Overview of Measurements of Poverty: Case of Asian Countries

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Although many countries have achieved strong economic growth by now, poverty is still found in the world. Many scholars previously have been trying to measure poverty. However, there seems to be some confusion occurred regardless of its importance, due to diversified measures of poverty. Nevertheless, as defined as one of the major international development goals, alleviating poverty is one of the top priority issues in the field of development since the severe situation of poverty sometimes does not allow people to have minimum standard of living.

At the same time, as poverty reduction is defined as a goal, whether or not the goal is achieved has to be observed consistently. In order to do that, the situation of poverty has to be grasped as accurate as possible. It is a difficult task to comprehend the living conditions fully since not only this task involves multidimensional factors but also it is related to the value of life which is somewhat subjective. So far many approaches have been introduced to contribute to this task. In this paper, the focus is given to mainly those approaches introduced in the field of development economics.

International measurements

Poverty situation differs by country and even by area within the same country, such as in urban and rural areas. Therefore, it is required to understand individual living conditions in small units as by region or by country. However, as poverty reduction is one of the international development goals, the goal has to be internationally compatible. From this point of view, poverty can be defined as $ 1 or $ 2 a day per person. This measurement brings up some issues. $ 1 can be the level of either consumption or income per person. Income cannot express either the capacity of expenses or the situation of daily intake. Also, when a country of target does not use dollar for major transactions, the level of exchange rate applied would affect the level of poverty. The dollar base poverty line was adjusted based on the 1993 level from the 1985 level in accordance with the revision of the PPP (Purchasing Power Parity) measures by the

World Bank. Then, it was adjusted to $ 1.25 a day based on the 2005 level in 2008, which is the average of the poverty lines in the poorest 15 countries based on the expenditure per capita. It is indicated that this level was formulated in order to represent the extreme poverty. However, this international poverty line does not state the poverty situation in each country and should be utilized solely for the international comparison. The consumer's basket of $ 1 in the United States is apparently not the same in other countries. Also, the availability of goods in poor regions might differ from that in other regions. In any matter, in relation to the millennium development goals, these international poverty lines can be utilized for seeking the rate of achievements of goals.

Table 1 demonstrates poverty rates by region according to the international poverty line.

Table 1 Poverty Headcount Ratios

%

	1.25 USD a day	2005 PPP		2 USD a day	2005 PPP		2 USD a day	1993 PPP	
Year	1993	1999	2005	1993	1999	2005	1993	1999	2004
East Asia&Pacific	50.80	35.50	16.80	75.80	61.80	38.60	65.04	49.34	36.58
East Europe&Central Asia	4.40	5.30	3.80	10.80	14.90	9.20	16.53	18.57	9.79
Latin America&Caribbean	10.10	10.90	8.20	20.70	21.80	17.10	24.09	25.31	22.17
Middle East&North Africa	4.10	4.20	3.60	19.80	18.90	16.90	21.41	23.62	19.70
South Asia	46.90	44.10	40.30	79.70	77.20	73.90	82.22	80.41	77.12
Sub Saharan Africa	56.90	58.40	50.90	75.90	77.60	72.90	76.09	75.85	71.97

Source: World Development Indicators, 2007, 2009.

According to this table, it is clear that in East Asia & Pacific poverty headcount ratios based on $1 a day dropped largely and between 1993 and 2005 the ratio dropped to almost one third. On the other hand, other regions such as South Asia and Sub Saharan Africa, ratios did not change much over time. In Latin America & Caribbean, Middle East & North Africa, and East Europe & Central Asia also, the ratios changed only a bit but the level is not so high. Poverty headcount ratios based on $ 2 a day with the PPP of the year 2005, dropped in East Asia & Pacific quite a lot but not as drastic as the change in the rate based on $ 1 a day. In other regions, this ratio did not seem to change much. As a reference, figures based on $ 2 a day with the PPP of the year 1993 are demonstrated as well. The big difference in the figure in 1993 is found in East Europe & Central Asia other than East Asia & Pacific but the direction differs. In East Asia & Pacific, the poverty headcount ratio based on $ 2 a day is higher for the revised version

but in East Europe & Central Asia, the opposite is true. PPP using the 1993 level might have had more capacity to buy things if exchange rates are not very influential. This is true for all other regions expect for East Asia & Pacific.

