

INCOME GROUPS AND INFLATION IN TURKEY

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## **ABSTRACT**

### **INCOME GROUPS AND INFLATION IN TURKEY**

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Official inflation figures represent the inflation of a typical (representative) household in an economy. However, each household has its own consumption behavior and pattern, which depends on demographic characteristics and the income. Relative price variability and the weight divergence of consumer items across households are high in the developing countries due to structural problems, convergence process and income inequality. Therefore, inflation exposure differential across households is more pronounced in the developing countries. We analyze inflation differentials across income and demographic groups in Turkey over the last 12 years by using Household Budget Survey (HBS) and consumer price data of TurkStat. We find that poor households are exposed to higher inflation than rich households on average in Turkey. Inflation exposure differentials are highly volatile due to frequent supply shocks. More importantly, as income gap widens, inflation inequality across households increases. While main upside contributors to inflation differential are bread and cereals, vegetables, tobacco products, rent and solid fuels, main downside contributors are automobile, motor fuel products and services. Moreover, we conclude that the inflation of poor households is more sensitive to shocks to food prices, while that of rich households is more sensitive to exchange rate and import price changes in Turkey.

**Keywords:** Inflation differentials, income groups, Household Budget Survey, developing countries, Turkey.

## ÖZ

### TÜRKİYE’DE GELİR GRUPLARI VE ENFLASYON

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Resmi enflasyon rakamları bir ekonomideki tipik (temsili) bir hanehalkının enflasyonunu göstermektedir. Ancak her hanehalkı demografik özelliklerine ve gelirine göre değişen tüketim davranışı ve kalıbına sahiptir. Yapısal problemler, yakınsama süreci ve gelir eşitsizliğinden dolayı gelişmekte olan ülkelerde görece fiyat oynaklığı ve hanehalkları arasında tüketici kalemlerinin ağırlık ayrışması belirgindir. Bu nedenle, hanehalkları arasında maruz kalınan enflasyon farklılıkları gelişmekte olan ülkelerde daha belirgindir. Biz bu tezde Türkiye’de son on iki yılda farklı gelir ve demografik grupları arasındaki enflasyon farklarını TÜİK tarafından açıklanan Hanehalkı Bütçe Anketi (HBA) ve tüketici fiyat verisini kullanarak analiz ediyoruz. Türkiye’de fakir hanehalklarının zengin hanehalklarına kıyasla ortalamada daha yüksek enflasyona maruz kaldıklarını bulgulanmıştır. Sık görülen arz şoklarından dolayı enflasyon farkının zaman içindeki oynaklığı ise oldukça yüksektir. Daha önemlisi, hanehalkları arasındaki gelir farkı açıldıkça maruz kalınan enflasyon farkı da artmaktadır. Enflasyon farkını arttıran harcama kalemleri ekmek ve tahıllar, sebze, tütün ürünleri, kira ve katı yakıtlar iken enflasyon farkını azaltan kalemler otomobil, akaryakıt ve hizmet kalemlerinden oluşmaktadır. Ayrıca, fakir hanehalklarının enflasyonu gıda fiyatlarına gelen şoklara daha duyarlıyken zengin hanehalkları enflasyonunun döviz kuru ve ithalat fiyat değişimlerine daha duyarlı olduğu bulunmuştur.

**Anahtar Kelimeler:** Enflasyon farklılıkları, gelir grupları, Hanehalkı Bütçe Anketi, gelişmekte olan ülkeler, Türkiye.

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## TABLE OF CONTENTS

PLAGIARISM.....	iii
ABSTRACT.....	iv
ÖZ.....	v
ACKNOWLEDGMENTS.....	vi
TABLE OF CONTENTS.....	vii
LIST OF TABLES.....	ix
LIST OF FIGURES.....	x
LIST OF ABBREVIATIONS.....	xii
CHAPTER	
1. INTRODUCTION.....	1
2. INFLATION DYNAMICS IN DEVELOPING COUNTRIES.....	7
2.1 Introduction.....	7
2.2 Related Literature.....	8
2.3 Conclusion .....	14
3. INCOME GROUPS AND INFLATION.....	15
3.1 Introduction.....	15
3.2 Related Literature.....	16
3.3 Conclusion .....	23
4. INCOME GROUPS AND INFLATION: THE CASE OF TURKEY.....	24
4.1 Introduction.....	24
4.2 Related Literature.....	26
4.3 Data and Methodology.....	29
4.3.1 Data.....	29

4.3.2 Descriptive Statistics.....	32
4.3.3 Methodology.....	36
4.4 Empirical Findings.....	40
4.4.1 Inflation by Income Groups .....	40
4.4.2 Contributors to Inflation Differentials.....	50
4.4.3 Inflation by Demographic Groups.....	54
4.5 Conclusion.....	58
5. DETERMINANTS OF INFLATION FOR INCOME GROUPS.....	59
5.1 Introduction.....	59
5.2 Data and Methodology.....	59
5.3 Empirical Findings.....	62
5.4 Conclusion.....	64
6. CONCLUDING REMARKS AND POLICY IMPLICATIONS.....	66
REFERENCES.....	69
APPENDICES	
A. TurkStat’s Descriptions of COICOP Classification and Annual Disposable Income.....	72
B. Properties of Inflation Differentials.....	74
C. Tests for whether TurkStat’s and Calculated Inflation are Different.....	75
D. Estimation Results and Diagnostic Tests of VAR Models.....	77
E. Impulse-Response Functions of Different Cholesky Orderings.....	85
F. Impulse-Response Functions and Variance Decompositions.....	90
G. Türkçe Özet.....	95
H. Tez Fotokopisi İzin Formu.....	107

## LIST OF TABLES

### TABLES

Table 4.1 Descriptive Statistics of Food and Energy Annual Inflation.....	32
Table 4.2 Sample Size of Each Household Budget Survey.....	32
Table 4.3 The Weights of 12 Main Expenditure Groups (COICOP) in CPI.....	33
Table 4.4 Average Annual Inflation Rates of 12 Main Expenditure Groups (COICOP).....	34
Table 4.5 Year-End Annual Inflation Rates of 12 Main Expenditure Groups (COICOP).....	35
Table 4.6 Relative Contribution of 12 Main Expenditure Groups (COICOP) to Year-End CPI Inflation.....	36
Table 4.7 Calculated Weights of "01.Food and Non-Alcoholic Beverages" in CPI for Each Income Group.....	48
Table 4.8 Calculated Weights of "02.Alcoholic Beverages and Tobacco" in CPI for Each Income Group.....	48
Table 4.9 Inflation Exposure Differentials by Different Quantiles.....	51
Table 4.10 Poverty Threshold (TL) By Equivalised Household Disposable Income, Turkey.....	51
Table 4.11 Contribution of 12 Main Expenditure Groups to Inflation Difference between the Poorest and the Richest Quintiles.....	52
Table 4.12 Contribution of Selected 4-Digit COICOP Consumption Items to Inflation Difference between the Poorest and the Richest Quintiles.....	53
Table 4.13 Inflation Differentials by Demographic Groups.....	57

## LIST OF FIGURES

### FIGURES

Figure 2.1. Share of Food in Consumers' Basket vs. Income Per Capita.....	8
Figure 2.2. Income Elasticity of Food Demand vs. Income Per Capita.....	10
Figure 2.3. Price Elasticity of Food Expenditures vs. Income Per Capita.....	11
Figure 2.4. Consumer Inflation Rates: Developed vs. Developing Countries.....	13
Figure 4.1. Consumer Inflation Rates: Turkey.....	30
Figure 4.2. Consumer Price Indices: Food, Energy, CPIX.....	32
Figure 4.3 Inflation Rates: Food, Energy and CPI excluding Food and Energy.....	32
Figure 4.4 Consumer Price Index Comparison: CPI_Calculated vs. CPI_TurkStat	39
Figure 4.5 Consumer Price Indices for Each Quintile.....	42
Figure 4.6 Inflation Rates for Each Quintile.....	42
Figure 4.7 Inflation Difference between the 1 <sup>st</sup> and the 5 <sup>th</sup> Income Groups.....	43
Figure 4.8 Standard Deviation of Annual Inflation Difference between the 1 <sup>st</sup> and the 5 <sup>th</sup> Income Groups (Moving Average of 12 Months).....	44
Figure 4.9 Statistical Significance of Annual Inflation Difference between the 1 <sup>st</sup> and the 5 <sup>th</sup> Income Groups (t-test values for Moving Average of 36 months).....	45
Figure 4.10 Inflation Rates for the 1 <sup>st</sup> and the 10 <sup>th</sup> Deciles.....	46
Figure 4.11 Inflation Difference between the 1 <sup>st</sup> and the 10 <sup>th</sup> Deciles.....	46
Figure 4.12 Inflation Rates for the 1 <sup>st</sup> and the 20 <sup>th</sup> Ventiles.....	47
Figure 4.13 Inflation Difference between the 1 <sup>st</sup> and the 20 <sup>th</sup> Ventiles.....	47
Figure 4.14 Consumer Price Indices for Poor and Non-poor Households.....	49
Figure 4.15 Inflation Rates for Poor and Non-poor Households.....	49
Figure 4.16 Annual Inflation Difference between Poor and Non-poor Households	49
Figure 4.17 Annual Inflation Difference between Tenant and Homeowner	

Households vs. Annual Rent Inflation.....	56
Figure 5.1 Accumulated Response of the Poorest (1 <sup>st</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Innovation.....	62
Figure 5.2 Accumulated Response of the Poorest (1 <sup>st</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation.....	62
Figure 5.3 Accumulated Response of the Richest (5 <sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Innovation.....	63
Figure 5.4 Accumulated Response of the Richest (5 <sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation.....	63
Figure 5.5 Variance of the Poorest (1 <sup>st</sup> Quintile) Inflation Due to Exchange Rate Basket.....	64
Figure 5.6 Variance of the Poorest (1 <sup>st</sup> Quintile) Inflation Due to Import Prices...	64
Figure 5.7 Variance of the Richest (5 <sup>th</sup> Quintile) Inflation Due to Exchange Rate Basket.....	64
Figure 5.8 Variance of the Richest (5 <sup>th</sup> Quintile) Inflation Due to Import Prices...	64

## **LIST OF ABBREVIATIONS**

ADF	Augmented Dickey Fuller
CBRT	Central Bank of the Republic of Turkey
COICOP	Classification of Individual Consumption According to Purpose
CPI	Consumer Price Index
HBS	Household Budget Survey
IRF	Impulse Response Function
PPI	Producer Price Index
TURKSTAT	Turkish Statistical Institute
USDA	United States Department of Agriculture
VAR	Vector Autoregression

## **CHAPTER 1**

### **INTRODUCTION**

Inflation is a measure of how quickly general price level of goods and services is persistently increasing. Inflation is the main criterion for measuring cost of living changes. Therefore, inflation rate is mostly used as a benchmark in wage bargaining between labor union and employers. Governments use inflation as a basis for minimum wage determination and the pensions of retirees. Thus, purchasing power of all employees is directly affected by the difference between exposed inflation and wage increase. Inflation rate is also used as a reference rate in rent contracts, administered prices and tax adjustments. Hence, it is important to know whether official inflation rate represents cost of living changes for all households in any economy or not.

Official headline inflation rates published by National Statistics Offices represent the inflation of an average household in the economy. However, each household has its own consumption basket and pattern according to their preferences. And, these preferences may change with demographic characteristics such as age, employment status, region of residence etc. and mostly with the household's income level. In addition to ingredients of consumption basket, the shares of goods and services on household's budget also vary according to the preferences mainly determined by income and demographic characteristics of households. Thus, such situations may cause the divergence of consumption basket and the weights of each good and service in the consumer basket. When relative price movements among goods and services diverge from each other, inflation exposures may significantly differentiate across distinct household groups. In these cases, while one household group becomes worse off, another one may be better off in terms of welfare since incomes and expenditures of all households are adjusted with the same official inflation measure.

Inflation dynamics are different between developing and developed countries. Structural problems and convergence process increase relative price variability in emerging markets. In addition, income inequality across households is relatively higher in the developing countries (Kuznets, 1955). Thus, one may expect higher inflation differentials across household groups in developing countries than developed countries. However, there are very few studies about inflation differentials across different household groups in the literature for emerging markets.

In this study, inflation differences across income and demographic groups are analyzed for Turkey. First, the weights of 5-digit COICOP level goods and services<sup>1</sup> are obtained from HBS of TurkStat for each demographic and income group. Then, inflation of CPI and main expenditure subgroups from 5-digit COICOP level are calculated for each specified income and demographic group. In addition to TurkStat's classifications (20% quintiles segment), income groups are formed according to different criteria such as 10% deciles, 5% ventiles, and poor & non-poor<sup>2</sup> by using equivalised annual disposable income. Also, HBSs of TurkStat provide the flexibility of examining different demographic groups according to age, household size, family type, pensioners vs. non-pensioners, tenant vs. homeowner, regional differences (urban vs. rural).

This study has two main contributions to the inflation inequality literature. Firstly, to the best of our knowledge, this is the first comprehensive study about inflation exposure differentials for a developing country, Turkey. It will be a contribution to understand the dynamics of inflation exposure differences across households in the developing

---

<sup>1</sup> TurkStat's description of 5-digit COICOP item level can be found in Appendix A.1 for food group as an example.

<sup>2</sup> Households below poverty threshold are categorized as poor. Other households are grouped as non-poor.

countries. Secondly, the economic reasons behind inflation differentials across household groups are investigated in this study.<sup>3</sup>

There are five contributions of this study to Turkish inflation inequality literature. Firstly, the use of 5-digit COICOP level data provides reliable results for the inflation differentials across households in Turkey. Secondly, the number of members in the household is considered when income groups are formed. Thirdly, households are divided into different quantiles according to their income levels. By doing this, the effect of income gap on inflation differentials is analyzed. Fourthly, how demographic characteristics affects inflation exposure differences for Turkey are examined by the help of comprehensive HBS data. Lastly, main contributors to inflation differentials are shown in terms of not only expenditure groups but also product-based.

Turkey, as an important emerging economy, has experienced elevated inflation over the last 12 years despite being lower compared to 90's. And, the variance of price changes among various expenditure groups is also high. Specifically, food (particularly, unprocessed food prices) and energy (particularly, electricity and natural gas prices) prices are very volatile in this period. Moreover, income distribution among individuals and households is relatively distorted<sup>4</sup>, and regional income differences are visible in Turkey.<sup>5</sup> Thus, the variation in consumption patterns and baskets across household groups is anticipated. The price variability differences among consumer items and consumption pattern differentials of households preoccupy the presence of inflation exposure differences across Turkish household groups.

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<sup>3</sup> Ryan and Milne (1994) analyze the determinants of inflation for three income groups (lower-middle-upper) in Kenya but they do not approach their findings from the perspective of inflation differences across income groups.

<sup>4</sup> According to World Bank estimates, the latest Gini coefficient of Turkey is 0.402 in 2012. According to TurkStat, the latest Gini coefficient of Turkey is 0.391 in 2014.

<sup>5</sup> According to TurkStat, the highest average annual equivalised disposable income per capita is 20446 TL for TR51 (Ankara) while the lowest one is 7233 TL for TRC3 (Mardin, Batman, Şırnak, Siirt) in 2014.

There are six main findings of this study. The first one is that poor households have been exposed to higher inflation than rich households on average over the last twelve years in Turkey. Secondly, the inflation differentials between poor and rich households are very volatile due to frequent supply shocks. The third one is that when income gap across households widens, inflation exposure difference is also rising. Fourth one is that demographic characteristics have less impact on inflation exposure differences across households when compared to income level. The fifth one is that main upside contributors to inflation differential across income groups are bread and cereals, vegetables, tobacco, rent, and solid fuels, while main downside contributors are automobile, motor fuels, and services. The sixth and the last main finding is that while the inflation of poor households is more sensitive to food price shocks, the inflation of rich households is more sensitive to exchange rate and import price changes.

The study categorizes households according to their income levels in four different ways. All income groups are constituted according to equalised annual disposable income, which also take into account the size of household. Households are divided into 5, 10 and 20 equal parts in ascending order. We find that the poorest quintile household group experience 0.65 percentage points higher inflation exposure than the richest quintile household group on average over the last 12 years in Turkey. This difference increases to 0.78 percentage points between the poorest decile and the richest decile on average. The poorest 5 percent group is exposed to 0.87 percentage points of higher annual inflation than the richest 5 percent group on average. One can easily conclude that as income gap between two households increases, inflation exposure differential becomes larger. Another income classification is formed as poor and non-poor according to poverty threshold line. Annual inflation exposure difference between poor and non-poor is estimated as 0.39 percentage points on average.

Another finding is that inflation exposure difference is very volatile. For instance, inflation exposure difference between the poorest ventile and the richest ventile has a standard deviation of 1.86 percentage points with a mean of 0.87 points. The reasons of

this volatility are frequent supply shocks such as tax adjustments, weather conditions, exchange rate and import price changes. These shocks are the consequences of being a developing country as well as specific factors to Turkey.

Main upside contributors to inflation difference between poor and rich households are bread and cereals, vegetables, tobacco, solid fuels and rent on average. Main downside contributors are automobile, motor fuels, restaurant services and housework services on average over the whole period.

According to VAR estimations and the contributor items to inflation differentials, the inflation of poor households is more sensitive to food price shocks while that of rich households is more sensitive to exchange rate and import price changes. This finding is also consistent with findings about contributor items since downside contributors, automobile and motor fuels, are more sensitive to exchange rate and import price changes.

Demographic characteristics of households also affect consumption patterns. To detect the effects of relative price variability on each demographic group, domestic households are grouped in terms of age, employment status, home tenure, household size, region, and family type. We find that young, non-pensioners, tenant, large, rural, families with three or more children experience higher inflation than their counterparties on average over the discussed period in Turkey. Except for homeownership category, the inflation differential is not pronounced as much as income groups. These results are also consistent with the results of inflation exposure difference across income groups. All these demographic groups with higher inflation exposure are commonly considered as lower income portion of its own classification.

The structure of the remainder of the thesis is as follows. Chapter 2 summarizes inflation dynamics characteristics in developing countries. Chapter 3 reviews recent literature on inflation differentials across income and demographic groups. Chapter 4 analyzes how inflation differences across income and demographic groups in Turkey evolve over time

with the data and methodology. Chapter 5 examines the economic reasons behind inflation differentials by looking at the determinants of inflation for poor and rich households. Chapter 6 concludes the thesis and suggests some policy implications.

## CHAPTER 2

### INFLATION DYNAMICS IN DEVELOPING COUNTRIES

#### 2.1. Introduction

We analyze inflation dynamics in developing countries in comparison with developed countries in this chapter. Inflation dynamics in developing countries are significantly different from developed countries. Supply side factors have greater importance in determining the inflation of developing countries. This difference is caused by different structure of the emerging economies. Firstly, food items have substantial share in the budget of consumers in developing countries. Thus, the weights of food consumption items are very high in CPI baskets of developing countries. Secondly, consumers have higher income elasticity of food demand in developing countries. And, price elasticity of food demand is lower than unity in absolute terms due to being necessities of food items. Thirdly, developing countries experience higher income per capita growth. When we think higher income elasticity, low price elasticity of food demand and higher income growth together in developing countries, high and volatile food inflation is an expected outcome. Due to high share of food items in CPI basket, relative price variability and price changes become higher in developing countries. Lastly, Balassa-Samuelson effect as by-products of convergence process and structural problems also increase relative price variability and inflation in developing countries.

In the next section of this chapter, we review the determinants of inflation in developing countries in comparison with developed countries. In the last section, we summarize inflation dynamics differences of developing countries, and we emphasize their importance for inflation exposure differences across households.

## 2.2. Related Literature

There are significant inflation dynamics differences between developed and developing countries. Supply side factors are much more important in the inflation of developing countries. The composition of typical consumer basket is one reason of the factors. Figure 2.1 shows the share of food in consumer's expenditure basket vs. income per capita. Firstly, it is clearly seen that the weight of food items in CPI baskets is significantly higher in developing countries than developed countries. Secondly, the share of food products in CPI baskets of developing countries is still very significant and elevated as the level, for example 24 percent for Turkey in 2014. Thus, it is important to explain the dynamics behind food inflation in developing countries.

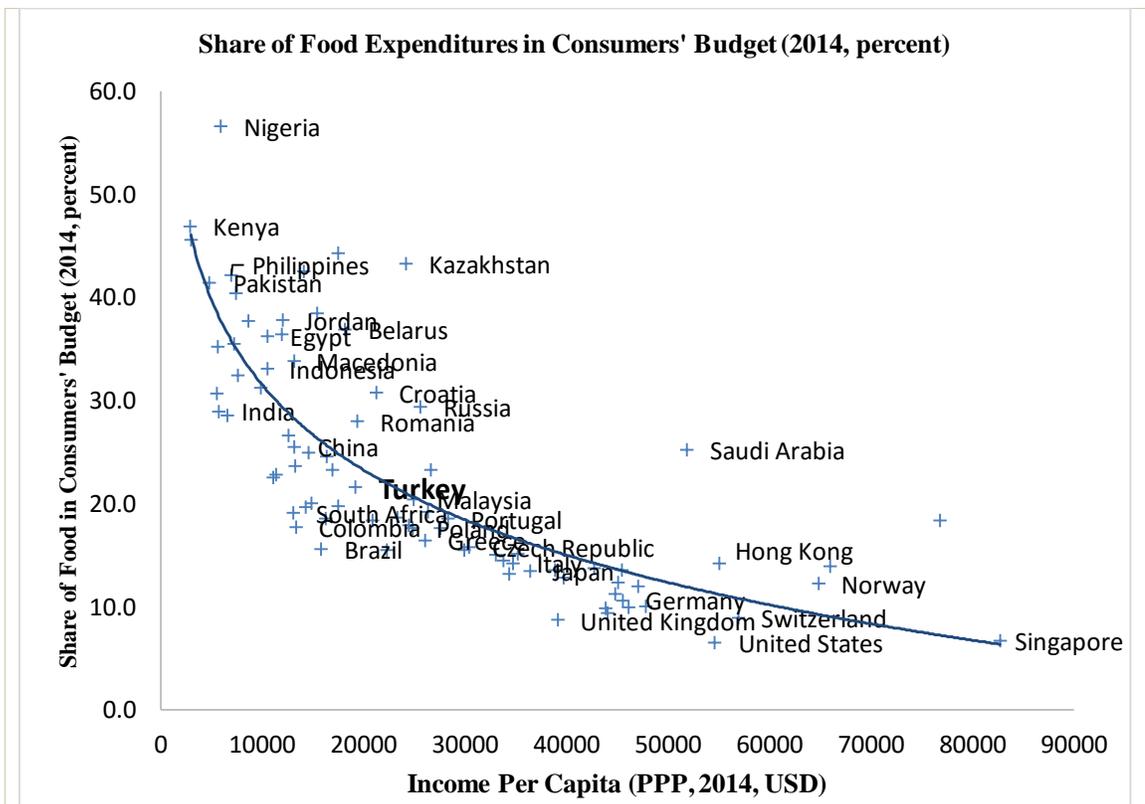


Figure 2.1 Share of Food in Consumers' Basket vs. Income Per Capita

Source: USDA calculations based on annual household expenditure data from Euro Monitor International, World Bank, Author's Own Calculations.

Another implication of high share of food items in the CPI baskets of developing countries is that inflation is less sensitive to demand conditions. Demand side factors are not as important as it is in developed countries in determining inflation since luxury goods and services with high income elasticity of demand have relatively low share in typical consumer basket in developing countries.

When demand and supply side factors of food items are investigated separately, one can easily understand the trend in food inflation over time in developing countries. When we look at the income and price elasticity of food, it may give an idea about food inflation differentials between developing and developed countries. Figure 2.2 plots income elasticity of food demand vs. income per capita for developing and developed countries. Income elasticity of food is higher in developing countries, which have low income per capita. As expected, developing countries experience higher income per capita growth due to convergence process and urbanization etc. However, supply of food does not grow enough to meet increasing food demand because of poor agricultural productivity in consequence of being labor intensive, urbanization, and declining land use for agricultural purposes in emerging markets as Yorukoglu (2009) emphasizes. Therefore, it is expected that this supply-demand gap ends up with higher food price increases in developing countries as a by-product of convergence process.

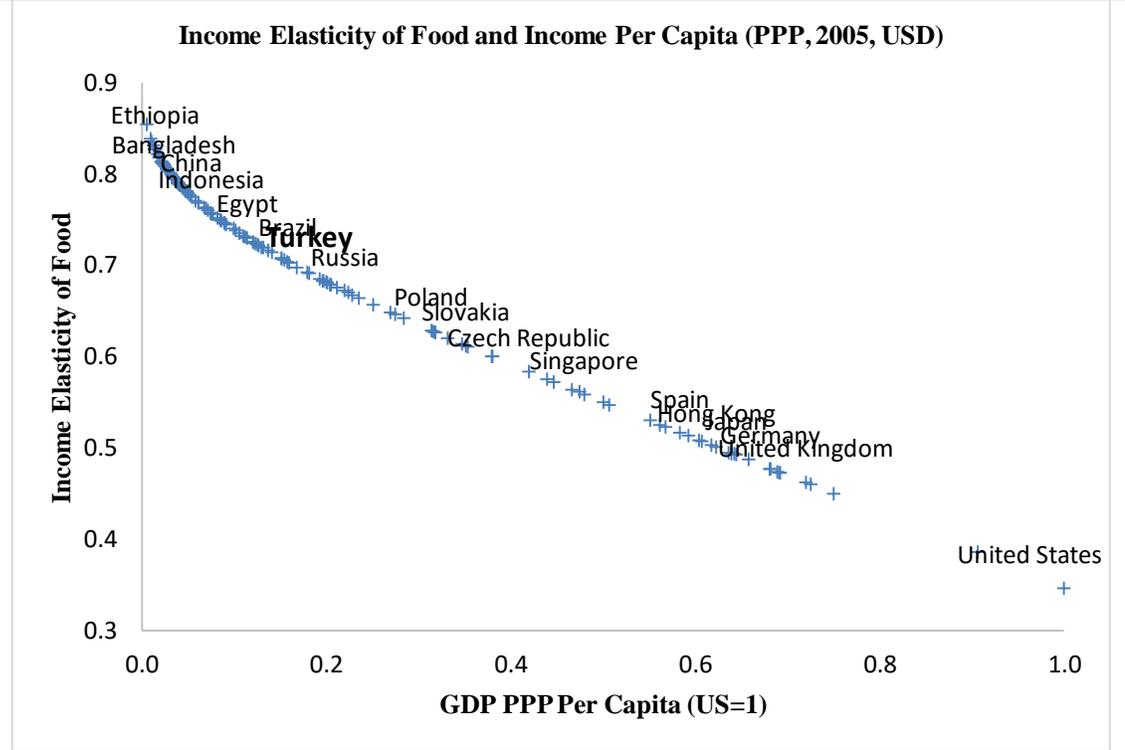


Figure 2.2 Income Elasticity of Food Demand vs. Income Per Capita

Source: Muhammad, Seale, Meade, and Regmi (2011), USDA, Author's Own Calculations.

Figure 2.3 shows price elasticity of food expenditures in developed and developing countries.<sup>6</sup> The price elasticity of food is higher in absolute terms in developing countries as expected but it is still much lower than unitary price elasticity of demand defined as normal in the literature. It confirms that food is a necessity even for households with low income in developing countries. The price elasticity of food is lower than the normal unitary price elasticity in absolute terms in developing countries. One can easily say that food is also a relatively price inelastic expenditure group for

<sup>6</sup> Budget shares of food expenditures (Figure 2.1), income (Figure 2.2) and price elasticity of food demand (Figure 2.3) figures are also the updated versions of related graphs in Yorukoglu (2009).

developing countries. In other words, food demand is not adjusted completely to food price changes in developing countries. This gives the pricing power to food producers to set their prices more independently from food demand.

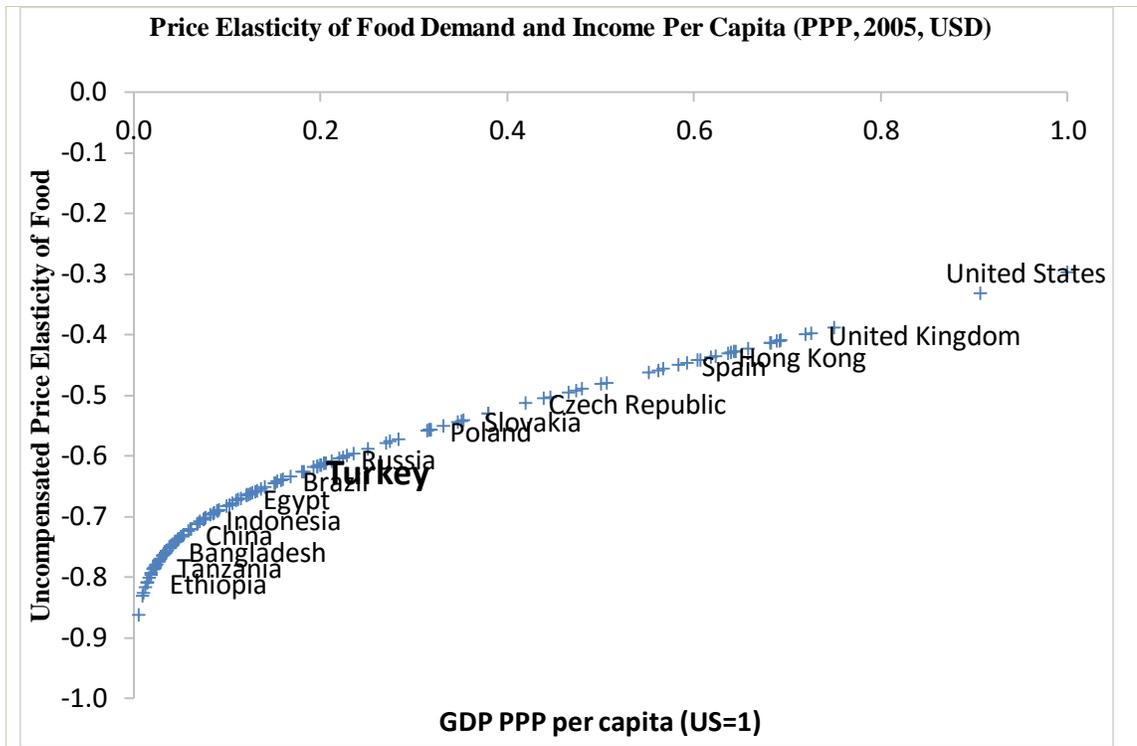


Figure 2.3 Price Elasticity of Food Expenditures vs. Income Per Capita

Source: Muhammad, Seale, Meade, and Regmi (2011), USDA, Author's Own Calculations.

As a result, both high share of food and anticipated high food inflation are one of the reasons behind higher consumer inflation in developing countries (Figure 2.4). These findings are in line with Klau and Mohanty (2000), which analyze inflation determinants in 14 emerging markets, and find that the changes in food price are the most important determinant of inflation in most of the developing countries.

