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Consumption Quintile Groups in the Analysis of Poverty and Development Issues

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Abstract

Background: This paper provides computer program which facilitates to create consumption quintile groups (CQGs), and demonstrates some benefits of the created CQGs in the analysis of poverty and development issues.

Methods: The proposed computer program is tested by creating CQGs using the data of 28,670 individuals enumerated in a sample of 5,988 households of Nepal Living Standard Survey (NLSS) III instigated by the Central Bureau of Statistics in 2010/11, and identifies some disadvantages of the lowest 20% of population compared to the highest 20% of population.

Results: Some identified disadvantages of the lowest population are - excessive number of children, low literacy rate among the working-age population and low expenditure on non-food items, including education and health of children.

Conclusion: This paper illustrates how to compute income inequality, an important issue of sustainable development, by Gini coefficient when the income distribution is across the CQGs and the computed value was 0.46.
Novelty: This paper tries to draw attention of scholars on the use of CQGs in the analysis of poverty and development issues.
Keywords: Consumption Quintile Groups (CQGs), development Gini coefficient, poverty

Introduction

The two research problems - identification of disadvantages of the poor group of entities (individuals or households) relative to non-poor and identification of the factors that affect poverty – are mainstay of poverty analysis. A simple way to identify disadvantages of the poor is to use a statistical method that compares appropriate socio-economic and demographic indicators amongst poor and non-poor group of entities, and a reasonably advanced way to identify the factor affecting poverty is to use a statistical method, namely the binary logistic regression model, where poverty status (poor or non-poor) is considered as outcome variable and a few of relevant socio-economic and demographic indicators as covariates. One major drawback in the use of these two methods is that the poor and non-poor groups of entities need to identify prior to the use, and the problem of identification of poor and non-poor group of entities is not a simple task, particularly to those scholars who collect poverty related primary data and want to identify poor and non-poor group of individuals. However, in the context of Nepal the solutions to the above two research problems could be sought in the Nepal Living Standard Surveys (NLSSs) data since the Central Bureau of Statistics (CBS) has been providing the poor and non-poor group of entities based on a rigorously estimated poverty line (a threshold monetary value that demarcates poor and non-poor individuals).

An alternative solution to the aforementioned research problems is to first construct the *consumption quintile groups* (CQGs). Then compare the appropriate socio-economic and demographic indicators across the five consumption quintile groups instead of comparing between the poor and non-poor groups. For reasonably advanced statistical analysis, one can perform *quantile regression analysis* (Koenker, 2005). The consumption quintile groups are just the *social stratification* of a society stratified by per capita consumption expenditure. They are fundamentally the five equal-sized clusters (20% each) of individuals created in such a way that the per capita consumption of an upper quintile group of an individual is greater than the per capita consumption of any lower quintile group of all individuals. As a result, it is a common practice to say the first consumption quintile group of individuals as the *lowest among the poor* (or simply *lowest*) and the fifth quintile group of population as the *highest among the rich* (or simply *highest*) (CBS, 2011a). The concept of CQGs is not a new one. The benefit of its use in poverty and development issues was pointed out by Miller and Roby (1967).

Comparison of relevant development indicators across the CQGs is also tantamount to studying inequalities in different dimensions (Miller and Roby, 1967). Share of income of consumption quintile groups can be used to measure *Gini coefficient*. One of the popular statistical

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measurements of inequality and welfare is the income Gini coefficient (Gini, 1936). The Goal 10 of Sustainable Development Goals is to reduce inequalities, and in particular Target 10.1 is to reduce income inequalities (Goal 10: Reduced inequalities - SDG tracker 2022).
Basu (2001) calls the per capita income of the lowest 20% of the individuals as *quintile income* and argues for why it would be appropriate to maximize quintile income as a legitimate goal of development. Subramanian (2011) recommended that the government must commit itself to a target rate of growth of the quintile income.

Objective of the study

Despite all the benefits on the use of CQGs, its use in the analysis of poverty and development issues is not as popular among the scholars as it expected to be. In the context of Nepal, few Nepali research scholars were found to have used CQGs in the analysis of poverty and development issues (Thapa, 2013; Devkota, 2014; Thapa and Acharya, 2017). One simple reason for the less use of CQGs might be the ignorance of scholars about how to construct CQGs in the household level data file as well as not knowing how harshly the outcomes based on CQGs present the issues of poverty and development.
The main goal of this paper is to direct the attention of scholars on the use of CQGs in the analysis of poverty and development issues. To meet this goal, we fulfill the following three objectives in this paper.

