. Provides a basis to target poverty alleviation on specific aspects</td>
<td>1. Data collection is difficult and costly, requires cooperation and sensibilization of policy-and decision makers 2. The result doesn’t make great difference from the poverty line measurement</td>
</tr>
</tbody>
</table>
Research limitations

In this study an attempt was made to measure urban poverty in an alternative way, focusing on the current situation in Wuhan municipal. However, the efficiency and effectiveness expected cannot be achieved unless some limitations and problems are resolved. The problems encountered included the quality and accessibility of data. Besides the data collection and updating are costly. Besides the data limitation, the alternative measurement itself has some limitations. According to different stakeholders, the focus and weights are variable, which directly affects the priorities in poverty alleviation programs. For example, it is difficult to say which one is prior to the other between housing and infrastructure by stakeholder of different focus. And the difference makes result different for policy-maker to determine financial fund or investment.

Given the problems mentioned above, it is suggested to stick to the income-based poverty line measurement for urban poverty as used presently by the government. If those problems can be resolved, e.g. through launching a superior database of urban households or individuals including multi-dimensional information for urban poverty statistic and management, the proposed method is an alternative one for policy-maker or as a tool for advocacy.

Urban poverty measurement is primarily an up-front activity. Its fundamental purpose is to identify those households or individuals in poverty and at-risk into urban poverty and to measure the level of urban poverty of potential households or individuals before they receive financial fund service or social benefit schemes. The conclusion got above is also an implication for policy/decision-maker to pay more attention to those people in difficulties, and make relative anti-poverty programs or projects for urban poor groups.

5.3. Recommendations

(1) Recommendation to urban poverty alleviation in Wuhan

From survey data analysis, we can find poverty in Wuhan is very severe; more than half of the interviewees were identified as poor. Suggestions for poverty alleviation were given below according to the findings of the study:

➢ To update and improve the poverty line of lowest living insurance to cover more people living in multi-dimensional deprivation or insufficient;
➢ To supply more reemployment opportunities and skill training for the unemployed and laid-off;
➢ To encourage and give preferential policies to those self-employed;
➢ To reduce and give priority to the unemployed and laid-off of their health care and kid’s schooling;
➢ To increase social benefits (e.g. MLA, unemployment insurance) for those below the poverty line who need help anxiously;
➢ To improve housing condition and infrastructure service of the unemployed and laid-off.
(2) Recommendation to urban poverty measurement

The method developed by this research can provide an overall measure for urban poverty on various deprivations and help decision-maker to scheme corresponding programs or projects on poverty alleviation.

- To build up urban household database at committee or district level for the purpose of statistic, measuring and urban poverty management;
- To add or subtract criteria identified by proposed method for targeting specific groups of population by different stakeholders analysis;
- To establish of adequate and continuous data collection system for survey to make comparison convenient and credible;
- To interview adequate stakeholders for weights setting by different focus.

(3) Recommendation to further study

- To apply statistic analysis with adequate samples and test the correlation between various criteria;
- To map urban poverty spatially by integrating survey data with adequate Census data using GIS. Especially in spatial analysis, GIS can make great help in locating urban poverty distribution, making comparison and optimizing regions by different stakeholder analysis;
- GIS can also be used to integrate several data sets and manage database effectively for different purpose of policy-making.
Reference


Appendix 1: Some definitions

**HUKOU:** the household registration system in China. It established a uniform household registration system by which every one had to be registered. For those living in cities and in towns with a public security station, each household was issued a household registration booklet, whereas in rural areas, only a collective registration booklet was issued to each co-operative. The household registration booklet and the content recorded on it.

**State-Owned Economic Units/enterprises**
Refer to various enterprises, institutions and government administrative organizations at various levels, social organizations and etc. with state ownership of production means.

**Collective-Owned Economic Units/enterprises**
Refer to various enterprises and institutions with collective ownership of production means, including various rural economic organizations engaged in farming, forestry, animal husbandry and fishery, enterprises and institutions run by townships and villages, collective enterprises and institutions run by cities, counties, towns and subdistrict offices.