As implications of food inflation in developing countries, Walsh (2011) emphasizes that food inflation is higher than nonfood inflation, and it affects nonfood inflation through

higher inflation expectations in emerging markets. Anand et. al. (2015) states that while targeting core inflation maximizes welfare in developed countries, headline inflation targeting improves welfare outcomes in developing countries. They claim that high income elasticity of food, low price elasticity of food expenditures and high share of food expenditures in total consumption expenditures are among the reasons of this difference in developing countries.

Another inflation dynamics differential between developing and developed countries originates from wages, productivity and inflation relationship. Mihaljeck and Saxena (2009) point out that real wages increases are higher than labor productivity gains, and cost-pressures often induce inflation increases in the emerging countries.<sup>7</sup> As a result of Balassa-Samuelson effect, rapid productivity growth in tradable goods market during convergence process ends up with fast wage growth in this sector, and spreads to the rest of the economy, which consists of non-tradable goods and services. At the end, developing countries may experience higher inflation than developed countries through wage-price relationships.

In addition to by-products of convergence process and high food share in CPI baskets with elevated food price increases, inflation dynamics may also differentiate in developing countries from advanced countries due to the structure of economy. Macroeconomic instability, non-competitive markets, inadequate legal regulations, insufficient quality of regulator institutions, and the overweight of the government in the economy may be the reasons of high and volatile inflation in developing countries. As an example of macroeconomic instability, some developing countries experience chronic current account deficits. Accordingly, exchange rate adjustments may frequently cause cost-pressures on consumer prices in these countries. In line with this situation, Klau and Mohanty (2000) show that exchange rate is the most significant variable for the inflation

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<sup>7</sup> They state that many observers have underlined real wages increases often exceed productivity gains in developing countries due to lack of skilled labor, spillovers from terms-of-trade shocks, and loose public sector wage policy although they are not shown empirically.

in most of the developing countries after the shocks to food prices. Benialper and Comert (2013) show that inflation is mostly affected by supply side factors such as exchange rate and international commodity prices rather than demand side factors for the period between 2002 and 2008 in Turkey as a developing country. In addition, non-competitive markets give pricing power to suppliers especially for goods and services with low price elasticity in absolute terms. Another factor can be the effects of government on consumer prices. Administered prices such as electricity, natural gas, water tariffs and special consumption tax changes such as motor fuel, alcoholic beverages, tobacco, automobile, electronic devices are mainly adjusted to finance public budget. Thus, budget deficits pose risks on the prices of goods and services. As a result of these factors, inflation rates are higher in developing countries due to the convergence process to developed countries and structural problems (Figure 2.4).

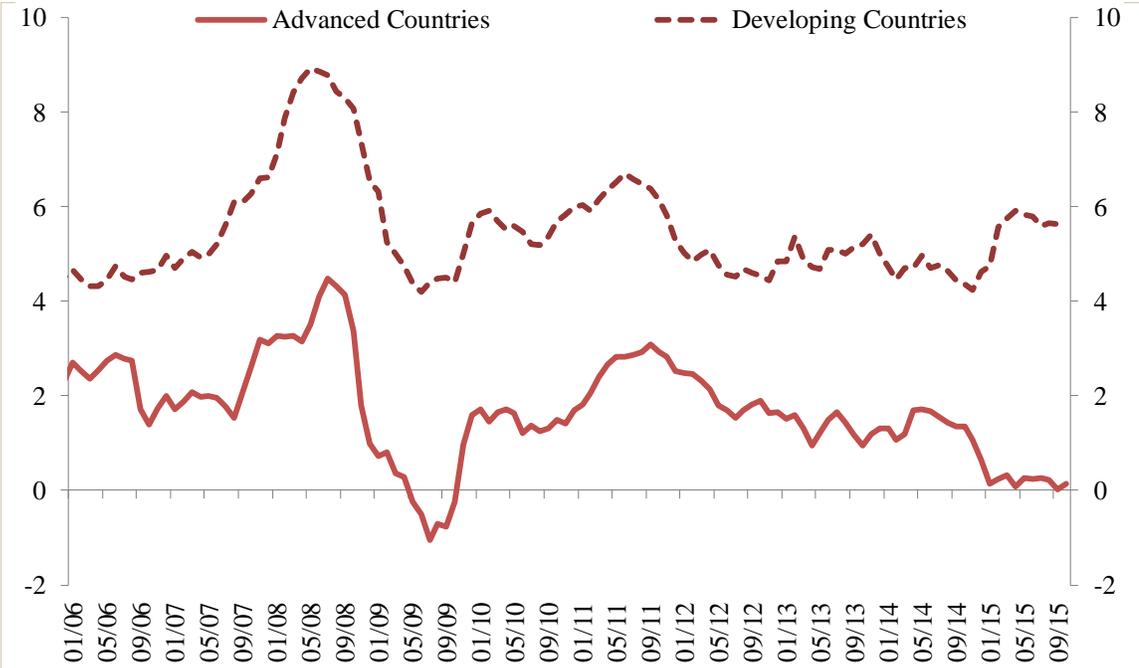


Figure 2.4 Consumer Inflation Rates: Developed vs. Developing Countries (Annual Percentage Change)

Advanced Countries: USA, Euro Area, Japan, UK, Canada, S.Korea, Switzerland, Sweden, Norway, Denmark, and Israel.  
 Developing Countries: China, Brazil, India, Mexico, Russia, Turkey, Poland, Indonesia, S.Africa, Argentina, Thailand, Czech Rep., Colombia, Hungary, Romania, Philippines, Ukraine, Vietnam, Chile, Peru, Egypt, Morocco.

Note: Inflation rates are weighted by Gross Domestic Products (GDPs) of the countries.

Source: Bloomberg, CBRT.

Figure 2.4 (continued).

### **2.3. Conclusion**

Inflation exposure differentials across income and demographic groups are affected by inflation dynamics. Inflation dynamics differentiate in developing countries significantly from developed countries. Supply factors resulting in higher inflation prevail in developing countries. High income elasticity and low price elasticity (in absolute terms) of food demand coupled with high share of food items in CPI is one of the reasons of higher and more volatile inflation in developing countries. As by-products of convergence process, higher income growth and Balassa-Samuelson effect are other factors increasing inflation in developing countries. Structural problems such as chronic current account deficit, high budget deficit, non-competitive market structure may also end up with higher inflation and relative price variability. Due to these reasons, unlike developed countries, supply side factors such as food price, international commodity price, exchange rate shocks become dominant in the inflation of developing countries rather than demand side factors. Thus, one can expect higher inflation differentials across income and demographic household groups in developing countries. Turkey is one of the developing countries, and shows typical characteristics of developing countries in terms of inflation dynamics. Thus, it becomes more important to investigate inflation exposure differences across households for Turkey. More importantly, the economic reasons behind inflation exposure differences across households can easily be understood by identifying inflation dynamics in developing countries.

## CHAPTER 3

### INCOME GROUPS AND INFLATION

#### 3.1. Introduction

The reliability of official inflation reported by National Statistics Office has always been questioned. Especially low-income households claim that their inflation is higher than official headline inflation. Part of such claims is caused by the fact that a single official inflation represents the expenditure and inflation experiences of a typical household. Most household's spending patterns, and price changes they face may substantially differ from that of the representative household. Against this background, it is expected that the share of household's budget devoted to 'necessities' such as food and housing is in tendency to decrease as households become rich, while the share of luxury goods and services such as automobile, tours, recreational activities, hotels and restaurants tends to rise. Thus, when the prices of mandatory items in consumer basket are increasing faster than the prices of luxury items, the inflation rates for poorer households will be higher than that for richer households. If variation in the prices of goods and services is significant and persistent, then it will increase income inequality and cause demographic unrest within the society.

In the next section, we examine inflation inequality studies across income groups (and demographic groups) for developed and developing countries. We review methodologies, data, empirical findings, and the shortcomings of existing studies. Then, we summarize literature review of inflation inequality differentials in the third section.

### 3.2. Related Literature

The studies about inflation differences across household groups are limited in number. Some authors examine inflation differentials using different household types, methodologies and datasets. However, prominent studies in the literature are all carried out for advanced countries, and although most of these studies provide no evidence on significant and persistent inflation exposure differentials across income groups on average, some of the studies find that inflation differences across household groups become evident occasionally.

Researchers mostly approach the issue from affected household group of society perspective. For instance, Crawford and Smith (2002) examine the distribution of inflation rates for UK household groups in the period 1976–2000 by using micro data from UK Family Expenditure Survey (FES). This study finds that average inflation rate for the poorest 10 percent of households was 6.8%, while the average annual inflation rate for the richest 10 percent was 7.1%. Another study for UK, Leicester et. al. (2008), concentrates on Retail Price Index (RPI) inflation for pensioners by using data from the Expenditure and Family Survey (EFS) over the period between 1977 and 2008. It finds that average inflation rate for a pensioner (5.8 percent) is the same as that for non-pensioners (5.9 percent). Hobijn and Lagakos (2005) study inflation differences across US households for the period January, 1987 - December, 2001 by utilizing Consumer Expenditure Survey (CES) and price data from CPI-U (prices for all urban consumers). This study reveals that inflation differential between poor and other households is less than 0.1 percentage points on average.<sup>8</sup> Chiru (2005) investigates CPI inflation for two sets of households, which are the 20 percent with the lowest incomes and the 20 percent with the highest incomes for the period between January 1992 and February 2004 for Canada. It finds that annual average inflation rate is 1.86 percent for the one-fifth of

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<sup>8</sup> Poor households are determined as households with reported incomes below the official Census Bureau poverty threshold, which changes with the number of children and number of other household members in addition to incomes in this study.

households with lowest incomes while it is 1.83 percent for the one-fifth with highest incomes. Fritzer and Glatzer (2009) examine group-specific inflation rates for Austria over the period between January, 2000 and October 2008 by using two Austrian expenditure surveys (CEX 1999/2000 and CEX 2004/2005) and 4-digit COICOP level prices. This study finds households with lower total spending have experienced a higher inflation rate than the “average” consumer. The annual average inflation gap was about –0.1 percentage points. Mehrhoff and Breuer (2009) investigate inflation difference across 13 income groups by using micro data from the Household Income and Expenditure Survey (EVS 2003) and COICOP 4-digit for Germany. This study reveals that although there exists some variation, the general trend is almost the same regardless of household’s income.<sup>9</sup> Their results invalidate the claims of higher inflation rates for poor households in Germany. As a result, although there is some variation in inflation exposure inequalities across income groups from time to time, no statistically significant inflation differences are found on average in developed countries.

Some studies focus on demographic characteristics of income groups and demonstrate the inflation differences across different household groups. For example, Crawford and Smith (2002) shows that non-pensioner, mortgagor, employed and childless households are exposed to higher inflation than official CPI inflation in UK. Chiru (2005) examines the inflation rate difference for different provinces and reveals that large differences exist across different provinces due to home heating costs and tuition fees in Canada. Hobijn and Lagakos (2005) find that elderly households (over the age 61) generally face a higher-than-average inflation rate. And, the households with children under 18 face lower-than-average inflation. Leicester et. al. (2008) emphasize inflation for pensioner households is heterogeneous in terms of age, income, housing tenure (tenant or owner), and family structure (single or couple) for UK. Moreover, the oldest, single, home-owner paying mortgage and the poorest pensioners have higher inflation in inflationary

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<sup>9</sup> It is found that there is long-run relationship between 13 price indices for each income groups and overall CPI by using co-integration tests.

episodes of 2006 and 2008. Fritzer and Glatzer (2009) show that contrary to common understanding households with children and larger households are not subject to higher than average inflation. Brachinger (2008) examines the very special case of a family with three children and a net monthly income between €2,600 and €3,600, which consume less alcohol and tobacco products by using two-digit COICOP level data. This study shows that the inflation of this specific household type was mostly lower than overall CPI for the period from January, 2000 to December, 2006. It is suggested that demographic differentiation across households gives extra information about inflation differences even for developed countries.

Another interesting finding is the sensitivity of inflation differential variations to economic conjuncture. For instance, Crawford and Smith (2002) state that only about a third of households at a point in time faced inflation rates within 1 percentage point of the headline inflation rate on average for UK. However, the representativeness of the average inflation rate tends to be lower when inflation is high (9 percent in 1989 vs. 65 percent in 1994) due to an increase in inflation variation across different households. Mehrhoff and Breuer (2009) emphasize that after a long period of low inflation with 2 percent, consumer inflation increased to 3 percent in 2008 due to the sharp increase in food and energy. They point out the discussion of whether the burden of inflation is shared equally among different income groups or not is revived due to this increase. Thus, inflationary environment may be responsible for inflation inequality across households due to relative price variability.

Almost all related studies work out how much each expenditure group contributes to inflation difference across household groups. For example, Hobijn and Lagakos (2005) state that although inflation differential is very low on average, poor households have highest inflation when gasoline prices increase sharply, like 1989-1991 and 1999-2001 episodes. This study finds that upside major contributors to inflation inequality are an increase in costs of education and health care, and the rise in volatility of gasoline prices.

The downside contributors are apparel, new and used vehicle prices, and the prices of household equipment. Chiru (2005) analyzes the contribution of different goods and services, and he finds that the low-average price increases of household electronics and computer equipment prices favor higher-income households while rent with low average price increases benefit lower-income households. Leicester et. al. (2008) reveals that inflation differences among different pensioner household groups in inflationary episodes of 2006 and 2008 are mostly caused by food and fuel prices. Fritzer and Glatzer (2009) find that the inflation contribution of housing and food was higher for lower-income groups. Higher-income households are usually exposed to a higher transport inflation than lower-income households. They also find that fuels for transport, liquid fuels for housing, restaurant services, rentals and meat are the main drivers of inflation difference across households.

Due to inflation dynamics differentials mentioned in Chapter 2, the difference in inflation exposure is expected to be more pronounced in developing countries. Studies for developing countries concentrate on mostly poverty implications of inflation exposure differences. Main focus of these studies is the price changes for necessities, especially food and heating items. For instance, Pinstrup-Andersen (1985) compiles related studies for developing countries and emphasizes that the negative impact of food price increases on real incomes of the poor is more severe in developing countries due to high budget share spent on food. Gulde (1991) examines short-run effects of Sri Lanka's structural adjustment programs consisting of the liberalization of food and energy prices on the poorest segments of society. The poor households are defined as nutritionally at risk group and they are the bottom 20 percent of the population. The poor spend around 70 percent of their overall income on food while the weight of food items in Colombo Consumer Price Index (CCPI) is 61.4 percent. The structural adjustment facility (SAF) program for 1989-1992 affected the prices of staple foods and kerosene, the cooking material that are important in expenditure and incomes of the poor. Due to SAF program; rice, wheat flour, bread, sugar prices increased by 32, 36, 46, and 15 percent;

respectively. Thus, food price increase occurred at 30 percent from June, 1989 to January, 1990 after excluding effects of changes in world prices. Net price impact of SAF program on the poor's consumption basket is estimated to have increased by 24.6 percent if non-controlled prices were assumed to be constant. Although they are mitigated by positive effects on income and government programs aimed at poverty alleviation to some extent, the effects of disorderly adjustments on living standards of the poor also appear. The most important ones of them are caused by inflation. Contrary to the more wealthy groups of population, the poor cannot hedge against the danger of loss in the currency's buying power. At the end, adjustment measures cause a loss in the spending capacity of the poor through changing the relative prices faced by the poor as a direct channel as well as by the indirect effects of inflation in Sri Lanka.

While its main focus is different from inflation differentials, another study for a developing country, Ryan and Milne (1994), examines the determinants of inflation rate for lower, middle and upper income groups for Kenya based on monthly data from 1976 to the end of 1990. The study measures inflation through annualized monthly inflation rate of CPI rather than annual inflation rate due to economic structure of Kenya as a developing country. It utilizes exchange rate, currency outside banks, reserves of banking system, interest rate, the production of cement, coffee and tea, gas-oil price as explanatory variables in each regression of dependent variable CPI for total and three different income groups. Authors find that exchange rate depreciation is the largest contributor among explanatory variables in upper income group's inflation while gas-oil price is the largest one in lower and middle income groups' inflation. It is expected since the effect of a gas-oil price increase is the largest for lower income group since this group is major consumer of cooking and bus services. Upper income group is major consumer of imported goods, and the fact that import prices increase due to exchange rate depreciations provides an explanation of why exchange rate depreciations are main contributors for upper income group.

Some economists draw attention to the issue of whether inflation differences among household groups are persistent over time or not. Crawford and Smith (2002) state that in any year, the differences in household specific inflation rates and the rankings change in UK. Similarly, Hobijn and Lagakos (2005) find that no persistence of inflation inequality is found across household groups over time for US by using Quah (1997)'s non-parametric Kernel density estimates for the conditional distribution of the next year's deviation from average inflation conditional on this year's deviation from average inflation. Leicester et. al. (2008) emphasize the differences between average inflation faced by pensioner and non-pensioner in any particular year or month can be quite substantial and change frequently in UK. At the end, most studies about inflation differentials for developed countries end up with no persistent inflation inequality across income groups over whole discussed period.

As an implication of inflation differentials, Crawford and Smith (2002) point out ignoring inflation differential can lead to misleading conclusions about the inequality measurements calculated from real incomes (variance of the log, the Gini coefficient, etc.). Hobijn and Lagakos (2005) propose to produce an official CPI for the elderly (CPI-E) by the Bureau of Labor Statistics due to significant difference from overall CPI. Gulde (1991) emphasizes that deflating the poor households' incomes by CPI will be a misleading indicator of the real effect of price changes on the purchasing power of the poor in case of Sri Lanka.

One missing part of related studies is the identification of economic reasons behind inflation discrepancies.<sup>10</sup> Although the studies uncover which consumption items cause inflation differences with their timing, why the divergence of price changes happen in that period is still missing. It is important to understand economic reasons such as exchange rate, oil price, regulations, supply and demand conditions behind the

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<sup>10</sup> Ryan and Milne (1994) analyze the determinants of inflation for three income groups (lower-middle-upper) in Kenya but they do not handle their findings from the perspective of inflation differences across income groups.

divergence of price changes among commodities and the weight differences across household groups.

Another missing issue in the studies is the lack of implications of inflation exposure differences. Although some studies point out that ignoring inflation differences may result in misleading inferences (Gulde, 1991; Crawford and Smith, 2002), most studies do not refer to the results of ignoring inflation inequality across household groups. Moreover, policy implications are not discussed to reduce inflation gap between household groups. This issue is vital especially for developing countries with structural problems since supply factors may prevent the convergence of price changes over time.

Furthermore, related studies have empirical weaknesses of related studies that vary from country to country. One of them is the issue of aggregation bias in estimations. The studies are heterogeneous about the aggregation level of data that they use. When the most disaggregate data is utilized, demand heterogeneity among goods and services is covered rather appropriately. Most studies use 2 or 3 digit COICOP level data. These studies ignore demand heterogeneity below this level of aggregation. Rather, some of them employ 4 digit COICOP level data for price and weight such as Fritzer and Glatzer (2009) and Mehrhoff and Breuer (2009).

Another empirical deficiency in the literature is the usage of same survey for a long period. Some studies use only one survey (Chiru, 2005; Mehrhoff and Breuer, 2009; Gulde, 1991; and Ryan and Milne, 1994) or two surveys (Fritzer and Glatzer, 2009) for the whole period. By doing this, these studies ignore consumption pattern changes over time. However, such problems are avoidable with comprehensive data. Nevertheless, some of empirical weaknesses are inevitable and cause biases in determining exact inflation differences across income groups due to the data limitation and nature of calculation procedures. All studies can detect consumer inflation differences between lower and higher-income households caused only by different spending patterns. The

reason is that the possibility of different prices that each income group faces is ignored. National Statistics Offices declare only one price for each item as Chiru (2005) emphasizes. However, richer households and poorer households may shop from different stores or outlets, and they may be charged with distinct price for the same good or service. Due to data limitation, price of each item is assumed to be identical for all income groups in all studies. Another inevitable bias is the substitution bias. When calculating current annual inflation, the one inevitably overstate inflation in the second period due to using previous weights as Hobijn and Lagakos (2005) also point out. Current weights for each household are not obtained since National Statistics do not complete the survey when determining the weights. Thus, inflation differentials computed by the same method with National Statistics Office have substitution bias. As a result, studies encounter unavoidable biases in determining inflation differences such as consumption pattern, outlet, and substitution bias.

### **3.3. Conclusion**

Inflation inequality studies are mostly done for advanced countries. Although significant inflation differences across income groups may occur due to cyclical developments, there is no clear evidence that poor households experience higher inflation than rich households in advanced countries in the long term. However, there can be occasionally an inflation exposure difference across different income and demographic household groups. The divergence among the prices of necessities (food and housing) and other consumption items is mostly responsible for cyclical inflation differentials across income groups against poor households. Related literature indicates that inflation inequality across household groups is more visible for emerging countries due to inflation dynamics differentials and consumption pattern divergence across households. In this context, next chapter of the thesis examines inflation differentials in Turkey as the case of developing countries.

## CHAPTER 4

### INCOME GROUPS AND INFLATION: THE CASE OF TURKEY

#### 4.1. Introduction

Whether official inflation figures represent inflation rate for poor households in Turkey or not is questioned in public from time to time. These discussions are valid to some extent due to two main phenomena in Turkey. Firstly, food and energy inflation are higher and more volatile than the inflation of other consumption items in Turkey. Secondly, income distribution across households is relatively distorted and regional income differences are visible in Turkey. According to TurkStat, Gini coefficient<sup>11</sup> for Turkey in terms of equivalised household disposable income is 0.391 in 2014, and the Gini coefficient is 0.402 in 2012 for Turkey according to the World Bank. According to TurkStat, while the highest annual equivalised disposable income per capita belongs to TR51 (Ankara) with 20446 TL, the lowest one is 7233 TL for TRC3 (Mardin, Batman, Şırnak, Siirt) in 2014. Thus, some variation in spending patterns and consumption baskets across households in Turkey is expected. The inflation differentials among consumer items and the share differentiation of each consumer item in consumer baskets cause inflation exposure differences across Turkish household groups.

As a developing country, Turkey has experienced high inflation over the last 12 years compared to developed countries in spite of being lower than 90's. Turkey has shown most of inflation dynamics characteristics of developing countries mentioned in Chapter 2. In addition, Turkish economy has specific factors to exhibit peculiar inflation dynamics. First, Turkey is a producer country of agricultural products. This situation makes the consumer inflation more sensitive to supply shocks such as weather

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<sup>11</sup> Gini coefficient of 0 represents perfect equality while that of 1 shows perfect inequality.

conditions in Turkey. Also, there is a long distribution chain from producer to consumer in food sector, which exacerbates the effects of shocks to food prices, especially for fresh fruits and vegetables. Poor competition conditions and downward price rigidity are other factors resulting in higher food inflation (Orman et. al., 2010 and Monetary and Exchange Rate Policy, CBRT, 2010).

Other factors specific to Turkey are related with administered prices and indirect tax adjustments. Electricity, natural gas and water prices are determined by central and local government. Furthermore, the price of certain products is strongly affected by government through indirect tax adjustments. Motor fuel products, tobacco, alcoholic beverages and automobiles are typical examples of such products.<sup>12</sup> Although fiscal balance is relatively strong, budget structure is not resilient enough. Thus, government has taken measures to improve public balances through special consumption tax adjustments and administered price increases from time to time. As a result of being a developing country and specific factors, inflation differentials across income groups are evident in Turkey.

In this chapter, we analyze inflation exposure differentials across income and demographic groups in Turkey. We review related studies for Turkey with their data, methodology and findings in the second section. Then, we present the data descriptions, descriptive statistics of the consumer price and the weights of expenditure groups in CPI basket, and the methodology in the third section. In the fourth and last section, empirical findings are presented. This section incorporates inflation exposure differentials across income groups, upside and downside contributors to inflation differentials, and inflation exposure differences across demographic groups.

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<sup>12</sup> Source: Inflation Report 2012-IV, Box 3.1, *CBRT*.

## 4.2. Related Literature

There are few attempts to identify consumer inflation differentials across income groups for Turkey by using different methods and data. These are not comprehensive analyses about inflation exposure difference for Turkey. For instance, Yukseler and Turkan (2008) claim that consumer inflation is perceived by various household groups differently due to distinct expenditure structure and price increase differentials across expenditure groups in consumer prices. The report forms mandatory spending basket, which consists of food, clothing, and housing expenditures. Then, the weights of mandatory spending in consumer basket for one-fifth with highest incomes and one-fifth with lowest incomes over the period 2003 and 2006 are calculated. While the weight of mandatory spending of one-fifth with the lowest incomes is around 70 percent, that of one-fifth with the highest incomes is around 50 percent. It is found that inflation rates for these two income groups are close to each other in 2003 and 2004, while one-fifth with lowest incomes is exposed to higher inflation in 2006 due to high share of necessities in their baskets and elevated price increases in mandatory goods and services. Another study for Turkey, Gursel and Sak (2008), examines inflation differentials across different income groups over the period January, 2003 to March, 2008 by using 2-digit COICOP level and the weights from HBS-2006. The study finds that there is 5.2 points<sup>13</sup> difference of CPI between one-fifth with the lowest incomes and one-fifth with the highest incomes against the poor households. The main upside contributor expenditure groups to inflation differentials are food and non-alcoholic beverages, housing and rent, alcohol and tobacco products due to elevated price increases in these groups over this period and high shares in consumption basket of poor households. The main downside contributors to inflation differences are transportation, furnishings, and miscellaneous goods and services in favor of poor households. They claim that CPI inflation, which is average inflation for a representative household, loses the property of a benchmark in

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<sup>13</sup> This difference does not represent the inflation exposure difference since it is Consumer Price Index difference of final observations of the poorest one-fifth and the richest one-fifth group.

determining wages and prices in Turkey. Then, they emphasize the importance of following inflation differentials across different household groups.

Yunculer (2013) quantifies the inflation exposures of households ordered by income in Turkey over the period between January, 2003 and June, 2013 by using 3-digit COICOP level prices and weights. This study's methodology is closer to TurkStat's one so far. It is similar in terms of determination of the weights from HBS and Laspeyres chained index structure compared to other studies for Turkey when calculating CPIs. This study finds that annual inflation rate of the poorest one-fifth group is 0.87 percentage points higher than that of the richest one-fifth group, and this difference is statistically significant. While the difference reaches to 3 percentage points in both directions from time to time, most of the time the poorest group is exposed to higher inflation. Also, this study extends the analysis to regions, which are rural and urban. It is found that the inflation difference increases to 1 percentage point in urban areas and falls to 0.6 percentage points in rural areas. Irrespective of regions, the annual inflation gap between the poorest and richest groups mainly originates from "food and non-alcoholic beverages" (01) and "housing, water, electricity, gas and other fuels" (04) expenditure groups, respectively. On the other side, "transportation" (07), "education" (10), "restaurants and hotels" (11), "recreation and culture" (09) and "furnishings, household equipment, routine maintenance of the house" (05) reduces this gap. As a result, the main determinants of inflation gap between poor and rich household groups are the price developments in food and energy items, which have higher shares in poor households' expenditures.

Similar to Gursel and Sak (2008), Gursel and Acar (2015) again study inflation differences among income groups over the period January, 2003 and December, 2014 by using HBSs (2003-2013) of TurkStat for the weights and 2-digit COICOP level main expenditure group price indices. They find that CPI difference (2003=100) between one-fifth with the lowest incomes and one-fifth with the highest incomes is 18.1 points<sup>14</sup> at

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<sup>14</sup> Again, it is CPI index difference of final observations rather than inflation difference.

the end of 2014, which is the highest difference over the whole period. They claim that elevated energy and food prices, which are affected by international markets since the second half of 2007, cause an increasing trend in inflation differentials between poor and rich households in Turkey. It is found that the main upside contributors to this difference are “housing, water, electricity, gas and other fuels” (04), “food and non-alcoholic beverages” (01) and “alcoholic beverages and tobacco” (02) respectively. On the other side, “transportation” (07) and “education” (10) are the main downside contributors to inflation gap in favor of poor households. They emphasize that food and energy items are mandatory expenditures and their shares in the budget of poor households are higher as stated by Yukseler and Turkan (2008). Thus, it is expected that any food and energy price shocks may increase the inflation inequality against poor households in Turkey.

From these studies, Yunculer (2013) is the one which used the most detailed goods and services basket, 3-digit COICOP level data, in calculating price index for different income groups. However, all studies for Turkey, including Yunculer (2013), have aggregation bias and might have got misleading results for this reason. For example, the share of red meat products in food expenditure group is higher in rich households when compared to poor households. Yet, all these studies treat all food items as equally, and their shares in the expenditure basket for poor households are higher. Counter example can be potato and bread in food expenditure group. As expected, the shares of bread and potato in consumption basket for poor households are higher than that for the representative and rich household group. In addition to these weight differentials, red meat, bread and potato prices are very volatile in Turkey due to frequent supply shocks. Thus, relative price variations of red meat, bread, and potato may change inflation exposure differentials between poor and rich households dramatically from time to time.

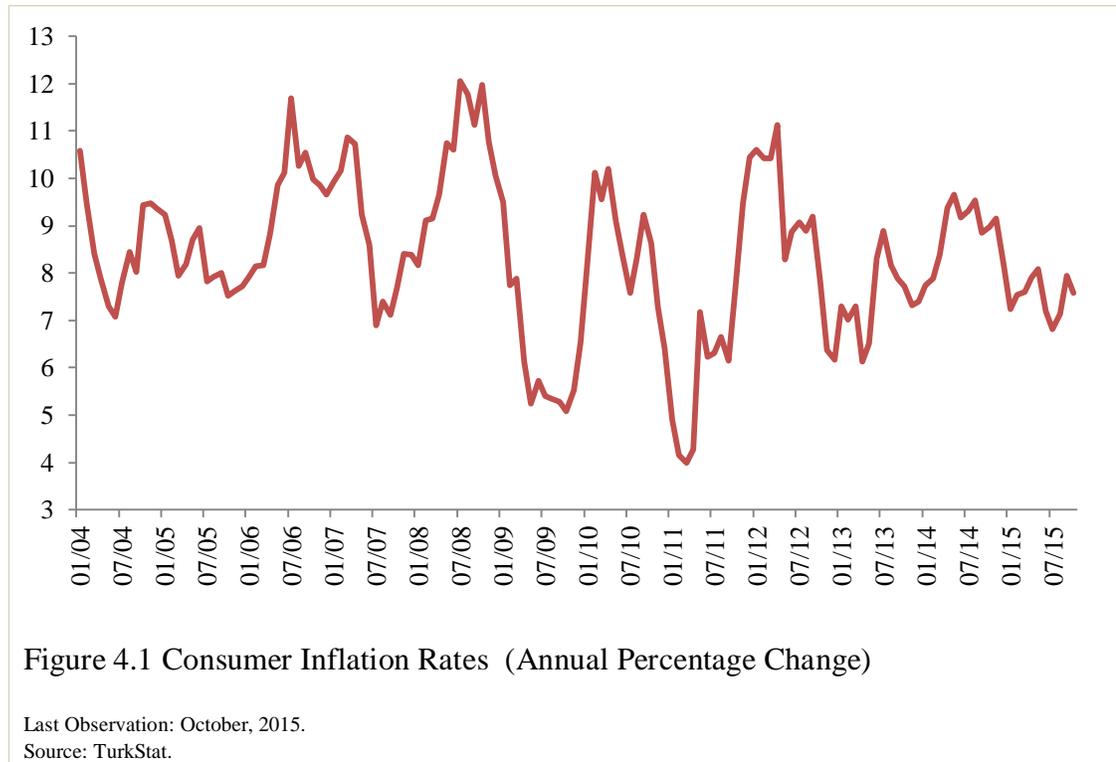
Although almost all studies have aggregation bias in the literature, our study eliminates the aggregation bias for inflation differentials across household groups by using 5-digit COICOP level. Also, contributors to inflation differences across income groups are obtained in terms of not only main expenditure groups but also product-based.

