

## CONSUMPTION INEQUALITY: AN ANALYSIS BASED ON THE DECOMPOSITION OF THE GINI COEFFICIENT OF EXPENDITURES IN ALBANIA

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### ABSTRACT

This article analyzes the inequality of consumer's spending in Albania by calculating and decomposing the Gini coefficient for expenditures. The data is obtained from the 2012 Living Standard Measure Survey (LSMS), which provides data on household expenditures on multiple categories of commodities and services. The results suggest for an inequality of 0.371 for total consumption versus an inequality of 0.403 for total income. About 78% of all household expenses consist of food, utilities and household operations. Consequently, expenses on other consumption components are perceived as being a luxury with a high relative inequality (relative Gini) coefficient.

### INTRODUCTION

Consumers' decisions are the main determinants of economic growth and business cycles. As part of Albania's Gross Domestic Product (GDP), private consumption has steadily increased, marking 80% of annual GDP in 2015 [INSTAT (2017)]. In a recession period, as a result of increased uncertainty, consumers' expenditures are likely not only to fall but also to affect the prospects for recovery [Bernanke (1993), Dow and Hillard, (1995) and (2000), Sordi and Vercelli (2010), Bartolucci et al. (2011)]. However, aggregate consumption is the result of consumer's behavior in diverse subpopulations, which cannot be taken into account in macroeconomic estimates. In particular, heterogeneity in the composition of the population, along with the concentration of income and wealth at the peak of the distribution, is likely to cause disparities in the spending and consumption behavior of the households.

The Gini coefficient of income is considered one of the best statistical measures of inequality and welfare [Gini (1936)]. Inequality of income has attracted much interest in academic literature [look at Levy and Murnane (1992); Burtless (1995); Gottschalk and Smeeding (1997)], while few studies analyze consumption inequality. Indeed, it is easy to argue that family welfare is more appropriately measured by consumption rather than income. Consumption can be a better metric of permanent household income (Meyer and Sullivan, 2006), the welfare of the poor (Meyer and Sullivan, 2003) and changes in income inequality have implications on welfare that depend on the structure of credit and insurance markets (Krueger and Perri, 2005).

On the other hand, many studies have found that Gini's income and consumption coefficient are two complementary indicators that exhibit different behaviors

at certain times. Many studies have found that despite the decline in income inequality during years of recession and crises, inequality in consumption has increased, leading to the deterioration of welfare [Daunfeldt, Folster and Hortlund (2007)]. Also, many studies suggest that the growth of one of these coefficients warns of an increase of the next coefficient in the future: a growth in consumption Gini warns and an increase in income Gini. Moreover, many studies suggest that the growth of one of the coefficients warns for an increase of the other in the future: a growth in consumption's Gini anticipates for and an increase in income's Gini [Cutler and Katz (1992)] and vice versa [Krueger and Perri (2005)].

This article uses household micro data from 2012 and calculates the inequality in the distribution of household expenditures, and decomposes multiple inequality indicators of total expenditure components based on Garner's (1991) methodology. Using this methodology allows for sketching the Engels' curves as the calculation of elasticities provides information on preferences on consumption components and consequently on the slope of the curve of each of these components. Simultaneously, this analysis provides complementary and necessary information on understanding of welfare and family expenditure models and therefore provides important details on the behavior of aggregate consumption, serving the knowledge and decision-making of monetary policy and financial stability.

In the following two sections one can find details on the data and methodology used for the calculations and decomposition of the Gini and further results and conclusions.

## METHODOLOGY

The Gini coefficient represents an indicator of inequality in the distribution of household expenditures in the population. The formula is written in terms of the covariance of total expenditures ( $X$ ), the cumulative distribution [ $F(X)$ ] and the mean of total expenditures ( $m$ ) according to the formula:

$$(1) \quad G = \frac{2\text{cov}(X,F)}{m}$$

The coefficient takes a value in the range of  $0 \leq G \leq 1$  where the closer to 1, the higher is the rate of inequality and the closer to 0 the lower the rate of inequality. A value of 0 indicates complete equality and 1 indicates complete inequality.

