Catastrophic Health Expenditures in Turkey

1. Introduction

According to the World Health Organization (WHO) reports; health expenditure of households may cause to sacrifice their mandatory needs by being deprived of financial protection, to use their deposit accounts, to sell assets or borrow. One of the main reasons of the debt of poor households in some countries is the health expenditure. Similarly, the use of credit to cover medical expenses, the sale of assets or to sacrifice from households food consumption because of the medical expenses may also be concerned. The World Health Organization describes such situations as "financial catastrophe caused by medical expenses". Briefly, catastrophic pocket expenses are usually defined as "medical expenses exceed a certain percentage of the total household income or expenditure"

In recent years, measuring the impact of health expenditures on households gains in importance both in Turkey and in the World and various studies have been conducted in this regard. The most popular study on this subject is the article of methodological discussion of Ke Xu which is also published by the World Health Organization. In that respect, it is aimed to conduct a study using Turkish Statistical Institute (TurkStat) data to reflect the situation in Turkey.

The indicators within the scope of the catastrophic health expenditure in this report is calculated based on the methodology of the article "Distribution of health payments and catastrophic expenditures: methodology (Ke Xu, 2005)" using expenditure data from household budget survey, conducted annually between 2002 and 2014.

2. Methodology

Data Source

Household Budget Survey (HBS) is the main data source of the study providing types of household consumption expenditures, socio-economic and employment status of household members, total household income and sources of income etc.

The aims of the survey are;
- To select goods and services to be used for consumer price index and to obtain the base year weights,
- To monitor changes in the consumption patterns of households over time
- To compile data to be used as an auxiliary information for the estimation of private final consumption expenditures in national accounts,
- To determine poverty line
- To obtain required data for calculation of minimum wage level and other socio-economic analysis.

Turkish Statistical Institute has implemented Household Budget Survey annually since 2002. The survey is applied to the sample households, changing each month from January to December. Sample blocks are selected by the probability proportional to size sampling from the blocks which are constructed from National Address Database. The final sampling units, households, are systematically selected from each block.

2002 Household Budget Survey was implemented to 800 households changing every month, total 9600 households throughout the year; 2003 HBS was conducted to 2160 in each month and totally to 25,920 sample households. In 2004-2008 Household Budget Surveys were conducted monthly to 720 households and annually 8640 households. Since 2009 Household Budget Survey has been applied to 1104 households monthly and 13,248 households annually. The estimation level of 2002 Household Budget Survey is the whole Turkey and urban and rural areas. From the 2003 Household Budget Survey estimates both on whole Turkey at urban and rural discrimination and on Statistical Regions at level 1 (12 regions) and level 2 (26 regions) have been obtained. In accordance with the sampling plan of the household budget survey; it is possible to have estimates on Turkey at urban/rural discrimination for the period of 2004-2013, and on whole Turkey beginning from 2014 by using each year’s survey itself; and it is possible to have estimates on distribuition of expenditures at regional discrimination (SRE level 1 and level 2) by using the combination of each year’s data and last two years’ data since 2004.

Data on household income and expenditure are compiled by interviews with household members and also diaries filled by households with their expenses during the survey month. Information is compiled by interview, registration and observation methods. Each sample household are visited 8 times, on average, during the survey month. In the first visit, prior to the survey month, the information about the socio-economic status of the households is obtained and a diary is given to the sample households and how to fill the diary is explained. During the visits in the survey month, consumption expenditures of the sample household on food, clothing, health, transportation, communication, education, culture, entertainment, housing, furniture etc. are obtained. Information about employment status and income of the household members are compiled in the last interview at the end of the survey month.
3. Calculation method

The main objective of this report is to estimate the “ratio of households with catastrophic health expenditure” and “impoverished household rate because of the catastrophic health expenditures” using the HBS data for the 2002-2014 period. The study is based on the article of Ke Xu “Distribution of health payments and catastrophic expenditures: Methodology” which is published by World Health Organization in 2005.

The definitions and methodology used in this study are different from absolute poverty indicators produced by TurkStat since 2002 and relative income poverty and material deprivation indicators produced by TurkStat since 2006. The poverty line defined in this study is “the average food expenditure per equivalent adult of households in the 45th and 55th percentiles, ordered by the share of food expenditure.

In poverty analysis, adult-child differences among households are taken into account and thus it allows comparisons between households of different size and compositions. Accordingly, it is calculated the actual size of household (the number of equivalent adult in the household) by using coefficients called equivalent scale. In the calculation, the equivalent size of each household is calculated as 0.56 times of the total number of persons in the household. Then poverty lines are calculated according to equivalent size of each household. Household, expenditures for which below the poverty line which is defined by its equivalent size, is considered as “poor”.

After identification of poor households, the ratio of health expenditure to capacity of payment (expenditure which is outside subsistence limit of households) is calculated in order to examine the risk of poverty of households due to catastrophic health expenditure.

**Capacity of payment of household:**

It was defined as expenditure which is outside subsistence limit of households. It was calculated as below;

\[
\begin{align*}
\text{If household’s poverty line is less than or equal to the household’s food expenditure} \\
\text{Capacity of payment} &= \text{Total expenditure of household} – \text{poverty line of household}
\end{align*}
\]

\[
\begin{align*}
\text{If household’s poverty line is more than the household’s food expenditure} \\
\text{Capacity of payment} &= \text{Total expenditure of household} – \text{Food expenditure of household}
\end{align*}
\]

Households with rate of health expenditure to payment capacity is greater than 40% are described as "households with catastrophic health expenditures".
Households who are not poor but expenditures outside health are lower than poverty line according to own equivalent household size, are defined as "impoverished households because of catastrophic health expenditure".

The indicators defined in the calculation steps and formulas are given in Annex-1.

In addition, as it is important to analyse sample size sufficiency for statistically significant and consistent results, number of households, coefficient variance (CV) values and confidence intervals for the estimated indicators should be considered.

4. The health expenditures of households:

According to the results of 2014 Household Budget Survey; while the expenditures on "housing and rent" have the highest share in total consumption expenditures with the ratio of 24.8%, the share of expenditures on food and non-alcoholic beverages is 19.7% in overall Turkey. The lowest share belongs to expenditures on health with the ratio of 2.1% in Turkey.

Graph 1: Distribution of consumption expenditures of households by expenditure types, Turkey, 2014

When analyzing at the distribution of health expenditures by quintiles ordered by income of households, it is observed that the share of expenditures is 8.8% for households in the first quintile (the lowest quintile) while the share of expenditures is 40.2% for households in the fifth quintile (the highest quintile) in 2014.
While the average share of expenditures on food is 32.8%, the average share of expenditures on health is 2.2% in overall Turkey in 2002, the average share of expenditures on food is 23.6% and the average share of expenditures on health is 2% in 2014 (Table 2).

When analyzing the distribution of consumption expenditures by quintiles ordered by equivalised expenditure of households, it is observed that the average share of food expenditures is 43.1% for households in the first quintile (the lowest quintile) while the average share of food expenditures is 20% for households in the fifth quintile (the highest quintile) in 2002, and for 2014 these shares are 31.7% and 14.4% respectively. On the other hand, the average share of health expenditures has different pattern from food expenditures; the average share of health is 1.5% for households in the first quintile and 2.7% for those in the fifth quintile in 2002 while the shares are 1.8% and 2.4% in 2014 (Table 2).

Ratio of health expenditure to payment capacity of households is 3% in 2002, nearly 2% in other years and 2.5% in 2014 (Table 2).

In terms of the distribution of consumption expenditures by quintiles ordered by equivalised expenditure of households, ratio of health expenditure to payment capacity of households is estimated as 2.5% for households in the first quintile and 3% for households in the fifth quintile in 2002; and for 2014 in the first quintile 2.7% and in the fifth quintile 2.6% (Table 2).
Table 2: Distribution of average shares* of food and health expenditures by quintiles ordered by equivalised expenditure of households

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<td>1. 20%</td>
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<td>23.7</td>
<td>23.3</td>
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*: They refer to the average of shares of food expenditure and health expenditure calculated for each household.

TurkStat, Household Budget Survey

When analyzing the ratios of health expenditure to total expenditure and to capacity of payment in the period of 2002 and 2014, it is observed that both indicators show the parallel structure by years. Additionally remarkable falls are seen for both indicators in 2003, 2008, 2011 and 2012.

Ratio of households with catastrophic health expenditure and ratio of poors because of catastrophic health expenditures are given in Table 3.
Table 3: Catastrophic Health Expenditure - Rates, Turkey, Urban, Rural

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<thead>
<tr>
<th>Years</th>
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<th>2012</th>
<th>2013</th>
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<tbody>
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<td>4.07</td>
<td>4.51</td>
<td>4.16</td>
<td>3.60</td>
<td>3.16</td>
<td>2.72</td>
<td>1.77</td>
<td>2.82</td>
<td>1.78</td>
<td>1.01</td>
<td>1.29</td>
<td>1.10</td>
<td>1.18</td>
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<td>Kent</td>
<td>2.96</td>
<td>2.40</td>
<td>1.18</td>
<td>2.29</td>
<td>1.48</td>
<td>1.27</td>
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<td>0.96</td>
<td>0.19</td>
<td>0.31</td>
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<td>Kar</td>
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<td>8.24</td>
<td>7.68</td>
<td>6.97</td>
<td>6.50</td>
<td>6.44</td>
<td>6.96</td>
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<tr>
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<td>Türkiye</td>
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<td>Kar</td>
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(1) It is based on the new administrative division for sampling design in 2014. Therefore there are no estimations at urban-rural level.

TurkStat, Household Budget Survey

As stated in Section 3, “the average food expenditure per equivalent adult of households in the 45th and 55th percentiles, ordered by the share of food expenditures” is defined as a poverty line, specific for the study. The new administrative division for sampling design was used in 2014. Significant differences in the distribution of urban and rural areas have emerged because of the villages united with greater municipalities in the province. Therefore there are no estimations at urban-rural level for 2014.

According to this method the ratio of the poor households is 4.07% in 2002 and 1.18% in 2014 in overall Turkey.

Ratio of households with catastrophic health expenditure is less than 1% and it is calculated as 0.31% in 2014 and 0.81% in 2002. The ratio of impoverished households due to catastrophic health expenditures is 0.43% in 2002 and 0.12% in 2014.

Both the ratio of households with catastrophic health expenditure and the ratio of impoverished households are predicted less than 1%.
Graph 3: Catastrophic Health Expenditure, 2002-2014, Turkey

From Graph 3, the ratio of poor households and ratio of households with catastrophic health expenditure and the ratio of impoverished household due to health expenditure between 2002 and 2014 can be seen. From the graph, although fluctuations are observed, it is seen that these three indicator are getting closer by years.

These indicators are estimated on the basis of the annual results of Household Budget Survey and restricted sample size should be taken into account while evaluating the results.

6. Conclusion

In this study, indicators on catastrophic health expenditure are estimated by using expenditure data based on household budget survey, implemented every year since 2002 by Turkish Statistical Institute. Because the design of the survey is not intended for such measurement, estimates are made according to the adequacy of data.

The poverty line, the base of the study, is defined as “the average food expenditure per equivalent adult of households in the 45th and 55th percentiles, ordered by the share of food expenditures” as proposed by the World Health Organization. Households with ratio of health expenditure to capacity of payment equals to or more than 40%, is determined as “households with catastrophic health expenditure” and households not poor but the other expenditure (out of health) are less than poverty line are defined as “impoverished households because of catastrophic health expenditure”.

According to results of the study, the ratio of households with catastrophic health expenditure is 0.81% and the ratio of impoverished household because of catastrophic health expenditure is 0.43%, in 2002. The ratio of households with catastrophic health expenditure is 0.31% and the ratio of impoverished households because of catastrophic health expenditure is 0.12% in 2014.
ANNEX-1

Definitions and formulas of indicators on the catastrophic health expenditure methodology

**Out-of-pocket health expenditure (oop):** The total of expenditure in health group according to classification of COICOP/HBS within household budget survey.

**Household consumption expenditure (exp):** The total of household consumption expenditure collected within the Household Budget Survey.

**Food expenditure (food):** The total of expenditure in group of food and beverages according to classification of COICOP/HBS, within household budget survey.

**Equivalent household size (eqsize):** Indicators, allowing more accurate comparisons between households in different size and compositions are defined as equivalent scale. In this study, equivalent scale is calculated as beta coefficient as 0.56 according to the following formulation:

\[ eqsize_h = hhsize_h^{\beta} \]

hhsize: Number of individuals in the household

**Poverty line (pl):** The average food expenditure per equivalent adult of households whom in the 45th and 55th percentiles, ordered by the share of food expenditures is determined as a poverty line.

\[ pl = \frac{\sum w_h \times eqfood_h}{\sum w_h} \text{ where } food_{45}<foodexp_h<food_{55} \]

Here,

- \( w_h \) : Population weights
- eqfood: Food expenditure per equivalent adult (food/eqsize)
- foodexp: Share of food expenditure into total expenditure (food/exp).

Then **poverty lines according to equivalent household size** and poor households are determined.

\[ se_h = pl \times eqsize_h \]

\[ poor_h = 1 \quad \text{if } exp_h < se_h \]

\[ poor_h = 0 \quad \text{if } exp_h \geq se_h \]

Accordingly; households whose expenditure is less than the poverty line, determined by each household according to its own equivalent household size, are considered as poor.
**Household’s capacity to payment (ctp):** It is defined as a household nonsubsistence spending.

According to this;

- It is the expenditure value out of poverty line in households whose own poverty line according to equivalent household size is equal or less than food expenditure,
- It is the expenditure value out of food expenditure in households whose own poverty line according to equivalent household size is greater than food expenditure,

\[
\begin{align*}
ctp_h &= \exp_h - se_h & \text{if } se_h \leq food_h \\
ctp_h &= \exp_h - food_h & \text{if } se_h > food_h
\end{align*}
\]

**Ratio of health expenditure to capacity of payment (oopctp):** It's obtained dividing the health expenditure of household by capacity to pay.

\[
oopctp_h = \frac{oop_h}{ctp_h}
\]

**Does household have catastrophic health expenditure? (cata):** Households whose ratio of capacity of payment to health expenditure is equal or greater than 40% are defined as “households with catastrophic health expenditure”

\[
\begin{align*}
cata_h &= 1 & \text{if } \frac{oop_h}{ctp_h} \geq 0.4 \\
cata_h &= 0 & \text{if } \frac{oop_h}{ctp_h} < 0.4
\end{align*}
\]

**Does health expenditure impoverish the households? (Impoverishment, impoor):** Households who are not poor (i.e. expenditure of it is greater than its own poverty line, determined according to its equivalent size) and whose total expenditure out of health are less than its own poverty line, determined according to its equivalent size are determined as “impoverished households due to catastrophic health expenditure”.

\[
\begin{align*}
impoor_h &= 1 & \text{if } \exp_h \geq se_h \text{ and } \exp_h - oop_h < se_h, \text{ otherwise}, \\
impoor_h &= 0
\end{align*}
\]
REFERENCES
Ke Xu, Distribution of Health Payments and Catastrophic Expenditures: Methodology, 2005