

EFFECT OF INFLATION DIFFERENTIALS ACROSS INCOME GROUPS ON
INEQUALITY MEASURES: THE TURKISH CASE

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ABSTRACT

EFFECT OF INFLATION DIFFERENTIALS ACROSS INCOME GROUPS ON INEQUALITY MEASURES: THE TURKISH CASE

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The official inflation rate reflects the inflation of a typical urban household in an economy. However, inflation rates across income groups may diverge from each other since different income groups have different consumption patterns. The probability of observing inflation differentials across income groups increases when there are high income inequality and high food inflation in an economy. In addition, high inflation environment and frequent supply shocks may increase this probability more. Therefore, we may observe inflation differentials across income groups more in developing countries. As a result of this, we may observe difference between nominal and real inequality measures. We examine inflation differentials across income groups and their effect on Gini coefficient in Turkey for 2003-2018 by using Household Budget Survey (HBS) and consumer price data of TurkStat. We find that poor households experience slightly more inflation than rich households on average in 2003-2015. However, rich households experience slightly more inflation than poor households on average after 2015 and during 2003-2018 in Turkey. As income gap widens, inflation difference changes in detriment of poor households. Increase in inflation of transportation plays an

important role in changing sign of inflation differentials across poor and rich households after 2016. Moreover, we conclude that real Gini coefficient is not statistically different from nominal Gini coefficient since inflation differentials across income groups are not statistically significant in Turkey during 2003-2018.

Keywords: Inflation differentials, income groups, real inequality measure, Turkey, Gini coefficient

ÖZ

GELİR GRUPLARI ARASI ENFLASYON FARKLILIKLARININ EŞİTSİZLİK ÖLÇÜLERİNE ETKİSİ: TÜRKİYE ÖRNEĞİ

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Resmi enflasyon oranı ekonomideki tipik bir kentli hanehalkının enflasyonunu yansıtmaktadır. Ancak gelir gruplarının enflasyon oranları gelir gruplarının farklı tüketim kalıpları olması sebebiyle birbirinden farklılaşabilir. Bir ekonomide yüksek gelir eşitsizliği ve yüksek gıda enflasyonu varken gelir grupları arasında enflasyon farklılıkları gözlemleme ihtimali artar. Ayrıca, yüksek enflasyon ortamı ve sık görülen arz şokları bu ihtimali daha da artırabilir. Bu nedenle, gelir grupları arası enflasyon farklılıklarını geliştirmekte olan ülkelerde daha fazla gözlemleyebiliriz. Sonuç olarak, reel ve nominal eşitsizlik ölçüleri arasında da farklar gözlemleyebiliriz. Biz bu tezde TÜİK tarafından açıklanan Hanehalkı Bütçe Anketi (HBA) ve tüketici fiyat verisini kullanarak gelir grupları arası enflasyon farklılıklarını ve o farklılıkların Gini katsayısına etkisini Türkiye'nin 2003-2018 periyodu için inceliyoruz. Türkiye'de 2003-2015 periyodunda fakir hanehalkları ortalamada bir miktar daha fazla enflasyona maruz kalmaktadır. Ancak 2015 sonrası ve 2003-2018 periyotlarında zengin hanehalkları ortalamada bir miktar daha fazla enflasyona maruz kalmaktadır. Hanehalkları arasındaki gelir farkı açıldıkça, enflasyon farklılıkları fakir hanehalkları aleyhine

değişmektedir. Ulaşım harcama grubunun enflasyonundaki yükseliş 2015 sonrası zengin ve fakir hanhalkları arası enflasyon farkının işaret değiştirmesinde önemli rol oynamaktadır. Ayrıca, Türkiye’de 2003-2018 periyodunda gelir grupları arası enflasyon farklılıklarının istatistiki olarak farklı olmaması sebebiyle reel Gini katsayısının nominal Gini katsayısından istatistiki olarak farklı olmadığı bulunmuştur.

Anahtar Kelimeler: Enflasyon farklılıkları, gelir grupları, reel eşitsizlik ölçüleri, Türkiye, Gini katsayısı

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LIST OF ABBREVIATIONS

CBRT	:Central Bank of Republic of Turkey
CES	:Consumer Expenditure Survey
COICOP	:Classification of Individual Consumption by Purpose
CPI	:Consumer Price Index
EPI	:Expenditure Price Indices
HBS	:Household Budget Survey
OECD	:Organisation for Economic Co-operation and Development
OLS	:Ordinary Least Squares
RPI	:Retail Price Index
TurkStat	:Turkish Statistical Institute

CHAPTER 1

INTRODUCTION

Inflation rate is one of the three leading macroeconomic variables, others being the growth and unemployment rate. It affects all agents in the economy. It affects the leading official institutions via two channels. It is the target variable in modern central banking and therefore watched carefully by the central banks. Also, governments adjust their spending by taking inflation into account. It affects the firms through different channels. It affects the competitiveness of the firms in the global goods and services markets, and the direction of the capital flows through the uncertainties caused by a high inflation environment. Thus, it affects the exchange rate, and this may affect the production cost of the firms. Also, inflation rate influences real interest rate and, thus, investment of the firms. Moreover, it is crucial while evaluating the stability of the economy. A high inflation environment may cause main macroeconomic variables such as consumption, investment, and growth rate to fluctuate due to the deterioration of the economic agents' expectations. The inflation rate is also essential for households. With its effect on the purchasing power of households, the inflation rate directly affects the daily life of consumers. It is a significant factor in the determination of the wage increases. Moreover, it may affect income inequality in the economy. Because of these reasons, examining inflation properly and clarifying its structural, conjunctural, political, or geographical reasons, together with its implications, is essential. In addition, it is very important to investigate the inflation differentials across income groups in an economy. In this study, we investigate the effect of inflation differentials across income groups on Gini coefficient. Its effect on inequality measures is one of the most important implications of inflation differentials across income groups in an economy. Thus, we have examined it in detail. However, there are some more implications of inflation differentials on various aspects of the economy. It may affect the update of the minimum wage. If inflation rate of poor households higher than the official inflation rate, they may have loss of welfare since their wage cannot compensate the increase in their cost of living. In the same case, if poverty line

is updated according to official inflation rate then number of people who can be counted as poor and have the right to obtain government aids decreases. Moreover, tracking inflation rate of different income groups and expenditure groups that contribute to inflation differentials across income groups may enable the government to realize how their fiscal policies such as subsidies may affect different income groups. In addition, policymakers have the chance to see the volatility of inflation rates of different income groups when they track income group specific inflation rates. In this way, they can make policies when poor households suffer from higher volatility even though their inflation rate is equal with rich households on average. Finally, inflation differentials across income groups affect the real interest rate they experience, and monitoring income specific inflation rates may prevent possible monetary policy failures that happen due to those differentials. Together with the effect of inflation differentials across income groups on inequality measures, all these implications show the importance of calculating income specific inflation rates and tracking the evolution of inflation rate of expenditure groups that contribute to those differentials most. In this way, we can monitor the economic developments that will be unseen due to aggregation in the data and whose effects will be larger in the long run. Therefore, we can make better economic policies.

Inflation is a general increase in price levels. To measure it, a basket of goods and services is defined that reflects the consumption habits of society in general. Afterward, comparing the price of the basket throughout the years, the inflation rate is calculated. It is important to note that consumption basket represents the consumption habits of the typical urban household. However, there are different income or demographic groups in society, and their consumption habit may differ according to their income. As a result, the consumption basket of each income or demographic group may differ, and some of them would experience different inflation rates compared to the representative household. One of the reasons for such a difference is the inflation dynamics of different income groups. Thus, it is useful to investigate the different inflation dynamics of income groups. There are some factors such as downward pressure on prices due to high degree of competition in some markets that target rich households (Jaravel, 2016), resource constraint of poor people preventing them from utilizing bulk discounts (Orhun & Palazzolo, 2019), shopping environment of poor people which make them observe higher prices (Chung & Myers, 1999) and lack of quality substitution of poor people preventing them from substituting to cheaper goods (Argente & Munseob, 2016). Moreover, different dynamics of developing and developed countries would cause to observe inflation differentials between

income groups. High inflation in developing countries may increase price dispersion and cause inflation differentials (Alvarez et al., 2019). High inequality in developing countries may differentiate the consumption baskets of different income groups, and frequent supply shocks may affect those baskets differently (Benlialper & Comert, 2013). Finally, a higher share of food expenditure of poor people together with high food inflation in developing countries may cause poor households in developing countries to experience higher inflation (Yorukoglu, 2009). All factors above are essential while explaining the inflation differentials across household groups. As a result of the inflation differentials across household groups, economic policies that consider only the inflation rate of the representative household affects some household groups negatively. For example, a low-income household that experiences an inflation rate higher than the official rate and gets a salary increase according to the official rate observes a decrease in purchasing power.

There are several studies that investigate inflation differentials across income groups for Turkey. Those studies examine Turkey and find different results about the income group that suffers from inflation differentials. Turkan and Yukseler (2008) examine the period of 2003-2005 and state that rich households experience higher inflation compared to poor households. In contrast, Gürsel and Sak (2008), Yüncüler (2013), Acar and Gürsel (2015), Gürsel et al. (2016) and Akcelik (2016) examine different periods ranging from 2003-2008 to 2003-2016 and states that poor households experience higher inflation compared to rich households. These studies show us that different income groups may suffer from higher inflation compared to other income groups at different times for various reasons in Turkey.

Inequality is one of the central themes of the economics literature and economic policies. Very high inequalities threaten the sustainable growth of the economy. Thus, policymakers regularly watch inequality indicators and make some policies accordingly. One missing point in the calculation of the inequality measures is that these calculations do not take inflation differentials across income groups into account. Studies calculating inequality measures generally treat each income group as if they experience the same inflation rate. However, this does not reflect reality. Household groups experience different inflation rates. Thus, their real incomes are affected differently. When some studies take this into account, they show that real inequality measures may differ from the nominal inequality measures significantly. Crawford

and Smith (2002), Collyer et al. (2019), Finn et. al. (2016), Rao (2000), Arndt et. al. (2015) examine UK, US, South Africa, South India, and Mozambique, respectively. They recalculate some inequality measures such as the Gini coefficient, Theil index, and mean log deviation taking inflation differentials into account and find that inequality is understated in those countries. Moreover, there are some studies that find the opposite results. Broda and Romalis(2009), Broda and Weinstein (2008), Goni et al. (2006) examine the US, Brazil, Columbia, Mexico, and Peru. They state that inequality is overstated in those countries. When we examine these studies, we can say that there are few studies that investigate developing countries about this topic in detail, and there are no studies for Turkey.

In this study, we analyze the effect of inflation differentials across income groups on inequality measures. First, we aggregate the price data of 7-digit COICOP level goods and services to 5-digit COICOP level to be able to match the price data with 5-digit COICOP level consumption data in HBS. Second, we calculate the weights of the 5-digit COICOP level goods and services in HBS utilizing 5-digit COICOP level price data. Third, we calculate general inflation rate with aggregated price data and weights which are found in the previous step. Fourth, we divide the households into quintiles, deciles, and ventiles utilizing the equivalised annual disposable income data in HBS and calculate inflation rate for each group. Finally, we calculate the Gini coefficient taking inflation differentials into account.

The main contribution of this study to the inflation and income inequality literature is that it is the, to the best of our knowledge, first study that investigates the effect of inflation differentials across income groups on inequality measures such as the Gini coefficient for Turkey. It will be a contribution to understanding the dynamics and evolution of the inflation differentials across income groups and its effect on income inequality.

There are four contributions of this study to Turkish inflation and income inequality literature. Firstly, this study works with the data of the longest period(2003-2018) for Turkey and becomes a better resource for analyzing the dynamics and evolution of the inflation differentials and real Gini coefficient. This study uses 5-digit COICOP level data, and this high degree of detail in products makes its results more reliable. This study analyzes the

relationship between income and inflation in detail by dividing households into quintiles, deciles, and ventiles according to equivalized annual disposable income. Lastly, this study shows the difference between real and nominal Gini coefficient by taking inflation differentials into account.

There are five main findings of this study. The first one is that while poor households experienced higher inflation rate compared to rich households on average in the period of 2003-2015, rich households experienced higher inflation than the poor households on average after 2015 and during 2003-2018 in general. This shows us that different income groups may suffer from higher inflation compared to other income groups at different times with various reasons. In addition, inflation differentials decrease as income gap widens across households. As another finding, 2016 was the turning point for the sign of inflation differentials across poor and rich households. Moreover, increase in inflation of transportation plays an important role in changing sign of inflation differentials across poor and rich households after 2016. In addition, our data problem which may be rooted in lack of quality adjustments in our method may be the reason why rich households experience higher inflation than poor households in general since it may increase the inflation of rich households. Lastly, real Gini coefficient is not statistically different from nominal Gini coefficient since inflation differentials across income groups are not statistically significant.

This study classifies households in three ways according to their income. While classifying households, we consider not only household income but also household composition. In this way, we obtain a more realistic income ranking across households. We divide households into quintiles(five equal parts), deciles(ten equal parts), and ventiles (twenty equal parts). As a result, we find that the poorest quintile experience 0.19 percentage points less inflation rate compared to the richest quintile on average. This number becomes 0.11 between the poorest and richest deciles. Finally, the poorest ventile is exposed to 0.08 points less inflation rate compared to richest ventile. Thus, we can say that rich households experience higher inflation and this difference decreases as income gap widens.

Main expenditure groups that determine the direction of inflation differentials are food and non-alcoholic beverages, alcoholic beverages and tobacco, housing, and transportation. While relative positions of other expenditure groups are stable in ranking of inflation rates of expenditure groups in pre-2016 and post-2016 periods, inflation in transportation increase faster than other groups and changes the sign of inflation differential between rich and poor households. While inflation of poor households higher than rich households before 2016, overall picture reverses after 2016 due to high inflation in transportation. Moreover, our data problem which may be originated from lack of quality adjustments may be another reason why we observe inflation differentials in detriment of rich households since this limitation plays like a factor that increase inflation rate of rich households.

Another finding is about the effect of inflation differentials on Gini coefficient. When we take inflation differentials into account, we see that real Gini coefficient do not diverge from nominal Gini coefficient significantly since inflation differentials across income groups are not statistically different from zero. However, we should keep in mind that calculations including quality adjustments may change the overall picture. Thus, we must see these real Gini coefficients as minimum values of real inequality.

The outline of the thesis is as follows. Chapter 2 reviews the literature on inflation differentials across household groups. Chapter 3 investigates the effects of inflation differentials across household groups on inequality measures. Chapter 4 presents data and methodology and calculates the Gini coefficient for Turkey taking different inflation across income groups into account. Chapter 5 concludes the thesis and examines possible policy implications.

CHAPTER 2

INFLATION ACROSS INCOME GROUPS

2.1 Introduction

We analyze the inflation differentials across household groups, its reasons, and implications in this chapter. We may observe inflation differentials across household groups. This may happen across income or demographic groups. For example, the poor may experience a higher inflation rate than the rich, or the elderly may experience higher inflation than young households. The reason for this differential is that different household groups may have different consumption baskets. Thus, changes in the relative prices of goods and services such as health care, fuel, food, etc. may affect the inflation rate of households differently. There may be several reasons for such inflation differentials. Firstly, the factors such as resource constraint (Bell & Hilber, 2006), shopping environment (Kaufman et al.,1997) and lack of quality substitution of poor households (Jaimovich et. al.,2017) together with downward pressure on prices due to high degree of competition in some markets that target rich households (Faber & Fally, 2017) increase the inflation differentials across two groups. Secondly, different dynamics of developing and developed countries may cause to observe inflation differentials between income groups. High food inflation, together with a higher share of food expenditure of poor people in developing countries, may increase the inflation rate of poor people in developing countries (Anand et al.,2015). Higher inflation in developing countries may cause larger price dispersion, and inflation differentials across income groups (Van Hoomissen, 1988). High-income inequality observed in developing countries may differentiate the shares of expenditure groups in the consumption basket of different income groups, and recurrent supply shocks focused on some expenditure groups may affect different income groups differently (Klau & Mohanty,2000). Inflation differentials across household groups may have some implications on policymaking. The poverty threshold may change, and

this may change the number of poor households in the country (Collyer et al., 2019). Higher inflation of poor households may require central bank to conduct different policies to secure the standard of living of poor households (Oosthuizen, 2007). Finally, inflation differentials across income groups may affect the subsidization policy of the government (Mortaza & Hasnayan, 2008). Because of these reasons, it is important to investigate inflation differentials across rich and poor households and their implications in developing countries.

In the next section of this chapter, we will discuss the studies that investigate the inflation differentials across household groups, the persistence of these differentials, and the reasons for those differentials. Then, structural dynamics that differentiate the inflation rate between developing and developed countries are examined together with the reasons why poor households generally experience higher inflation. In the last section, we will investigate the implications of inflation differentials across household groups.

2.2 Literature Review

We can discuss the studies conducted about inflation differentials across household categories in four groups.

Studies in the first groups examine inflation differentials across different income or demographic groups and claim that there are no persistent inflation differentials across household groups. Oosthuizen (2007) examines South Africa for the period of 1998-2006. South Africa was one of the unequal countries in the world because of the apartheid regime and still have this structural characteristic in its economy. Starting from this point, the author questions whether the official inflation rate represents the inflation of the average household in such an unequal economy. There are two types of weighting in the calculation of inflation: plutocratic and democratic. Normally, official inflation rates are calculated by using plutocratic weighting. In this method, while calculating the weight of a product, the summation of expenditures of households for the product is divided by all consumption of households. The author states that such a method represents the inflation

of the upper percentiles of expenditure since their expenditure share is higher in total expenditure. As an alternative, democratic weighting can be used. In this method, the share of a product is calculated in the expenditure of each household, and then the average of those weights gives the weight of the product. The author calculates the inflation rates with both methods utilizing data of 2000 Income and Expenditure Survey and price indices of Statistics South Africa. Then, he examines the difference between those two inflation rates to analyze how much the current method represents poor households' consumption patterns. As a result, the author states that over shorter periods, the difference between the two methods can be significant, but there is no persistent difference in the long run. Michael (1979) examines the US by constructing Expenditure Price Indices (EPI). With the household-specific Laspeyres price indices, the author finds that inflation rates range from 2% to 13% for the first six months of 1974. Also, this study finds that 20% of households experienced inflation of either less than 4.6 % or greater than 7.4 % in the first six months of 1974 even though the inflation rate calculated for more than 11000 households was 6%. In addition to this variation, there exists a difference between the inflation rates of different income or demographic groups. For example, the inflation rate for low income and the elderly rose faster compared to other groups for the year 1973. However, the author states that the importance of this difference is diminished by two factors. First, inflation rate dispersion within groups is still significant and tends to dominate between-groups differences. Second, inflation differences between household groups are not stable over time. Bridges and Packard (1981) examine the elderly in the US and test the claim that inflation of the elderly is higher than the official rate since the price of the expenditure groups such as health care which covers a relatively higher share of their total expenditure rise faster than average. To test this claim, the authors construct a price index for the elderly for the period of 1967-1979 using the expenditure shares of the elderly in 1972-73 CES (Consumer Expenditure Survey) and compare this index with the official one. As a result, this study reveals that the generated price index for the elderly rose 6.8 % per year, while the official rate rose 6.9%. This finding shows that there are no significant differences between the inflation of the elderly and the official rate. Studies above claim that the issue of inflation differentials across household groups is not very important, and policymakers do not need to do anything about it since the inflation rate of all household groups will converge to each other. However, some studies claim the opposite, as discussed below. Thus, inflation differentials across household groups is a topic that we should investigate. Moreover, even if we do not observe persistent inflation

differentials, the volatility of the inflation rate may change across income groups. If the volatility of the inflation rate is higher for poor people, the credit constraint of poor people prevents them from smoothing their consumption and causes welfare loss for them when they experience a higher inflation rate.