**Immigrants**
Refers those from migrants had been resident in the current locality for at least six months or more.
(The definition of migrants in Chinese statistics)

**Laid-off employees**
Refers to ex-regular employees of the state and urban collective sector who are no longer in paid work but still formally attached to their employment units, hence they are not counted as unemployed. Most of them receive a “living allowance” (less than the local minimum wages) and may also enjoy some of the benefits in kind provided to employees such as housing and subsidized health care. The category of “laid-off employees” is throwback to the social welfare role of employment unit that dates back to the planning period but is being phased out. At the end of 2000, there were 8.6 million “laid-off employees”; around 44.5 per cent more numerous than the 5.95 million “registered unemployed”.

**Registered unemployed**
By the ILO definition a person is unemployed if not engaged in paid work for more than one hour per week and actively searching for a job. The “registered unemployed” includes those who are in part-time or occasionally full-time informal employment.

**Disposable Income of Urban Households**
Refers to the actual income of the sample households that can be used for daily expenses, i.e., total income minus personal income tax, sample household subsidy and expenditure on household sideline production.

**Residents’ committee/district committee**
These are part of the same structure, the resident’s committee being neighborhood based and the district committee (or street office) corresponding to a larger urban area. Colloquially, these terms are sometimes used interchangeably.
Appendix 2: Indicators adopted by the World Bank

Indicators of health

Public expenditure on health consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds.

Access to improved water source refers to the percentage of the population with reasonable access to an adequate amount of water (including treated surface water and untreated but uncontaminated water, such as from springs, sanitary wells, and protected boreholes). In urban areas the source may be a public fountain or standpipe located not more than 200 meters from the residence.

Access to sanitation is the percentage of the population with disposal facilities that can effectively prevent human, animal, and insect contact with excreta. Suitable facilities range from simple but protected pit latrines to flush toilets with sewerage. To be effective, all facilities must be correctly constructed and properly maintained.

Infant mortality rate is the number of infants who die before reaching 1 year of age, expressed per 1,000 live births in a given year.

Contraceptive prevalence rate is the percentage of women who are practicing, or whose sexual partners are practicing, any form of contraception. It is usually measured for married women aged 15–49 only. Contraceptive prevalence includes all methods: ineffective traditional methods as well as highly effective modern methods. Unmarried women are often excluded from the surveys, and this may bias the estimate. The rates are obtained mainly from demographic and health surveys and contraceptive prevalence surveys.

Total fertility rate is the number of children who would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.

Maternal mortality ratio is the number of women who die during pregnancy or childbirth, per 100,000 live births. Household surveys such as the demographic and health surveys attempt to measure maternal mortality by asking respondents about survivorship of sisters.

Indicators of education

Public expenditure on education is the percentage of GNP accounted for by public spending on public education plus subsidies to private education at the primary, secondary, and tertiary levels. It may exclude spending on religious schools, which play a significant role in many developing countries.

Net enrollment ratio is the ratio of the number of children of official school age (as defined by the education system) who are enrolled in school to the population of the corresponding official school age. Enrollment data are based on annual enrollment surveys, typically conducted at the beginning of the school year.

Percentage of cohort reaching grade 5 is the share of students enrolled in the first grade of primary school who eventually reach fifth grade. Because tracking data for individual students are not available, aggregate student flows from one grade to the next are estimated using data on enrollment and repetition by grade for two consecutive years.

Expected years of schooling are the average years of formal schooling that a child is expected to receive, including university education and years spent in repetition. This indicator may also be inter-
interpreted as an indicator of the total education resources, measured in school years, that a child will require over the course of his or her “lifetime” in school.

**Indicators of vulnerability**

**Physical assets.** A household’s physical assets—those that can be sold to compensate for temporary loss of income—are a measure of its capacity to self-insure. What matters is not just the total value of the assets, but also their liquidity. Thus knowledge of the functioning of asset markets is needed to determine the usefulness of the assets as insurance.

**Human capital.** Households with limited education tend to be more subject to income fluctuations and less able to manage risk—for example, through access to credit or multiple income sources.

**Income diversification.** The extent of diversification of income sources has often been used to assess vulnerability. Diversification needs to be evaluated in the context of the household’s overall risk strategy.

**Links to networks.** Family-based networks, occupation-based groups of mutual help, rotating savings and credit groups, and other groups or associations to which a household belongs—all part of the household’s social capital—can be a source of transfers in cash or kind in the event of a calamity. An assessment of vulnerability should be based not only on the observed transfers but also on the household’s expectation about the assistance it will receive in a crisis.