The methodology used to calculate the decomposition of the Gini is based on the methodology introduced by Lerman and Yitzhaki (1984) and later used by Garner (1993). This methodology is one of the few methods that measures the

Gini coefficient at the individual (household) level and not at a group level. For comparison, using the above formula we calculate as well the Gini coefficient of total household income.

Expenditures are decomposed in ( $x_k$ ) components such that:  $x = \sum_{k=1}^K (x_k)$ . The components are: food, transportation, entertainment, alcohol and cigarettes, household operations, furnishing and equipment, apparel and services, fuel and utilities and other expenses<sup>1</sup>.  $F_k$  represents the cumulative distribution of  $x_k$  and  $m_k$  it's the mean. Therefore, the Gini coefficient of the "k-th" component is calculated as:

$$(2) \quad G_k = \frac{2\text{cov}(x_k, F_k)}{m_k}$$

Likewise, the Gini coefficient of total expenditures can be calculated by using the formula below, which utilizes cumulative distributions and averages of the expenditure components:

$$(3) \quad G = \frac{2 \sum_{k=1}^K \text{cov}(F, x_k)}{m}$$

Besides the decomposition of the Gini coefficient, in this article, decomposed budget components have also been calculated. Multiplying and dividing the two sides of equation (3) with  $\text{cov}(x_k, F_k)$  and  $m_k$ , the equation is transformed as follows:

$$(4) \quad G = \sum_{k=1}^K \left( \frac{\text{cov}(x_k, F)}{\text{cov}(x_k, F_k)} \cdot \frac{2\text{cov}(x_k, F_k)}{m_k} \cdot \frac{m_k}{m} \right) = \sum_{k=1}^K R_k G_k S_k = \sum_{k=1}^K C_k$$

Where,  $R_k$  represents the correlation between expenditures of the k-th component with total expenditures.  $G_k$  measures the Gini coefficient for each one of the expenditure components as described above and  $S_k$  is the contribution to total expenses of the k-th component.  $C_k$  represents the product of the three decomposed elements for the k-th component. Any change in the variables  $R_k$ ,  $G_k$ , or  $S_k$  will be reflected in changes of  $C_k$ . The greater the value of one of these components the more  $C_k$  increases, the more the expenditure inequality increases (as  $G = \sum_{k=1}^K C_k$ ).

Furthermore, in this article, two measures of relative effects of inequality are calculated: the relative inequality of expenditures, which is calculated as the ratio between the share of inequality to the total expenditure attributed to each component ( $I_k = C_k/G$ ) with the share on expenditures of the k-th component ( $S_k$ , formula 4), and the relative marginal effects, calculated as the difference of the above.

<sup>1</sup> For a more detailed list of goods and services that are included in each category, refer to Table 2 in the appendix.

Finally, for each component, we calculate the elasticity to determine whether the goods and services are consumed and perceived as luxury, necessary or inferior goods:

$$(5) \quad e = \frac{R_k G_k}{G}$$

The elasticity takes three values: if  $e > 1$ , the good is consumed as a luxury good, if  $0 < e < 1$  the good is consumed as a necessity good and if  $e < 0$  the good is consumed as an inferior good. Using the elasticities of the expenditure components, the Engel's curves for each component are sketched.

## DATA

The data used for the analysis was derived from the Living Standards Measure Survey (LSMS) for 2012. The LSMS is a survey conducted by INSTAT with a 4-year frequency and a sample of 6672 households, providing information on various topics including data on household expenditures on multiple categories of goods and services. Although the information dates to 2012, the database is still suitable for analysis since: 1) Consumer theories suggest that individual smooth consumption throughout life and particularly in unchanged economic and social conditions consumption does not change significantly 2) the analysis does not use absolute values of expenditures, but cumulative averages and cumulative distributions of the population. However, this analysis would be interesting to repeat and compare with the results of the current LSMS.