1. To provide a computer-based program written by us using SPSS commands which will help research scholars to create CQGs in their own data file in future.
2. To present some examples related to poverty issues by comparing pertinent socio-economic and demographic indicators across the CQGs.
3. To illustrate how to compute income inequality - Gini coefficient - when the income share of each quintile group to total income is available.

Research Method and Data Sources

This study utilizes the available data of Nepal Living Standard Survey III (NLSSIII) instigated by the Central Bureau of Statistics (CBS) in the fiscal year 2010/2011. The NLSSIII provides comprehensive socio-economic and demographic data based on a nationally representative sample of 5,988 households that comprise of 28,670 household members.
The method adopted to fulfill the first objective of this paper is a very simple. The collected data on household consumption expenditure (HCE) and household size (HS) is transformed to a new variable 'per capita consumption expenditure (PCCE)' using the numerical expression, HCE/HS. The algorithm involved in the construction of CQGs is as follows.

- Sort the households in ascending order (from smallest to highest) by PCCE.
- Generate a new variable that displays the percentage distribution of cumulated household size.
- Create a new variable that demonstrates the division scheme of the percentage distribution of cumulated household size into five equal parts.

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The above algorithm is utilized for creating a computer program file with the aid of SPSS commands and is presented in Annex-I. To create CQGs in a new data file do the followings.

- Type the program as it is in a new SPSS syntax file.
- Replace the number 28670 by the total household members of the new data file.
- Run the SPSS program as prepared above.

SPSS automatically creates CQGs in the new data file. To meet the second objective, we present three motivational examples based on – demographic indicators, social indicators and economic indicators. To meet the third objective, we will present a detail computational scheme for measuring Gini coefficient of income inequality using two formulae as follows.

Suppose X_i and Y_i represent correspondingly the cumulated proportion of population and the cumulated proportion of income of the i^{th} quintile group. The following formula is available in Shryock, Siegel & Larmon (1976) has been used for computing Gini coefficient

$$2\Sigma(X_i - Y_i) \times (X_{i+1} - X_i) \qquad (1)$$

$$\Sigma(X_iY_{i+1}) - \Sigma(X_{i+1}Y_i) \qquad (2)$$

The illustrative computations are presented in ANNEX II.

Data Analysis and Findings

In this section we will present three examples with justification for selecting relevant indicators namely demographic indicators, social indicators and economic indicators. The first two examples are based on the CQGs created by us and the last example, due to technical reason, is borrowed from the already available in the NLSS report (CBS, 2011b). The main purpose of these examples is to motivate the readers by demonstrating interesting outcomes with discussions which are discussed in the following sub-sections.

CQGs on Demographic Indicators

In this example we mainly focus on the household size related indicators and show how their values change across the CQGs. The household size is an important demographic indicator that has an impact on poverty. Many research scholars had shown that a household with large household size is very likely to be poorer than a household with small household size (Chhetry, 2001; Thapa et al., 2013; Jali and Ayub, 2015; Imam et al., 2018). It is essential to recognize that households consist of three mutually exclusive groups: children, working age population (WAP) and the elderly. The primary needs of these groups that to be mentioned by policy makers are significantly differed. For instances, children primarily need access to proper education, the WAP requires support to improve their income-earning capabilities, and the elders need to be covered under social security. In this context, the research question that which group of population is highly responsible for making the household size large among the poor group of households is more relevant than the research question that whether or not the household size has impact on poverty.

Motivated by the above argument, we decided to compare the average number of three groups of population per household across CQGs. The average number of three population groups per household is computed and is presented in Table 1.

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Table 1: Comparison of mean number of three population groups across CQGs

Population Group	1st Quintile (Lowest)	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile (Highest)
Children (under 15 years)	2.90	2.19	1.71	1.34	0.87
WAP (15 to 64 years)	2.92	2.96	2.92	2.78	2.62
Elders (65 or over years)	0.25	0.25	0.26	0.25	0.21

Source: Acharya (2023)

The continually decreasing trend in the average number of children from the lowest group to the highest group and almost uniform distribution of the average number of WAP as well as the average number of elders, it is clear that children are most responsible for making household size large in the lowest group. One of the disadvantages of the lowest group compared to the highest group is the excessive number of children, since the average number of children/households among the lowest group is 3.3 folds higher as compared to the highest group.

