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**The American University in Cairo
School of Global Affairs and Public Policy
Department of Public Policy and Administration**

**CONSUMPTION INEQUALITY AND INFLATION DIFFERENTIALS AMONG DIFFERENT
INCOME GROUPS IN EGYPT**

A Thesis Submitted to the Public Policy and Administration Department

in partial fulfillment of the requirements for the degree of Master of Public Policy

By

Dina Shaaban Haggag Abdallah

Fall16

**The American University in Cairo
School of Global Affairs and Public Policy
Department of Public Policy and Administration**

**CONSUMPTION INEQUALITY AND INFLATION DIFFERENTIALS AMONG DIFFERENT
INCOME GROUPS IN EGYPT**

**Dina Shaaban Haggag
Supervised by :Dr. Hamid Ali**

ABSTRACT:

One of the dilemmas about inequality in Egypt is that perception of inequality has always exceeded actual measures of inequality. Egyptians have long called for more equal income distribution while Gini coefficient according to income figures has maintained its same magnitude ranging from 37.8 percent to 36.6 percent in the last decade (World Bank, 2012). One claim to explain this puzzle is that inequality directly impacts on welfare; people feeling worse off compared to the rest of the economy. When it comes to welfare, consumption captures people utility better than income does. Using consumption expenditure data from different waves of Household Income and Consumption survey 1999-2013, this thesis investigates consumption inequality among different income groups in Egypt and found an improvement in consumption inequality overtime. In addition, we examine to what extent does inflation affects different income groups in Egypt. We find that differences in baskets of goods consumed, perceptions of necessities and luxuries and the fact that people do not pay the same prices for the same goods weaken CPI power in estimating the average consumer's cost of living. More accurate weighting for different consumption baskets based on income groups used throughout the thesis show statistically significant different inflation rates. One policy recommendation is to improve indexation policies because the lower income groups burden a proportional share of inflation.

Acknowledgement

First and foremost, I would like to thank God for granting me the opportunity of learning at the American University in Cairo everything I have applied in this paper. This work is dedicated to the spirit of my unique dad Shaaban Haggag , may he rest in peace. I would like to thank my family for supporting me all the way through. I am most grateful to my professors at public policy who enriched knowledge and made my learning experience so different and exceptional. Special thanks go to Dr Hamid Ali who taught me many courses in public policy and also supervised my thesis. I would also like to thank my readers Dr Samer and Dr Bouaddi for their time and their useful comments. I would like to thank Dr. Mohamad Al-Ississ for guiding me all the way till I reached this point, for this I will always be grateful and thankful.

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Chapter 1 Introduction

Measures of Inequality: Conceptual framework

Economic inequality "generally refers to the disparity of wealth or income between different groups or within a society" (Kara, 2015). The question of economic inequality comes at the core of economic growth and distribution of the limited resources. A minimum level of equal distribution of resources is certainly a goal of all economies. The difficulty of equal distribution arises from many factors that go even beyond the economic theory such as accessibility, incentives, socioeconomic disparities, and corruption. The economic and social threat that Inequality poses on the society in terms of different levels of welfare experienced by different segments in the economy has been under examination for decades.

Previous research has shown that a high level of economic inequality is associated with higher level of poverty through economic growth link, as inequality affects and growth affects poverty (Naschold, 2002). Poverty in turn leads to higher crime rate, poor public health and most importantly, reduces the lower income access to education and their labor productivity which in turn leads to a vicious cycle of poverty and places more burdens on the economy (Galor and Moav 2004; Aghion, Caroli, and Garcia-Penalosa 1999).

Economic inequality also negatively impacts economic stability. Holmes (2012) suggests one mechanism by which this happens is that as the rich consume a smaller amount of their income than the poor they are able to save a share of their income which lowers aggregate demand. This forces the governments to take measures to stimulate demand, such as lowering interest rates. "This feeds into asset bubbles. Meanwhile, as inequality grows, individuals facing low or declining relative incomes maintain their consumption through borrowing (financed by the savings of the rich)". This can lead to catastrophic results as happened in 2008 financial crisis (Holmes, 2012)

Also, Inequality gives motivating forces to occupy endeavors toward securing favored treatment and assurance, bringing about asset misallocation, corruption, and nepotism. Specifically, citizens can lose trust in the economy institutions, dissolving social union and trust (Norris et al, 2015). Ali and Sami (2017) refer to the World

Economic Forum (2014) augment that income inequality is the second most noteworthy global hazard since it is influencing social solidness inside nations and threatening worldwide security. Different researchers have proposed that the outcome of the expansion in the level of disparity has been contrasted with the arrangement of "patrimonial capitalism" in light of the fact that the economy is ruled by acquired riches that has thus lead to the expansion of influence and the formation of a skewed government; as long as the capital rate of return surpasses the economic growth the imbalance of power endures (Ali and Sami, 2017). Wealthy citizens maintain privileged political power as compared to poorer citizens, which allows the wealthy to vote for the development of inefficient policies such as social coverage and tax structures skewed in their favor at the expense of the poor (Kara,2015). As indicated by Stiglitz (2013), however, market powers shape the level of imbalance; the administration strategies shape those market powers.

The term "inequality" is a fairly free term that might be connected with disparities of different sorts, for example, social, status, and access to resources or inequality of opportunity in large. However, people usually associate inequality to the disparity of wealth or income. Despite the fact that inequality is a multidimensional concern, most researchers measured material inequality in one specific measurement of it: income inequality. Income refers to total disposable income from wages, compensations, or interests on investment account, profits from shares of stock, lease, and benefits. In that sense, income inequality refers to how these income sources are skewed infavor of one group in the society at the expense of the other.

Many problems arise when measuring inequality within an income distribution as it is usually compared to a scenario of perfect equality or perfect inequality which presents unrealistic biased measures of inequality. Most commonly, literature on inequality use Gini coefficient to measue inequality. Other research apply GDP per capita, relative share of consumption or highest share 1 percent. More often than not, the decision of a particular measure of disparity relies on upon the origination of the measure as a list, and all the more significantly on information accessibility and the nature of information close by.

There are numerous drawbacks of utilizing income to be the essential measure of inequality. For instance, some studies use income before deducting taxes or transfers, this tends to underestimate the real figure of inequality. Second, salary does not mirror all accessible financial assets –, for example, credit accessibility, government help or amassed family riches. They contend that utilization is a superior measure of monetary prosperity (Desilver, 2015)

In economic theory, a fundamental utility function depends mainly on consumption rather than income and how people choose to devote their income shares to different commodities expenditures. Given the different weights people assign to each commodity and the variation in the price increases of these commodities, consumption provides a better measure of welfare and disparity based on each group's basket of goods consumed (Attanasio and Pistaferri, 2016).

Theoretical Framework

The consumption inequality model in this thesis is in accordance with the theory proposed by James Duesenberry of relative income distribution which shows that consumption patterns depends on the individual relative position in the income distribution. Based on relative income, Duesenberry put forward the concept and the importance of psychological factors linked to habit formation as well as social interdependence. These factors were discussed in greater detail in his book "Income, Saving and the Theory of Consumer Behavior" published in 1949 which challenged the Keynes's construction.

The discrepancy between the perceived inequality and the actual inequality found in Egypt can be explained by what Duesenberry called "keeping up with the joneses". Simply put, the individual becomes concerned about his relative consumption. "The strength of any individual's desire to increase his consumption expenditure is a function of the ratio of his expenditure to some weighted average of the expenditures of others with whom he comes into contact (Duesenberry, 1948)." (Palley, 2008)

Duesenberry proposed another theory explaining this which deals with the rigidity of consumption habit breaking in face of declining income. "The fundamental psychological postulate underlying our argument is that it is harder for a family to reduce its expenditure from a higher level than for a family to refrain from making high

expenditures in the first place (Duesenberry, 1948)." (Palley, 2008). The statement made by Duesenberry can be explained by necessities and luxuries shift over time.

In 1966, Runciman proposed the social injustice, reworked later by Yitzhaki. This theory deals with the important concept of relative deprivation. Relative deprivation can only be studied in presence of inequality and is an amass of feelings of inequality when segregated against a reference of peers. Feelings of deprivation are a result of relative assessment by the individual towards a set group of peers, which is not absolute. increase of income gap between the peers results in increased inequality which results in inequality aversion (Verme, 2012).

Yatzhki in 1979, in his advanced a way to measure relative deprivation as a summation of one's income and the incomes of all wealthier individuals in the peer group. Approaching the Gini index, Yatzhki's work consolidated both inequality and relative deprivation. Increase of either values increases the other and in turn increases their combined effect of Inequality aversion.

During the outgoing decade leading to the 2011 Egyptian revolution, the feelings of deprivation and inequality should prove crucial as it served as the cornerstone of many historic examples of civil strife and revolutions.

Two group dynamics are scrutinized by Davis (1955) and Runciman (1966) who both agreed that distinguishing within group and between group dynamics is important in the study of judgment about fairness and judgement about subordination. Within group dynamics, in which, judgments about fairness are drawn, while between-group dynamics where judgement about subordination are drawn. In his concept of social strife, Gurr (1968) explains that individuals focus on the gap between what they expect to possess and what they possess. This is a new concept that only is concerned with one's actual possession and his self-appraisal in comparison to one's expectations. Utilizing this model, factors that affect deprivation and inequality are factors that deals with individual expectation. (Verme, 2012).

Many argue that change has an imposing effect on feelings of deprivation. Karapetoff (1903) argued: "The degree of life-satisfaction of separate individuals or of whole societies is measured, not by the absolute quantity of goods possessed, but by the rapidity with which this quantity is increasing" (p. 681). Davies (1962) during his studies on the revolutions determined that people's level of

satisfaction is more affected on periods of growth vs stagnation rather than absolute levels of income.

All proposed concepts and models need five common elements which are : thereference group, ranking system to the reference group, fluidity of the reference group, mobility of the studied society and the final element is expectation. These theories in combination induce a complex relation of facts and perception of inequality that cannot be easily quantified (Verme, 2012).

This takes us to Engel's Law. Ernst Engel has used Belgian cross-section data for the incomes and expenditures of certain groups, and examined their consumption of sepecific categories of commodities. He calculated income elasticities for these categories of commodotoes and found interesting results mainly related to the consumption of food that tends to decrease as income increases. He also noted specific trends related to the consumption of luxuries as a whole which tends to increase as income increases. These expenditure elasticity curves have been termed Engel curves and has provided very useful tools for many interpretation of consumer pattern based on income groups (Ahçihoca and Ertek, 1983)

Consumption Inequality and CPI

The main determinants of consumption expenditure, other than tastes, are income and prices faced in the economy. When measuring households' welfare, the effects of price increase or inflation can not be neglected as it is the force through which income generates consumption of specific commodities. (Oosthuizen, 2007). The main effect of price disparities over time is on having asymmetric purchasing power among different sectors of the economy based on their consumption basket and the changing prices they face given their income level. (Oosthuizen, 2007).

It is well established in the literature that similar groups of homogenous income levels and demographic profiles have pretty similar consumption patterns in terms of necessities and luxuries consumption (Garner et al., 1996). This, in itself suggests that different income groups will have different proportions of commodities in their consumption expenditure, hence affecting the weights of these commodities in calculating their specific inflation level. Secondly, since not all prices of commodities increase at the same rate or at the same level , households may face different inflation rates according to the relative price increase mix within their bundle of commodities consumed (Oosthuizen, 2007).

There arguments made rise to the calculation of subgroup inflation rates. However, the problems that arise in calculating group price indices as mentioned by Amble and Stewart (1994) and Moulton and Stewart (1999) can not be neglected. First, sampling errors are widely observed due to small survey sample sizes. Second the process of collecting prices can be misrepresenting all segments of the society in terms of income and demographic profiles.