Moreover, the methodology of this study is the closest one to TurkStat's methodology. First of all, when the weights of items are calculated, we do not take into account the imputed rent of owner occupied housing and expenditures from household production as done by TurkStat. Secondly, we use Laspeyres chain index when price indices are calculated. Thirdly, we use all related HBSs rather than that of only one or two years. By doing this, we are able to incorporate consumption pattern changes of households over time. In the end, TurkStat's CPI index is replicated in the best possible way. Moreover, when income groups are formed, more relevant income criteria are used by considering household size. More importantly, the effect of income gap on inflation differentials is found by forming different income groups. The economic reasons behind inflation exposure differential variations are investigated in this study as well. Another contribution of the thesis is to reveal inflation exposure differences across demographic characteristics of households such as age, tenant vs. homeowner, pensioner vs. non-pensioners, small vs. large household, family type, and region of residence (rural vs. urban) for Turkey.

### **4.3. Data and Methodology**

#### **4.3.1. Data**

Main measure of cost of living in Turkey is consumer price index (CPI) published by Turkish Statistical Institute (TurkStat), which is National Statistics Office of Turkey. CPI measures the changes in the current retail prices of goods and services purchased by a typical Turkish household over a given time period. The prices of goods and services included within the index are retail prices including taxes but excluding any deposits and installments. The base year of current CPI is 2003. Average annual inflation is 8.32 percent and standard deviation of annual inflation is 1.65 percent over the period between January, 2004 and October, 2015 (Figure 4.1).



In 2003=100 based CPI, all of the final monetary consumption expenditures made for the consumption of goods and services in the domestic markets are taken as bases. In the index 81 city centers and 74 administrative district centers are included. 390 984 prices are compiled from 27 198 outlets in a month and 4290 tenants are included in the scope of the index. Number of outlets and prices may change during the year because of seasonality. Index coverage of the population is the whole population of Turkey without any groupings according to income level or geographical areas. TurkStat takes into account all of the final monetary consumptions of the households, foreign visitors and constitutional population.

In determining the weights and calculating the CPI, TurkStat uses UN Classification of Individual Consumption According to Purpose (COICOP), and expenditures are organized in 44 sub-groups and 12 major expenditure groups. 426 commodities are used in the compilation of the index according to this classification. When we calculate CPI

for each income and demographic group, we use 147 5-digit COICOP consumer items. Price data are available at 7-digit COICOP level for 2003-2015 in TurkStat's database. Also, the weights of each 7-digit items are available for 2015 in TurkStat's website. However, the expenditure data are available in HBS in more aggregate item level, which is 5-digit-COICOP level. We have to aggregate up from 426 commodities to 147 5-digit items. To do this, we calculate the prices of 5-digit items by using the prices and weights of 7-digit items. After that, we match 5-digit COICOP item codes from eleven HBS with CPI item codes by making necessary adjustments in Stata.

HBS has been carried out annually by TurkStat since 2002 regularly. In addition to other contributions, HBS is used to determine the items to be included in CPI basket and the base year weights with information about consumption expenditures. Within the compliance framework of European Union, HBS with its new framework is reviewed to form a basis for the harmonized index of consumer prices in 2003. In order to give estimates for Turkey, Urban, Rural, Statistical Regional Units Classification Level-1, the urban/rural separation for each Level-1 and Level-2 detail, HBS is expanded only for year 2003, and the survey was applied with 25 920 households. The sample size of HBS was reduced to 8 640 households in 2004. After that, HBS has been applied annually with reduced sample size.

In this thesis, 11 consecutive waves of the TurkStat's HBSs from 2003 to 2013 are utilized to determine the weights in CPI. In each year, this survey is conducted with different number of household in Turkey. Number of households whom the survey is valid over the period between 2003 and 2013 is seen in Table 4.1. The surveys incorporate information about family types, economic indicators, and demographic characteristics both at individual and household level. Moreover, the surveys provide detailed data about the 5-digit COICOP sub-items of consumption expenditures in addition to annual disposable income at household level.

2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
25764	8544	8559	8558	8548	8549	10046	10082	9918	9987	10060

Source: TurkStat.

### 4.3.2. Descriptive Statistics

As a result of structural problems of developing countries and those specific to Turkish economy mentioned above, food (and non-alcoholic beverages) and energy prices are more volatile and increase more than other consumer prices in Turkey over the period between January, 2003 and October, 2015 (Table 4.2, Figure 4.2 and Figure 4.3). It is expected that the weights of these goods and services in consumer basket are higher in low-income households due to being necessities than average representative household.

	Food	Energy	Food and Energy	CPIX*
Mean	9.41	9.02	9.21	7.70
Standard Deviation	3.44	5.99	3.08	1.89

Source: TurkStat, Author's Own Calculations. \*CPIX represents CPI Excluding Food and Energy.

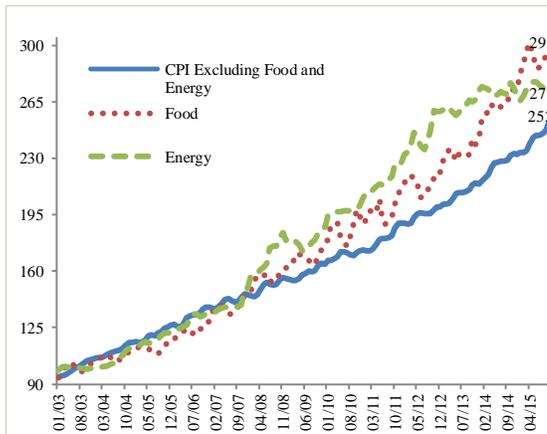


Figure 4.2 Consumer Price Indices: Food, Energy and CPI Excluding Food and Energy

Last Observation: October, 2015.

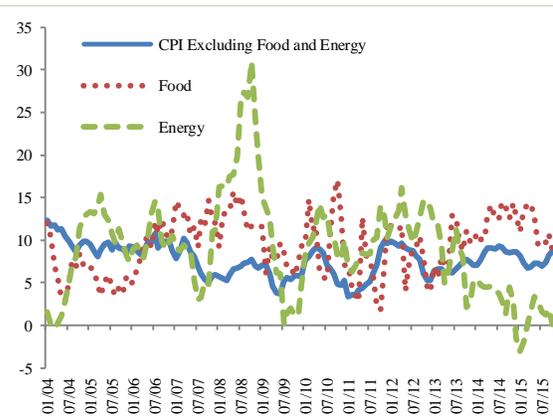


Figure 4.3 Annual Inflation Rates: Food, Energy and CPI Excluding Food and Energy

Source: TurkStat, Author's Own Calculations.  
Figure 4.2 (continued).

Source: TurkStat, Author's Own Calculations.  
Figure 4.3 (continued).

As discussed in Chapter 2, households have high share of food expenditures in their total expenditure in developing countries. Turkey is no exception. The weight of food and non-alcoholic beverages in CPI basket is 27.5 percent on average over the period between 2003 and 2015. Although the share of “(01) Food and non-alcoholic beverages” has fallen over time, it is still very high at present (Table 4.3). In addition to high share of food, average inflation rate of food and non-alcoholic beverages is significantly above that of general consumer price index (Table 4.4).

Other important changes in the weights over time are observed in “(07) Transport” and “(11) Hotels, Cafes and Restaurants” expenditure groups. The weights of these two groups have a rising trend over time (Table 4.3). It is expected since income per capita is increasing over this period in Turkey. As households become richer, the share of food expenditures in their budgets falls and the share of services increases.<sup>15</sup>

	01. Food and Non-Alcoholic Beverages	02. Alcoholic Beverages and Tobacco	03. Clothing and Footwear	04. Housing, Water, Electricity, Gas and Other Fuels	05. Furnishings, Household Eq., Routine Maintenance of the House	06. Health	07. Transport	08. Communications	09. Recreation and Culture	10. Education	11. Hotels, Cafes and Restaurants	12. Miscellaneous Goods and Services
2003	30.21	4.83	7.29	18.37	6.62	2.52	11.39	5.01	2.51	2.28	4.84	4.12
2004	30.21	4.83	7.29	18.37	6.62	2.52	11.39	5.01	2.51	2.28	4.84	4.12
2005	30.21	4.83	7.29	18.37	6.62	2.52	11.39	5.01	2.51	2.28	4.84	4.12
2006	28.70	5.91	6.94	17.26	7.10	2.38	11.91	4.74	2.68	2.44	5.28	4.66
2007	27.98	5.44	6.94	16.37	7.88	2.32	13.41	4.77	2.70	2.33	5.30	4.56
2008	28.20	4.98	6.73	16.69	7.37	2.43	13.89	4.71	2.66	2.33	5.24	4.77
2009	28.62	4.61	5.98	18.83	7.08	2.26	13.11	4.48	2.32	2.43	5.41	4.87
2010	27.60	5.31	7.30	16.83	6.78	2.55	13.90	4.94	2.83	2.48	5.51	3.97
2011	26.78	5.90	7.22	16.46	6.93	2.40	15.15	4.64	2.70	2.32	5.89	3.61
2012	26.22	5.21	6.87	16.44	7.45	2.29	16.73	4.60	2.98	2.18	5.63	3.40
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

<sup>15</sup> Although “(07) Transport” incorporates automobile purchase and motor fuel in addition to transportation services, the weights of these items are still consistent with a rising trend with income per capita.

<sup>16</sup> Only 2010-2015 weights are announced in TurkStat's website. The weights between 2003 and 2009 are author's own calculations from HBSs.

2014	24.45	5.29	7.17	16.41	7.52	2.44	15.54	4.70	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	4.60
<b>Average</b>	<b>27.50</b>	<b>5.16</b>	<b>7.02</b>	<b>17.14</b>	<b>7.16</b>	<b>2.42</b>	<b>13.94</b>	<b>4.74</b>	<b>2.79</b>	<b>2.31</b>	<b>5.58</b>	<b>4.25</b>

Source: TurkStat, Author's Own Calculations.  
Table 4.3 (continued).

Among 12 main expenditure groups, “(02) Alcoholic Beverages and Tobacco” has the highest mean and standard deviation in the discussed period (Table 4.4). The large portion of alcohol and cigarette prices consists of taxes. And, in order to improve public finance balances, government raises special consumption tax rates frequently on tobacco products, which in turn frequent special consumption tax adjustments induces very high and volatile inflation in this group.

	General	01.Food and Non-Alcoholic Beverages	02.Alcoholic Beverages and Tobacco	03. Clothing and Footwear	04. Housing, Water, Electricity, Gas and Other Fuels	05. Furnishings, Household Eq., Routine Maintenance of the House	06.Health	07.Transport	08. Communications	09. Recreation and Culture	10. Education	11. Hotels, Cafes and Restaurants	12.Miscellaneous Goods and Services
2004	8.60	6.82	19.10	6.63	8.44	6.02	8.05	7.31	3.17	8.91	19.33	16.73	10.22
2005	8.18	4.93	13.50	3.57	10.66	7.19	4.25	15.30	1.66	7.48	13.26	14.36	6.79
2006	9.60	9.70	20.97	-0.08	12.65	5.61	3.83	10.27	2.60	4.97	7.76	13.93	16.43
2007	8.76	12.42	9.92	4.52	11.21	7.60	4.77	5.61	-0.84	3.66	7.21	11.19	5.56
2008	10.44	12.79	7.07	2.49	19.64	6.89	0.41	7.97	1.81	1.95	6.76	13.38	9.63
2009	6.25	8.02	12.71	0.81	8.82	0.87	2.94	0.24	3.44	9.85	5.80	9.15	12.97
2010	8.57	10.58	34.77	4.55	6.28	2.20	0.72	9.63	-0.24	2.31	5.39	9.47	6.99
2011	6.47	6.24	3.57	6.57	5.79	7.79	0.61	9.98	0.46	1.54	5.43	8.05	12.76
2012	8.89	8.41	14.01	8.17	11.45	9.15	1.37	7.64	3.17	5.57	6.03	9.15	12.99
2013	7.49	9.10	15.20	6.39	7.17	4.88	2.67	6.83	5.12	2.54	7.12	9.26	4.93
2014	8.85	12.62	4.05	8.01	5.69	8.33	8.45	9.77	1.04	7.34	9.06	13.28	7.15
2015	7.67	11.15	4.54	6.19	7.63	8.65	7.34	1.49	3.06	9.01	6.95	13.46	10.13
<b>Average</b>	<b>8.31</b>	<b>9.40</b>	<b>13.29</b>	<b>4.82</b>	<b>9.62</b>	<b>6.26</b>	<b>3.78</b>	<b>7.67</b>	<b>2.04</b>	<b>5.43</b>	<b>8.34</b>	<b>11.78</b>	<b>9.71</b>
<b>Standard Deviation</b>	<b>1.20</b>	<b>2.61</b>	<b>8.87</b>	<b>2.69</b>	<b>3.93</b>	<b>2.55</b>	<b>2.90</b>	<b>4.01</b>	<b>1.72</b>	<b>3.03</b>	<b>4.07</b>	<b>2.75</b>	<b>3.55</b>

Source: TurkStat, Author's Own Calculations.

CBRT has been implementing inflation targeting regime since 2002. Its inflation target is the year-end annual inflation of CPI. Besides, volatile nature of consumer inflation in Turkey becomes worthwhile to know year-end inflation rates of 12 main expenditure groups. Table 4.5 shows year-end inflation rates. As seen, “02.Alcoholic Beverages and

Tobacco”, “11. Hotels, Cafes and Restaurants”, “12. Miscellaneous Goods and Services”, “04. Housing, Water, Electricity, Gas and Other Fuel”, and “01. Food and Non-Alcoholic Beverages” have higher year-end annual inflation rates than headline inflation on average over the period between 2004 and 2015.

	General	01. Food and Non-Alcoholic Beverages	02. Alcoholic Beverages and Tobacco	03. Clothing and Footwear	04. Housing, Water, Electricity, Gas and Other Fuels	05. Furnishings, Household Eq., Routine Maintenance of the House	06. Health	07. Transport	08. Communications	09. Recreation and Culture	10. Education	11. Hotels, Cafes and Restaurants	12. Miscellaneous Goods and Services
2004	9.35	6.62	11.49	7.75	11.52	6.22	11.70	13.46	1.70	9.83	17.84	14.42	10.15
2005	7.72	4.92	27.88	-0.12	9.87	6.26	-0.40	11.01	1.71	6.63	7.21	14.98	8.52
2006	9.65	11.17	5.06	1.91	14.04	7.31	7.93	10.15	1.34	8.25	7.73	13.54	12.33
2007	8.39	12.03	17.20	4.08	11.48	4.17	0.85	5.26	-1.78	-1.26	5.96	10.87	5.08
2008	10.06	11.90	0.32	-1.54	22.88	10.37	2.01	2.37	5.74	6.98	7.32	13.44	11.66
2009	6.53	9.26	20.91	3.39	2.31	-2.68	2.44	7.89	3.35	8.92	5.47	7.31	13.75
2010	6.40	7.02	24.66	4.74	5.91	3.27	0.57	6.78	-3.22	-2.32	4.25	9.76	5.51
2011	10.45	12.21	18.50	7.98	8.20	11.04	0.34	12.22	2.48	6.49	6.47	8.20	17.14
2012	6.16	3.90	0.98	8.17	11.37	5.89	1.68	5.54	5.90	1.98	4.81	9.31	8.66
2013	7.40	9.67	10.52	4.87	4.84	5.95	4.85	9.77	1.20	5.18	10.05	9.86	2.24
2014	8.17	12.73	7.67	8.43	6.83	8.06	8.62	2.07	1.61	5.68	8.31	13.98	9.68
2015	8.81	10.87	5.68	8.99	6.71	10.95	7.16	6.40	3.56	11.56	6.39	13.23	11.00
<b>Average</b>	<b>8.26</b>	<b>9.36</b>	<b>12.57</b>	<b>4.89</b>	<b>9.66</b>	<b>6.40</b>	<b>3.98</b>	<b>7.74</b>	<b>1.97</b>	<b>5.66</b>	<b>7.65</b>	<b>11.57</b>	<b>9.64</b>
<b>Standard Deviation</b>	<b>1.46</b>	<b>3.03</b>	<b>9.17</b>	<b>3.52</b>	<b>5.34</b>	<b>3.80</b>	<b>3.96</b>	<b>3.67</b>	<b>2.64</b>	<b>4.25</b>	<b>3.57</b>	<b>2.65</b>	<b>4.06</b>

Source: TurkStat, Author's Own Calculations.

Although 4 of 12 expenditure groups have higher inflation than headline inflation, the weights of each expenditure groups should also be considered. Table 4.6 reveals the contribution of each expenditure group to overall inflation. The highest contribution comes from “01. Food and Non-Alcoholic Beverages” due to high share in consumer basket as well as elevated price increases. “01. Food and Non-Alcoholic Beverages” comprises 30.65 percent of headline inflation, and “04. Housing, Water, Electricity, Gas and Other Fuel” constitutes 19.86 percent of headline inflation on average over the discussed period (Table 4.6).

**Table 4.6 Relative Contribution of 12 Main Expenditure Groups (COICOP) to Year-End CPI Inflation (Percent)**

	01. Food and Non-Alcoholic Beverages	02. Alcoholic Beverages and Tobacco	03. Clothing and Footwear	04. Housing, Water, Electricity, Gas and Other Fuels	05. Furnishings, Household Equipment, Routine Maintenance of The House	06. Health	07. Transport	08. Communications	09. Recreation and Culture	10. Education	11. Hotels, Cafes and Restaurants	12. Miscellaneous Goods and Services
2004	21.39	5.94	6.04	22.62	4.40	3.15	16.39	0.91	2.64	4.35	7.45	4.47
2005	19.25	17.46	-0.12	23.49	5.37	-0.13	16.24	1.11	2.16	2.13	9.39	4.55
2006	33.22	3.10	1.37	25.10	5.37	1.96	12.52	0.66	2.29	1.95	7.40	5.95
2007	40.13	11.15	3.38	22.40	3.92	0.23	8.41	-1.01	-0.41	1.65	6.87	2.76
2008	33.36	0.16	-1.03	37.93	7.59	0.49	3.27	2.69	1.85	1.70	6.99	5.53
2009	40.62	14.76	3.10	6.67	-2.90	0.85	15.85	2.30	3.17	2.04	6.06	10.26
2010	30.27	20.45	5.40	15.53	3.46	0.23	14.73	-2.49	-1.03	1.65	8.40	3.42
2011	31.29	10.45	5.51	12.91	7.32	0.08	17.72	1.10	1.68	1.44	4.62	5.92
2012	16.57	0.83	9.11	30.33	7.12	0.63	15.03	4.40	0.96	1.70	8.50	4.78
2013	31.47	7.21	4.50	10.91	5.85	1.45	23.75	0.75	2.07	2.59	8.23	1.26
2014	38.10	4.96	7.40	13.71	7.41	2.57	3.93	0.93	2.34	2.30	11.26	5.07
2015	29.92	3.11	7.53	12.03	9.67	2.09	11.18	1.77	4.64	1.84	10.48	5.74
<b>Average</b>	<b>30.65</b>	<b>7.85</b>	<b>4.19</b>	<b>19.86</b>	<b>5.62</b>	<b>1.17</b>	<b>12.97</b>	<b>1.09</b>	<b>1.93</b>	<b>2.12</b>	<b>7.88</b>	<b>4.99</b>

Source: TurkStat, Author's Own Calculations.

### 4.3.3. Methodology

Item baskets and the weights are updated by TurkStat at the end of every year and chained with the Laspeyres formulation. Every year in December, new goods and services are added in the basket, and goods and services which lost their importance are taken out and renewed weights are used in the calculation of index. 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 index numbers of December.<sup>17</sup>

$$I = w. P_i / P_0$$

I: index

$P_i$ : current price

<sup>17</sup> This approach also eliminates index difference bias which occurs as a result of different inflation rates across COICOP 5-digit items.

w: weight

P<sub>0</sub>: base year price

$$I_t = w_i \cdot P_{it} / P_{\text{December}(t-1)} \cdot I_{\text{December}(t-1)}$$

w<sub>1</sub> : new weight

t: time

TurkStat uses “Household Budget Survey”, “Tourism Survey”, “Constitutional Population Expenditure Survey” and administrative records in the determination of item weights in CPI basket. However, when calculating the weights of COICOP 5 digit items in CPI, we do not take into account tourism survey. This is the main difference from TurkStat’s calculation.<sup>18</sup> The reason is that we concentrate on the cost of living changes of domestic households, not foreign visitors. From that perspective, HBS is sufficient to assess consumption patterns of each domestic household. Also, the weights of administered energy items in consumer basket such as electricity, natural gas, water are obtained not only from HBSs but also administered records. Due to this difference, while the weights of water are underestimated, that of natural gas is overestimated by calculations from HBSs in comparison with TurkStat’s ones.<sup>19</sup> Second hand automobile sales are not considered in HBS-2012 and HBS-2013 to replicate TurkStat’s announced weights when the shares of automobile are formed. Current weights (t) of consumer items are averages of expenditures from two (t-2), three (t-3) and four (t-4) years earlier survey.<sup>20</sup> As TurkStat does, expenditures from household’s own production and imputed rental prices, which are asked to the home owners or households staying at relative’s

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<sup>18</sup> Due to this, while the weight of non-classified other services (12700) is higher, that of accommodation services (11201-11202) and package tours (09600) are estimated lower than TurkStat’s ones.

<sup>19</sup> Adjustment is done for water and natural gas by using year 2015 weights to eliminate this difference.

<sup>20</sup> For years 2003-2005, the weights are assumed to be same and calculated according to 2003-year HBS due to lack of data. When the weights of year 2006 are calculated, two-thirds of year 2004 and one-third of year 2003 are taken.

house, are not taken into account when the weights of expenditure items for CPI are calculated. We assume that the expenditure of each 5-digit COICOP consumer items are inflated by their own price index and the weights are calculated with the help of Stata program according to the formula below.

$$E_{i,t} = \frac{\sum_{j=1}^n E_{i,j,t} pw_{i,j,t}}{\sum_{j=1}^n pw_{i,j,t}} \quad (1)$$

$$AE_{i,t} = [E_{i,t-2} (1+\pi_{i,t-1}) + E_{i,t-3} (1+\pi_{i,t-2}) (1+\pi_{i,t-1}) + E_{i,t-4} (1+\pi_{i,t-3}) (1+\pi_{i,t-2}) (1+\pi_{i,t-1})] / 3 \quad (2)^{21}$$

$$AE_t = \sum_{i=1}^{147} AE_{i,t} \quad (3)$$

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

where E is the amount of expenditure , pw is population weight<sup>22</sup>,  $\pi$  is year-end annual inflation rate<sup>23</sup>, w is the calculated weight in CPI basket for COICOP 5-digit item code i (i=1, 2, ..., 147), household ID number j (j=1, 2, 3,..., n)<sup>24</sup>, and for the period t (t=2003, 2004, ..., 2015). AE is the average of present value of expenditure amount of t-4, t-3, and t-2.

In the end, these differences do not result in any significant difference between calculated CPI and the official CPI by TurkStat (Figure 4.4).<sup>25</sup> Also, annual and monthly

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<sup>21</sup>  $(1+\pi_{i,t-1})$  part may not be necessary to bring all expenditures to the same period, but it is needed since the price of some consumption items (mostly administered prices) changes by relatively high amounts especially in years 2005, 2008, 2012.

<sup>22</sup> Each household in HBS has a population weight, which is calculated population projections according to Address Based Population Registration System (ABPRS).

<sup>23</sup> Expenditures in HBSs show year-end values in current calendar year, thus year-end inflation rate is used in order to be consistent.

<sup>24</sup> The number of valid households (n) varies across HBSs and it is seen in Table 4.2.

<sup>25</sup> It is expected since almost 90 percent of expenditures come from annual HBS in the calculation of CPI's weights.

inflation derived from calculated CPI do not statistically significantly diverge from official annual and monthly inflation rates over the whole period.<sup>26</sup>

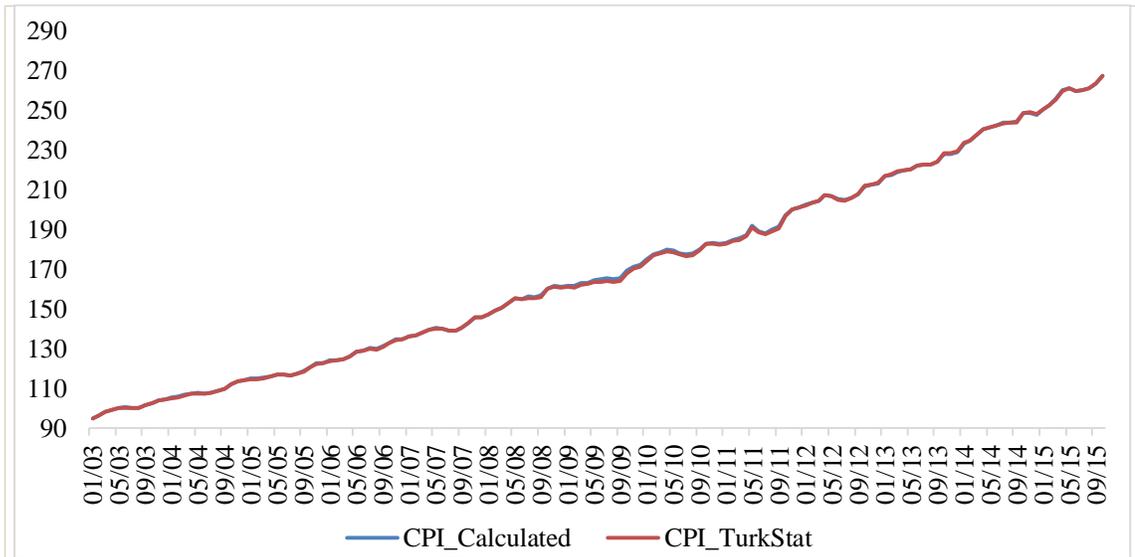


Figure 4.4 Consumer Price Index Comparison: CPI\_Calculated vs. CPI\_TurkStat

Note: CPI\_Calculated is author’s consumer price index calculation from 5-digit COICOP level prices and weights.  
 Source: TurkStat, Author’s Own Calculations.

Some limitations exist in determining exact inflation differentials across income and demographic groups in the literature and this study. First of all, particular type of household from income or demographic groups may have distinct goods and services consumption basket, and it may differentiate from the consumer basket of a representative household. Thus, some consumption items may not be covered in this case. For instance, specific luxury goods or services such as diamond, caviar or business class flight ticket mostly purchased by the richest households are not included due to low share in total expenditure of overall households. Secondly, each different demographic or income group probably uses different outlets for shopping in daily life. For instance, richer households mostly prefer supermarkets while poorer households

<sup>26</sup> Statistical test results for significance of the difference between official and calculated inflation rates with the help of Eviews can be seen in Appendix B.

may still choose local markets to buy food (Yorukoglu, 2009). However, we have only one price for each good and service in consumer basket in each month. And, this price only represents the one from popular and permanent outlet. Price differences for same good or service are not considered in this study. It causes the outlet bias. Thirdly, one may abstain from any good or service in the next period after experiencing high price increases in current period. However, TurkStat should use previous three surveys (t-2, t-3 and t-4) to calculate current weights (t) of items due to lack of current and last year expenditure data. This may affect the results since households may protect themselves against inflation by switching to cheaper complementary goods. Thus, substitution effects are inevitably not captured fully due to utilizing HBS data with two lags. It ends up with the substitution bias. However, this is a common problem of all price indices and impossible to account for. Lastly, consumer items are selected according to average (representative) household's preferences. However, households probably prefer different quality level for same expenditure item by their levels of income. In this case, each income group faces different prices for the same type of consumer item. For example, the quality of coat that richer households prefer is probably different from the quality of coat that poorer households can purchase. Since we do not have detailed price and expenditure data for each household, consumer basket, outlet bias and quality bias inevitably come to light in our results. Also, substitution bias prevails in our study due to using HBS data with two years lag to replicate TurkStat's methodology. However, these are inevitable biases that exist almost all studies in the literature due to nature of price and expenditure data.

#### **4.4. Empirical Findings**

##### **4.4.1. Inflation by Income Groups**

As a starting point, the last study with most disaggregated data for Turkey, Yunculer (2013), is replicated with the available data from TurkStat's website. From replication of Yunculer (2013) study, we find that one-fifth households with the lowest income has experienced 0.74 percentage points higher annual inflation than one-fifth households

with highest income on average over the period between January, 2004 and October, 2015. However, these results have aggregation bias and its income description does not take into account the number of members in households.<sup>27</sup> Previous studies about Turkey and TurkStat use annual disposable income when income groups are formed.<sup>28</sup> However, since using only household's aggregate income does not represent welfare of household and each member, it is more rational to use an income per capita measure. For example, one household with one child and another one with two children can have similar income, but they will probably have different consumption habits. Thus, studies for developed countries categorize households in terms of income per capita measures. Also, treating each household member equally may have misleading results to categorize households in terms of their incomes. For instance, a single adult has different amount of spending from each member of a nuclear family due to rent, bills, catering, etc. To take into account these two issues, equivalised annual disposable income is used in this study to categorize households more accurately. In TurkStat's HBS, each household has equivalent size of the household by modified OECD scale. This scale gives a weight of 1.0 to the first adult, 0.5 to the second one and each subsequent person aged 14 and over, and 0.3 to each child aged less than 14 in the household. Dividing annual disposable income by equivalent size of household by modified OECD scale, equivalised annual disposable income for each household is obtained. Then, households are grouped into 5, 10 and 20 equal groups in ascending order according to this income per capita measure. After that, the shares of 147 5-digit COICOP consumer items for each quintile are calculated by using the amount of spending and population weight of each household. By interacting TurkStat's price data with calculated weights of each item, CPIs are obtained for each quintile, decile and ventile. Figure 4.5 shows CPIs for 5 income groups for the period between January, 2003 and October, 2015. One can conclude that as equivalised disposable income rises, the increase in CPI slows down. Figure 4.6 plots

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<sup>27</sup> Moreover, it uses 3-digit COICOP level data and it does not exclude expenditures from household's own production when the weights of items are calculated.