As a corollary of the above main table, the two demographic indicators – *average household size* (AHS) and *child dependency ratio* (CDR) – emerges and the values of these two indicators are displayed in Table 2 where AHS and CDR were seen to be in continually decreasing tendency from the lowest group to the highest group. The large number of children among the lowest group is a serious issue since the households of this group is trapped into the so-called *demographic poverty trap* characterized by large household size with high child dependency ratio.

Table 2: Comparison of AHS and CDR across CQGs

	1st Quintile (Lowest)	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile (Highest)
Average household size	6.07	5.40	4.89	4.37	3.70
Child Dependency Ratio (%)	99.32	73.99	58.56	48.20	33.21

The two indicators were derived from Table 1 by following scheme of computation:
AHS = sum of the average number of three groups of population
CDR = ratio of the average number of children to the average number of working-age population

Table 1 also reveals the significant fact: a considerable proportion of households have an average number of WAP per household, for the lowest group, the average numbers of WAP

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per household is 2.92, while for the highest group, it is 2.62. This shows that the earning capacity of WAP holds greater importance than their quantity. Therefore, the earning capacity largely rely on their education.

CQGs on Social Indicators

In this example we mainly focus on indicators related to literacy and show how their values change across the CQGs. Literacy and schooling are main indicators of people's quality of life. Further, these factors are considered important determinants for accomplishing income earning opportunities (Haughton and Khandker, 2009). As a result, in this paper gender-disaggregated indicators – literacy rate of WAP – were computed within each quintile group and presented in Table 3.

Table 3: Comparison of literacy rate of WAP by gender across CQGs

	1st Quintile (Lowest)	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile (Highest)	Ratio of Highest to Lowest
Male	61.3	70.6	76.6	85.4	90.6	1.5
Female	31.5	41.6	50.9	59.1	72.0	2.3
Overall, across CQGs	44.1	54.5	62.1	70.7	80.4	1.8

Source: Computed from NLSSIII data

The literacy rates for both males and females within WAP are in growing tendency from the lowest to the highest quintile group. A significant drawback for the lowest group when compared to the highest group, is their lower literacy rates along both male and female WAP. Ratios comparing to the literacy rate of the lowest group were calculated and shown in Table 3 for males, females and overall.

For female, the ratio is 2.3, indicating that the literacy rate for females in the highest group is 2.3 times higher than that of the lowest group. The particularly low literacy rate among females in the lowest WAP is a major concern especially out migrations results is a higher proportion of females within the WAP in each quintile group. (Table 4).

Table 4: Percentage share of females in WAP

1st Quintile (Lowest)	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile (Highest)
57.7	55.5	56.6	56.0	54.8

Source: Computed from NLSSIII data

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Gender issue is being a cross-cutting issue, gender parity index (GPI), is the ratio of female literacy rate to male literacy rate, is computed for each quintile group and presented in Table 5. GPI among WAP increases from the lowest group to highest group implying that gender parity that favors females continually increases from the lowest to highest group.

Table 5: Comparison of GPI in literacy rate of WAP across CQGs

1st Quintile (Lowest)	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile (Highest)
0.51	0.59	0.66	0.69	0.79

Source: Computed from NLSSIII data

CQGs on Economic Indicators

In this example we mainly focus on income and consumption related indicators and show how their values change across the CQGs. The existing data on the two economic indicators - per capita expenditure and per capita income - of each quintile group are displayed in Table 6.

Table 6: Nominal per capita consumption and income within each CQGs

	1st Quintile (Lowest)	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile (Highest)	Inequality
Consumption	13,168	19,317	26,253	36,962	78,504	6.0
Income	8,498	16,294	25,329	41,138	117,063	13.8

Source: CBS (2011), Table 10.2 and Table 11.5

While comparing the two economic indicators within each quintile group, it exposes an exceptional result. It shows the per capita expenditure is larger than per capita income within each of the bottom.