Although many consumption components are measured using household expenditures, there are significant differences between the two concepts. First, expenditures exclude consumption that is not based on market transactions. Given the importance of domestic production in developing countries, this can be a significant difference. Second, expenditures refer to the purchase of a certain good or service. However, some goods cannot be consumed immediately or may have permanent benefits. In this article, we will be using expenditure inequality as a proxy for consumption inequality as the database does not allow access to real household consumption data.

Data on in-home and out-of-home food expenses are collected in two separate 14-day periods in the form of a diary for all households. These expenditures are representative of the average monthly household expenditures and are therefore multiplied by '26' in order to obtain the value of annual food consumption. Other expenditure questions are grouped in the survey into three major categories: with a frequency of one-month, six-month and 12-month; providing information on a variety of products, which for the purpose of the analysis are grouped according to expenditure components and multiplied respectively with 12, 2 and 1 to give the relevant annual consumption values. Total annual expenditures are calculated as the sum of the amounts in each category. Expenditures on insurance and voluntary pension's schemes, as well as tax payments, are not included in the value of the total.

A limitation of the data is that, a large number of reported “zeros” would bring an increase in the Gini of expenditures, thus if households voluntarily not report or underreport would increase artificially the coefficient. In order to obtain more accurate and unbiased values from the sample, we have dropped households that did not answer any of the questions about spending; those who answered questions about food, but none of the questions about the 1, 6, and 12-month spending and households who did not answer questions about 1-month spending, whose products are indispensable for the household. Moreover, these exclusions are made to avoid a deflated value of total household expenditure. After dropping these observations the sample resulted to be a total of 4987 households, which are sufficient to provide significant results.

On the other hand, the 2012 LSMS does not provide data on total self-reported household consumption, which could serve as a reference over the outcome and calculations, and moreover data on shelter, which could be a valuable addition to the expenditure components list.

## RESULTS

Table 1 shows the results of the analysis. The first column ( $C_k$ ) is calculated by using the second column ( $R_k$ ) the third ( $G_k$ ) and the fourth ( $S_k$ ). The fifth column ( $I_k$ ), the sixth ( $I_k/S_k$ ) and the seventh ( $I_k \cdot S_k$ ) present relative effects of the decomposition. The last column presents the elasticity for each component of expenditures.

**First, the Gini coefficient of total expenditures is equal to 0.371, which is lower than the Gini coefficient of total income of 0.403 calculated from the same data.** Despite inequality is more prominent in income, it is not reflected to the same extent on household expenditures, thus households, regardless of income, spend same amounts on certain goods.

Meanwhile, looking at the third column, we can see that the Ginis of the expenditure components take high values. The lower the value the higher the probability of expenditures being distributed equally comparing to other expenditures and the higher the value the lower the probability of expenditures being distributed equally comparing to other expenditures. Entertainment, furnishing and equipment reach a value almost equal to 1, which implies that the probability that these expenses are being equally distributed is extremely low. The lowest coefficient comes from fuel and utilities, followed by household operation and food, which are commodities and services which generally a household cannot live without.

Meanwhile, as seen in column 1, the components that have a lower Gini are those that have contributed more to the calculation of Gini's total value versus components with a higher Gini, which implies a biased reduction of Gini's of the total. Food, household operations and fuel and utilities have the lowest coefficient and at the same time are the main contributors to the value of total

inequality (see column 5,  $I_k$ ). On the other hand, furnishing and equipment, transportation and entertainment have the highest Gini component, but also give the lowest contribution to total inequality.

Indeed, the majority of total expenditures consist of food, fuel, utilities and household operations, which account for 76% of total household expenditure. Besides, the other components have a small share on household expenditures, for example, entertainment constitutes only 3% of the total expenditures of the average household, suggesting that basic consumption (and as such are reflected in the last column of elasticities) comprise the vast majority of household expenditures and this explains the calculated Gini's values and respective contributions.

So in this context, regardless of Gini's low total value, the Gini coefficients of the expenditure components should not be overlooked as they are a better indicator of inclusive inequality.