<sup>28</sup> Annual disposable income incorporates not only wage and transfers but also asset incomes of each household. TurkStat's description of annual disposable income is presented in Appendix A.2.

annual inflation rates calculated from CPI for the 1<sup>st</sup> and the 5<sup>th</sup> quintile income groups. All inflation rates are volatile to track movements. However, one can easily say that annual inflation of the poorest group is mostly higher than that of richest group.

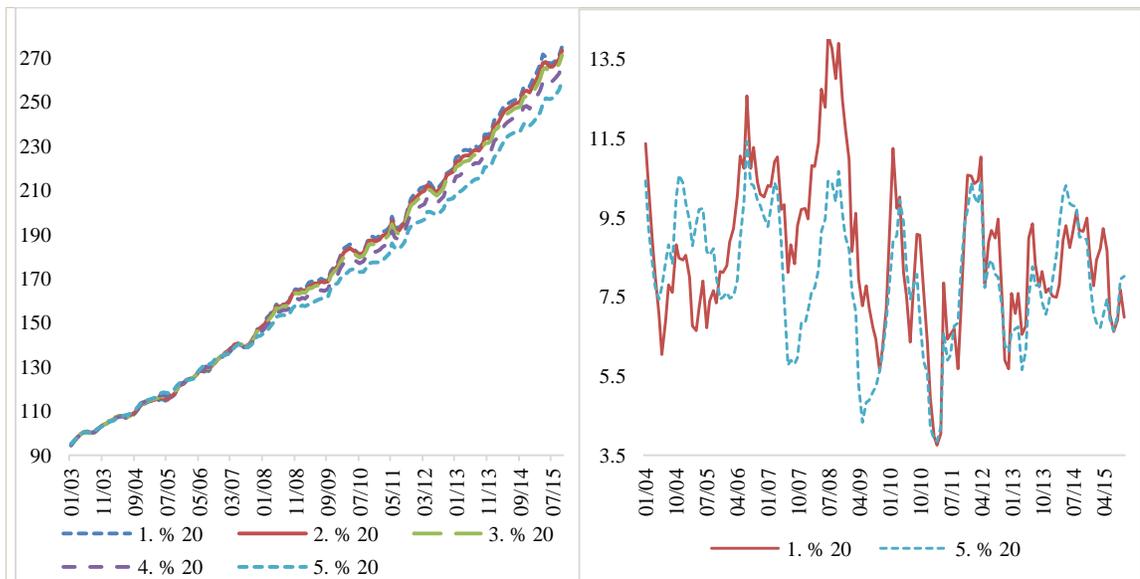


Figure 4.5 Consumer Price Indices for Each Quintile\* (Index, 2003=100)

Figure 4.6 Inflation Rates for the 1<sup>st</sup> and the 5<sup>th</sup> Quintile\* (Annual Percentage Change)

\*1<sup>st</sup> 20% shows the poorest quintile and 5<sup>th</sup> 20% represents the richest quintile.  
Source: TurkStat, Authors' Own Calculations.

Source: TurkStat, Authors' Own Calculations.

Figure 4.7 plots annual inflation difference between the poorest and richest quintiles for the period between January, 2004 and October, 2015. As one can easily see, this difference is significant and very volatile over time. The difference has a mean of 0.65 percentage points and a standard deviation of 1.43 percentage points. Coefficient of first lagged of inflation difference is 0.90 when dependent variable is inflation difference in the regression. Thus, the inflation exposure difference is categorized as highly persistent.<sup>29</sup> The inflation differential fluctuates between 3.68 percentage points (July-

<sup>29</sup> Related regression and autocorrelation functions of the difference are seen in Appendix C.2.

2008)<sup>30</sup> to -2.70 percentage points (April-2005)<sup>31</sup>. This high volatility of inflation differential is mostly driven by the price changes in fresh fruits and vegetables. It results from problems specific to Turkey. Seasonality tests do not indicate any stable seasonality in annual inflation difference.<sup>32</sup> This confirms the idea that frequent external price shocks may be the main reason of the volatility over time.

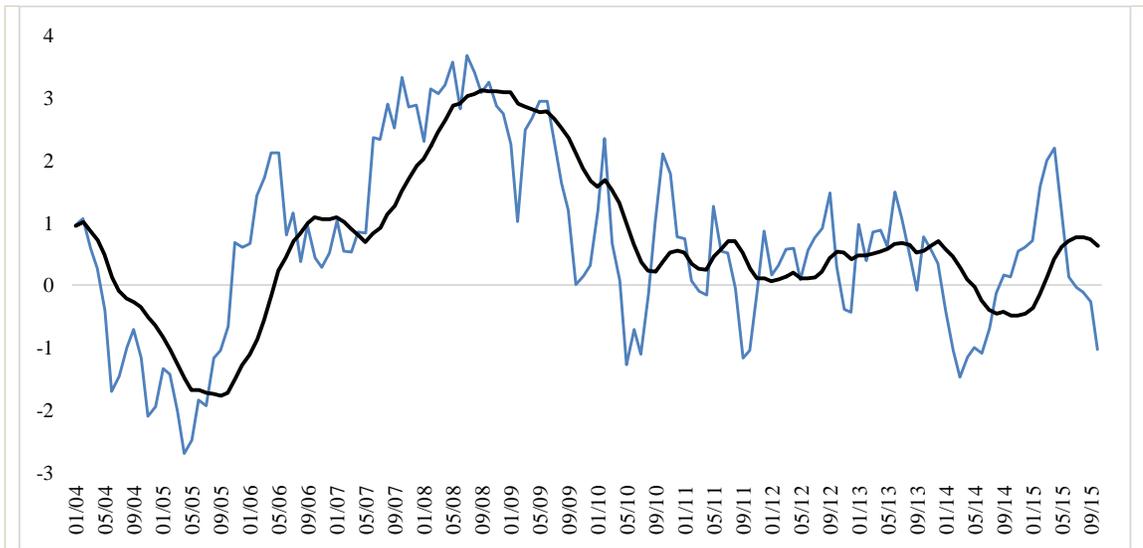


Figure 4.7 Annual Inflation Difference Between the 1<sup>st</sup> and the 5<sup>th</sup> Income Groups (Percentage Points)\*

\*Black line shows moving average of 12 months-MA (12).

Source: TurkStat, Author's Own Calculations.

To test statistical significance of inflation difference between 1<sup>st</sup> and 5<sup>th</sup> income groups, the following hypotheses are constructed.

$$H_0: \mu_d=0$$

$$H_1: \mu_d>0$$

<sup>30</sup> The maximum difference is the peak point caused by the effects of 2007-08 global food price crisis.

<sup>31</sup> This period is one of the lowest food inflation periods over the whole period due to favorable fresh fruits and vegetables thanks to favorable weather conditions.

<sup>32</sup> Seasonality test results can be found in Appendix C.1.

From  $\mu_d=0.65$ ,  $s_d=1.43$ ,  $n_d=142$ , we get  $t=5.40 > t_{0.05, 141}=1.654$ . Then, we conclude inflation difference is statistically higher than zero over whole period. This means that the poorest households experience statistically significant higher inflation than richest ones over the period between January, 2004 and October, 2015.

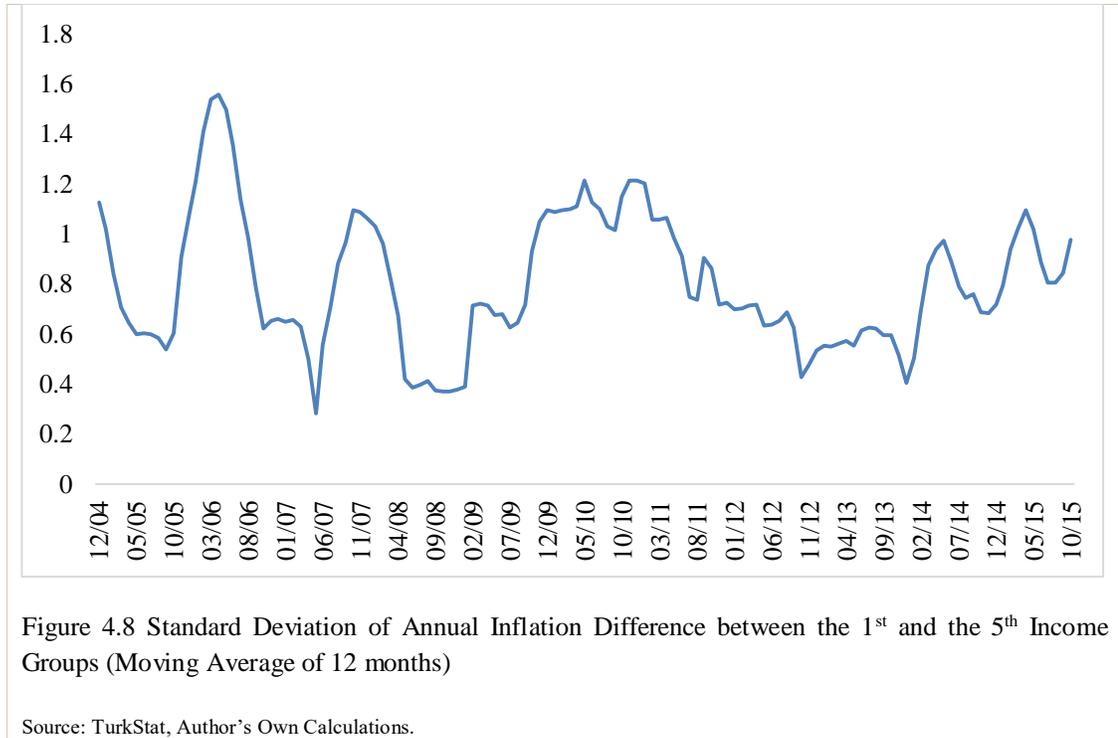


Figure 4.8 plots standard deviation of moving average 12 months of inflation difference. When food and tobacco inflations are rising rapidly, the volatility of inflation differentials is also increasing (Figure 4.8 and Table 4.4).

In order to investigate whether significance of inflation difference changes over time, t-test is applied to the moving average of inflation difference series with 36 months horizon. Most of the time, the poorest group is exposed to statistically higher inflation than the richest group over the discussed period (Figure 4.9).

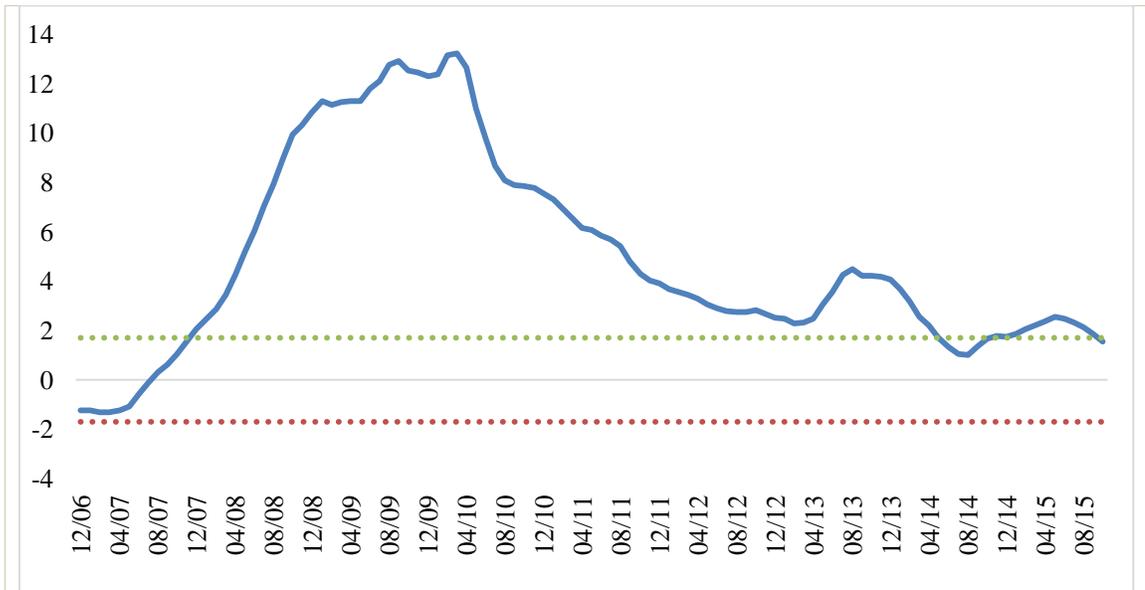


Figure 4.9 Statistical Significance of Annual Inflation Difference between the 1<sup>st</sup> and the 5<sup>th</sup> Income Groups (t-test values for Moving Average of 36 months)\*

\*Dotted lines show the significance level for 95 percent confidence level with one tailed t test ( $|t_{0.05,35}|=1.69$ )

Source: TurkStat, Author's Own Calculations.

We also investigate whether income gap across households affects inflation exposure differentials or not. To this end, households are also grouped into deciles and ventiles according to their equivalised annual disposable income.

Figure 4.11 shows inflation differentials between the poorest and the richest deciles over the period between January, 2004 and October, 2015. The inflation difference has a mean of 0.78 percentage points and standard deviation of 1.70 percentage points on average over the whole period. The trend of inflation difference has almost the same pattern with the one between the poorest one-fifth and the richest one-fifth group. Only distinction is that inflation differences become larger and more volatile.

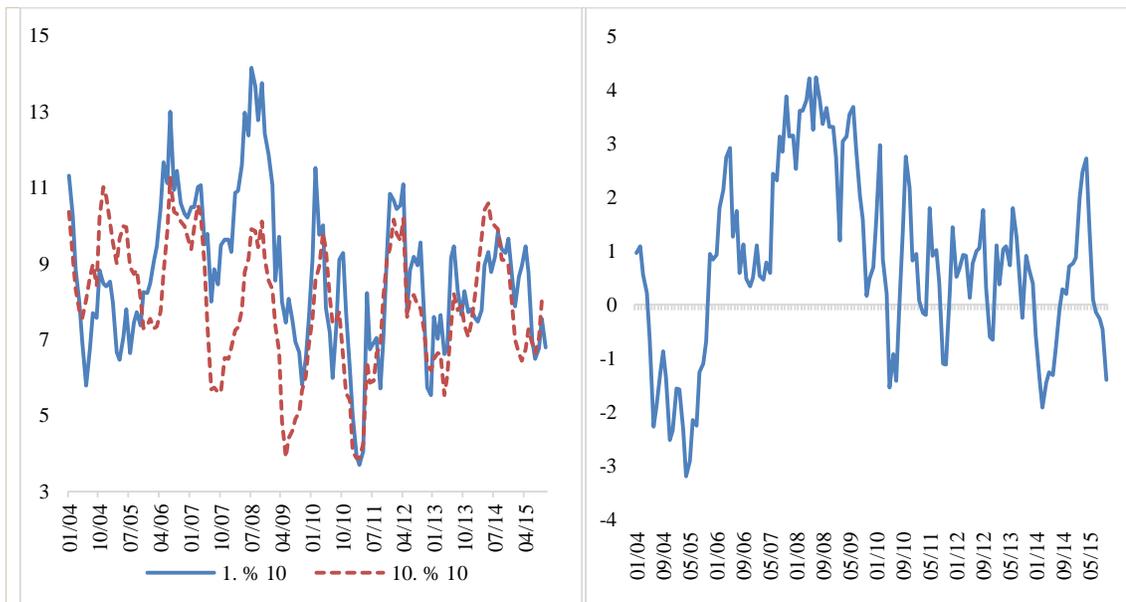


Figure 4.10 Inflation Rates for the 1<sup>st</sup> and the 10<sup>th</sup> Deciles\* (Annual Percentage Change)

\*1<sup>st</sup> 10% shows the poorest decile and 10<sup>th</sup> 10% represents the richest decile.  
Source: TurkStat, Author's Own Calculations.

Figure 4.11 Inflation Difference between the 1<sup>st</sup> and the 10<sup>th</sup> Deciles\*(Percentage Points)

Source: TurkStat, Author's Own Calculations.

Figure 4.13 illustrates inflation differentials between the poorest 5 percent and the richest 5 percent household groups. The inflation difference has a mean of 0.87 percentage points and standard deviation of 1.86 percentage points.<sup>33</sup>

From economic significance of difference perspective, this inflation differential corresponds to 11 percent of accumulated annualized inflation differential over the last 12 years. In order to understand the significance of this inflation differential, suppose that we have one household from the richest 5 percent of society and one household from the poorest 5 percent group. It is assumed that both households spend 10 percent higher than their income<sup>34</sup> at the beginning of the period, January 2003. We inflate both

<sup>33</sup> This high volatility may damage the income equality since households with low-income cannot hedge themselves by diversifying their consumption patterns.

<sup>34</sup> Their incomes are determined according to the mean of each income group in HBS-2003.

households' expenditures by their own inflation rates each month, and we increase their incomes by annual headline inflation rate once a year. We accumulate monthly debt of each household with consumer loan rates from CBRT Database. While the cumulative debt of the richest one ends up with 11.0 percent of its income, the poorest household's the accumulated debt has reached 18.3 percent of its income<sup>35</sup> at the end of the discussed period.

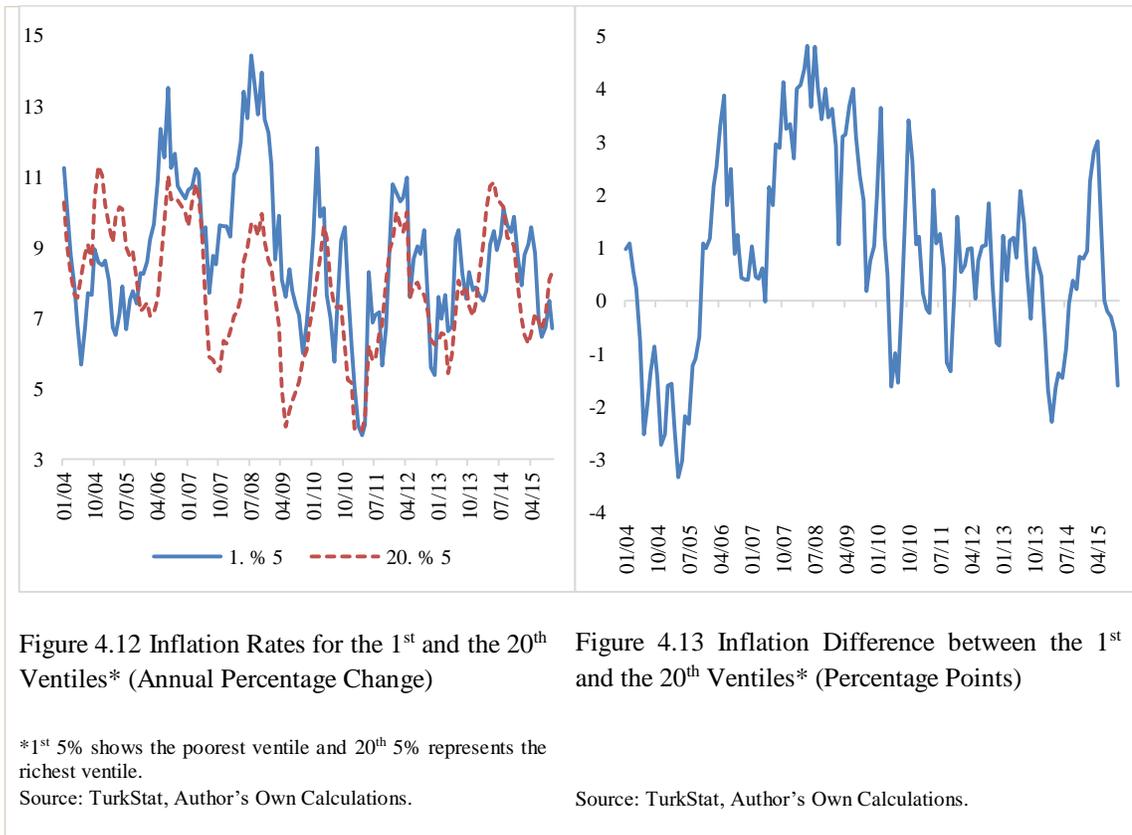


Table 4.7 shows inflation differentials between the poorest and the richest groups for different income quantiles. It is clearly seen that as income gap widens across households, the mean and standard deviation of inflation differentials monotonically increase. In other words, as households get poorer, their exposure to inflation rises.

<sup>35</sup> When present value of all monthly incomes are calculated, monthly headline inflation rates for both households are used.

	1 <sup>st</sup> -5 <sup>th</sup> Quintile	1 <sup>st</sup> – 10 <sup>th</sup> Decile	1 <sup>st</sup> -20 <sup>th</sup> Ventile
Mean	0.65	0.78	0.87
Standard Deviation	1.43	1.70	1.86
Range (Max-Min)	6.38	7.43	8.14
Source: Author's Own Calculations.			

Following Hobijn and Lagakos (2005), another income classification is formed as poor and non-poor households. Households with less than or equal to poverty threshold are categorized as poor. Other households are classified as non-poor. Poverty threshold is based on the 50% of equivalised median annual household disposable income from Income and Living Conditions Survey by TurkStat (Table 4.8).<sup>36</sup>

2006	2007	2008	2009	2010	2011	2012	2013	2014
2 351	3 041	3 164	3 522	3 714	4 069	4 515	5 007	5 554
Reference period of incomes is the previous calendar year. Thus, each value shows previous year's poverty threshold level.								
Source: TurkStat, Income and Living Conditions Survey, 2006-2014.								

<sup>36</sup> Income and Living Conditions Survey has been implemented annually since 2006. Reference period of incomes is the previous calendar year. Thus, only year 2003 and 2004 are not available, and half of equivalised median annual household disposable income from HBS is used as a proxy for them.

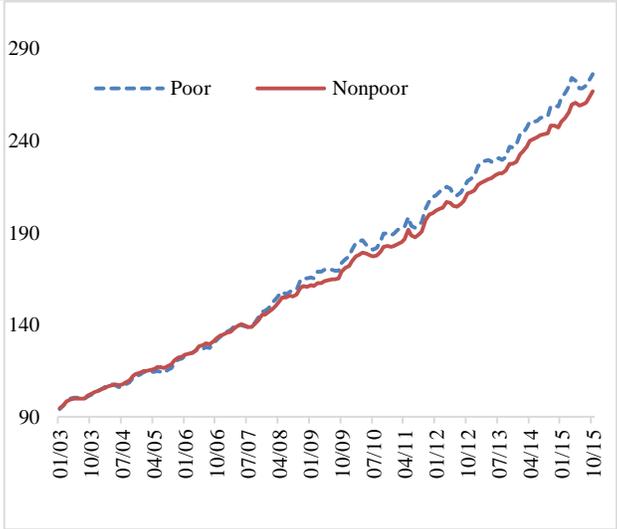


Figure 4.14 Consumer Price Indices for Poor and Non-poor Households (Index, 2003=100)

Source: TurkStat, Authors' Own Calculations.

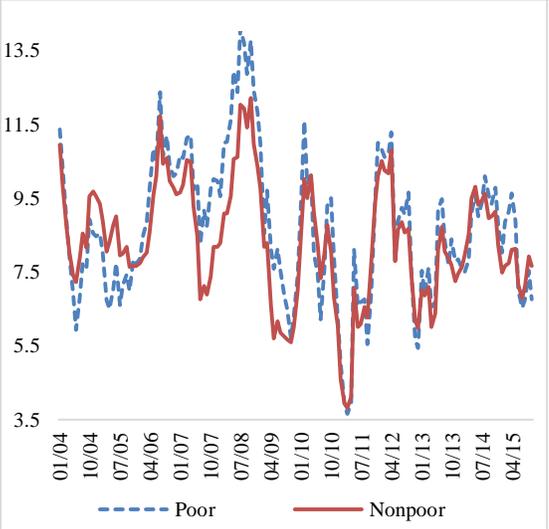


Figure 4.15 Inflation Rates for Poor and Non-poor Households (Annual Percentage Change)

Source: TurkStat, Authors' Own Calculations.

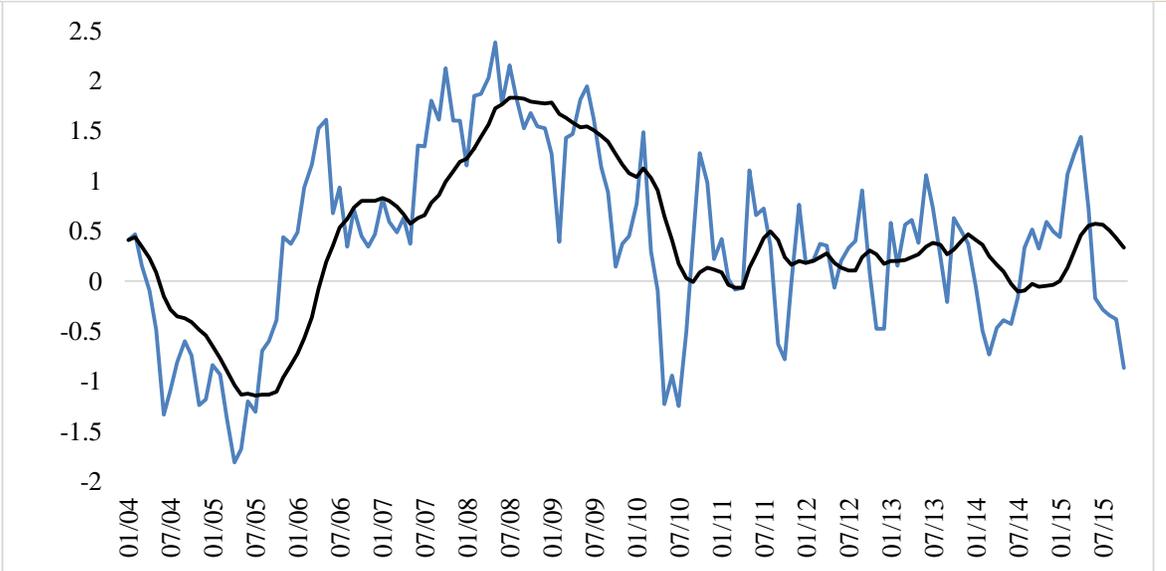


Figure 4.16 Annual Inflation Difference Between Poor and Non-poor Households (Percentage Points)

\*Black line shows moving average of 12 months-MA (12).

Source: TurkStat, Author's Own Calculations.

Figure 4.16 shows annual inflation difference between the poor and non-poor group between January, 2004 and October, 2015. The trend over time is similar to other income classifications. The difference is significant from time to time. The inflation differential between the poor and the non-poor has a mean of 0.39 percentage points and a standard deviation of 0.91 percentage points.

As a result, one can easily conclude that as income gap widens, inflation exposure difference become larger and more volatile while their trends over time do not change significantly.

#### **4.4.2. Contributors to Inflation Differentials**

We analyze upside and downside contributor items to inflation differentials between the poorest one-fifth group and the richest one-fifth group in this section. The reason we choose the poorest and richest quintiles as a benchmark is to provide compatibility with other studies. Main upside and downside contributor items are calculated in terms of not only 2-digit COICOP aggregation level but also 4-digit COICOP level in this section.

Among 12 main expenditure groups, the weight divergence across income groups is more pronounced in “01.Food and Non-Alcoholic Beverages” and “02. Alcoholic Beverages and Tobacco”. The weight of “01.Food and Non-Alcoholic Beverages” for the poorest quintile is twice as that for the richest quintile (Table 4.9). As mentioned above, Turkey is a producer of agricultural products, thus food prices are sensitive to supply shocks such as weather conditions. When we consider the high share in consumer basket of poor households and this specific factor together, one can easily conclude that the inflation of poorer households is more sensitive to supply shocks to food prices than that of richer households.

Year/Group	1. % 20	2. % 20	3. % 20	4. % 20	5. % 20
2003	43.9	37.3	33.6	30.0	20.9
2004	43.9	37.3	33.6	30.0	20.9
2005	43.9	37.3	33.6	30.0	20.9
2006	41.6	34.5	31.5	28.5	19.9
2007	40.6	33.8	31.0	27.7	19.4
2008	39.7	33.1	31.0	27.6	19.9
2009	39.4	33.4	30.7	28.2	20.8
2010	37.9	32.0	29.2	27.2	20.3
2011	37.1	31.4	28.6	26.7	20.0
2012	35.5	30.2	27.6	25.2	19.1
2013	33.6	28.6	25.9	23.5	17.3
2014	32.3	28.1	25.6	23.4	16.6
2015	32.0	28.2	25.8	23.0	16.0

Source: TurkStat, Author's Own Calculations.

Another weight differentiation exists in “02. Alcoholic Beverages and Tobacco”. The weight of this expenditure group for the poorest quintile is also almost twice the weight for the richest quintile (Table 4.10). As mentioned above, price changes are mostly determined by special consumption tax adjustments in this expenditure group. Due to these two factors, the inflation of the poorest group is more sensitive to special consumption tax changes on tobacco compared to the richest group.

Year/Group	1. % 20	2. % 20	3. % 20	4. % 20	5. % 20
2003	6.5	6.0	5.2	5.0	3.5
2004	6.5	6.0	5.2	5.0	3.5
2005	6.5	6.0	5.2	5.0	3.5
2006	7.4	7.3	6.6	5.9	4.4
2007	6.9	6.7	6.1	5.3	4.1
2008	6.3	6.1	5.5	4.7	3.7
2009	5.8	5.6	5.1	4.3	3.5
2010	6.1	5.6	5.1	4.4	3.3
2011	6.7	6.1	5.6	4.9	3.6
2012	7.5	6.7	6.2	5.5	3.9
2013	6.8	6.0	5.6	5.3	3.6
2014	6.4	5.9	5.6	5.2	3.4
2015	6.3	5.9	5.7	5.2	3.3

Source: TurkStat, Author's Own Calculations.

Main upside contributors to inflation difference between the poorest one-fifth and richest one-fifth households are “01. Food and Non-alcoholic Beverages” with 1.75 percentage points, “04. Housing, Water, Electricity, Gas and Other Fuels” with 0.47 percentage points, “02. Alcoholic Beverages and Tobacco” with 0.39 percentage points, on average over the period between January, 2004 and October 2015 (Table 4.11).<sup>37</sup>

The highest contributions from food expenditure group are observed in 2007 and 2008 (Table 4.11). These are the results of 2007-2008 world food price crises on inflation differentials.

Main downside contributors are “07. Transport” with 0.71 percentage points, “11. Hotels, Cafes and Restaurants” with 0.29 percentage points, “10. Education” with 0.28 percentage points, and “12. Miscellaneous Goods and Services” with 0.24 percentage points on average over discussed period (Table 4.11).