One of the biggest disadvantages for the lowest group is their obviously low income and, as a result, their relatively limited consumption in comparison to the highest group. The ratio of the highest group's per capita income or consumption to that for the lowest group serves as a notable indicator of inequality. (Table 6). The highest versus the lowest inequality in income is almost 14, while that in consumption is 6.0

A more rigorous way of measuring income/consumption inequality is to compute Gini coefficient for which share of income/consumption of each quintile group is required and the available shares are displayed in Table 7. The lowest 20% of individuals share around 4% of total income, while the highest 20% of individuals share around 56% of the total income.

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Table 7: Percentage share of each quintile group income & consumption

	1st Quintile (Lowest)	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile (Highest)
Income share	4.1	7.8	12.2	19.7	56.2
Consumption share	7.6	11.1	15.0	21.3	45.0

Source: CBS (2011), Table 10.2 and Table 11.5

The inequality of the above share of income/consumption distribution can be seen more vividly by observing the gap between egalitarian line and the Lorenz Curve (Figure 1 and 2) where horizontal and vertical axis correspondingly represent the cumulative share of population and the cumulative share of income/consumption. Any position on the vertical axis where the curve is higher than zero represents the percentage of the population represented on the horizontal axis that receives that total income or consumption.

The fraction of the area constrained between the egalitarian line and the Lorenz curve to the area of the lower triangle measures inequality, and this measure of inequality is widely known as the Gini coefficient, Gini ratio or Gini index. The computational scheme of Gini coefficient of the distribution of income share of Table 7 is presented in Annex-II. The computed value of Gini coefficient is 0.46. Similar computation based on the available share of consumption, the Gini coefficient of the distribution of consumption is 0.34.

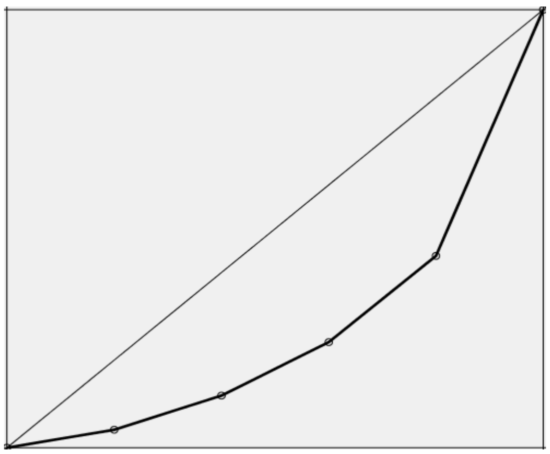

Figure 1: Lorenz curve of income distribution

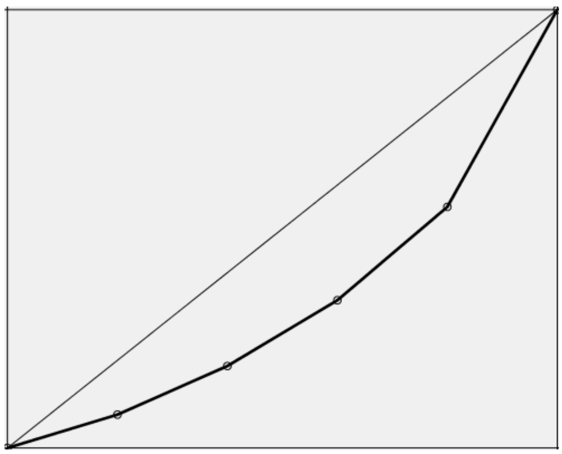

Figure 2: Lorenz curve of consumption distribution

Source: Acharya (2023)

The portion of food expenditure to total consumption expenditure is an indicator of household food security and also used in poverty analysis. It follows Engel's law of consumption which in a plain language is that *as a household's income increases, the percentage share of food expenditure decreases while the proportion spent on other goods (such as luxury goods) increases* (Hayes, 2022).

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The percentage share of food expenditure was available in NLSS III report (CBS, 2011, Table 10.4). The percentage share of non-food expenditure is computed by subtracting the percentage share of food from 100. The two indicators are displayed in Figure 2.

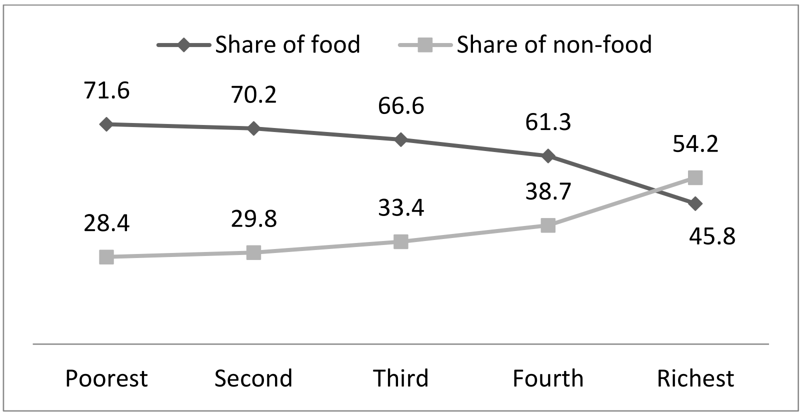

Fig 2: Comparison of percentage Share of Food and Non-food Expenditure
Source: Acharya (2023)

The graph illustrates that the proportion of food expenditure continually declines from around 72% for the lowest group to approximately 46% for the highest group. The main drawback faced by the lowest group, is their substantially higher spending on food. Consequently, this leads to considerably lower expenditure on non-food items, such as education and health for their children. Thus, lowest groups in capability to invest adequately in their children education and health is another major drawback relative to the highest group.

Discussion

Although CBS and some researchers of Nepal, like Khanal (2012), average per capita monthly income, and Thapa (2013), the relationship between education and poverty in Nepal, used consumption quintile groups, and they are the only ones who have used it. The variables they used will not match our variables. Henceforth, this study draws out its variables by comparing several socio-economic and demographic indicators across CQGs; this paper has identified several disadvantages of the lowest group relative to the wealthiest group. Excessive number of children increases the household size of the household which will eventually increase the child dependency ratio. Therefore, the consumption quintile of lowest group from larger family size is high, while the consumption quintile of smaller family size is low. This result is the similar to the findings of CBS (2016). Similarly, the literacy rate of female working age population is lower than male working age population. This result is also similar to the findings of CBS (2016). Therefore, low expenditure on education of children particularly among female, is the major disadvantages of the lowest group relative to the highest group. High inequalities in development indicators are serious issues from the perspective of Sustainable Development Goals.

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Conclusion

In a nutshell, the lowest group is trapped into the demographic poverty trap, without government's huge efforts and investments on education for children poverty is likely to perpetuate from this generation to the next generation. Also, the lowest group of individuals could not escape out of poverty without government's initiatives directed towards more productive activities of WAP by enhancing their income-earning capabilities.

References

Acharya, K. P. (2023). *Risk Factors Affecting Poverty in Nepal: Statistical Modeling Approach* (Doctoral dissertation, Institute of Science & Technology).

Basu, K. (2001). On the goals of development. *Frontiers of development economics: The future in perspective*, 61-86.

Brewer, M, and O'Dea, C. 2012, Measuring living standards with income and consumption: evidence from the UK, IFS Working Paper W12/12.

Central Bureau of Statistics. (2011b). Nepal living standard survey 2010/11: Statistical report volume one. *Central Bureau of Statistics, National Planning Commission Secretariat, Government of Nepal*.

Central Bureau of Statistics. (2011a). Nepal living standard survey 2010/11: Statistical report volume two. *Central Bureau of Statistics, National Planning Commission Secretariat, Government of Nepal*.

Central Bureau of Statistics. (2016). Annual household survey 2015/16: Major findings. *Central Bureau of Statistics, National Planning Commission Secretariat, Government of Nepal*.

Chhetry, D. (2001). Understanding rural poverty in Nepal. In *Asia and Pacific forum on poverty: Reforming policies and institutions for poverty reduction 2*, 5-9.

Devkota, J. (2014, March). Impact of migrants' remittances on poverty and inequality in Nepal. In *Forum of International Development Studies,44*, 36-53.

Gini, C. (1936). "On the Measure of Concentration with Special Reference to Income and Statistics".*Colorado College Publication, General Series, 208*, 73–79.

Goal 10: Reduced inequalities - SDG tracker. (2022). Retrieved November 5, 2022, from https://sdg-tracker.org/inequality.

Haughton, Jonathan; Khandker, Shahidur R. 2009. *Handbook on Poverty and Inequality*. Washington, DC: World Bank. https://openknowledge.worldbank.org/handle/10986/11985 License: CC BY 3.0 IGO.

Hayes, A. (2022, July 19). Engel's law. Retrieved November 5, 2022, from https://www.investopedia.com/terms/e/engels-law.asp.

Imam, M. F., Islam, M. A., & Hossain, M. J. (2018). Factors affecting poverty in rural Bangladesh: An analysis using multilevel modeling. *Journal of the Bangladesh Agricultural University, 16*(1), 123-130.

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Jali, M. R. H. M., & Ayub, K. (2015). Poverty Alleviation in Pakistan: Evidence from Project Area of Asian Development Bank in Southern Punjab. *Journal of poverty, Investment and Development*, *8*, 166-171.

Khanal, P. (2012). Trends and Scenario of Poverty in Nepal. https://mpra.ub.uni-muenchen.de/43191/1/MPRA_paper_43191.pdf

Koenker, R. (2005). Quantile Regression. New York: *Cambridge University Press*.

Miller, S., and Roby, P. (1967) 'Poverty: Changing Social Stratification', in P. Townsend (ed.), the Concept of Poverty, London: Heinemann.

Shryock, H. S., Siegel, J. S., & Larmon, E. A. (1976). *The methods and materials of demography*, *2*, 68. US Bureau of the Census.

Subramanian, S. (2011). 'Inclusive Development and the Quintile Income Statistic. *Economic and Political Weekly*, 69-72.

Thapa, A. K., Dhungana, A. R., Tripathi, Y. R., & Aryal, B. (2013). Determinants of poverty in rural parts of Nepal: A study of Western Development Region. *pinnacle economics & finance*.

Thapa, S., & Acharya, S. (2017). Remittances and household expenditure in Nepal: Evidence from cross-section data. *Economies*, *5*(2), 16.

Thapa, S. B. (2013). Relationship between education and poverty in Nepal. *Economic Journal of Development Issues*, 148-161.

Annex-I

Computer Program for Constructing CQGs Written in SPSS Commands

```
Sort cases by PCCE.
CREATE CHS = csum(HS).
Variable Labels CHS 'cumulated household size'.
Execute.
Compute PCHS = 100*CHS/28670.
Variable labels PCHS 'Percentage of CHS'.
Execute.
if (PCHS <= 20) CQG =1.
if (PCHS > 20 and PCHS <=40) CQG =2.
if (PCHS > 40 and PCHS <=60) CQG =3.
if (PCHS > 60 and PCHS <=80) CQG =4.
if (PCHS > 80 ) CQG =5.
Variable labels CQG 'Consumption Quintile Groups'.
Value labels CQG 1 'Lowest' 2 'Second' 3 'Third' 4 'Fourth' 5 'Highest'.
Execute.
```

Test of the computer program on NLSSIII data file

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The sum of household population within each of the five quintile groups created above is presented in the table below.

Annex-II

	Lowest	Second	Third	Fourth	Highest	Total
Sum	5733	5734	5732	5737	5734	28670
Percent	20.0	20.0	20.0	20.0	20.0	100.0

Computation of Gini Coefficient

		Use of first formula			Use of second formula	
X_i	Y_i	$(X_i - Y_i)$	$(X_{i+1} - X_i)$	$(X_i - Y_i) \times (X_{i+1} - X_i)$	$X_i Y_{i+1}$	$X_{i+1} Y_i$
0.2	0.041	0.159	0.2	0.032	0.024	0.016
0.4	0.119	0.281	0.2	0.056	0.096	0.071
0.6	0.241	0.359	0.2	0.072	0.263	0.193
0.8	0.438	0.362	0.2	0.072	0.800	0.438
1.0	1.000	**Total**		**0.232**	**1.183**	**0.719**

Share of income (Y_i) is from Table 7 of this paper after converting percentages to proportions.

According to the first formula, Gini coefficient equals to **0.464** (= 2×0.232) and according to the the second formula, Gini coefficient equals to **0.464** (=1.183 – 0.719). Here the two formulae have coincidently produced the same value up to three decimal places. But in another situation may differ with a small margin.