Table 1. Results: Gini of expenditures decomposition

Expenditure Component	Contribution to total inequality ( $C_k$ )	Correlation with rank of total expenditures ( $R_k$ )	Gini of Component ( $G_k$ )	Expenditure Share ( $S_k$ )	Share Expenditure Inequality ( $I_k$ )	Relative Expenditure Inequality ( $I_k/S_k$ )	Relative Marginal Effect ( $I_k \cdot S_k$ )	Elasticity ( $R_k \cdot G_k / G$ )
Food	0.090	0.636	0.484	0.292	0.243	0.832	-0.049	0.830
Transportation	0.012	0.449	0.888	0.030	0.032	1.067	0.002	1.074
Entertainment	0.027	0.788	0.906	0.038	0.072	1.894	0.034	1.924
Alcohol and Cigarettes	0.033	0.555	0.799	0.074	0.089	1.203	0.015	1.195
Household Operations	0.083	0.756	0.477	0.230	0.224	0.974	-0.006	0.972
Apparel and Services	0.019	0.611	0.596	0.054	0.051	0.944	-0.003	0.982
Furnishing and Equipment	0.011	0.670	0.923	0.017	0.030	1.765	0.013	1.667
Fuel and Utilities	0.083	0.742	0.469	0.238	0.224	0.941	-0.014	0.938
Other	0.013	0.536	0.818	0.029	0.035	1.207	0.006	1.182
Total	0.371	1.000	0.371	1.000	1.000	1.000	0.000	

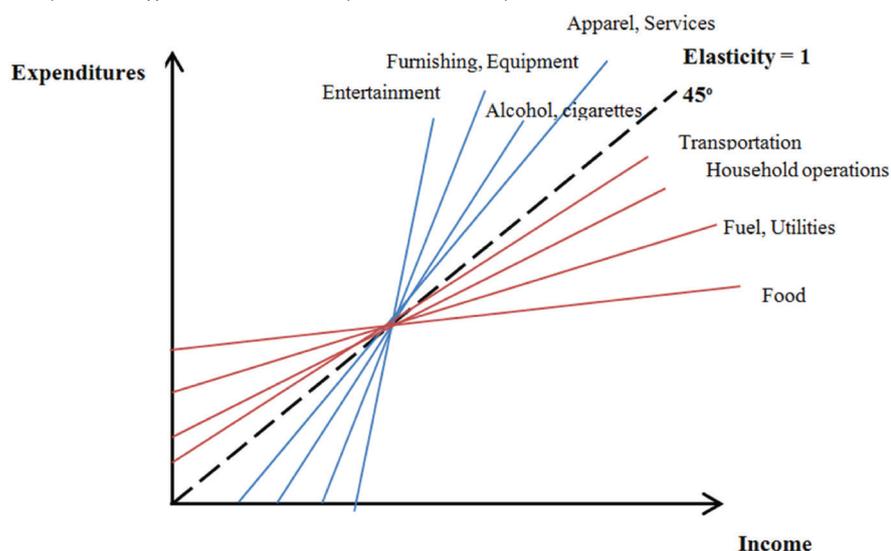
Source: The author's calculations (LSMS 2012 used)

Second, by analyzing the elasticities in the last column, we can see that entertainment, which as mentioned is only 3% of total expenditure, has a significantly higher elasticity coefficient, indicating that this commodity is considered a luxury good. The same applies to furnishing and equipment, transportation, alcohol and tobacco. Based on this grouping of goods and services, no component displays inferior goods tendencies, as these categories are quite broad and diverse and the aggregate effect can fade the effects on a couple of commodities that are perceived as such.

The value of the elasticity is significantly influenced by the correlation with the rank of total expenditure ( $R_k$ ) and the Gini of the component ( $G_k$ ). A high correlation and a high Gini result in goods and services displaying a high elasticity. As an example: food, household operations, fuel and utilities, are relatively inelastic, while entertainment, furnishing and equipment are relatively elastic.