Similarly, as one of the standard international poverty indices, the poverty gap index is also commonly used. Whereas poverty headcount ratios express the incidence of poverty by the number of people who are considered as poor, poverty gap indices emphasize the gap between those who are not poor and who are poor. Larger poverty gap indices mean that the degree of poverty is more severe. This index is constructed from the sum of the distance between the poverty line and consumption or income per capita of a household for those who are considered as poor.

$$G = \frac{1}{N}\sum_{i=1}^{H}\left(\frac{PL - Y_i}{PL}\right)$$

Table 2 shows the poverty gap indices of some countries in the South African region as examples. In Mozambique and Madagascar, both indices based on $1.25 a day and $ 2 a day dropped over time. On the other hand, Tanzania and Zambia show that both indices have gone up. In Tanzania, especially, the consumption levels of the poor are considered to be much lower than the poverty line in recent years and it can be stated that the degree of poverty became more severe over the given period of time. Even though the level of poverty given by the poverty headcount ratios did not change much for the same period in Sub Saharan Africa, the severity of poverty differs by country.

Table 2 Poverty Gap Indices

	1.25 USD a day		2 USD a day	
Year	1996-97	2002-03	1996-97	2002-03
Mozambique	42	35.4	59.4	53.5
Year	1991-92	2000-01	1991-92	2000-01
Tanzania	29.7	46.8	50.10	64.40
Year	2001	2005	2001	2005
Madagascar	41.4	26.5	57.2	46.9
Year	2002-03	2004-05	2002-03	2004-05
Zambia	27.1	32.8	45.8	48.3

Source: World Development Indicators, 2009.

Another commonly used poverty index would be the Squared poverty gap index. This is the sum of squared distance between the poverty line and consumption per capita of the poor, divided by total population. In this index, as the people with longer distances receive larger weights, people with severe situations are put more importance.

National Measurements

In the previous section, international measurements of poverty were reviewed. These measurements are meaningful in order to observe the level of achievement compared to international goals or the average level in the world or in the same region. However, it is hard to think that these measurements also express real situations of the poor. Therefore, apart from international measurements, national standards are set to grasp the situation of the poor more accurately. Food poverty line is one of those measurements. This was created from the consumer's basket, which enables an adult to intake necessary calories per day. More precisely, the requirement of consumption for an adult male and female and for an adult and a child would be different. Therefore, some adjustments should be made for the mixed groups. There is another national poverty line which is the sum of food poverty line and expenditures for other necessities. Those who are categorized as poor based on this poverty line estimate may not be as poor as those under the food poverty line. Yet, they do not have other necessities and are considered as poor. Nevertheless, homeless people and street children, who are suffering from quite difficult living conditions every day, tend to be left out from these calculations. Additional assessment for these people might be necessary to understand poverty fully.

Concerning national poverty lines, there are some challenges in terms of comparison. Even within the same country, there will be price differences. The availability of goods might also differ by region and consequently the poverty line would differ by region. For example, in Vietnam, an adult male is a base, who consumes 2100 kcal a day and the amount of expenses for sufficient food of 2100 kcal is the food poverty line. Poverty lines vary by the contents of consumer's baskets. In Vietnam, food poverty lines are set based on from 15 to 20 kg of rice in rural areas and 25 kg of rice in urban areas. These are smaller figures than those poverty lines, which include food other than rice. Then, the poverty line, which includes non-food items, was calculated in a way that the food poverty line becomes 70% of the entire expense.

Overall, there are various poverty measurements that are frequently used in order to understand the situation of poverty. Then, which measurement would be appropriate?

How much is the difference when different measurements are applied?

Shinkai (2006) compares poverty headcount ratios based on different national poverty lines and the international poverty line. The poverty headcount ratio based on the national poverty line in urban areas is 27.56%, 87.21% based on the international poverty line ($1 a day, average market exchange rate is used), and 17. 53% based on the international poverty line ($1 a day, PPP in the year 2000 is used). Poverty headcount ratios based on the international poverty (PPP applied) line and that based on the national poverty line are closer but not very close either. When regional poverty headcount ratios are examined, the poverty headcount ratio in urban areas based on the international poverty line is 22. 61%, which is higher than that in rural areas 16.02%. When the national poverty line is applied, the poverty headcount ratio is 33.98% in rural areas, whereas in urban areas, the ratio is 6.91%, which is one fifth of the level in rural areas. When regional poverty lines set by the national government are applied, in total, the poverty headcount ratio is 5. 56%, while 6.91% in urban areas and 5.33% in rural areas. This finding of higher poverty rate in urban areas is the same as in the case with the poverty line based on PPP. This may be caused by the fact that there are more households in rural areas, whose consumption level is higher than the regional poverty line or the international poverty line based on PPP but lower than the regional poverty line in urban areas. In sum, since the level of poverty differs by poverty lines applied, a comparison of situations of poverty based on different poverty lines is quite important in order to understand the situations of poverty.