Year	01. Food and Non-Alcoholic Beverages	02. Alcoholic Beverages and Tobacco	03. Clothing and Footwear	04. Housing, Water, Electricity, Gas and Other Fuels	05. Furnishings, Household Eq., Routine Maintenance of the House	06. Health	07. Transport	08. Communications	09. Recreation and Culture	10. Education	11. Hotels, Cafes and Restaurants	12. Miscellaneous Goods and Services	Overall CPI
2004	1.17	0.48	-0.09	0.64	-0.44	-0.14	-0.55	-0.04	-0.28	-0.62	-0.34	0.46	0.63
2005	1.21	0.36	-0.03	-0.10	-0.36	-0.04	-1.17	-0.04	-0.17	-0.45	-0.27	0.20	1.27
2006	2.24	0.81	0.00	0.45	-0.25	-0.06	-1.04	-0.04	-0.26	-0.28	0.32	0.20	1.05
2007	2.73	0.31	-0.07	0.46	-0.16	-0.03	-0.43	0.05	-0.22	-0.27	-0.28	0.17	1.92
2008	3.26	0.21	-0.05	0.88	-0.12	0.04	-0.34	0.01	-0.11	-0.21	0.34	0.15	3.10
2009	1.57	0.35	0.01	0.46	-0.10	0.07	0.37	-0.03	-0.27	-0.21	-0.26	0.29	1.66
2010	0.81	1.01	-0.05	0.79	-0.18	0.05	-1.04	0.00	-0.08	-0.19	0.26	0.31	0.56
2011	1.45	0.04	-0.07	0.47	-0.08	0.06	-0.80	0.00	-0.08	-0.17	-0.23	0.48	0.12
2012	1.48	0.40	-0.08	0.43	-0.16	0.07	-0.75	-0.03	-0.16	-0.18	-0.26	0.36	0.41
2013	1.56	0.52	-0.07	0.29	-0.24	0.06	-0.71	-0.04	-0.07	-0.19	-	-	0.70

<sup>37</sup> Inflation contributions are calculated according to the formula explained in Atuk and Sevinç (2012).

											0.25	0.15	
2014	2.04	0.08	-0.06	0.40	-0.26	0.02	-1.86	0.00	-0.21	-0.28	-0.34	0.00	-0.46
2015	1.47	0.09	-0.04	0.39	-0.21	0.01	-0.12	0.01	-0.28	-0.26	-0.32	-0.10	0.64
<b>Average</b>	<b>1.75</b>	<b>0.39</b>	<b>-0.05</b>	<b>0.47</b>	<b>-0.21</b>	<b>0.01</b>	<b>-0.71</b>	<b>-0.01</b>	<b>-0.18</b>	<b>-0.28</b>	<b>-0.29</b>	<b>0.24</b>	<b>0.65</b>
Source: TurkStat, Author's Own Calculations. Table 4.11(continued).													

Inflation differential investigation with detailed data (4-digit COICOP level) reveals that “0111. Bread and Cereals”<sup>38</sup> with 0.64 percentage points, “0117. Vegetables” with 0.50 percentage points, “0220. Tobacco” with 0.45 percentage points, “0410. Rent” with 0.18 percentage points, and “0454. Solid Fuels” with 0.15 percentage points are the main upside contributors on average (Table 4.12).

Main downside contributors are “0711. Automobile” with 0.34 points, “0722. Motor Fuels”<sup>39</sup> with 0.34 points, “1110. Restaurant Services” with 0.23 points and “0562. Housework Services” with 0.17 percentage points on average over whole period (Table 4.12).

Year	Bread and Cereals	Vegetables	Tobacco	Rent	Solid Fuels	Automobile	Motor Fuels	Restaurant Services	Household Services
2004	0.53	-0.01	0.61	0.24	0.23	-0.15	-0.40	-0.27	-0.29
2005	0.22	0.67	0.47	0.23	0.06	-0.01	-1.11	-0.21	-0.23
2006	0.72	1.03	0.84	0.24	0.19	-0.51	-0.44	-0.21	-0.24
2007	1.06	0.64	0.35	0.23	0.27	-0.15	-0.19	-0.22	-0.19
2008	1.81	0.26	0.25	0.21	0.26	0.31	-0.63	-0.28	-0.15
2009	0.39	0.50	0.37	0.15	0.22	0.19	0.23	-0.21	-0.10
2010	0.02	0.68	1.05	0.10	0.03	-0.37	-0.67	-0.24	-0.09
2011	0.35	0.28	0.09	0.11	0.10	-0.22	-0.52	-0.20	-0.09
2012	0.56	0.24	0.46	0.14	0.25	-0.43	-0.30	-0.22	-0.16
2013	0.62	0.57	0.56	0.17	0.07	-0.45	-0.27	-0.20	-0.16
2014	0.91	0.55	0.12	0.19	0.04	-1.72	-0.09	-0.27	-0.18
2015	0.47	0.60	0.13	0.19	0.13	-0.61	0.44	-0.28	-0.15
<b>Average</b>	<b>0.64</b>	<b>0.50</b>	<b>0.45</b>	<b>0.18</b>	<b>0.15</b>	<b>-0.34</b>	<b>-0.34</b>	<b>-0.23</b>	<b>-0.17</b>

<sup>38</sup> This group comprises of rice, bread, pasta, and bakery products.

<sup>39</sup> It includes 95 octane unleaded gasoline, diesel, liquefied petroleum gas (LPG), and motor oils.

Note: Only 4-digit COICOP items with average of greater than 0.15 percentage points contribution difference in absolute terms are shown in the table.  
Source: TurkStat, Author's Own Calculations.  
Table 4.12 (continued).

When we analyze noticeable changes in contributions over time, the upside contribution in rent declined rapidly after 2008. The hikes in the upside contribution of bread and cereals in 2007 and 2008 are mostly caused by the effects of global food price crisis. The upside contribution of tobacco prices increased sharply in 2006 and 2010 due to high special consumption tax adjustments. Also, the visible downside contribution of automobile in 2014 is attributed to price increases due to special consumption tax increases and the depreciation of Turkish lira. The changes in the contribution of motor fuels are mostly determined by Brent oil price changes. Thus, the contribution of motor fuels becomes positive in 2015 due to the sharp decline in oil prices after mid-2014 in favor of rich households.

#### **4.4.3. Inflation by Demographic Groups**

The consumption habits of a household may also change with its demographic characteristics. In addition to income groups, households are also grouped in terms of age, family size, region of residents, homeownership, head of family's employment status, and family type. For each demographic characteristic, CPI is calculated with related weights derived from HBS. Then, two demographic groups with the highest inflation differentials for each demographic classification are reported below.

Households are divided into two groups in terms of household size according to equivalent size of household by modified OECD scale. Typical household is assumed to be one with 2 adults and 2 children (one of them is aged 14 and over, and the other one is aged less than 14).<sup>40</sup> Thus, 2.3 is selected as a threshold to determine whether the household is small or large. Households with less than or equal to 2.3 of equivalent size are categorized as small, and households with greater than 2.3 of equivalent size are

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<sup>40</sup> It is consistent with the survey data. Mean of equivalent size of household by modified OECD scale is around 2.2 in TurkStat's HBS.

classified as large household. The inflation difference between large and small households has a mean of 0.08 percentage points and 0.36 percentage points of standard deviation (Table 4.13).

Another demographic classification is formed according to the age. Households are classified as 4 groups in terms of age. Age categorization of the households is based on the age of head of the family. One of the UN age classification set is used to determine age intervals.<sup>41</sup> Age classifications are found below<sup>42</sup>:

- 1) Young Adulthood: 15-24
- 2) Middle Adulthood: 25-44,
- 3) Older Adulthood: 45-64,
- 4) Retirement: 65+

The inflation difference between young adulthood and older adulthood households has a mean of 0.25 percentage points and 0.89 percentage points of standard deviation (Table 4.13).

Households may have different consumption habits depending on the region they live. TurkStat and this study categorize settlements with a population of 20 001 and above as urban areas, and settlements with a population of 20 000 and below as rural areas. Households are grouped into two categories: 1) rural vs. 2) urban. Then, the inflation difference between rural and urban households is found as a mean of 0.08 percentage points and 0.65 percentage points of standard deviation (Table 4.13).

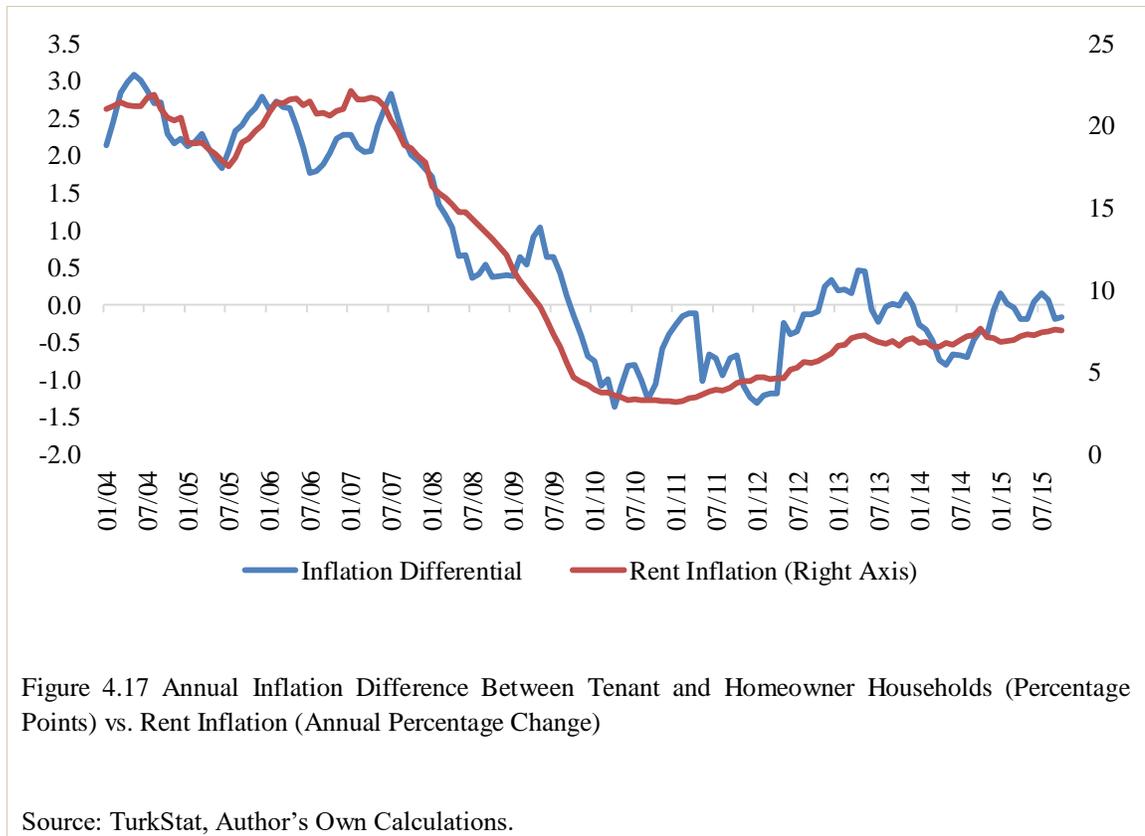
We have formed 3 categories in terms of home tenure based on the significance of rent spending: 1-Tenants, 2-Homeowners, and 3-Others. Others consist of 2 groups: One group is the one who lives in dwelling which belongs to government or workplace or whose rent is paid by workplace of one of the members of household. The other group is

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<sup>41</sup> Source: Provisional Guidelines on Standard International Age Classifications, *Statistical Papers, Series M No: 74, 1982.*

<sup>42</sup> Retirement age threshold increases over this period in Turkey, but it is taken as 65+ for all period in order to be consistent.

one who lives in a dwelling which is owned by relative of household. The inflation difference between tenant and homeowner households has a mean of 0.68 percentage points and 1.32 percentage points of standard deviation (Table 4.13). The reason of this difference is high rent inflation over the period between 2004 and 2008 (Figure 4.17).



Households are divided into two groups in terms of employment status. If head of the household has non-zero annual pension wage, then the household is defined as a pensioner. Other households are classified as non-pensioners. The inflation difference between non-pensioners and pensioners has a mean of 0.10 percentage points against non-pensioners and it has 0.34 percentage points of standard deviation (Table 4.13).

Households are categorized into 6 groups in terms of family types. While 13 family structures are available in 2003-2007 HBS, there are 7 different family structures

defined in 2008-2013 HBSs. Compiling family structures of 2003-2007 and 2008-2013 with the help of Stata, 6 family type categories below are formed.

1-Nuclear household with one child, 2-Nuclear household with 2 children, 3-Nuclear household with 3 or more children, 4-Couple without children, 5-Patriarchal or extensive household, 6-One adult household or persons who live together such as students or relatives. Nuclear household with three or more children has 0.07 percentage points higher inflation on average than nuclear household with one child, and the inflation difference has 0.44 percentage points of standard deviation (Table 4.13).

Table 4.13 summarizes the results of hypothesis below for demographic categories.

$H_0: \mu_d=0$

$H_1: \mu_d>0$

<b>Table 4.13 Inflation Differentials by Demographic Groups*</b>				
	Mean	Standard Deviation	t-value	p-value
Homeownership	0.6787	1.3237	6.1102	0.0000
Age	0.2626	0.8912	3.5103	0.0006
Employment Status	0.1036	0.3373	3.6610	0.0004
Size	0.0737	0.3495	2.5132	0.0131
Family Type	0.0666	0.4351	1.8248	0.0701
Region	0.0549	0.6164	1.0620	0.2900
*They are calculated by the help of E-views. Source: TurkStat, Author's Own Calculations.				

Although most of inflation differentials are statistically significant, only homeownership category has an economically significant inflation differential (Table 4.13). Large, young, rural, tenant, non-pensioners and families with three or more children are exposed to higher inflation than their counterparties on average. All these demographic groups have lower income than their counterparties in their own classification. As a

result, one can conclude that demographic characteristics have no economically significant effect on inflation differentials across households.

#### **4.5. Conclusion**

Relative price variability and the weight divergence induce inflation exposure differentials across different income and demographic groups in Turkey. Poor households are exposed to higher inflation than rich households on average over last 12 years. The inflation of poor households is more sensitive to shocks to food prices than rich households' inflation due to the weight divergence of food in the consumer basket. More importantly, inflation exposure is very volatile over time due to frequent supply shocks such as weather conditions, administered price and tax adjustments. At the same time, inflation differential is highly persistent. Another finding is that when income gap across households becomes larger, the inflation differential is increasing. Income level has been the main attribute that affects inflation differentials across households rather than demographic characteristics in Turkey over the last 12 years. Main upside contributors to inflation differentials are bread and cereals, vegetables, rent and solid fuels. Main downside contributors are automobile, motor fuel, restaurant and housework services. While contributor items give an idea about the causes of inflation differentials, it is important to find out the determinants of inflation differentials. To this end, next chapter of the thesis analyzes the effects of inflation determinants on the inflation of the poorest and the richest quintile.

## **CHAPTER 5**

### **DETERMINANTS OF INFLATION FOR INCOME GROUPS**

#### **5.1. Introduction**

Inflation inequality studies do not discuss why the inflation rates of upside and downside contributor items differentiate from those of other goods and services in CPI basket, although they detect these items. In other words, related studies do not analyze the determinants of inflation differentials across income groups. To fill this gap in the literature, we investigate the effects of determinants on the inflation of poor and rich households in this chapter. For this purpose, we construct two separate models for the inflation of the poorest quintile and that of the richest quintile. The VAR models indicate that exchange rate and import prices have a greater impact on the inflation of the richest quintile compared to that of the poorest quintile.

In the next section, we introduce the data and methodology. In the third section, we present our empirical findings, and we conclude the chapter in the last section.

#### **5.2. Data and Methodology**

The main data sources are TurkStat and CBRT Electronic Data Delivery System. HBS data, consumer price, industrial production index and import prices are obtained from TurkStat while exchange rate data are retrieved from CBRT Electronic Data Delivery System. We use monthly data for the period 2003:01-2015:10. New methodology with

2003 base year in CPI index is the main reason behind the selection of this estimation sample.

Following Kara and Ogunc (2012), exchange rate is defined as currency basket consisting of the average of monthly US Dollar (\$/£) and Euro (€/£) selling rates. The import price is seasonally adjusted import unit value index denominated in US dollar terms. The output gap is defined as HP-filtered seasonally and calendar adjusted monthly industrial production data. The consumer price is the seasonally adjusted CPI for each income group  $i$ . The models take the output gap in levels<sup>43</sup>, while other variables are percentage changes. All variables used in the VAR models are stationary according to ADF unit root tests.<sup>44</sup>

We use a monthly VAR model<sup>45</sup> based on McCarthy (2000), which is frequently cited in the pass-through literature. McCarthy (2000) investigates the effect of exchange rates and import prices on domestic prices for 9 industrialized countries by using a quarterly VAR model with the following ordering of the variables: oil price inflation, output gap, nominal exchange rate change, import price inflation, PPI inflation, CPI inflation, short-term interest rate and money growth. Here, we use a similar structure to analyze the effect of import price and exchange rate on CPI for the poorest one-fifth and the richest one-fifth household groups, separately. We use output gap, exchange rate, import price changes, and CPI inflation in our monthly VAR models. Our VAR model with lag  $p$  in standard form is:

$$x_t = A_0 + A_1 x_{t-1} + A_2 x_{t-2} + \dots + A_p x_{t-p} + e_t$$

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<sup>43</sup> Natural logarithm of industrial production data is HP-filtered, and cycle part is taken. Thus, output gap level is a proxy to the percentage change of seasonally and calendar adjusted industrial production.

<sup>44</sup> Exchange rate basket, import price and consumer price levels are intergrated of order 1. Percentage change of these variables and output gap level used in the VAR models are stationary.

<sup>45</sup> The VAR (Vector Autoregression) model handles the endogeneity problem arising from the need to assess which variables are exogenous.

where  $x_t = \begin{bmatrix} \pi_t^m \\ \tilde{y}_t \\ \Delta e_t^b \\ \pi_t^i \end{bmatrix}$  and  $A_0$  is constant and 4x1 matrix, other  $A$ 's are 4x4 matrices,  $e$  is estimated residuals.

$\pi_t^m$ ,  $\Delta e_t^b$ ,  $\tilde{y}_t$ , and  $\pi_t^i$  are the import price inflation denominated in \$ terms, exchange rate basket change, output gap, and monthly consumer price (CPI) inflation for each income group  $i$ , respectively. Inflation expectations are taken into account in the model by using the lags of the variables in the system.<sup>46</sup>

There is no standard method to determine ordering of endogenous variables in Cholesky decomposition. Turkey is a commodity (mostly oil products) importer, small, and open economy. Thus, there is no effect of Turkish economy on import prices. Then, import prices are considered as the most exogenous variable. By considering Granger Causality test and this economic intuition, Cholesky ordering of the variables is import prices denominated in foreign currency, output gap, exchange rate, and consumer price index, respectively in our baseline model.<sup>47</sup> According to Akaike Information Criterion, we choose the lag length as 4 for the VAR model of poorest group and 3 for that of the richest group. VAR estimation results for the poorest and richest quintile can be found in Appendix D.1. Stability of the VAR systems is satisfied by inverse AR roots.<sup>48</sup> Also, there is no serial correlation in residuals by autocorrelation LM tests.<sup>49</sup> More importantly, accumulated responses of inflation of poorest and richest quintiles to

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<sup>46</sup> The rationale behind choosing the determinant variables of inflation comes from New Keynesian Philips Curve. Inflation expectations and real marginal costs are the main determinants of inflation in this theoretical framework. And, real marginal costs are represented by output gap and imported input prices in small and open economies in the literature.

<sup>47</sup> Output gap Granger-causes exchange rate basket. Granger causality test results can be found in Appendix D.2.

<sup>48</sup> The graphs of inverse AR roots are seen in Appendix D.2, and they are all smaller than unity in absolute terms.

<sup>49</sup> Autocorrelation LM tests do not reject no serial correlation of null hypothesis in both VAR models.

exchange rate and import prices are not sensitive to the ordering of variables in our setup.<sup>50</sup> Thus, our results pass robustness checks in terms of diagnostic tests and Cholesky ordering.

### 5.3. Empirical Findings

Figure 5.1 and 5.2 show accumulated response of the inflation of the poorest quintile to exchange rate and import price shocks, respectively. They imply that exchange rate and import price have positive effects on the inflation of the poorest household group as expected, but the uncertainty bands of accumulated responses include zero. In other words, accumulated responses of the inflation of the poorest households to exchange rate and import price shocks are not statistically significant.

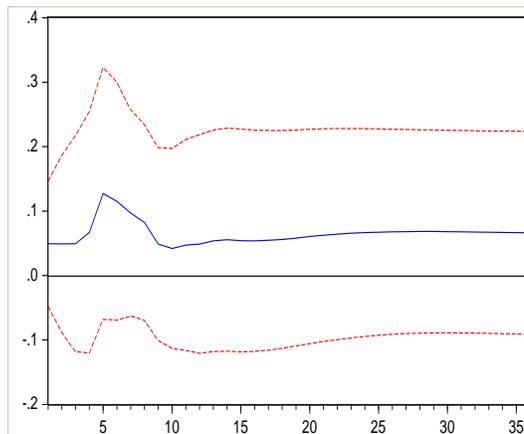


Figure 5.1 Accumulated Response of the Poorest (1<sup>st</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Innovation

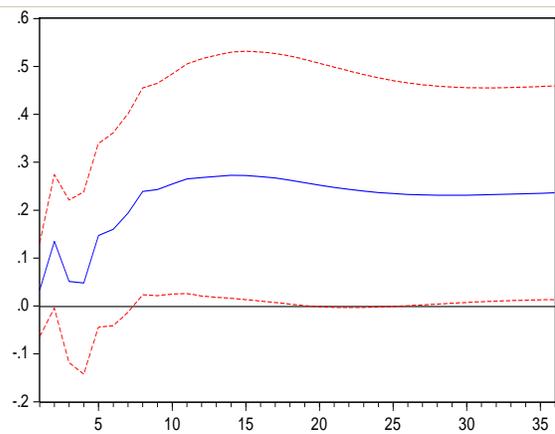


Figure 5.2 Accumulated Response of the Poorest (1<sup>st</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation

Figure 5.3 and Figure 5.4 plot accumulated response of the inflation of the richest quintile to exchange rate and import price shocks, respectively. Exchange rate and import price affect the inflation of the richest group positively as expected. More importantly, the uncertainty bands of accumulated responses do not include zero, which

<sup>50</sup> The impulse response functions of all six possible combinations can be found in Appendix E.

means accumulated response of inflation to exchange rate and import price shocks are statistically significant.

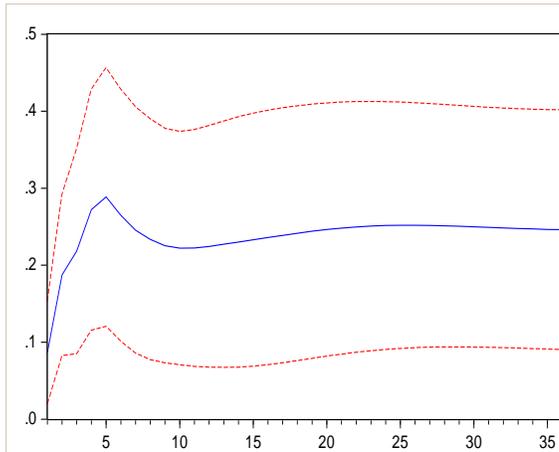


Figure 5.3 Accumulated Response of the Richest (5<sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Innovation

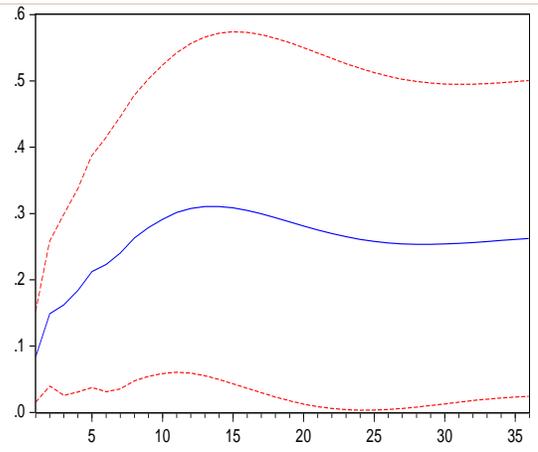


Figure 5.4 Accumulated Response of the Richest (5<sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation

Figure 5.5 and Figure 5.6 show variance decomposition of the poorest quintile's inflation due to exchange rate basket and import prices, respectively. Figure 5.7 and Figure 5.8 present variance decomposition of the richest quintile's inflation due to exchange rate and import prices, respectively. Exchange rate shocks have higher explanatory power on forecast error variance of the richest quintile's inflation when compared to the poorest quintile's inflation. Import price shocks have higher explanatory power on forecast error variance of the richest quintile's inflation in the first four months.<sup>51</sup> It is expected since final imported goods such as automobile and motor fuel have higher share on the consumption basket of the richest group and the pass-through of external prices into domestic prices is fast in these goods. In the medium term, the explanatory power of import price shocks is somewhat higher than that of the

<sup>51</sup> For detailed data, see Appendix F. IRF and variance decomposition of output gap are not presented since they are statistically insignificant in both models but one may detect the output gap has higher explanatory power on forecast error variance of the CPI inflation for the richest quintile group in Appendix F.

poorest quintile's inflation. The reason is that the effect of external prices on domestic food prices occurs with a lag. As a result, these findings are in line with the results of the IRFs.

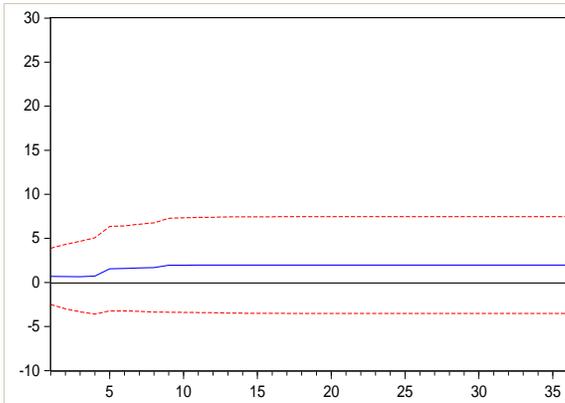


Figure 5.5 Variance of the Poorest (1<sup>st</sup> Quintile) Inflation Due to Exchange Rate  $\pm 2$  S.E. (Percent)

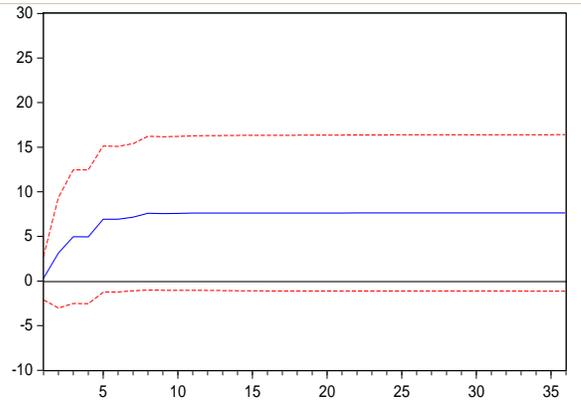


Figure 5.6 Variance of the Poorest (1<sup>st</sup> Quintile) Inflation Due to Import Prices  $\pm 2$  S.E. (Percent)

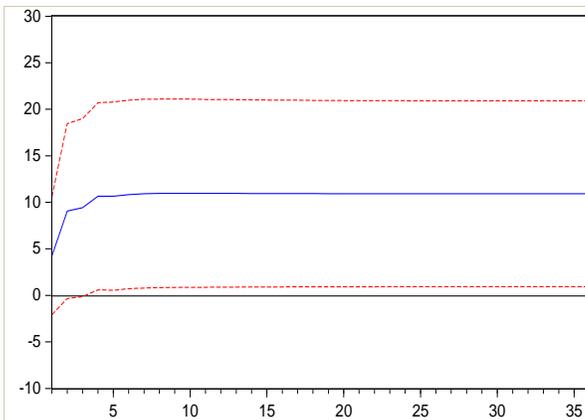


Figure 5.7 Variance of the Richest (5<sup>th</sup> Quintile) Inflation Due to Exchange Rate  $\pm 2$  S.E. (Percent)

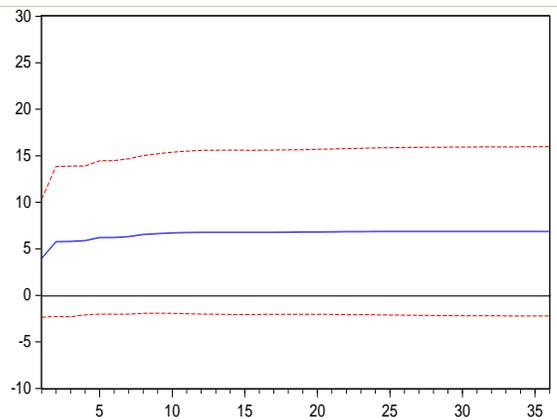


Figure 5.8 Variance of the Richest (5<sup>th</sup> Quintile) Inflation Due to Import Prices  $\pm 2$  S.E. (Percent)

#### 5.4. Conclusion

We conclude that the richest quintile's inflation is more sensitive to exchange rate and import price (in the short term) than the poorest quintile's inflation in Turkey according to IRFs and variance decompositions. This finding is consistent with main downside

contributors to inflation differentials presented in Chapter 4. Automobile and motor fuels are found as main downside contributors. In other words, these consumption items increase the inflation of richer households more than that of poorer ones. The prices of automobile and motor fuels are determined by import prices (composed of commodity prices such as oil, metals etc.) and exchange rates in Turkey. Thus, Turkish lira appreciation and the fall in oil prices widen inflation inequality against the poor households. Next chapter of the thesis summarizes our findings and suggests some policy implications.

## CHAPTER 6

### CONCLUDING REMARKS AND POLICY IMPLICATIONS

We have shown that relative price variability and consumption pattern divergence across households have caused inflation exposure differentials over the last 12 years in Turkey. Inflation differentials are more pronounced across income groups. Poor households have become worse off on average over the discussed period in Turkey. More importantly, the volatility of inflation differential is very high and it varies over a wide range. The most important upside contributors to inflation differentials are food items. The most important downside contributors are automobile and motor fuels. While the inflation of poor households is more sensitive to food price shocks, the rich households' inflation is more responsive to exchange rate and import prices. The economic reasons behind inflation differentials are supply-side factors arising from structural problems and convergence process of Turkey to developed countries.

There are several policy implications of inflation exposure differentials for Turkey. Firstly, food prices should closely be monitored by Ministry of Food, Agriculture and Livestock due to non-competitive nature of the food market in Turkey. Turkey is a producer country for agricultural products. As agricultural policies, attempts to increase domestic food prices to provide stronger incentives to farmers as a subsidy in Turkey may increase inflation differentials. While policies related to food sector are designed, the implications for poor consumers should not be ignored since it would cause welfare losses for low-income households, and increase social unrest. Secondly, energy prices are determined by exchange rate (i.e. USD/TL) and international commodity prices (i.e. Brent oil price) in Turkey due to being oil importing country. Thus, structural reforms

such as sustainable energy resources, energy efficiency, etc. may contribute to reduce inflation differentials across households. Thirdly, TurkStat may calculate inflation for each income group. And, inflation rate of poor households may be a reference rate in minimum wage determination. Tracking the inflation of poor households gives more realistic idea about cost of living changes when minimum wage negotiations are made.