**Participation in the formal safety net.** A household’s vulnerability is reduced if it is entitled to social assistance, unemployment insurance, pensions, and other publicly provided transfers—and if it can benefit from workfare programs, social funds, and similar mechanisms. So information on such programs and their rules of eligibility is also important in assessing vulnerability and risk exposure.

**Access to credit markets.** Similarly, a household’s vulnerability is reduced if it has access to credit for consumption smoothing.
### Appendix 3: Indicators used by Rowntree Foundation

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Tends over time</th>
<th>Approximate numbers affected in latest year</th>
<th>Variance across groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Gap between low and median income</td>
<td>Steady</td>
<td>Steady</td>
<td>N/A</td>
</tr>
<tr>
<td>2. Individuals with low income (below 60% of median income)</td>
<td>Steady</td>
<td>Steady</td>
<td>Improved</td>
</tr>
<tr>
<td>3. Intensity of poverty (below 30% of median income)</td>
<td>Steady</td>
<td>Improved</td>
<td>8 million</td>
</tr>
<tr>
<td>4. In receipt of means-tested benefits at any time</td>
<td>Steady</td>
<td>Improved</td>
<td>4 million</td>
</tr>
<tr>
<td>5. Long-term unemployment (at any time)</td>
<td>Steady</td>
<td>Improved</td>
<td>2 million</td>
</tr>
<tr>
<td>6. Period of low income (at least two years in three or more income periods)</td>
<td>Steady</td>
<td>Improved</td>
<td>10 million</td>
</tr>
<tr>
<td>7. The location of low income</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td><strong>Children</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Living in poverty households being lived in by children (at least two children)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>9. Incidence of poverty among children</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>10. Living in poverty households being lived in by children (at least two children)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>11. Incidence of poverty among children</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>12. Living in poverty households being lived in by children (at least two children)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>13. Living in poverty households being lived in by children (at least two children)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>14. Living in poverty households being lived in by children (at least two children)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>15. Living in poverty households being lived in by children (at least two children)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>16. Living in poverty households being lived in by children (at least two children)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td><strong>Youth and adults</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Unemployed (16 to 24)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>18. Incidence of poverty among adults (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>19. Participation in education, training or work (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>20. Problem drinking (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>21. Suicide (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>22. Mental health (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>23. Substance abuse (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>24. Disability (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>25. Poverty in retirement (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>26. Poverty in retirement (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>27. Poverty in retirement (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>28. Poverty in retirement (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>29. Poverty in retirement (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>30. Poverty in retirement (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>31. Poverty in retirement (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>32. Poverty in retirement (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>33. Poverty in retirement (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>34. Poverty in retirement (at least two years in poverty)</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>Indicator</td>
<td>Over the median score</td>
<td>Over the year of availability</td>
<td>Approximate number affected</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------</td>
<td>-----------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>30: Being after the social security</td>
<td>Wasserst</td>
<td>Improved</td>
<td>25,000-50,000 each year</td>
</tr>
<tr>
<td>35: Living long-standing illness or disability</td>
<td>Steady</td>
<td>Steady</td>
<td>4 millions</td>
</tr>
<tr>
<td>37: Coping with the cost of living</td>
<td>Steady</td>
<td>Steady</td>
<td>5 millions</td>
</tr>
<tr>
<td>38: Help from other seniors in house (%)</td>
<td>Wasserst</td>
<td>Wasserst</td>
<td>N/A</td>
</tr>
<tr>
<td>39: Without a telephone</td>
<td>Improved</td>
<td>Steady</td>
<td>200,000</td>
</tr>
<tr>
<td>Community participation in civic organizations</td>
<td>Steady</td>
<td>Wasserst</td>
<td>10 million</td>
</tr>
<tr>
<td>41: Education (%)</td>
<td>Steady</td>
<td>Steady</td>
<td>N/A</td>
</tr>
<tr>
<td>42: Spending on travel</td>
<td>Improved</td>
<td>Improved</td>
<td>N/A</td>
</tr>
<tr>
<td>43: Without a bank or building society account</td>
<td>Steady</td>
<td>Wasserst</td>
<td>N/A</td>
</tr>
<tr>
<td>44: Unemployment</td>
<td>Improved</td>
<td>Improved</td>
<td>1 million</td>
</tr>
<tr>
<td>45: Without household insurance</td>
<td>Improved</td>
<td>Steady</td>
<td>N/A</td>
</tr>
<tr>
<td>46: Disaffection with local area (%)</td>
<td>Steady</td>
<td>Improved</td>
<td>N/A</td>
</tr>
<tr>
<td>47: Without central heating</td>
<td>Improved</td>
<td>Improved</td>
<td>N/A</td>
</tr>
<tr>
<td>48: Overcrowding</td>
<td>Improved</td>
<td>Wasserst</td>
<td>500,000 households</td>
</tr>
<tr>
<td>49: Household temporary accommodation</td>
<td>Wasserst</td>
<td>Wasserst</td>
<td>500,000</td>
</tr>
<tr>
<td>50: Mortgage arrears</td>
<td>Improved</td>
<td>Steady</td>
<td>200,000</td>
</tr>
</tbody>
</table>
Appendix 4: Questionnaire