The studies in the second group investigate whether poor people's inflation rate differs from the official rate. These studies claim that there are persistent inflation differentials across income groups. For the period of 1964-1972, Muellbauer (1974) examines the UK by calculating the cost of living indices for different expenditure levels estimating the linear expenditure system of demand equations using National Income and Expenditure Blue Book. This study finds that prices of the necessities rise faster than luxuries, and the cost of living of poor people increases more rapidly. For the period of 1970-1980, Marlin and Shorrocks (1982) examine the inflation experience of low-income households in Canada by calculating a price index for them using Consumer Price Index (CPI) and Survey of Family Expenditure data. For the constructed price index, the authors do their calculations based on the seven main components of the CPI. They fix the weights of seven main components according to the 1974 weights and construct the price indices for different types of households. As a result, the authors find that ten years of inflation of low-income households is 6.3 points higher than the official inflation, which is 116.7. Moreover, the study reveals that the spread between two inflation rates reaches 11.5 percent when the shelter component of CPI is excluded from calculations. For the period of 2004-2013, Kaplan and Wohl (2016) examine US households by calculating the inflation rates at the household level using scanner data. Scanner data is obtained by scanning the bar codes of products sold at the point of sale in retailers. This data includes information about prices, quantities, or other characteristics of the goods sold. In the study, the authors use a dataset that contains prices and quantities obtained from 500 million transactions made by 50,000 U.S. households. The authors claim that inflation differentials across households not only come from different consumption bundles but also from different prices paid for the same goods. This claim is against the previous assumptions of the literature since studies in this topic generally assume that prices paid for identical goods are the same, and inflation differentials are due to the different consumption bundles. Thanks to the large scanner data, the author tests his claim by analyzing the cross-sectional variation of household-level price indexes, the cross-

sectional variation of prices, and the cross-sectional variation of bundles. The result is that low-income households experience higher inflation. Two-thirds of the cross-sectional variation in household-level price indexes is due to cross-sectional dispersion in prices paid for the same goods, and one-third is due to different consumption bundles. However, the author states that this data covers only 30% of the household consumption and exclude main expenditure groups such as education, health care, and gasoline. Thus, it may have limitations in measuring inflation inequality. Utilizing the UK Family Expenditure Survey, Crawford and Smith (2002) examine the UK for the period of 1976-2000. This study challenges the expression of “The RPI(Retail Price Index), while not applying to any one household or person, will be close to the experience of inflation for the great majority of households” that exists in The RPI Technical Manual, and reveals that the official inflation rate is not a good representative for the inflation experienced by households since only one-third of the households experience an inflation rate within the one percentage point of the official rate. Furthermore, the average inflation rate for the poorest 10 percent of households is 6.8 percent, while it is 7.1 for the richest 10 percent of the households. This difference reaches up to 5 percentage points in some periods and sustains its persistency throughout the years. There are some studies that investigate the Turkish case on this topic. Turkan and Yukseler (2008) examine the households in Turkey in terms of the labor force, income, expenditure, and poverty. In this wide content, the authors, firstly, investigate the expenditure patterns of different income groups. They find that share of necessities (food, clothes, and housing) in the total expenditure of the poorest quintile is 74.9% in 2003, while it is 53% for the highest quintile. The same shares are 69.5% and 47.9% in 2005, respectively. Starting from these differences, they analyze the price movements of these expenditure groups and find that the price of necessities increases less than other groups. Then, the authors calculate inflation rates of one-fifth with the highest incomes and one-fifth with the lowest incomes for the period of 2003-2005. As a result, they reveal that these two income groups experience similar inflation rates in 2003 and 2004. However, one-fifth with the lowest income experience 7.7% inflation in 2005, while it is 9.3 for the one-fifth with the highest incomes. Gürsel and Sak (2008) examine the period of January 2003 to March 2008 by comparing the inflation rates of the same income groups in Turkey. Although there is a study that compares the inflation of two extreme income quintiles for the period of 2003-2005, they want to reexamine the inflation differentials across income groups extending the period to 2003-2008 since the price of food, which covers a higher portion of the budget of lowest

quintile, rise faster compared to other expenditure groups in recent years. As a result, they find that inflation increases as we move from highest to lowest quintile. There exists a cumulative 5.2% inflation difference between two extreme income groups for the five years period. Yüncüler (2013) examines the period of January 2003 to June 2013 by comparing the inflation rates of the income quintiles. For doing that, the author utilizes from HBS (Household Budget Survey) and TurkStat price data. Goods and services are represented by different COICOP (Classification of Individual Consumption According to Purpose) levels, which indicates the details of the product in price and expenditure data. In this study, the author uses 3-digit COICOP level data and replicates the shares of the products in different household budgets. Then, he constructs the Laspeyres chained index structure. Finally, the author finds that one-fifth with the lowest incomes experience annual 0.87 points higher inflation rate compared to the one-fifth with the highest incomes. While the direction of difference changes in different periods, the poorest group generally experiences higher inflation. Acar and Gürsel (2015) and Gürsel et al. (2016) examine Turkey for the periods of 2003-2014 and 2003-2016. Although there are previous studies that investigate the inflation differentials across income groups, these studies extend the time periods and show the evolution of the inflation differential over time. In the first study, the authors find that inflation of the one-fifth with the lowest incomes is cumulatively 18.1 points higher than one-fifth with the highest incomes. In the second study, the authors find that poorer households suffer from 21.4 points higher cumulative inflation compared to wealthier households. These series of studies indicate that there is an inflation differential between lowest and highest income quintiles, and this differential is getting bigger in time. Akcelik (2016) investigates the period of 2003-2015 utilizing from the Household Budget Survey and price data of TurkStat. While investigating inflation differentials across income groups, the author uses 5-digit COICOP level data to form more reliable weights of the expenditure groups in household budgets. Moreover, he uses equivalized annual disposable income and considers household size while forming income quintiles. As a result, he finds significant inflation differentials between the richest and poorest quintiles, deciles, and ventiles. There is an annual 0.65 percentage points difference between richest and poorest quintiles, annual 0.78 percentage points difference between richest and poorest quintiles, and annual 0.87 percentage points difference between richest and poorest quintiles in the period of 2003-2015.

The studies in the third group consider not only income differences but also demographic differences. These studies claim that there are persistent inflation differentials across demographic groups. For example, they investigate the elderly and households with children while investigating different inflation rates across different household groups. For the period of 1987-1993, using the 1982-84 Consumer Expenditure Survey, Amble and Stewart (1994) examine the US by constructing an experimental price index for the elderly. The 1987 amendments to the Older Americans Act of 1965 directs Bureau of Labor Statistics to develop an experimental index for three household groups for the period of December 1982 to December 1987: All Urban Consumers (CPI-U), Index for Urban Wage Earners and Clerical Workers (CPI-W), and experimental index for Americans 62 years of age and older. In those calculations, the experimental price index for the elderly increase slightly faster than other groups. In this study, the authors update the indices for the period of 1987-1993. As a result, they find that the experimental index designed for the elderly again rose slightly faster than others. While the experimental index increases 28.7% for this period, CPI-U and CPI-W increase 26.3 and 25.5, respectively. McGranahan and Paulson (2006) examine the US and state that different households experience different inflation for the period of 1982 to 2004. The authors use Consumer Expenditure Survey data and combine it with price data to calculate monthly inflation rates for thirty-two different demographic groups, including the urban population. As a result, they find that inflation for different groups fluctuates between 195% to 212% with the mean of 201%, and household group with the highest inflation is the one whose head or spouse is 65 years of age or older. This corresponds to 5.5% higher inflation over 23 years. Oosthuizen (2013) examines South Africa and calculates different inflation rates for different household types. To do this, the author utilizes the Income and Expenditure Survey of 2000 and price data obtained from Statistics South Africa. Considering policy relevance, the author constructs new weights and price indices specific to different household types such as grant recipient households, unskilled worker households, unionized worker households, public and private sector worker households, formal and informal sector worker households, households with unemployed members and households with children. Among these, some groups experience inflation rates close to the urban household, but some of them experience higher inflation. For example, the inflation rate of urban households between January 1997 and December 2008 was 134.8. However, the inflation rate of grant recipients and unemployed households was 149.7 and 145.8, respectively. Chang et al. (2004) examine Taiwan by constructing group-specific price indices for the period of 1991-1996. This study finds that the poorest group faced an inflation rate that was 0.15 percentage point higher than

the general population and 0.43 percentage point than that of the wealthiest group. Also, there are some characteristics that affect the inflation rate of those households. Households with the second-lowest income level, households whose head is under 20 years of age, households with children and households residing in urban areas experience higher than average inflation rates. Conversely, households with the highest income level and households whose head is in the 20-34 age group experience lower than average inflation rate. Moreover, most importantly, this study states that these differentials are persistent and have long-run effects on inequality. Idson and Miller (1999) examine the US by calculating a price index for the families with children for the period of 1968 to 1987. The authors do this to analyze the effect of varying consumption habits for families with and without children on child poverty. Although they find that having children increases the cost of living for a family, it decreases the inflation rate experienced by the household. To analyze this surprising result, they do a multivariate analysis and show that the reason for lower inflation experienced by households with children is their age. In this study, younger households experience lower inflation, and households with children are younger compared to the ones that do not have children. Because of this reason, households with children are exposed to lower inflation. However, when the age of the households is constant, they show that having children changes consumption pattern in a way that increases inflation persistently.

The studies in the fourth group investigate the factors that affect inflation differentials across household groups. For the period of 1972-1982, Hagemann (1982) examines the US and do a multiple regression analysis to investigate inflation differentials across household groups and the expenditure groups that cause those differentials. In the analysis, the author regresses the CPI-U to several variables, including the household type and 38 expenditure categories. After showing inflation differentials across households, the author determines the relative contribution of some consumption components to those differentials. For example, the food at home, fuel oil, natural gas, electricity, medical care services, and hospital care and insurance contribute to the gap between retirees and CPI-W households, while housing, telephone services, and mass transportation contribute negatively to this gap. For the period of 2006-2007, Mortaza and Hasnayan (2008) examine Bangladesh to calculate inflation rates for different income groups utilizing Income and Expenditure Survey 2005. For this purpose, the authors, firstly, divide the households into four: hardcore poor, moderate poor, middle income, and rich. Then, they calculate the inflation rate for these groups, food inflation for this period,

and share of food in the budget of these household groups. As a result, the study finds that food inflation is higher than the official inflation and share of food expenditure increases as we go from rich to hardcore poor. Thus, they state that high food inflation is one of the major factors that cause the poor household to experience high inflation. For the period of 1987-2001, Hobijn and Lagakos (2003) examine the US by constructing different price indices for different household groups. Those household groups are households that live in an urban versus a rural area, households whose reference person is white versus non-white, the elderly versus the non-elderly, poor versus other households, and households with kids less than 18 years old and other households. This study reveals that disparities between inflation rates of the households are due to mainly relative prices of three goods categories: education, health care, and gasoline. Moreover, the authors state that high inflation of the elderly is due to their high health care expenditure, and inflation of the poor is very sensitive to fluctuations in gasoline prices. Walsh and Yu (2012) examine 31 Chinese provinces, municipalities, and autonomous regions and Indian states for the periods of 1994-2006 and 1990-2004, respectively. The authors investigate the effect of food and nonfood inflation on inequality in those states. For this purpose, they regress inequality measure of the state, Gini coefficient or Theil index, to inflation data and find that nonfood inflation increases the income inequality while the effect of food inflation is mixed, which we can translate as nonfood inflation affects poor people more negatively and food inflation is neutral in this respect.

As we discussed in the studies above, persistent inflation differentials may affect the poor people or some demographic groups negatively. Although there are some studies that claim the opposite of this, the chance of poor people being negatively affected by persistent inflation differential is a topic to dwell on. Because income inequality in the society becomes higher than it is assumed in that case. Increasing inequality threatens the sustainable growth of the economy and results in social unrest. Thus, this is an essential topic that we should investigate and understand to achieve a sustainable and fair economy.

To understand the effect of inflation differentials on poor people, we first investigated the studies examining the factors that increase inflation of the poor people relative to rich people. Studies below try to explain higher inflation of the poor relative to rich, and we can classify them as follows:

Studies in the first group inspect the effect of different degrees of competition and firm productivity among sectors on the poor households' inflation. The degree of competition may be higher in some product segments, and this may create more incentives for firms to innovate in that sector. As a result of this, customers of that segment may experience lower relative prices due to the downward pressure of competition on prices. Whether the customers are poorer or richer households is an important point in investigating inflation differentials across income groups. The following studies examine this issue and find that differences in competition and firm productivity among sectors create inflation differentials across income groups. Using scanner data from the retail sector and CEX-CPI data, Jaravel (2016) examines the US for the period of 2004-2015. He states that annual inflation for retail products is 0.66 points higher for the lowest income quintile compared to the highest income quintile. To explain this difference, the author does various and reach the following results. Firstly, he states that the portion of national income serving to high-income households increased due to the growing number of households entering high-income brackets and rising inequality. As a result of this, firms started to serve this income group predominantly to take advantage of growing demand. Thus, product innovations and new product introduction concentrated here. The authors state that increasing degree of competition in those segments created downward pressure on markups and, consequently, on prices. Thus, high-income households more tend to observe lower inflation. For the period of January 2006 to December 2014, Faber and Fally (2017) examine the US using the retail scanner data consisting of weekly price and quantity information generated by point-of-sale systems for more than 100 participating retail chains across all US markets. From data, the authors first derive some facts about the consumption behavior of households, such as the average size of firms catering to various income groups. Then, they construct a general economy model compatible with the facts observed in data and finally do some counterfactual analysis to see the effect of firm heterogeneity within sectors on relative inflation of income groups. As a result, they find that more productive firms serve the wealthier households, and this generates asymmetries in household price indices causing poor people to experience relatively higher inflation.

The studies in the second group investigate the effect of the resource constraint of poor people on their inflation. For the period of 2006-2014, Orhun and Palazzolo (2019) examine the US

using daily purchasing decisions of a large number of households in non-food grocery categories over nine years utilizing Nielsen consumer panel data. In this study, the authors state that utilizing bulk discounts or promotions is one of the main rational consumer behaviors. Then, they show that households take advantage of such opportunities both at the beginning and end of a month. However, they also show that this pattern gets weaker for low-income households as opposed to households with high income towards the end of a month. They explain this with the liquidity constraint of households with low income. Because of this reason, poor households are exposed to higher inflation compared to the richer households since they cannot utilize from bulk discounts due to their liquidity constraint. Using the American Housing Survey (1989), United States Census (1990), and Stanford Market Basket Database (1991–1993), Bell and Hilber (2006) examine the US and do a regression analysis to examine the relationship of storage constraint and consumer purchasing behavior. The authors regress the number of shopping trips and purchasing quantity on several variables, including storage constraint of households whose proxy variable is house size of households. As a result, they find that households with more storage constraints tend to do shopping more frequently with smaller amounts, which increases the average price. Since poor households have more storage constraints, the authors claim that the average price they observe becomes higher.

Studies in the third group investigate the effect of the shopping environment of poor people on their inflation. Using food price surveys and household food consumption and expenditure surveys, Kaufman et. al. (1997) examine the US and find that poor households generally observe higher food prices but pay less for food in unit basis buying lower quality or economical products. However, the food cost of poor households may increase when the geographical constraints such as reaching to larger retail food outlets exist, which increases the inflation of the poor. Using grocery or convenience stores data in Hennepin and Ramsey counties, Chung and Myers (1999) examine Minneapolis and St. Paul metropolitan areas. The authors, firstly, examine 526 grocery stores and state that only 22 percent of the chain stores are located in the inner city while nearly 50% of the nonchains were located there. Secondly, they analyze 55 stores and price differences in those stores and state that prices are generally lower in chain stores, which is shown as the main reason for price differences between inner-city and suburban. Finally, the authors state that prices are higher in poor neighborhoods compared to nonpoor neighborhoods. Then, they do an OLS regression to explain why the

poor pay a higher price for the same goods and find that not having access to chain stores is the main cause of that difference. As a result, they state that access limit to chain stores is an essential factor increasing the inflation of poor households.

Studies in the fourth group investigate the effect of poor households' lack of quality substitution on their inflation. Using Nielsen Consumer Panel data set (2004-2016) and Nielsen Retail Scanner data set (2006-2016), Argente and Munseob (2016) examine the US by constructing income-specific price indices and investigate the changes during the great recession. They find that there are 0.22 percentage points annual inflation difference between lowest and top income quintiles during 2004-2007, 0.85 percentage points annual inflation difference for 2008-2013, and 0.02 percentage points annual inflation difference for 2014-2016. Then, they do a decomposition analysis to find whether the source of differences is due to change in product prices, product substitution, change in shopping behavior, or new good bias adjustment. As a result, they explain that quality substitution and changes in shopping behavior, which are done by wealthier households more easily, account for 40% of the differences. Jaimovich et. al. (2017) examine the US for the great recession period and examine consumer behavior during that period. The authors classify the restaurant as quick-service restaurants, midscale, casual dining, and fine dining according to their average meal price. Then, they examine these restaurants by their traffic and market share data. The authors show that there is an increase in market share and traffic data of cheaper restaurants and a decrease in market share and traffic data of more expensive restaurants during the great recession. Since this behavior is mostly valid for wealthier households, poor households cannot get rid of the higher prices by decreasing the quality of the product they consumed as much as wealthier households do and experience higher inflation.

As we discussed in the studies above, there are many reasons that may cause poor people to have higher inflation relative to rich people. As a result, there would be persistent inflation differentials that affect poor people negatively. Another point to investigate is whether inflation differentials that affect poor people is related to the structure and dynamics of the economy. At this point, the differences between developing and developed countries worth investigating since there are important structural differences among those countries. There are

some studies supporting the idea that poor people in developing countries may suffer more from inflation differentials compared to poor people in developed countries.

When we consider the studies above that investigate why poor people may have higher inflation relative to rich people, they are all for a developed country, the US. However, we can say that all the arguments, especially second and fourth, are also valid for developing countries. There are more poor households in developing countries, and this means that resource constraints and lack of quality substitution are valid for more of the population in developing countries. Thus, there is a high chance that poor households would experience higher inflation in developing countries. Moreover, the average inflation rate in developing countries is higher than the average inflation rate in developed countries. Alvarez et al. (2019) and Van Hoomissen (1988) show that high inflation causes higher price dispersion, and this may lead to dispersion between inflation rates of different household groups. As a result, the probability of observing inflation differentials that affect poor people negatively may increase. Furthermore, supply shocks generally govern the path of inflation rate in the developing countries, as Benlialper and Comert (2013) and Klau and Mohanty (2000) state. When we consider the developing countries which are more unequal compared to the developed countries, we can say that the consumption basket of high-income groups differentiates from the consumption basket of low-income groups. Thus, supply shocks that affect expenditure groups differently may generate inflation differential between different household groups. This may increase the probability of observing inflation differentials that affect poor people negatively. Finally, as Yorukoglu (2009) and Anand et al. (2015) state, higher food inflation in developing countries may increase the inflation of poor people further since the share of food expenditure in the budget of poor people is higher in developing countries.

All these studies show that there is a chance of experiencing higher inflation for poor people, and this chance increases in developing countries. However, we see that there are few studies about inflation differentials for developing countries while there are many studies for developed countries in the literature. The fact that we see persistent inflation differentials among those few studies shows the importance of studying developing countries about inflation differentials. If we omit this, it may have some implications for poor people, and we

can handle the studies related to the implications of these inflation differentials across household groups in three groups.

Studies in the first group discuss the effect of inflation differentials on poverty. Idson and Miller (1999) examine the US by calculating a price index for the families with children for the period of 1968 to 1987. After stating the difference between the price index of families with and without children, authors firstly deflate the poverty threshold back to its original value in 1968 by using the old price index and then inflate them by using a new price index. Then, the authors recalculate the poverty rates and present the difference between the two results. Collyer et al. (2019) examine the US by re-estimating the poverty for the period of 2004 to 2018. For re-estimation, the authors firstly investigate the inflation differentials between lowest and top income quintiles and find that the annual inflation rate is 0.44 percentage points higher for the lowest income quintile. They take the official inflation rate as the representative inflation rate of top income quintile and add 0.44 points to calculate the inflation rate of the lowest income quintile. Then, they update the poverty threshold using a new inflation rate. As a result of this poverty calculation that takes inflation differentials into account, the authors state that an additional 3.2 million people are classified as poor and 0.8 million people as deeply poor. Thus, such studies show that inflation differentials are significant to understand the facts related to poverty.

Studies in the second group discuss the effect of inflation differential on monetary policy. Utilizing data of 2000 Income and Expenditure Survey and price indices of Statistics South Africa, Oosthuizen (2007) examines South Africa by calculating inflation rates for different expenditure deciles for the period of 1998-2006. It finds that some groups may suffer from higher than official inflation in the short run. Thus, the authors state that a central bank that will be sensitive to the living standards of the poor should be aware of their inflation differential and adjust its policy accordingly. Kaplan and Wohl (2016) examine US households for the period of 2004-2013. They calculate different inflation rates for different income levels and discuss the implications of this. One of the implications is on monetary policy of the central bank. The authors state when only the inflation rate of the representative household is considered, all households face the same real interest rate. However, inflation differentials across household groups cause them to have different real interest rates. This

may affect the decision making of the central bank and optimal monetary policy. Moreover, the authors state that heterogeneity in the inflation rate of households may be an important factor in explaining why small firms fail to be informed about the general inflation rate. As a result of this factor, the central bank may lose its ability to influence agents, and this may explain why some central banks have difficulty in managing expectations. This shows that inflation differentials across different household types may change the optimal monetary policy decision.

Studies in the third group discuss the effect of inflation differential on government policies. Oosthuizen (2007) states the main expenditure categories of poor households that increase their inflation. Mealie meal, and brown and wholewheat bread, poultry and beef and veal, water, and house rent, and paraffin and electricity are among those goods, and they account for 34.5 percent of 1st decile inflation and 26.9 percent of 4th decile inflation. The authors state that making monetary policy not only considering official inflation but also poor household's inflation may help to improve their conditions.

For example, subsidizing the goods listed above may help to increase the real income and welfare of poor households. Using Income and Expenditure Survey 2005, Mortaza and Hasnayan (2008) examine Bangladesh by calculating inflation rates for different income groups for the period of 2006-2007. This study finds that relatively high inflation rates for the poor is due to the high inflation in food and government policies aiming at food price may improve conditions of the poor households. These findings show the importance of inflation differentials in policymaking.