So far, various poverty measurements were examined but these are all objective measurements. From the Vietnamese survey in 2001/2002, it is possible to observe subjective measures of the degree of poverty as well. According to Shinkai (2006), 72.26% of the households, which are considered to be poor based on the regional poverty line, replied “don’t know”, 23. 32% said “they are poor” and 2.97% said “they are very poor”. Overall, only around 30% of the households, who are considered as poor from the objective measurements, perceive them as poor. From the other side, most of the households who are not poor replied “don’t know” but 5.3% said “they are poor” and 0.77% said even “they are very poor”. So those households, who are not poor but think they are poor, are not a few. Examination by region results in the same situation. There are more households who replied “don’t know” in rural areas. Therefore, when poverty reduction program such as cash transfer requires the selection of recipients, the subjective measurements should be used with care since there is a high chance that the program will not be operated for the people who are really in need.

In any case, when poverty estimates are used, some measurement errors should be taken into account and we should be careful about the application of those results.

So far, various poverty measurements were examined but frequently used measurements of poverty can be categorized into two groups; static poverty measurements and dynamic poverty measurements. Dynamic measurements are preferred in the case when there are fluctuations through out the give period, such as within a year, especially in rural areas. In addition, another grouping of relative and absolute measurements exists. Relative measurements state the position compared to others in the same region or country. Therefore, this does not show the degree of poverty. In order to grasp the situation of poverty, some absolute measures will be necessary.

Income Distribution

So far, various measurements of poverty have been reviewed. Then, what kind of policies for poverty reduction can be effective? From macroeconomic perspectives, economic growth can be taken as one of the goals for such kinds of policies. Whether economic growth brings poverty reduction depends on the shape of income distribution as well as the process of income growth in different income groups. Next, income distribution of income/consumption is taken account. When the shape of income distribution stays the same before and after economic growth, those people whose consumption levels are lower than the poverty line will decrease to some extent. On the other hand, there might be a case where income distribution becomes skewed to the upper income groups when the average income grows. In this case, poverty headcount ratio may not change or in some extreme cases that ratio can increase even. Next, those indices to observe the skewness of distribution are examined.

Among indices, first the percentage shares of each income group are considered. Each individual or unit is ordered according to its level of income/consumption and all the units are grouped together from 1 to 100 (or 1 to 10 or 1 to 5) equally. If they are grouped together from 1 to 10, the share of the sum of income/consumption of the people who belong to the group between 0 and 1 (the lowest 10 %) out of the sum of total units is calculated and utilized for the measurement of income inequality. For instance, the share of the upper 20% divided by the share of the lowest 40% can be employed.

Here, income distributions of South East Asian countries where rapid economic growth has been experienced recently and those countries in South Asia and Latin America where income inequality is relatively large are observed. In Latin American countries, the relative shares of the highest 20% and the lowest 20% are much bigger

than those in other Asian countries. Especially, in Brazil and Argentina, those shares are more than two times of those in Asia. When the movement overtime is examined, except for Thailand, all the Asian countries demonstrate the increase in income/expenditure inequality. On the other hand, in Latin America where its inequality is still at the high level in the world, the income gap has been narrowed except for Argentina.