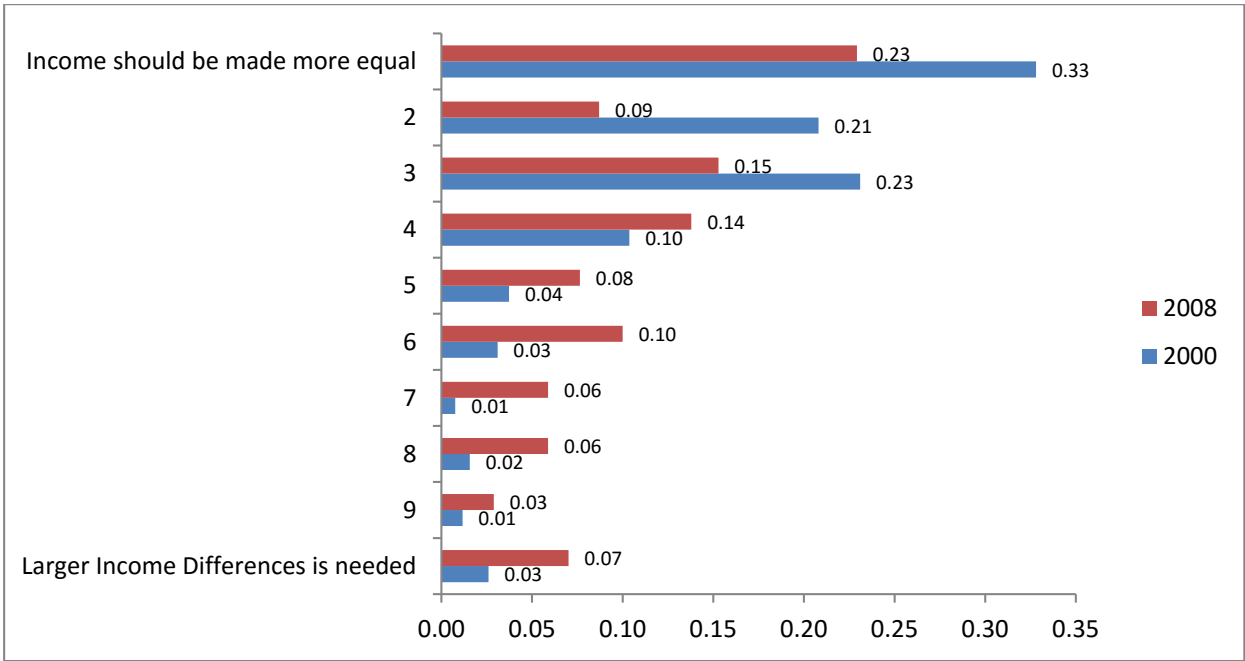
Inequality in Egypt

As mentioned before Egypt's perceptions of inequality highly exceed actual figures measuring inequality. Interestingly enough, Egypt scores low on measures of inequality as compared to its Arab counterparts or other countries in the world. Figure 1 shows that Egypt has the most minimal gini coefficient among all Arab nations. Egypt Gini coefficient kept its magnitude from 36.1 to 30 in the last decade, not a significant decrease but still a very low one compared to the rest of the world (World Bank 2007, 2011)

Also, using **Income share held by highest 20%** what is owned by the richest 20% of the economy measure, Egypt scores very well with only South Korea scoring less as shown in Figure 3. Moreover, Egypt GDP per capita as shown in Figure 4 has been improving over the years.

Yet, when asked about income inequality in the World Value Survey, both waves conducted in Egypt 2000 and 2008, people responses showed that 23% and 33% in 2000 and 2008 respectively ask for more income equality. This implies many possible explanations, among which two will be examined throughout this paper. Income does not really capture people's welfare level relative to others as consumption does and whether different levels of inflation faced by different groups lead to higher inequality levels not accounted for in the economy.

Figure1: World Value Survey Egypt 2000 and 2008 Income Inequality Perception



Source: World Value Survey, author's calculations

Figure 2: Gini Coefficients 2012

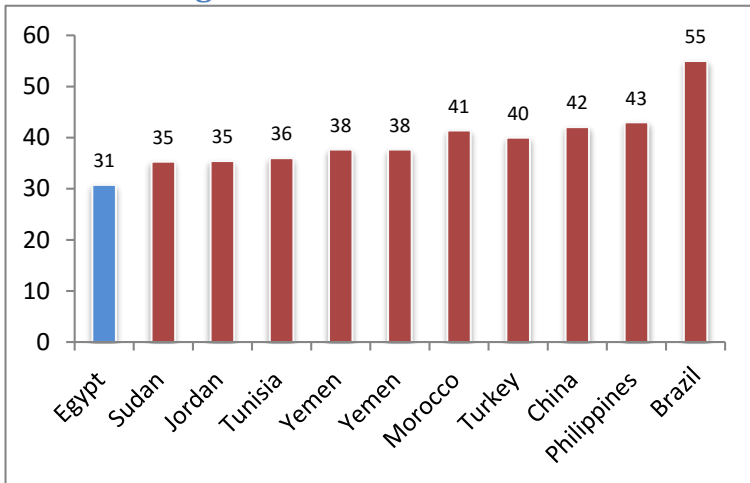
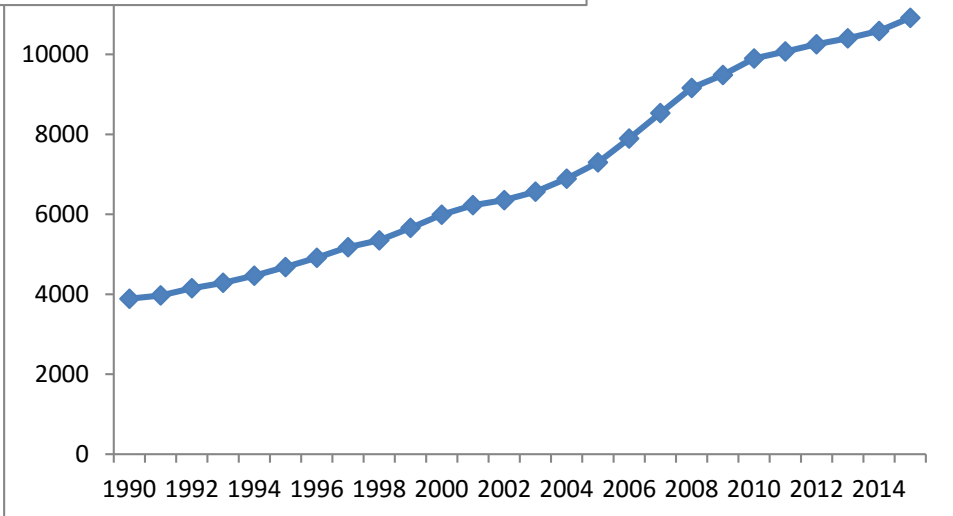
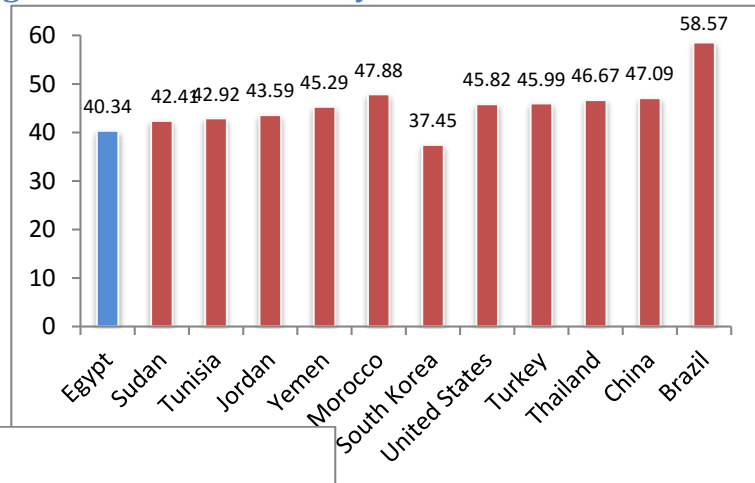


Figure 3: What is owned by the richest

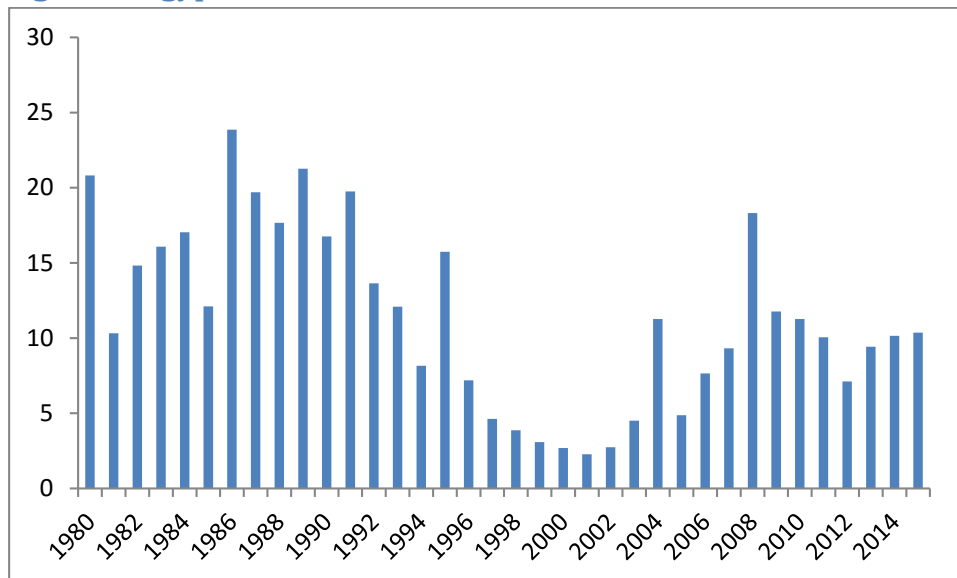


Source: WorldBank

Inflation and consumption inequality in Egypt

The recent surge in inflation in Egypt has stimulated a heated debate in academic and policymaking circles. High and volatile inflation tends to reduce economic efficiency and has a negative impact on income and wealth distribution. It disrupts saving and investment decisions, with a negative impact on long-term growth and employment. In addition, it reduces the efficiency of the price system in allocating resources, as it makes it harder to distinguish between relative and absolute price movements. It also penalizes fixed income earners (wage earners as well as recipients of pension, interest, and rent), and it tends to benefit debtors at the expense of creditors.(NoorelDin, 2015)

Figure 5: Egypt Inflation Rate



Source: WorldBank

Inflation is one of the most important indicators of macroeconomic stability. It also affects welfare and serves as a goal to public policy. Since the flotation of the pound in 2003, the Egyptian economy has been subject to waves of relatively high increases in prices. During each of these waves, a heated debate occurred about the accuracy of the official inflation rates in reflecting actual changes in prices. Most Egyptians, whether economists or not, would argue that the Consumer Price Index (CPI) underestimates actual increases in prices and, therefore, undermines living standards in Egypt. At the same time, the Central Bank of Egypt (CBE) has announced its intention to shift to an

inflation targeting (IT) framework that aims to achieve price stability. Since a target for inflation should then be set and sought by the monetary authorities, the use of an accurate and adequate measure of inflation becomes imperative. The motivation for this study also comes from the concern that the absence of a reliable and accurate measurement of inflation may lead to distortion of policy decisions and complications in macroeconomic management (Noureldin, 2015) which may mislead the comparison of a country's economic performance both over time and with other countries. Finally, inadequate measurement of inflation may make it more difficult to explain the causes of inflation or predict them (Triplett 1977)

Since inflation is a central guide to consumption and investment decisions, an inaccurate measure of inflation could hinder the efficient allocation of resources in a market economy (Greenspan 1997). The lowest income quintile of the economy have less resources to face inflation and hence need more targeted indexation policies that takes into consideration the actual inflation that they really face given their specific consumption pattern.

Objective of the thesis

This thesis objective is twofold: First to measure consumption inequality by examining how richer versus poorer households allocates spending across commodity groups in Egypt in terms of consumption of necessities and luxuries overtime and the likelihood of owning a luxurious durable good. Second the thesis measures the inflation assynmetry faced y different income groups across time. The following chapter reviews the literature on consumption inequality, consumption patterns and group price indices. Chapter three shows data and data sources used for this study. Chapter four presents the methodology followed in measuring consumption inequality, deriving expenditure weights and calculating price indices and inflation rates. Chapter five shows the results. Section 6 presents the thesis policy implications and section 7 concludes.

Chapter 2 Literature Review

This thesis fits in the intersection of three strands of literature. First, the strand that examines different consumption expenditure patterns of different income groups based on expenditure elasticity to determine each income group specific definition of

necessities and luxuries. Second, consumption inequality and income inequality in capturing welfare and third the empirical evidence that different income-levels in the economy experience different rates of inflation, linked directly to their differing consumption patterns.

The first strand of literature on consumption pattern varies on different levels; namely, on approach and methodology. Some papers concentrate on one commodity and its different subcategories. Food and its different subcategories has been the central theme for many papers. Dawoud (2013) analyses the changes in food expenditure patterns over time in Egypt emphasizing the differences in food consumption between urban and rural sectors. He estimates Engel curves for food groups based on data obtained from the Household, Income, Expenditure, and Consumption Survey (HIECS) conducted by the Central Agency for Public Mobilisation and Statistics (CAPMAS) of Egypt for five survey periods from 1990-2010. Dawoud (2013) found that the estimated expenditure elasticities for food groups have decreased significantly over the time. He found statistically significant variations between the urban and rural expenditure elasticity of most food categories with higher elasticities in favor of rural areas.

Selvanathan et al (2015) analyses the demand for meat and fish in Saudi Arabia in a system-wide framework using data for the period 1985–2010. They find that the implied income elasticities indicate that beef, lamb and fish are considered to be luxuries, while chicken is a necessity. The demand for all meat products and fish are price inelastic. These elasticities are key inputs for policy analysts in terms of devising policies in relation to meat production, meat imports, taxation and food security issues in Saudi Arabia

Moreover, Wong et al (2015) examines the demand for the various types of meat in Australia using data from 1962 to 2011 to forecast meat demand in Australia under various economic policy scenarios. The results show that between 1962 and 2011, beef is a luxury, while mutton, lamb, chicken and pork are necessities. Demand for mutton is price elastic and, beef, lamb, chicken and pork is price inelastic.

There is another group of paper that consider more than one commodity groups and analyze their consumption pattern either in one country or in many countries,. Worth noting that most papers focus on estimating Engel's law for computing

elasticities of demand Cornelsen et al. (2015) systematically reviews the global evidence on cross-price elasticities for seven food groups in low-income, middle-income and high-income countries. They found that changes in food prices had the largest own-price effects in low-income countries. Cross price effects were more varied and mainly depending on country income level alleviating own price effect.

Navamuel et al. (2014) estimate expenditure and own-price elasticities for 10 aggregated food product groups using the Spanish Household Budget Survey for the year 2010. They apply an Almost Ideal Demand System (AIDS) model. They estimated variations in demand based on income level as well as demographic profiles of households. The results show that in Spain, large central cities show a greater response to price changes than smaller cities or rural peripheral areas.

Selvathnathan and Selvanathan (2006) considers the consumption patterns of food, tobacco, soft drinks, and alcohol in 43 developed and developing countries. The results show that consumers in the developing countries spend a much higher proportion of their income on food than consumers in developed countries abiding by Engel's law. The proportion of expenditure allocated to the other three commodities, tobacco, alcohol, and soft drinks, are similar in the two groups of countries. The income elasticity estimates reveal that food is a necessity in most countries, while tobacco and alcohol are necessities in most of the developed countries and luxuries in most of the developing countries.

Wan (1996) uses the household survey data from rural China to model consumer behaviour. He calculated income elasticities of household demand for ten commodity groups in 30 rural regions. The results indicate that food, clothing and fuel are necessities, while housing, service, entertainment and culture are luxuries with remarkable variations in the elasticities across regions, which call for serious considerations in the design and implementation of re. He recommends tailored by region policies such as intra-region trade policies.

Shamim and Ahmad (2007) analyze the household consumption patterns in urban and rural regions using Household Integrated Expenditure Survey of Pakistan for one year 2000-2001. They estimate Engel curves by applying quadratic expenditure system for expenditures on 18 commodity groups. They used demographic

disaggregation of groups to explain consumption pattern. The study shows that consumption of food and non-food items is significantly affected by changes in total expenditure and household size.

Yusof and Duasa (2010) provide examine expenditure patterns of a group of products and services for various groups of Malaysian society. The analysis focuses on differences in consumption across age groups, and identifies factors that affect the level of total expenditure as well as expenditure on specific consumption commodities. They compare estimates for income elasticities to identify expenditure items as either luxuries or necessities. The empirical framework for income elasticities in this study is based on the estimation of Engel functions for urban areas, male versus females and married and single individuals

Leskinen et al.(2012) identify which consumption practices young adults regard as necessity. The data are based on consumption diaries in which young adults reported their consumption practices during one week and then rated the degree to which they experienced each of these practices as a necessity or luxury on a seven-point scale. The results show that young adults experienced almost 60 per cent of their consumption practices as necessary. Accordingly, five groups of consumption practices were identified on the basis of their ratings, and three of these groups included necessity practices of different levels. The results show that young adults define necessity consumption differently in different situations.

Ahçıhoca and Ertek (2012) considered income and urbanity of North Cyprus as factors affecting how household allocate expenditure on different groups of commodities . Therefore, they conduct a survey on 300 households from four different regions and estimated Engel curves income elasticities. The empirical findings indicate that expenditure on food, rent, electricity, water, gas, household services, transportation and communication are inelastic, and expenditure on restaurants, clothing, furniture, health, personal care, culture, education, entertainment, and other commodities are elastic.

Seale (2006) addresses a number of key problems commonly confronted in the literature on international demand analysis. Among these concerns are data issues, multistage budgeting, outliers, group heteroskedasticity, and model selection. They

investigate nine aggregate categories and eight food sub-categories of goods. They omit outliers and use maximum likelihood to correct for heteroskedasticity. Country specific income and own-price elasticities are calculated and indicate that poor countries are more responsive to changes in income and prices than rich countries. They also find evidence for the strong version of Engel's law; that when income doubles, the budget share of food declines by approximately 0.10.

The second strand of literature examines income and consumption inequality based on consumption patterns. Attanasio and Pistaferri (2016) have compared figures of income inequality to consumption inequality. They look at specific data on inequality in consumption of food, ownership of major household appliances, leisure, and persistence in consumption across generations. They suggested for future research to measure inequality in well-being to study the value that people attach to leisure.

Literature on consumption inequality is very limited mainly because of the unavailability of adequate high quality consumption expenditure data. Piketty (2015) had stated that "Household income and expenditure surveys, generally used by economists and international organizations almost certainly underestimate the level of inequality, possibly by a very large margin. One would need reliable fiscal sources in order to make a precise comparison between different income shares". Unfortunately, such sources are lacking in many developed and developing countries as well.

Previous studies on inequality have actually investigated the puzzle of low inequality figures in Egypt. Verme(2015) argues that economic inequality in Egypt is not only low, it is also declining, while people's perception of inequality may simply be a "sign of widespread misery, low and stagnant income opportunities, low labor demand and ineffective markets. In this case, the focus of the government should be better placed on investments, inclusive growth measures, improving jobs and income opportunities, and better allocation of existing resources rather than a simple redistribution of government revenues" Verme(2015).

While the lack of transparency on income, consumption and wealth is an important issue in most areas of the world, it is exceptionally extreme in the Middle East, and raises many question marks about democratic accountability, apart from the actual level of inequality (Piketty, 2015)

Krueger and Perri (2002) studied the cross-sectional income and consumption distribution in the US in the past 25 years. They find that a rising income inequality has not been accompanied by a corresponding rise in consumption inequality over the period from 1972 to 1998. "The standard deviation of the log of after-tax labor income has increased by 20% while the standard deviation of log consumption has increased less than 2%" (Krueger and Perri, 2002). Furthermore income inequality has increased both between and within education groups while consumption inequality has increased between education groups but mildly declined within groups.

Aguiar and Bils (2011) consider trends in the relative expenditure of high income and low income households for different goods with different expenditure elasticity varying over time by good and income group. This exercise indicates that consumption inequality has closely tracked income inequality over the period 1980-2007

Attanasio and Pistaferri (2016) added that the joint analysis of consumption and income inequality to understand the effects of inequality on those in the poorest segments of society in which consumption reveal different insights than income, for example. Moreover, higher consumption of leisure could substitute for lower consumption of goods when it comes to overall welfare measurement.

Since prices translate income into goods and commodities that affect people's welfare levels. Prior studies evaluate inflation rates for different groups. Yet, there is no agreement in the literature on whether different groups actually face different inflation rates or not. Lieu et al. (2004), use data from Taiwan and finds that there is "statistically significant evidence to support the claim that different household groups face differential price changes, and that these variations are persistent"

Gürsel and Kökkızıl (2014) use different price indices calculated for each income quintile from the poorest to the richest by using consumption data from the Household Budget Surveys (HBS) for the period 2003-2013 for United States of America. The results indicate that poorer households considerably face higher inflation rates than richer ones. Flower and Wales (2014) examined inflation rates experienced by different types of households in the UK between 2003 and 2014 for households in different positions of the income and expenditure distributions, for households with and without children and for retired and non-retired households. They find that the inflation

experience of UK households differed widely over this period, with implications for economic policy. Low-spending households experienced faster rates of price increase than high-spending households. They also find that retired households and households without children also face faster inflation rates than for high-income, non-retired and households with children respectively. Moreover, Duran(2016) analyzes the convergence of regional inflation rates in Turkey from 2004 to 2015 by. He finds that, inflation disparities decline over time. He also finds that that regional inflation behavior is random and non-structural..

Hait and Jansky(2014) find that Inflation rates are significantly different in the Czech Republic during the period 1995-2010. Their results show that only around 60 % of households actually experienced an inflation rate that was similar to the national average. They find that among the main contributors to inflation are expenditures for housing and energy and, especially for low-income households and pensioners, expenditures on food and non-alcoholic drinks.

Mortaza and Hasnayen (2007) estimate the food contribution to inflation in Bangladesh. The results suggest that the inflation has a higher burden on the poor because they spend more of their income on food. The results highlight the importance for the government to follow pro-poor growth and anti-inflation policies to mitigate the adverse effects of recent inflation on the poor.

Oosthuizen(2007)uses expenditure data from the 2000 Income and Expenditure Survey and price indices from Statistics South Africa to calculate inflation rates for expenditure deciles for the period 1998 to 2006. The results show that the national reported inflation does not reflect the 'average' household as is commonly believed and that it most closely reflects the spending patterns of households in the 95th percentile of the expenditure.

Asra(2006) demonstrates empirically the importance of urban-rural price differences and inflation figures in poverty analysis. He shows that the urban-rural food price differential during the period 1987–96 was lower than announced by the 'official' food poverty lines. The paper concludes that it is essential to use accurate urban–rural cost of living differences in deriving aggregate, urban and rural poverty estimates.

Hanfi (2016) finds that food inflation hurt the poor more than the rich as the poor spend higher proportion of their income on food items as compared to the rich. Higher global food and crude oil prices in 2008 results in higher (than historical

average) food inflation in Pakistan. Global food inflation caused food inflation in Pakistan. However, food inflation diffusion has been lower as compared to non-food inflation in Pakistan.

Deaton (1998) referred to Griliches (1996) and Krueger (1997) who argue for “indexing Social Security payments to wages or to consumption, rather than to prices, which would require the elderly to bear some of the exogenous aggregate uncertainty faced by the economy, while allowing them to enjoy some of the benefits of exogenous productivity growth”. A recent panel of the National Academy of Sciences argued that rather than indexing the poverty line to the CPI, it might better be set as a fraction of median expenditure on a subset of “necessary” consumption expenditures, including food, clothing, and shelter (NRC, 1995).

Mortaza and Hasnayan (2008) also suggest that It might also be practical for the government to monitor prices and take necessary action to ease the supply situation in the social sectors, such as education and healthcare, and ensure the supply of these basic services to the poor at low costs so that the long-term adverse effects of inflation on education and health can be avoided

Duran (2016) indicates the dispersion of inflation rates across the regions of a country may constitute severe policy distortions (Weber and Beck 2005). Firstly, if inflation rates differ largely between regions, monetary policy can hardly satisfy the needs of all regions equally (Weber and Beck 2005; Mundel 1961; Weyerstrass et al. 2011), such that places which experience high inflation rates naturally require a contractionary monetary policy, while those which experience low inflation need rather an expansionary monetary stance (Weber and Beck 2005). Furthermore, inflation differentials are likely to create regional dispersion in the real interest rates, which are likely to induce differential effects on local economic growth (Yilmazkuday 2013).

Prais (1959) focused on weights and set the theoretical framework for plutocratic versus democratic weight calculation. Studies that have investigated different ways of constructing the expenditure weights underlying consumer price indices, calculating plutocratic and democratic inflation rates, have generally found there to be little difference between the two types of indices. Crawford and Smith (2002) find that, although their calculated plutocratic and democratic indices are often statistically different from each other, “[there] is no persistent ‘bias’ in either direction in the plutocratic index compared to the democratic index over the period studied”.

Similarly, Artsev et al. (2006) find little difference in the plutocratic and democratic indices over the period, indicating that neither upper- nor lower-income groups experienced consistently higher rates of inflation.

While Garner et al (1996) compared CPI figures using different price indices such as Laspeyers, Pasche and Fisher and found significance difference. Moreover, Deaton (1998) showed that CPI calculation does not take into account quality changes, substitution effect and income effect since it uses a fixed basket of goods which tend to over/under estimate inflation (Deaton, 1998) , hence indexation based on CPI become inaccurate.

Our analysis should help locating Egypt with which group of countries. Our Hypothesis is that Egypt faces consumption and inflation inequality which causes disparities in welfare levels among the economy. Based on the results, policy amendments mainly regarding indexation should be taken into consideration.

Chapter 3 Data

The analysis is based on secondary data attained mainly from two sources:

1- Consumption expenditure data obtained from the Egyptian Household Income, Expenditure, and Consumption Surveys (EHIECS), for the years 1999, 2004, 2008, 2010 and 2012.

(EHIECS) was conducted by the official statistical agency of Egypt, the Central Agency for Public Mobilization and Statistics (CAPMAS). The Economic Research Forum in Egypt (ERF) provided on demand all five waves starting the 7th wave for the year 1999 till the 11th wave for the years 2012-2013 of the survey both for household consumption and individuals. In each wave of the survey there are panel households and individuals, that is the same households and individuals who are surveyed over time to measure changes in income, socioeconomic status and its effect on expenditure pattern and also new households are interviewed each wave. The sample size is usually divided between urban and rural areas in each governorate to study different expenditure patterns between both (ERF, HIECS data dictionary)

Table 1: Household Income, Expenditure, and Consumption Survey, HIECS 1999-2012

Wave	Year	Sample Size	Urban	Rural	Observation Period	Methodology
7th	1999	48000 households	60%	40%	1 month	4000 household monthly
8th	2004	48000 households	46%	54%	1 month	4000 household monthly
9th	2008	48658 households	47%	53%	surveyed households were changed every 15 days).	2000 households every 15 days
10th	2010	26500 households	47%	53%	surveyed households were changed every 15 days).	16.5 thousands were new households and 10 thousands were panel households. 1100 household were collected every 15 days

11th	2012	24863 household s	45%	55%	surveyed household s were changed every 15 days).	16094 thousands were new household s and 8769 thousands were panel household s. 1036 household were collected every 15 days
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Source: ERF HIECS data dictionary

The survey was designed to cover different reference periods for expenditure data, since they differ based on the expenditure nature. The reference period agreed upon for regular consumption of commodities such as those related to food and beverage is two weeks. Alcoholic beverages, tobacco, and narcotics are collected for a reference of one month ending by the end of the survey period. Commodities and services consumed on a semi-regular basis are collected for a reference of 3 months while commodities and services consumed less regularly are collected on annual basis, ending by the end of the survey period.(ERF HIECS data dictionary)

The total number of items has increased from 587 in 1999 survey to 781 commodity and service in 2012 survey. The following table shows different groups and sub groups of commodities and services that will be examined in this study from the survey using the recent Classification of Individual Consumption According to Purpose (COICOP) published by the United Nations Statistics Division that divides the purpose of individual consumption expenditures incurred by three institutional sectors, namely households, non-profit institutions serving households and general government. (ERF HIECS data dictionary)

Table 2 : Main and Sub-Groups of goods and services

1	Food and non-alcoholic beverages:
	Bread and cereals
	Meat
	Fish and sea food
	Milk, cheese and eggs
	Oils and fats
	Fruit
	Vegetables
	Sugar, jam, honey, chocolate and confectionery
	Food products n.e.c.
	Non-alcoholic beverages
2	Alcoholic beverages tobacco and narcotics:
	Alcoholic beverages
	Tobacco
	Narcotics
3	Clothing and footwear:
	Clothing materials
	Garments
	Other articles of clothing and clothing accessories
	Cleaning, repair and hire of clothing
	Footwear
	Used garments
4	Housing, water, electricity, gas and other fuels:
	Actual rentals for housing
	Imputed rentals for housing
	Maintenance and repair of the dwelling
	Water supply and miscellaneous services relating to the dwelling
	Electricity, gas and other fuels
5	Furnishings, household equipment and routine household maintenance:
	Furniture and furnishings, carpets and other floor coverings
	Household textiles
	Household appliances
	Glassware, tableware and household utensils
	Tools and equipment for house and garden
	Goods and services for routine household maintenance
	Used furniture and furnishings and household equipments
6	Health:
	Medical products, appliances and equipment
	Outpatient services
	Hospital services
7	Transport :

	Purchase of vehicles
	Operation of personal transport equipment
	Transport services
8	Communication:
	Postal services
	Telephone and telefax equipment
	Telephone and telefax services
9	Recreation and culture:
	Audio-visual, photographic and information processing equipment
	Other major durables for recreation and culture
	Other recreational items and equipment, gardens and pets
	Recreational and cultural services
	Newspapers, books and stationery
	Package holidays
	Used major durables for recreation and culture
10	Education
	Pre-primary and Primary education
	Secondary education
	Post-secondary non-tertiary education
	Tertiary education
	Education not definable by level
11	Restaurants and hotels
	Catering services
	Accommodation services
12	Miscellaneous goods and services
	Personal care
	Personal effects N.E.C.
	Other services (not classified)

Source: ERF HIECS data dictionary

The survey also presents Demographic characteristics and basic data for all household individuals including marital status, disposable income, type of dwelling...etc. It also provides data on sources of income. (Wages and salaries, Self-employed income, received cash and in kind transfers...etc). In this study the aggregated 12 groups of commodities will be examined to investigate consumption inequality and CPI differentials between them among different income and expenditure groups.

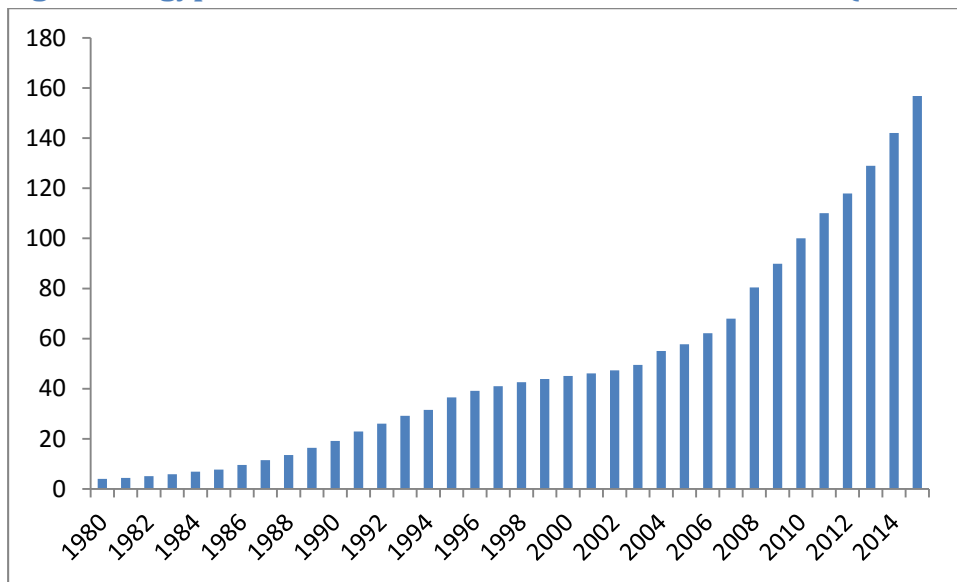
Income data

Income data are attained from total disposable income provided in the survey. The HIECS variable of disposable income can be summarized in the following equation

Total Income= Gross wages and salaries +Self-employment+ Income less expenses from rentals+ Property income+ Current transfers received+ Employers’ social insurance+ Contributions Employees’ social insurance contributions+ Taxes on income less refund Regular taxes on wealth Regular inter-household cash transfers+ Regular cash transfers to charities

3- CPI Data will be obtained CAPMAS for the years 1999, 2004, 2008, 2010 and 2012 corresponding to the years in which the consumption expenditure survey waves were attained by commodity group of HIECS.

Figure 6: Egypt Overall Consumer Price Index 1980-2016 (Reference Year=2010)



Source: CAPMAS

CPI data cover population living in urban and rural areas in all governorates in Egypt. CPI has 12 sections. These sections correspond closely to the HIECS commodity groups and are built up from 43 groups, 97 classes, 174 sub-classes, 479 detailed commodity groups, 964 goods and services.

Prices are collected through a purposive urban/rural stratified sample of 14,442 outlets. The urban stratum is further stratified into six regions: Cairo, Alexandria, and Suez Canal cities, Frontier Governorates, Urban Upper Egypt and Urban Lower Egypt. While rural strata is classified into Rural Upper Egypt and Rural Lower Egypt (SDDS, IMF)

CPI data are disseminated on the urban consumer prices index, a Modified Laspeyres in which a fixed basket of goods is compared across two time periods in terms of pr prices.

The reference period differ for the period under study according to Table 3.

Table 3 Matching CPI and HIECS Weights and reference years

HIECS year	CPI reference year	Weights used
1999-2000	1996	1996
2004-2005	1999	1999
2008-2009	2004	2004
2010-2011	2008	2008
2012-2013	2010	2008

Source: MOF Egypt

CPI data for urban areas is published monthly while for rural areas, it is published bimonthly. National CPI for the whole country is published bimonthly. Weights used are derived from the household income and consumption expenditure survey (HIECS) and is usually updated every two years (SDDS, IMF). Current weights uses 2008-2009 HIECS weights.

Food, industrial commodities and services prices are collected monthly for urban and rural areas from the 1st- 22nd of each month. For commodity groups characterized by rapid price fluctuation, the prices are collected weekly, examples of such groups are (vegetables, fruits, fresh meat, poultry, fresh fish, birds, eggs) (SDDS, IMF)

Chapter 4 Methodology

The analysis will be based on two steps: establishing consumption inequality and calculating CPI differentials among different income groups.

Establishing consumption inequality

I will rely in my analysis of consumption inequality on Aguiar and Bils (2015) measure of consumption inequality. In their paper, they measure consumption inequality based on how high-income and low-income households allocate spending toward luxuries versus necessities. They claim that higher income groups would increase higher percentage of luxuries as per Engel Law than lower groups do. This

concept also is closely related to the theory of relative deprivation where the poor might feel deprived of the luxuries consumption comparing their pattern of consumption to the rich. This specific measure of consumption inequality as self-corrects for measurement errors, such as underreporting of the richer households, in expenditures of households, since the ratio of expenditures will be the same. Inequality in consumption across income groups is then estimated by comparing the respective ratios .

For estimating Expenditure elasticity I will use a double log function

$$\text{Log } Y_{it} = b_0 + b_1 \log \text{expenditure on all items per capita} + \varepsilon$$

Where Y_{it} = spending of household h on good I at time t

And b_1 = expenditure elasticity on good i at time t

Five income groups will be disaggregated based on total income reported in the HIECS

- The lowest 20% (the poor)
- The lower middle class
- The median (the middle class)
- The higher middle class
- The highest 20 % (the rich)

And consumption inequality will be measured between and within these five groups using differences in necessities and luxuries consumption

A probit model will also be of use to calculate the likelihood of the poor owning different durable goods over the period 1999–2012 using (Hasset and Mathur, 2012) approach to measure consumption inequality. The model specification is

$$\text{Pr}(Y_{it} = 1) = \beta * \text{lowincome}_{it} + \gamma * X_{it} + \alpha + \varepsilon_{it}$$

where Y_{it} equals 1 if a household owns a durable good like microwaves, refrigerators, computers, clothes washers and so forth. The model is run separately for each year to see changes in trends. The coefficient of interest is β , associated with the dummy variable for whether the household is a low-income household. Our definition of low income will be the lowest income quintile. X refers to other explanatory variables.

These are demographic variables capturing the age, household composition and dwelling type and sex of the respondent. I also include a dummy for urban or rural areas. The results report the marginal effects from the probit regression for easier interpretation. The reference group is the highest income quintile.

The second step in the analysis will be **calculating CPI differentials among different income groups** based on two major steps: **Weight Construction and Inflation calculation**

1- Weight Construction

According to the literature, I will use democratic weights rather than plutocratic weights to calculate CPI differentials. According to Prais (1959: 126), the democratic weight presents an equally weighted average non-biased estimate of actual shares of each commodity groups within the consumption basket of their relative income quintiles. Accordingly, I will compute democratic weights using the following equation for democratic weight:

$$W_i^d = \frac{1}{H} \sum_{h=1}^H \left(\frac{e_i^h}{\sum_{i=1}^n e_i^h} \right)$$

Where e_i^h is the sum of household expenditure on ith commodity

And H= total Household sample size

The expected results is that the commodities with higher weights and/or with the lower elasticity level (necessities) will put higher inflationary burden on its respective income group.

Unlike the national measure of inflation which sets the weights of a specific bundle at the base year and compares its prices over time, we will use the weights corresponding to each year in the analysis.. This has two main advantages, it limits the dependence on one base year, adjusts for seasonality and minimizes the substitution bias in our calculations.

2. Calculation of Inflation Rates

Another difference from the national reported inflation rate is that I calculate annual rather than monthly inflation rates To get rid off the seasonality. According to the equation:

$$\pi = \sum_{j=1}^m \pi_{j,t} W_{i,j,t-12}$$

Inflation is measured as the sum of each household i weighted average expenditure share w on commodity j at time t for each year under examination for each income quintile multiplied by the price increase of this specific commodity on a yearly basis. In this analysis I assume that different income quintiles face the same price increase, This is an assumption that is commonly made in the literature when constructing group price indices, as in Amble and Stewart (1994) and Garner et. al. (1996).

Chapter 5 Results and Findings

As will discussed above, the income quintiles are constructed by arranging households in ascending order of household income and expenditure and dividing them into five equally sized groups. The first quintile will represent the poorest income quintile , the second, third and fourth quintile represent the middle-income group while the 5th income quintile represents the richest income quintile.

Table 4: Descriptive Statistics of Income Quintiles

Year	Group	Household no.	Mean	Std. Dev.	Min	Max	Median	Gini Coefficient
1999	1st Income quintile	20757	5291.57	1118.57	574	6740	5520	0.12
1999	2nd Income quintile	21071	7744.51	575.23	6741	8754	7743	0.04
1999	3rd Income quintile	21845	9890.25	685.13	8755	11159	9852	0.04
1999	4th Income quintile	23379	12960.24	1148.62	11160	15184	12880	0.05
1999	5th Income quintile	26215	26155.52	26025.32	15185	108,911	20325	0.26
	Total	113267						0.51

2004	1st Income quintile	41982	6353.62	1331.43	735	8100	6624	0.12
2004	2nd Income quintile	41440	9350.86	699.89	8101	10576	9360	0.04
2004	3rd Income quintile	41484	11921.31	806.81	10577	13370	11920	0.04
2004	4th Income quintile	41415	15371.54	1298.78	13371	17975	15241	0.05
2004	5th Income quintile	41110	28925.88	22832.12	17976	663000	23300	0.24
	Total	207431						0.48
2008	1st Income quintile	21711	9848.18	2001.89	804	12500	10231	0.11
2008	2nd Income quintile	21793	14375.65	1068.29	12501	16200	14391	0.04
2008	3rd Income quintile	21633	18313.62	1241.86	16204	20620	18250	0.04
2008	4th Income quintile	22201	23827.88	2075.22	20621	27960	23600	0.05
2008	5th Income quintile	22425	44743.42	34455.64	27980	1298200	36336	0.23
	Total	109763						0.48
2010	1st Income quintile	6853	12333.90	2515.13	1951	15500	12900	0.11
2010	2nd Income quintile	6742	17865.71	1312.97	15506	20125	17910	0.04
2010	3rd Income quintile	6870	22605.65	1559.60	20150	25535	22440	0.04
2010	4th Income quintile	6832	29225.93	2369.92	25545	34120	28892	0.05
2010	5th Income quintile	6772	52746.33	31631.59	34122	760860	43378	0.21
	Total	34069						0.45
2012	1st Income quintile	6561	15225.27	3235.28	3012	19480	15900	0.12
2012	2nd Income quintile	6611	22254.98	1580.87	19485	24900	22344	0.04
2012	3rd Income quintile	6560	27766.09	1747.85	24916	31000	27700	0.04
2012	4th Income quintile	6630	35502.53	2927.91	31010	41000	35300	0.05
2012	5th Income quintile	6370	61578.83	33516.55	41008	612700	52400	0.19
	Total	32732						0.44

Table 4 presents some descriptive statistics about these five groups. Intra-quintile inequality is generally very low, for all quintiles except for the highest quintile. For the five years the 5th quintile intra inequality ranges between 26 % in 1999 and decreases to 19.5 % in 2012. Overall income inequality also has decreased from 51% to 43% in 2012. The highest variation is witnessed in the lowest and the highest income quintiles. This is true for the five waves of the survey while less variation is witnessed in the middle-income quintiles.

Table 5: Descriptive Statistics of Expenditure Quintiles

	Group	Household no.	Mean	Std. Dev.	Min	Max	Median	Gini Coefficient
9	1st Expenditure quintile	20570	4,561.26	947.23	489.00	5,800.05	4,768.40	0.11
9	2nd Expenditure quintile	21196	6,649.52	479.74	5,800.30	7,487.10	6,642.00	0.04
9	3rd Expenditure quintile	21761	8,403.89	546.48	7,487.40	9,408.80	8,383.10	0.04
9	4th Expenditure quintile	23458	10,883.70	941.13	9,410.25	12,698.30	10,836.80	0.05
9	5th Expenditure quintile	26282	20,698.40	12,245.50	12,699.70	331,532.00	16,738.00	0.23
	Total	113267						0.48
4	1st Expenditure quintile	41920	5,752.75	1,149.06	888.40	7,259.20	5,992.20	0.11
4	2nd Expenditure quintile	41596	8,293.15	579.78	7,259.40	9,290.80	8,303.00	0.04
4	3rd Expenditure quintile	41428	10,356.50	644.39	9,290.90	11,540.20	10,329.20	0.04
4	4th Expenditure quintile	41454	13,121.40	1,027.56	11,540.40	15,152.00	13,036.70	0.05
4	5th Expenditure quintile	41033	23,268.90	12,153.60	15,152.20	190,731.00	19,304.80	0.21
	Total	207431						0.44
8	1st Expenditure quintile	21657	8,818.21	1,701.77	1,242.50	11,068.40	9,126.60	0.11
8	2nd Expenditure quintile	21795	12,569.20	845.43	11,068.60	14,036.20	12,576.30	0.04
8	3rd Expenditure quintile	21865	15,661.70	967.74	14,036.40	17,424.00	15,630.90	0.04
8	4th Expenditure quintile	22096	19,825.80	1,541.51	17,424.80	22,923.00	19,693.40	0.04
8	5th Expenditure quintile	22350	35,032.30	18,646.50	22,924.00	542,211.00	29,291.40	0.21
	Total	109763						0.43
0	1st Expenditure	6765	11,575.70	2,252.50	2,200.80	14,420.00	12,086.60	0.11

0	quintile							
0	2nd Expenditure quintile	6807	16,297.70	1,074.12	14,422.00	18,197.90	16,292.00	0.04
0	3rd Expenditure quintile	6864	20,188.00	1,222.99	18,198.20	22,411.00	20,120.00	0.03
0	4th Expenditure quintile	6896	25,635.90	2,033.79	22,413.00	29,603.80	25,477.80	0.05
0	5th Expenditure quintile	6737	45,549.30	26,719.50	29,608.00	363,023.00	37,720.40	0.21
	Total	34069						0.44
2	1st Expenditure quintile	6608	13,983.30	2,861.17	2,872.00	17,738.60	14,608.00	0.11
2	2nd Expenditure quintile	6608	20,019.10	1,284.41	17,738.80	22,220.00	20,034.00	0.04
2	3rd Expenditure quintile	6524	24,449.20	1,374.68	22,223.00	26,964.00	24,383.00	0.03
2	4th Expenditure quintile	6614	30,400.00	2,245.94	26,964.20	34,991.50	30,185.80	0.04
2	5th Expenditure quintile	6378	51,387.70	22,665.50	34,995.00	243,283.00	43,634.00	0.19
	Total	32732						0.41

While correlation between total disposable income and total expenditure is 83%, consumption expenditure Inequality has exhibited lower figures than income does. By dividing the sample for the 5 years to 5 quintiles by expenditure size, we found that the overall expenditure inequality has decreased from 48% in 1999 to 41% in 2012. Hence the decrease is consistent with income inequality only a little smaller consistent with the literature . Also the note about the inequality hitting highest figures for the 5th quintile is persistent for expenditure where intra expenditure inequality ranging from 23% to 19% in 2012.

Yet all figures show that overall inequality has decreased over the years consistent with the literature using both expenditure and income figures.

Consumption Inequality

Table 6 below reports results of our double log estimation of each commodity group by income quintile and defines necessities at which expenditure elasticity is less than 1 and luxuries at which expenditure elasticity exceeds 1.

Table 6: Elasticities of different commodity groups by income quintile

Year		1st Income Quintile		2nd Income Quintile		3rd Income Quintile		4th Income Quintile		5th Income Quintile	
		Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good
1999	Food and non-alcoholic beverages	0.891***	Necessity	0.887***	Necessity	0.828***	Necessity	0.836***	Necessity	0.554***	Necessity
1999	Clothing and footwear	1.473***	Luxury	1.302***	Luxury	1.212***	Luxury	1.118***	Luxury	0.907***	Necessity
1999	Alcohol and Tobacco	0.563***	Necessity	0.523***	Necessity	0.650***	Necessity	0.535***	Necessity	0.568***	Necessity
1999	Communication	1.027***	Luxury	1.385***	Luxury	1.248***	Luxury	0.913***	Necessity	1.586***	Luxury
1999	Recreation and culture	2.285***	Luxury	2.367***	Luxury	2.346***	Luxury	2.168***	Luxury	1.606***	Luxury
1999	Education	1.249***	Luxury	1.696***	Luxury	2.029***	Luxury	1.808***	Luxury	1.605***	Luxury
1999	Housing and Utilities	0.726***	Necessity	0.484***	Necessity	0.454***	Necessity	0.470***	Necessity	0.865***	Necessity
1999	Health	0.747***	Necessity	1.001***	Luxury	1.126***	Luxury	1.086***	Luxury	0.883***	Necessity
1999	Personal care.	1.346***	Luxury	1.060***	Luxury	1.103***	Luxury	1.065***	Luxury	1.257***	Luxury
1999	Restaurant and Hotels	1.146***	Luxury	1.188***	Luxury	1.224***	Luxury	0.963***	Necessity	0.865***	Necessity
1999	Transport	0.994***	Necessity	1.264***	Luxury	1.415***	Luxury	1.373***	Luxury	1.704***	Luxury
		1st Income Quintile		2nd Income Quintile		3rd Income Quintile		4th Income Quintile		5th Income Quintile	

Year		Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good
2004	Alcohol and Tobacco	0.702***	Necessity	0.896***	Necessity	0.913***	Necessity	0.655***	Necessity	0.586***	Necessity
2004	Clothing and footwear	1.456***	Luxury	1.267***	Luxury	1.124***	Luxury	1.036***	Luxury	0.947***	Necessity
2004	Communication	1.155***	Luxury	1.243***	Luxury	1.116***	Luxury	1.252***	Luxury	1.413***	Luxury
2004	Recreation and culture	1.727***	Luxury	2.107***	Luxury	2.038***	Luxury	2.153***	Luxury	1.993***	Luxury
2004	Education	1.361***	Luxury	1.720***	Luxury	1.954***	Luxury	1.967***	Luxury	1.823***	Luxury
2004	Food and non-alcoholic beverages	0.911***	Necessity	0.867***	Necessity	0.819***	Necessity	0.800***	Necessity	0.598***	Necessity
2004	Housing and Utilities	0.671***	Necessity	0.512***	Necessity	0.440***	Necessity	0.431***	Necessity	0.745***	Necessity
2004	household Furnishing	1.142***	Luxury	1.818***	Luxury	2.016***	Luxury	1.834***	Luxury	1.351***	Luxury
2004	Health	0.759***	Necessity	1.054***	Luxury	1.182***	Luxury	1.151***	Luxury	0.986***	Necessity
2004	Personal care.	1.347***	Luxury	1.086***	Luxury	1.127***	Luxury	1.084***	Luxury	1.116***	Luxury
2004	Restaurant and Hotels	0.924***	Necessity	1.093***	Luxury	1.183***	Luxury	1.086***	Luxury	0.986***	Necessity
2004	Transport	1.312***	Luxury	1.541***	Luxury	1.654***	Luxury	1.593***	Luxury	1.679***	Luxury
		1st Income Quintile		2nd Income Quintile		3rd Income Quintile		4th Income Quintile		5th Income Quintile	
Year		Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good

2008	Alcohol and Tobacco	0.588***	Necessity	0.680***	Necessity	0.368***	Necessity	0.613***	Necessity	0.376***	Necessity
2008	Clothing and footwear	1.322***	Luxury	0.912***	Necessity	0.845***	Necessity	0.818***	Necessity	0.728***	Necessity
2008	Communication	0.956***	Necessity	0.778***	Necessity	0.905***	Necessity	0.947***	Necessity	1.021***	Luxury
2008	Recreation and culture	1.573***	Luxury	1.857***	Luxury	1.796***	Luxury	1.873***	Luxury	1.599***	Luxury
2008	Education	1.669***	Luxury	2.064***	Luxury	2.098***	Luxury	2.069***	Luxury	1.749***	Luxury
2008	Food and non-alcoholic beverages	0.911***	Necessity	0.914***	Necessity	0.911***	Necessity	0.806***	Necessity	0.606***	Necessity
2008	Housing and Utilities	0.782***	Necessity	0.679***	Necessity	0.593***	Necessity	0.622***	Necessity	0.918***	Necessity
2008	Household Furnishing	1.672***	Luxury	1.251***	Luxury	1.454***	Luxury	1.508***	Luxury	1.508***	Luxury
2008	Health	1.060***	Luxury	1.295***	Luxury	1.445***	Luxury	1.472***	Luxury	1.111***	Luxury
2008	Personal care.	1.203***	Luxury	0.804***	Necessity	0.832***	Necessity	0.767***	Necessity	0.875***	Necessity
2008	Restaurant and Hotels	0.544*	Necessity	1.063**	Luxury	1.048**	Luxury	0.699**	Necessity	0.258***	Necessity
2008	Transport	1.209***	Luxury	1.117***	Luxury	1.187***	Luxury	1.273***	Luxury	1.493***	Luxury
		1st Income Quintile		2nd Income Quintile		3rd Income Quintile		4th Income Quintile		5th Income Quintile	
Year		Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good
2010	Alcohol and Tobacco	0.713***	Necessity	0.578***	Necessity	0.815***	Necessity	0.838***	Necessity	0.347***	Necessity

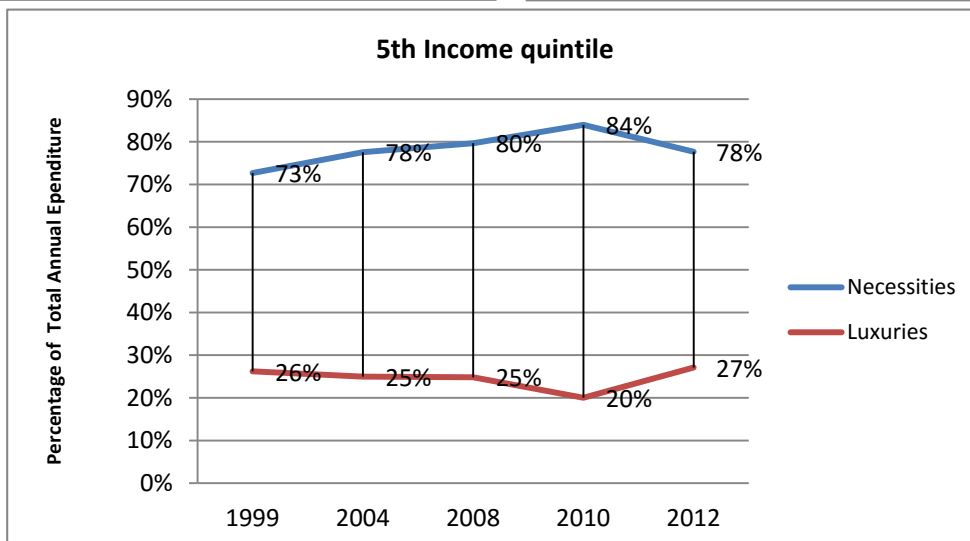
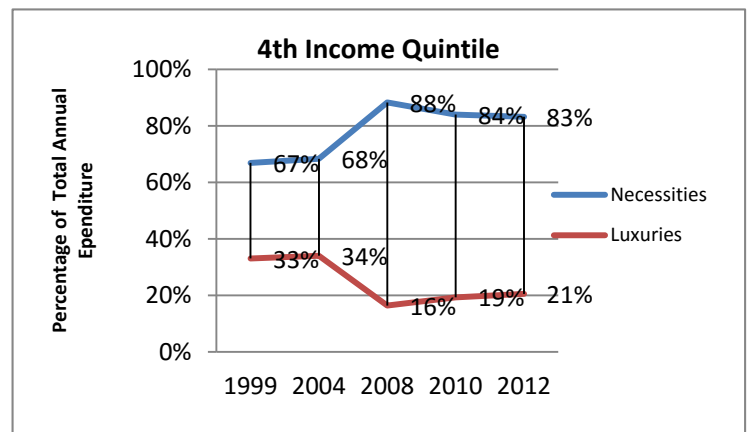
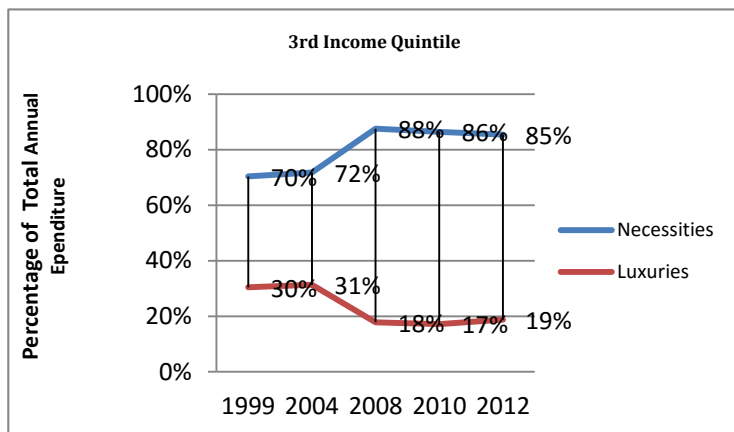
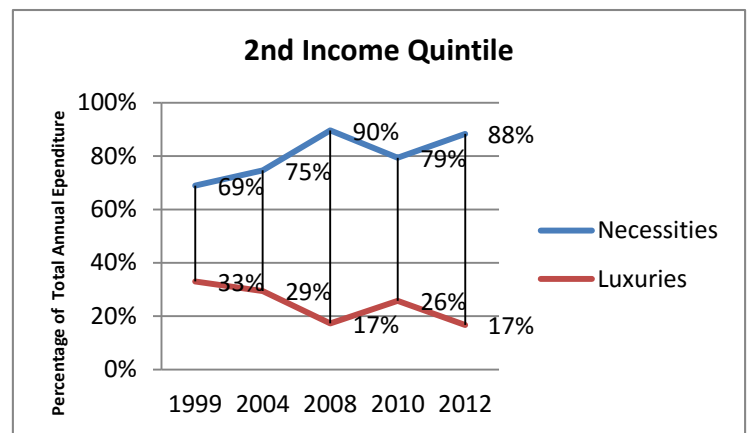
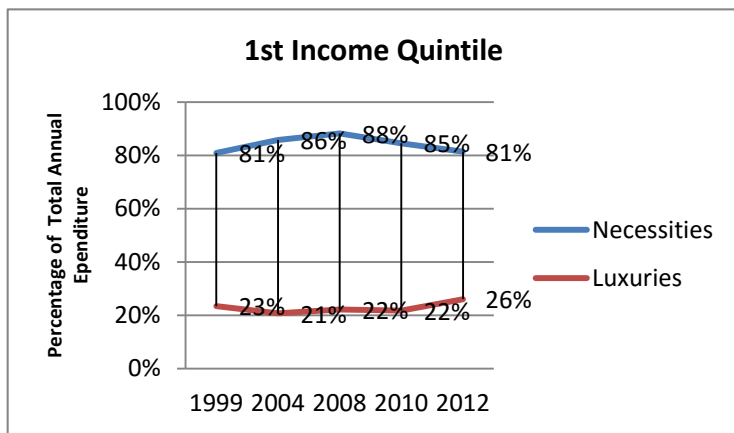
2010	Clothing and footwear	1.399***	Luxury	1.079***	Luxury	0.778***	Necessity	0.848***	Necessity	0.728***	Necessity
2010	Communication	0.862***	Necessity	0.931***	Necessity	0.753***	Necessity	0.966***	Necessity	1.100***	Luxury
2010	Recreation and culture	1.435***	Luxury	1.946***	Luxury	2.263***	Luxury	1.883***	Luxury	1.916***	Luxury
2010	Education	1.931***	Luxury	2.003***	Luxury	2.437***	Luxury	1.883***	Luxury	2.256***	Luxury
2010	Food and non-alcoholic beverages	0.882***	Necessity	0.757***	Necessity	0.667***	Necessity	0.701***	Necessity	0.518***	Necessity
2010	Housing and Utilities	0.740***	Necessity	0.599***	Necessity	0.526***	Necessity	0.591***	Necessity	0.936***	Necessity
2010	household Furnishing	0.595***	Necessity	2.304***	Luxury	1.656***	Luxury	1.323***	Luxury	1.075***	Luxury
2010	Health	1.203***	Luxury	1.761***	Luxury	2.017***	Luxury	1.910***	Luxury	0.988***	Necessity
2010	Personal care.	1.228***	Luxury	1.002***	Luxury	0.909***	Necessity	0.858***	Necessity	0.798***	Necessity
2010	Restaurant and Hotels	0.941***	Necessity	0.969***	Necessity	0.853***	Necessity	0.538***	Necessity	0.703***	Necessity
2010	Transport	1.475***	Luxury	1.350***	Luxury	1.478***	Luxury	1.327***	Luxury	1.568***	Luxury
		1st Income Quintile		2nd Income Quintile		3rd Income Quintile		4th Income Quintile		5th Income Quintile	
Year		Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good	Elasticity	Type of Good
2012	Alcohol and Tobacco	0.725***	Necessity	0.590***	Necessity	0.858***	Necessity	0.607***	Necessity	0.455***	Necessity
2012	Clothing and footwear	1.392***	Luxury	0.954***	Necessity	0.941***	Necessity	0.878***	Necessity	0.790***	Necessity

2012	Communication	1.003***	Luxury	0.965***	Necessity	0.903***	Necessity	0.954***	Necessity	0.981***	Necessity
2012	Recreation and culture	1.870***	Luxury	2.579***	Luxury	2.235***	Luxury	2.05619	Luxury	1.734***	Luxury
2012	Education	2.006***	Luxury	2.187***	Luxury	2.337***	Luxury	2.272***	Luxury	1.685***	Luxury
2012	Food and non-alcoholic beverages	0.811***	Necessity	0.753***	Necessity	0.743***	Necessity	0.691***	Necessity	0.564***	Necessity
2012	Housing and Utilities	0.770***	Necessity	0.552***	Necessity	0.455***	Necessity	0.43376	Necessity	0.861***	Necessity
2012	household Furnishing	0.762***	Necessity	1.265***	Luxury	2.295***	Luxury	2.401***	Luxury	1.829***	Luxury
2012	Health	1.124***	Luxury	1.796***	Luxury	1.699***	Luxury	1.695***	Luxury	1.136***	Luxury
2012	Personal care.	1.223***	Luxury	0.955***	Necessity	0.917***	Necessity	0.672***	Necessity	0.645***	Necessity
2012	Restaurant and Hotels	0.811***	Necessity	0.862***	Necessity	0.826***	Necessity	0.674***	Necessity	0.640***	Necessity
2012	Transport	1.373***	Luxury	1.627***	Luxury	1.082***	Luxury	1.148***	Luxury	1.490***	Luxury

Since, defining necessities and luxuries depend on each income group consumption pattern; we may notice that variances in type of good occur according to different income groups. For instance, while clothing and footwear are a luxury for the lowest income quintile, they are a necessity for the highest income quintile. Also, some commodities changed from being luxuries to necessities across time, such as communication which was a luxury for lowest income quintile in 1999 and turned to being a necessity starting 2008 and vice-versa for transport, a necessity in 1999 and a luxury onwards for the lowest income quintile. This result supports the literature that there is no clear-cut way of classifying goods and services as luxuries or necessities. Any classification is subjective at best and

inconsistent at worst (Henry, 2014). This table will be of significant importance when I discuss below the main contributors to inflation by income quintile because as will be shown the highest the elasticity the lower the commodity contributes to inflation unless significant rise in the commodity price itself outweighs the effect of high elasticity figures.

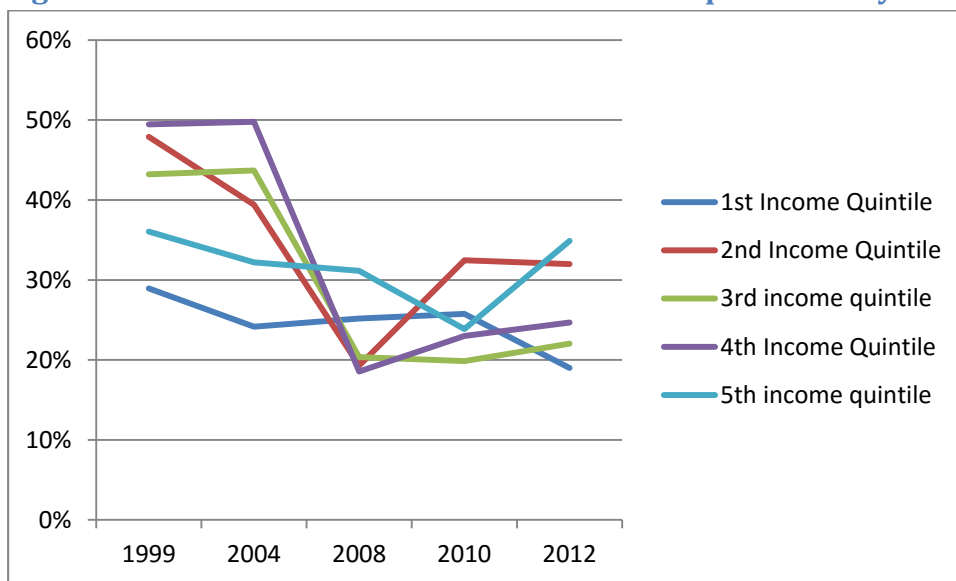
Figure7 Relative Real Consumption Shares by Income Quintile



The results of this analysis show how the shares of different categories of real consumption, averaged across the analysis period 1999-2012, change as income moves from the lowest income quintile to the highest income quintile. Using this method to sort the data into luxuries and necessities reveals that across all income categories, the

consumption of goods and services classified as necessities declined from 1999 to 2012, the average consumption share across all income categories rose for items classified as luxuries over the same time period increased. While this trend movement is similar across the various income the rate at which they transitioned into consuming greater amounts of luxuries differed greatly across groups. As the results in figure8 detailsl, the lowest and highest income quintiles were the most invariant over time with respect to their consumption of luxury goods. Middle income consumers experienced the greatest variation of all the groups specifically the second income quintile. Their consumption of necessities increased by 19 percentage points over the analysis period, while their consumption of luxuries decreased by 16percent. In other words, the middle class suffered the most during the time period of my analysis while the lowest and highest income quintiles maintained their spending pattern overtime.

Figure 9: The Ratio of Luxuries to Necessities Expenditure by Income Quintile



To provide a sense of how these ratios are informative about relative consumption inequality, we plot the relative expenditure for the 5 income quintiles in Figure 9. High-income households display a smooth relative consumption of necessities and luxuries overtime, with 1% decrease in the period 1999-2012 and a significant drop in 2010-2011 which might be explained by 25th January revolution. While all other income groups shifted in expenditure to necessities over the sample period. Specifically, low-income households display a shift away from luxuries, with their ratio falling from 29% to 19% over the sample period while middle income quintiles shifted away from luxuries with the percentages 16%,11% and 15% respectively. The relative shift in

expenditure toward a luxury for the high-income households implies a slight increase in total expenditure inequality.

Now we move to our second measure of consumption inequality which is the the probability of owning different durable goods. Table 7 shows how the probability of owning different durable goods has changed over the period of our study. The results report the marginal effects from the probit regression. The reference group is all middle-income and high-income households.

Table 7: Effect of Low-Income Status On Probability Of Owning Durable Goods

	1999	2004	2008	2010	2012
Refrigerator	-0.379 (0.018)**	-0.358 (0.014)**	-0.244 (0.022)**	-0.15 (0.044)**	-0.125 (0.051)**
Microwave			-0.91 (0.033)**	-0.876 (0.055)**	-0.854 (0.055)**
TV	-0.123 (0.086)**	-0.125 (0.017)**	-0.114 (0.023)**	-0.074 (0.050)**	-0.072 (0.059)**
Satellite	-0.281 (0.052)**	-0.283 (0.013)**	-0.415 (0.014)**	-0.283 (0.029)**	-0.179 (0.037)**
Computer	-0.083 (0.123)**	-0.178 (0.032)**	-0.3333 (0.022)**	-0.421 (0.033)**	-0.466 (0.030)**
Cell Phone	-0.534 (0.018)**	-0.583 (0.011)**	-0.403 (0.019)**	-0.178 (0.060)**	-0.087 (0.059)**
Air Conditioner	-0.126 (0.045)**	-0.119 (0.023)**	-0.144 (0.033)**	-0.166 (0.054)**	-0.171 (0.044)**
Washing Machine	-0.2 (0.022)**	-0.171 (0.016)**	-0.124 (0.025)**	-0.087 (0.046)**	-0.064 (0.048)**
Vaccum	-0.345 (0.031)**	-0.299 (0.021)**	-0.327 (0.024)**	-0.391 (0.036)**	-0.377 (0.034)**
Water Heater	-0.484 (0.018)**	-0.481 (0.012)**	-0.475 (0.017)**	-0.478 (0.029)**	-0.484 (0.029)**
Car	-0.225 (0.086)**	-0.187 (0.036)**	-0.21 (0.061)**	-0.218 (0.077)**	-0.231 (0.082)**

SOURCE: Authors' calculations.

NOTE: Standard errors in parentheses: ***significant at 1 percent; **significant at 5 percent; *significant at 10 percent. The table shows the marginal effects from a probit regression. We report only the coefficients on the low-income household dummy. All regressions control for demographics such as the age, sex, household composition and dwelling type. I also control for urban-rural differences. The missing coefficients

relating to microwaves, for 1999 and 2004 are a result of these questions not being asked in those years.

The first row of the table reports the likelihood of a low-income household owning a refrigerator in 1999 as 38 percentage points less than the reference group, that is, than the highest income group. However, across years, the likelihood of the lowest income owning a refrigerator has increased to 12 percentage points in 2012 against the reference group. These trends are replicated in the results for other appliances such as televisions, satellites and washing machines . Computers show an interesting trend. In the 1999 when computers were less widespread in the population, low-income households were only 8percentage points less likely to own a computer relative to other households. By 2012, that number reached its peak at 46.6 percentage points. Since then, the gap has narrowed somewhat, and in 2009, low-income households were only 25 percentage points less likely to own a computer than other households. Other interesting housing characteristics that we study include microwaves which have exhibited the lowest probability of the poor owning one against the rich with 91-85 percentage points. For air conditioners, water heaters, vacuums and cars to be fairly stable across years with a slight narrowing in the 2004 and 2008. While cell phones has shown a significant improvement in the probability of the poor owning one against the rich and middle income from 53% to only 8%. In general, results from this section suggest that there has been a great narrowing of the gap between low income and other households in certain durable goods items, such as color televisions, refrigerators, and air conditioners. In other items, like air conditioners and water heaters the gap was small to begin with but widened as use of these items became more widespread and the cost of these items declined. In recent years, even this gap has narrowed. For a third category of items, the gap has tended to be fairly stable over time. Generally speaking, there is a trend toward a narrowing of the consumption gap between low-income and other households in terms of owning some durable goods.

Inflation differential among different income groups

Given that this paper focuses on the differences in inflation experiences across the distribution, it is important to assess how the structure of expenditure varies as income quintiles. Figures 11-14 present the demographic weights structure of expenditure for each income quintile and revealing a number of distribution sensitive expenditure patterns

Figure11 Democratic weights of each commodity group by income quintile 1999

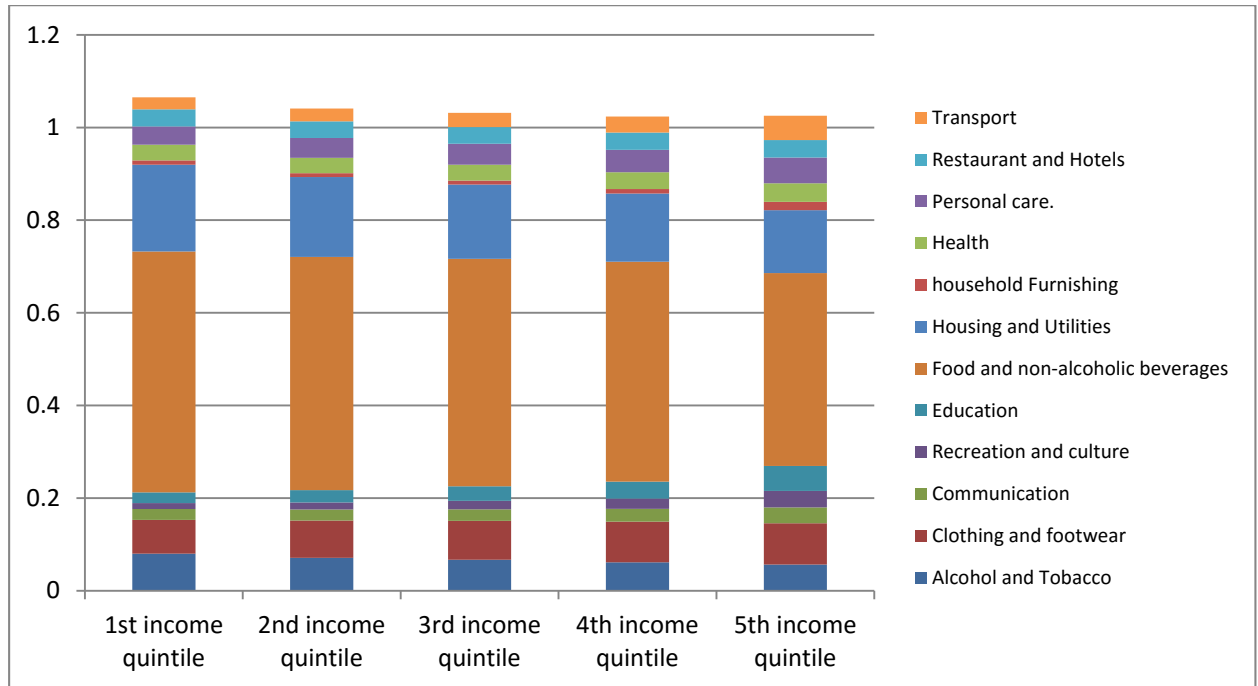


Figure 12 Democratic weights of each commodity group by income quintile 2004

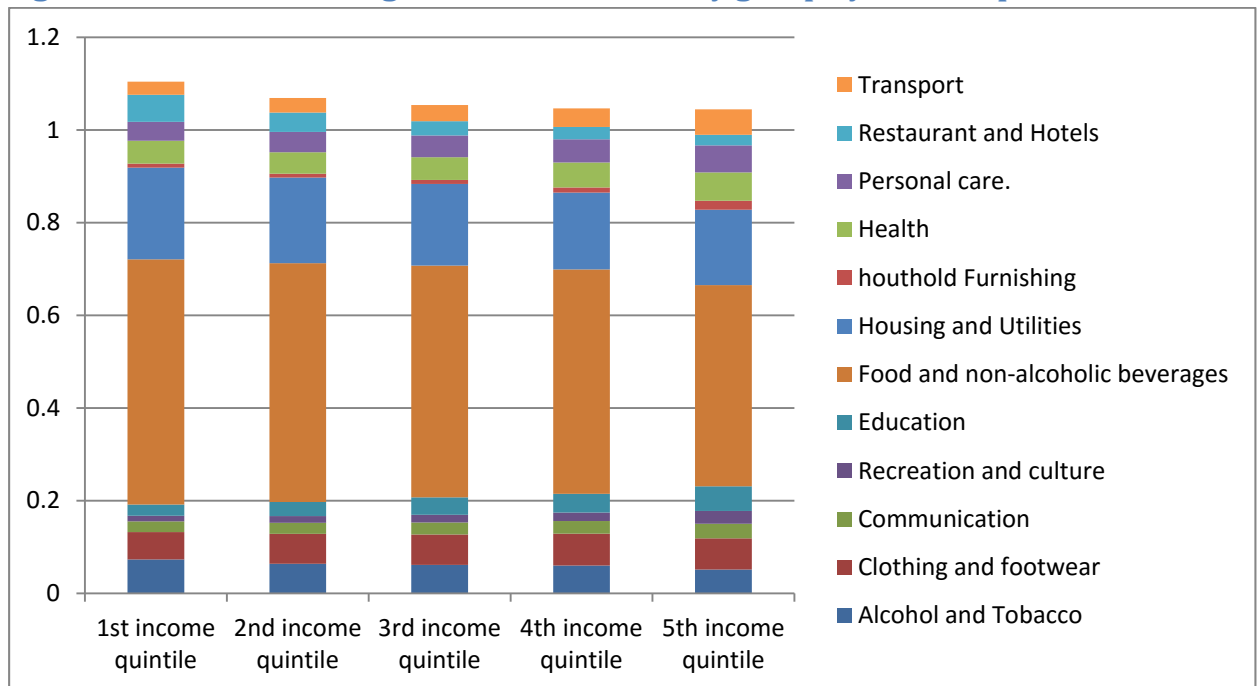


Figure13 Democratic weights of each commodity group by income quintile2008

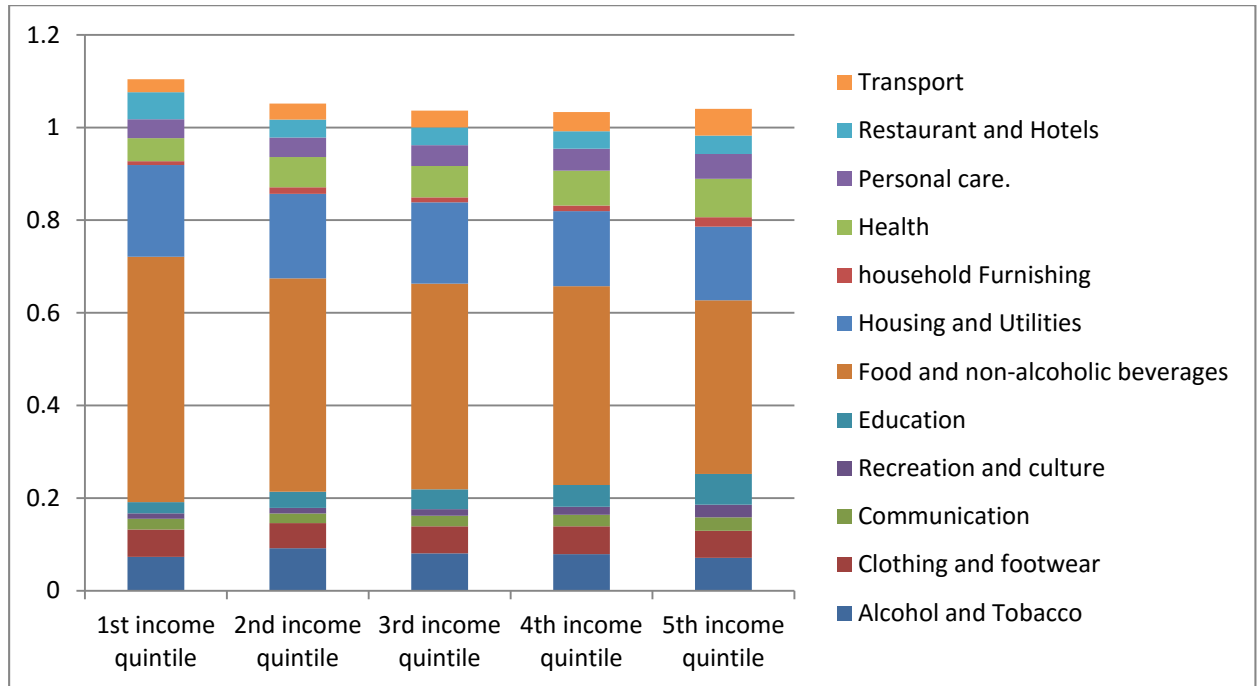


Figure14 Democratic weights of each commodity group by income quintile2010

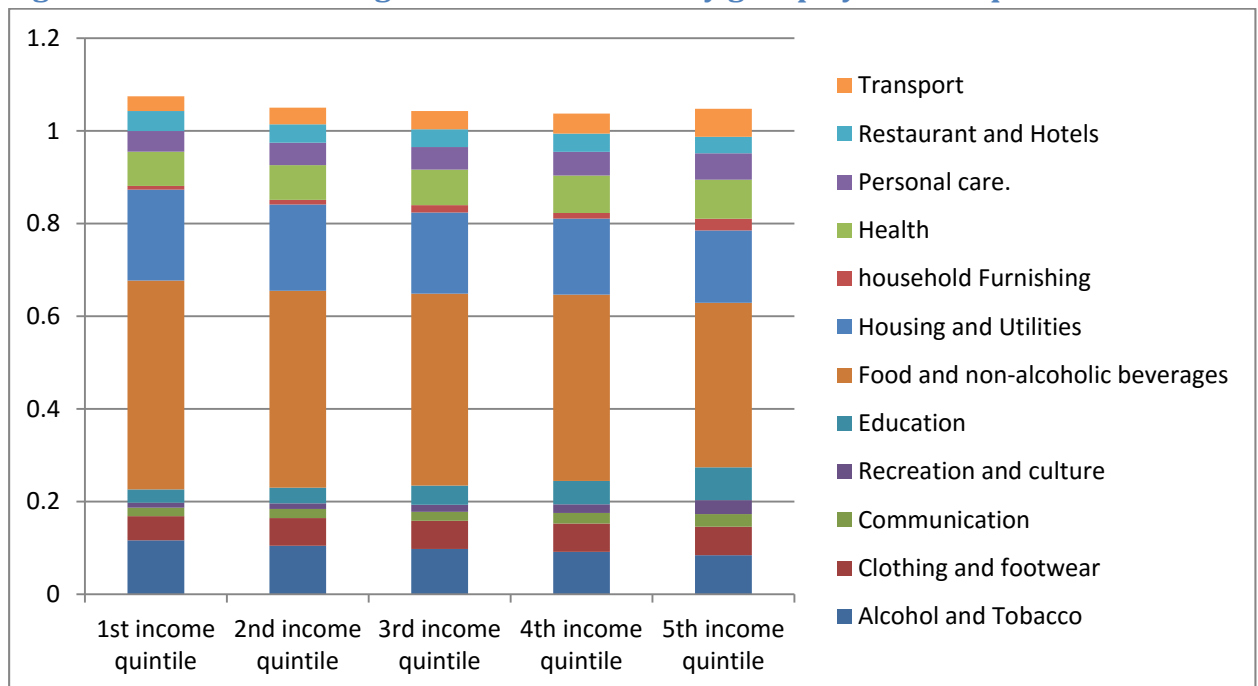
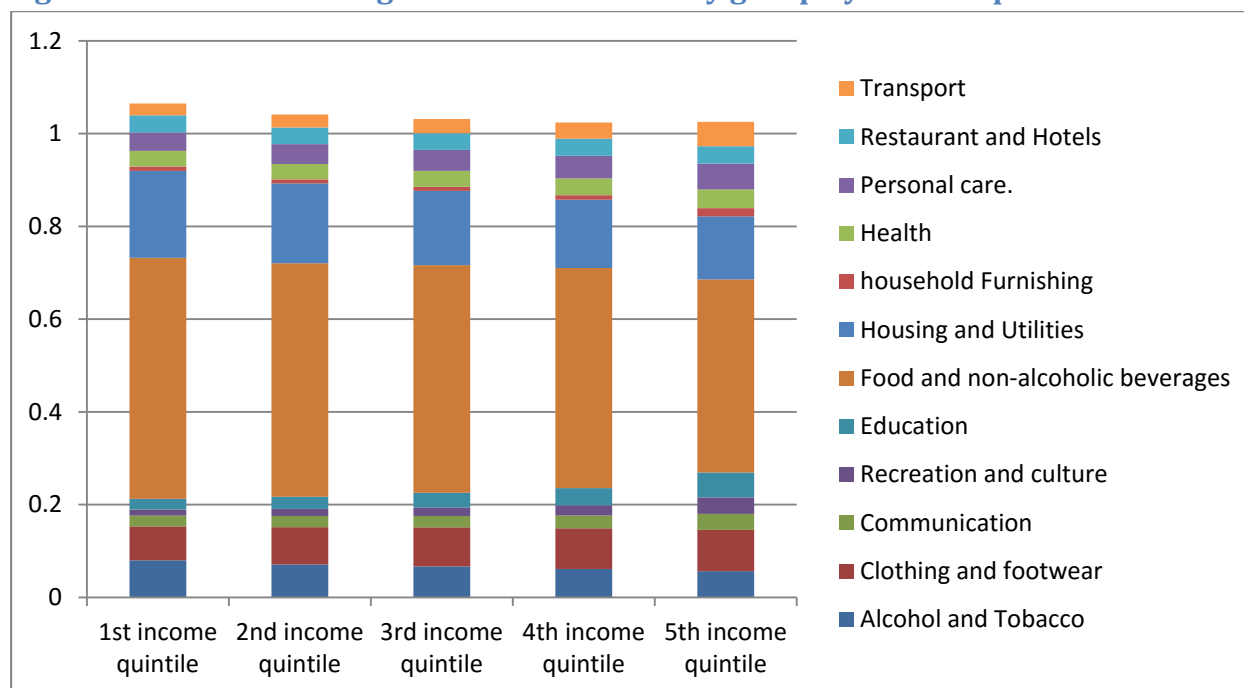


Figure15 Democratic weights of each commodity group by income quintile2012



Source: Author's calculations

First and foremost is the dominance of spending on food within total expenditure across households in all quintiles, but particularly in quintile one and two where expenditure on food is always above 45% of total expenditure and this is consistent for all years of analysis while for the richest quintile expenditure on food ranged between 37%-41%. This is compared to an average expenditure share for all households of 46 percent across years. Secondly, a number of expenditure categories are revealed to decline in importance relative to total expenditure as income increases. These are specifically tobacco products which account for nearly ten percent of total expenditure in quintile one, falling to around 8 percent in quintile five.

Thirdly, housing related expenditures increase from under 7 percent for the poor quintile and goes up to 16 percent in the rich quintile. This means that the richest quintile spends nearly three times more than quintile one households on housing. Moreover, spending on transport rises from 3.0 percent of expenditure in quintile one, to 6 percent in quintile five. Other expenditure categories that exhibit this pattern include furniture, medical care, communication, recreation and culture and education.

Lower income households also tend to have their expenditures concentrated in relatively few categories. Thus, more than 70% of expenditure in quintile one households is located in just three categories, namely food, housing and tobacco

In the 5th quintile, this proportion falls to between 50% and 55 percent, rising slightly. Consequently, it can be expected that poorer households are more vulnerable to inflation originating in their main expenditure categories than higher income households.

Table 8: Inflation Rate by Quintile 2004-2012

	1st Income Quintile	2nd Income Quintile	3rd Income Quintile	4th Income Quintile	5th Income Quintile
2004	26.6%	25.8%	25.3%	24.6%	23.09%
2008	29.8%	19.2%	18.72%	18.51%	17.73%
2010	14.0%	13.6%	13.0%	12.8%	12.0%
2012	20.1%	19.1%	18.6%	18.2%	17.6%

Table 8 shows the inflation rates experienced by each of the income quintiles throughout the period 1999-2012. It indicates that the waves of inflation faced by the poor are harder than those faced by the rich for all years under examination. The highest difference between the rich and the poor was faced in 2008 where the difference between the inflation faced by the poor and the rich was nearly 8%.

Interestingly enough, using 2010 as a reference year 2010-2012 official inflation is 17% which captures inflation faced by the highest income quintile while the poorest income quintile inflation was almost 3% higher with 20.1% figure. That is also the case from 1999-2004 inflation, official statistics show that inflation faced was 24.5 which captures 4th income quintile in our calculations. Again, the comparison is not quite accurate as the official statistics use different reference period and weights and a laspeyers formula rather than our weighted chain index, but it helps to give a sense of an underrated official inflation rate with respect to that faced by the poor.

Main contributors to inflation by income quintile

To examine why lowest income quintiles has faced the highest inflation rates as compared to their richest counterparts it is essential to investigate which specific commodities contributed to each income quintile inflation rate. The main factors affecting each commodity contribution is the rise in the commodity specific price or the increase of its specific weight in each relative income quintile consumption bundle. If both factors occur at the same time the item specific contribution to inflation becomes very high. This is witnessed in the categories of food, tobacco and housing and utilities

for the lowest income quintile. They account for above 60% of their expenditure weights and have witnessed an average price increase of 12% and 30% and 3 % respectively.

Table 9 Main Inflation Contributors by Expenditure Group, Democratic Indices, 1999-2013

1 st Quintile	2 nd Quintile	3 rd Quintile	4 th Quintile	5 th Quintile
Food and non-alcoholic beverages	Food and non-alcoholic beverages	Food and non-alcoholic beverages	Food and non-alcoholic beverages	Food and non-alcoholic beverages
Alcohol and Tobacco	Alcohol and Tobacco	Alcohol and Tobacco	Alcohol and Tobacco	Alcohol and Tobacco
Housing and Utilities	Housing and Utilities	Housing and Utilities	Housing and Utilities	Housing and Utilities
Health	Education	Education	Education	Education
Clothing and footwear	Health	Health	Health	Recreation and culture
Education	Clothing and footwear	Clothing and footwear	Clothing and footwear	Health
Communication	Recreation and culture	Recreation and culture	Recreation and culture	Clothing and footwear
Transport	Restaurant and Hotels	Restaurant and Hotels	Personal care.	household Furnishing
Personal care.	Personal care.	Personal care.	Restaurant and Hotels	Transport
Recreation and Culture	Transport	household Furnishing	Transport	Personal care.
household Furnishing	household Furnishing	Transport	household Furnishing	Restaurant and Hotels
Restaurants and Hotels	Communication	Communication	Communication	Communication

Source: Author's calculations

Expenditure elasticities exhibited in table 7 also play a role in determining how hard inflation hits different income groups. Income groups tend to suffer more from inflation in necessities rather than luxuries. Hence comes food, housing and tobacco on top of the list for all income quintiles which contribute to inflation more especially to the lowest income quintile due to their special consumption pattern.

Chapter 6 Policy Recommendations

The main policy recommendation will definitely be to provide more accurate tools of measuring inflation on a national level. Using democratic weights rather than conventional plutocratic weights might make a difference. Also reporting inflation data

disaggregated by income group can actually help develop better indexation policies such as social coverage and safety nets. The way inflation is reported now is only on rural/urban level. Also applying what Deaton (1998) mentioned regarding basing indexing Social Security payments to wages or to consumption, rather than to prices might help overcome the problem of the underestimation of inflation figures.

Moreover, more strict prices supervision policies will minimize the variation in the prices faced by different income groups in the economy and offset the random profit margins that private outlets sets on consumers pushing inflation figures up with no valid economic reasoning.

Finally, indexation policies should also target middle income that suffered most from inflation and restrained from consuming luxuries because there is not enough social coverage for the middle income which make them more exposed to inflation and mitigating its effect by changing their consumption pattern significantly overtime.

Chapter 7 Conclusion

This paper first investigates different consumption patterns among different income groups using trends in necessities and luxuries consumption. The paper has established that with time the gap between necessities and luxuries consumption has varied most for the middle income quintiles with the lowest and the highest quintiles maintaining their consumption expenditure pattern of necessities and luxuries steadily. This does not mean that there is no consumption inequality; it rather means that the gap has not widened overtime comparing these specific income quintiles. Since the gap in consumption exists, it contributes to relative perception of inequality.

The results of the probit model of the likelihood of the lowest income owning durable goods such as TVs, refrigerators, washing machine...etc show that the probability of owning a durable good increases overtime for the lowest income quintile as compared to the richest income quintile in the economy. This shows that standards of living overall has improved with time for the lowest income quintile.

Then we present an analysis of the inflation rates experienced by different types of households in Egypt between 1999 and 2012 based on their different consumption patterns. Using data from the Household Income and Consumption survey (HIECS) and

the Consumer Prices Index (CPI), it estimates inflation rates for households in each quintile of the income distributions.

This analysis draws a number of conclusions. First, the rate of inflation experienced by different types of household has varied markedly since 1999. These differences are most apparent when comparing the lowest and the highest income quintiles. More variation of inflation rates was witnessed in 2008. The national figures of inflation captures the inflation faced by the highest income quintile closer than that faced by the lowest income quintile. This shows that official inflation figures are underestimated and do not reflect the pace and magnitude of inflation faced by lower income quintiles. .

The analysis also suggests that the rising food and housing costs have played an important role for all income quintiles. While the movements in some prices have influenced all groups, their importance as drivers of inflation has differed substantially. The lowest income households were particularly exposed to the movements of food prices over this period, but were much less affected by the increasing price of education or culture and recreation activities . The richest quintile households, by contrast, were more exposed to price changes for education, and less exposed to movements in transportation costs. Comparing high and low expenditure groups, changes in the costs of utilities, food and drink account for most of the differences in inflation rates.

Our findings have several policy implications, of which two are particularly clear. First, better measurements of inflation with estimates of sub-income group estimates is substantial for better and more accurate reflection of the cost of living for each income category to allow for better distributional policies. Second indexation policies based on wages and consumption expenditure rather than inflation might help overcome the inflation measurement error. Finally, wider coverage to include middle class is needed as it is exposed to inflation differential with no safety net.

This paper presents a range of avenues for further study overcoming our research limitations. First, future research, more disaggregation of the lowest and the highest income quintile could be of use for more meaningful analysis of consumption and income inequality. Also, the probit model of durable goods could provide interesting results if applied on the middle income class compared to the highest five percent tale of the income distribution. This might rather show how middle income

living standards have performed over time as compared to the highest income categories especially given the results of the consumption inequality measures that suggest the middle income variations of necessities versus luxuries spending. It could also seek to quantify the extent to which different households face different prices for the same product. If different households face different prices for the same products, and if these prices grow at different rates, then their experience of inflation may differ from the estimates presented here.

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