Finally, we can discuss the effects of inflation differentials on inequality measures, and we will handle that in the next chapter in detail.

One missing part in the literature is the lack of studies that investigates quantitative models assuming one inflation rate for all households. Most of the models about the topics related to inflation assume that there is one inflation rate for all. However, making this assumption more

realistic may generate different implications for policymaking. Thus, it is crucial to replicate such models and examine how much policy outcomes deviate.

2.3 Conclusion

Inflation inequality studies mainly focus on the comparison of the actual inflation rates of different income groups, especially investigating the case of low-income households. Also, in some studies, different groups such as households with children or households with the elderly are examined in detail to understand whether the official inflation rate represents their experience or not. While some studies reveal that inflation differentials throughout household groups are not persistent, others state that there are persistent inflation differentials which affect some household groups negatively. When we investigate the reasons for these inflation differentials, we see that food prices and health care expenditures affect poor people and the elderly, respectively. Also, there are some factors such as liquidity constraint, consumption habits, or shopping environment of poor households that play a significant role in explaining higher inflation of poor households. Moreover, there are some factors such as high food inflation, high inequality, supply shocks, and price dispersion due to high inflation in developing countries that may increase the possibility of observing inflation differentials across household groups. As a result, these differentials imply that real inequality and poverty may differ from their nominal values and may require policymakers to conduct policies taking inflation inequality into account. This would be especially the case for developing countries. Thus, it is important to investigate a developing country such as Turkey.

CHAPTER 3

INEQUALITY MEASURES AND EFFECT OF INFLATION DIFFERENTIALS ACROSS INCOME GROUPS ON INEQUALITY MEASURES

3.1 Introduction

We analyze the inequality measures and the effect of inflation differentials across income groups on inequality measures in this chapter. Inequality measures are function of incomes in the economy. While calculating inequality measures, it is not important to deflate incomes with the official inflation rate since this process does not change the result. However, different household groups would have different baskets of consumption, and changes in relative prices may increase the inflation of an income group more than others. Thus, different income groups may experience different inflation rates, as we know from the previous chapter. When we consider this case, we may obtain real inequality measures by deflating household incomes by their own inflation rate. Crawford and Smith (2002), Collyer et al. (2019), Finn et. al. (2016), Rao (2000) and Arndt et. al. (2015) calculate inequality measures in this way for UK, US, South Africa, South India, and Mozambique, respectively. They state that inequality is understated in those countries. In contrast, Broda and Romalis(2009), Broda and Weinstein (2008), and Goni et al. (2006) calculate inequality measures for the US, Brazil, Columbia, Mexico, and Peru. They state that inequality is overstated in those countries. These studies show that considering inflation differentials may produce better indicators about the economy, which may lead to better policies.

In the next section of this chapter, we will examine the frequently used inequality measures and their properties. Then, we present the studies that recalculate certain inequality measures after taking inflation differentials across income groups into account.

3.2 Literature Review

As discussed in the previous chapter, there are many studies stating that poor households may be exposed to higher inflation, and this probability may increase when we examine the developing countries. This situation invites some questions about the inequality in the corresponding economies. There are some studies about this topic for developed and developing countries. When we examine the effect of inflation differentials on inequality measures, we see that there are various studies that calculate numerous inequality measures. Each inequality measure shows different aspects of inequality in the economy. Thus, it is better to understand them before presenting the studies.

Inequality measures frequently used are the Gini coefficient, Hoover index, generalized entropy measures (Theil's L, Theil's T), Atkinson index, Galt score, McLoone index, Palma ratio, and range ratio. As Haughton and Khandker (2009) state in the World Bank report, there are some properties for an inequality measure to be a good one. Those are as follows:

- *Mean independence*: If all incomes are doubled, then measure does not change.
- *Population size independence*: If the population changes, the measure does not change.
- *Symmetry*: If two households swap their incomes, then there is no change in measure.
- *Pigou-Dalton transfer sensitivity*: Transfer from rich to poor decreases measured inequality.
- *Decomposability*: Inequality may be broken by subgroups (population groups, income sources)
- *Statistical testability*: It must be possible to test for the significance of the changes in the index over time

Inequality measures above satisfy different conditions above and explain the different dynamics of income inequality in society.

Gini coefficient is one of the oldest and most frequently used income inequality measures. While measuring it, first authorities rank the household incomes. Then, they construct the Lorenz curve, which shows the cumulative portion of income earned by cumulative % of the population, as shown in the figure below.

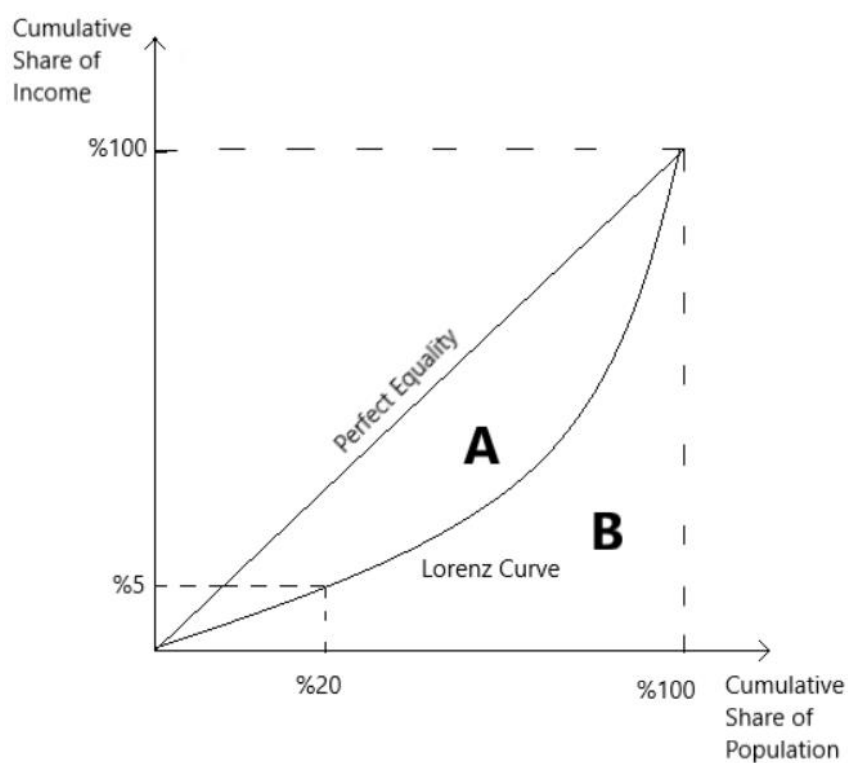


Figure 3.1 Lorenz Curve

In the figure above, the %20-%5 point on the Lorenz curve states that the poorest 20% of the population have the %5 of the total income in that country for a given year. After constructing the Lorenz Curve, they calculate the Gini Coefficient by dividing the area of A to area of A+B in the figure above, as stated in Haughton and Khandker(2009). The coefficient ranges from 0 to 1. A Gini coefficient of 0 expresses perfect equality, where all households have the same

income. A Gini coefficient of 1 expresses perfect inequality where one household owns all the resources in the economy. According to the World Bank estimates Gini Coefficient ranges between 0.20 and 0.65 in reality. Gini Coefficient is easily calculable and attractive in intuitive interpretation. However, it has some inadequacies. For example, it does not give information about the dynamics of inequality in society. If half of a country's households have zero income and the other half share the income equally, then the Gini coefficient will be 0.5. Also, if a country has complete equality except for one household who owns half of the total income, then the Gini Coefficient will be 0.5 again.

Gini Coefficient does not satisfy the last two conditions above. Thus, different measures of inequality are also used in the literature.

Hoover index is the percentage of total income that should be redistributed from the rich half to the poor half to obtain perfect equality. Because of this definition, it is also named as Robin Hood index. Its formula is as follows:

$$H = \frac{1}{2} \frac{\sum_i |x_i - \bar{x}|}{\sum_i x_i} \quad (3.1)$$

where x_i is the income of i^{th} household, and \bar{x} is the mean income.

Since the Hoover index is a percentage, it ranges from zero to one. As the index gets closer to zero, inequality decreases. It is an easily calculable index but does not give information about the dynamics of the inequality in society.

Generalized entropy measures are brought to the literature of income inequality from information theory that uses it as a measure of redundancy in data. The general formula of the generalized entropy measures are stated in Haughton and Khandker(2009) as follows:

$$GE(\alpha) = \frac{1}{N\alpha(\alpha-1)} \sum_{i=1}^N \left[\left(\frac{x_i}{\bar{x}} \right)^\alpha - 1 \right] \quad (3.2)$$

Where N is the number of households, x_i is the income for household i , \bar{x} is the mean income, and α is a parameter that determines the sensitivity of the measure on the tails of the income distribution.

These measures satisfy the six features to be a good measure of inequality stated at the beginning of this chapter. Their values range from zero to infinity, where values closer to 0 mean lower inequality, and higher values mean higher inequality. When α is equal to 0, the measure is named as Theil's L, and when it is equal to 1, the measure is named as Theil's T.

Below you can see the formulas for Theil's T and Theil's L.

$$L = -\frac{1}{N} \sum_{i=1}^N \ln \frac{x_i}{\bar{x}} \quad (3.3)$$

$$T = \frac{1}{N} \sum_{i=1}^N \frac{x_i}{\bar{x}} \ln \frac{x_i}{\bar{x}} \quad (3.4)$$

Theil's L is also named as the mean log deviation measure. It is more sensitive to changes in the lower tail of the distribution. On the contrary, Theil's T is more sensitive to the changes in the upper tail of the distribution.

As we see from the formula, these measures are not very intuitive and mathematically complex. However, they may decompose the inequality into between-group (rural-urban income gap) and within-group (urban, rural) inequality. Also, they may use group data effectively.

In his study of A.B. Atkinson (1970), British economist Anthony Barnes Atkinson states that inequality measures are not purely statistical. They attach different levels of importance to the ones affected by income inequality in society. This given importance may be implicit or explicit. Atkinson states that it is implicit in the Gini Coefficient and constructs his index with explicit judgment about the importance given to different income groups in the society. The formula of the Atkinson index is as follows:

$$A_{\epsilon} = 1 - \left[\frac{1}{N} \sum_{i=1}^N \left(\frac{y_i}{\bar{y}} \right)^{1-\epsilon} \right]^{\frac{1}{1-\epsilon}}, \quad \epsilon \neq 1 \quad (3.5)$$

$$A_{\epsilon} = 1 - \frac{\prod_{i=1}^N (y_i^{1/N})}{\bar{y}}, \quad \epsilon = 1 \quad (3.6)$$

Where N is the number of households, y_i is the income for household i, \bar{y} is the mean income, and ϵ is the inequality aversion parameter.

Atkinson index includes a sensitivity parameter ϵ . As the value of ϵ increases researcher becomes more concerned about the position of the lowest income group and the negative consequences of the income inequality in the society.

Atkinson index ranges from zero to one, and it is the percentage of total income which is desired to obtain the same level of social welfare if incomes are perfectly distributed. For example, an index of 0.3 means that society can achieve the same level of social welfare with $1-0.3=70\%$ of income given a welfare function.

As we can see from the formula, the Atkinson index is mathematically complex and not very intuitive. However, it is decomposable, and we can adjust the weight we attached to different income groups adjusting the sensitivity parameter.

The McLoone Index focuses on the bottom half of the population and is calculated by dividing the summation of all observations below the median by the median multiplied by the number of observations below the median. This index ranges from 0 to 1, where higher values yield more equal societies. It is an easily calculable index but only focuses on the bottom half. Also, the relevance of the index depends on the median value.

The Palma ratio is defined as the ratio of the richest 10% of the population's share of gross national income divided by the poorest 40 % share.

The Range Ratio is computed by dividing a value at one predetermined percentile by the value at a lower predetermined percentile.

All inequality measures above are a function of the incomes in society. When we use only one inflation rate to deflate the incomes, these measures do not depend on whether incomes are real or nominal since they are all mean independent. However, when we take inflation differentials into account, we observe changes in the inequality measures mentioned above since deflation through different inflation rates changes relative incomes. This reflects the income inequality in society better. Studies below discuss the effect of inflation differentials on inequality measures. While doing that, they consider the inflation differentials and report the changes in inequality measures when they take inflation differentials into account. We can discuss those studies in two groups.

The studies in the first group state that inequality measures are understated since they do not consider the inflation differentials across household groups. Crawford and Smith (2002) examine the UK by calculating the Gini coefficient and the family of generalized entropy measures (which include the Theil mean log deviation, the Theil index and the (half the

squared) coefficient of variation as special cases) using prices indices calculated for each income group. While doing that, the authors adjust household incomes with household-specific inflation rates and compare inequality measures calculated with these incomes with the one calculated with the official inflation rate. As a result, they state that inequality measures can be overstated or understated up to 6 percent when inflation differentials are not taken into account. Collyer et al. (2019) examine the US by re-estimating the income inequality taking adjusted inflation indices into account for the period of 2004 to 2018. For re-estimation, the authors firstly investigate the inflation differentials between lowest and top income quintiles and find that the annual inflation rate is 0.44 percentage points higher for the lowest income quintile. They take the official inflation rate as the representative inflation rate of top income quintile and add 0.44 points to calculate the inflation rate of the lowest income quintile. Then, they compare the real income growth of lowest and top income quintiles throughout the period of 2004-2018. Without taking inflation differential into account, top income grows 16.6 percent between 2004 and 2018, and the lowest income decreases by 1 percent, which means a difference of 17 percent. When they take inflation differential into account, this difference goes up to 23 percent. Thus, the authors show how inflation differentials affect the real income of different income quintiles and income inequality. Finn et. al. (2016) examine South Africa and investigate the effect of inflation differentials on inequality. The authors firstly state the improving conditions of the economy in recent decades, including nominal inequality measures. However, they try to explore the role of prices in those improvements. For this purpose, the authors calculate expenditure-based inequality measures such as the Gini coefficient, Theil index, and mean log deviation using expenditure data for the period of 2005-2010 and decompose the changes in these measures into real and nominal improvements. As a result, the authors find that taking inflation differentials into account weakens the improvements seen in inequality measures since inflation was anti-poor in this period. Rao (2000) examines South India villages and shows that inflation of poor households is higher than the rich households. Then, he investigates the effect of this inflation differential on income inequality in those villages. For this purpose, the author calculates the Gini coefficient taking household-specific inflation rates into account and shows that the real Gini coefficient is higher than the nominal by 12 to 23%. Using household budget survey and price data from 2002/03 and 2008/09, Arndt et. al. (2015) examine Mozambique by constructing a price deflator that takes different price dynamics of different product categories into account. The authors use the expenditure data and the household-specific deflators to calculate various inequality measures such as the Gini

coefficient, Theil index, percentile ratio, and Palma index taking inflation differentials into account. As a result, they state that real inequality calculated by the Gini coefficient is higher than the nominal one by up to nearly five Gini points. All these studies show that when we consider inflation differentials, we can calculate inequality measures more accurately.

The studies in the second group state that inequality measures are overstated since they do not consider the inflation differentials across household groups. Using household data on non-durable consumption, Broda and Romalis(2009) examine the US for the period of 1994-2005. Non-durable consumption data is scanner data of goods sold in grocery, drug, mass merchandise, and other stores. With this data, authors observe price and quantity data of non-durable consumption goods preferred by each income group. Also, the evolution of consumption baskets of income groups is monitored. Thus, they discover that poor households prefer low-quality products and show that prices of the low-quality products that are preferred by low-income households increase less compared to other goods. When the authors consider this fact, inflation of the consumers in the poorest decile becomes 7.3 percent lower than the inflation of the consumers in the richest decile. Moreover, authors calculate a combined cost of living index, and it increases faster for rich households. Thus, assuming a representative price index neglecting inflation differential across product types overstate the income inequality measures. Also, the authors claim that these findings are valid beyond non-durable consumption data. Firstly, they state that poor households generally consume low-quality goods whose prices increase slower. Also, poor households tend to substitute away from products whose prices increase faster. Thus, substitution bias is higher for poor households. Then, the authors prove these claims both in their own data and using several sources of data such as Monthly US Imports of Merchandise data, US Imports of Merchandise. Finally, they state that their findings are not specific to the used sample or time period, and overstatement may be higher than stated when all other expenditure groups are considered. Using household survey data from those countries, Goni et.al. (2006) examine nine episodes of Brazil(1988-1996), Columbia(1997-2003), Mexico (1984-1989; 1989-1994; 1994-1996; 1996-2002) and Peru(1995-1999; 1999-2001; 2001-2003). The authors state that inflation differentials may exist for two reasons: difference in consumption patterns across households and the difference in inflation rates across products. After analyzing these two ingredients of inflation differentials, the authors find that there are significant differences between consumption patterns of different income groups and the relative price of different goods and services.

Then, they calculate the inflation rate of each ventile and find that the official inflation rate represents the inflation of the households who are in the 80-90 decile of the income distribution. Moreover, the inflation of the poorer households is less than the inflation of the richest, and there is a significant difference between them. Considering this, the authors decompose nominal inequality into real inequality (quantity) changes and price changes. As a result, they find that inflation differentials contribute to the increasing nominal inequality, but real inequality is lower than officially stated when inflation differentials are considered. Finally, they test their findings with different price indices, alternative inequality measures, corrections for quality change bias, and state that results are robust to these changes. Broda and Weinstein (2008) examine the US for the period of 1990-2015. The authors focus on the way CPI-U is calculated and state that CPI-U is upward biased because of the substitution, new goods, and quality bias. The authors calculate the 90-10 income ratio taking these biases into account and show that ratio decreases from 2.5 to 5 percent in that case. Thus, the authors claim that income inequality is lower, and Americans are better off than they think.

One missing point of the studies about the effect of inflation differentials on income inequality measures is that there is no study for Turkey. There are various studies that investigate other developing and developed countries. Also, there are many studies about inequality measures and inflation differentials across household groups separately for Turkey. However, no study is done that combines both. It is essential to combine these two topics to be able to evaluate the real inequality in Turkey.

3.3 Conclusion

Inequality is one of the central themes in economics, and there are a lot of measures to calculate it taking different aspects of income inequality into account. Gini coefficient is the most popular one among them. However, different economists derive different measures to focus on different household groups of society. All those inequality measures share a common point. When only one inflation rate is used in calculations, they give the same result independent from the selection of nominal or deflated incomes. However, some studies calculate different inflation rates for different household groups and take those inflation

differentials into account while calculating inequality measures. When these inflation differentials are persistent, we see that real inequality measures may be understated or overstated. Since this will affect public policies, it is very important to investigate this issue. As we state in the previous chapter, the possibility of observing inflation differentials and understatement of inequality measures are higher in developing countries. Studies that discuss South Africa, South India, Mozambique cases above support this claim. Thus, it is important to investigate the Turkish case to analyze its income inequality better.

CHAPTER 4

EFFECT OF INFLATION DIFFERENTIALS ACROSS INCOME GROUPS ON INEQUALITY MEASURES IN TURKEY

4.1 Introduction

In this chapter, we analyze the effect of inflation differentials across income groups on inequality measures for Turkey. Like we mentioned in the literature review section, there are some reasons why poor households may experience higher inflation rate as Bell and Hilber (2006), Kaufman et al.(1997), Jaimovich et. al. (2017) and Faber and Fally(2017) state. In addition, these reasons become more valid in developing countries and there are some other factors that increase inflation rate of poor households arising from dynamics of developing economies as Anand et al. (2015), Van Hoomissen (1988), and Klau and Mohanty (2000) state. We have selected Turkey as a developing country to examine these claims. Moreover, Turkey, with its high inflation environment and high-income inequality, is a good candidate for testing the arguments for developing countries.

Even though there are studies that examine the inflation differentials in Turkey, there is no study that investigates its effect on inequality measures. Thus, this study will be the first study that accomplishes this task and will be very helpful for policymakers since it will show the real inequality in the Turkish economy.

In the next section of this chapter, we present the data sources and descriptive statistics related to the general inflation rate, weights of expenditure groups in the budget of households, and inflation rates of those expenditure groups. Then, we explain the methodology we followed while calculating general and group-specific inflation rates. After explaining the methodology, we present the empirical findings of inflation differentials and the reasons that

contribute to those inflation differentials. Finally, we recalculate the Gini coefficient taking inflation differentials into account and state the difference between nominal and real Gini coefficient.

4.2 Data and Methodology

4.2.1 Data

With the transition from a barter economy to a monetary economy, monetary variables have become one of the most important indicators in the economy. Some of them are monetary aggregates such as M0, M1, M2, M3, and some others are the values of goods and services in terms of the domestic currency. Taking the weighted average of these values for a specific bundle of goods and services, we can calculate the consumer price index and inflation rate, and this rate is essential in measuring the cost of living for consumers. According to this inflation rate, the central bank makes necessary policies to maintain price stability.

Turkish Statistical Institute (TurkStat) measures and publishes the CPI (Consumer Price Index) in Turkey. TurkStat measures the change in the price of goods and services consumed in the markets. While choosing those goods and services, TurkStat takes all final monetary consumption expenditure of the households, foreign visitors, and institutional population into account.