Table 3 Indices of Income Distribution for Selected Countries

	Income Distribution						Gini Index		
	Highest 20%			Lowest 20%					
	Year	1992	2005		1992	2005		1992	2005	
Bangladesh		36.20	40.80		10.00	9.40		26.20	31.00	
	Year	1996	2002		1996	2002		1996	2002	
Sri Lanka		43.90	48.00		8.00	6.80		35.40	41.10	
	Year	1993	2005	2007	1993	2005	2007	1993	2005	2007
Brazil		63.50	60.00	58.70	2.60	2.90	3.00	59.70	56.40	55.0
	Year	1992	2005		1992	2005		1992	2005	
Argentina		50.20	53.90		4.60	3.40		45.4	50	
	Year	1992	2004	2006	1992	2004	2006	1992	2004	2006
Mexico		55.6	51	53.3	3.9	4.5	4.6	51.1	46.1	48.1
	Year	1994	2004	2007	1994	2004	2007	1994	2004	2007
Cambodia		46.8	49.4	48.8	8	6.9	7.1	38.3	41.8	40.7
	Year	1992	2004		1992	2004		1992	2004	
Thailand		52.7	49		5.6	6.1		46.2	42.4	
	Year	1993	2004	2006	1993	2004	2006	1993	2004	2006
Vietnam		44	46.9	45.4	7.8	7.1	7.1	35.7	39.2	37.8

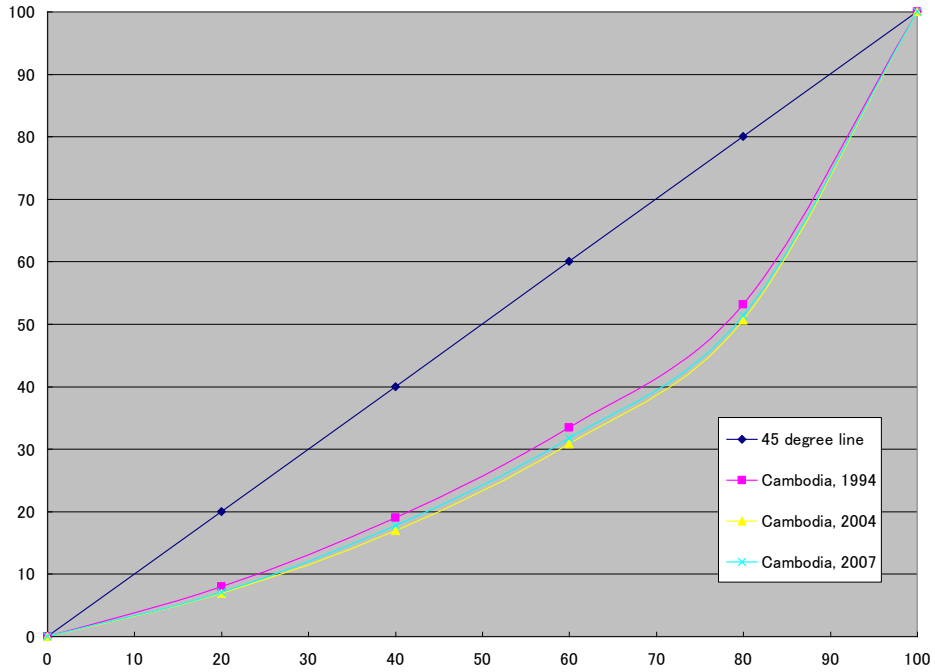
Source: World Development Indicators, 2009.

Next, the similar index to express income disparity based on the Lorenz curve is considered. First, all the units, individuals or households, are ordered from the lowest income/consumption level to the highest. Then, the shares of income of those people in total income are shown as the Lorenz curve. Figure 1 demonstrates examples of the Lorenz curve. If income/consumption is equally allocated to each unit, the distribution will be the same as the 45 degree line. The larger the disparity is, the farther the Lorenz curve is away from the 45 degree line. For instance, if the highest 5% group holds all the income of that region, the Lorenz curve will look like going along the horizontal axis until it reaches the highest 5 % and then along the vertical axis on the right for this highest group. The degree of disparity is measured by the area between the 45 degree line and the Lorenz curve divided by the triangular area between the 45 degree line and axes. This is called Gini index or Gini coefficient. When this area becomes larger, the

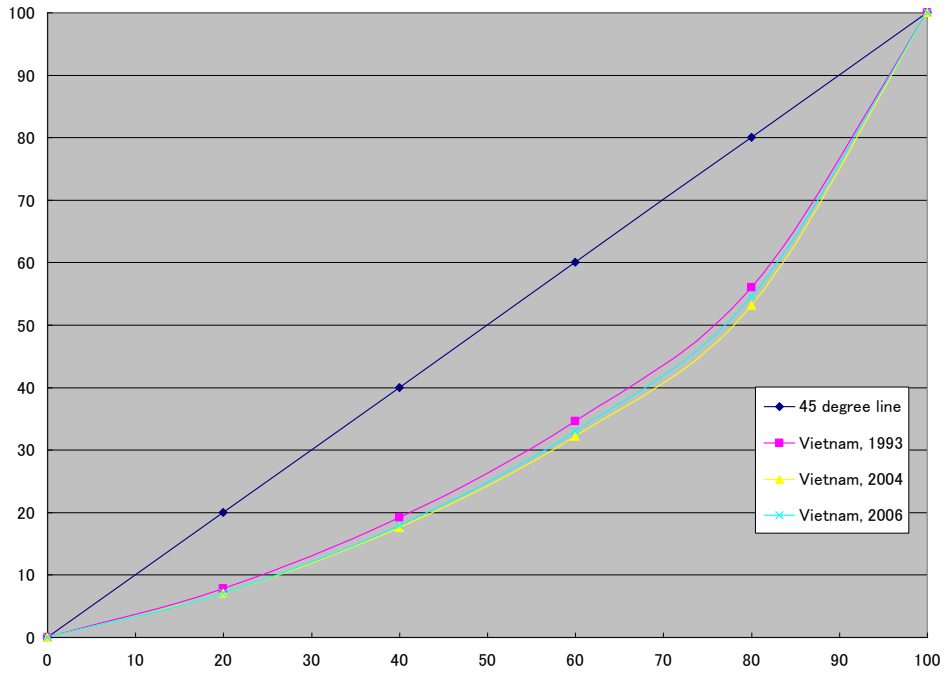
Gini index will increase and become close to 100 (if it is normalized, it will become close to 1). The Gini indices of Latin American countries are close to 50, whereas those indices in Asia are close to 40 or even smaller in some countries. The similar aspects are observed in Figure 1. It is also found from this Figure that in Brazil, it seems that the decrease in income disparity occurred in the higher income groups more than the lower income groups.

Figure 1 Examples of Income Distribution

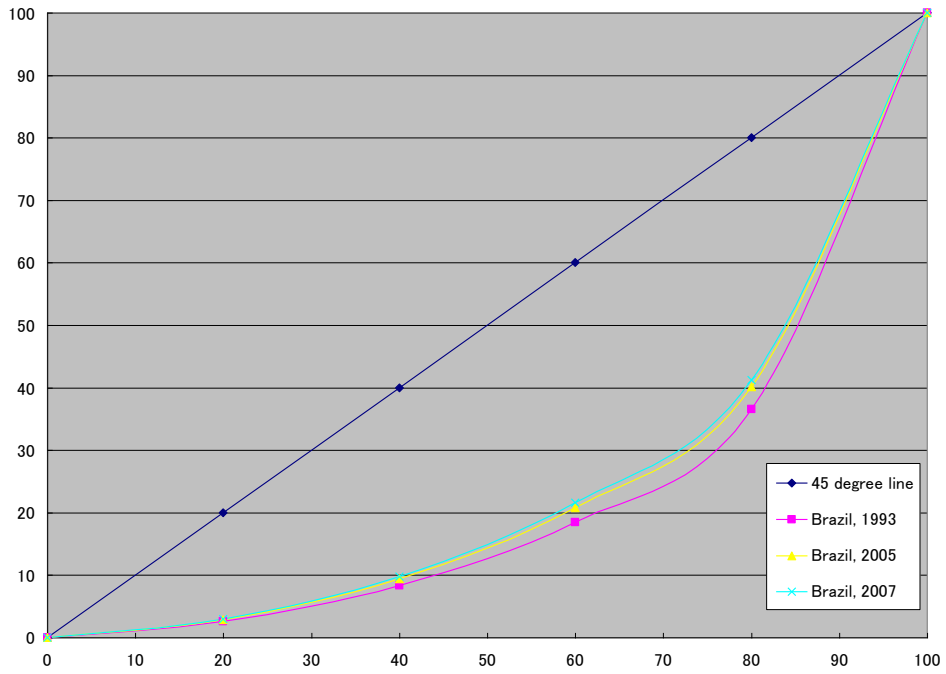
Cambodia



Vietnam



Brazil



Source: Compiled by the Author based on the World Development Indicators 2009

Lastly, one more index to express income inequality, Theil index, is considered. Theil index is written as:

$$T = \frac{1}{N}\sum_i \frac{I_i}{m}\ln\frac{I_i}{m}$$

when m is the average and I is individual income.

Theil index also measures the inequality of distribution as well as the Gini index. However, when income transfer among different income groups is discussed and the dispersion from the average is relatively small, the Theil index could be more precise than the Gini index in terms of relative measurements of inequality. This is because the Gini index utilizes real values for the dispersion while the Theil index utilizes relative income compared to the average.

So far, indices for inequality have been examined. There is another issue such as flow and stock. If stock variables are utilized, the result might be different from that based on flow variables. Which variable to use depends on what the objective is. That is to say, it is important to know first, whether a living condition at one point of time is an issue or the change of living conditions overtime is an issue, for instance. Variable selection should be carefully made to accommodate each research objective.

Challenges Ahead

So far, measurements for poverty and income distribution were examined. These indices are based on economic activities such as consumption and income. These economic activities would be a base for living and indispensable for daily lives. Poverty itself, however, is not formed by economic activities only. Referring to "Capabilities" by Sen, there are some situations where conditions to achieve "Capabilities" are not met, such as lack of opportunities, or not aware of opportunities, or not able to take opportunities although those are given etc. On the other hand, even though economically they are considered as non-poor, it is not clear whether they surely have daily lives at the satisfactory level as we expect, or whether they are happy. In order to tackle this issue, there have been various approaches taken.

First, Human Development Index which UNDP publish every year is the one. Not only basic economic activities but also life expectancy, literacy, infant mortality rate are taken into account in this index. However, as pointed out in Yamazaki (1998), there is

some criticism. For instance, HDI is not expressing “Capabilities” and yet has problems of weighting. Therefore, this index can be referred as a macro view of living condition at the country level but does not seem to grasp all the poverty situations.

Next, recent examples to compare subjective and objective measurements are reviewed. The Inter-American Development Bank recently compared subjective replies and objective indices such as poverty headcount ratios in Latin America（Gasparini, Escudero, Marchionni, Olivieri　2008）. Based on this result, ranking of Latin American countries based on “satisfaction to the life” (based on the results in 2006) starts from Venezuela as a top, Puerto Rico, Costa Rica, Guatemala, to Mexico. However, ranking based on household income goes from Chile, Guatemala, Argentina, Jamaica, to Trinidad and Tobago. It shows that the relationship between satisfaction to the life and economic status do not go hand in hand and its correlation is rather negative, -0.013. “no exiting problem in food expenditure” has a positive correlation with “satisfaction to the life” and it is 0.425 but not very large.

Then, how about the living condition of the world? Does that improve after economic development and poverty reduction? How much is the level of happiness in the world? According to the recent study, economic status and happiness do not have a strong relationship. “Overall happiness level” (scale 1 to 4) is 3.18 in Japan (2005), 2.99 in Korea (2005), China 2.94 (2007) and it does not differ by county in East Asia (As a reference, in the United States, it is 3.27 and in the United Kingdom, it is 3.3 in 2006). In new industrialized countries and South East Asian countries, Singapore is 3.23 (2002), Taiwan 3.04 (2006), Thailand 3.32 (2005), Vietnam 3.15 (2005), Indonesia 3.18 (2005), and Philippines 3.26 (2001). These figures are all above 3 (= quite happy) but it does not seem to positively correlated with GDP. Within the same country, in Japan, this figure changed from 2.98 in 1980 to 3.18 in 2005 and in China, this figure changed from 2.91 (1990) to 2.94 (2007) as GDP per capita increased. However, in Vietnam, which is experiencing high economic growth recently, this figure decreased from 3.41 (2001) to 3.15 (2005). Therefore, again, it cannot be stated that the growth in income is associated with more happiness. Happiness disparity within a country exists also. When 131 countries are ranked based on happiness, those countries which are grouped into high economic growth with medium happiness disparity, such as China and India, demonstrates a high level of happiness (Kalmijn and Veenhoven, 2005). It seems that large happiness disparity is found in Africa but factors to bring happiness and reduce happiness disparity are not very clear.

In sum, standard measurements have been reviewed as well as some of the recent findings in this paper. It seems that elements that may link between background of

poverty and living conditions, such as quality of life and satisfaction, are hard to measure. How to measure these elements and how to integrate those social aspects into existing approaches should be further discussed.

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