Turkey is an upper middle income developing country. Inflation differentials may be more specifically for low income developing countries due to higher share of food in consumer basket, higher income and low price elasticity of food demand. Also, supply-side factors are more dominant on the inflation due to structural problems of low-income countries. Thus, there are also general implications of inflation exposure differentials for developing countries especially low-income countries. Firstly, inflation exposure differentials may be detrimental to income equality. Low-income households do not have a flexibility to substitute goods with high price increases in the consumer basket due to being necessities while rich households can diversity their consumption patterns. Secondly, deflating the all household's incomes by official CPI will be a misleading indicator for the real effect of price changes on the purchasing power of each household group in developing countries. Thirdly, using only one headline inflation may end up with misleading results in macroeconomic models for developing countries (Anand, et. al., 2015).

In this study, the effect of relative price changes and consumption pattern differences on expenditures is investigated. One can analyze income effects of relative price changes across different demographic and income groups. By doing this, the effects of inflation differentials on income inequality can be exactly found. Specifically, whether poor households are net food buyers in Turkey or not has important implications. Also, welfare losses of different income and demographic groups due to inflation differentials can be done as a further study.

As a further study, consumer basket, outlet and quality biases can be eliminated with detailed data. These data may be obtained by private survey company or national

statistical agency with special data collection process. Each income and demographic group has its own preference for consumption items, outlet selection, and quality. Consumer basket of each group can be determined according to the importance of goods and services to the group. Moreover, one can consider not only the preference of representative household but also that of each group by incorporating different price for same items with different quality or from distinct outlet.

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## APPENDICES

### Appendix A: TurkStat’s Descriptions of COICOP Classification and Annual Disposable Income

#### Appendix A.1

Table A.1.1 TurkStat’s COICOP Classification of “01.Food and Non-Alcoholic Beverages” Expenditure Group

Number of Digit	COICOP Code	Description
1	0	<b>General (CPI)</b>
2	01	Food and Non-Alcoholic Beverages
3	011	Food
4	0111	Bread and Cereals
5	01111	Rice
5	01112	Flour and Other Cereals
5	01113	Bread
5	01114	Other Bakery Products
5	01115	Pasta Products
5	01116	Other Cereal Products
4	0112	Meat
5	01122	Veal
5	01124	Lamb, Sheep and Goat Meat
5	01125	Poultry
5	01126	Edible Offal
5	01127	Deli Meat Products and Other Meats
4	0113	Fish
5	01131	Fresh Fish and Seafood
4	0114	Milk, Cheese and Eggs
5	01141	Fresh Milk
5	01143	Other Milk Products

5	01144	Cheese
5	01145	Egg
4	0115	Oils and fats
5	01151	Butter
5	01152	Margarin
5	01153	Other Fat and Oils
4	0116	Fruits
5	01161	Fresh Fruits
5	01162	Dried Fruit and Nuts
4	0117	Vegetables
5	01171	Vegetables excluding Potato and Some Tuber Crops
5	01172	Potato and Some Tuber Crops
5	01174	Dried Vegetables
5	01175	Canned or Processed Vegetables and Products Containing Vegetables
4	0118	Sugar, Jam, Honey, Chocolate and Confectionery
5	01181	Sugar
5	01182	Jam, Marmalade and Honey
5	01183	Sweets, Chocolate and Cocoa Products
5	01184	Edible Ice, Ice Cream, Syrup
4	0119	Food products n.e.c
5	01190	Non-Classified Other Food Products
3	012	Non-Alcoholic Beverages
4	0121	Coffee, Tea and Cacao
5	01211	Coffee
5	01212	Tea
5	01213	Cacao (Excluding Cacao Products)
4	0122	Mineral Waters, Soft Drinks, Fruit and Vegetable Juices
5	01221	Water and Mineral Waters
5	01222	Non-Alcoholic and Concentrated Beverages
5	01223	Fruit and Vegetable Juices

Table A.1.1 (continued).

## Appendix A.2

Table A.2.1 Annual Disposable Income in TurkStat's Household Budget Surveys

+ Annual wage, salary and daily fee in cash (Q8.21+Q8.22)	}	x CPI (Index)
+ Annual wage, salary and daily fee in-kind (Q8.23)		
+ Annual entrepreneurial income in cash (Q8.25+Q8.27)		
+ Annual entrepreneurial income in-kind (Q8.26)		
+ Annual rental income in cash (Q8.29)		
+ Annual rental income in-kind (Q8.30)		
+ Annual income from properties in cash (Q8.31+Q8.32+Q8.33)		
+ Annual income from properties in-kind (Q8.34)		
+ Annual transfers received in cash (Q8.35+...+Q8.43+Q8.45+Q8.46+Q8.48)		
+ Annual transfers received in-kind (Q8.44+Q8.47+Q8.49)		
+ Monthly imputed rent x 12		
- Non-consumption expenditures (Monthly) x Frequency (T7.1)		
- Annual aids given to other households regularly (Monthly) x Frequency (T7.1)		

$$\text{Household Disposable Income} = [(\text{Annual Household Income} \times \text{Index})] + (\text{Imputed rent} \times \text{Index} \times 12) - [(\text{Annual Non-Consumption Expenditures} + \text{Annual Aids Given to Others}) \times \text{Index}]$$

## Appendix B: Tests for whether TurkStat's and Calculated Inflation are Different

Hypothesis Testing for INFLATION\_DIFFERENCE

Date: 12/28/15 Time: 16:37

Sample (adjusted): 2004M01 2015M10

Included observations: 142 after adjustments

Test of Hypothesis: Mean = 0.000000

---

Sample Mean = 0.003141

Sample Std. Dev. = 0.243738

<u>Method</u>	<u>Value</u>	<u>Probability</u>
t-statistic	0.153553	<b>0.8782</b>

---

Hypothesis Testing for MONTHLY\_DIFFERENCE

Date: 12/28/15 Time: 16:38

Sample (adjusted): 2003M02 2015M10

Included observations: 153 after adjustments

Test of Hypothesis: Mean = 0.000000

---

Sample Mean = 0.000676

Sample Std. Dev. = 0.092326

<u>Method</u>	<u>Value</u>	<u>Probability</u>
t-statistic	0.090552	<b>0.9280</b>

---

## Appendix C: Properties of Inflation Differentials

### Appendix C.1

Table C.1.1 Seasonality Test of Annual Inflation Difference between 1<sup>st</sup> and 5<sup>th</sup> Income Quintiles by Demetra+

<p><b><u>Non parametric tests for stable seasonality</u></b></p> <p><b>Friedman test</b>                  Friedman statistic = 0.0763                  Distribution: F-stat with 11 degrees of freedom in the numerator and 110 degrees of freedom in the denominator                  P-Value: <b>1.0000</b>                  No evidence of stable seasonality at the 5 per cent level</p> <p><b>Kruskall-Wallis test</b>                  Kruskall-Wallis statistic = 1.3633                  Distribution: Chi2(11)                  P-Value: <b>0.9998</b>                  No evidence of stable seasonality at the 5 per cent level</p>			
<p><b><u>Test for the presence of seasonality assuming stability</u></b></p>			
	<i>Sum of squares</i>	<i>degrees of freedom</i>	<i>Mean square</i>
<i>Between months</i>	0.0401542	11	0.00365038
<i>Residual</i>	7.04596	130	0.0541997
<i>Total</i>	7.08611	141	0.0502561
<p>Value: 0.0673506                  Distribution: F-stat with 11 degrees of freedom in the numerator and 130 degrees of freedom in the denominator                  P-Value: <b>1.0000</b>                  No evidence of seasonality at the 5 per cent level</p>			
<p><b><u>Evolutionary seasonality test</u></b></p>			
	<i>Sum of squares</i>	<i>Degrees of freedom</i>	<i>Mean square</i>
<i>Between years</i>	0.285518	10	0.0285518
<i>Error</i>	1.90586	110	0.017326
<p>Value: 1.64792                  Distribution: F-stat with 10 degrees of freedom in the numerator and 110 degrees of freedom in the denominator                  P-Value: <b>0.1025</b></p>			
<p><b><u>Combined seasonality test</u></b></p> <p><b>Identifiable seasonality not present</b></p>			
<p><b><u>Residual seasonality test</u></b></p> <p>No evidence of residual seasonality in the entire series at the 10 per cent level: F=0.0972                  No evidence of residual seasonality in the last 3 years at the 10 per cent level: F=0.1059</p>			

## Appendix C.2

Table C.2.1 Inflation Persistence Regression

Dependent Variable: DIFFERENCE  
 Method: Least Squares  
 Date: 12/30/15 Time: 15:17  
 Sample (adjusted): 2004M02 2015M10  
 Included observations: 141 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.050006	0.058754	0.851110	0.3962
DIFFERENCE(-1)	<b>0.903092</b>	0.037359	24.17348	0.0000
R-squared	0.807840	Mean dependent var		0.647152
Adjusted R-squared	0.806458	S.D. dependent var		1.438866
S.E. of regression	0.633006	Akaike info criterion		1.937409
Sum squared resid	55.69683	Schwarz criterion		1.979236
Log likelihood	-134.5873	Hannan-Quinn criter.		1.954406
F-statistic	584.3573	Durbin-Watson stat		1.839467
Prob(F-statistic)	0.000000			

Date: 12/29/15 Time: 19:48  
 Sample: 2004M01 2015M12  
 Included observations: 142

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1	0.894	0.894	115.97	0.000	
2	0.787	-0.064	206.38	0.000	
3	0.676	-0.075	273.67	0.000	
4	0.607	0.143	328.32	0.000	
5	0.560	0.064	375.20	0.000	
6	0.524	0.006	416.41	0.000	
7	0.494	0.040	453.37	0.000	
8	0.458	-0.022	485.36	0.000	
9	0.409	-0.070	511.01	0.000	
10	0.319	-0.215	526.75	0.000	
11	0.239	0.003	535.68	0.000	
12	0.171	-0.006	540.29	0.000	
13	0.204	0.407	546.86	0.000	
14	0.218	-0.138	554.43	0.000	
15	0.234	0.000	563.26	0.000	
16	0.216	-0.065	570.84	0.000	
17	0.173	-0.101	575.72	0.000	
18	0.130	0.015	578.53	0.000	
19	0.089	0.020	579.85	0.000	
20	0.053	-0.080	580.33	0.000	
21	0.036	0.022	580.55	0.000	
22	0.034	-0.111	580.74	0.000	
23	0.011	-0.094	580.77	0.000	
24	-0.026	-0.073	580.88	0.000	

Figure C.2.1 Autocorrelations of Annual Inflation Difference between the 1<sup>st</sup> and the 5<sup>th</sup> Income Quintiles

## Appendix D: Estimation Results and Diagnostic Tests of VAR Models

### Appendix D.1 Vector Autoregression (VAR) Estimation Results

Table D.1.1 Vector Autoregression Estimates of CPI Inflation for the Poorest Quintile

Vector Autoregression Estimates  
 Date: 12/29/15 Time: 10:50  
 Sample (adjusted): 2003M06 2015M08  
 Included observations: 147 after adjustments  
 Standard errors in ( ) & t-statistics in [ ]

	@PC(IMP)	GAP	@PC(BASKET)	@PC(POOREST)
@PC(IMP(-1))	0.366520 (0.08825) [ 4.15341]	0.000563 (0.00034) [ 1.67164]	0.010750 (0.16018) [ 0.06711]	0.071120 (0.03326) [ 2.13826]
@PC(IMP(-2))	0.048156 (0.09303) [ 0.51762]	0.000152 (0.00035) [ 0.42772]	-0.384938 (0.16887) [-2.27952]	-0.073336 (0.03507) [-2.09142]
@PC(IMP(-3))	0.176778 (0.09336) [ 1.89345]	0.000564 (0.00036) [ 1.58335]	0.197454 (0.16947) [ 1.16515]	0.010599 (0.03519) [ 0.30120]
@PC(IMP(-4))	-0.030516 (0.08889) [-0.34330]	-0.000692 (0.00034) [-2.03972]	0.033039 (0.16135) [ 0.20477]	0.059785 (0.03350) [ 1.78445]
GAP(-1)	41.08021 (23.1446) [ 1.77494]	1.419115 (0.08827) [ 16.0763]	-45.67540 (42.0107) [-1.08723]	-8.636763 (8.72345) [-0.99006]
GAP(-2)	-37.59981 (38.1350) [-0.98597]	-0.203619 (0.14545) [-1.39995]	147.3766 (69.2203) [ 2.12909]	13.44994 (14.3735) [ 0.93575]
GAP(-3)	14.32688 (38.4772) [ 0.37235]	-0.420671 (0.14675) [-2.86654]	-170.7386 (69.8414) [-2.44466]	1.533927 (14.5025) [ 0.10577]
GAP(-4)	-15.97942 (22.1078) [-0.72279]	0.139446 (0.08432) [ 1.65378]	83.91087 (40.1288) [ 2.09104]	-5.088920 (8.33268) [-0.61072]
@PC(BASKET(-1))	-0.080507 (0.04850) [-1.66003]	-0.000292 (0.00018) [-1.58064]	0.334573 (0.08803) [ 3.80069]	0.000721 (0.01828) [ 0.03943]
@PC(BASKET(-2))	0.093477 (0.05057) [ 1.84865]	6.14E-05 (0.00019) [ 0.31843]	-0.266284 (0.09178) [-2.90124]	0.003633 (0.01906) [ 0.19064]

@PC(BASKET(-3))	-0.009734 (0.05085) [-0.19141]	-0.000360 (0.00019) [-1.85504]	0.052803 (0.09231) [ 0.57202]	-0.002172 (0.01917) [-0.11333]
@PC(BASKET(-4))	-0.002096 (0.04803) [-0.04364]	0.000133 (0.00018) [ 0.72375]	-0.094585 (0.08718) [-1.08497]	0.027460 (0.01810) [ 1.51696]
@PC(POOREST(-1))	0.110971 (0.22237) [ 0.49905]	0.000570 (0.00085) [ 0.67157]	-0.508266 (0.40362) [-1.25926]	-0.046267 (0.08381) [-0.55204]
@PC(POOREST(-2))	-0.357281 (0.22340) [-1.59926]	-0.001194 (0.00085) [-1.40113]	-0.280354 (0.40551) [-0.69136]	-0.032971 (0.08420) [-0.39156]
@PC(POOREST(-3))	0.181948 (0.22172) [ 0.82062]	0.000986 (0.00085) [ 1.16564]	-0.638280 (0.40245) [-1.58597]	-0.016980 (0.08357) [-0.20319]
@PC(POOREST(-4))	-0.379361 (0.22123) [-1.71478]	-0.000458 (0.00084) [-0.54261]	-0.312212 (0.40156) [-0.77749]	-0.274076 (0.08338) [-3.28692]
C	0.398976 (0.34416) [ 1.15928]	0.000200 (0.00131) [ 0.15229]	1.718645 (0.62469) [ 2.75118]	0.923952 (0.12972) [ 7.12284]
R-squared	0.423810	0.973930	0.254005	0.174373
Adj. R-squared	0.352894	0.970721	0.162191	0.072757
Sum sq. resids	320.4638	0.004662	1055.841	45.52560
S.E. equation	1.570066	0.005988	2.849886	0.591774
F-statistic	5.976240	303.5318	2.766499	1.716003
Log likelihood	-265.8652	552.7885	-353.5010	-122.4304
Akaike AIC	3.848506	-7.289640	5.040830	1.897012
Schwarz SC	4.194339	-6.943808	5.386662	2.242844
Mean dependent	0.235362	-3.52E-05	0.473285	0.688986
S.D. dependent	1.951776	0.034996	3.113543	0.614553
Determinant resid covariance (dof adj.)		0.000230		
Determinant resid covariance		0.000141		
Log likelihood		-182.4607		
Akaike information criterion		3.407628		
Schwarz criterion		4.790957		

Table D.1.1 (continued).

Table D.1.2 Vector Autoregression Estimates of CPI Inflation for the Richest Quintile

Vector Autoregression Estimates  
 Date: 12/29/15 Time: 11:23  
 Sample (adjusted): 2003M05 2015M08  
 Included observations: 148 after adjustments  
 Standard errors in ( ) & t-statistics in [ ]

	@PC(IMP)	GAP	@PC(BASKET)	@PC(RICHEST)
@PC(IMP(-1))	0.339162 (0.08817) [ 3.84650]	0.000490 (0.00034) [ 1.43105]	-0.010708 (0.16365) [-0.06543]	0.040006 (0.02384) [ 1.67788]
@PC(IMP(-2))	0.101276 (0.09135) [ 1.10872]	0.000274 (0.00035) [ 0.77237]	-0.386369 (0.16954) [-2.27894]	-0.007880 (0.02470) [-0.31904]
@PC(IMP(-3))	0.198069 (0.08815) [ 2.24700]	0.000128 (0.00034) [ 0.37292]	0.222175 (0.16361) [ 1.35799]	0.021866 (0.02384) [ 0.91735]
GAP(-1)	41.99925 (21.9093) [ 1.91696]	1.369180 (0.08502) [ 16.1045]	-71.54210 (40.6643) [-1.75934]	-3.458362 (5.92441) [-0.58375]
GAP(-2)	-30.96614 (36.8301) [-0.84078]	-0.222814 (0.14292) [-1.55903]	151.7049 (68.3577) [ 2.21928]	11.96373 (9.95909) [ 1.20129]
GAP(-3)	-10.17506 (20.6237) [-0.49337]	-0.231461 (0.08003) [-2.89217]	-70.77226 (38.2783) [-1.84889]	-8.339062 (5.57679) [-1.49532]
@PC(BASKET(-1))	-0.076314 (0.04760) [-1.60334]	-0.000336 (0.00018) [-1.81700]	0.325492 (0.08834) [ 3.68446]	0.031836 (0.01287) [ 2.47355]
@PC(BASKET(-2))	0.104348 (0.04939) [ 2.11268]	0.000123 (0.00019) [ 0.64206]	-0.248638 (0.09167) [-2.71227]	0.000181 (0.01336) [ 0.01354]
@PC(BASKET(-3))	0.021910 (0.04839) [ 0.45282]	-0.000294 (0.00019) [-1.56403]	0.089071 (0.08981) [ 0.99183]	0.025148 (0.01308) [ 1.92207]
@PC(RICHEST(-1))	0.274464 (0.32800) [ 0.83677]	-2.52E-05 (0.00127) [-0.01979]	-0.567423 (0.60878) [-0.93206]	0.121309 (0.08869) [ 1.36772]
@PC(RICHEST(-2))	-0.758752 (0.33102) [-2.29215]	-0.002037 (0.00128) [-1.58578]	-0.157521 (0.61439) [-0.25639]	-0.059291 (0.08951) [-0.66239]

@PC(RICHEST(-3))	-0.058314 (0.32582) [-0.17898]	0.001590 (0.00126) [ 1.25718]	-1.113929 (0.60473) [-1.84201]	-0.010562 (0.08810) [-0.11988]
C	0.399711 (0.33828) [ 1.18161]	0.000328 (0.00131) [ 0.25007]	1.626604 (0.62785) [ 2.59075]	0.574936 (0.09147) [ 6.28538]
R-squared	0.415100	0.972639	0.225337	0.164660
Adj. R-squared	0.363109	0.970207	0.156478	0.090408
Sum sq. resids	326.1028	0.004911	1123.375	23.84454
S.E. equation	1.554212	0.006031	2.884666	0.420269
F-statistic	7.984066	399.9235	3.272443	2.217574
Log likelihood	-268.4629	553.2025	-359.9921	-74.90429
Akaike AIC	3.803553	-7.300034	5.040434	1.187896
Schwarz SC	4.066822	-7.036766	5.303702	1.451164
Mean dependent	0.243266	-0.000210	0.433290	0.643517
S.D. dependent	1.947502	0.034942	3.140851	0.440661
Determinant resid covariance (dof adj.)		0.000112		
Determinant resid covariance		7.72E-05		
Log likelihood		-139.3199		
Akaike information criterion		2.585404		
Schwarz criterion		3.638478		

Table D.1.2 (continued).

## Appendix D.2 Diagnostic Tests of VAR Model for the Poorest and Richest Quintile

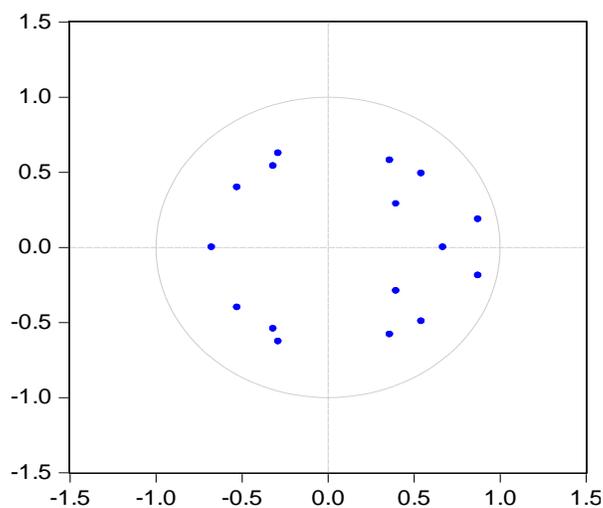


Figure D.2.1 Inverse Roots of AR Characteristic for VAR of the Poorest Quintile

Table D.2.1 Length Selection Criteria for VAR of the Poorest Quintile

VAR Lag Order Selection Criteria

Endogenous variables: @PC(IMP) GAP @PC(BASKET) @PC(POOREST)

Exogenous variables: C

Date: 12/29/15 Time: 09:49

Sample: 2003M01 2015M12

Included observations: 143

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-506.1000	NA	0.014739	7.134266	7.217143	7.167943
1	-263.6622	467.9220	0.000621	3.967303	4.381687	4.135689
2	-212.4845	95.91335	0.000380*	3.475308	4.221199*	3.778403*
3	-199.9137	22.85615	0.000399	3.523268	4.600666	3.961071
4	-180.2103	34.72203	0.000380	<b>3.471473*</b>	4.880378	4.043984
5	-172.3890	13.34544	0.000428	3.585860	5.326272	4.293080
6	-155.9876	27.06809	0.000428	3.580246	5.652165	4.422174
7	-139.2094	26.75124*	0.000427	3.569362	5.972788	4.545999
8	-131.1625	12.37980	0.000482	3.680594	6.415528	4.791940

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

Table D.2.2 Granger Causality Test Results for VAR of Poorest Quintile

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 12/29/15 Time: 09:40

Sample: 2003M01 2015M12

Included observations: 147

Dependent variable: @PC(IMP)

Excluded	Chi-sq	df	Prob.
GAP	8.254788	4	0.0827
@PC(BASKET)	5.417302	4	0.2471
@PC(POOREST)	6.477501	4	0.1662
All	21.42577	12	0.0445

Dependent variable: GAP

Excluded	Chi-sq	df	Prob.
@PC(IMP)	9.074129	4	0.0593

@PC(BASKET)	5.345531	4	0.2536
@PC(POOREST)	4.187831	4	0.3812
All	18.10108	12	0.1127

Dependent variable: @PC(BASKET)

Excluded	Chi-sq	df	Prob.
@PC(IMP)	5.816598	4	0.2133
GAP	10.61254	4	0.0313
@PC(POOREST)	4.993765	4	0.2879
All	22.59891	12	0.0313

Dependent variable: @PC(POOREST)

Excluded	Chi-sq	df	Prob.
@PC(IMP)	11.49112	4	0.0216
GAP	2.621242	4	0.6231
@PC(BASKET)	2.447882	4	0.6540
All	19.74496	12	0.0721

Table D.2.2 (continued).

### Table D.2.3 Autocorrelation LM Tests for VAR of the Poorest Quintile

VAR Residual Serial Correlation LM Tests

Null Hypothesis: no serial correlation at lag order h

Date: 12/29/15 Time: 09:48

Sample: 2003M01 2015M12

Included observations: 147

Lags	LM-Stat	Prob
1	10.83088	0.8198
2	18.90169	0.2738
3	26.59539	0.0462
4	13.40089	0.6433

Probs from chi-square with 16 df.

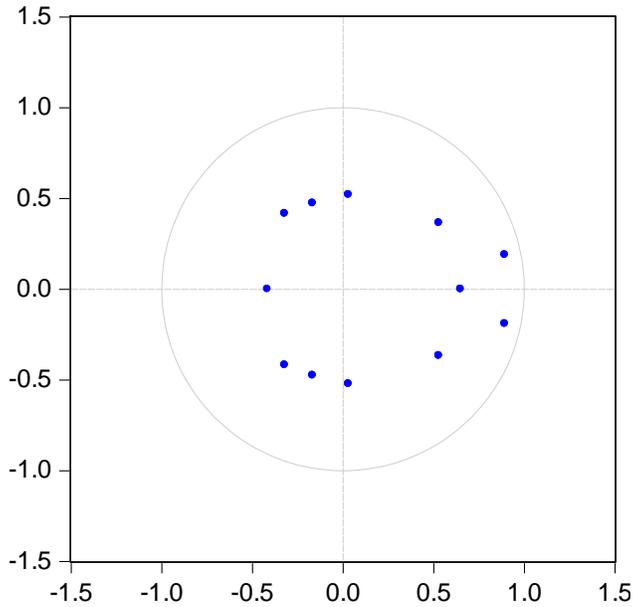


Figure D.2.2 Inverse Roots of AR Characteristic for VAR of the Richest Quintile

Table D.2.4 Length Selection Criteria for VAR of the Richest Quintile

VAR Lag Order Selection Criteria  
 Endogenous variables: @PC(IMP) GAP @PC(BASKET) @PC(RICHEST)  
 Exogenous variables: C  
 Date: 12/29/15 Time: 09:55  
 Sample: 2003M01 2015M12  
 Included observations: 143

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-451.4516	NA	0.006863	6.369952	6.452829	6.403629
1	-202.9447	479.6358	0.000266	3.118107	3.532491	3.286493
2	-147.9381	93.71857	0.000165	2.642491	3.388382*	2.945585*
3	-136.7175	29.49191	0.000165*	<b>2.639406*</b>	3.716804	3.077209
4	-122.9091	24.33384	0.000170	2.670057	4.078962	3.242568
5	-116.0023	11.78504	0.000194	2.797234	4.537647	3.504455
6	-93.97536	36.35209*	0.000180	2.712942	4.784861	3.554871
7	-77.86547	25.68570	0.000181	2.711405	5.114832	3.688043
8	-67.92918	15.28660	0.000199	2.796212	5.531146	3.907558

\* indicates lag order selected by the criterion  
 LR: sequential modified LR test statistic (each test at 5% level)  
 FPE: Final prediction error  
 AIC: Akaike information criterion  
 SC: Schwarz information criterion  
 HQ: Hannan-Quinn information criterion

Table D.2.5 Granger Causality Test Results for VAR of the Richest Quintile

VAR Granger Causality/Block Exogeneity Wald Tests

Date: 12/29/15 Time: 09:56

Sample: 2003M01 2015M12

Included observations: 148

Dependent variable: @PC(IMP)

Excluded	Chi-sq	df	Prob.
GAP	7.994818	3	0.0461
@PC(BASKET)	7.322259	3	0.0623
@PC(RICHEST)	5.845541	3	0.1194
All	20.22923	9	0.0165

Dependent variable: GAP

Excluded	Chi-sq	df	Prob.
@PC(IMP)	4.441741	3	0.2175
@PC(BASKET)	4.759928	3	0.1902
@PC(RICHEST)	3.588606	3	0.3095
All	13.28685	9	0.1501

Dependent variable: @PC(BASKET)

Excluded	Chi-sq	df	Prob.
@PC(IMP)	6.279883	3	0.0988
GAP	7.294836	3	0.0631
@PC(RICHEST)	4.765882	3	0.1898
All	19.10171	9	0.0243

Dependent variable: @PC(RICHEST)

Excluded	Chi-sq	df	Prob.
@PC(IMP)	4.413510	3	0.2201
GAP	2.465033	3	0.4816
@PC(BASKET)	9.288589	3	0.0257
All	17.90323	9	0.0363

Table D.2.6 Autocorrelation LM Tests for VAR of Richest Quintile

VAR Residual Serial Correlation LM Tests  
 Null Hypothesis: no serial correlation at lag order h

Date: 12/29/15 Time: 09:57

Sample: 2003M01 2015M12

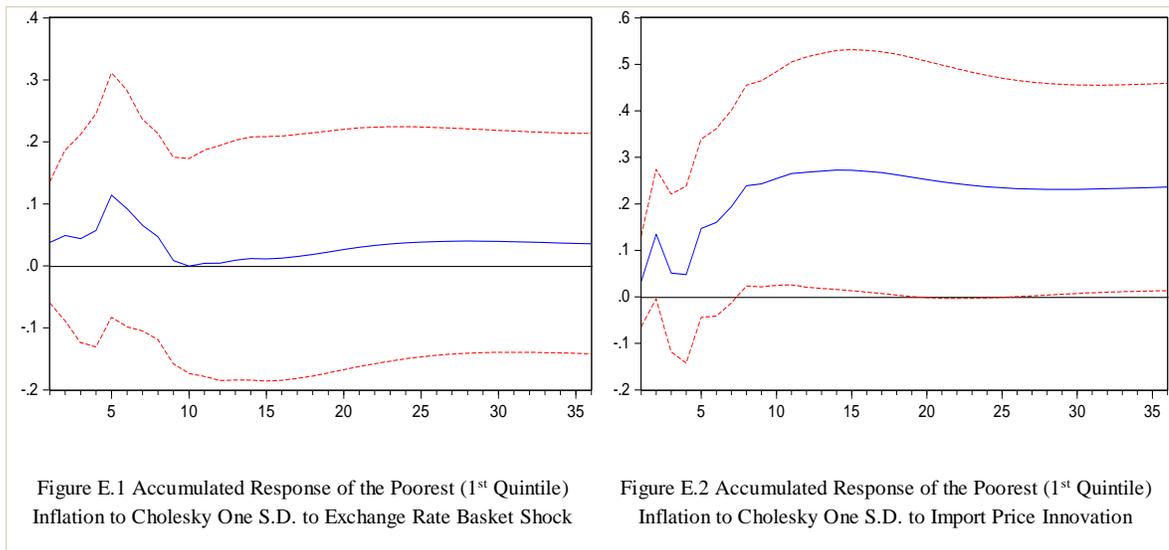
Included observations: 148

Lags	LM-Stat	Prob
1	22.19335	0.1371
2	16.81432	0.3977
3	15.47860	0.4899

Probs from chi-square with 16 df.