Household Budget Survey (HBS) is the essential data source for the selection of goods and services (others being the Tourism Survey, Constitutional Population Expenditure Survey and administrative records) that will be used in calculating CPI. HBS is a survey collecting data from a certain number of households every year to follow the consumption patterns of households. The expenditures counted as consumption expenditures of households include purchases in the survey month, consumption of the products produced by household in or before the survey month, consumption of goods and services obtained from the workplace of the working members of the household and products purchased by households to give as a gift or donate to others. For income, disposable income obtained in the last 12 months is counted.

In addition, the household budget survey is an essential source that gives insights on socio-economic structures, living standards, and consumption habits of the households. It includes consumption patterns and income levels of households from different income groups and regions. Therefore, it makes it possible to produce information on types of consumption expenditure, the variability of spending based on household characteristics, employment status of household members, total income of households, and source of their incomes. Thus, it is used before, during, and after implementing socio-economic policies. Finally, HBS is an important data source for the selection of goods and services to be considered in calculation CPI, determining the poverty threshold, monitoring the changes in consumption patterns of consumers, and update of weights in the consumption basket.

After the selection of goods and services to be used in the calculation of CPI, we need to calculate the weight of those in household expenditures. While calculating weights, TurkStat uses Classification of Individual Consumption by Purpose (COICOP). With this classification, there exist 12 major and 43 sub-groups of expenditure. In total, 418 goods and services are used in the calculation of the index. However, owner-occupied housing and expenditures from household production are excluded from the consumption expenditures. While determining the weight for period t , TurkStat takes the average of weights in period $t-2$, $t-3$ and $t-4$.

After determining the weights of goods and services, TurkStat compiles prices of those goods and services. While compiling prices, TurkStat uses 225 district centers from all of the 81 city centers. From 28 019 outlets, they compile 553 064 prices together with 4 274 tenants, but these numbers may change because of seasonality. TurkStat uses purchasing price while calculating index and retail prices include taxes, but excludes any deposits and installments.

In this thesis, we follow a similar path and use HBS data together with price data of TurkStat that covers 2003-2018. However, there are some differences in our method compared to the one of TurkStat. Firstly, we utilize only HBS, compatible with the Akçelik (2015), in the determination of the weights of the goods and services. In this way, we focus on the cost of living changes of domestic households. Secondly, we calculate the CPI with 5 COICOP level goods and services as opposed to the method of TurkStat using 7 COICOP level since 5 level

goods and services exist in HBS's. Moreover, secondhand automobile sales are not considered in HBS-2012 and HBS-2013, compatible with Akçelik (2015), to replicate TurkStat's announced weights when the shares of the automobile are formed. Finally, the weights of administered energy items in consumer basket such as electricity, natural gas, water are obtained only from HBSs as opposed to Akçelik (2015) using also administered records.

4.2.2 Descriptive Statistics

Before analyzing inflation differentials across income groups, it is useful to see the general trends in the inflation rate of Turkey. As we can see from Figure 4.1, the inflation rate of Turkey fluctuates between 4 percent and 12 percent from 2003 to 2017. When we consider that the Central Bank of Republic of Turkey (CBRT) implements an inflation targeting regime at %5, it is reasonable to say that CBRT is far from hitting target throughout these years. The inflation rate started to increase in 2017, and it reaches to peak after the 2018 currency crisis.

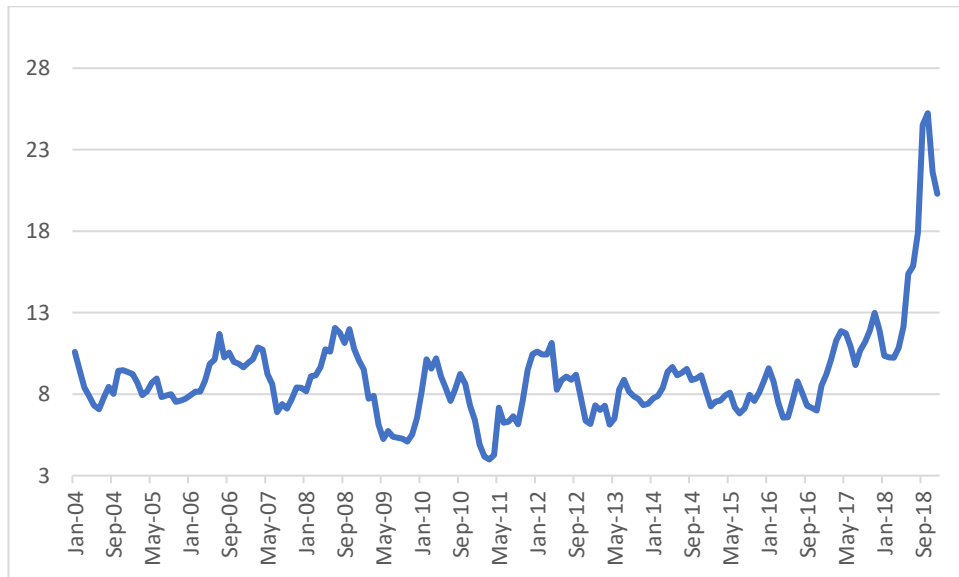


Figure 4.1 Consumer Inflation Rates (Annual Percentage Change)

Source: TurkStat

There exist 418 goods and services in the consumption basket from which TurkStat calculates CPI, as stated in the previous section. Those 418 goods and services organized in 12 major expenditure groups, which are presented together with the weights in Table 4.1. Weights of those groups are important since they affect the CPI as much as their weights. When we look at Table 4.1, we see that the largest shares belong to food and non-alcoholic beverages, housing, and transportation. Fluctuations in these groups affect CPI more than other groups do. Moreover, the evolution of weights is important. Weight of the food and non-alcoholic beverages decreases, weights of transportation and hotels, cafes, and restaurants increase. We can explain this with the increasing per capita income of Turkey. One should note that there are discrepancies between pre-2010 and post-2010 weights of some expenditure groups, especially 1st and 4th expenditure groups. However, we present all years to show the weight trend of all expenditure groups.

Table 4.1 The Weights of 12 Main Expenditure Groups (COICOP) in CPI (Percent)

Source: TurkStat

	01.Food and non-alcoholic beverages	02.Alcoholic beverages and tobacco	03.Clothing and footwear	04.Housing	05.Furnishings, household equipment	06.Health	07.Transportation	08.Communication	09.Recreation and culture	10.Education	11.Hotels, cafes and restaurants	12.Miscellaneous goods and services
2003	27.48	4.14	6.25	28.30	5.72	2.23	9.76	4.29	2.20	1.96	4.14	3.53
2004	26.42	4.33	6.52	26.99	6.62	2.24	9.46	4.48	2.46	2.09	4.49	3.91
2005	24.88	4.14	6.21	25.91	6.78	2.24	12.61	4.32	2.54	1.87	4.38	4.12
2006	24.79	4.07	5.87	27.17	6.20	2.18	13.09	4.18	2.18	2.13	4.15	3.99
2007	23.64	4.33	5.90	28.91	5.88	2.37	11.11	4.52	2.09	2.51	4.53	4.21
2008	22.64	3.84	5.40	29.06	5.79	1.90	14.07	4.37	2.50	1.96	4.38	4.10
2009	23.00	4.09	5.07	28.24	6.16	1.91	13.59	4.23	2.62	1.88	5.16	4.05
2010	27.6	5.31	7.3	16.83	6.78	2.55	13.9	4.94	2.83	2.48	5.51	3.97
2011	26.78	5.9	7.22	16.46	6.93	2.4	15.15	4.64	2.7	2.32	5.89	3.61
2012	26.22	5.21	6.87	16.44	7.45	2.29	16.73	4.6	2.98	2.18	5.63	3.4
2013	24.09	5.07	6.83	16.68	7.28	2.22	17.99	4.64	2.95	1.91	6.18	4.16
2014	24.45	5.29	7.17	16.41	7.52	2.44	15.54	4.7	3.36	2.26	6.58	4.28
2015	24.25	4.82	7.38	15.79	7.78	2.57	15.38	4.38	3.54	2.53	6.98	4.6
2016	23.68	4.98	7.43	15.93	8.02	2.66	14.31	4.42	3.81	2.56	7.47	4.73
2017	21.77	5.87	7.33	14.85	7.72	2.63	16.31	4.12	3.62	2.69	8.05	5.04
2018	23.03	5.14	7.21	14.85	7.66	2.64	17.47	3.91	3.39	2.67	7.27	4.76

In addition to shares of expenditure groups, their inflation rate is also important. When we look at Table 4.2, we see that price of food and non-alcoholic beverages, alcoholic beverages and tobacco, housing, hotels, cafes and restaurants, and miscellaneous goods and services increase faster than other groups and raise the general inflation rate.

Table 4.2 Annual Inflation Rates of 12 Main Expenditure Groups (COICOP)

Source: TurkStat

	01.Food and non-alcoholic beverages	02.Alcoholic beverages and tobacco	03.Clothing and footwear	04.Housing	05.Furnishings, household equipment	06.Health	07.Transportation	08.Communication	09.Recreation and culture	10.Education	11.Hotels, cafes and restaurants	12.Miscellaneous goods and services	general
2004	6.6	11.5	7.7	11.5	6.2	11.7	13.5	1.7	9.8	17.8	14.4	10.1	9.4
2005	4.9	27.9	-0.1	9.9	6.3	-0.4	11.0	1.7	6.6	7.2	15.0	8.5	7.7
2006	11.2	5.1	1.9	14.0	7.3	7.9	10.1	1.3	8.3	7.7	13.5	12.3	9.7
2007	12.0	17.2	4.1	11.5	4.2	0.8	5.3	-1.8	-1.3	6.0	10.9	5.1	8.4
2008	11.9	0.3	-1.5	22.9	10.4	2.0	2.4	5.7	7.0	7.3	13.4	11.7	10.1
2009	9.3	20.9	3.4	2.3	-2.7	2.4	7.9	3.3	8.9	5.5	7.3	13.8	6.5
2010	7.0	24.7	4.7	5.9	3.3	0.6	6.8	-3.2	-2.3	4.3	9.8	5.5	6.4
2011	12.2	18.5	8.0	8.2	11.0	0.3	12.2	2.5	6.5	6.5	8.2	17.1	10.4
2012	3.9	1.0	8.2	11.4	5.9	1.7	5.5	5.9	2.0	4.8	9.3	8.7	6.2
2013	9.7	10.5	4.9	4.8	5.9	4.8	9.8	1.2	5.2	10.1	9.9	2.2	7.4
2014	12.7	7.7	8.4	6.8	8.1	8.6	2.1	1.6	5.7	8.3	14.0	9.7	8.2
2015	10.9	5.7	9.0	6.7	11.0	7.2	6.4	3.6	11.6	6.4	13.2	11.0	8.8
2016	5.7	31.6	4.0	6.4	6.2	9.7	12.4	3.2	5.9	9.5	8.6	11.1	8.5
2017	13.8	2.9	11.5	9.6	12.7	11.9	18.2	1.4	8.4	10.5	11.5	12.8	11.9
2018	25.1	2.4	14.8	23.7	31.4	16.7	16.0	9.6	20.9	10.2	19.8	28.8	20.3

4.2.3 Methodology

TurkStat has a method while updating the weights and calculating the CPI, and it is stated officially as follows:

CPI baskets and the weights are updated at the end of every year and chained with the Laspeyres formulation. In the chain index, every December, new goods and services are added in the basket, goods and services which lost their importance are taken out, and renewed weights are used in the calculation of the index. The index is calculated by dividing current

prices to the prices of previous December, which is “new price reference period (P_0)”, and then chained by multiplying it with the chained index numbers of December.

$$I = w \cdot P_i / P_o \quad (4.1)$$

I : index

P_i : current price

w : weight

P_o : base year price

$$I_t = w_1 * (P_{it} / P_{\text{December}(t-1)}) * I_{\text{December}(t-1)} \quad (4.2)$$

w_1 : new weight

t : time

In this thesis, we follow the same method, and this method eliminates the index difference bias, which occurs because of different inflation rates across COICOP 5-digit items.

To follow this method, we need the price series and weights of goods and services which are in the consumption basket. We have the price series of 418 goods and services with 7 COICOP

level from 2003 to 2018. However, goods and services given in the HBS are with 5 COICOP level. Thus, we aggregate the prices of 7 COICOP level goods and services to 5 COICOP level and get 145 price series at the end. For this aggregation, we use the weights of 7 COICOP level goods and services in 2019 (only year whose weights are provided by TurkStat). There are some important steps while aggregating 7 COICOP level prices to 5 level. Firstly, some expenditure groups contain seasonal goods. That is, some goods do not have a price for all 12 months. While determining the weight distribution of these goods and services, we followed a fixed weight approach. We kept the weight of the 5 level goods and services fixed and allocated weights of goods with no price to the ones with a price according to their relative share. Secondly, the prices of some goods do not start in 2003. In this case, we assumed the index of starting the year as 100 and calculated the index of the following years according to that. If that good is a member of a group of goods and services, its weight is allocated to other goods and services according to their relative weights for the years with no price.

After these steps, we obtain 5 COICOP level prices. Then, we started to weight calculation utilizing from HBS according to 4 formulas below.

$$E_{i,t} = \frac{\sum_{j=1}^n E_{ij,t} \text{pw}_{ij,t}}{\sum_{j=1}^n \text{pw}_{ij,t}} \quad (4.3)$$

$$AE_{i,t} = [E_{i,t-2} (1 + \pi_{i,t-1}) + E_{i,t-3} (1 + \pi_{i,t-2}) (1 + \pi_{i,t-1}) + E_{i,t-4} (1 + \pi_{i,t-3}) (1 + \pi_{i,t-2}) (1 + \pi_{i,t-1})] / 3 \quad (4.4)$$

$$AE_t = \sum_{i=1}^{145} AE_{i,t} \quad (4.5)$$

$$w_{i,t} = \frac{AE_{i,t}}{AE_t} \quad (4.6)$$

Where E is the amount of expenditure, pw is population weight, π is the year-end annual inflation rate, w is the calculated weight in CPI basket for COICOP 5-digit item code i ($i=1, 2, \dots, 145$), household ID number j ($j=1, 2, 3, \dots, n$), and for the period t ($t=2003, 2004, \dots, 2018$). AE is the average of the present value of the expenditure amount of $t-4$, $t-3$, and $t-2$.

In the second formula, we need to use the expenditure and inflation data together. However, one of the problems we had is that HBS codes and price codes are incompatible with each other. Thus, we need to convert HBS codes such that it will be compatible with price codes. Another problem is that HBS codes for 2003-2014 and 2015-2018 are different. While converting 2003-2014 codes, we followed the way of Akçelik (2015) to a large extent. Then, we make the conversion for 2015-2018 such that it will be compatible with conversions of the 2003-2014 period. In this conversion process, we reproduce some missing codes according to 2019 weights, ignore some codes and distribute some codes into other codes. Selection of codes to ignore largely depend on the way of Akçelik (2015). In this process, we think that our method is close to the one of Akçelik (2015), but there may be some slight differences in the process of ignoring, reproducing, or redistributing codes.

As a result of these steps, we obtain 145 price series and 145 weights. However, we see that price data of some codes include outliers, which increase(decrease) the inflation rate of those products to unrealistically high(low) levels. Usually, we do not expect such outliers and we have a data problem here. Normally, TurkStat makes some quality and quantity adjustments to data it collects. Those adjustments fix the problem, but they are not accessible to us unlike other countries' statistical agencies. Because of this reason, we proceed with our method to get rid of this data problem. We ignored those outliers whose distance to mean inflation rate for a given year is more than three standard deviation. Then, we obtain the general inflation rate, group weights, and group inflation rates presented in the following figures and tables.

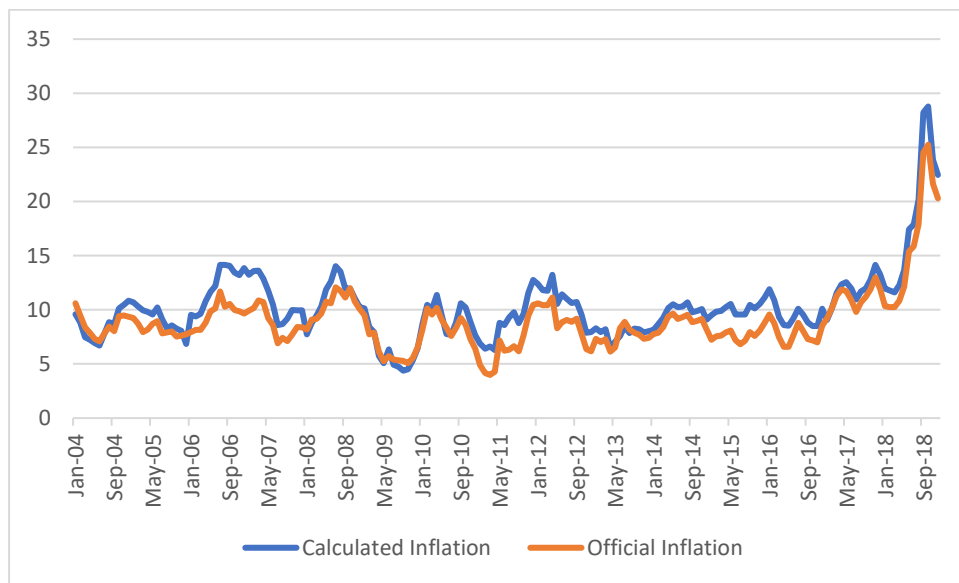


Figure 4.2 Yearly Inflation Rate Comparison

Source: TurkStat, Author's Own Calculations.

As we can see from Figure 4.2, calculated inflation rates and official inflation rates are very close to each other. Although they start to diverge at some points, we obtain a correlation coefficient of two series as 0.96. We investigate reasons of such a divergence in the section 4.4.

Table 4.3 The Weights of 12 Main Expenditure Groups (COICOP) in CPI (Percent)

Source: Author's Own Calculations.

	01. Food and non-alcoholic beverages	02. Alcoholic beverages and tobacco	03. Clothing and footwear	04. Housing	05. Furnishings, household equipment	06. Health	07. Transportation	08. Communication	09. Recreation and culture	10. Education	11. Hotels, cafes and restaurants	12. Miscellaneous goods and services
2003	31.53	4.75	7.17	17.92	6.51	2.48	11.20	4.93	2.47	2.24	4.75	4.05
2004	31.53	4.75	7.17	17.92	6.51	2.48	11.20	4.93	2.47	2.24	4.75	4.05
2005	31.53	4.75	7.17	17.92	6.51	2.48	11.20	4.93	2.47	2.24	4.75	4.05
2006	28.51	5.92	6.65	16.92	6.80	2.23	13.87	4.69	2.50	2.34	5.24	4.35
2007	29.59	5.12	6.33	16.79	6.64	2.37	14.03	5.34	2.28	2.15	5.01	4.36
2008	30.04	5.16	6.38	16.18	6.67	1.96	14.60	5.16	2.20	2.23	5.02	4.40
2009	29.15	4.85	6.00	18.07	6.93	2.04	13.14	5.37	2.28	2.45	5.10	4.64
2010	27.78	4.83	6.01	17.32	6.51	2.23	14.58	5.09	2.66	2.57	5.22	5.20
2011	26.99	5.41	5.87	16.67	6.47	2.19	15.10	4.77	2.81	2.44	5.64	5.64
2012	25.93	4.91	5.63	15.98	6.62	2.15	16.71	4.87	2.97	2.24	5.65	6.35
2013	23.84	4.88	5.67	16.50	7.14	1.97	17.70	4.89	2.99	2.25	6.44	5.73
2014	23.61	5.11	5.86	15.98	7.50	2.53	17.45	4.54	2.92	2.70	6.82	4.97
2015	24.85	4.75	6.15	15.84	7.81	2.22	15.33	4.21	3.18	2.81	7.89	4.96
2016	26.02	5.03	6.13	14.65	7.86	2.28	14.83	4.73	3.71	2.56	7.33	4.86
2017	24.05	5.75	5.71	14.59	7.23	2.10	18.16	4.58	3.52	2.01	7.23	5.08
2018	23.58	4.96	5.49	14.03	7.05	2.15	21.79	4.08	3.28	2.03	6.72	4.85

When we compare the calculated group weights in Table 4.3 and official group weights in Table 4.1, we see that calculated weights reflect the general trend of official weights.

Although there are some differences in some parts, we see that calculated and official weights generally move close to each other.

Table 4.4 Annual Inflation Rates of 12 Main Expenditure Groups (COICOP)

Source: Author's Own Calculations.