Dear Sir/Madam:

Thank you very much for your attending this questionnaire investigation.

This questionnaire investigation is part of a research. The objective of this questionnaire investigation is to have a look at living standard of urban residents and their view and perception of urban poverty. This help to know what people need for living and other aspects in Wuhan. The result of this survey will be used in a Master thesis in urban planning and land administration of ITC in the Netherlands.

Your co-operation would be warmly appreciated.

Thank you again.

Street Committee________________

Date_______________
### General situation

1. Gender
   - Male ☐
   - Female ☐

2. Age
   - Under 15 ☐
   - 15-39 years ☐
   - 40-49 years ☐
   - 50-59 years ☐
   - above 60 years ☐

3. Household numbers (unit: person)
   - 1 ☐
   - 2 ☐
   - 3 ☐
   - 4 and above ☐

4. Education level
   - Illiterate ☐
   - Primary school ☐
   - Junior secondary school ☐
   - Senior secondary school ☐
   - College and above ☐

5. Occupation
   - Industry and Service ☐
   - Construction ☐
   - Transportation ☐
   - Repast ☐
   - Commerce and retail ☐
   - Household help ☐
   - Other ☐

6. HUKOU
   - Urban ☐
   - Non-urban ☐

### Employment and Income

7. Your employment status
   - Full-time workers / staff ☐
   - Part-time informal employment ☐
   - Self-employed ☐
   - Laid-off workers ☐
   - Unemployed ☐
   - Retired ☐
   - Other ☐

8. Average monthly income (RMB/ per person)
   - Under 220 ☐
   - 220-560 ☐
   - 560 and above ☐

9. Living expenditure ______________ (per household per year RMB)
   - Food ______________
   - Housing ______________

### Housing Condition

10. Your house type is
    - Rented housing ☐
    - Individual owned housing ☐
    - Borrowed from relatives ☐
    - Free housing allocated by units ☐
    - Squatter huts ☐
    - Others ☐

11. Your house area (usable floor area sq m/person)
    - <8 ☐
    - 9-16 ☐
    - 17-30 ☐
    - 30-50 ☐
    - > 50 ☐

12. Infrastructure service condition
    - Type of tap water:
      - Without access to tap water ☐
      - Public use of tap water ☐
      - Monopoly use of tap water ☐
    - Type of sanitary service:
      - Without sanitary facility ☐
      - Public sanitary facility ☐
      - With lavatory but without bathroom ☐
      - With bathroom and lavatory ☐
13. Holding of durable products
   Sectional furniture □  bicycle □  washing machine □  refrigerator □  
   TV □  VCD or DVD □  recorder □  computer □  music center □  
   camera □  air-condition □  gas cooker □  water heater □  dust cleaner □  

Living level situation

14. Which level do you think your household is in:
   Very poor □  Poor □  Normal □  Not poor □  
   
   If you choose “very poor” or “poor”, which social benefits you have received:
   The Lowest Living Allowance (MLA) □  Unemployment insurance □  
   Health care □  Housing subsidy □  Pension □  Other □  Nothing □  

15. Do you have no access or in difficulty to health care?  Yes □  No □  

16. Please ranking item below by importance of your view to measure “poor”:
   Income □  Expenditure □  Durable assets □  Education level □  
   Housing condition □  Welfare receipt □  Employment status □  
   Infrastructure condition □  Health care condition  

17. Your requests or suggestions to local government:  
   ___________________________________________ 
   ___________________________________________  

Thanks very much for participating in this survey!