### Appendix E: Impulse-Response Functions of Different Cholesky Orderings

When Cholesky ordering is import prices → exchange rate basket → output gap → consumer inflation respectively, the impulse-response functions are below:



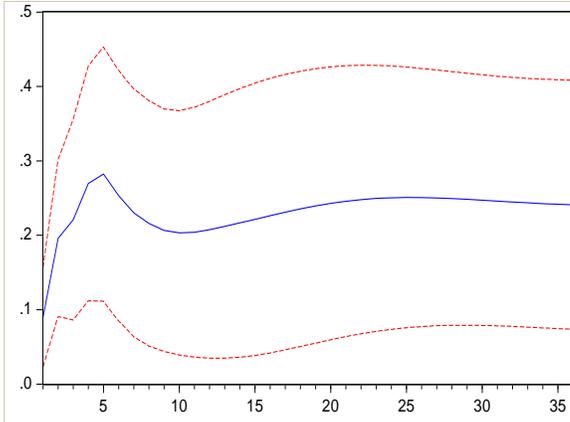


Figure E.3 Accumulated Response of the Richest (5<sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Shock

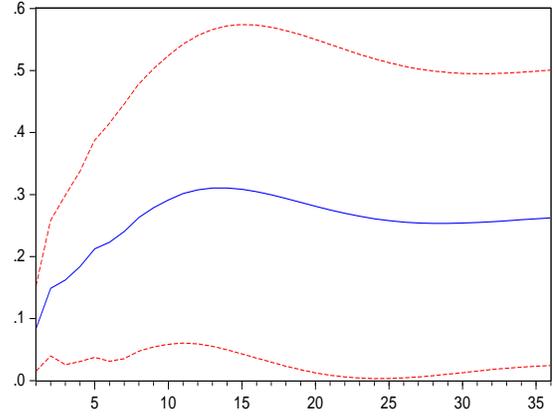


Figure E.4 Accumulated Response of the Richest (5<sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation

When the Cholesky ordering is exchange rate basket → import prices → output gap → consumer inflation respectively, the impulse-response functions are below:

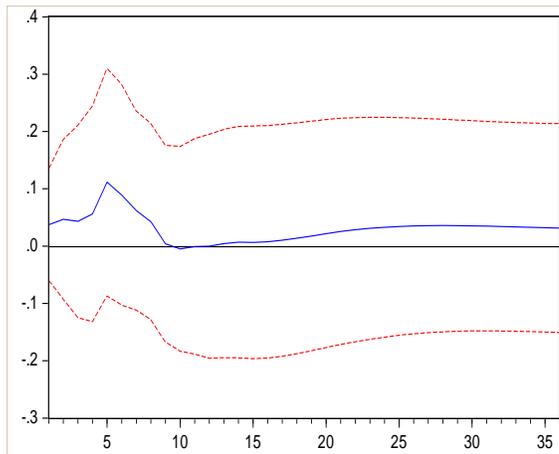


Figure E.5 Accumulated Response of Poorest (1<sup>st</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Shock

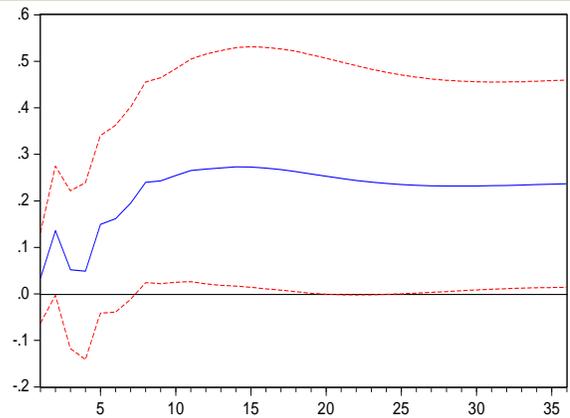


Figure E.6 Accumulated Response of Poorest (1<sup>st</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation

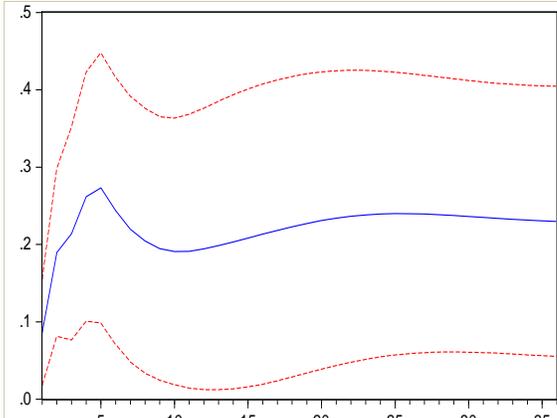


Figure E.7 Accumulated Response of the Richest (5<sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Shock

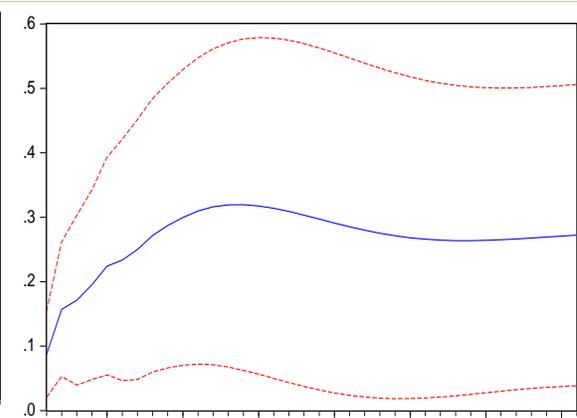


Figure E.8 Accumulated Response of the Richest (5<sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation

When the Cholesky ordering is exchange rate basket  $\rightarrow$  output gap  $\rightarrow$  import prices  $\rightarrow$  consumer inflation respectively, the impulse-response functions are below:

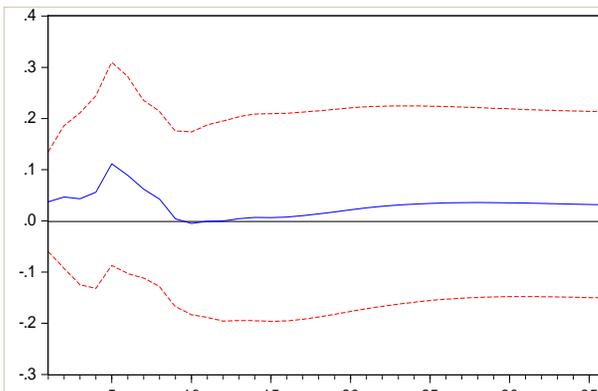


Figure E.9 Accumulated Response of the Poorest (1<sup>st</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Innovation

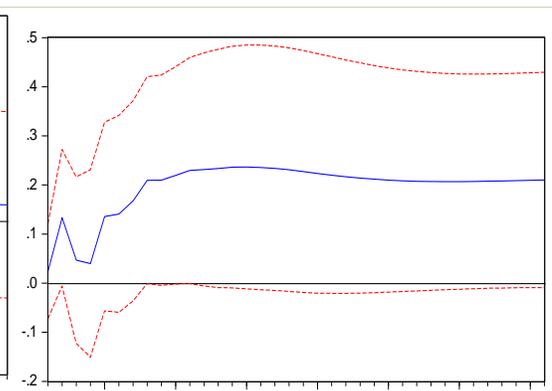


Figure E.10 Accumulated Response of the Poorest (1<sup>st</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation

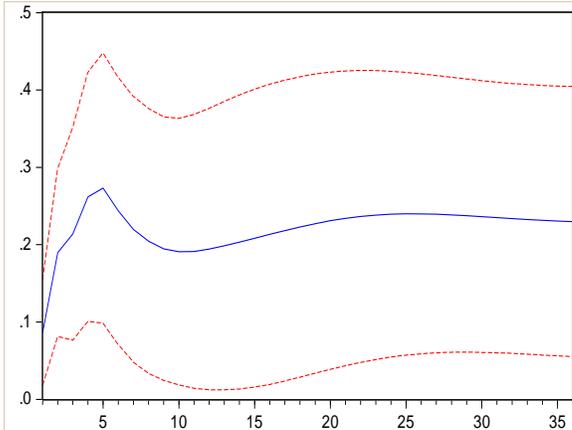


Figure E.11 Accumulated Response of the Richest (5<sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Shock

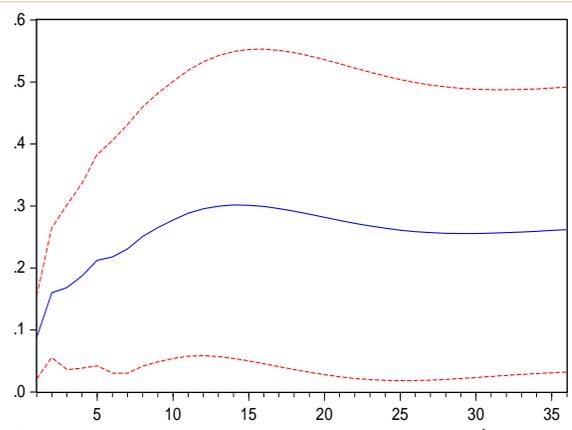


Figure E.12 Accumulated Response of the Richest (5<sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation

When the Cholesky ordering is output gap  $\rightarrow$  exchange rate basket  $\rightarrow$  import prices  $\rightarrow$  consumer inflation respectively, the impulse-response functions are below:

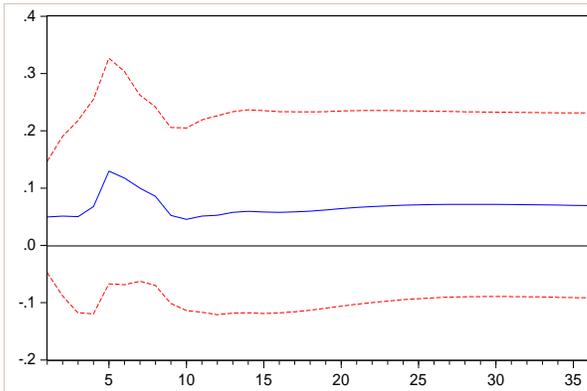


Figure E.13 Accumulated Response of the Poorest (1<sup>st</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Shock

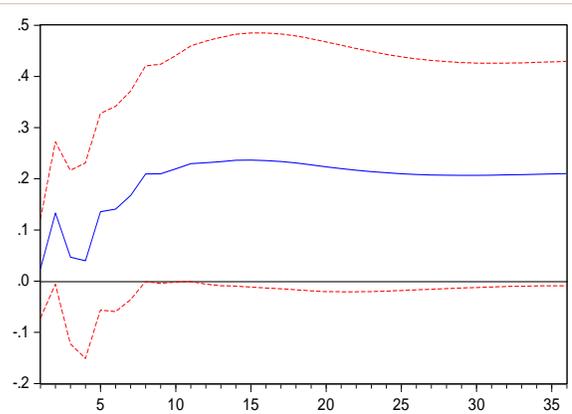


Figure E.14 Accumulated Response of the Poorest (1<sup>st</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation

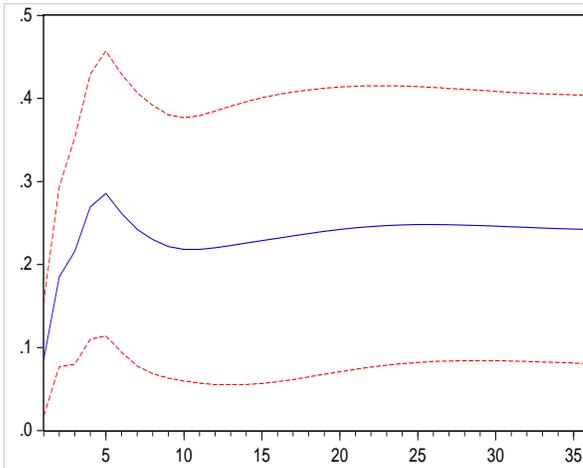


Figure E.15 Accumulated Response of the Richest (5<sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Shock

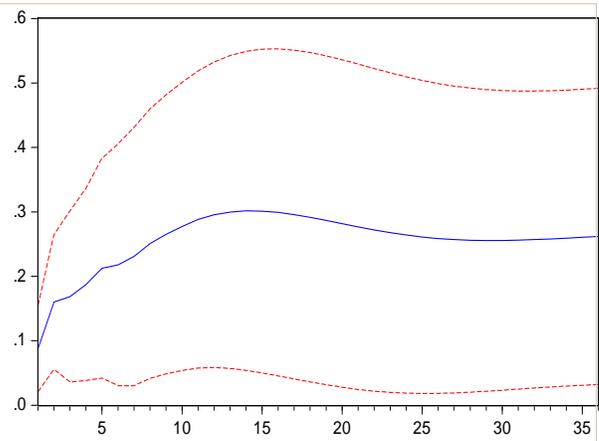


Figure E.16 Accumulated Response of the Richest (5<sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation

When the Cholesky ordering is output gap  $\rightarrow$  import prices  $\rightarrow$  exchange rate basket  $\rightarrow$  consumer inflation respectively, the impulse-response functions are below:

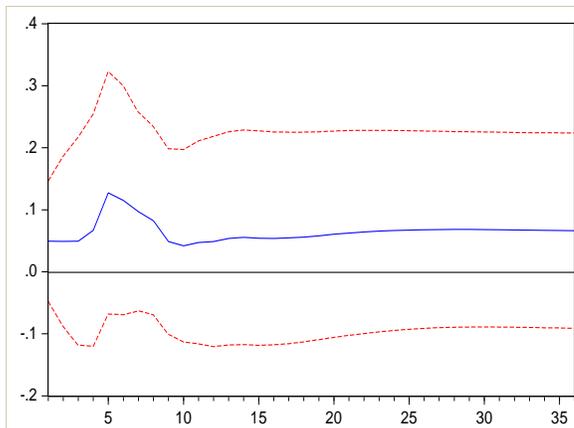


Figure E.17 Accumulated Response of the Poorest (1<sup>st</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Shock

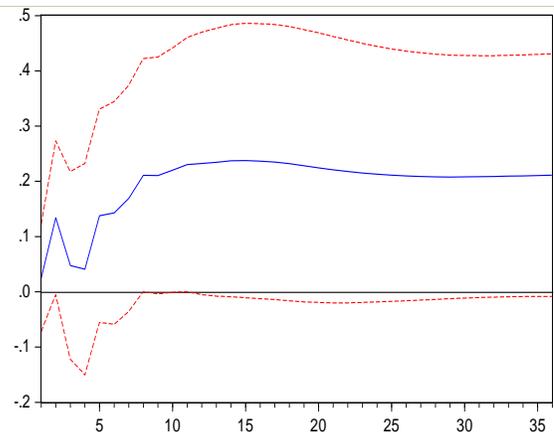


Figure E.18 Accumulated Response of the Poorest (1<sup>st</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation

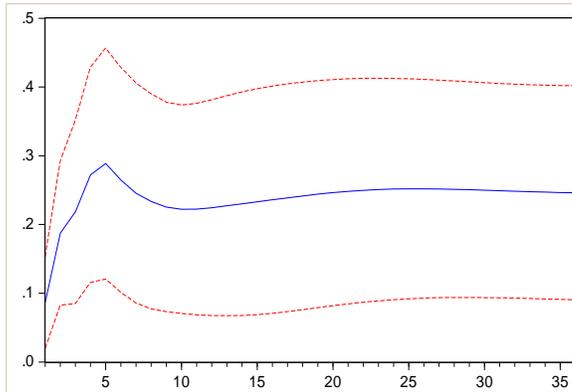


Figure E.19 Accumulated Response of the Richest (5<sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Exchange Rate Basket Innovation

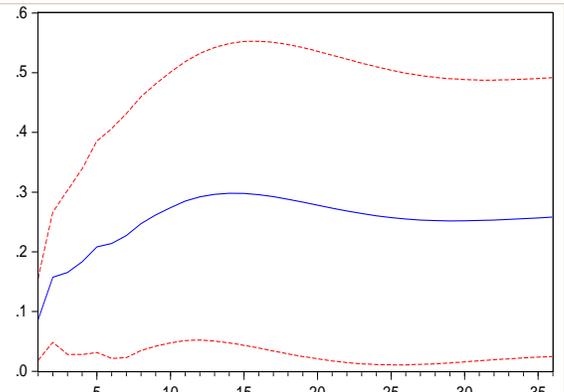


Figure E.20 Accumulated Response of the Richest (5<sup>th</sup> Quintile) Inflation to Cholesky One S.D. to Import Price Innovation

## Appendix F: Impulse Response Functions and Variance Decompositions

Table F.1 Impulse Response Functions (IRFs) of CPI Inflation for the Poorest Quintile

Period	@PC(IMP)	@PC(BASKET)
1	0.033122 (0.04877)	0.049213 (0.04848)
2	0.134966 (0.06963)	0.048943 (0.06871)
3	0.051280 (0.08492)	0.049338 (0.08381)
4	0.047808 (0.09529)	0.066992 (0.09352)
5	0.147239 (0.09592)	0.127342 (0.09774)
6	0.160174 (0.10077)	0.114967 (0.09221)
7	0.193790 (0.10344)	0.096937 (0.08006)
8	0.239158 (0.10794)	0.082172 (0.07584)
9	0.243007 (0.11083)	0.048701 (0.07477)
10	0.254604 (0.11501)	0.041830 (0.07762)
11	0.265344 (0.11978)	0.047297 (0.08187)
12	0.268180 (0.12375)	0.048752 (0.08481)
13	0.270488	0.053683

	(0.12639)	(0.08593)
14	0.272787	0.055589
	(0.12838)	(0.08652)
15	0.272428	0.054183
	(0.12957)	(0.08641)
16	0.270022	0.053697
	(0.12996)	(0.08579)
17	0.267027	0.054539
	(0.12995)	(0.08520)
18	0.262634	0.055929
	(0.12947)	(0.08453)
19	0.257282	0.058017
	(0.12845)	(0.08381)
20	0.252324	0.060465
	(0.12705)	(0.08319)
21	0.247564	0.062479
	(0.12536)	(0.08259)
22	0.243290	0.064131
	(0.12347)	(0.08194)
23	0.239772	0.065527
	(0.12152)	(0.08128)
24	0.236867	0.066507
	(0.11964)	(0.08063)
25	0.234557	0.067225
	(0.11787)	(0.08004)
26	0.232875	0.067757
	(0.11628)	(0.07955)
27	0.231768	0.068082
	(0.11489)	(0.07917)
28	0.231179	0.068237
	(0.11372)	(0.07890)
29	0.231054	0.068247
	(0.11277)	(0.07871)
30	0.231312	0.068116
	(0.11205)	(0.07859)
31	0.231850	0.067873
	(0.11155)	(0.07852)
32	0.232587	0.067558
	(0.11125)	(0.07850)
33	0.233442	0.067204
	(0.11113)	(0.07853)
34	0.234344	0.066840
	(0.11117)	(0.07859)
35	0.235237	0.066490
	(0.11133)	(0.07868)
36	<b>0.236079</b>	<b>0.066170</b>
	(0.11159)	(0.07879)

Standard errors are shown in parenthesis.

Table F.1 (continued).

Table F.2 Impulse Response Functions (IRFs) of CPI Inflation for the Richest Quintile

Period	@PC(IMP)	@PC(BASKET)
1	0.083675 (0.03420)	0.086533 (0.03341)
2	0.148953 (0.05459)	0.187375 (0.05254)
3	0.162109 (0.06832)	0.218421 (0.06668)
4	0.184032 (0.07665)	0.272210 (0.07826)
5	0.212490 (0.08753)	0.288688 (0.08404)
6	0.223076 (0.09597)	0.264774 (0.08190)
7	0.240438 (0.10268)	0.245520 (0.08001)
8	0.262906 (0.10772)	0.233639 (0.07819)
9	0.278612 (0.11210)	0.225451 (0.07616)
10	0.291211 (0.11642)	0.222146 (0.07579)
11	0.301526 (0.12054)	0.222315 (0.07690)
12	0.307722 (0.12435)	0.224408 (0.07850)
13	0.310516 (0.12774)	0.227252 (0.08004)
14	0.310653 (0.13056)	0.230177 (0.08131)
15	0.308510 (0.13272)	0.233106 (0.08220)
16	0.304640 (0.13419)	0.236013 (0.08267)
17	0.299549 (0.13504)	0.238842 (0.08282)
18	0.293674 (0.13530)	0.241549 (0.08276)
19	0.287428 (0.13504)	0.244063 (0.08255)
20	0.281164 (0.13436)	0.246301 (0.08224)
21	0.275177 (0.13331)	0.248194 (0.08186)
22	0.269705 (0.13200)	0.249697 (0.08143)
23	0.264924	0.250797

	(0.13051)	(0.08096)
24	0.260946	0.251504
	(0.12890)	(0.08048)
25	0.257828	0.251850
	(0.12726)	(0.08000)
26	0.255573	0.251879
	(0.12566)	(0.07953)
27	0.254147	0.251645
	(0.12415)	(0.07910)
28	0.253476	0.251204
	(0.12279)	(0.07872)
29	0.253467	0.250611
	(0.12160)	(0.07840)
30	0.254009	0.249922
	(0.12063)	(0.07815)
31	0.254982	0.249185
	(0.11987)	(0.07795)
32	0.256269	0.248444
	(0.11933)	(0.07782)
33	0.257754	0.247733
	(0.11900)	(0.07775)
34	0.259334	0.247083
	(0.11887)	(0.07773)
35	0.260917	0.246514
	(0.11889)	(0.07775)
36	<b>0.262427</b>	<b>0.246040</b>
	(0.11905)	(0.07780)

Standard errors are shown in parenthesis.

Table F.2 (continued).

Table F.3 Variance Decomposition of CPI Inflation for the Poorest Quintile Group

Period	S.E.	@PC(IMP)	GAP	@PC(BASKET)	@PC(POOREST)
1	1.570066	<b>0.313268</b>	0.669277	0.691597	98.32586
2	1.729979	<b>3.149209</b>	1.436321	0.665038	94.74943
3	1.785779	<b>4.964613</b>	1.570362	0.650978	92.81405
4	1.881192	<b>4.953004</b>	1.675084	0.732546	92.63937
5	1.949556	<b>6.936134</b>	1.548906	1.558781	89.95618
6	1.977886	6.933496	2.074409	1.586257	89.40584
7	1.997275	7.151378	2.492357	1.652146	88.70412
8	2.008444	7.598226	2.563308	1.693711	88.14476
9	2.009675	7.558767	2.717992	1.950920	87.77232
10	2.010967	7.585052	2.743210	1.960678	87.71106
11	2.013948	7.609504	2.745756	1.967017	87.67772
12	2.018963	7.610591	2.750648	1.967307	87.67145

13	2.026199	7.611006	2.750444	1.972869	87.66568
14	2.034144	7.611732	2.752587	1.973595	87.66209
15	2.042126	7.611211	2.757107	1.973922	87.65776
16	2.049569	7.611563	2.768771	1.973712	87.64595
17	2.055813	7.612110	2.786688	1.973470	87.62773
18	2.060652	7.614815	2.805564	1.973441	87.60618
19	2.064125	7.619597	2.823428	1.973953	87.58302
20	2.066330	7.623594	2.839679	1.974899	87.56183
21	2.067564	7.627508	2.851993	1.975483	87.54502
22	2.068144	7.630755	2.860877	1.975849	87.53252
23	2.068344	7.632953	2.866891	1.976119	87.52404
24	2.068383	7.634506	2.870390	1.976231	87.51887
25	2.068405	7.635526	2.872137	1.976289	87.51605
26	2.068482	7.636084	2.872831	1.976327	87.51476
27	2.068638	7.636337	2.872977	1.976342	87.51434
28	2.068861	7.636413	2.872974	1.976346	87.51427
29	2.069121	7.636409	2.873057	1.976344	87.51419
30	2.069388	7.636403	2.873321	1.976343	87.51393
31	2.069633	7.636430	2.873769	1.976346	87.51346
32	2.069838	7.636502	2.874338	1.976355	87.51281
33	2.069994	7.636611	2.874953	1.976368	87.51207
34	2.070103	7.636740	2.875541	1.976383	87.51134
35	2.070172	7.636872	2.876051	1.976397	87.51068
36	2.070209	<b>7.636994</b>	<b>2.876454</b>	<b>1.976409</b>	87.51014

Table F.3 (continued).

Table F.4 Variance Decomposition of CPI Inflation for the Richest Quintile Group

Period	S.E.	@PC(IMP)	GAP	@PC(BASKET)	@PC(RICHEST)
1	1.554212	<b>3.963990</b>	0.381568	4.239481	91.41496
2	1.703560	<b>5.775295</b>	1.157565	9.054161	84.01298
3	1.781333	<b>5.787064</b>	1.662334	9.423079	83.12752
4	1.880176	<b>5.895860</b>	1.923396	10.64446	81.53628
5	1.922161	<b>6.220499</b>	2.108975	10.64865	81.02188
6	1.951033	6.217895	2.574772	10.82825	80.37908
7	1.973425	6.319578	2.842901	10.93115	79.90637
8	1.984285	6.535326	2.923590	10.95371	79.58737
9	1.989669	6.641724	2.940307	10.96643	79.45154
10	1.993486	6.712092	2.938070	10.96262	79.38722
11	1.996990	6.758957	2.943876	10.95622	79.34095
12	2.001070	6.774205	2.967611	10.95332	79.30486
13	2.005931	6.774499	3.008794	10.95164	79.26507

14	2.011388	6.770483	3.061698	10.94921	79.21861
15	2.017064	6.768086	3.120544	10.94588	79.16549
16	2.022522	6.770284	3.179577	10.94193	79.10821
17	2.027394	6.777702	3.233532	10.93780	79.05097
18	2.031441	6.789541	3.278786	10.93391	78.99776
19	2.034567	6.804126	3.313519	10.93055	78.95180
20	2.036804	6.819586	3.337659	10.92782	78.91493
21	2.038279	6.834231	3.352526	10.92573	78.88751
22	2.039169	6.846809	3.360269	10.92420	78.86873
23	2.039665	6.856630	3.363308	10.92313	78.85693
24	2.039940	6.863546	3.363875	10.92243	78.85015
25	2.040128	6.867836	3.363723	10.92197	78.84647
26	2.040318	6.870052	3.364007	10.92166	78.84428
27	2.040556	6.870853	3.365294	10.92142	78.84243
28	2.040851	6.870873	3.367679	10.92121	78.84024
29	2.041190	6.870628	3.370931	10.92098	78.83746
30	2.041545	6.870475	3.374653	10.92075	78.83413
31	2.041888	6.870606	3.378417	10.92050	78.83048
32	2.042194	6.871071	3.381860	10.92025	78.82682
33	2.042449	6.871822	3.384734	10.92002	78.82343
34	2.042646	6.872751	3.386925	10.91981	78.82051
35	2.042786	6.873737	3.388437	10.91965	78.81818
36	2.042878	<b>6.874668</b>	<b>3.389361</b>	<b>10.91951</b>	78.81646

Table F.4 (continued).

### Appendix G: Türkçe Özet

Enflasyon, mal ve hizmetlerin genel fiyat seviyesinin kalıcı olarak ne kadar hızlı arttığına bir ölçüsüdür. Enflasyon bu açıdan yaşam maliyet değişimlerinin ölçümünde ana kriterdir. Bu nedenle, enflasyon oranı işçi temsilcileri ile işverenler arasında yapılan ücret sözleşmelerinde sıkça temel ölçüt olarak kullanılmaktadır. Merkezi yönetimler, asgari ücret ve emeklilik maaşı belirlenmesinde enflasyonu temel almaktadır. Bu nedenle, tüm çalışanların satın alma gücü maruz kalınan enflasyon ile ücret artışı arasındaki farktan doğrudan etkilenmektedir. Enflasyon oranı, kira sözleşmeleri ile yönetilen fiyatlar ve vergi ayarlamalarında referans olarak kullanılmaktadır. Bu

nedenlerden dolayı, bir ekonomide resmi enflasyon oranının ülkede yaşayan tüm hanhalklarının yaşam maliyet değişimlerini temsil edip etmediği önem taşımaktadır.

Ulusal İstatistik Ofisleri tarafından açıklanan resmi enflasyon oranları bir ekonomide ortalama hanhalkının enflasyonunu temsil etmektedir. Ancak, her hanhalkı kendi tercihlerine göre tüketim sepetine ve tüketim kalıbına sahiptir. Bu tüketim tercihleri yaş, çalışma durumu, yaşanan bölge, evli olup olmama, ev sahipliği gibi hanhalkının demografik özelliklerine ve daha önemlisi hanhalkının gelir seviyesine göre farklılaşabilir. Tüketim sepetinin içeriğine ek olarak, mal ve hizmetlerin hanhalkının bütçesindeki payları da temelde hanhalkının gelir seviyesi ve demografik özelliklerine göre değişkenlik gösterebilir. Bu durum, hanhalkları arasında tüketici sepet ayrışması ve tüketici sepetinde yer alan her mal ve hizmetin ağırlığının hanhalkları arasında farklı olmasına neden olabilir. Mal ve hizmetler arasındaki nispi fiyat değişimleri birbirinden ayrıştığında, farklı hanhalkı grupları arasında maruz kalınan enflasyon önemli ölçüde farklılaşabilir. Bu durumlarda, tüm çalışan hanhalklarının gelirleri aynı resmi enflasyon ölçütüyle güncellendiğinden refah açısından bir hanhalkı grubu daha kötüye giderken başka bir hanhalkı daha iyiye gidebilir.

Yukarıdaki nedenlerden dolayı Ulusal İstatistik Ofisleri tarafından açıklanan resmi enflasyon oranlarının güvenilirliği kamuoyu tarafından sıkça sorgulanmaktadır. Özellikle düşük gelirli hanhalkları kendi enflasyon oranlarının resmi enflasyon oranından yüksek olduğunu iddia etmektedir. Bu iddialarının bir bölümünün haklılık payı bulunmaktadır. Çünkü tek bir resmi enflasyon seviyesi ülkedeki tipik bir hanhalkının harcama kalıbı ve karşılaştığı fiyat değişimlerini temsil etmektedir. Ancak, birçok hanhalkının tüketim alışkanlıkları ve maruz kaldıkları fiyat değişimleri temsili hanhalkından önemli ölçüde farklılaşabilir. Bu bağlamda, bir hanhalkının gıda ve konut masrafları gibi zorunlu ihtiyaçlara ayrılmış bütçe payı hanhalkları zenginleştikçe düşme eğiliminde olurken otomobil, turlar, eğlence aktiviteleri, otel ve lokanta hizmetleri gibi lüks mal ve hizmetlere ayrılan bütçe payı artma eğilimindedir. Bu nedenle, tüketici sepetindeki zorunlu ihtiyaç olan ürünlerin fiyatları lüks ürünlere göre

daha hızlı artarsa, fakir hanehalklarının maruz kaldığı enflasyon oranları zengin hanehalklarına kıyasla daha yüksek olacaktır. Eğer zorunlu ihtiyaç olan mal ve hizmetlerin görece fiyat oynaklığı kayda değer oranda ve kalıcı olursa, bu durum toplumda gelir eşitsizliği arttıracak ve sosyal huzursuzluğa neden olacaktır.