	01.Food and non-alcoholic beverages	02.Alcoholic beverages and tobacco	03.Clothing and footwear	04.Housing	05.Furnishings, household equipment	06.Health	07.Transportation	08.Communication	09.Recreation and culture	10.Education	11.Hotels, cafés and restaurants	12.Miscellaneous goods and services	general
2004	10.26	21.03	7.30	12.07	5.18	11.87	16.09	3.18	5.48	17.73	15.72	14.42	10.84
2005	2.98	21.87	1.00	12.19	5.79	0.21	13.68	3.20	1.02	8.91	14.25	9.26	6.83
2006	17.30	5.95	7.28	13.99	9.20	15.98	10.84	28.92	3.75	8.03	11.32	11.81	13.84
2007	13.89	6.65	6.54	10.44	3.95	-11.25	12.14	-19.06	1.37	9.77	11.61	6.60	9.96
2008	10.78	4.03	0.64	19.38	13.15	1.89	3.04	10.05	8.17	10.12	12.27	11.28	10.24
2009	5.60	4.69	3.27	3.79	1.71	5.44	7.23	12.93	12.05	8.15	7.54	17.30	6.43
2010	7.95	30.04	4.76	6.58	3.58	0.51	7.96	-9.54	5.51	6.75	10.17	19.13	7.63
2011	11.24	16.27	8.87	8.94	11.59	11.85	12.19	98.03	1.58	11.06	8.13	43.19	12.77
2012	2.50	15.90	8.43	12.72	10.72	-3.99	8.09	27.05	0.91	7.79	12.43	14.75	7.93
2013	8.10	5.39	6.18	4.37	7.34	26.81	9.31	12.00	1.77	18.65	12.26	4.54	8.03
2014	12.96	7.12	9.11	6.44	9.54	3.02	0.92	60.34	6.06	9.30	22.78	8.62	9.11
2015	11.42	8.99	11.61	6.06	12.42	7.12	7.52	31.73	21.32	5.90	15.50	10.58	11.12
2016	5.01	29.57	5.77	8.15	6.89	3.33	16.55	20.75	8.98	-7.94	11.98	13.97	10.11
2017	14.53	3.11	11.92	10.12	13.49	15.29	20.92	0.95	15.68	10.75	11.94	13.46	13.26
2018	22.80	2.04	21.14	27.84	39.21	19.46	18.65	13.02	32.95	12.19	21.18	28.20	22.44

When we compare the calculated group inflation rates in Table 4.4 and official group inflation rates in Table 4.2 in terms of the average group inflation rate and correlation coefficient, we see that almost all groups have high correlation coefficients and close average inflation rates (Table A.1 and Table 4.5).

4.3 Empirical Findings

After calculating general inflation rates, we analyze the inflation differentials across income groups. To do that, we obtain income data from HBS. However, using income data for the household directly may generate misleading results since we do not consider the household size and composition. To measure the income of the households better, we use an equivalized annual disposable income approach. In HBS, households have their size in terms of the OECD scale. In this scale, the weight of the first adult is 1.0, the weight of the second, and each subsequent person aged over 14 is 0.5, and the weight of each child less than 14 is 0.3. When we divide the annual disposable income by the equivalent size of the household modified OECD scale, we obtain the equivalized annual disposable income for that household. After this step, we divide the households into quintiles, deciles, and ventiles to analyze inflation differentials across income groups better. In figure 4.3, we see the annual inflation rates for each quintile. One can conclude that inflation rates of income quintiles do not diverge from each other very much. We also see that calculated CPIs for income quintiles do not diverge from each other (Figure A.1).

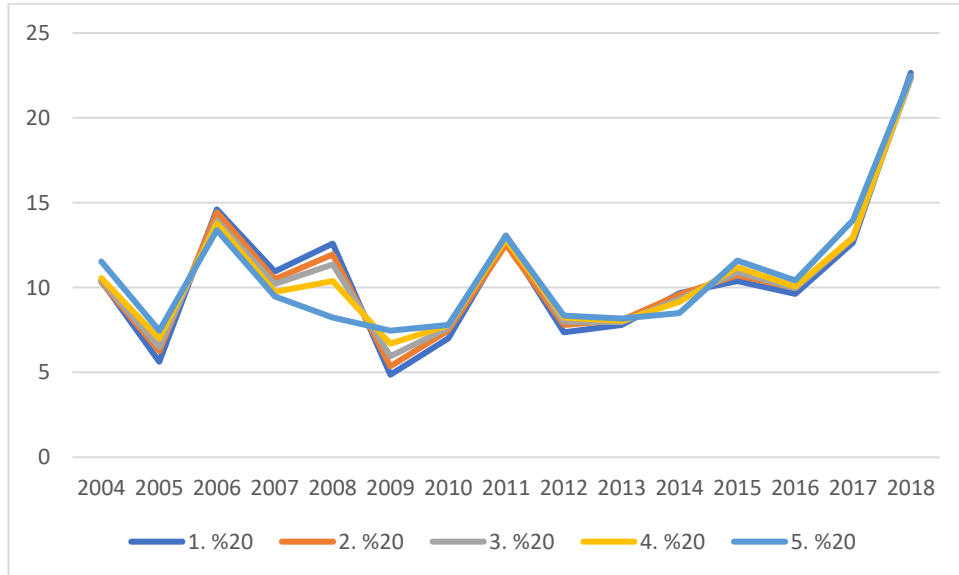


Figure 4.3 Annual Year-End Inflation Rates for Each Quintile*

*1st 20% shows the poorest quintile and 5th 20% represents the richest quintile.

Source: TurkStat, Authors' Own Calculations.

When we analyze the lowest and top income quintiles (Figure 4.4) to see the difference between rich and poor households clearly, we again cannot see a big difference between the yearly inflation rates of the groups. The difference has a mean of -0.19 percentage points (poor minus rich) and a standard deviation of 1.64 percentage points, as seen in Figure 4.5.

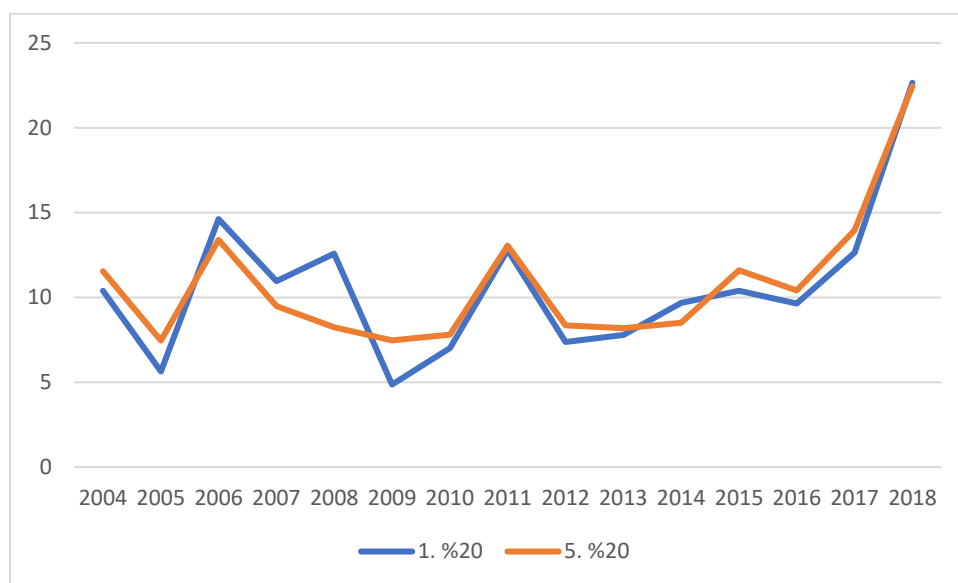


Figure 4.4 Annual Year-End Inflation Rates for 1st and 5th Quintile*

*1st 20% shows the poorest quintile and 5th 20% represents the richest quintile.

Source: TurkStat, Authors' Own Calculations.

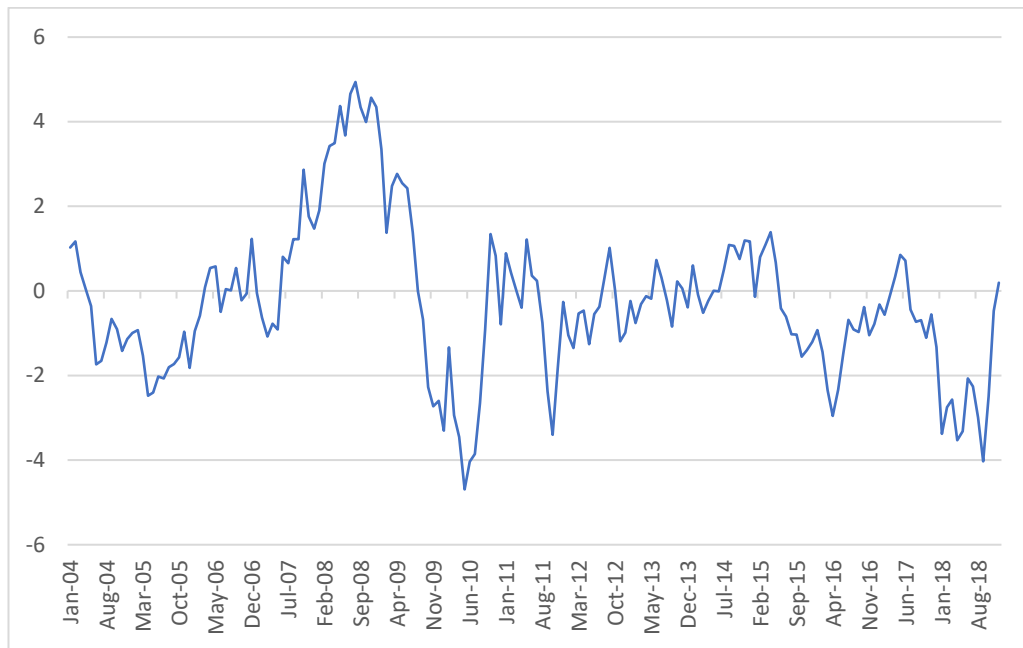


Figure 4.5 Annual Inflation Difference Between the 1st and the 5th Quintiles (Percentage Points)

Source: TurkStat, Author's Own Calculations.

When we analyze the lowest and top income deciles (Figure 4.6) to see the difference between rich and poor households more clearly, we again cannot see a big difference between yearly inflation rates of the groups. The difference has a mean of -0.11 percentage points (poor minus rich) and a standard deviation of 1.92 percentage points, as seen in Figure 4.7.

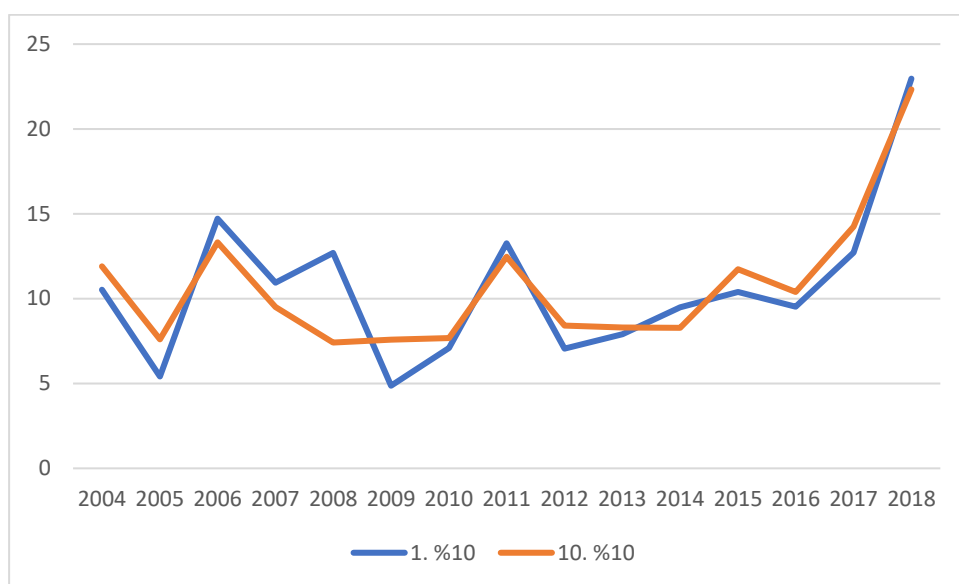


Figure 4.6 Annual Year-End Inflation Rates for 1st and 10th Decile*

*1st 10% shows the poorest quintile and 10th 10% represents the richest quintile.

Source: TurkStat, Authors' Own Calculations.

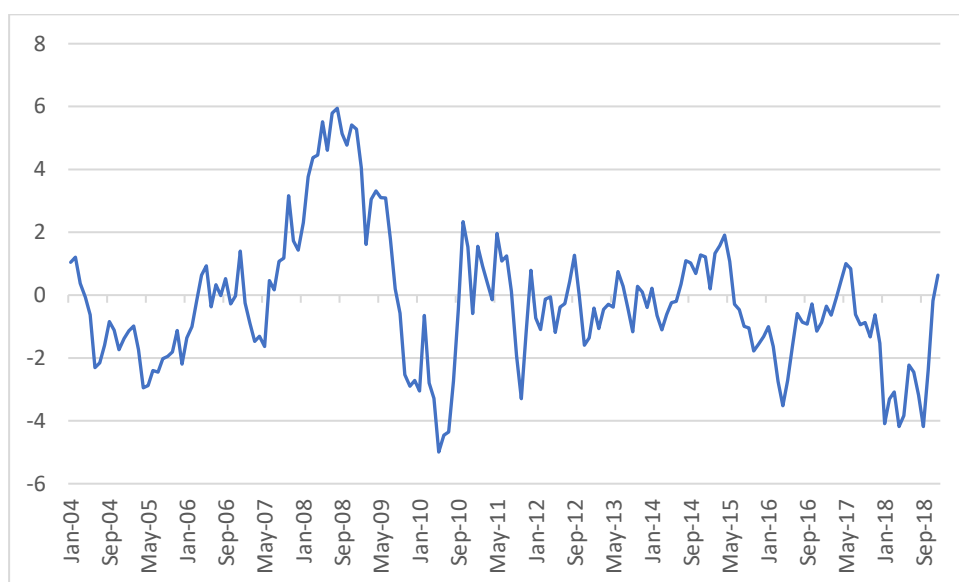


Figure 4.7 Annual Inflation Difference Between the 1st and the 10th Deciles (Percentage Points)

Source: TurkStat, Author's Own Calculations.

When we analyze the lowest and top income ventiles (Figure 4.8) to see the difference between the richest and poorest households more clearly, we again cannot see a big difference between yearly inflation rates of the groups. The difference has a mean of -0.08 percentage points (poor minus rich) and a standard deviation of 2.13 percentage points, as seen in Figure 4.9.

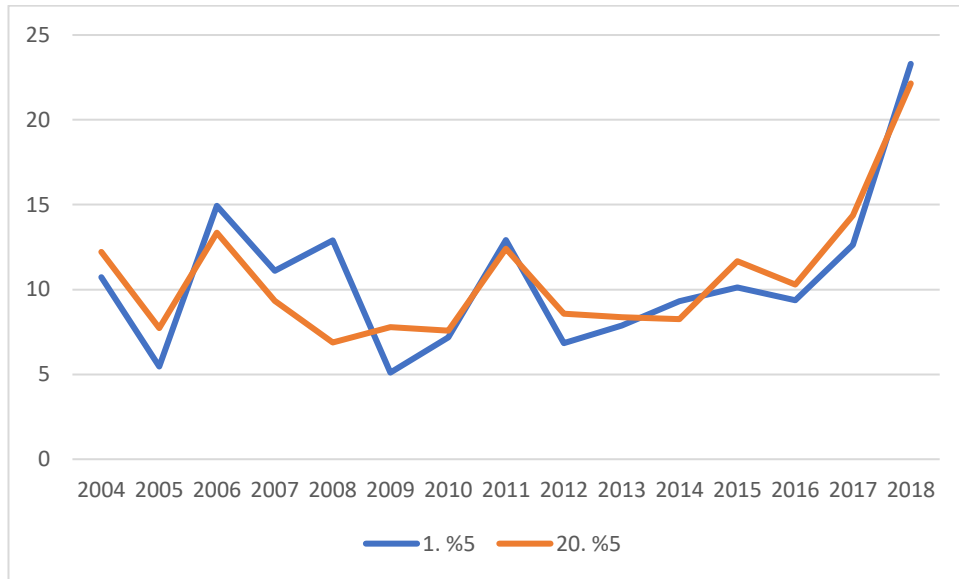


Figure 4.8 Annual Year-End Inflation Rates for 1st and 20th Ventile*

*1st 5% shows the poorest quintile and 20th 5% represents the richest quintile.

Source: TurkStat, Authors' Own Calculations.

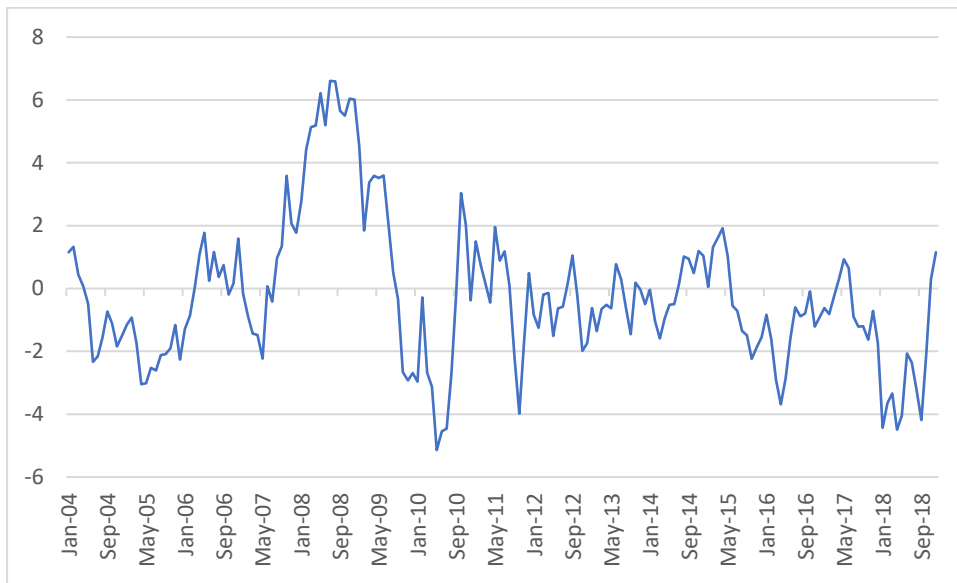


Figure 4.9 Annual Inflation Difference Between the 1st and the 20th Ventiles (Percentage Points)

Source: TurkStat, Author's Own Calculations.

When we consider inflation differentials across income quintiles, deciles and ventiles, we see that inflation of rich households is slightly higher than the inflation of poor households, but their difference is statistically insignificant. Moreover, as we move from quintiles to ventiles, we see that difference between poor inflation and rich inflation is getting smaller.

4.4 Contributors to Inflation Differentials

We examine three important points while investigating contributors to inflation differentials across income groups. Initially, we will compare our results with official data and results of Akçelik (2015) which is related to inflation differentials across income groups. Importance of comparison with official data is highest since it is the main source with which we try to match our results. Then, we will compare our results with the ones of Akçelik (2015) as an important step since its methodology is very similar to our study. Firstly, we try to explain why calculated inflation rate is significantly higher than official inflation rate which is a topic related to the inflation differentials across income groups. When we look at the Table 4.5, we see that

average calculated inflation rate is significantly higher than the official inflation rate in some expenditure groups. We think that this may be the result of our data problem which may be rooted in lack of quality adjustments in our methodology. Normally, officials make some quality adjustments to get rid of the price increase due to the increase in quality of the product. There may be new products in the market, innovative improvements in some existing products, or quality changes due to seasonal reasons in some product categories. To calculate an accurate inflation rate, officials adjust their data taking these changes into account. TurkStat makes same adjustments in the price data, too. However, we used raw price data while calculating inflation rates since the method of adjustments are not open to public. We think that this may be the reason why calculated inflation rate is higher than the official inflation rate.

Table 4.5 Average Inflation Rates of Expenditure Groups

Source: TurkStat, Author's Own Calculations.

	01.Food and non-alcoholic beverages	02.Alcoholic beverages and tobacco	03.Clothing and footwear	04.Housing	05.Furnishings, household equipment	06.Health	07.Transportation	08.Communication	09.Recreation and culture	10.Education	11.Hotels, cafes and restaurants	12.Miscellaneous goods and services	general
Official Inflation Rate	10.4	12.5	5.9	10.3	8.4	5.7	9.3	2.5	6.8	8.1	11.9	11.2	9.3
Calculated Inflation Rate	10.4	12.1	7.5	10.8	10.2	7.1	11.0	19.5	8.4	9.1	13.2	15.1	10.7

After examining the reason of difference between official and calculated results, we try to explain why our results are not very close with the results of Akçelik(2015). Akçelik(2015) studies the inflation differentials across income groups in Turkey for 2004-2015 and our methodology is very close to the one he follows in his study. Thus, it is useful to compare the results of two studies. Akçelik(2015) states that the poorest quintile experience 0.65 percentage points higher inflation rate than the richest quintile on average between 2004-2015. This number is 0.78 for deciles and 0.87 for ventiles. For the same period, we obtain different results according to how we divide the households (Table 4.6). For quintiles, poorest group experiences 0.09 percentage points less inflation compared to richest group. For deciles, sign of the difference changes and poorest decile experience 0.01 percentage point higher inflation compared to richest group. For ventiles, poorest groups experience 0.03 percentage points

higher inflation compared to richest group. We see that trend of inflation differentials as we move from quintiles to ventiles is compatible with Akçelik(2015). However, there is a significant difference between inflation differentials across income groups. When we look at Table 4.5 and Table 4.7, we see that the expenditure groups that cover larger share in budgets of rich households are the ones whose calculated inflation rates are significantly higher than official inflation rates. This both increases calculated general inflation and affects the inflation differentials to the detriment of rich households. We think that our data problem which may arise from lack of adjustment in our methodology may be the reason of such a difference because of the fact that these groups, especially the communication furnishings, household equipment, clothing and footwear, are the ones that need an adjustment due to the reasons of innovation or launching new product. With such an adjustment, our results may get close to the results of Akçelik(2015).

Table 4.6 Average Yearly Inflation Rates for Income Groups

Source: Author's Own Calculations.

	poorest %20	richest %20		poorest %10	richest %10		poorest %5	richest %5
2004-2015	9.50	9.59		9.53	9.52		9.54	9.51
2016-2018	14.98	15.61		15.07	15.65		15.10	15.60
2004-2018	10.60	10.79		10.64	10.75		10.65	10.73

Table 4.7 Share of given expenditure group in poorest quintile budget divided by share in richest quintile budget (in ascending order)

Source: Author's Own Calculations.

01.Food and non-alcoholic beverages	0.47
02.Alcoholic beverages and tobacco	0.54
04.Housing	0.82
06.Health	1.15
03.Clothing and footwear	1.16
05.Furnishings, household equipment	1.29
08.Communication	1.35
12.Miscellaneous goods and services	1.53
11.Hotels, cafes and restaurants	1.76
09.Recreation and culture	2.57
07.Transportation	2.62
10.Education	4.86

The reason of these two differences is method or data limitation. We have the raw price data, but it requires some adjustments. If we learn the method of adjustment, we can do necessary calculations and solve this problem by including adjustment process into our methodology. In another way, we can obtain the adjusted price data and solve this problem by using it in our calculations. Thus, one can improve this study by learning adjustment method or using adjusted price data and reach to more accurate results.

Lastly, we try to explain why inflation rate of rich households increased faster than the poor households after 2015. We can see this change from Table 4.6. During 2004-2015, inflation rates of poor and rich households are very close but after 2015 this situation changes to the detriment of rich households. As a result, we obtain higher inflation rates for rich households during 2004-2018 period. To understand the reason of this change, we must combine the information in Table 4.7 with information in Table 4.8.

Table 4.8 Average shares of expenditure groups in all households' budgets (in ascending order)

Source: Author's Own Calculations.

06.Health	2.24
10.Education	2.34
09.Recreation and culture	2.79
08.Communication	4.82
12.Miscellaneous goods and services	4.85
02.Alcoholic beverages and tobacco	5.06
11.Hotels, cafes and restaurants	5.85
03.Clothing and footwear	6.21
05.Furnishings, household equipment	6.92
07.Transportation	15.05
04.Housing	16.46
01.Food and non-alcoholic beverages	27.41

When we look at those two tables, we can determine the most effective expenditure groups that change the relative inflation rates of income groups. From Table 4.7, we see that 1st, 2nd and 4th groups cover relatively higher share in budgets of poor households. In contrast, 10th, 7th and 9th expenditure groups cover relatively larger share in budgets of rich households. Moreover, we can say that absolute share of an expenditure group is important while determining its effect on relative inflation rates of income groups. From Table 4.8, we see that the most effective ones are 1st, 4th and 7th expenditure groups while 6th, 10th and 9th expenditure groups are least effective. When we combine the information in two tables, we can say that the primary expenditure groups that determine the direction of inflation differentials across rich and poor households are 1st, 2nd, 4th and 7th expenditure groups.

To understand why inflation of rich households increase more relative to poor households we can analyze the evolution of inflation rates of those groups.

Table 4.9 Ranking of Expenditure Groups in terms of Inflation Rate

Source: Author's Own Calculations.

2004-2015			2016-2018	
Expenditure Group	Inflation Rate		Expenditure Group	Inflation Rate
9	5.75		10	5.00
6	5.79		8	11.57
3	6.25		2	11.57
5	7.85		6	12.69
7	9.08		3	12.94
1	9.58		1	14.12
4	9.75		11	15.03
10	10.18		4	15.37
2	12.33		12	18.54
11	12.83		7	18.71
12	14.29		9	19.20
8	21.57		5	19.86

When we look at Table 4.9, we see that inflation rates of the expenditure groups that cover a larger share of budgets of richest income groups such as transportation increase more compared to other expenditure groups. Moreover, the inflation rate of alcoholic beverages and tobacco group that covers a larger share of poorest income groups increase less compared to other expenditure groups. Here, food and non-alcoholic beverages and housing are very important since their weight in the poorest households' budget very high, but we do not see any significant difference in the relative position of them between two periods. As a result, we obtain the change in the sign of the difference between inflation rates of the poorest and richest income groups overall.

The reason we divide whole period as pre-2016 and post-2016 is to compare our results with the ones of Akçelik(2015). However, it is useful to examine the rankings of 12 expenditure groups throughout the whole period to see the general trends. When we look at the Table A.2, Table A.3 and Table A.4, we see that relative position of 1st expenditure group moves around middle except a few periods. Position of 4th expenditure groups is very volatile, but it is in the middle on average. Behavior of these expenditure groups does not change significantly neither between pre-2016 and post-2016 periods nor in general. 2nd expenditure group generally ranks among top, but its inflation rate falls dramatically after 2016 and ranks among bottom. Finally, 7th expenditure group generally ranks among top throughout whole period, but its inflation rate falls significantly during 2014 and 2015. This decreases the average inflation rate of 7th expenditure group substantially before 2016 and explains the difference between inflation rate of 7th expenditure groups between pre-2016 and post-2016 periods. Also, this shows us there may be different dynamics that govern the inflation rate of different expenditure groups. It may be useful to examine those dynamics in a study that investigates the effect of expenditure groups on inflation differentials in detail in the future.

4.5 Effect of Inflation Differentials Across Income Groups on Gini Coefficient

Nominal income is not important on its own, and its importance comes from the purchasing power. Thus, it is essential to convert the nominal variables into real variables to measure the standard of living of households. To do this, we create a price index and adjust nominal quantities using that price index. We can do this in the calculation of inequality measures and deflate all of the incomes with the official inflation rate. However, this does not make any difference since inequality measures are mean independent, as we state in the previous chapter. Therefore, we deflate the household incomes with the household-specific inflation rates that we present in the previous section and calculate the real Gini coefficient. Before calculating the real Gini coefficient, we calculate the nominal Gini coefficient utilizing from income and factor data in HBS. As we can see from Figure 4.10, calculated and official Gini coefficients are close to each other.

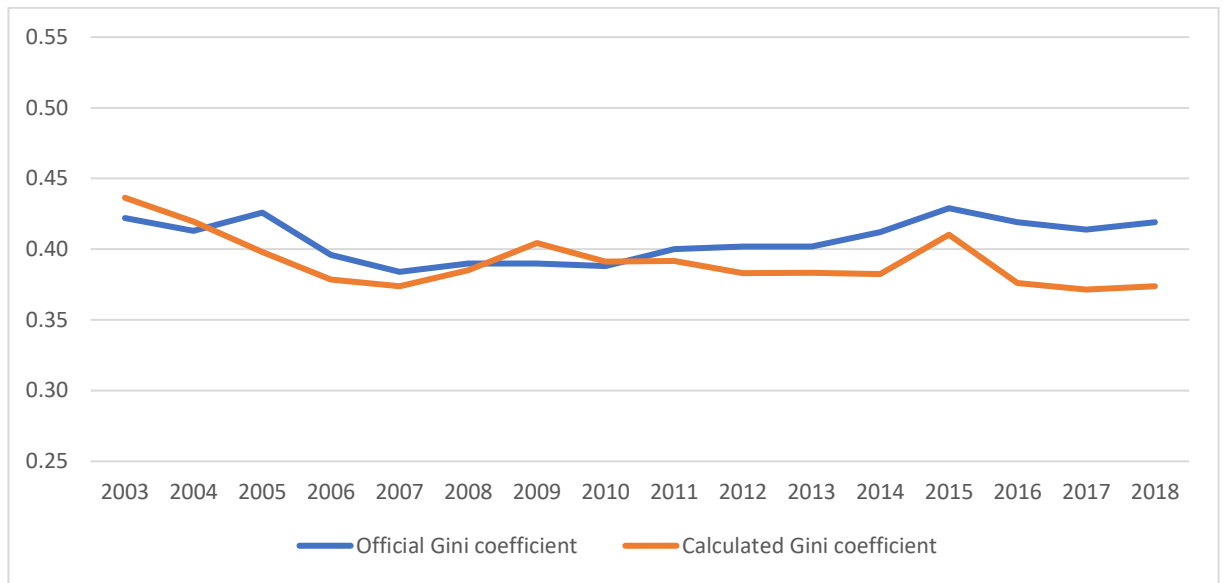


Figure 4.10 Nominal Gini Coefficient Comparison

Source: WorldBank, Author's Own Calculations.

Nominal Gini coefficient shows the inequality trends in terms of nominal incomes, and we calculate the real Gini coefficient to account for the inflation differentials across income groups. To do that, we choose 2003 as the base year and deflate the incomes of quintiles to that year using quintile specific inflation rates. Then, we calculate the Gini coefficient with resulting incomes. As we see in Table 4.10, we do not see a significant difference between nominal and real Gini coefficient since we do not observe significant inflation differentials across income groups.

Table 4.10 Calculated Nominal and Real Gini Coefficient

Source: Author's Own Calculations.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Nominal Gini coeff.	0.43	0.41	0.39	0.37	0.37	0.38	0.40	0.39	0.39	0.38	0.38	0.38	0.41	0.37	0.37	0.37
Real Gini coeff.	0.43	0.41	0.39	0.37	0.37	0.38	0.40	0.39	0.39	0.38	0.38	0.38	0.41	0.37	0.36	0.37

4.6 Conclusion

The fact that different income groups have different consumption patterns causes to observe inflation differentials across those income groups. These differentials exist in Turkey, too. Richest income quintile experience 0.19 percentage points higher inflation than the poorest income quintile on average for 2004-2018. However, we see that this differential decreases as income gap widens. Most importantly, we show that inflation rates of different income groups are very close to each other and their differences are not statistically significant. When we examine the evolution of inflation differentials, we see that inflation rate of poorest households is higher than richest households before 2016. Inflation rate of richest households increases after 2016 and overall picture changes in this period. This shows us that that different income groups may suffer from higher inflation compared to other income groups at different times with various reasons. Increase in inflation in transportation is one of the causes of this change. Moreover, our data problem which may have its source in lack of quality adjustments may be another reason for observing inflation differentials in detriment of richest households. When those adjustments are made, it is highly possible to see inflation differentials in detriment of poorest households. Taking inflation differentials into account, we calculate real Gini coefficient. In this study, real Gini coefficient is not statistically significant from nominal one since inflation differentials are not statistically significant across income groups. However, we should keep in mind that inflation differentials may change in detriment of poorest households when necessary quality adjustments are made. Thus, we can take these real Gini coefficient values as minimum values.

CHAPTER 5

CONCLUDING REMARKS AND POLICY IMPLICATIONS

We have shown that each income group has different consumption patterns and relative price variability affects those income groups differently. In different time periods, different income groups suffer from higher than official inflation rate depending on the relative price movements. During 2004-2015, poor households suffer from higher inflation rate. After 2015, rich households suffer from higher inflation rate and this changes overall picture in detriment of rich households. The determinants of these inflation differentials across income groups are increasing inflation rate in transportation after 2015 and our data problem which may be rooted in lack of quality adjustments in our method since adjustment method is not open to public. Our study is the first study that calculates an inequality measure considering inflation differentials across income groups for Turkey. We calculated real Gini coefficient taking inflation differentials into account, but real Gini coefficient did not diverge very much from nominal one since inflation differentials across income groups did not diverge from each other very much.

There are several policy implications of inflation differentials across income groups in Turkey. Firstly, TurkStat may calculate inflation rates for each income group. Then, inflation rate of poorest income group may be used in determination of minimum wage when inflation rate of poor households is higher than official rate. In this way, deterioration of income inequality can be prevented. Secondly, we have presented the most effective expenditure groups that affect the income groups' inflation rates and inflation differentials among them. After determining the reasons of inflation in those expenditure groups, government can make policies that aim to control the inflation differentials across income groups proactively.

Turkey is a developing country and there are several reasons to observe inflation differentials across income groups in detriment of poor households as we stated in previous chapters. We see those inflation differentials before 2016 in Turkey (it may exist even after 2016 if data

problem is solved in detriment of poor households). We show that implication of that inflation differential is an increase in real inequality. In the following period, it seems that overall picture changes and rich households experience higher inflation which makes the situation fair. However, we should note that poor households are financially constrained, and this prevents them from smoothing their consumption. Thus, as a second implication, we may observe higher welfare loss in poor households when volatility of their inflation increases even if average inflation rates of both income groups are equal at the end.

In this study, we investigated the effect of inflation differentials across income groups on inequality measures in Turkey. We have seen that arguments presented in literature review may apply to Turkish case and may increase the inflation rate of poor households. However, there are other forces that may increase the inflation rate of rich households such as high inflation in transportation expenditure group. Thus, it is not directly possible to say that one income group is persistently suffering from higher than official inflation rate and it is important to keep track of inflation differentials and real income inequality. We have calculated the real income inequality by using the Gini coefficient, but one can use other measures. In that way, importance given to different income groups can be adjusted and results of different inequality measures can be compared.

As a further study, some methods can be used to account for the quality adjustment and overcome the data problem, and this may lead to more accurate solutions for the period under investigation.

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APPENDICES

A. RELEVANT TABLES AND FIGURES

Table A.1 Correlation Coefficient between Yearly Calculated and Official Inflation Rates of Expenditure Groups

Source: TurkStat, Author's Own Calculations.

	01.Food and non-alcoholic beverages	02.Alcoholic beverages and tobacco	03.Clothing and footwear	04.Housing	05.Furnishings, household equipment	06.Health	07.Transportation	08.Communication	09.Recreation and culture	10.Education	11.Hotels, cafes and restaurants	12.Miscellaneous goods and services	general
Correlation Coefficient	0.89	0.71	0.92	0.96	0.97	0.56	0.93	0.24	0.80	0.38	0.79	0.67	0.96

Table A.2 Ranking of Expenditure Groups in terms of Inflation Rate for 2004-2008

Source: Author's Own Calculations

2004		2005		2006		2007		2008	
Expenditure Group	Inflation Rate	Expenditure Group	Inflation Rate	Expenditure Group	Inflation Rate	Expenditure Group	Inflation Rate	Expenditure Group	Inflation Rate
8	3.18	6	0.21	9	3.75	8	-19.06	3	0.64
5	5.18	3	1.00	2	5.95	6	-11.25	6	1.89
9	5.48	9	1.02	3	7.28	9	1.37	7	3.04
3	7.30	1	2.98	10	8.03	5	3.95	2	4.03
1	10.26	8	3.20	5	9.20	3	6.54	9	8.17
6	11.87	5	5.79	7	10.84	12	6.60	8	10.05
4	12.07	10	8.91	11	11.32	2	6.65	10	10.12
12	14.42	12	9.26	12	11.81	10	9.77	1	10.78
11	15.72	4	12.19	4	13.99	4	10.44	12	11.28
7	16.09	7	13.68	6	15.98	11	11.61	11	12.27
10	17.73	11	14.25	1	17.30	7	12.14	5	13.15
2	21.03	2	21.87	8	28.92	1	13.89	4	19.38

Table A.3 Ranking of Expenditure Groups in terms of Inflation Rate for 2009-2013

Source: Author's Own Calculations.

2009		2010		2011		2012		2013	
Expenditure Group	Inflation Rate	Expenditure Group	Inflation Rate	Expenditure Group	Inflation Rate	Expenditure Group	Inflation Rate	Expenditure Group	Inflation Rate
5	1.71	8	-9.54	9	1.58	6	-3.99	9	1.77
3	3.27	6	0.51	11	8.13	9	0.91	4	4.37
4	3.79	5	3.58	3	8.87	1	2.50	12	4.54
2	4.69	3	4.76	4	8.94	10	7.79	2	5.39
6	5.44	9	5.51	10	11.06	7	8.09	3	6.18
1	5.60	4	6.58	1	11.24	3	8.43	5	7.34
7	7.23	10	6.75	5	11.59	5	10.72	1	8.10
11	7.54	1	7.95	6	11.85	11	12.43	7	9.31
10	8.15	7	7.96	7	12.19	4	12.72	8	12.00
9	12.05	11	10.17	2	16.27	12	14.75	11	12.26
8	12.93	12	19.13	12	43.19	2	15.90	10	18.65
12	17.30	2	30.04	8	98.03	8	27.05	6	26.81

Table A.4 Ranking of Expenditure Groups in terms of Inflation Rate for 2014-2018

Source: Author's Own Calculations.

2014		2015		2016		2017		2018	
Expenditure Group	Inflation Rate	Expenditure Group	Inflation Rate	Expenditure Group	Inflation Rate	Expenditure Group	Inflation Rate	Expenditure Group	Inflation Rate
7	0.92	10	5.90	10	-7.94	8	0.95	2	2.04
6	3.02	4	6.06	6	3.33	2	3.11	10	12.19
9	6.06	6	7.12	1	5.01	4	10.12	8	13.02
4	6.44	7	7.52	3	5.77	10	10.75	7	18.65
2	7.12	2	8.99	5	6.89	3	11.92	6	19.46
12	8.62	12	10.58	4	8.15	11	11.94	3	21.14
3	9.11	1	11.42	9	8.98	12	13.46	11	21.18
10	9.30	3	11.61	11	11.98	5	13.49	1	22.80
5	9.54	5	12.42	12	13.97	1	14.53	4	27.84
1	12.96	11	15.50	7	16.55	6	15.29	12	28.20
11	22.78	9	21.32	8	20.75	9	15.68	9	32.95
8	60.34	8	31.73	2	29.57	7	20.92	5	39.21

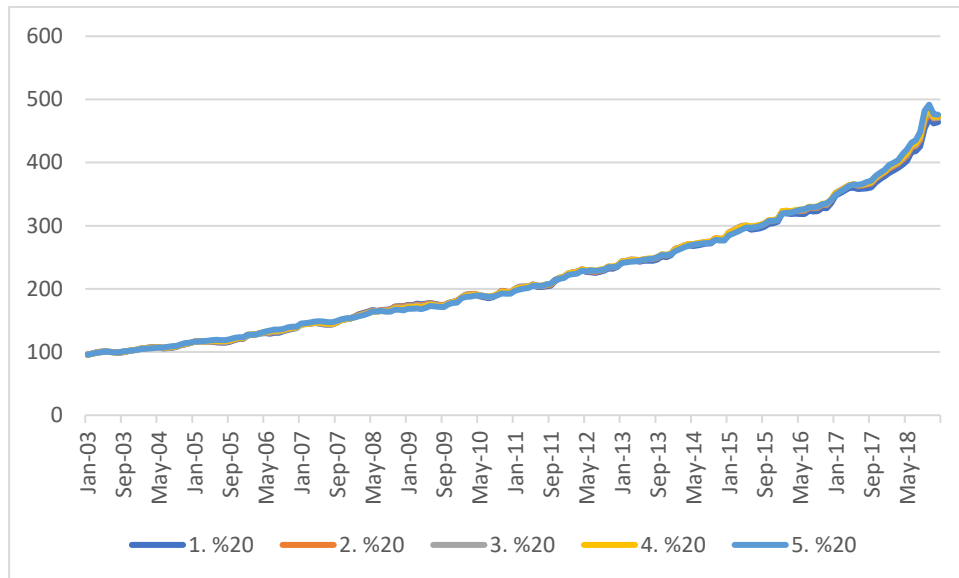


Figure A.1 Calculated CPIs for each Income Quintile

Source: TurkStat, Author's Own Calculations.

B. TURKISH SUMMARY/ TÜRKÇE ÖZET

Enflasyon oranı, önde gelen üç makroekonomik değişkenden biridir, diğerleri büyüme ve işsizlik oranıdır. Ekonomideki tüm birimleri etkiler. Önde gelen resmi kurumları iki kanaldan etkiler. Modern merkez bankacılığında hedef değişkendir ve bu nedenle merkez bankaları tarafından dikkatle izlenir. Ayrıca, hükümetler enflasyonu dikkate alarak harcamalarını ayarlamaktadırlar. Farklı kanallardan firmaları etkiler. Küresel mal ve hizmet piyasalarında firmaların rekabet gücünü ve yüksek enflasyon ortamının yarattığı belirsizlikler üzerinden sermaye akışının yönünü etkiler. Dolayısıyla döviz kurunu etkiler ve bu da firmaların üretim maliyetlerini etkileyebilir. Ayrıca enflasyon oranı reel faiz oranını ve dolayısıyla firmaların yatırımlarını etkiler. Üstelik ekonominin istikrarını değerlendirirken çok önemlidir. Yüksek enflasyon ortamı, ekonomik birimlerin beklentilerinin bozulması nedeniyle tüketim, yatırım ve büyüme hızı gibi ana makroekonomik değişkenlerin dalgalanmasına neden olabilir. Enflasyon oranı haneler için de önemlidir. Enflasyon oranı hanehalkının satın alma gücüne etkisi ile tüketicilerin günlük yaşamını doğrudan etkilemektedir. Ücret artışlarının belirlenmesinde önemli bir faktördür. Ayrıca, ekonomideki gelir eşitsizliğini de etkileyebilir. Bu nedenlerden ötürü, enflasyonu doğru bir şekilde incelemek ve yapısal, konjonktürel, politik veya coğrafi nedenleriyle birlikte açıklığa kavuşturmak esastır.

Bu incelemeye gelir grupları ve hanehalkları arasındaki enflasyon farklılıklarına odaklanmış çalışmaları inceleyerek başlayabiliriz. Hanehalkı kategorilerine göre enflasyon farklılıkları konusunda yapılan çalışmaları çeşitli gruplarda tartışabiliriz. İlk gruptaki çalışmalar, farklı gelir grupları veya demografik gruplar arasındaki enflasyon farklılıklarını inceliyor ve hane grupları arasında kalıcı enflasyon farklılıkları olmadığını iddia ediyor. Michael (1979) ABD'yi Harcama Fiyat Endeksleri (HFE) oluşturarak incelemektedir. Hanehalkına özgü Laspeyres fiyat endeksleri ile yazar, enflasyon oranlarının 1974'ün ilk altı ayı için % 2 ila % 13 arasında değiştiğini bulmuştur. Ayrıca, bu çalışma, 1974'ün ilk altı ayında 11000'den fazla hanehalkı için hesaplanan enflasyon oranı %6 olmasına rağmen, hanelerin % 20'sinin %4,6'dan daha az veya %7,4'ten daha yüksek bir enflasyon yaşadığını tespit etmiştir. Bu farka ek olarak, farklı gelir veya demografik grupların enflasyon oranları arasında bir fark vardır. Örneğin, 1973 yılında düşük gelirli ve yaşlılar için enflasyon oranı diğer gruplara göre daha hızlı yükseldi. Ancak yazar, bu farkın öneminin iki faktör tarafından azaltıldığını belirtiyor. Birincisi, gruplar

içindeki enflasyon oranı dağılımı hala önemlidir ve gruplar arası farklılıklara hakim olma eğilimindedir. İkincisi, hanehalkı grupları arasındaki enflasyon farklılıkları zaman içinde istikrarlı değildir. Bridges ve Packard (1981) ABD'deki yaşlıları inceliyor ve toplam harcamalarının nispeten daha yüksek bir bölümünü kapsayan sağlık hizmetleri gibi harcama gruplarının fiyatlarının ortalamadan daha hızlı artması nedeniyle yaşlıların enflasyonunun resmi orandan daha yüksek olduğu iddiasını test ediyor. Yazarlar bu iddiayı test etmek için 1972-73 THA'da (Tüketici Harcama Anketi) yaşlıların harcama paylarını kullanarak 1967-1979 dönemi için yaşlılar için bir fiyat endeksi oluşturarak bu endeksi resmi olanla karşılaştırırlar. Sonuç olarak, bu çalışma yaşlılar için üretilen fiyat endeksinin yıllık %6,8, resmi oranın ise %6,9 arttığını ortaya koymaktadır. Bu bulgu, yaşlı enflasyonu ile resmi oran arasında önemli bir fark olmadığını göstermektedir. Yukarıdaki çalışmalar, hanehalkı grupları arasında enflasyon farklılıkları konusunun çok önemli olmadığını ve tüm hanehalkı gruplarının enflasyon oranları birbirine yaklaşacağından politika yapıcıların bu konuda hiçbir şey yapmalarına gerek olmadığını iddia ediyor. Bununla birlikte, bazı çalışmalar aşağıda tartışıldığı gibi aksini iddia etmektedir. Bu nedenle hanehalkı grupları arasındaki enflasyon farklılıkları araştırmamız gereken bir konudur. Üstelik, enflasyonda sürekli farklılıklar gözlemlemesek bile, enflasyon oranındaki oynaklık gelir grupları arasında değişebilir. Enflasyon oranının oynaklığı yoksul insanlar için daha yüksekse, yoksulların kredi kısıtı tüketimlerini zamana yaymalarını engeller ve daha yüksek bir enflasyon oranı yaşadıklarında onlar için refah kaybına neden olur.

İkinci gruptaki araştırmalar, yoksulların enflasyon oranının resmi orandan farklı olup olmadığını araştırıyor. Bu araştırmalar, gelir grupları arasında sürekli enflasyon farklılıkları olduğunu iddia ediyor. 1964-1972 dönemi için Muellbauer (1974), Ulusal Gelir ve Gider Mavi Kitap'ı kullanarak talep denklemlerinin doğrusal harcama sistemini tahmin ederek farklı harcama seviyeleri için yaşam endekslerini hesaplayarak Birleşik Krallık'ı incelemektedir. Bu çalışma, ihtiyaçların fiyatlarının lükslerden daha hızlı arttığını ve yoksul insanların yaşam maliyetinin daha hızlı arttığını ortaya koymaktadır. 1970-1980 dönemi için Marlin ve Shorrocks (1982), Tüketici Fiyat Endeksi (FTE) ve Aile Harcama Anketi verilerini kullanarak Kanada'daki düşük gelirli hanehalklarının enflasyon deneyimlerini incelerler. Oluşturulan fiyat endeksi için, yazarlar hesaplamalarını CPI'nın yedi ana bileşenine göre yaparlar. 1974 ağırlıklarına göre yedi ana bileşenin ağırlığını sabitler ve farklı hanehalkları için fiyat endeksleri oluştururlar. Sonuç olarak, yazarlar düşük gelirli hanehalklarının on yıllık

enflasyonunun resmi enflasyon olan 116.7'den 6,3 puan daha yüksek olduğunu bulmuşlardır. Ayrıca çalışma, TÜFE'nin barınak bileşeni hesaplamalardan hariç tutulduğunda iki enflasyon oranı arasındaki farkın yüzde 11,5'e ulaştığını ortaya koymaktadır.

Üçüncü gruptaki araştırmalar sadece gelir farklılıklarını değil aynı zamanda demografik farklılıkları da dikkate almaktadır. Bu çalışmalar, demografik gruplar arasında sürekli enflasyon farklılıkları olduğunu iddia ediyor. Örneğin, farklı hane halkı grupları arasındaki farklı enflasyon oranlarını araştırırken yaşlıları ve çocuklu aileleri araştırmaktadırlar. 1987-1993 dönemi için Amble ve Stewart (1994) 1982-84 Tüketici Harcama Anketi'ni kullanarak yaşlılar için deneysel bir fiyat endeksi oluşturarak ABD'yi incelemektedir. 1965 tarihli Yaşlı Amerikalılar Yasası'nda 1987'de yapılan değişiklikler, Çalışma İstatistikleri Bürosu'nu Aralık 1982'den Aralık 1987'ye kadar üç hane grubu için deneysel bir endeks geliştirmeye yönlendirir: Tüm Kentsel Tüketiciler (CPI-U), Kentsel Ücretliler ve Ruhbanlık Endeksi İşçiler (CPI-W) ve 62 yaş ve üstü Amerikalılar için deneysel endeks. Bu hesaplamalarda yaşlılar için deneysel fiyat endeksi diğer gruplara göre biraz daha hızlı artmaktadır. Bu çalışmada yazarlar 1987-1993 dönemi endekslerini güncellemiştir. Sonuç olarak, yaşlılar için tasarlanan deneysel endeksin diğerlerinden biraz daha hızlı arttığını buldular. Bu dönemde deneysel endeks %28,7 artarken, TÜFE-U ve TÜFE-W sırasıyla 26,3 ve 25,5 arttı. McGranahan ve Paulson (2006) ABD'yi inceliyor ve farklı hanelerin 1982 ile 2004 yılları arasında farklı enflasyon yaşadıklarını belirtiyorlar. Yazarlar Tüketici Harcama Anketi verilerini kullanıyor ve otuz iki farklı demografik grup için aylık enflasyon oranlarını hesaplamak için bunları fiyat verileriyle birleştiriyor. Sonuç olarak, farklı gruplar için enflasyonun ortalama %201 ile %195 ila %212 arasında dalgalandığını ve en yüksek enflasyona sahip hanehalkı grubunun, başı veya eşi 65 yaş ve üzerinde olanlar olduğunu bulmuşlardır. Bu, 23 yılda %5,5 daha yüksek enflasyona karşılık geliyor.

Yukarıdaki çalışmalarda tartıştığımız gibi, kalıcı enflasyon farklılıkları yoksulları veya bazı demografik grupları olumsuz etkileyebilir. Bunun aksini iddia eden bazı çalışmalar olsa da, yoksul insanların kalıcı enflasyon farkından olumsuz etkilenme şansı üzerinde durulması gereken bir konu. Çünkü toplumdaki gelir eşitsizliği bu durumda varsayılandan daha yüksek olur. Artan eşitsizlik, ekonominin sürdürülebilir büyümesini tehdit eder ve sosyal huzursuzluğa neden olur. Dolayısıyla bu, sürdürülebilir ve adil bir ekonomi elde etmek için

araştırmamız ve anlamamız gereken önemli bir konudur. Enflasyon farklarının yoksul insanlar üzerindeki etkisini anlamak için öncelikle fakirlerin enflasyonunu zenginlere kıyasla daha çok artıran faktörleri inceleyen çalışmaları inceledik. Aşağıdaki çalışmalar fakirlerin zenginlere göre daha yüksek enflasyonunu açıklamaya çalışıyor ve bunları şu şekilde sınıflandırabiliriz:

Birinci gruptaki araştırmalar, sektörler arasındaki farklı rekabet ve firma verimliliğinin yoksul hanehalklarının enflasyonu üzerindeki etkisini incelemektedir. Bazı ürün segmentlerinde rekabet derecesi daha yüksek olabilir ve bu, firmaların o sektörde yenilik yapması için daha fazla teşvik yaratabilir. Bunun bir sonucu olarak, o segmentin müşterileri, fiyatlar üzerindeki aşağı yönlü rekabet baskısı nedeniyle daha düşük nispi fiyatlar yaşayabilir. Müşterilerin daha fakir mi yoksa daha zengin haneler mi olduğu, gelir grupları arasındaki enflasyon farklılıklarının araştırılmasında önemli bir noktadır. Çeşitli çalışmalar bu konuyu incelemekte ve sektörler arasındaki rekabet ve firma verimliliği farklılıklarının gelir grupları arasında enflasyon farklılıkları yarattığını ortaya koymaktadır.

İkinci gruptaki çalışmalar yoksulların kaynak kısıtlamasının enflasyona etkisini araştırmaktadır. 2006-2014 dönemi için Orhun ve Palazzolo (2019), Nielsen tüketici paneli verilerini kullanarak dokuz yıl boyunca gıda dışı bakkal kategorilerindeki çok sayıda hanenin günlük satın alma kararlarını kullanarak ABD'yi incelemektedir. Yazarlar, bu çalışmada toplu indirimler veya promosyonlardan yararlanmanın temel akılcı tüketici davranışlarından biri olduğunu belirtmektedir. Daha sonra, hanelerin bu tür fırsatlardan hem ayın başında hem de sonunda faydalandığını gösterirler. Bununla birlikte, bu davranışın düşük gelirli haneler için bir ayın sonuna doğru yüksek gelirli hanelere kıyasla zayıfladığını da gösteriyorlar. Bunu düşük gelirli hanelerin likidite kısıtlamasıyla açıklıyorlar. Bu nedenle yoksul haneler, likidite kısıtlamaları nedeniyle toplu indirimlerden yararlanamadıkları için zengin hanehalklarına göre daha yüksek enflasyona maruz kalmaktadır.

Üçüncü grupta yapılan araştırmalar, yoksulların alışveriş ortamının enflasyona etkisini araştırıyor. Kaufman, MacDonald, Lutz ve Smallwood (1997), gıda fiyatı anketlerini ve ev gıda tüketim ve harcama anketlerini kullanarak ABD'yi inceliyor ve fakir hanelerin genellikle daha yüksek gıda fiyatları gözlemlediğini, ancak daha düşük kaliteli veya ekonomik ürünler

satın alarak birim bazında gıda için daha az ödeme yaptıklarını tespit ettiler. Bununla birlikte, yoksul hanehalklarının gıda maliyetleri, daha büyük perakende gıda satış noktalarına ulaşmak gibi coğrafi kısıtlamalar mevcut olduğunda artabilir, bu da yoksulların enflasyonunu artırır.

Dördüncü gruptaki araştırmalar, yoksul hanehalklarının kalite ikame eksikliğinin enflasyona etkisini araştırmaktadır. Argente ve Munseob (2016), Nielsen Tüketici Paneli veri kümesini (2004-2016) ve Nielsen Perakende Tarayıcı veri kümesini (2006-2016) kullanarak, gelire özgü fiyat endeksleri oluşturarak ABD'yi incelemekte ve büyük durgunluk dönemindeki değişiklikleri araştırmaktadır. 2004-2007 döneminde en düşük ve en yüksek gelirli beşte birlik gruplar arasında 0,22 puan yıllık enflasyon farkı, 2008-2013 için 0,85 puan yıllık enflasyon farkı ve 2014-2016 için 0,02 puan yıllık enflasyon farkı olduğunu bulmuşlardır. Daha sonra, farklılıkların kaynağının ürün fiyatlarındaki değişiklik, ürün ikamesi, alışveriş davranışındaki değişiklik veya yeni iyi önyargı ayarlaması nedeniyle olup olmadığını bulmak için bir ayrışma analizi yaparlar. Sonuç olarak, daha varlıklı haneler tarafından daha kolay yapılan kalite ikamesi ve alışveriş davranışındaki değişikliklerin, farklılıkların% 40'ını oluşturduğunu açıklıyorlar.

Yukarıdaki çalışmalarda tartıştığımız gibi, fakirlerin zenginlere göre daha yüksek enflasyona sahip olmasına neden olabilecek birçok neden var. Sonuç olarak, yoksul insanları olumsuz etkileyen kalıcı enflasyon farklılıkları olacaktır. Araştırılacak diğer bir nokta, yoksul insanları etkileyen enflasyon farklılıklarının ekonominin yapısı ve dinamikleri ile ilgili olup olmadığıdır. Bu noktada, gelişmekte olan ve gelişmiş ülkeler arasında araştırmaya değer farklılıklar vardır, çünkü bu ülkeler arasında önemli yapısal farklılıklar vardır. Gelişmekte olan ülkelerdeki yoksul insanların, gelişmiş ülkelerdeki yoksullara kıyasla enflasyon farklılıklarından daha fazla zarar görebileceği fikrini destekleyen bazı çalışmalar var.

Yukarıda fakir insanların neden zengin insanlara göre daha yüksek enflasyona sahip olabileceğini araştıran çalışmaları ele aldığımızda, hepsi gelişmiş bir ülke olan ABD içindir. Ancak, tüm argümanların, özellikle ikinci ve dördüncü argümanın, gelişmekte olan ülkeler için de geçerli olduğunu söyleyebiliriz. Gelişmekte olan ülkelerde daha fazla yoksul hane vardır ve bu da kaynak kısıtlamaları ve kalite ikame eksikliğinin gelişmekte olan ülkelerdeki

nüfusun daha fazlası için geçerli olduğu anlamına gelir. Bu nedenle, gelişmekte olan ülkelerde yoksul hanehalklarının daha yüksek enflasyon yaşaması olasılığı yüksektir. Ayrıca, gelişmekte olan ülkelerdeki ortalama enflasyon oranı, gelişmiş ülkelerdeki ortalama enflasyon oranının üzerindedir. Alvarez ve diğ. (2019) ve Van Hoomissen (1988) yüksek enflasyonun daha yüksek fiyat dağılımına neden olduğunu ve bu durumun farklı hane halkı gruplarının enflasyon oranları arasında dağılmaya yol açabileceğini göstermektedir. Sonuç olarak, yoksul insanları olumsuz etkileyen enflasyon farklılıklarını gözlemlenebilir. Ayrıca, Benlialper ve Comert (2013) ile Klau ve Mohanty'nin (2000) belirttiği gibi, arz şokları genellikle gelişmekte olan ülkelerde enflasyon oranının yolunu yönetmektedir. Gelişmiş ülkelere göre daha eşitsizlik gösteren gelişmekte olan ülkeleri ele aldığımızda, yüksek gelirli grupların tüketim sepetinin, düşük gelirli grupların tüketim sepetinden farklılaştığını söyleyebiliriz. Dolayısıyla, harcama gruplarını farklı şekilde etkileyen arz şokları, farklı hane halkı grupları arasında enflasyon farkı yaratabilir. Bu, yoksul insanları olumsuz etkileyen enflasyon farklılıklarını gözlemlenebilir. Son olarak Yörükoğlu (2009) ve Anand ve diğ. (2015), gelişmekte olan ülkelerde gıda enflasyonunun yükselmesinin yoksulların bütçesindeki gıda payının gelişmekte olan ülkelerde daha yüksek olması nedeniyle yoksulların enflasyonunu daha da artırabileceğini belirtmektedir.

Tüm bu çalışmalar, yoksul insanlar için daha yüksek enflasyon yaşama şansının olduğunu ve gelişmekte olan ülkelerde bu şansın arttığını gösteriyor. Ancak, gelişmekte olan ülkeler için enflasyon farklılıkları konusunda az sayıda çalışma olduğunu, literatürde gelişmiş ülkeler için çok sayıda çalışma olduğunu görmekteyiz. Bu birkaç çalışma arasında sürekli enflasyon farklılıkları görmemiz, gelişmekte olan ülkeleri enflasyon farklılıkları konusunda incelemenin önemini göstermektedir.

Bu konuda Türkiye'yi incelemeye geçmeden önce gelir grupları arasındaki enflasyon farklılıklarının eşitsizlik ölçülerine etkisine odaklanan çalışmaları da incelemek gerekir. Birinci gruptaki çalışmalar, eşitsizlik ölçütlerinin hane halkı grupları arasındaki enflasyon farklılıklarını dikkate almadıkları için az ifade edildiğini belirtmektedir. Crawford ve Smith (2002), fiyat endekslerini kullanarak Gini katsayısını ve genelleştirilmiş entropi ölçüm ailesini (Theil ortalama log sapması, Theil indeksi ve (kare kare) varyasyon katsayısını içeren) her bir gelir grubu için hesaplayarak İngiltere'yi inceliyor. Yazarlar bunu yaparken hanehalkı

gelirlerini hanehalkına özgü enflasyon oranlarına göre ayarlamakta ve bu gelirlerle hesaplanan eşitsizlik ölçülerini resmi enflasyon oranıyla hesaplananlarla karşılaştırmaktadır. Sonuç olarak, enflasyon farkları dikkate alınmadığında eşitsizlik önlemlerinin abartılabileceğini veya yüzde 6'ya kadar küçümsenebileceğini belirtiyorlar. Collyer vd. (2019), 2004-2018 dönemi için düzeltilmiş enflasyon endekslerini dikkate alarak gelir eşitsizliğini yeniden tahmin ederek ABD'yi incelemektedir. En düşük gelir diliminde enflasyon oranı 0,44 puan daha yüksektir. Resmi enflasyon oranını en yüksek beşte birlik gelir diliminin temsili enflasyonu oranı olarak alırlar ve en düşük gelir diliminin enflasyon oranını hesaplamak için 0,44 puan eklerler. Ardından, 2004-2018 dönemi boyunca en düşük ve en yüksek beşte birlik gelir gruplarının reel gelir artışını karşılaştırırlar. Enflasyon farkını hesaba katmadan, 2004 ile 2018 arasında en yüksek gelir yüzde 16,6 artarken, en düşük gelir yüzde 1 azaldı, bu da yüzde 17'lik bir fark anlamına geliyor. Enflasyon farkını da hesaba kattıklarında bu fark yüzde 23'e çıkıyor. Böylece yazarlar, enflasyon farklılıklarının farklı beşte birlik gelir dilimlerinin reel gelirini ve gelir eşitsizliğini nasıl etkilediğini gösteriyor.

İkinci gruptaki çalışmalar, hane halkı grupları arasındaki enflasyon farklarını dikkate almadığı için eşitsizlik ölçülerinin abartıldığını belirtmektedir. Dayanıklı olmayan tüketim ile ilgili hane halkı verilerini kullanan Broda ve Romalis (2009) 1994-2005 dönemi için ABD'yi incelemektedir. Dayanıklı olmayan tüketim verileri, bakkal, ilaç, toplu mal ve diğer mağazalarda satılan ürünlerin tarayıcı verileridir. Yazarlar bu verilerle her bir gelir grubunun tercih ettiği dayanıksız tüketim mallarının fiyat ve miktar verilerini gözlemlemektedir. Ayrıca gelir gruplarının tüketim sepetlerinin gelişimi izlenir. Böylece yoksul hanehalklarının düşük kaliteli ürünleri tercih ettiklerini keşfederek, düşük gelirli hanehalklarının tercih ettiği düşük kaliteli ürünlerin fiyatlarının diğer mallara göre daha az arttığını gösteriyorlar. Yazarlar bu gerçeği göz önünde bulundurduğunda, en yoksul ondalık dilimdeki tüketicilerin enflasyonu, en zengin ondalık dilimdeki tüketicilerin enflasyonundan yüzde 7,3 daha düşük oluyor. Dahası, yazarlar birleşik bir yaşam maliyeti endeksi hesaplar ve bu, zengin haneler için daha hızlı artar. Bu nedenle, ürün türleri arasında enflasyon farkını ihmal eden temsili bir fiyat endeksi varsayıldığında, gelir eşitsizliği ölçülerinin üzerinde bir baskı vardır. Ayrıca yazarlar, bu bulguların kalıcı olmayan tüketim verilerinin ötesinde geçerli olduğunu iddia ediyorlar. Birincisi, yoksul hanehalklarının genellikle fiyatları daha yavaş artan düşük kaliteli mallar tükettiklerini belirtiyorlar. Ayrıca yoksul haneler, fiyatları daha hızlı artan ürünlerden uzaklaşmaya meyillidir. Bu nedenle, yoksul haneler için ikame eğilimi daha yüksektir. Daha

sonra, yazarlar bu iddiaları hem kendi verilerinde hem de Aylık ABD Mal İthalatı verileri, ABD Mal İthalatı gibi çeşitli veri kaynaklarını kullanarak kanıtlıyorlar. Son olarak, bulgularının kullanılan örnekleme veya zaman dilimine özgü olmadığını ve diğer tüm harcama grupları dikkate alındığında fazla ifade belirtilenden daha yüksek olabileceğini belirtmişlerdir.

Tüm bu çalışmaları inceledikten sonra gelir grupları arasındaki enflasyon farklılıklarının Gini katsayısına etkisini Türkiye için inceledik. Bunu yaparken TÜİK'in Hanehalkı Bütçe Anketlerini ve fiyat verilerini kullanarak TÜİK'in yöntemini izledik. Bu yöntemi takip etmek için tüketim sepetinde yer alan mal ve hizmetlerin fiyat serilerine ve ağırlıklarına ihtiyacımız var. 2003 yılından 2018 yılına kadar 7 COICOP seviyesinde 418 mal ve hizmet fiyat serisine sahibiz. Ancak HBA'da verilen mal ve hizmetler 5 COICOP seviyesindedir. Bu yüzden 7 COICOP seviyesindeki mal ve hizmetlerin fiyatlarını 5 COICOP seviyesine topluyoruz ve sonunda 145 fiyat serisi elde ediyoruz. Bu toplama için, 2019 yılında 7 COICOP seviyesinde mal ve hizmetin ağırlıklarını kullanıyoruz (ağırlıkları TÜİK tarafından sağlanan son yıl).

Bu adımdan sonra 5 COICOP seviyesinde fiyat elde ediyoruz. Daha sonra HBA'dan yararlanarak aşağıdaki 4 formüle göre ağırlık hesaplamasına başladık.

$$E_{i,t} = \frac{\sum_{j=1}^n E_{ij,t} \text{pw}_{ij,t}}{\sum_{j=1}^n \text{pw}_{ij,t}} \quad (\text{A.1})$$

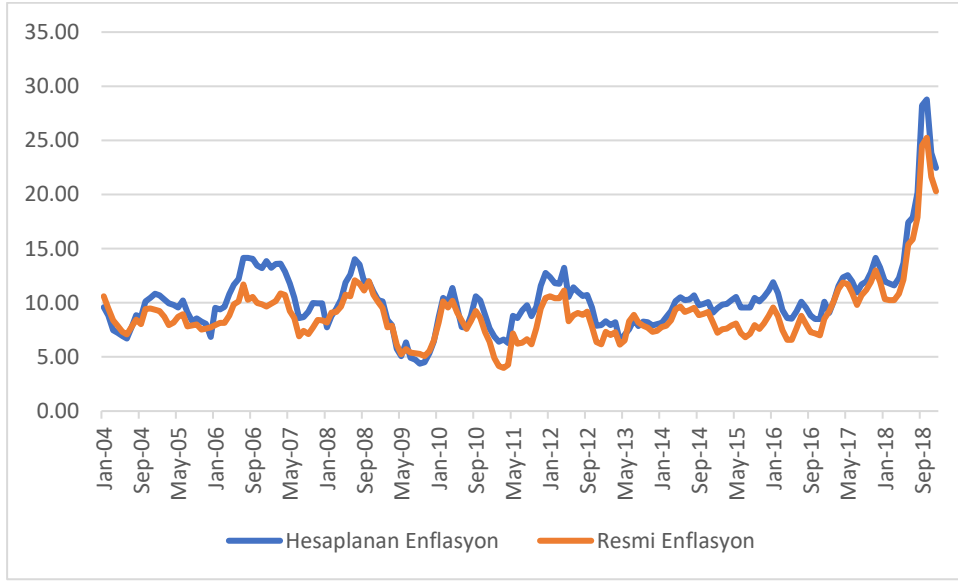
$$AE_{i,t} = [E_{i,t-2} (1 + \pi_{i,t-1}) + E_{i,t-3} (1 + \pi_{i,t-2}) (1 + \pi_{i,t-1}) + E_{i,t-4} (1 + \pi_{i,t-3}) (1 + \pi_{i,t-2}) (1 + \pi_{i,t-1})] / 3 \quad (\text{A.2})$$

$$AE_t = \sum_{i=1}^{145} AE_{i,t} \quad (\text{A.3})$$

$$w_{i,t} = \frac{AE_{i,t}}{AE_t} \quad (A.4)$$

E harcama miktarı, p_w nüfus ağırlığı, π yıl sonu yıllık enflasyon oranı, w COICOP 5 haneli kalem kodu i için TÜFE sepetinde hesaplanan ağırlık ($i = 1, 2, \dots, 145$), hane kimlik numarası j ($j = 1, 2, 3, \dots, n$) ve t dönem içindir ($t = 2003, 2004, \dots, 2018$). AE , $t-4$, $t-3$ ve $t-2$ harcama miktarının bugünkü değerinin ortalamasıdır.

Bu adımlar neticesinde 145 fiyat serisi ve 145 ağırlık elde ediyoruz. Ancak, bazı kodların fiyat verilerinin, bu ürünlerin enflasyon oranını gerçekçi olmayan yüksek (düşük) seviyelere yükselten (düşüren) aykırı değerleri içerdiğini görüyoruz. Genellikle böyle aykırı değerler beklemiyoruz ve burada bir veri sorununuz var. Normalde TÜİK, topladığı verilere bazı kalite ve miktar ayarlamaları yapar. Bu ayarlamalar sorunu çözer, ancak diğer ülkelerin istatistik kurumlarının aksine bu ayarlamalar bizim için erişilebilir değildir. Bu sebeple bu veri probleminden kurtulmak için yöntemimizle ilerliyoruz. Belirli bir yıldaki ortalama enflasyon oranına uzaklığı üç standart sapmadan fazla olan aykırı değerleri görmezden geldik. Ardından aşağıdaki şekilde sunulan genel enflasyon oranını elde ediyoruz.



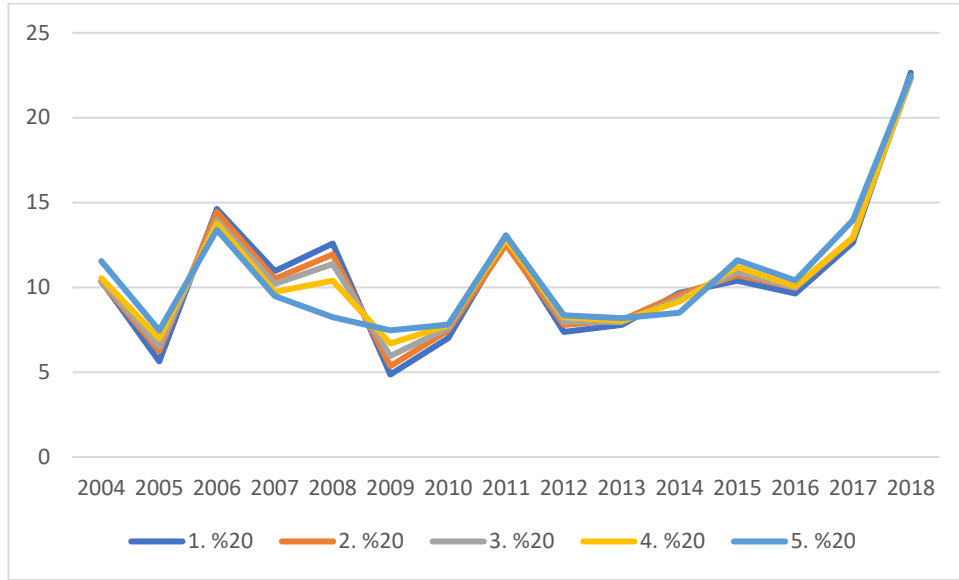
Grafik Ek-B.1. Yıllık Enflasyon Oranı Karşılaştırması

Kaynak: TÜİK, Yazarın Kendi Hesaplaması.

Grafik Ek-B.1'den de görebileceğimiz gibi, hesaplanan enflasyon oranları ile resmi enflasyon oranları birbirine çok yakındır. Her ne kadar bazı noktalarda ayrılmaya başlasalar da, iki serinin korelasyon katsayısını 0.96 olarak hesaplıyoruz.

Genel enflasyon oranlarını hesapladıktan sonra, gelir grupları arasındaki enflasyon farklarını analiz ediyoruz. Bunu yapmak için HBA'dan gelir verileri alıyoruz. Ancak hane halkı için gelir verilerinin doğrudan kullanılması hane halkı büyüklüğü ve bileşimini dikkate almadığımız için yanıltıcı sonuçlar doğurabilir. Hanehalkının gelirini daha iyi ölçmek için, yıllık olarak eşdeğer bir harcanabilir gelir yaklaşımı kullanıyoruz. HBA'da, hanelerin OECD ölçeği açısından boyutları vardır. Bu ölçekte, birinci yetişkinin ağırlığı 1.0, ikincisinin ağırlığı ve 14 yaşın üzerindeki sonraki her kişinin ağırlığı 0.5 ve 14 yaşın altındaki her çocuğun ağırlığı 0.3'tür. Yıllık harcanabilir geliri, değiştirilmiş hane halkı OECD ölçeğinin eşdeğer büyüklüğüne böldüğümüzde, o hane için eşdeğer yıllık harcanabilir geliri elde ederiz. Bu adımdan sonra, gelir grupları arasındaki enflasyon farklılıklarını daha iyi analiz etmek için haneleri beşte birlik dilimlere, ondalık dilimlere ve yirmide birlik dilimlere ayırıyoruz. Grafik Ek-B.2'de, her beşte birlik dilim için yıllık enflasyon oranlarını görüyoruz. Beşte birlik gelir dilimlerinin enflasyon oranlarının birbirinden çok farklı olmadığı sonucuna varılabilir. Diğer

gelir grupları için de aynı şeyi gözlemliyoruz. Bunun sonrasında gelir grupları arasındaki enflasyon farklılıklarının sebeplerini araştırıyoruz.



Grafik Ek-B.2. Her Bir Yüzde 20'lik Gelir Grubu için Yıllık Yıl Sonu Enflasyon Oranı

*1. Yüzde 20'lik Dilim en Fakir Kesimi, 5. Yüzde 20'lik Dilim en Zengin Kesimi Temsil Eder
Kaynak: TÜİK, Yazarın Kendi Hesaplaması.

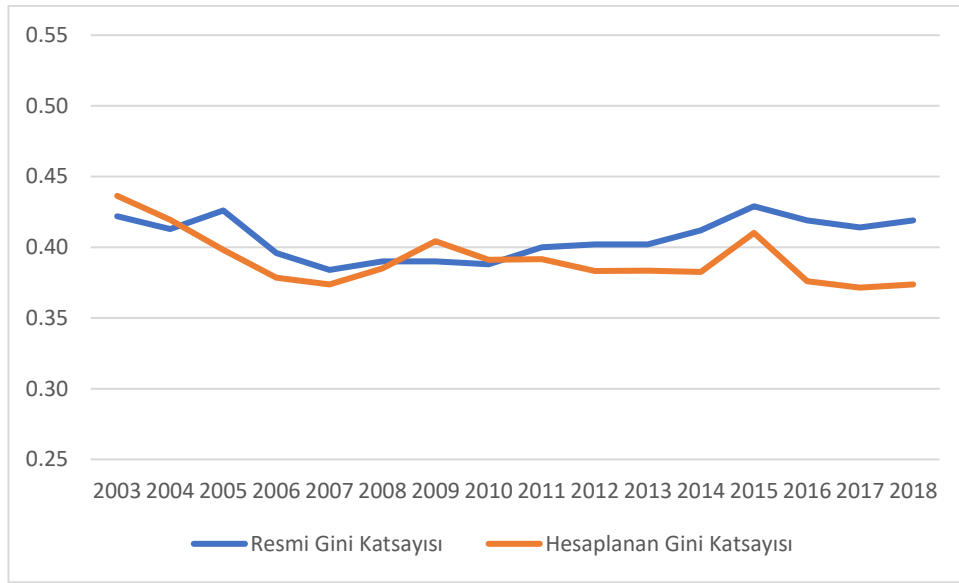
Gelir grupları arasındaki enflasyon farklılıklarına katkıda bulunan faktörleri araştırırken üç önemli noktayı inceliyoruz. İlk olarak, sonuçlarımızı gelir grupları arasındaki enflasyon farklarıyla ilgili olarak resmi veriyle ve Akçelik'in (2015) sonuçlarıyla karşılaştıracamız. Sonuçlarımızı eşleştirmeye çalıştığımız ana kaynak olduğu için resmi verilerle karşılaştırmanın önemi en yüksektir. Ardından metodolojisi çalışmamıza çok benzediğinden, sonuçlarımızı Akçelik (2015) ile karşılaştırmamızı önemli bir adım olarak değerlendireceğiz. İlk olarak, gelir grupları arasındaki enflasyon farklılıkları ile ilgili bir konu olan hesaplanan enflasyon oranının resmi enflasyon oranından önemli ölçüde yüksek olduğunu açıklamaya çalışıyoruz. Bazı harcama gruplarında hesaplanan ortalama enflasyon oranının resmi enflasyon oranından önemli ölçüde yüksek olduğunu görüyoruz. Bunun, metodolojimizdeki

kalite ayarlamalarının eksikliğinden kaynaklanabilecek veri sorunumuzun bir sonucu olabileceğini düşünüyoruz. Hesaplanan enflasyon oranının resmi enflasyon oranından yüksek olmasının sebebinin bu olabileceğini düşünüyoruz.

Resmi ve hesaplanan sonuçlar arasındaki farkın nedenini inceledikten sonra, sonuçlarımızın neden Akçelik (2015) sonuçlarıyla çok yakın olmadığını açıklamaya çalışıyoruz. Akçelik (2015), 2004-2015 döneminde Türkiye'deki gelir grupları arasındaki enflasyon farklarını inceliyor ve bizim metodolojimiz araştırmasında izlediği yönteme çok yakın. Bu nedenle iki çalışmanın sonuçlarını karşılaştırmakta fayda var. Sonuçlara baktığımızda, zengin hanehalklarının bütçelerinde daha fazla paya sahip olan harcama gruplarının, hesaplanan enflasyon oranları resmi enflasyon oranlarından önemli ölçüde yüksek olan gruplar olduğunu görüyoruz. Bu hem hesaplanan genel enflasyonu artırır hem de enflasyon farklarını zengin hanehalklarının aleyhine etkiler. Metodolojimizdeki ayarlama eksikliğinden kaynaklanabilecek veri sorunumuzun, bu grupların, özellikle iletişim, mobilya, ev eşyası, giyim ve ayakkabıların, yenilik veya yeni ürün lansmanı nedeniyle ayarlama ihtiyacı duyulan gruplar olması nedeniyle böyle bir farklılığın nedeni olabileceğini düşünüyoruz. Böyle bir ayarlama ile sonuçlarımız Akçelik (2015) sonuçlarına yaklaşabilir.

Son olarak, 2015 yılından sonra zengin hanehalklarının enflasyon oranının yoksul hanelere göre neden daha hızlı arttığını açıklamaya çalışıyoruz. Bunu yapmak için enflasyon farklılıklarına yol açan en etkili harcama gruplarını belirlemeye çalışıyoruz ve onların 1., 2., 4. ve 7. harcama grupları olduğunu görüyoruz. Zengin hanelerin enflasyonunun yoksul hanelere göre neden daha fazla arttığını anlamak için, bu grupların enflasyon oranlarının evrimini analiz edebiliriz. Sonuçlara baktığımızda, ulaşım gibi en zengin gelir gruplarının bütçelerinde daha büyük bir paya sahip olan harcama gruplarının enflasyon oranlarının diğer harcama gruplarına göre daha fazla arttığını görüyoruz. Ayrıca en yoksul gelir gruplarında daha büyük bir paya sahip olan alkollü içecekler ve tütün grubunun enflasyon oranı diğer harcama gruplarına göre daha az artmaktadır. Burada yiyecek ve alkolsüz içecekler ve barınma, en yoksul hanelerin bütçeleri çok yüksek olduğu için çok önemlidir, ancak iki dönem arasında göreceli konumlarında önemli bir farklılık görmüyoruz. Bunların sonucu olarak, en yoksul ve en zengin gelir gruplarının enflasyon oranları arasındaki farkın işaretindeki değişimi elde ediyoruz.

Bu incelemenin sonrasında gelir grupları arası enflasyon farklılıklarının Türkiye’de Gini katsayısı üzerine etkisini inceliyoruz. Bir önceki bölümde sunduğumuz hanehalkına özgü enflasyon oranları ile hanehalkı gelirlerini baz yıla çekiyor ve reel Gini katsayısını hesaplıyoruz. Reel Gini katsayısını hesaplamadan önce, HBA'daki gelir ve faktör verilerinden yararlanarak nominal Gini katsayısını hesaplıyoruz. Grafik Ek-B.3'ten de görebileceğimiz gibi, hesaplanan ve resmi Gini katsayıları birbirine yakındır.



Grafik Ek-B.3. Nominal Gini Katsayısı Karşılaştırması

Kaynak: Dünya Bankası, Yazarın Kendi Hesaplaması.

Nominal Gini katsayısı, nominal gelirler açısından eşitsizlik eğilimlerini gösterir. Biz gelir grupları arasındaki enflasyon farklılıklarını hesaba katarak reel Gini katsayısını hesaplıyoruz. Bunu yapmak için, baz yıl olarak 2003'ü seçiyoruz ve beşte birlik dilimlere özgü enflasyon oranlarını kullanarak beşte birlik dilimlerin gelirlerini o yıla indiriyoruz. Ardından, ortaya çıkan gelirlerle Gini katsayısını hesaplıyoruz. Tablo Ek-B.1’de gördüğümüz gibi, gelir grupları arasında önemli enflasyon farklılıkları gözlemlemediğimiz için nominal ve reel Gini katsayısı arasında önemli bir fark görmüyoruz.

Tablo Ek-B.1. Hesaplanan Nominal ve Reel Gini Katsayısı

Kaynak: Yazarın Kendi Hesaplaması.

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
NominalGini Katsayısı	0.43	0.41	0.39	0.37	0.37	0.38	0.40	0.39	0.39	0.38	0.38	0.38	0.41	0.37	0.37	0.37
Reel Gini Katsayısı	0.43	0.41	0.39	0.37	0.37	0.38	0.40	0.39	0.39	0.38	0.38	0.38	0.41	0.37	0.36	0.37

Bu çalışmada her bir gelir grubunun farklı tüketim kalıplarına sahip olduğunu ve görelî fiyat değişkenliğinin bu gelir gruplarını farklı şekilde etkilediğini gösterdik. Farklı zaman dilimlerinde, farklı gelir grupları, görelî fiyat hareketlerine bağlı olarak resmi enflasyon oranından daha yüksek oranda enflasyondan muzdariptir. 2004-2015 döneminde yoksul haneler daha yüksek enflasyon oranından muzdariptir. 2015'ten sonra, zengin hanehalkları daha yüksek enflasyon oranından muzdariptir ve bu durum zengin hanehalklarının zarar görmesine neden olarak genel tabloyu değiştirmektedir. Gelir grupları arasındaki bu enflasyon farklılıklarının belirleyicileri, 2015 yılından sonra ulaşımda enflasyon oranının artması ve düzeltme yönteminin kamuya açık olmaması nedeniyle yöntemimizde kalite ayarlamalarının olmamasından kaynaklanabilecek veri sorununuz olabilir. Çalışmamız, Türkiye için gelir grupları arasındaki enflasyon farklılıklarını dikkate alan bir eşitsizlik ölçüsü hesaplayan ilk çalışmadır. Enflasyon farklarını hesaba katarak reel Gini katsayısını hesapladık, ancak reel Gini katsayısı nominal olandan çok fazla farklılaşmadı çünkü gelir grupları arasındaki enflasyon farkları birbirinden çok fazla farklılaşmadı.

Daha ileri bir çalışma olarak, kalite ayarını hesaba katmak ve veri sorununun üstesinden gelmek için bazı yöntemler kullanılabilir ve bu, incelenen dönem için daha doğru çözümlere yol açabilir. Ayrıca biz reel gelir eşitsizliğini Gini katsayısını kullanarak hesapladık, ancak başka ölçüler de kullanılabilir. Böylelikle farklı gelir gruplarına verilen önem ayarlanabilir ve farklı eşitsizlik ölçütlerinin sonuçları karşılaştırılabilir.

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