Below we present a rough outline of the Engel's curves of the components of total expenditure, based on the values of elasticities. For comparison purposes, all curves are built on the same graph. These curves present a relationship between income and expenses and have a positive slope. Measuring elasticities avoids the need to include data on household income in the analysis.

Graph 1. Engel's curves for expenditure components



Engel's curves for luxury goods ( $E > 1$ ) start on the horizontal axis, which means that up to a certain level of household income these goods are not consumed. While for necessity goods ( $E < 1$ ), Engel's curves start at the vertical axis, which means that even when household income is zero, these goods are consumed in positive quantities and the 45-degree curve representing  $E = 1$  starts from the origin. Cross cutting does not necessarily mean that these curves will intersect at this point on the 45-degree line, but is rather used to facilitate the visualization.

Finally, the relative marginal effects presented in column (7) point to the possibility that an increase in expenditures for a particular component can lead to a decrease in inequality. To achieve this  $I_k > S_k$  so the coefficient should have a negative value. A positive coefficient implies that an increase in expenditures for this component will result in an increase in inequality. **In our case, an increase in expenditures on food, household operations, apparel and services and fuel and utilities will bring a decrease in inequality.** An increase in expenditures for these components may come from tax cuts on basic products and services or other facilitating or incentivizing policies. Also, further taxation or constraining policies on luxury commodities, which have positive relative marginal effects will help achieving the same result, namely a reduction in the inequality of total expenditures.

## CONCLUSIONS

The article finds a Gini income coefficient of 0.403% and a Gini expenditure coefficient of 0.371%, two values which suggest that the spending behavior of households is influenced by income but the inequality in the distribution of expenditures is lower than that in the income distribution. However, inequality deepens when calculating decomposed with Gini coefficients for components of total expenditure. In Albania, 78% of total expenditures refer to basic household goods and services, which have an impact on lowering artificially the Gini's coefficient. Certain components of expenditure as entertainment, transportation, furnishing and equipment constitute a very small proportion of average household expenditure and therefore have a probability almost one to be distributed unevenly among the population. In this context, the decomposition of the coefficient by categories of goods and services provides more information on inequality, purchasing power and consumption.

Indeed, only basic goods and services are consumed as a necessity, and any other expense, including entertainment, transportation, apparel, etc., are considered luxury expenses and as such their share to total expenditures is low in a large number of households. Since this analysis does not take into account household income, prices, or household characteristics, it is not possible to reason behind the optimization of household expenditures and consumption. These findings suggest for heterogeneity in the income and expenditures of households and the significant impact that sustainable and facilitating policies can have, which should be taken into account in the analysis and decision-making process of monetary policy and financial stability in the long run. In developing countries such as Albania, where spending is geared towards indispensable goods and services, market fluctuations have a major impact on consumption, welfare, and household debt levels [Cirera, Masset (2010)].

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## APPENDIX

Table 2 Goods and services included in the expenditure components

Component	Goods and Services
Food	Food at home Food outside home
Transportation	Road transport (bus, taxi etc.)and rail Sea, water transport Air transport
Entertainment	Recreation (cinema, theatre, opera, concerts, circus, music, sport) Holidays in the country and abroad Excursions Books, journals, magazines Sport and hobby equipment
Alcohol and cigarettes	Alcohol and cigarettes
Household operations	Communication Internet, Wi-Fi Items of personal care Home cleaning items Domestic services (child and elderly care, cleaning etc.) Dry cleaning Postal services Food and services for pets Courses
Apparel and services	Men apparel, clothing and shoes Kids apparel, clothing and shoes Women apparel, clothing and shoes Fashion accessories Tailor services Cloth and sewing/knitting kits Banking, notary services etc. Personal care services
Furnishing and equipment	Renovation and maintenance of the house Furniture Small electric and nonelectric appliances Large electric and nonelectric appliances Kitchen utensils Linens, covers etc.
Fuel and Utilities	Fuel Electricity Water supply
Other expenses	Gifts Transfers outside the family Charity Gamble losses Expenses on family parties Other expenses in the past 1-month, 6-months, 12-months