Literatürdeki enflasyon eşitsizliğine ilişkin çalışmalar genellikle gelişmiş ülkeler için yapılmıştır. Bu ülkelerde, gelir grupları arasında konjonktürel gelişmelerden dolayı zaman zaman önemli enflasyon farkları ortaya çıkmasına karşın, uzun vadede fakir hanehalklarının zengin hanehalklarına kıyasla daha yüksek enflasyona maruz kaldıklarına ilişkin net bir kanıt bulunmamıştır. Ancak, farklı gelir ve demografik hanehalkı grupları arasında zaman zaman enflasyonda belirgin farklar gözlenmektedir. Genellikle zorunlu ihtiyaç kalemleri (gıda ürünleri ve elektrik, su, ısınma ve kira gibi barınma ile ilgili harcama kalemleri) ile diğer tüketim maddeleri arasındaki fiyat değişim ayrışması bu konjonktürel enflasyon farklılıklarının ana nedenini oluşturmaktadır. Daha da önemlisi ilgili yazın, enflasyon dinamiği farklılıkları ve hanehalkları arasındaki tüketim davranış ayrışması nedeniyle hanehalkı grupları arasındaki enflasyon eşitsizliğinin gelişmekte olan ülkelerde daha belirgin olduğuna işaret etmektedir.

Enflasyon dinamikleri, gelişmiş ve gelişmekte olan ülkeler arasında birbirinden farklıdır. Gelişmekte olan ülkelerde enflasyonun belirlenmesinde arz yönlü faktörler daha fazla öneme sahiptir. Bu durum, gelişmekte olan ülkelerdeki farklı ekonomik yapıdan kaynaklanmaktadır. İlk olarak, gıda ürünleri gelişmekte olan ülkelerdeki tüketicilerin bütçelerinde önemli bir paya sahiptir. Bu yüzden gıda tüketim ürünlerinin tüketici fiyat endeksi (TÜFE) sepetindeki payı oldukça yüksektir. İkincisi, gelişmekte olan ülkelerde tüketiciler gelişmiş ülkelere kıyasla daha yüksek gıda talebi gelir esnekliğine sahiptir. Buna ek olarak, gıda ürünleri ihtiyaç olduğundan dolayı gıda talebinin fiyat esnekliği (mutlak değer olarak) bir (1)'den küçüktür. Üçüncüsü, gelişmekte olan ülkelerde daha yüksek kişi başına gelir büyümesi gözlenmektedir. Gıda talebinde yüksek gelir esnekliği, düşük fiyat esnekliği ve yüksek büyüme oranı birlikte düşünüldüğünde, gelişmekte olan ülkelerde daha yüksek ve oynak gıda enflasyonu görülmesi

kaçınılmazdır. Gıda ürünlerinin tüketici sepetindeki payının yüksek oluşu, tüketici enflasyonundaki yüksek seyri açıklamaktadır. Son olarak, gelişmekte olan ülkelerin gelişmiş ülkelere yakınsama sürecinin bir sonucu olarak Balassa-Samuelson etkisi ve yapısal ekonomik problemler gelişmekte olan ülkelerde görece fiyat değişimlerini ve enflasyon seviyesini arttırmaktadır. Bunlara ek olarak, gelişmekte olan ülkelerde gelişmiş ülkelere kıyasla gelir eşitsizliği nispeten daha yüksektir (Kuznets, 1955). Bu nedenle, gelişmekte olan ülkelerde gelişmiş ülkelere kıyasla hanehalkı grupları arasında daha yüksek enflasyon farklılıkları beklenebilir. Buna karşın, yazında hanehalkları arasındaki enflasyon farklılıklarına ilişkin gelişmekte olan ülkeler için yapılmış oldukça az çalışma bulunmaktadır.

Türkiye ekonomisi, yukarıda sözü edilen gelişmekte olan ülkelere özgü enflasyon dinamiklerini taşımaktadır. Bunlara ek olarak, Türkiye ekonomisi özgün enflasyon dinamikleri sergilemesine yol açan kendine özgü faktörlere sahiptir. İlk olarak, Türkiye tarımsal ürünleri üreticisi bir ülkedir. Bu durum, tüketici enflasyonunu hava koşulları gibi arz yönlü şoklara daha duyarlı hale getirmektedir. Ayrıca, gıda sektöründe üreticiden tüketiciye kadar uzun bir dağıtım ağının olması özellikle taze meyve ve sebzeler için arz yönlü şokların gıda fiyatları üzerindeki etkilerini güçlendirmektedir. Rekabet eksikliği ve aşağı yönlü fiyat katılığı Türkiye'deki yüksek gıda enflasyonunun diğer nedenlerindedir (Orman ve diğerleri, 2010; Para ve Kur Politikası, TCMB, 2010). Türkiye'ye özgü bir diğer faktör ise yönetilen fiyatlar ve tüketim vergi ayarlamalarıdır. Türkiye'de su fiyatları yerel yönetimler, elektrik ve doğalgaz fiyatları ise merkezi yönetim tarafından belirlenmektedir. Ayrıca, belli ürünlerin fiyatları tüketim vergileri ayarlamaları aracılığıyla önemli ölçüde merkezi yönetim tarafından etkilenmektedir. Akaryakıt, tütün ürünleri, alkollü içecekler ve otomobiller bu ürünlerinin tipik örnekleridir. Kamu maliyesi 1990'lara kıyasla görece güçlü olsa da bütçe yapısı yeterince esnek değildir. Bu nedenle, yerel ve merkezi yönetimler zaman zaman özel tüketim vergisi ayarlamaları ve yönetilen fiyat artışlarıyla kamu dengelerini iyileştirmeyi amaçlamaktadır. Bu durum, tüketici fiyatları üzerinde yukarı yönlü baskı oluşturmakta ve ürünler arasındaki fiyat değişim oynaklığı arttırıcı yönde etki yapmaktadır. Sonuç

olarak, geliřmekte olan lke zelliklerini tařması ve kendine zg ekonomik faktrlerin yansması olarak, Trkiye’de gelir grupları arasında enflasyon farklılıklarının belirgin olması beklenebilir.

nemli bir geliřmekte olan lke olan Trkiye 1990’lara kıyasla dřk olmasına karřın son 12 yılda grece yksek bir enflasyona maruz kalmıřtır. Ayrıca farklı harcama gruplarındaki fiyat deęiřimlerinin oynaklıęı olduka yksek dzeyde gerekleřmiřtir. Bařta taze meyve sebze fiyatları olmak zere gıda fiyatları ile bařta elektrik ve doęalgaz fiyatları olmak zere enerji fiyatları son 12 yılda olduka oynak bir seyir izlemiřtir. Buna ek olarak, Trkiye’de bireyler ve hanehalkları arasında gelir daęılımı greceli olarak bozuk olup<sup>52</sup> blgesel gelir farklılıkları belirgindir.<sup>53</sup> Tkretim rnlerindeki fiyat oynaklık farklılıkları ve hanehalklarının tkretim kalıp farklılıkları, Trkiye’deki hanehalkı grupları arasında enflasyon farklarının varlıęını dřndrtmektedir.

Bu alıřmada, gelir ve demografik gruplar arasındaki enflasyon farkları Trkiye iin analiz edilmiřtir. İlk olarak, 5 basamaklı COICOP (Amaca Gre Bireysel Tkretim Sınıflaması) mal ve hizmetlerin tketicisi sepetindeki aęırlıkları her gelir ve demografik grup iin TİK tarafından yayınlanan Hanehalkı Bte Anketi’nden (HBA) elde edilmiřtir. Daha sonra, TFE ve ana harcama grupları iin enflasyon, belirlenmiř her gelir ve demografik grup iin 5 basamaklı COICOP seviyeden hesaplanmıřtır. TİK’in gelir sınıflamasına (%20’lik 5 gelir grubu) ek olarak %10’luk 10 gelir grubu, %5’lik 20 gelir grubu, fakir ve fakir olmayan olmak zere farklı ltlere gre gelir grupları eřdeęer yıllık harcanabilir gelir kullanılarak oluřturulmuřtur. Ayrıca, TİK’in Hanehalkı Bte Anketleri (HBA) hanehalklarını yař, hanehalkı byklę, aile tipi,

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<sup>52</sup> Dnya Bankası hesaplamalarına gre, Trkiye’nin en gncel Gini katsayısı 2012 yılı itibarıyla 0,402’dir. Trkiye İstatistik Kurumu’na (TİK) gre ise en gncel Gini katsayısı 2014 yılı itibarıyla 0,391’dir.

<sup>53</sup> Trkiye İstatistik Kurumu (TİK) verilerine gre, Trkiye’de 2014 yılı itibarıyla en yksek kiři bařına yıllık eřdeęer yıllık harcanabilir gelir 20446 TL ile TR51 (Ankara) blgesine aitken en dřk kiři bařına yıllık eřdeęer yıllık harcanabilir gelir 7233 TL ile TRC3 (Mardin, Batman, řırnak, Siirt) blgesine aittir.

emekli ve emekli olmayan, kiracı ve ev sahibi, bölge farklarına (kent ve kırsal) gibi farklı demografik gruplarını inceleme fırsatı sağlamaktadır.

Bu çalışmanın enflasyon eşitsizliği yazınına iki temel katkısı bulunmaktadır. Birincisi, bu çalışma bilgimize göre hanhalkları arasındaki enflasyon farklılıklarına ilişkin bir gelişmekte olan ülke için (Türkiye) yapılan ilk ayrıntılı çalışmadır. Bu nedenle, bu çalışma gelişmekte olan ülkelerde hanhalkları arasında yaşanan enflasyon farklılıklarının dinamiklerini anlamak açısından yazına katkı sunmaktadır. İkinci olarak, bu çalışmada hanhalkları grupları arasında gözlenen enflasyon farklılıklarının arkasındaki ekonomik nedenleri incelenmiştir.<sup>54</sup>

Bu çalışmanın Türkiye enflasyon eşitsizliği yazınına beş (5) önemli katkısı bulunmaktadır. Birincisi, Türkiye için 5 basamaklı COICOP fiyat ve ağırlık verilerinin kullanımı hanhalkları arasında enflasyon farklılıklarına ilişkin güvenilir sonuçlar sağlamaktadır. İkinci olarak, gelir grupları oluşturulurken hanhalkındaki kişi sayısı dikkate alınmıştır. Üçüncüsü, hanhalkları gelir seviyelerine göre farklı gelir dilimlerine ayrılmıştır. Böylece, gelir farkının enflasyon farklılıklarına etkisi analiz edilmiştir. Dördüncü olarak, ayrıntılı Hanhalkı Bütçe Anketi (HBA) verisi yardımıyla demografik özelliklerin maruz kalınan enflasyon farklarını Türkiye için nasıl etkilediğini incelenmiştir. Son olarak, enflasyon farklarına katkı sağlayan kalemler ana harcama gruplarının yanı sıra mal ve hizmet kalemleri cinsinden de gösterilmiştir.

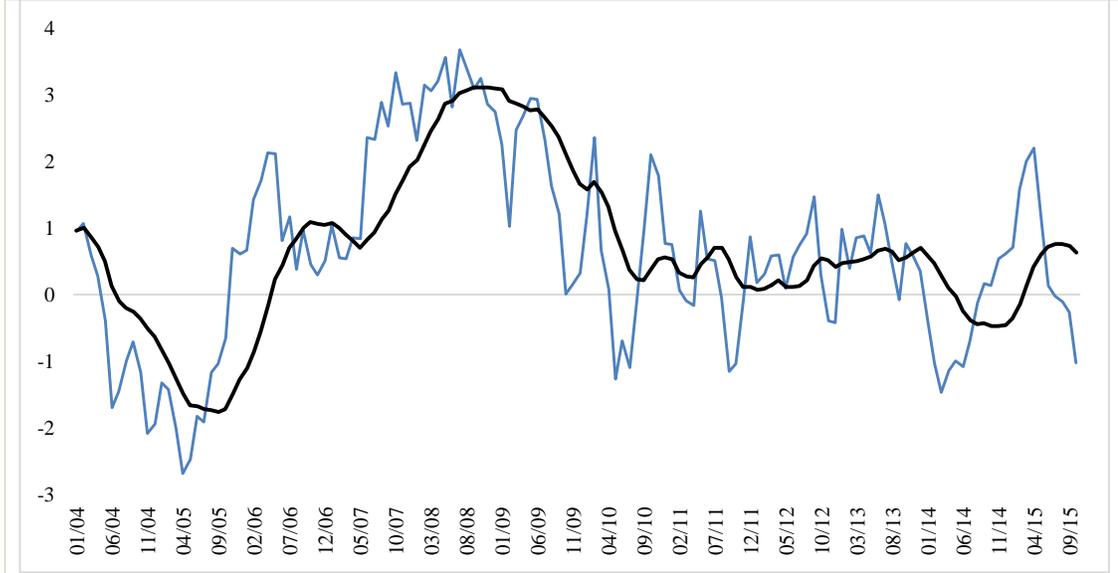
Bu çalışmanın altı (6) ana bulgusu vardır. Birincisi, son 12 yılda Türkiye’de fakir hanhalkları zengin hanhalklarına kıyasla ortalamada daha yüksek enflasyona maruz kalmıştır. İkincisi, sık sık gerçekleşen arz şoklarından dolayı fakir ve zengin hanhalkları arasındaki enflasyon farkları oldukça oynak bir seyir izlemiştir. Üçüncü bulgu ise hanhalkları arasındaki gelir farkı açıldıkça maruz kalınan enflasyon farkları artmaktadır. Dördüncüsü, hanhalklarının demografik özelliklerinin maruz kalınan

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<sup>54</sup> Ryan ve Milne (1994), üç farklı gelir grubu (düşük, orta ve yüksek gelirli) için enflasyonun belirleyicilerini Kenya için analiz etse de sonuçları hanhalkları arasındaki enflasyon farkları çerçevesinde ele almamıştır.

enflasyonda gelir seviyesine kıyasla daha az etkili olduğu bulunmuştur. Beşinci olarak, gelir grupları arasındaki enflasyon farklarına yukarı yönde katkı sunan başlıca tüketici kalemleri ekmek ve tahıllar, sebzeler, tütün ürünleri, kira ve katı yakıtlar iken aşağı yönde katkı sunan başlıca kalemler otomobil, akaryakıt, ev hizmetleri ve lokanta hizmetleri olmuştur. Altıncı ve son bulgu ise, fakir hanehalklarının enflasyonu gıda fiyat şoklarına daha duyarlıyken zengin hanehalklarının enflasyonu döviz kuru ve ithalat fiyatlarındaki değişimlere daha duyarlı olduğu şeklindedir.

Bu çalışma hanehalklarını gelir seviyelerine göre dört (4) farklı şekilde kategorize etmiştir. Tüm gelir grupları, hanehalkındaki kişi sayısını da göz önüne alan eşdeğer yıllık harcanabilir gelire göre oluşturulmuştur. Hanehalkları gelirlerine göre artan sırayla ayrı ayrı beş (5), on (10) ve yirmi (20) eşit parçaya bölünmüştür. Ardından her gelir grubu için tüketici enflasyonu hesaplanmıştır. Ardından 3 ayrı kategoride de en fakir ve en zengin grupların maruz kaldıkları yıllık enflasyon hesaplanmıştır. Buna göre, en fakir yüzde 20'lik dilimdeki hanehalkları en zengin yüzde 20'lik dilimdeki hanehalklarına kıyasla son 12 yılda ortalama 0,65 yüzde puanlık daha fazla yıllık enflasyona maruz kalmıştır (Grafik Ek-G.1). Yıllık enflasyon farkı, en fakir yüzde 10'luk kesim ile en zengin yüzde 10'luk kesim arasında ortalama 0,78 yüzde puan seviyesine yükselmektedir. En fakir yüzde 5'lik hanehalkları ise en zengin yüzde 5'lik kesime kıyasla ortalama 0,87 yüzde puan daha fazla yıllık enflasyona maruz kalmıştır. Herkesin kolayca görebileceği gibi iki hanehalkı arasındaki gelir farkı açıldıkça maruz kaldıkları enflasyon farkı monoton bir şekilde artmaktadır. Ayrıca, yoksulluk eşiği göz önüne alınarak fakir ve fakir olmayan olmak üzere iki kesime bölen bir başka gelir sınıflaması daha yapılmıştır. Bu kategoride ise, fakir hanehalkları ile fakir olmayan hanehalkları arasında maruz kalınan yıllık enflasyon farkı 0,39 yüzde puan olarak gerçekleşmiştir.



Grafik Ek-G.1. En Fakir Yüzde 20'lik ve En Zengin Yüzde 20'lik Gelir Grupları Arasındaki Yıllık Enflasyon Farkı (Yüzde Puan)\*

\*Siyah çizgi 12 aylık kayan ortalamaları göstermekte olup enflasyon farklarının eğilimini temsil etmektedir.  
Kaynak: TÜİK, Yazarların Kendi Hesaplamaları.

<b>Tablo Ek-G.1. Farklı Gelir Sınıflamalarına Göre Yıllık Enflasyon Farkları (Yüzde Puan)</b>			
	En Fakir Yüzde 20'lik Grup - En Zengin Yüzde 20'lik Grup	En Fakir Yüzde 10'luk Grup - En Zengin Yüzde 10'luk Grup	En Fakir Yüzde 5'lik Grup - En Zengin Yüzde 5'lik Grup
Ortalama	0,65	0,78	0,87
Standart Sapma	1,43	1,70	1,86
En Yüksek-En Düşük	6,38	7,43	8,14

Kaynak: TÜİK, Yazarların Kendi Hesaplamaları.

Bir diğer bulgu ise farklı gelir grupları arasındaki enflasyon farklarının oldukça oynak oluşudur (Grafik Ek-G.1). Örneğin, en fakir yüzde 5'lik hanehalkı grubu ile en zengin yüzde 5'lik hanehalkı grubu arasındaki enflasyon farkı 0,87 yüzde puan ortalamaya sahipken standart sapması 1,86 yüzde puan seviyesindedir. Bu oynaklık temelde vergi ayarlamaları, hava koşulları, döviz kuru ve ithalat fiyat değişimleri gibi sık gerçekleşen arz yönlü şoklardan kaynaklanmaktadır. Bu şoklar, Türkiye'nin gelişmekte olan bir ülke

oluşundan kaynaklanan ve kendine özgü ekonomik faktörlerin sonucunda ortaya çıkmaktadır.

Enflasyon farklarının 5 basamaklı COICOP seviyesinden hesaplanmasının avantajıyla, enflasyon farklarını yukarı ve aşağı yönde etkileyen tüketim mal ve hizmetleri ürün seviyesinde ortaya çıkarılabilmektedir. Zengin ve fakir hanehalklarının maruz kaldıkları enflasyon farkına yukarı yönde katkı sunan başlıca tüketici kalemleri ekmek ve tahıllar, sebzeler, tütün ürünleri, katı yakıtlar ve kira olarak gerçekleşmiştir. İncelenen dönem boyunca, enflasyon farkını ortalamada aşağı yönde etkileyen başlıca kalemler ise otomobil ve akaryakıt ile lokanta ve ev hizmetleri olmuştur (Tablo Ek-G.2).

<b>Tablo Ek-G.2. Seçilmiş 4 Basamaklı COICOP Seviyesindeki Tüketim Ürünlerinin En Fakir ve En Zengin Yüzde 20'lik Grup Arasındaki Enflasyon Farkına Katkısı (Yüzde Puan)</b>									
Yıllar	Ekmek ve Tahıllar	Sebzeler	Tütün Ürünleri	Kira	Katı Yakıtlar	Otomobil	Akaryakıt	Lokanta Hizmetleri	Ev Hizmetleri
2004	0,53	-0,01	0,61	0,24	0,23	-0,15	-0,40	-0,27	-0,29
2005	0,22	0,67	0,47	0,23	0,06	-0,01	-1,11	-0,21	-0,23
2006	0,72	1,03	0,84	0,24	0,19	-0,51	-0,44	-0,21	-0,24
2007	1,06	0,64	0,35	0,23	0,27	-0,15	-0,19	-0,22	-0,19
2008	1,81	0,26	0,25	0,21	0,26	0,31	-0,63	-0,28	-0,15
2009	0,39	0,50	0,37	0,15	0,22	0,19	0,23	-0,21	-0,10
2010	0,02	0,68	1,05	0,10	0,03	-0,37	-0,67	-0,24	-0,09
2011	0,35	0,28	0,09	0,11	0,10	-0,22	-0,52	-0,20	-0,09
2012	0,56	0,24	0,46	0,14	0,25	-0,43	-0,30	-0,22	-0,16
2013	0,62	0,57	0,56	0,17	0,07	-0,45	-0,27	-0,20	-0,16
2014	0,91	0,55	0,12	0,19	0,04	-1,72	-0,09	-0,27	-0,18
2015	0,47	0,60	0,13	0,19	0,13	-0,61	0,44	-0,28	-0,15
<b>Ortalama</b>	<b>0,64</b>	<b>0,50</b>	<b>0,45</b>	<b>0,18</b>	<b>0,15</b>	<b>-0,34</b>	<b>-0,34</b>	<b>-0,23</b>	<b>-0,17</b>
Not: Sadece ortalamada 0,15 yüzde puandan fazla (mutlak değer cinsinden) katkı sunan 4 basamaklı COICOP mal ve hizmet kalemleri tabloda gösterilmiştir. Kaynak: TÜİK, Yazarların Kendi Hesaplamaları.									

Vektör Özgecikmeli Regresyonlarından (VAR) elde edilen etki-tepki fonksiyonları ile varyans ayrıştırma tahminleri ve enflasyon farklarına katkı sunan tüketim ürünlerine göre, fakir hanehalklarının enflasyonunun gıda fiyat şoklarına daha duyarlıyken zengin hanehalklarının enflasyonu döviz kuru ve ithalat fiyat değişimlerine daha duyarlı olduğu bulunmuştur. Zengin hanehalklarına ilişkin bulgu, yukarıda belirtilen enflasyon farklarına katkı sunan tüketim ürünleriyle de tutarlıdır. Yukarıda aşağı yönde katkı

sunduđu belirtilen otomobil ve akaryakıt kalemleri döviz kuru ve ithalat fiyat deđişimlerine diđer tüketim ürünlerine kıyasla daha duyarlıdır. Bir diđer deyişle, döviz kuru ve ithalat fiyat artışıyla (özellikle metal ve petrol fiyatları) yükselen otomobil ve akaryakıt fiyatları zengin hanehalklarının enflasyonunu daha fazla arttırmaktadır.

Gelir seviyesine ek olarak, hanehalklarının demografik özellikleri de tüketim kalıplarının oluşmasında etkili olmaktadır. Türkiye’de görelî fiyat oynaklığının her bir demografik grup için etkilerini incelemek amacıyla, hanehalkları yaş, çalışma durumu (emekli veya emekli olmayan), ev sahipliđi (kiracı veya ev sahibi), hanehalkı büyüklüğü (küçük veya geniş), yaşadığı bölge (kent veya kırsal) ve aile tipine göre gruplara ayrılmıştır. Bu kapsamda her demografik grup için enflasyon oranları hesaplanmıştır. Genç, emekli olmayan, kiracı, geniş, kırsal bölgede yaşayan ve üç veya daha fazla çocuđu olan hanehalklarının kendi kategorilerinde yer alan karşı taraflara kıyasla anılan dönemde ortalamada daha yüksek enflasyona maruz kaldıkları bulunmuştur. Ev sahipliđi kategorisi dışındaki demografik sınıflamalarda enflasyon farklarının gelir gruplarına kıyasla belirgin olmadığı ortaya çıkmıştır. Daha fazla enflasyona maruz kalan tüm demografik gruplar, kendi kategorilerindeki daha fakir kesimi temsil etmektedir. Bu bakımdan, demografik gruplara ilişkin bu bulgular, gelir grupları arasındaki enflasyon farklarına ilişkin bulgularla tutarlılık göstermektedir.

	Ortalama	Standart Sapma	t-deđeri	p-deđeri
Ev Sahipliđi	0,6787	1,3237	6,1102	0,0000
Yaş	0,2626	0,8912	3,5103	0,0006
Çalışma Durumu	0,1036	0,3373	3,6610	0,0004
Hanehalkı Büyüklüğü	0,0737	0,3495	2,5132	0,0131
Aile Tipi	0,0666	0,4351	1,8248	0,0701
Yaşanan Bölge	0,0549	0,6164	1,0620	0,2900

Kaynak: TÜİK, Yazarların Kendi Hesaplamaları.

Görelî fiyat oynaklığı ve tüketim davranışı ayrışması Türkiye’de son 12 yılda hanehalkları arasında maruz kalınan enflasyon oranında farklılıklara neden olmuştur. Bu enflasyon farklılaşması gelir grupları arasında demografik gruplara kıyasla daha belirgindir. Anılan dönemde, fakir hanehalkları zengin hanehalklarına kıyasla enflasyondan daha fazla etkilenmiştir. Daha önemlisi, enflasyon farklarının oynaklığı oldukça yüksek olup geniş bir aralıkta dalgalanmaktadır. Enflasyon farkına en yüksek yukarı yönlü katkı gıda ürünlerinden gelirken en fazla düşürücü etki otomobil ve akaryakıt kalemlerinden kaynaklanmıştır. Bu sonuçlara paralel olarak, fakir hanehalklarının enflasyonu gıda fiyatlarına gelen şoklara daha duyarlıyken zengin hanehalklarının enflasyonu döviz kuru ve ithalat fiyatlarına duyarlıdır. Türkiye’de hanehalkları arasında gözlenen enflasyon farkları, gelişmekte olan bir ülke oluşu ve kendine özgü yapısal ekonomik problemleri kaynaklı arz yönlü faktörlerin bir sonucudur.

Türkiye’de hanehalkları arasında gözlenen enflasyon farklarıyla ilgili birkaç politika çıkarımı yapılabilir. İlk olarak, gıda piyasasının rekabetçi olmayan yapısı nedeniyle gıda fiyatları Gıda, Tarım ve Hayvancılık Bakanlığı tarafından yakından izlenmelidir. Türkiye tarım ürünleri üreticisi bir ülkedir. Bu kapsamda, tarım politikaları çerçevesinde çiftçilere teşvik sağlamak amaçlı yurtiçi gıda fiyatlarını arttırmaya yönelik girişimler enflasyon farklarını arttırabilir. Gıda sektörüne ilişkin politikalar tasarlanırken politikaların fakir hanehalklarına etkileri göz ardı edilmemelidir. Aksi halde, düşük-gelirli hanehalklarında refah düşüşü ve toplumsal huzursuzluğa yol açabilir. İkincisi, Türkiye petrol ithalatçı bir ülke olduğundan enerji fiyatları temelde döviz kuru (Dolar/TL) ve uluslararası emtia fiyatları (başta Brent petrol fiyatı olmak üzere) tarafından belirlenmektedir. Enerji verimliliği, sürdürülebilir enerji kaynak kullanımı gibi yapısal reformlar hanehalkları arasındaki enflasyon farklarının seviye ve oynaklığının azaltılmasına katkı sunabilir. Üçüncüsü, TÜİK her gelir grubu için enflasyon oranı hesaplayabilir. Böylece, fakir hanehalklarının enflasyon oranı asgari ücret belirlenmesinde referans olarak kullanılabilir. Asgari ücret görüşmelerinde kullanılmak

üzere fakir hanehalklarının enflasyonu, bu hanehalklarının yaşam maliyet değişimlerine ilişkin daha güvenilir göstergeler olacaktır.

Türkiye üst orta gelir düzeyinde olan gelişmekte olan bir ülkedir. Düşük gelirli gelişmekte olan ülkelerde, tüketici sepetinde gıdanın payının daha yüksek oluşu, gıda talebinin daha yüksek gelir esnekliği ve düşük fiyat esnekliğe sahip oluşu nedeniyle enflasyon farkları çok daha fazla olabilir. Buna ek olarak, düşük gelirli ülkelerde yapısal ekonomik problemleri nedeniyle arz yönlü faktörlerin enflasyonda daha baskın olması beklenir. Bu nedenle, enflasyon farklarının başta düşük gelirli ülkeler olmak üzere gelişmekte olan ülkeler için genel çıkarımları mevcuttur. İlk olarak, hanehalkları arasında gözlenen enflasyon farklılıkları gelir eşitliğine zarar verebilir. Zengin hanehalkları fiyat artışlarının ürünler arasında farklılaşması durumunda tüketim tercihlerini çeşitlendirebilir. Ancak, düşük gelirli hanehalklarının tüketim sepetinde genelde zorunlu ihtiyaç kalemleri olduğundan yüksek fiyat artışı gösteren ürünlerin yerine alternatiflerini koyma esnekliği bulunmamaktadır. İkincisi, gelişmekte olan ülkelerde resmi TÜFE endeksiyle tüm hanehalklarının gelirlerini reel hale getirmek, fiyat değişimlerinin hanehalklarının satın alma gücüne etkisini ölçmekte yanlış bir yaklaşım olmaktadır. Üçüncü olarak, makroekonomik modellerde yalnızca bir enflasyon oranı kullanmak, gelişmekte olan ülkeler için hatalı bulgulara yol açabilir (Anand ve diğerleri, 2015).

Bu çalışmada göreceli fiyat değişimleri ile tüketim tercih farklılıklarının harcamalar üzerine etkisi incelenmiştir. Göreceli fiyat değişimleri ile tüketim kalıbı ayrışmasının farklı demografik ve gelir gruplarında hanehalkı gelirlerine yansımaları da analiz edilebilir. Böylece, enflasyon farklarının gelir eşitsizliği üzerine etkileri tam olarak açıklanabilir. Örneğin, Türkiye özelinde fakir hanehalklarının gıda ürünlerinin nette alıcısı olup olmadığının önemli sonuçları bulunmaktadır. Geniş bir çerçevede ise, enflasyon farklarından kaynaklı olarak farklı gelir ve demografik gruplarında yaşanan refah kayıpları ileride yapılacak çalışmalarda ele alınabilir.

## Appendix H: Tez Fotokopisi İzin Formu

### ENSTİTÜ

Fen Bilimleri Enstitüsü	<input type="checkbox"/>
Sosyal Bilimler Enstitüsü	<input checked="" type="checkbox"/>
Uygulamalı Matematik Enstitüsü	<input type="checkbox"/>
Enformatik Enstitüsü	<input type="checkbox"/>
Deniz Bilimleri Enstitüsü	<input type="checkbox"/>

### YAZARIN

Soyadı: Akçelik  
Adı: Fatih  
Bölümü: İktisat

TEZİN ADI (İngilizce) : Income Groups and Inflation in Turkey

TEZİN TÜRÜ : Yüksek Lisans  Doktora

1. Tezimin tamamından kaynak gösterilmek şartıyla fotokopi alınabilir.
2. Tezimin içindekiler sayfası, özet, indeks sayfalarından ve/veya bir bölümünden kaynak gösterilmek şartıyla fotokopi alınabilir.
3. Tezimden bir (1) yıl süreyle fotokopi alınmaz.

TEZİN KÜTÜPHANEYE TESLİM TARİHİ: