



Federal Reserve Bank of Chicago

**Constructing the Chicago Fed Income  
Based Economic Index – Consumer  
Price Index: Inflation Experiences by  
Demographic Group: 1983-2005**

*Leslie McGranahan and Anna Paulson*

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Leslie McGranahan  
Federal Reserve Bank of Chicago

Anna Paulson  
Federal Reserve Bank of Chicago

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## Abstract

We use Consumer Expenditure Survey data from 1982-2004 and combine it with item-specific Consumer Price Index data to construct monthly chain-weighted inflation measures for thirty-one different demographic groups and for the urban population as a whole from 1983-2005. We find that the inflation experiences of the different groups are highly correlated with and similar in magnitude to the inflation experiences of the overall urban population. Over the sample period, cumulative inflation for the groups ranged from 195% to 212% as compared to inflation for the overall population of 201%. The group with the largest deviation from overall inflation consists of households where the head or spouse is 65 years of age or older. These households had cumulative inflation 5%, or 11 percentage points, higher than the average. We also find that the variability of inflation is higher for vulnerable populations as defined by demographic and income characteristics and lower for advantaged populations. In particular, we calculate that the standard deviation of inflation declines with educational attainment. This is the result of higher expenditure shares among the less educated on necessities with more variable prices, including food and energy. However, this difference in variability is fairly modest. The inflation rate of the least educated is 3% more variable than inflation for all urban households. We conclude that inflation is principally an aggregate shock and that the CPI-U does a reasonable job of measuring the inflation experience of the demographic groups that we investigate.

## **I. Introduction**

The goal of this project is to develop historical and contemporary Consumer Price Indexes (CPIs) for various vulnerable population groups of interest. We define vulnerability in terms of income or earning potential. We would like to be able to release group-specific price indexes in a timely manner for use in research and policy analysis. This is part of a larger project that aims to develop an array of macroeconomic measures for vulnerable populations. We are calling the output of this larger project the Chicago Fed Income Based Economic Index or CFIBEX.

We believe that measuring the inflation experiences of specific groups provides valuable information for a number of reasons. First off, it will help us better measure, quantify and understand the macroeconomic situation faced by vulnerable populations. For groups, such as Social Security recipients, whose benefit levels are determined by overall consumer prices, it will allow us to understand whether benefit levels have kept up with the inflation faced by these specific groups. For individuals with limited income or human capital, it will allow us to ask whether their experience over the business cycle is similar to or different from other population groups. In particular, we can ask whether the inflation faced by these groups serves to increase or mitigate their vulnerability to cyclical changes in the economy. Our investigation into group-specific inflation rates will also allow us to examine whether the experience of a specific group or a combination of groups can produce a more accurate forecast of future inflation or other macroeconomic variables of interest than can aggregate inflation.

Based on Consumer Expenditure Survey data from 1982 to 2004 and Consumer Price Index data from 1983 to 2005, we find that most vulnerable population groups have faced average inflation very similar to that faced by the overall population. However, the inflation of vulnerable populations has been slightly more variable. The exception to this pattern is the elderly, who have faced cumulative inflation that is approximately 5% higher than the average, but that has not been more variable than overall inflation.

This paper proceeds as follows: In the next two sections we briefly discuss the goal of price index measurement and the different price indexes released by the Bureau of Labor Statistics (BLS). In Section IV, we review previous US and international research on inflation experience across population subgroups. This is followed by an introduction

to our data sources in Section V and a discussion of our methodology in Section VI. In Section VII, we report our findings on the market baskets purchased by different population groups over the sample period and our calculations of group inflation rates. We compare our calculations to the BLS's CPI-U in Section VIII. Section IX concludes.

## **II. What is a Consumer Price Index?**

In order to measure inflation, government officials and researchers would like to calculate a Cost of Living Index, or COLI. The goal of a COLI is to ask how much it would cost in current dollars for an individual or household to obtain the same level of well being or utility that was achieved in some base period. Inflation is measured as the percentage change in the nominal cost of achieving that utility level. In practice, it is difficult to measure the utility of a specific market basket. Analysts have developed different ways to calculate an inflation measure that approximates this equal utility concept as closely as is practical. The principal measure of inflation reported by the BLS in the US, the CPI, calculates inflation as the percentage change in the cost of a specific market basket purchased in a base period. The market basket consists of all the goods and services purchased out of pocket by US households in the base period. This measure is an upper bound on the COLI because it does not allow for a household to enhance its well being by substituting across goods in response to changes in prices. The BLS updates this market basket periodically to incorporate changing expenditure patterns. More frequent updating of market baskets to reflect changes in the consumption choices of consumers – chain weighting – is one method of more closely approximating a COLI and is the methodology used in this paper and in some BLS data releases.

## **III. Published Data**

The Bureau of Labor Statistics releases a series of monthly Consumer Price Indexes. The most commonly cited of their published indexes, the CPI-U, measures inflation for the U.S. urban population. The urban population represents approximately 87% of the US population. The CPI-U has been published monthly since 1978. Through 1997, the data were based on market baskets that were updated approximately every 10 years. Since 1998, the market baskets have been updated more frequently. Indexation of

poverty thresholds are based on the CPI-U as are adjustments in many features of the tax code.

The CPI-W measures inflation for a subset of the urban population – those who earn more than half their family income from clerical or hourly wage jobs. This covers approximately 32% of the US population. The CPI-W has been published since 1913 and is used for the indexation of many collective bargaining contracts and for indexation of the benefit levels in numerous Federal programs including Social Security and Supplemental Security Income (SSI).

While the CPI-U and the CPI-W are the most well known of the Consumer Price Indexes developed by the BLS, the Bureau also puts out additional indexes for the benefit of researchers and analysts: the C-CPI-U, the CPI-U-RS and the CPI-E. The C-CPI-U is a chain weighted price index that uses weights updated monthly. Because of data availability issues, it is released in Initial, Interim, and Final form as more data become available. By chain-weighting it takes into account changes in consumption patterns that result from price changes in a more contemporaneous fashion than is permitted in the construction of the CPI-U. The C-CPI-U is available from 2000 to the present, with the Initial C-CPI-U being released at the same time as the CPI-U. The CPI-U-RS is the Consumer Price Index Research Series Using Current Methods. As the title states, this series uses current methodology to reconstruct the CPI-U for periods prior to the institution of this new methodology. These data are available from 1978 on. The CPI-E is an experimental price index for individuals 62 years of age or above. It re-weights the price changes used to create the CPI-U to account for the market basket consumed by individuals who are potentially eligible for Social Security. The CPI-E's market baskets are calculated for the same time periods as are used for the measurement of the CPI-U. The methodology used in this paper is similar to that used for the creation of the CPI-E in that we construct market baskets based on the expenditure patterns of specific population groups. However, our methodology is different from that used in the construction of the CPI-E in that we use chain-weighting.

#### **IV. Previous Research**

##### ***A. U.S. Based Research***

We are not the first to investigate the inflation experiences of specific population groups. In particular, researchers at the BLS have looked at the inflation experiences of the elderly and the poor. As mentioned, an investigational price index for the elderly population, the CPI-E, is constructed by the BLS. This index has been analyzed on two occasions by BLS researchers. Both sets of researchers found that the price index for older Americans rose slightly faster than the CPI-U and CPI-W. Specifically, the most recent study was conducted by Amble and Stewart (1994) and covers the period from December 1987 through December 1993. The authors construct a CPI for elderly people using a fixed market basket based on the expenditure patterns of elderly households and find that the index for older Americans rose 28.7 percent over the period while the CPI-U had a 26.3 percent change and the CPI-W a 25.5 percent change. They attribute this divergence to increases in medical care prices, which rose more than twice as fast as the average for all items over the period. Since the elderly typically spend a greater share of their total expenditures on health costs, they conclude that the medical care component accounted for most of the difference between the experimental index and the CPI-U. The BLS has continued to update this series periodically, most recently for data through 2003 (BLS 2004).

The BLS also conducted and published a study by Garner et al. (1996) which investigates inflation among the poor. The authors use three concepts of poor to construct different price indexes to measure inflation for this group between 1984 and 1994. They define consumer units as being poor if either their household income or expenditures fall below the official Census poverty threshold or if they are participant poor, that is if someone in the consumer unit participates in selected welfare programs. Using expenditure weights derived from the 1982-1984 and 1992-1994 Consumer Expenditure Surveys, they find that there is little difference between the experimental CPIs produced for the poor and the CPI that corresponds to the entire population. The authors conclude that since the poor and the general population face similar trends in relative prices, indexing social assistance payments or poverty thresholds to the experimental index for the poor instead of to the overall CPI would not result in a large change.

Hobjin and Lagakos (2003) examine the degree of inflation inequality across American households between 1987 and 2001. Using expenditure weights that are updated in each time period, they construct group price indexes for various demographic groups. The authors find that over the period, the elderly faced an inflation rate that was roughly 0.2-0.4 percentage points higher than the rate of all other consumer units. Like Amble and Stewart (1994), they attribute most of this difference to higher medical care expenditures by the elderly. They also find there are few persistent differences in the price indexes of whites and non-whites. Similarly, there are no systematic differences in the inflation rates of the rural and urban populations. The authors discover that households with kids younger than 18 years old seem to face lower inflation than all other households. They explain this by noting that these households generally have lower health care expenditures and also are not spending a significant share of their expenditures on college education, two categories that have experienced greater than average price increases. Finally, they note that since poor households spend a relatively large portion of their income on gasoline, the nation's poor appear to be particularly hard hit in times of inflation when gas prices are high.

### ***B. International Research***

Studies exploring inflation inequality across households are not limited to the U.S. In their 2002 paper, Crawford and Smith investigate how inflation rates vary across demographic groups in the UK. The authors use data from the UK counterpart to the CES, namely the Family Expenditure Survey (FES), to construct group-specific Retail Price Indexes (RPI) over the 1976 to 2000 period. They find that on average, roughly a third of households faced inflation rates within 1 percentage point of the overall RPI rate at any point in time. They also conclude that the average annual inflation rate for the poorest decile of households was a statistically significant 0.3 percentage points lower than the highest income decile. Similarly, on average non-pensioners are found to experience higher inflation rates than the elderly population. Because health care provision is nationalized in the UK, this divergence from the US experience is not surprising. Finally, the authors find that in general, mortgagors, the employed, and



childless households experienced inflation rates which were slightly higher than the average throughout the period.

Murphy and Garvey (2004) use data from the Irish Household Budget Survey to construct inflation figures for the lowest income decile from 1989-2001. They also construct price indexes for both the urban poor and the rural poor, which are composed of households that fall in the lowest income deciles in each area. Upon comparing these indexes to the published State measure, they find that from 1989 to 1996 all group inflation rates were similar. From 1996 to 2001, however, prices for the urban poor rose significantly more than for the general population, while the price index for the rural poor approximated that of the population as a whole. They allot much of the divergence between the urban poor index and the State measure to rental costs, cigarette and clothing costs, and mortgage interest.

A handful of studies on group inflation differentials in Canada have been carried out over the years. Taktek (1998) explores the inflation experiences of certain socio-economic groups, including low-income households, low-income senior citizen households, and senior citizen households. Using fixed weights representing the 1992 market basket of goods, she constructs price indexes over the 1993-1996 period. She concludes that the findings of her study are comparable to those of earlier Statistics Canada studies, which determined that the inflation experiences of a given subgroup of the population do not differ substantially from the experiences of the population as a whole.

In a more recent study, Chiru (2005b) explores whether inflation varies with income across Canadian households. He constructs CPIs for the 20% of the population with the lowest incomes and the 20% with the highest incomes, comparing the inflation experiences of the two groups. He finds that between 1992 and 2004, the lowest and highest income groups took turns having higher inflation rates, and at the end of the period, the cumulative and average inflation rates were almost identical. Specifically, prices rose 24.4% for the highest income quintiles, with an annual average rate of 1.83% while they rose 24.7%, or 1.86% a year on average, for the lowest income group. As such, he concludes that inflation does not vary substantially across income levels. In another paper, Chiru (2005a) investigates whether inflation is higher for Canadian seniors

over the 1992 to 2004 period, comparing this group's inflation rates to non-senior households and to all households combined. He finds that the overall CPI quite accurately represented the inflation experience of seniors over the period. Specifically, households composed of seniors experienced an average annual rate of inflation of 1.95%, just slightly higher than a rate of 1.84% for non-senior households and 1.86% for all households combined. He notes that the slightly higher inflation over the period derives from higher inflation rates among seniors from 1998 to 2002. He attributes this disparity to increases in homeowners' costs and energy prices during this window – areas that comprise a larger share of the budgets of seniors.

Some researchers have also looked at the variability in the inflation experiences of different households. This work has found that there is substantial variation across households and that most variation occurs within rather than across groups.

Most previous research, both U.S. based and for other developed nations, has concluded that there is little variation in inflation across population groups with the exception of the elderly in the U.S. We build on the previous US-based work by looking at a broader array of population groups for a longer time period and by chain weighting. We also use both the Interview and Diary portions of the Consumer Expenditure Survey to compute market baskets. Most previous work has only used the Interview portion. Our methodology does not allow us to look at the variation of the inflation experience within population groups. Previous research has found that there is substantial inflation variation across households within groups. Our application of the data and the groups that we choose to investigate are described in detail in the next section.

## **V. Data**

### ***A. Consumption Data***

We use the Consumer Expenditure Survey (CES) to calculate market baskets for each of the groups of interest and item-specific Consumer Price Index data to price the items in the market basket. The CES is a nationally representative survey that asks individuals about the consumption and purchasing habits of their household. The survey has been conducted annually since 1980, and was conducted once per decade prior to 1980. The survey has two components: the Interview and Diary. The Interview

component asks about expenditure over the three months leading up to the month of the survey. Consumer units (the name given to CES households) are surveyed in five consecutive quarters. The focus of the Interview portion is larger ticket items that respondents are likely to recall up to three months after purchase. The Diary component asks households to keep detailed expenditure diaries for two consecutive weeks. The Diary survey captures smaller, high frequency purchases that are more difficult to recall, such as expenditures on food and household supplies. Both the Interview and Diary components ask respondents about demographic characteristics. In our analysis we use both the Interview and Diary Surveys, as does the BLS in its calculation of the official CPI. Also following the BLS, we restrict our sample to urban households. For the majority of this paper, we use data from 1982-2004, the most recent data currently available. In some places we use data from 1980 and 1981. In 1982, the definition of expenditure on owner occupied housing changed. The nature of this change and its implications are discussed in greater detail below.

### ***B. Defining Groups***

Our goal is to calculate market baskets and measure inflation for the overall urban population and for 31 different population groups and their complements (e.g. Elderly and Non-Elderly). We include a broad array of groups focusing on those that are frequently labeled as disadvantaged or vulnerable in the policy literature. All groups are comprised of individuals from within the urban population because the BLS only collects prices from urban sources. Of these 31 groups, 13 are based on demographic characteristics such as race while 18 are based on income, either alone or in combination with other characteristics.<sup>1</sup>

Table 1 displays definitions for all 31 of the groups while Table 2 gives the weighted fraction of the urban population falling into the population categories in selected years over the sample period according to the Interview data. The group definitions are based on the substantial demographic information provided in the data. Individuals are asked about their education, race, age, marital status, family structure,

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<sup>1</sup> The income data in the CES are imperfect. As will be discussed later in the text, we take advantage of the panel nature of the data to calculate a more precise measure of income than is available from any one survey.

work status and income. Over half of the groups are based on income as income is a straightforward measure of disadvantage. It should be noted, however, that the income data available in the CES are mediocre. The CES is fundamentally an expenditure survey and expenditure data are more reliably collected than income data. In the Interview Survey, only 80% of the sample in each quarter is considered a “complete income reporter,” indicating that income was collected from one or more primary income source (e.g. wages). “Incomplete income reporters” provide no information on any primary income source. In order to measure income as accurately as possible given the available data, we combine the income data provided by the CU in all of the survey quarters in which it responded to the Interview Survey and was a complete income reporter. Using data from all quarters, we calculate our best measure of annual income that corresponds to the year leading up to interview period. For the Diary data, we use income over the 12 months leading up to the survey. Because the two Diary surveys take place in consecutive weeks, there is little scope to take advantage of the panel nature of the data.

We divide the sample into those above and below both the poverty line and twice the poverty line. We also divide the sample into four quartiles of overall income and also income adjusted for family size based on the National Academy of Sciences equivalence scales. In addition to these groups, we divide the poor and non-poor based on their work status. The working poor live in households where more than 1750 hours are worked a year (35 hours per week, 50 weeks per year), but the family remains below poverty. This is consistent with the Census Bureau’s definition of the working poor.

We treat the reference person and spouse symmetrically in defining the groups. For instance, we base the highest education variable on the highest level obtained by either the head or the spouse. We do this for consistency because there is some randomness in the definition of the reference person in the CES. According to the questionnaire, the reference person is the “person or one of the persons who owns or rents this home.” No further elaboration is made and either spouse in a married couple household could be the reference person assuming the house is owned or rented jointly. In 80% of married couple households, the reference person is the husband.

The racial and ethnic groups are defined as mutually exclusive so that the entire population is divided into four groupings – White, Black, Hispanic, and Other Race. This

decision was made in order to maintain comparability across groups. In order to do this, consumer units that would potentially fall into two racial or ethnic categories are only placed in one. A family is considered to be Black if either head or spouse is Black. A family is considered to be Hispanic if neither head nor spouse is Black and either head or spouse is of Spanish Origin. A family is considered to be Other Race if either Head or Spouse is non-White, but neither is Hispanic nor Black. This categorization was driven by ease of use rather than by other concerns.

From Table 2 we see that the population percentages for these groups have been fairly stable over the analysis period with some notable exceptions. The Hispanic sample has grown in keeping with an expansion in the U.S. Hispanic population. The improvement in educational attainment of successive generations is also evident in the increase over time in the fraction of households falling into in the higher education categories and the decline in the fraction in the less educated categories. The inverted U-shape in the fraction of households receiving Food Stamps is the result of programmatic and eligibility reforms and is consistent with rates of receipt reported by the Committee on Ways and Means (2004). We can also see in Table 2 that some of the population groups are relatively small. Less than 10 percent of the population has consistently fallen into the Other Race, Single Mother and Food Stamp Recipient categories.

### ***C. Inflation Data***

Our data on prices also come from the BLS. We use the item-specific CPIs for the entire urban US to calculate price changes of the items in the market basket. The BLS also releases city-specific CPIs that we do not use for this project. Currently, for the overall US, the BLS collects prices on 305 different items and publishes 378 price series measuring the price changes on these items and combinations of these items. For most items, these data extend back to the beginning of our sample period. For some items, the item CPI only begins during the sample period. In these cases, we derive item price changes during the earlier years based on “old series” data also available from the BLS. In all cases, the periods for the old and new series overlap, allowing us to calculate inflation rates for all periods in the sample.

Ideally, we would like to match group expenditure to CPIs based on the price experiences of individuals within our groups of interest. Unfortunately, group-specific price data are not collected and we are constrained to use the CPIs for the entire urban population. As a result, all differences in our calculated group inflation rates arise from differences in the market basket. We discuss this assumption of identical prices in greater detail below.

## VI. Methodology

We calculated monthly chained year over year inflation for each demographic group based on expenditure from both the Diary and Interview portions of the CES using the formula presented in Hobijn and Lagakos (2003). In particular, we measure inflation in month  $t$  for group  $k$  as:

### Equation 1

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

Where  $j$  represents a specific expenditure item, there are  $m$  different expenditure items,  $\pi_{j,t}$  is a year over year inflation rate for item  $j$  and  $W_{j,t-12,k}$  is the expenditure weight of item  $j$  for the members of group  $k$  one year ago. The expenditure weight  $W_{j,t-12,k}$  is measured as:

$$W_{j,t-12,k} = \frac{X_{j,t-12,k}}{\sum_{j=1}^m X_{j,t-12,k}}$$

Where  $X_{j,t-12,k}$  is expenditure on item  $j$  by the members of group  $k$  12 months prior to time  $t$ . In the following sections we detail the decisions and data that combine to create the calculations.

### A. Merging Diary and Interview

We calculated monthly market baskets that we translate into expenditure weights,  $W_{j,t-12,k}$ , for groups combining the Diary and Interview portions of the CES. While most researchers using the CES use either the Diary or Interview depending on their

focus, we choose to use both. Using both sections allows us to get a more accurate picture of total group expenditure. The CES contains two sections because the designers and analysts generally believe that frequent small expenditures are more accurately measured with a short recall period while large ticket items are appropriately measured with a longer recall period. In particular, food, beverages, and non-durables are viewed as being better measured in the Diary while housing, transportation, and durables are viewed as better measured in the Interview. Recent research has found that combining Interview and Diary data yield different conclusions concerning expenditure inequality than using interview alone. (Attanasio, Battistin, and Ichimura 2004, and Battistin 2003) This indicates that combining the two surveys may influence substantive conclusions.

Expenditure in the CES is provided in the form of Universal Classification Codes (UCCs). Each UCC contains expenditure information on a specific item – e.g. “Men’s Footwear.” In the second quarter of 2004, there were 256 UCCs unique to the Diary, 337 unique to the interview, and 231 in both surveys giving a total of 824 UCCs. The numbers of UCCs vary by survey year and quarter. In order to use both surveys, we need to choose how to merge across the surveys and which items to get from each survey when the item is contained in both surveys. Different individuals are surveyed within the two instruments, so in using both surveys we lose the ability to look at the consumption patterns of individuals. As a result, we also lose the ability to calculate any measures that are based on individual data. For instance, we lack individual measures of inflation and therefore cannot calculate inflation percentiles within groups.

We choose to create market baskets for each demographic group by merging the Diary and Interview together based on per capita expenditure on each UCC by group members.<sup>2</sup> This is not how the BLS does the analogous calculation for the overall population. The BLS calculates total expenditure on items and merges the total expenditure from the two surveys together to calculate a market basket. For the entire US population, the population counts in the Diary and Interview are nearly identical, which means that these two procedures yield similar results. However, for the groups, especially the smaller ones, the population counts differ across the survey instruments enough to make this difference important. Using per capita expenditure allows us to

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<sup>2</sup> For our analysis, we use the household weights provided in the sample.

move away from the random nature of sampling. If we were to use total expenditure rather than per capita we would be giving more weight to whichever part of the sample, Diary or Interview, represented the larger group population in a particular month.

We follow a template provided by the BLS (BLS 2003a) to determine which expenditure items to take from which survey. While the BLS may change these decisions on an annual basis, we follow the same template retrospectively except if an item is unavailable in the survey given in the template. In that case, we substitute it with the same item in the other survey.<sup>3</sup>

Using these processes, we are able to calculate market baskets for each demographic group. We aggregate the numerous UCCs into 12 large and 89 smaller combinations of items. The categories of items are listed by larger category in Table 3. We then translate these market baskets into expenditure shares.

We calculate these market baskets using two alternative definitions for expenditure on owner occupied housing – owner’s outlays (24A in Table 3) and rental equivalence (24B in Table 3). Owner’s outlays calculates housing expenditure among owner occupiers as based on actual expenditure on housing related costs such as mortgage interest, homeowner’s insurance and property taxes. This definition does not take into account the asset value of housing so individuals who chose high down payments or paid off their mortgages will have low housing costs. Rental equivalence measures home ownership expenses based on the response to the question: “If someone were to rent your home today, how much do you think it would rent for monthly, unfurnished and without utilities?” Rental equivalence essentially measures the service flow from housing. The outlay definition captures direct expenditure items which should be capitalized into the rent. This disparity will be discussed in greater detail below. For most of the discussion in this document, we will use the rental equivalence definition of expenditure on owner occupied housing. However, we calculated all of our measures using both definitions.

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<sup>3</sup> Some new expenditure items enter into the CES over time and others disappear. For new items, we add them as they come into the survey. Most of these items represent technological advances that were not purchased in the earlier years of the survey e.g. pager services were added in 2001. We delete items that disappear, but these disappear from consumption first.



### ***B. Matching Expenditure Shares with Prices***

Once we have calculated expenditure shares, we need to determine the inflation rates,  $\pi_{j,t}$  corresponding to each of the weights. Note that these item-specific inflation rates are not indexed by  $k$ , the group of interest. In our study, we instead assume that the inflation rates faced by all groups on each item are the same. As already mentioned, we would ideally like price indexes for each group. However, we do not have data on group-specific price indexes. That is, we are constrained to use one set of price indexes for all the groups because the BLS provides only one set of prices. Currently, the BLS even uses the same set of price quotes for the CPI-U and CPI-W. Until 1982, the BLS calculated different price series for the two measures, but found that they did not differ enough to justify the expense of calculating two separate series. Because we only use one set of prices, all of the differences in inflation rates across groups derive from differences in the market basket. We derive inflation rates on individual items from the price index data provided by the BLS. The inflation rate is calculated as the year over year percentage change in the price index.

We match inflation rates and expenditure categories based on the category labels and descriptions provided by the BLS. The matches between our 89 expenditure categories and the BLS price data is provided in Table 4. Some of the matches are straightforward, such as matching “pork” in the CES with “pork” in the CPI data. In some cases, we need to match more than one expenditure category to a given price index. For example, the price index for educational books and supplies is matched to expenditure on supplies for college, supplies for elementary school, and supplies for daycare. Similarly, the price index for medical care commodities is matched to the expenditure on both drugs and medical supplies. In a few instances, we average CPIs together to get the price index applied to a particular expenditure share. While we are uncertain of how the BLS matches expenditure categories and prices, there are two ways in which our approach differs from the BLS. First, we do not have access to some unpublished CPIs that are used by the BLS. Second, the BLS likely uses a finer breakdown of expenditure more tailored to guarantee a match across prices and spending. We believe that our matches are very close to those used by the BLS. This belief is

supported by the similarity of our index to the official published BLS index when we use the official BLS formula, which is discussed in the findings section below.<sup>4</sup>

Table 4 also shows the price level in December 2005 as a percentage of the level in January 1982 for each category of expenditure. Nominal prices in December 2005 for the larger expenditure categories range from 122% of the January 1982 level (apparel) to 612% of the 1982 level (tobacco products). As a result, groups that concentrate a higher fraction of their total expenditure on apparel will have faced lower inflation between January 1982 and December 2005. By contrast, groups that concentrate a higher fraction on tobacco products will have faced higher inflation.

### ***C. Chain Weighting***

The inflation rates that we calculate both overall and for specific groups are chain weighted. We use chain-weighted measures because of the problem of substitution bias in the fixed weight measures. By allowing weights to change across months, we are allowing individuals to change their purchasing behavior in response to changes in prices. We believe chain weighting to be particularly important because we believe that some groups may be more sensitive than others to price changes and as a result substitution bias may differ across groups.<sup>5</sup>

## **VII. Findings**

### ***A. Market Baskets***

The first step in our analysis is calculating market baskets for each of the groups of interest. We focus our discussion of market baskets on the rental equivalence definition for expenditure on owner occupied housing. We choose to use rental equivalence because the BLS currently uses rental equivalence in its calculation of the CPI-U. In particular, the weight given to homeownership costs depends on the service flow from housing. Likewise, the item CPI assigned to homeownership costs is based on estimates of price changes in equivalent rent. However, information on rental

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<sup>4</sup> We aggregate the UCCs into the 89 larger groups in order to facilitate matching with the pricing data. We could have performed the matching between CPIs and UCCs at the UCC level, but the matching would have been more complicated and may have deviated further from the BLSs methodology.

<sup>5</sup> In future research we aim to investigate the magnitude of substitution bias for different groups by looking at the difference between fixed quantity and chain weighted measures.

equivalence has only been available in the Consumer Expenditure Survey since 1982. Prior to that time, outlays were combined with information on house prices to determine the contribution of owner occupied housing to the CPI.

For this paper, we measure housing expenditure based on both owner's outlays and rental equivalence and also calculate inflation based on both measures. Our measure of outlays is not equivalent to the measure of expenditure on owner occupied housing used by the BLS prior to 1982 because the BLS also included a measure of home value in their calculation, which we do not do. From 1983-2004, the average monthly share of expenditure dedicated to owned dwellings according to the rental equivalence definition was approximately 19% as opposed to 13% based on outlays.<sup>6</sup> Inflation based on the rental equivalence time series can only go back as far as 1983. Outlays can be measured back until 1981, but we need to inflate these expenditures using the CPI for something other than outlays because the BLS does not calculate item CPIs for the categories of expenditure that contribute to the outlay definition of housing. We choose to inflate outlays based on the CPI for rental equivalence from 1983 forward and the CPI for shelter prior to 1983. Throughout the remainder of the paper, most of our charts and tables are based on rental equivalence and use expenditure data from 1982-2004 (matched with price data from 1983-2005). However, we add information on outlays using expenditure data from 1980-2004 and from 1982-2004 where either we believe a comparison between the two definitions may be informative or we are interested in lengthening the time-series to include the high inflation years at the beginning of the 1980s.

In Figure 1, we show monthly expenditure shares on our twelve aggregated categories of expenditure based on the rental equivalence definition of owner occupier housing expenditure for the entire urban population. All the other figures in this section are also rental equivalence based unless otherwise stated. A couple of patterns emerge

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<sup>6</sup> In 2004, the gap between outlay-based expenditure and rental equivalence is around 8% for most of the population groups that we analyze, with two exceptions. Elderly individuals, and other groups that contain many elderly individuals, have a gap about double that size. Given that many elderly households have paid off their mortgages, but still receive a substantial service flow from their housing, this is to be expected. Non-homeowners have no gap because they have no expenses from owned dwellings. The advent of rental equivalence in 1983 reduced the weight of housing in the CPI-U. Prior to the use of rental equivalence, the BLS used owners' outlays combined with a measure of the asset value of housing. This combination was greater than rental equivalence, while owners' outlays by itself is below it.

from the figure. First, housing, food, and transportation represent the great majority of expenditure for the overall population. We find that these three categories of expenditure combined represent roughly three-quarters of total expenditure. Second, there is a great deal of consistency over time in the percentage of expenditure represented by each of the categories, although we also observe a decline in the percentage of expenditure on food and an increase in the percent spent on housing over the sample period. Third, we see spikes in a number of the series. These arise from seasonal expenditure patterns. For example, transportation expenditure peaks in the car-buying spring months, apparel and services expenditure peak in the run-up to Christmas, and education expenditure peaks in August, September and January when tuition payments are made.

This section discusses and graphically presents the market baskets calculated for 31 sub-populations and their complements. We present results for four sets of groups. Our first set of groups is comprised of demographic groups of interest to some policymakers – Blacks, the elderly, and Food Stamp recipients. Our second set of groups is divided by educational attainment. The third set of groups is divided by equivalent income quartile. Our final set of groups divides households by poverty status and further divides the poor into the working and non-working poor. We display data from 2004; the most recent year of data available. The expenditure patterns both within and across groups have been fairly consistent over time.

Figure 2 displays the breakdown in expenditure for 2004 annual data for a selection of demographic groups – namely Blacks, the elderly, and Food Stamp recipients. We can see that a greater share of elderly expenditure is on health care, which is consistent with results found in the BLS studies discussed earlier. We also see that Food Stamp recipients spend a higher fraction on food.<sup>7</sup> We can also see that all three of the demographic sub-groups – Blacks, the elderly, and Food Stamp recipients -- spend a lower fraction on transportation than the overall population. However, for most of the larger categories, expenditure shares are fairly consistent across groups.

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<sup>7</sup> The Consumer Expenditure Survey measures direct expenditures independent of the method of payment. As a result, payments with Food Stamps are captured as expenditure. By contrast, payments made on behalf of individuals by employers or by the government, such as employer-provided health insurance or Medicaid are not included.

In Figure 3, we perform the same tabulation excluding the larger expenditure categories: food, health, housing, and transportation. By doing this, we can more easily discern differences in shares outside these large categories. We do not constrain the expenditure shares to sum to one so that we can discuss the shares in absolute terms rather than in relation to the excluded categories. We see that Blacks and the elderly expend a higher fraction on the excluded categories than the overall urban population, while Food Stamp recipients spend relatively less on the excluded categories. We also find that all three demographic sub-groups have a lower expenditure fraction on education than the overall population. Blacks and Food Stamp recipients spend a higher fraction on apparel and a lower fraction on entertainment than the overall population. By contrast, elderly individuals spend a lower fraction on apparel. In addition, Food Stamp recipients spend a higher share on tobacco than the total population and the other population groups. Overall, we find that vulnerable populations, with the exception of the elderly, spend a higher fraction of their total expenditure on necessities – food and apparel – and a lower fraction on discretionary items – education and entertainment – than the overall population.

We can also break down expenditure within the larger expenditure categories. In Figure 4, we display expenditure shares within transportation. In 2004, Blacks and Food Stamp recipients had higher expenditure shares within transportation on gas and oil than the overall population. Households in these two groups also had lower expenditure shares within transportation on new cars and higher expenditure shares on used cars than the overall population.

In Figure 5 - Figure 7, we show the same graphs by educational attainment that we just presented for the vulnerable population groups. From Figure 5 we see that the expenditure share on food is decreasing in educational attainment. In Figure 6 we see that the expenditure share on food, health, housing and transportation combined is also decreasing in educational attainment. By contrast, the expenditure share on education is increasing in educational attainment. We also find that the expenditure share on entertainment is the lowest for the least educated, while the expenditure share on apparel is the highest. These results are consistent with the results by demographic group presented earlier – like other vulnerable populations, those with low educational

attainment spend more on necessities. We also find that college educated households spend a tiny fraction of their total expenditure on tobacco as compared to the other groups. Within transportation (see Figure 7), we find that the least educated spend a higher fraction on used cars and gasoline than other groups while the most educated spend a low percentage on used cars and a high percentage on new cars.

In Figure 8-Figure 10, we show another set of graphs, this time by equivalent income quartile. We can see that the expenditure share on food is decreasing in income, a similar result to our findings based on educational attainment. We also find that households in the bottom quartile spend less on transportation than other households. These households likely have lower car ownership rates than higher income households. In Figure 9, we see that the expenditure share on items excluding food, housing, health, and transportation is increasing in income for the top three income quartiles. However, individuals in the bottom quartile spend relatively more on this subset of items, particularly apparel, education, and tobacco, compared to individuals in the second and third income quartiles. The high relative spending on education among households in the bottom quartile likely indicates the opportunity cost of education. In other words, some households may be in the bottom income quartile because individuals in those households are in school rather than in the workplace. Within transportation (Figure 10), we find declining gasoline and motor oil and used car expenditure shares as income increases. Conversely new car expenditure shares increase in income.

Our final set of bar graphs, Figure 11 - Figure 13, break down expenditure by poverty status and by work status within the poor population. Similar to the result found previously, we find higher food expenditure for the poor, independent of work status, than for the non-poor. We also see that the non-poor and working poor have higher transportation expenditure shares than the non-poor. This derives from the contribution of commuting costs to transportation expenditures. We also find that the non-working poor have higher expenditure shares outside food, health, housing and transportation, as shown in Figure 12. In particular, the non-working poor have high education expenditure shares. Again this is a result of the substitution between time spent at school and in the workplace. We also see high apparel expenditure shares among all the poor groups.

Finally, when we look within transportation (Figure 13), we see large expenditures on used cars and trucks among the working poor.

In the next series of figures, we look at how expenditure shares by group have changed both absolutely and relatively over time. We do this for four categories of expenditure – the shelter portion of Housing (based on both the rental equivalence and outlay measures of expenditures by owner occupiers), for Tobacco, for Health Care, and for Gasoline and Motor Fuel – and for the same four sets of socioeconomic/demographic groups. We choose these categories of expenditure for different reasons: shelter is the single largest subcategory of expenditure; tobacco has experienced major price change and is heavily taxed; health care is the category implicated in the high inflation experienced by the elderly; and gasoline is a good that has experienced high price volatility. Expenditure shares on these four items, for the four different sets of groups, are presented in Figure 14-Figure 29. In all of these figures, we present annual rather than monthly expenditure shares to abstract from seasonal variation in expenditure patterns.

For rental equivalent-based shelter, a subcategory housing, (in Figure 14a, Figure 15a, Figure 16a, and Figure 17a) we see a general upward trend in expenditure shares over time for all of the different groups depicted. We also see that the elderly, individuals with less than a high school diploma, individuals in the bottom income quartile, and the non-working poor have the highest shelter expenditure shares. By contrast, the working poor and individuals in the top two income quartiles have lower expenditure shares. When we present data on outlay based shelter (in Figure 14b, Figure 15b, Figure 16b and Figure 17b), we see quite a different pattern. We observe low expenditure shares among the elderly, a high and variable share among Food Stamp recipients, high expenditure shares among the most educated and the top income quartile, and higher expenditure shares among the non-working poor than among the poor and non-poor.

The disparity between rental equivalence and outlays derives from the fact that many homeowners have paid off significant parts of their mortgages or live in homes that have appreciated significantly since they were originally purchased. As a result, their mortgage costs are below the equivalent rental rate. We would anticipate that the gap

between outlay and rental equivalence shares should be larger for groups that are predominately owner occupiers and have low mortgage payments relative to the value of their homes. The elderly disproportionately fall into this category. By contrast, Food Stamp recipients and poorer or less skilled individuals are likely to be disproportionately renters.

When we look at the trends for expenditure on tobacco and smoking supplies (Figure 18-Figure 21), we see that tobacco shares are relatively high for most economically vulnerable groups. Tobacco expenditure shares monotonically decrease in both educational attainment and in income. We also observe that Food Stamp recipients spend a much higher (although still small) fraction on tobacco than the overall population, and that the poor have a higher expenditure share than the non-poor. We also see that for most groups presented in the figures, as well as for the overall population, this share has been declining over time. This decline in expenditure share has occurred at the same time as a more than five-fold increase in after-tax cigarette prices since 1982 (see Table 4).

Turning our attention to health care (Figure 22-Figure 25), we observe the well documented pattern of relatively high out-of-pocket health care expenditure among the elderly. In most years, elderly health care expenditure exceeded 10% of total expenditure. Among the other demographic groups, health care expenditure represents about 5% of expenditure. We also see a slight upward trend in the health care share for the overall population. Finally, we see relatively high health care expenditure among the least educated, and higher expenditure shares among the bottom two income quartiles compared to the top two quartiles. Individuals in the bottom quartiles may have higher out of pocket expenditures because they are less likely to have access to employer provided health insurance than their more educated and higher income counterparts. We also see low and falling health care expenditure shares among the working poor, and higher and rising shares among the non-poor. The declining health care expenditure share among the working poor may derive from the expansion of Medicaid to low-income working parents in the 1996 reform of federal welfare law.

The final set of figures (Figure 26-Figure 29) depict gasoline expenditure shares. The overwhelming pattern in these figures is the decline in the expenditure share on



gasoline during the sample period. This is the result of the low price elasticity of gasoline demand and the fact that real gasoline prices were declining over most of the sample period. We also see an increase in expenditure shares in the most recent years of data as gasoline prices have increased. According to the demographic group breakdowns (Figure 26), the elderly and Food Stamp recipients spend a lower share on gasoline than Blacks and the overall population. The educational breakdowns in Figure 27 show that the college-educated spend a smaller proportion of total expenditure on gas than the other groups. Similarly, the top income quartile devotes a lower share of expenditure to gasoline compared to the remaining quartiles. Finally, when we divide groups by poverty status (Figure 29), we observe high expenditure shares among the working poor and low expenditure shares among the non-working poor. The non-working poor have low commuting costs and may be unlikely to own a car, in contrast to the working poor who spend a high fraction of their resources getting to work.

As mentioned above, we calculate expenditure shares for 89 different expenditure categories and look at 31 different demographic groups and their complements. We exploit group differences in expenditure shares across all 89 of these categories in developing our measure of inflation.

### ***B. Inflation Rates***

Having developed monthly market baskets for our groups of interest, we can calculate inflation rates for each by determining the price changes for the items in these evolving market baskets, as detailed in Equation 1. We label our chain-weighted measure of inflation for the overall urban population the IBEX-Urban Population or IBEX-U. We calculate the IBEX-U based on both rental equivalence and housing outlays.

In Figure 30, we compare the monthly IBEX-U based on rental equivalence to year over year inflation rates derived from the BLS's official monthly CPI-U. We can see that the two measures track each other very closely. The correlation between the two measures is 0.98 and the absolute value of the difference between them averages 0.22% (see Table 7). This translates to about 7% of the average inflation rate of the IBEX-U of 3.12%. We also see that IBEX-U inflation rates tend to be lower than CPI-U inflation

rates. In 76% of months, CPI-U inflation exceeds the IBEX-U. We would expect this relationship because the IBEX-U is chain-weighted which should lead to lower inflation rates. We will discuss the comparison between these two measures in greater detail below.

In Figure 31, we compare our measure of overall urban inflation to our measure of inflation using the monthly market basket purchased by the elderly. These two series are also highly correlated. The coefficient of correlation is 0.98 (see Table 5a). We can see in the graph that in most months, inflation for the elderly is above inflation for the overall population. In fact, elderly inflation is higher than inflation for the non-elderly and for the overall population in 88% of months between January 1983 and December 2005. On average, monthly year over year elderly inflation exceeds non-elderly inflation by 0.28%.

We can perform the same series of calculations for all of the demographic groups of interest. Because of the high correlation between the measures across groups, it is difficult to analyze the patterns graphically. As a result, we tabulate a series of inflation-related statistics for each group in Table 5a-c and Table 6a-c. In panel (a) of each table, we present the statistics using the rental equivalence definition of owner occupied housing expenditure for the years 1983-2005 (based on expenditures from 1982-2004); in panel (b), we use the outlay definition of housing expenditures for the years 1983-2005 (also based on expenditures from 1982-2004); in panel (c), we continue to use the outlay definition of housing and expand the time series to cover the years 1981-2005 (based on expenditures from 1980-2004). We will base most of our discussion on the results in panel (a).

In the first column of each panel of Table 5, we present cumulative inflation based on the CPI-U, based on the IBEX-U, and for each demographic group. We do this from January 1982 through January 2005 for panels (a) and (b), and from January 1980 through January 2005 for panel (c).<sup>8</sup> In the second column these cumulative inflation rates are ranked (excluding the CPI-U). In the third column we show mean monthly year over year inflation for each group. In column four, we rank this measure. In column

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<sup>8</sup> These are based on annual expenditure shares to minimize the impact of seasonal patterns. We do January to January because our inflation measures are defined as year over year so we only want to count each month once.

five, we report the standard deviation of the mean inflation rate, which we rank in column six. In column seven, we report the correlation between monthly inflation for the group and our measure of monthly inflation for the overall urban population (the IBEX-U). In column nine, we report the correlation between monthly inflation for the group and monthly inflation for the overall urban population according to the official CPI-U. These measures are ranked in columns eight and ten, respectively.

A number of interesting patterns emerge from Table 5a. First, we see that the elderly population has the highest cumulative and average monthly inflation. Over the period, total cumulative elderly inflation has been 11 percentage points, or 5.5% higher than overall inflation. This is smaller than the 9% cumulative gap found in the Amble and Stewart (1994) study. The gap between overall inflation and group inflation is much smaller for all of the other groups. The other groups that have experienced cumulative inflation rates four percentage points or more above the overall population are the non-working poor, the non-working non-poor, the bottom income quartile, and the least educated. The groups comprised of individuals who are not working contain many elderly individuals, so that result is consistent with the findings concerning the elderly. The groups that have experienced inflation rates four or more percentage points below the overall population are Blacks, Hispanics, single mothers and Food Stamp recipients. The pattern for Food Stamp recipients can partly be explained by the high relative apparel spending and low health care spending of this group. As detailed in Table 4, apparel prices have grown slowly, while health care prices have increased rapidly over the past two decades. For the remainder of the groups, the gap between cumulative group inflation and cumulative inflation for the urban population is less than 4 percentage points. This leads us to the conclusion that with the exception of the elderly, on average, vulnerable populations have faced inflation that is similar in magnitude to the inflation of the overall population.

In Column 3, we present mean monthly year over year inflation for each of the groups. Consistent with the discussion of cumulative inflation, the elderly and groups that contain many elderly individuals have experienced the highest mean inflation. We also see that mean inflation is monotonically decreasing with income. In other words, the highest inflation rate is among the bottom income quartile, while the lowest inflation rate

is among the top quartile. The mean inflation rate among the lowest equivalent income group is very close to the inflation rate of individuals living below the poverty line and twice the poverty line. This is reassuring given that the same households should fall into these three categories. Likewise, working individuals living above the poverty line have inflation similar to individuals in the top income quartile. The gap among the equivalent income quartiles is small. The difference between the top and bottom quartile is on average 0.14 percentage points -- just less than 5% of average urban inflation. We do not see a similar pattern when we look by education category. Instead, we find relatively high inflation among the least and the most educated. College educated households have high education expenditure shares, which may explain why their inflation experience has been above that for the overall population. As detailed in Table 4, nominal prices for education in 2005 were over four times their 1982 levels. The high inflation among the least educated is consistent with the high inflation among the bottom quartile of income, but may also arise because of cohort effects, with lower educational attainment among older generations.

In column 5, we look at the variability of inflation by group by measuring the standard deviation from the mean. We find that the elderly have the lowest variability of all of our population groups. Interestingly, when we look at inflation variability based on the outlay definition of owner occupied housing, in Table 5b and 5c, we find the variability of elderly inflation is the same as for the overall urban population. This indicates that the low variability partly derives from the high housing expenditure of the elderly when we use the rental equivalence definition. The other groups with low inflation variability are those who are not working (particularly the non-poor) and those in the top income quartile. By contrast, the households facing the highest inflation variability are the working poor and Food Stamp recipients. When we look at volatility by equivalent income, we see higher variability among the poorest compared to the richest. We also see higher variability among the least as compared to the most educated. Overall, inflation variability is higher among the vulnerable population groups, particularly the working poor, and lower among less vulnerable groups. Many of these patterns become more pronounced when we look at inflation variability using outlay-based housing expenditure.

In column 7 of Table 5a, we present correlations of our measure of group-specific inflation with our measure of total urban inflation (the IBEX-U, Rental Equivalence). By construction, this correlation is highest for those groups such as whites and homeowners that represent the largest fraction of the population. We can see from these correlations that total urban inflation and group-specific inflation is highly correlated for all of the groups. More than half of the groups we look at have correlations of 0.99 or above. The lowest correlation, 0.89, is for Food Stamp recipients whose program participation leads to distinct expenditure patterns. Outside of Food Stamp recipients, the lowest correlation is for the working poor, who have a correlation of 0.96 despite the fact that they represent between 4 and 5 percent of the urban population. These high correlations indicate that inflation is in large part an aggregate phenomenon.

The correlations between our calculation of group inflation and the official CPI-U are presented in column 9. The order of these measures is comparable to the correlations with the IBEX-U. The differences in magnitudes are discussed in more detail in the section below where we compare the IBEX-U and CPI-U.

We investigate these relationships in a complementary manner in Table 6a-c. In column 1, we display the percent of months that inflation for the group is higher than inflation for individuals outside of the group (i.e. the elderly as compared to the non-elderly). In column 2, we display the average monthly difference between annual inflation for those inside and outside the group. In column 3, we display the average difference in months when overall urban inflation is above its mean, and in column 4, we display the average difference when inflation is below its mean. In column 5, we test whether these differences are equal. In other words, we test whether the difference between overall inflation and group inflation is the same when overall inflation is high and when overall inflation is low. In column 6, we show the average of food and energy expenditure as a percent of total expenditure for the group, and in column 7, we rank the percentages in column 6.<sup>9</sup>

This table confirms the findings in Table 5. The elderly have faced higher inflation than the non-elderly in 88% of months. Elderly inflation has been higher than

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<sup>9</sup> We define energy expenditure as the sum of expenditures on natural gas, electricity, fuel oil and other fuels, and gasoline and motor oil.

non-elderly inflation both when overall inflation is high and when overall inflation is low. For college educated households, we find their inflation is low relative to other households when overall inflation is high, and high relative to other households when overall inflation is low, indicating that the purchasing patterns of this group mitigate price variability. We see a similar pattern for the top income quartile – their inflation is much lower than the inflation of other households when overall inflation is high, while their inflation is similar to the inflation of other households when overall inflation is low. By contrast, for the least educated two groups, the average difference in their inflation and the inflation of other households is higher when overall inflation is already high. For the working poor, their inflation is higher than the inflation of other households when overall inflation is high and lower than the inflation of other households when overall inflation is low, indicating that price swings are more pronounced for this group.

One possible explanation for these patterns is that less educated individuals, lower income individuals, and the working poor spend more on non-core items (i.e. food and energy) than the remainder of the population. Because prices are more variable for these items, the overall variability of inflation is increased for these groups. In order to investigate this hypothesis, we show non-core expenditure as a percentage of total expenditure in column 6. Non-core spending for the overall population is 23%. Generally, vulnerable groups spend more on non-core items, which tend to be necessities. Many policy discussions focus on core inflation; our results indicate that this focus on core inflation less accurately reflects the inflation experience of vulnerable populations than the experience of other populations.

The results from Tables 5 and 6 indicate that inflation is largely an aggregate shock and is highly correlated across groups. In keeping with previous research, we find the elderly to be the exception to this general conclusion. This justifies the focus on the elderly in discussions of group-specific inflation. From 1983-2005, the elderly have faced higher inflation than the overall population. However, even the gap between cumulative elderly inflation and cumulative overall inflation has been a modest 11 percentage points over this extended period. We also find that many vulnerable populations, particularly the working poor, have faced more variable inflation than the remainder of the population. In particular, inflation for these groups is relatively high

when overall inflation is high and relatively low when overall inflation is low, indicating that fluctuations are amplified for these groups. Conversely, we find that the most educated and those in the top income quartile have experienced less variable inflation. Combined, these results lead us to the conclusion that price stability in general is more important for vulnerable populations than for the less vulnerable.

### ***C. Contributions to Inflation***

One of the advantages of the formula we use is that it is additive; summing the inflation from different sources. This allows us to calculate contributions to inflation from different categories of expenditure. In particular, the contribution to inflation from all the items,  $c$ , in category  $C$  can be measured as:

$$\pi_{t,k,C} = \sum_{c \in C} W_{c,t-12,k} \pi_{c,t}$$

In Figure 32, we depict the contributions to total inflation coming from three different sources – transportation, housing, and all other categories -- for the overall urban population. The graph shows that much of the variability in inflation is driven by transportation, while the average overall level of inflation is driven by comparably stable patterns of inflation from housing and other goods. We provide a similar comparison for core and non-core items.<sup>10</sup> Core inflation excludes the volatile food and energy components from the inflation measures. This breakdown is presented in Figure 33. We can see from the Figure that core inflation has been more stable than non-core inflation. However, we also see that most inflation arises from price changes on core goods. In addition, inflation from core items has been lower since 1995 than it was prior to that time. Prior to January 1995, inflation from core goods was consistently above 2%, while it has almost always been below 2% since January 1995.

In Figure 34, we divide transportation inflation into its component parts -- vehicle purchases, gasoline and motor oil, and other transportation (which includes other vehicle expenses and public transportation). In this graph, we see the crucial role gasoline and motor oil prices play in driving transportation inflation and hence overall inflation. There

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<sup>10</sup> This is not the same as core and non-core inflation. Core inflation measures the weighted average change in all core goods, while the measure presented here measures the contribution to aggregate inflation from core items.

are also some periods in which inflation on vehicle purchases influences overall transportation inflation.

We can perform this same exercise for the inflation of different groups. In Figure 35, we compare inflation from health care expenditure for the elderly and non-elderly with total inflation for these two populations. We see that for the elderly, inflation from health care expenditure is larger than for the rest of the population. We further observe that the gap between the contributions to inflation from health care expenditure is larger than the gap in total inflation. This indicates that all of the difference between elderly inflation and the inflation of the non-elderly can be explained by differences in health care expenditure and that inflation due to other goods mitigates the difference. We can also ask what proportion of total inflation arises from health care for the two groups. We find that on average health care inflation accounts for 19% of inflation for the elderly, while it accounts for only 9% of the inflation for the non-elderly.<sup>11</sup>

In Figure 36, we disaggregate inflation into non-core (food and energy) and total inflation for the least and most educated sub-populations. From the Figure, we can see that the least educated have higher non-core inflation when non-core inflation is high for both the least and most educated and more negative non-core inflation when non-core inflation for both education groups is negative. We also see that the difference in total inflation for these two groups is smaller than the difference in non-core inflation. This suggests that spending on core goods attenuates the difference in inflation caused by non-core spending.

## **VIII. Comparisons with the Official CPI**

One final issue with our calculations is how our overall urban inflation rates, the IBEX-U, Rental Equivalence, differs from the official CPI-U, and why. We graphed the two measures of inflation in Figure 30 and saw that the CPI-U and IBEX-U were very similar, although not exact. We would expect these two measures to differ for a number of reasons. First, we are constrained to use different data than that used by the BLS. The BLS calculates overall inflation by aggregating inflation from different areas in the U.S.

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<sup>11</sup> This calculation makes sense because total inflation and health care inflation are positive in all months for both the elderly and non-elderly population.



They begin by constructing area-specific market baskets, which they subsequently match to area-specific item-specific CPIs. We cannot replicate this methodology because the publicly released version of the CES has a limited amount of geographic data. Therefore, we create nationwide market baskets that we match to nationwide item-specific CPIs. The BLS also changes the items they get from the Diary and Interview frequently, we use the categorizations from 2003 retrospectively, as was explained in greater detail earlier. We also only use publicly available price series and do not have access to some CPIs, such as the one for health insurance. Furthermore, we do not know how the BLS matches expenditure categories with item-CPIs, although our matches are likely similar to those used by the BLS.

In addition to using different data than the BLS, we also use a different formula. Our formula relies on monthly chain-weighting where the BLS fixes expenditure reference periods, essentially fixing quantities, for extended periods. The reference period used by the BLS changed every ten years through 1995, and now changes every two years. In addition, BLS weights are based on two years of expenditure while our weights are based on one month of expenditure.

We can divide the gap between the CPI-U and the IBEX-U, Rental Equivalence into that arising from differences in the formulas used and differences in the available data by using our national data and our matches between expenditure items and item CPIs and the BLS's formula for the CPI-U. The exact calculations made by the BLS are discussed in Chapter 17 of their handbook (BLS 2003b). We mirror these calculations to the best of our ability by using the same formula used by the BLS and using the same expenditure reference periods subject to our data constraints. We label our version of the CPI-U (using rental equivalence for consistency with the BLS) the "MP CPI-U". We are able to calculate this measure from 1988-2005.<sup>12</sup> The CPI-U for 1978-1986 uses 1972-1973 expenditures, data that we have not processed, and we would need the 1986 CPI-U to calculate 1987 inflation.

In Figure 37, we compare inflation based on the official CPI-U with the IBEX-U and the MP CPI-U. We can see in the figure that MP CPI-U inflation is very close to the

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<sup>12</sup> We could actually calculate this for months in 2005 for which item CPIs have been released – currently January through October.

official CPI-U inflation.<sup>13</sup> Because the lines are so close together, it is difficult to discern some of the patterns from the graph. As a result, we present comparisons between the MP CPI-U, based on both rental equivalence and outlays, the IBEX-U, based on both rental equivalence and outlays, and Official CPI-U inflation in Table 7. In Column 1, we present the correlation between our inflation measures and official CPI-U inflation. In Column 2, we show average monthly year over year inflation for the different inflation measures. In Column 4, we show the percent of months that our measures are above the CPI-U. Lastly, in Column 5, we show the absolute value of the average difference between our measures and official CPI-U inflation.

We find that MP CPI-U inflation is higher than the IBEX-U, but lower than the official CPI-U. We would expect MP CPI-U inflation to be higher than IBEX-U inflation because MP CPI-U inflation is not chain weighted. As discussed earlier, chain weighting reduces inflation because it takes into account changes in expenditure patterns that result from changes in relative prices. We did not have an expectation on the direction of the difference between the CPI-U and the MP CPI-U. We also find that official CPI-U inflation is more highly correlated with the MP CPI-U based on rental equivalence than with the CPI-U based on outlays. Given that the official CPI-U is based on rental equivalence, we would anticipate this result as well.

In the average month, the absolute value of the difference between the CPI-U and the IBEX-U Rental Equivalence is 0.22%. When we adopt the formula used by the BLS and calculate the MP CPI-U, this absolute difference drops to 0.13%. Based on these numbers, we conclude that 40% of the gap between the CPI-U and the IBEX-U is caused by differences in the formula used. The remainder of the difference must be attributed to differences in data usage and availability.

## **IX. Conclusions**

We calculate group inflation rates using Consumer Expenditure Survey data and item-specific price data from the BLS. We find that these group-specific inflation rates are very similar to the inflation rate for the total urban population with two exceptions.

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<sup>13</sup> The gap between the CPI-U and MP CPI-U appears to be largest in months close to January 1998, 2002 and 2004. These are the months in which the BLS switches weights. This suggests that we may be transitioning from one set of weights to another incorrectly. How these transitions are handled is not explicitly stated in BLS formula, so we are researching this issue further.

First, the inflation rate for the elderly population has been higher on average than the inflation rate for the overall urban population. Second, the inflation rate for less educated, working poor, and bottom quartile equivalent income households has been more variable than the overall urban inflation rate, while the inflation rate for the college educated and top quartile equivalent income households has been less variable. However, even these differences are fairly modest. Elderly inflation has been above urban inflation by 11 percentage points, or 5.5%, over 23 years, and inflation has been 3.0% more volatile for the bottom equivalent income quartile than for the urban population generally.

## References

Amble, Nathan and Ken Stewart (1994) "Experimental Price Index for Elderly Consumers," *Monthly Labor Review*, May 11-16.

Attanasio, Orazio, Erich Battistin, and Hidehiko Ichimura, (2004) "What Really Happened to Consumption Inequality in the US?" NBER Working Paper No. 10338, March.

Battistin, Erich, (2003) "Errors in Survey Reports of Consumption Expenditures," Institute for Fiscal Studies Working Paper: 03/07, May.

Bureau of Labor Statistics (2003a) "Consumer Expenditure Survey, 2000-2001" Washington: D.C.: U.S. Department of Labor, Bureau of Labor Statistics, Report 969, September.

Bureau of Labor Statistics (2003b) *Handbook of Methods*, Washington: D.C.: U.S. Department of Labor, Bureau of Labor Statistics available on the Internet at <http://www.bls.gov/opub/hom/home.htm>. Accessed 11/23/05.

Bureau of Labor Statistics (2004) "Experimental Consumer Price Index for Americans 62 Years of Age and Older, 1998-2003," Consumer Price Index Program, Bureau of Labor Statistics, January, 2004. Available on the Internet [www.bls.gov/cpi/cpiexpcpie2004.pdf](http://www.bls.gov/cpi/cpiexpcpie2004.pdf). Accessed 11/23/05.

Cage, Robert, John Greenlees, and Patrick Jackman (2003) "Introducing the Chained Consumer Price Index," U.S. Bureau of Labor Statistics, May 2003. Available on the Internet at: [http://www.bls.gov/cpi/super\\_paris.pdf](http://www.bls.gov/cpi/super_paris.pdf) accessed November 14, 2005.

Chiru, Radu (2005a) "Is Inflation Higher for Seniors?" Ottawa: Statistics Canada (Catalogue No: 62F0014MPB, Series No.13).

Chiru, Radu (2005b) "Does Inflation Vary with Income?" Ottawa: Statistics Canada (Catalogue No: 11-621-MIE- No.030).

Committee on Ways and Means (2004) "2004 Green Book: Background Material and Data on the Programs Within the Jurisdiction of the Committee on Ways and Means," Washington, DC: U.S. GPO, March. Available in the Internet at: <http://www.gpoaccess.gov/wmprints/green/2004.html>. Accessed 11/28/05.

Crawford, Ian and Zoe Smith (2002) "Distributional Aspects of Inflation," Institute for Fiscal Studies Commentary 90, June.

Garner, Thesia, David Johnson, and Mary Kokoski (1996) "An Experimental Consumer Price Index for the Poor," Monthly Labor Review, September 32-42.

Hobijn, Bart and David Lagakos, (2003) "Inflation Inequality in the United States," Federal Reserve Bank of New York: Staff Reports, Staff Report no. 173, October.

Murphy, Eithne and Eoghan Garvey (2004) "A Consumer Price Index for Low-Income Households in Ireland (1989-2001)," Combat Poverty Agency Working Paper 04/03, October.

Taktek, Nathalie (1998) "Comparative Study of Analytical Consumer Price Indexes (CPI) for Different Subgroups of the Reference Population," Ottawa: Statistics Canada (Catalogue No: 11-621-MIE20055027).

**Table 1: Group Definitions**

GROUP (Within Urban Pop)	Definition
1 All	All urban consumer units
2 Elderly	Reference person or spouse 65 or over
3 Below Poverty Line	Consumer unit income below federal poverty line given household composition
4 Below 2x Poverty Line	Consumer unit income below twice federal poverty line given household composition
5 Working Poor	Consumer unit income below federal poverty line given household composition and annual hours worked by all members of consumer unit 1750 or more
6 Working Poor (2x PL)	Consumer unit income below twice federal poverty line given household composition and annual hours worked by all members of consumer unit 1750 or more
7 Working Above Poverty Line	Consumer unit income above poverty line and annual hours worked by all members of consumer unit greater than or equal to 1750
8 Working Above 2x Poverty Line	Consumer unit income above twice poverty line and annual hours worked by all members of consumer unit greater than or equal to 1750
9 Poor Not Working	Consumer unit income below federal poverty line (given household composition) and annual hours worked by all members of consumer unit less than 1750
10 Poor Not Working (2x PL)	Consumer unit income below twice federal poverty line (given household composition) and annual hours worked by all members of consumer unit less than 1750
11 Not Working Not Poor	Consumer unit income above poverty line and annual hours worked by all members of consumer unit less than 1750
12 Not Working Not Poor (2x PL)	Consumer unit income above poverty line and annual hours worked by all members of consumer unit less than 1750
13 Other Race	Reference person or spouse is American Indian, Aleut, Eskimo, Asian or Pacific Islander, or other race Neither reference person nor spouse is Black or Afro-American Neither reference person nor spouse is of Spanish origin
14 White	Reference person and spouse are white Neither reference person nor spouse is Black or Afro-american Neither reference person nor spouse is of Spanish origin
15 Hispanic	Origin of reference person or spouse is Spanish Neither reference person nor spouse is Black or Afro-American
16 Black	Reference person or spouse is Black or of Afro-American origin
17 College Educated	Either head or spouse has a Bachelor's degree or higher degree
18 Highest Ed = Some College	Either head or spouse has some college, or an Associate's degree Neither head nor spouse has a Bachelor's degree or higher degree
19 Highest Ed = High School Grad	Either head or spouse is a high school graduate Neither head nor spouse attended some college or higher
20 Highest Ed = <High School	Neither head nor spouse is a high school graduate
21 Bottom Quartile Equiv. Income	Household income adjusted for family size using National Academy of Sciences scale is in bottom quartile among households in monthly sample
22 Quartile 2 Equiv. Income	Household income adjusted for family size using National Academy of Sciences scale is in second quartile among households in monthly sample
23 Quartile 3 Equiv. Income	Household income adjusted for family size using National Academy of Sciences scale is in third quartile among households in monthly sample
24 Top Quartile Equiv. Income	Household income adjusted for family size using National Academy of Sciences scale is in top quartile among households in monthly sample
25 Bottom Quartile Income	Household income unadjusted for family size is in bottom quartile among households in monthly sample
26 Quartile 2 Income	Household income unadjusted for family size is in second quartile among households in monthly sample
27 Quartile 3 Income	Household income unadjusted for family size is in third quartile among households in monthly sample
28 Top Quartile Income	Household income unadjusted for family size is in top quartile among households in monthly sample
29 Saver	Consumer unit either received income from savings, assets or pension, or put money into a pension
30 Single Mother	Consumer unit headed by unmarried female between 18 and 64 with own children 17 or under
31 Homeowner	Reference person owns home with or without mortgage
32 Food Stamp Recipient	Annual value of Food Stamps received is greater than zero

\*All definitions based on 1996 variable names. Some variable names and definitions changed over the sample period.

**Table 2: Fraction of Population Belonging to Groups in Selected Years**

<b>Demographic Group</b>	<b>Year</b>				
	<b>1983</b>	<b>1988</b>	<b>1993</b>	<b>1998</b>	<b>2003</b>
1 All	1.0000	1.0000	1.0000	1.0000	1.0000
2 Elderly	0.2028	0.2042	0.2165	0.2065	0.2001
3 Below Poverty Line	0.1705	0.1591	0.1707	0.1536	0.1495
4 Below 2x Poverty Line	0.4074	0.3728	0.3938	0.3783	0.3574
5 Working Poor	0.0415	0.0426	0.0415	0.0445	0.0406
6 Working Poor (2x PL)	0.1567	0.1466	0.1483	0.1550	0.1399
7 Working Above Poverty Line	0.5968	0.6269	0.6000	0.6306	0.6263
8 Working Above 2x Poverty Line	0.4816	0.5229	0.4933	0.5201	0.5271
9 Poor Not Working	0.1290	0.1165	0.1291	0.1092	0.1088
10 Poor Not Working (2x PL)	0.2507	0.2262	0.2454	0.2233	0.2175
11 Not Working Not Poor	0.2327	0.2140	0.2294	0.2157	0.2242
12 Not Working Not Poor (2x PL)	0.1110	0.1043	0.1129	0.1015	0.1155
13 Other Race	0.0217	0.0343	0.0322	0.0468	0.0551
14 White	0.7951	0.7797	0.7530	0.7309	0.7000
15 Hispanic	0.0681	0.0698	0.0876	0.0916	0.1139
16 Black	0.1150	0.1162	0.1272	0.1306	0.1311
17 College Educated	0.2545	0.2597	0.2803	0.3035	0.3231
18 Highest Ed = Some College	0.2412	0.2430	0.2620	0.3085	0.3114
19 Highest Ed = High School Grad	0.3057	0.3048	0.2886	0.2556	0.2414
20 Highest Ed = <High School	0.1986	0.1925	0.1692	0.1325	0.1241
21 Bottom Quartile Equiv. Income	0.2503	0.2501	0.2502	0.2502	0.2502
22 Quartile 2 Equiv. Income	0.2500	0.2500	0.2504	0.2499	0.2498
23 Quartile 3 Equiv. Income	0.2498	0.2500	0.2496	0.2499	0.2504
24 Top Quartile Equiv. Income	0.2499	0.2499	0.2498	0.2499	0.2495
25 Bottom Quartile Income	0.2502	0.2502	0.2506	0.2504	0.2507
26 Quartile 2 Income	0.2501	0.2501	0.2496	0.2497	0.2495
27 Quartile 3 Income	0.2498	0.2499	0.2500	0.2503	0.2507
28 Top Quartile Income	0.2498	0.2499	0.2498	0.2496	0.2492
29 Saver	0.4504	0.4426	0.4155	0.3544	0.3237
30 Single Mother	0.0534	0.0534	0.0614	0.0565	0.0573
31 Homeowner	0.5936	0.5940	0.5987	0.6167	0.6486
32 Food Stamp Recipient	0.0606	0.0601	0.0830	0.0536	0.0457

**Table 3: Expenditure Categories**

1 food	5 transportation
1 cereals and cereal products	49 new cars and trucks
2 bakery products	50 used cars and trucks
3 beef	51 other vehicles
4 pork	52 gasoline and motor oil
5 other meats	53 vehicle finance charges
6 poultry	54 maintenance and repairs
7 fish and seafood	55 vehicle insurance
8 eggs	56 vehicle rental, leases, licenses, other charges
9 dairy products	57 airline fares
10 fresh fruits	58 intercity bus fares
11 fresh vegetables	59 intracity mass transit fares
12 processed fruits and vegetables	60 local transportation, out of town trips
13 sugar and other sweets	61 taxi fares and limousine service on trips
14 fats and oils	62 taxi fares and limousine service
15 miscellaneous foods	63 intercity train fares
16 nonalcoholic beverages	64 ship fares
17 food- out of town trips	65 school bus
18 food away from home	6 health care
2 alcoholic beverages	66 health insurance
19 beer and ale	67 medical services
20 whiskey	68 drugs
21 wine	69 medical supplies
22 other alcoholic beverages	7 entertainment
23 alcoholic beverages away from home	70 fees and admissions
3 housing	71 television, radios, sound equipment
24A owned dwellings -- owner's outlays	72 pets
24B owned dwellings -- rental equivalent	73 toys, games, hobbies, and tricycles
25 rented dwellings	74 playground equipment
26 other lodging and services	75 mainly sports
27 natural gas	76 photo equipment
28 electricity	77 pinball, electronic video games
29 fuel oil and other fuels	8 personal care products
30 telephone services	78 personal care products
31 water and other public services	9 personal care services
32 household operations	79 personal care services
33 laundry and cleaning supplies	10 reading
34 other household products	80 reading
35 postage and stationery equipment	11 education
36 household textiles	81 tuition for colleges and universities
37 furniture	82 elementary and high school tuition and fees
38 floor coverings	83 tuition for other schools
39 major appliances	84 other school expenses, incl. rentals
40 small appliances, misc. housewares	85 schoolbooks, supplies, equipment for college
41 miscellaneous household equipment	86 schoolbooks, supplies, equip. for elem. school
4 apparel and services	87 schoolbooks, supplies, equipment for daycare
42 men's apparel	88 school supplies, etc- unspecified
43 boys' apparel	12 tobacco products and smoking supplies
44 women's apparel	89 tobacco products and smoking supplies
45 girls' apparel	
46 children's apparel	
47 footwear	
48 other apparel products and services	



**Table 4: Matching Expenditure Categories and Item CPIs**

<b>EXPENDITURE CATEGORY</b>	<b>Description of CPI Used</b>	<b>Cumulative Inflation (January 1982=1 to January 2005)</b>
<i>1 food</i>		<i>197%</i>
1 cereals and cereal products	Cereals and Cereal Products	193%
2 bakery products	Bakery Products	230%
3 beef	Beef and Veal	201%
4 pork	Pork	193%
5 other meats	Other Meats	183%
6 poultry	Poultry	193%
7 fish and seafood	Fish and Seafood	202%
8 eggs	Eggs	147%
9 dairy products	Dairy and Related Products	186%
10 fresh fruits	Fresh Fruits	343%
11 fresh vegetables	Fresh Vegetables	246%
12 processed fruits and vegetables	Processed Fruits Vegetables	180%
13 sugar and other sweets	Sugar and Sweets	170%
14 fats and oils	Fats and Oils	176%
15 miscellaneous foods	Other Foods	188%
16 nonalcoholic beverages	Nonalcoholic Beverages	147%
17 food- out of town trips	Other Food at Home	172%
18 food away from home	Food Away from Home	204%
<i>2 alcoholic beverages</i>		<i>205%</i>
19 beer and ale	Beer, ale, and other malt beverages at home	190%
20 whiskey	Whiskey at home	182%
21 wine	Wine at home	156%
22 other alcoholic beverages	Distilled Spirits at home	182%
23 alcoholic beverages away from home	Alcoholic Beverages away from home	260%
<i>3 housing</i>		<i>203%</i>
24A owned dwellings -- owner's outlays	Owner's equivalent rent of primary residence	233%
24B owned dwellings -- rental equivalent	Owner's equivalent rent of primary residence / Shelter (pre 1983)	233%
25 rented dwellings	Rent of Primary Residence	233%
26 other lodging and services	Lodging away from home	293%
27 natural gas	Utility (piped) gas service	243%
28 electricity	Electricity	154%
29 fuel oil and other fuels	Fuel oil and other fuels	171%
30 telephone services	Telephone Services	134%
31 water and other public services	Water and sewer and trash collection services	346%
32 household operations	Household operations	204%
33 laundry and cleaning supplies	Household cleaning products	167%
34 other household products	Housekeeping supplies	168%
35 postage and stationery	Postage	191%
36 household textiles	(Window coverings + other linens)/2	108%
37 furniture	Furniture and bedding	132%
38 floor coverings	Floor coverings	168%
39 major appliances	Appliances	64%
40 small appliances, misc. housewares	(Other appliances + dishes and flatware + nonelectric cookware)	121%
41 miscellaneous household equipment	Household furnishings and equipment	131%
<i>4 apparel and services</i>		<i>122%</i>
42 men's apparel	Men's Apparel	126%
43 boys' apparel	Boys' apparel	104%
44 women's apparel	Women's apparel	110%
45 girls' apparel	Girls' apparel	108%
46 children's apparel	Infants' and toddlers' apparel	127%
47 footwear	Footwear	122%
48 other apparel products and services	Apparel	122%

**Table 4: Matching Expenditure Categories and Item CPIs, Continued**

<b>EXPENDITURE CATEGORY</b>	<b>Description of CPI Used</b>	<b>Cumulative Inflation (January 1982=1 to January 2005)</b>
<i>5 transportation</i>		<i>170%</i>
49 new cars and trucks	New vehicles	144%
50 used cars and trucks	Used cars and trucks	164%
51 other vehicles	New and used motor vehicles	151%
52 gasoline and motor oil	Motor fuel	146%
53 vehicle finance charges	Private transportation	166%
54 maintenance and repairs	Motor vehicle maintenance and repair	220%
55 vehicle insurance	Motor vehicle insurance	373%
56 vehicle rental, leases, licenses, other charges	Private Transportation	166%
57 airline fares	Airline fare	243%
58 intercity bus fares	Other intercity transportation	160%
59 intracity mass transit fares	Intracity transportation	224%
60 local transportation, out of town trips	Intracity transportation	224%
61 taxi fares and limousine service on trips	Intracity transportation	224%
62 taxi fares and limousine service	Intracity transportation	224%
63 intercity train fares	Other intercity transportation	160%
64 ship fares	Other intercity transportation	160%
65 school bus	Intracity transportation	224%
<i>6 health care</i>		<i>359%</i>
66 health insurance	Medical Care Services	373%
67 medical services	Medical Care Services	373%
68 drugs	Medical Care Commodities	309%
69 medical supplies	Medical Care Commodities	309%
<i>7 entertainment</i>		<i>188%</i>
70 fees and admissions	Recreation services	260%
71 television, radios, sound equipment	Video and audio	83%
72 pets	Pets and pet products	163%
73 toys, games, hobbies, and tricycles	Toys and games	83%
74 playground equipment	Toys and games	83%
75 mainly sports	Sporting goods	119%
76 photo equipment	Photographic equipment and supplies	105%
77 pinball, electronic video games	Toys and games	83%
<i>8 personal care products</i>		<i>168%</i>
78 personal care products	Personal care products	168%
<i>9 personal care services</i>		<i>216%</i>
79 personal care services	Personal care services	216%
<i>10 reading</i>		<i>225%</i>
80 reading	Recreational Reading materials	225%
<i>11 education</i>		<i>462%</i>
81 tuition for colleges and universities	College tuition and fees	533%
82 elementary and high school tuition and fees	Elementary and high school tuition and fees	538%
83 tuition for other schools	Tuition, other fees, and childcare	494%
84 other school expenses, incl. rentals	Tuition, other fees, and childcare	494%
85 schoolbooks, supplies, equipment for college	Educational books and supplies	407%
86 schoolbooks, supplies, equip.for elem. school	Educational books and supplies	407%
87 schoolbooks, supplies, equipment for daycare	Educational books and supplies	407%
88 school supplies, etc- unspecified	Educational books and supplies	407%
<i>12 tobacco products and smoking supplies</i>		<i>612%</i>
89 tobacco products and smoking supplies	Tobacco and smoking products	612%

**Table 5a: Inflation Statistics by Group, Rental Equivalence Definition of Housing, 1983-2005 (Based on Expenditures from 1982-2004)**

Column:	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10
	Cumulative Inflation (Jan. 1982 = 1 to Jan 2005)	Rank of Cumulative Inflation	Mean Monthly Inflation (Year over Year)	Rank of Mean Monthly Inflation	Std. Dev. of Monthly Inflation (Year over Year)	Rank of Std. Dev. Of Monthly Inflation	Correlation with Monthly IBEX-U	Rank of Correlation	Correlation with Monthly CPI-U	Rank of Correlation
Official CPI-U	202%		3.12%		0.0108		0.9673			
IBEX-U, Rental Equivalence Groups Not Defined By Income	201%	18	3.03%	18	0.0107	22				
Elderly	212%	1	3.27%	1	0.0102	32	0.9791	24	0.960	14
Other Race	204%	11	3.09%	11	0.0105	26	0.9755	27	0.941	26
White	201%	14	3.05%	14	0.0107	23	0.9996	1	0.968	2
Hispanic	196%	30	2.92%	30	0.0112	7	0.9836	22	0.958	16
Black	197%	29	2.95%	29	0.0112	6	0.9849	17	0.944	24
College Educated	201%	15	3.05%	15	0.0104	29	0.9932	11	0.963	7
Highest Ed = Some College	199%	21	3.01%	21	0.0109	18	0.9958	6	0.956	18
Highest Ed = High School Grad	200%	19	3.01%	20	0.0113	4	0.9907	15	0.960	12
Highest Ed = <High School	205%	7	3.11%	8	0.0111	10	0.9846	18	0.955	20
Saver	201%	17	3.04%	17	0.0107	25	0.9967	5	0.966	3
Single Mother	195%	32	2.91%	32	0.0109	16	0.9710	28	0.923	28
Homeowner	201%	16	3.04%	16	0.0108	21	0.9970	4	0.975	1
Food Stamp Recipient	195%	31	2.91%	31	0.0115	3	0.9363	31	0.894	31

**Table 5a: Inflation Statistics by Group, Rental Equivalence Definition of Housing, 1983-2005 (Based on Expenditures from 1982-2004), Continued**

Column:	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10
	Cumulative Inflation (Jan. 1982 = 1 to Jan 2005)	Rank of Cumulative Inflation	Mean Monthly Inflation (Year over Year)	Rank of Mean Monthly Inflation	Std. Dev. of Monthly Inflation (Year over Year)	Rank of Std. Dev. Of Monthly Inflation	Correlati on with Monthly IBEX-U	Rank of Corre lation	Correlati on with Monthly CPI-U	Rank of Correlati on
<u>Groups Partly or Wholly Defined by Income</u>										
Below Poverty Line	204%	10	3.11%	9	0.0112	5	0.9793	23	0.937	27
Below 2x Poverty Line	204%	8	3.11%	10	0.0110	13	0.9921	14	0.957	17
Working Poor	199%	20	3.02%	19	0.0121	1	0.9617	30	0.916	30
Working Poor (2x PL)	199%	23	3.00%	22	0.0117	2	0.9837	21	0.943	25
Poor Not Working	208%	6	3.18%	6	0.0109	17	0.9624	29	0.922	29
Poor Not Working (2x PL)	210%	2	3.22%	2	0.0104	28	0.9786	26	0.949	22
Working Above Poverty Line	198%	27	2.97%	27	0.0109	15	0.9986	2	0.964	6
Working Above 2x Poverty Line	198%	28	2.97%	28	0.0108	19	0.9982	3	0.965	5
Not Working Not Poor	210%	3	3.21%	3	0.0102	31	0.9842	19	0.962	9
Not Working Not Poor (2x PL)	208%	4	3.19%	4	0.0102	30	0.9788	25	0.956	19
Bottom Quartile Equiv. Income	204%	9	3.12%	7	0.0111	8	0.9884	16	0.953	21
Quartile 2 Equiv. Income	203%	12	3.07%	12	0.0110	11	0.9928	12	0.961	10
Quartile 3 Equiv. Income	199%	22	3.00%	23	0.0110	12	0.9949	8	0.962	8
Top Quartile Equiv. Income	198%	25	2.98%	25	0.0105	27	0.9925	13	0.960	11
Bottom Quartile Income	208%	5	3.19%	5	0.0108	20	0.9840	20	0.947	23
Quartile 2 Income	203%	13	3.07%	13	0.0109	14	0.9938	10	0.960	13
Quartile 3 Income	198%	24	2.99%	24	0.0111	9	0.9950	7	0.959	15
Top Quartile Income	198%	26	2.97%	26	0.0107	24	0.9946	9	0.966	4

**Table 5b: Inflation Statistics by Group, Outlay Definition of Housing, 1983-2005 (Based on Expenditures from 1982-2004)**

Column:	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10
	Cumulative Inflation (Jan. 1982 = 1 to Jan 2005)	Rank of Cumulative Inflation	Mean Monthly Inflation (Year over Year)	Rank of Mean Monthly Inflation	Std. Dev. of Monthly Inflation (Year over Year)	Rank of Std. Dev. Of Monthly Inflation	Correlati on with Monthly IBEX-U	Rank of Corre lation	Correlati on with Monthly CPI-U	Rank of Correlat ion
Official CPI-U	202%		3.12%		0.0108		0.9600			
IBEX-U, Housing Outlays <u>Groups Not Defined By Income</u>	198%	17	2.98%	17	0.0113	22				
Elderly	208%	1	3.19%	1	0.0114	20	0.9840	19	0.953	16
Other Race	202%	7	3.06%	8	0.0109	31	0.9729	27	0.937	25
White	199%	15	3.00%	15	0.0113	23	0.9996	1	0.960	10
Hispanic	194%	30	2.88%	30	0.0116	15	0.9837	21	0.952	18
Black	194%	29	2.90%	29	0.0118	9	0.9846	18	0.934	26
College Educated	200%	14	3.01%	13	0.0108	32	0.9917	11	0.960	12
Highest Ed = Some College	197%	20	2.96%	20	0.0115	18	0.9959	6	0.947	20
Highest Ed = High School Grad	197%	22	2.95%	22	0.0122	3	0.9894	15	0.946	22
Highest Ed = <High School	201%	11	3.05%	11	0.0120	4	0.9822	23	0.940	24
Saver	198%	16	2.98%	16	0.0113	26	0.9968	5	0.961	8
Single Mother	194%	32	2.88%	31	0.0113	25	0.9699	28	0.916	29
Homeowner	198%	18	2.97%	18	0.0116	17	0.9972	4	0.966	1
Food Stamp Recipient	194%	31	2.88%	32	0.0119	8	0.9348	31	0.886	31

**Table 5b: Inflation Statistics by Group, Outlay Definition of Housing, 1983-2005 (Based on Expenditures from 1982-2004), Continued**

Column:	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10
	Cumulative Inflation (Jan. 1982 = 1 to Jan 2005)	Rank of Cumulative Inflation	Mean Monthly Inflation (Year over Year)	Rank of Mean Monthly Inflation	Std. Dev. of Monthly Inflation (Year over Year)	Rank of Std. Dev. Of Monthly Inflation	Correlati on with Monthly IBEX-U	Rank of Corre lation	Correlati on with Monthly CPI-U	Rank of Correlat ion
<u>Groups Partly or Wholly Defined by Income</u>										
Below Poverty Line	202%	8	3.06%	7	0.0119	5	0.9780	26	0.926	27
Below 2x Poverty Line	202%	10	3.05%	10	0.0118	10	0.9912	13	0.957	14
Working Poor	197%	19	2.97%	19	0.0128	1	0.9602	30	0.916	30
Working Poor (2x PL)	197%	21	2.95%	21	0.0124	2	0.9838	20	0.943	23
Poor Not Working	205%	4	3.14%	3	0.0116	16	0.9602	29	0.922	28
Poor Not Working (2x PL)	207%	2	3.16%	2	0.0114	21	0.9790	25	0.949	19
Working Above Poverty Line	196%	27	2.93%	27	0.0114	19	0.9988	2	0.964	4
Working Above 2x Poverty Line	196%	28	2.93%	28	0.0113	24	0.9983	3	0.965	3
Not Working Not Poor	206%	3	3.13%	4	0.0112	28	0.9872	17	0.962	6
Not Working Not Poor (2x PL)	205%	6	3.11%	6	0.0112	27	0.9807	24	0.956	15
Bottom Quartile Equiv. Income	202%	9	3.06%	9	0.0119	6	0.9874	16	0.953	17
Quartile 2 Equiv. Income	200%	12	3.01%	12	0.0119	7	0.9915	12	0.961	7
Quartile 3 Equiv. Income	197%	24	2.94%	23	0.0117	13	0.9949	7	0.962	5
Top Quartile Equiv. Income	197%	23	2.94%	24	0.0109	30	0.9910	14	0.960	9
Bottom Quartile Income	205%	5	3.13%	5	0.0116	14	0.9830	22	0.947	21
Quartile 2 Income	200%	13	3.01%	14	0.0117	11	0.9930	10	0.960	11
Quartile 3 Income	196%	26	2.94%	25	0.0117	12	0.9949	8	0.959	13
Top Quartile Income	196%	25	2.93%	26	0.0111	29	0.9938	9	0.966	2

**5c: Inflation Statistics by Group, Outlay Definition of Housing, 1981-2005 (Based on Expenditures from 1980-2004)**

Column:	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10
	Cumulative Inflation (Jan. 1980 = 1 to Jan 2005)	Rank of Cumulative Inflation	Mean Monthly Inflation (Year over Year)	Rank of Mean Monthly Inflation	Std. Dev. of Monthly Inflation (Year over Year)	Rank of Std. Dev. Of Monthly Inflation	Correlati on with Monthly IBEX-U	Rank of Corre lation	Correlati on with Monthly CPI-U	Rank of Correl ation
Official CPI-U	245%		3.53%		0.0186		0.9839			
IBEX-U, Housing Outlays <u>Groups Not Defined By Income</u>	237%	18	3.37%	17	0.0181	18				
Elderly	250%	1	3.58%	1	0.0182	16	0.9934	18	0.980	10
Other Race	242%	7	3.43%	11	0.0174	32	0.9872	28	0.974	22
White	238%	15	3.38%	15	0.0181	19	0.9998	1	0.984	6
Hispanic	232%	30	3.27%	31	0.0183	13	0.9924	22	0.978	14
Black	233%	29	3.29%	29	0.0186	4	0.9929	20	0.972	24
College Educated	239%	14	3.40%	13	0.0179	29	0.9964	14	0.985	3
Highest Ed = Some College	236%	21	3.35%	21	0.0181	22	0.9979	6	0.978	15
Highest Ed = High School Grad	235%	22	3.33%	24	0.0186	6	0.9949	15	0.975	19
Highest Ed = <High School	241%	11	3.44%	10	0.0187	3	0.9922	23	0.973	23
Saver	238%	16	3.37%	16	0.0181	20	0.9988	5	0.985	4
Single Mother	231%	32	3.27%	32	0.0179	28	0.9873	27	0.967	28
Homeowner	237%	17	3.37%	18	0.0185	10	0.9989	4	0.986	1
Food Stamp Recipient	231%	31	3.28%	30	0.0186	8	0.9717	31	0.951	31

**5c: Inflation Statistics by Group, Outlay Definition of Housing, 1981-2005 (Based on Expenditures from 1980-2004), Continued**

Column:	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8	Col. 9	Col. 10
	Cumulative Inflation (Jan. 1980 = 1 to Jan 2005)	Rank of Cumulative Inflation	Mean Monthly Inflation (Year over Year)	Rank of Mean Monthly Inflation	Std. Dev. of Monthly Inflation (Year over Year)	Rank of Std. Dev. Of Monthly Inflation	Correlati on with Monthly IBEX-U	Rank of Corre lation	Correlati on with Monthly CPI-U	Rank of Correl ation
<u>Groups Partly or Wholly Defined by Income</u>										
Below Poverty Line	242%	8	3.45%	8	0.0184	12	0.9901	26	0.968	27
Below 2x Poverty Line	241%	10	3.44%	9	0.0185	11	0.9964	12	0.977	17
Working Poor	236%	19	3.36%	19	0.0193	1	0.9822	29	0.957	30
Working Poor (2x PL)	236%	20	3.35%	20	0.0191	2	0.9930	19	0.972	26
Poor Not Working	245%	5	3.52%	4	0.0180	27	0.9819	30	0.962	29
Poor Not Working (2x PL)	248%	2	3.55%	2	0.0180	25	0.9914	25	0.975	20
Working Above Poverty Line	234%	27	3.32%	27	0.0182	17	0.9995	2	0.983	8
Working Above 2x Poverty Line	234%	28	3.31%	28	0.0181	21	0.9993	3	0.984	7
Not Working Not Poor	247%	3	3.52%	3	0.0180	26	0.9948	16	0.981	9
Not Working Not Poor (2x PL)	245%	6	3.50%	6	0.0179	30	0.9915	24	0.977	18
Bottom Quartile Equiv. Income	241%	9	3.45%	7	0.0185	9	0.9946	17	0.975	21
Quartile 2 Equiv. Income	240%	12	3.40%	14	0.0186	7	0.9964	13	0.978	16
Quartile 3 Equiv. Income	235%	23	3.33%	22	0.0183	14	0.9978	7	0.980	11
Top Quartile Equiv. Income	235%	24	3.33%	23	0.0179	31	0.9965	11	0.984	5
Bottom Quartile Income	246%	4	3.52%	5	0.0181	23	0.9924	21	0.972	25
Quartile 2 Income	239%	13	3.41%	12	0.0186	5	0.9967	10	0.979	12
Quartile 3 Income	234%	26	3.32%	25	0.0183	15	0.9977	8	0.979	13
Top Quartile Income	235%	25	3.32%	26	0.0180	24	0.9975	9	0.985	2



**Table 6a: More Inflation Statistics by Group, Rental Equivalence Definition of Housing, 1983-2005 (Based on Expenditures from 1982-2004)**

Column:	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
	Percent of Time Inflation for Group Higher than Inflation of Rest of Population	Average Difference Between Group Inflation and Inflation for Rest of Population	Average Difference when Overall Inflation HIGH (above average)	Average Difference when Overall Inflation LOW (below average)	P-Value of Test of Equality of Differences	Average Food and Energy (Non-Core) spending as a Percent of Total	Rank of Non-Core Spending
<u>Groups Not Defined By Income</u>							
Elderly	88%	0.28%	0.20%	0.36%	0.000 * * *	22%	25
Other Race	61%	0.06%	0.01%	0.10%	0.003 * * *	24%	20
White	70%	0.08%	0.06%	0.11%	0.011 * *	23%	22
Hispanic	30%	-0.12%	-0.08%	-0.15%	0.005 * * *	26%	10
Black	33%	-0.09%	-0.06%	-0.13%	0.006 * * *	26%	11
College Educated	57%	0.02%	-0.05%	0.09%	0.000 * * *	21%	29
Highest Ed = Some College	42%	-0.03%	-0.01%	-0.05%	0.016 * *	24%	19
Highest Ed = High School Grad	43%	-0.03%	0.03%	-0.08%	0.000 * * *	25%	14
Highest Ed = <High School	68%	0.09%	0.11%	0.06%	0.054 *	28%	4
Saver	55%	0.01%	-0.02%	0.04%	0.001 * * *	22%	26
Single Mother	33%	-0.13%	-0.11%	-0.14%	0.303	27%	8
Homeowner	60%	0.03%	-0.03%	0.08%	0.008 * * *	23%	23
Food Stamp Recipient	36%	-0.12%	-0.11%	-0.14%	0.481	33%	1

**Table 6a: More Inflation Statistics by Group, Rental Equivalence Definition of Housing, 1983-2005 (Based on Expenditures from 1982-2004), Continued**

Column:	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
	Percent of Time Inflation for Group Higher than Inflation of Rest of Population	Average Difference Between Group and Rest of Population Inflation	Average Difference when Overall Inflation HIGH (above average)	Average Difference when Overall Inflation LOW (below average)	P-Value of Test of Equality of Differences	Average Food and Energy spending as a Percent of Total	Rank of Non-Core Spending
<u>Groups Partly or Wholly Defined by Income</u>							
Below Poverty Line	60%	0.09%	0.13%	0.06%	0.024 * *	28%	3
Below 2x Poverty Line	69%	0.11%	0.13%	0.09%	0.070 *	27%	9
Working Poor	46%	-0.01%	0.07%	-0.08%	0.001 * * *	28%	5
Working Poor (2x PL)	45%	-0.03%	0.05%	-0.10%	0.000 * * *	27%	6
Poor Not Working	68%	0.16%	0.16%	0.17%	0.881	29%	2
Poor Not Working (2x PL)	80%	0.22%	0.18%	0.27%	0.003 * * *	26%	12
Working Above Poverty Line	15%	-0.21%	-0.16%	-0.25%	0.000 * * *	23%	21
Working Above 2x Poverty Line	17%	-0.16%	-0.15%	-0.18%	0.116	23%	24
Not Working Not Poor	85%	0.23%	0.15%	0.31%	0.000 * * *	22%	27
Not Working Not Poor (2x PL)	80%	0.19%	0.11%	0.26%	0.000 * * *	21%	30
Bottom Quartile Equiv. Income	67%	0.11%	0.14%	0.08%	0.007 * * *	27%	7
Quartile 2 Equiv. Income	68%	0.07%	0.09%	0.04%	0.027 * *	25%	15
Quartile 3 Equiv. Income	40%	-0.04%	-0.01%	-0.06%	0.007 * * *	24%	18
Top Quartile Equiv. Income	39%	-0.07%	-0.12%	-0.02%	0.000 * * *	21%	31
Bottom Quartile Income	80%	0.19%	0.19%	0.19%	0.933	26%	13
Quartile 2 Income	64%	0.06%	0.08%	0.05%	0.065 *	25%	16
Quartile 3 Income	35%	-0.05%	-0.02%	-0.08%	0.001 * * *	24%	17
Top Quartile Income	35%	-0.09%	-0.12%	-0.06%	0.003 * * *	22%	28

Column:	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
	Percent of Time Inflation for Group Higher than Inflation of Rest of Population	Average Difference Between Group Inflation and Inflation for Rest of Population	Average Difference when Overall Inflation HIGH (above average)	Average Difference when Overall Inflation LOW (below average)	P-Value of Test of Equality of Differences	Average Food and Energy spending as a Percent of Total	Rank of Non-Core Spending
<u>Groups Not Defined By Income</u>							
Elderly	86%	0.24%	0.21%	0.26%	0.085 *	22%	25
Other Race	64%	0.08%	0.02%	0.15%	0.000 * * *	24%	20
White	68%	0.07%	0.06%	0.08%	0.370	23%	22
Hispanic	33%	-0.11%	-0.08%	-0.13%	0.091 *	26%	10
Black	34%	-0.09%	-0.06%	-0.12%	0.044 * *	26%	11
College Educated	60%	0.05%	-0.05%	0.14%	0.000 * * *	21%	29
Highest Ed = Some College	43%	-0.03%	-0.01%	-0.05%	0.011 * *	24%	19
Highest Ed = High School Grad	40%	-0.05%	0.03%	-0.13%	0.000 * * *	25%	14
Highest Ed = <High School	58%	0.07%	0.12%	0.02%	0.002 * * *	28%	4
Saver	55%	0.01%	-0.02%	0.04%	0.002 * * *	22%	26
Single Mother	36%	-0.10%	-0.11%	-0.09%	0.562	27%	8
Homeowner	49%	-0.04%	-0.03%	-0.06%	0.441	23%	23
Food Stamp Recipient	42%	-0.10%	-0.12%	-0.09%	0.650	33%	1

**Table 6b: More Inflation Statistics by Group, Outlay Definition of Housing, 1983-2005 (Based on Expenditures from 1982-2004), Continued**

Column:	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
	Percent of Time Inflation for Group Higher than Inflation of Rest of Population	Average Difference Between Group and Rest of Population Inflation	Average Difference when Overall Inflation HIGH (above average)	Average Difference when Overall Inflation LOW (below average)	P-Value of Test of Equality of Differences	Average Food and Energy spending as a Percent of Total	Rank of Non-Core Spending
<u>Groups Partly or Wholly Defined by Income</u>							
Below Poverty Line	59%	0.10%	0.13%	0.07%	0.057 *	28%	3
Below 2x Poverty Line	63%	0.10%	0.13%	0.06%	0.005 * * *	27%	9
Working Poor	46%	0.00%	0.06%	-0.07%	0.004 * * *	28%	5
Working Poor (2x PL)	46%	-0.02%	0.06%	-0.10%	0.000 * * *	27%	6
Poor Not Working	68%	0.17%	0.17%	0.17%	0.819	29%	2
Poor Not Working (2x PL)	79%	0.20%	0.18%	0.22%	0.199	26%	12
Working Above Poverty Line	19%	-0.18%	-0.16%	-0.19%	0.189	23%	21
Working Above 2x Poverty Line	22%	-0.14%	-0.15%	-0.13%	0.249	23%	24
Not Working Not Poor	84%	0.19%	0.15%	0.23%	0.003 * * *	22%	27
Not Working Not Poor (2x PL)	75%	0.16%	0.12%	0.19%	0.011 * *	21%	30
Bottom Quartile Equiv. Income	63%	0.10%	0.15%	0.06%	0.001 * * *	27%	7
Quartile 2 Equiv. Income	61%	0.05%	0.09%	0.01%	0.000 * * *	25%	15
Quartile 3 Equiv. Income	39%	-0.04%	-0.01%	-0.07%	0.003 * * *	24%	18
Top Quartile Equiv. Income	47%	-0.05%	-0.13%	0.03%	0.000 * * *	21%	31
Bottom Quartile Income	76%	0.18%	0.20%	0.16%	0.280	26%	13
Quartile 2 Income	58%	0.05%	0.08%	0.01%	0.001 * * *	25%	16
Quartile 3 Income	36%	-0.05%	-0.01%	-0.08%	0.000 * * *	24%	17
Top Quartile Income	41%	-0.07%	-0.13%	-0.01%	0.000 * * *	22%	28

**Table 6c: More Inflation Statistic by Group, Outlay Definition of Housing, 1981-2005 (Based on Expenditures from 1980-2004)**

Column:	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
	Percent of Time Inflation for Group Higher than Inflation of Rest of Population	Average Difference Between Group Inflation and Rest of Population	Average Difference when Overall Inflation HIGH (above average)	Average Difference when Overall Inflation LOW (below average)	P-Value of Test of Equality of Differences	Average Food and Energy spending as a Percent of Total	Rank of Non-Core Spending
<u>Groups Not Defined By Income</u>							
Elderly	86%	0.24%	0.25%	0.24%	0.917	28%	17
Other Race	61%	0.06%	0.00%	0.11%	0.002 * * *	25%	24
White	68%	0.07%	0.06%	0.08%	0.212	26%	23
Hispanic	34%	-0.11%	-0.08%	-0.12%	0.173	29%	12
Black	35%	-0.08%	-0.04%	-0.11%	0.029 * *	29%	11
College Educated	61%	0.05%	0.00%	0.09%	0.004 * * *	23%	30
Highest Ed = Some College	43%	-0.03%	-0.03%	-0.03%	0.968	26%	22
Highest Ed = High School Grad	39%	-0.06%	-0.02%	-0.08%	0.054 *	29%	13
Highest Ed = <High School	59%	0.07%	0.13%	0.04%	0.004 * * *	32%	2
Saver	54%	0.01%	0.00%	0.02%	0.305	24%	28
Single Mother	37%	-0.10%	-0.10%	-0.11%	0.765	28%	15
Homeowner	50%	-0.02%	0.00%	-0.04%	0.313	26%	21
Food Stamp Recipient	43%	-0.09%	-0.06%	-0.11%	0.360	35%	1

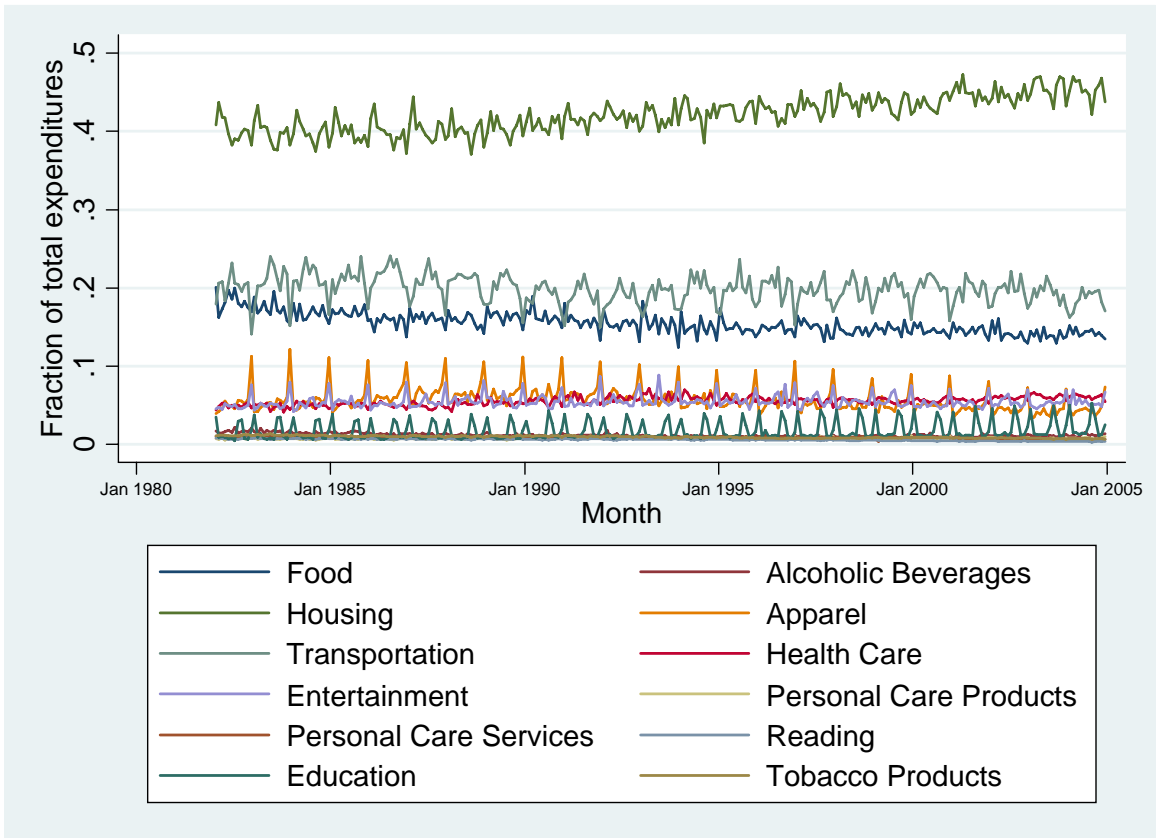
**Table 6c: More Inflation Statistic by Group, Outlay Definition of Housing, 1981-2005 (Based on Expenditures from 1980-2004), Continued**

Column:	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
	Percent of Time Inflation for Group Higher than Inflation of Rest of Population	Average Difference Between Group Inflation and Inflation for Rest of Population	Average Difference when Overall Inflation HIGH (above average)	Average Difference when Overall Inflation LOW (below average)	P-Value of Test of Equality of Differences	Average Food and Energy spending as a Percent of Total	Rank of Non-Core Spending
<u>Groups Partly or Wholly Defined by Income</u>							
Below Poverty Line	59%	0.10%	0.15%	0.06%	0.008 * * *	31%	4
Below 2x Poverty Line	65%	0.11%	0.16%	0.07%	0.000 * * *	30%	8
Working Poor	47%	0.00%	0.07%	-0.05%	0.008 * * *	30%	6
Working Poor (2x PL)	47%	-0.01%	0.06%	-0.06%	0.000 * * *	30%	9
Poor Not Working	68%	0.17%	0.20%	0.15%	0.300	32%	3
Poor Not Working (2x PL)	79%	0.21%	0.23%	0.19%	0.211	30%	7
Working Above Poverty Line	19%	-0.18%	-0.20%	-0.17%	0.294	25%	25
Working Above 2x Poverty Line	22%	-0.14%	-0.18%	-0.12%	0.011 * *	25%	27
Not Working Not Poor	83%	0.20%	0.19%	0.20%	0.522	26%	20
Not Working Not Poor (2x PL)	75%	0.15%	0.13%	0.17%	0.139	25%	26
Bottom Quartile Equiv. Income	64%	0.11%	0.18%	0.06%	0.000 * * *	30%	5
Quartile 2 Equiv. Income	61%	0.05%	0.08%	0.03%	0.052 *	29%	14
Quartile 3 Equiv. Income	38%	-0.04%	-0.05%	-0.04%	0.906	26%	19
Top Quartile Equiv. Income	46%	-0.05%	-0.11%	-0.01%	0.001 * * *	22%	31
Bottom Quartile Income	75%	0.18%	0.22%	0.15%	0.024 * *	29%	10
Quartile 2 Income	58%	0.06%	0.10%	0.03%	0.003 * * *	28%	16
Quartile 3 Income	36%	-0.05%	-0.05%	-0.06%	0.889	27%	18
Top Quartile Income	40%	-0.07%	-0.11%	-0.04%	0.002 * * *	23%	29

**Table 7: Comparisons Among IBEX-U CPI-U Inflation, MP CPI-U and IBEX-U, 1988-2005**

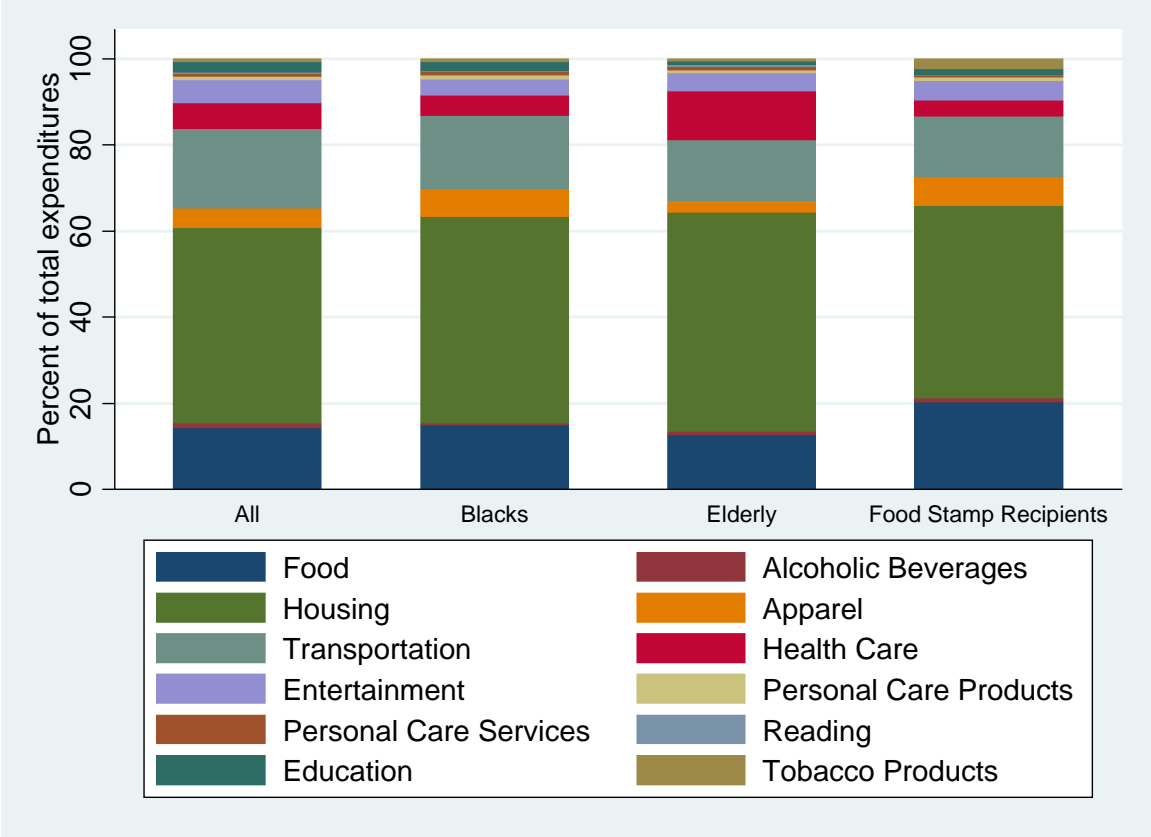
Column:	1	2	3	4
	Correlation with Official CPI-U	Mean Infl.	Percent of Months Above CPI-U	Average Absolute Value of Difference from CPI-U
IBEX-U Inflation (Housing Outlays)	0.973	2.85%	22%	0.28%
IBEX-U Inflation (Rental Equivalence)	0.981	2.90%	24%	0.22%
MP CPI-U Inflation (Housing Outlays)	0.986	2.98%	35%	0.18%
MP CPI-U Inflation (Rental Equivalence)	0.991	3.01%	39%	0.13%
Official CPI-U	1.000	3.06%		

**Figure 1: Overall Expenditure Shares**

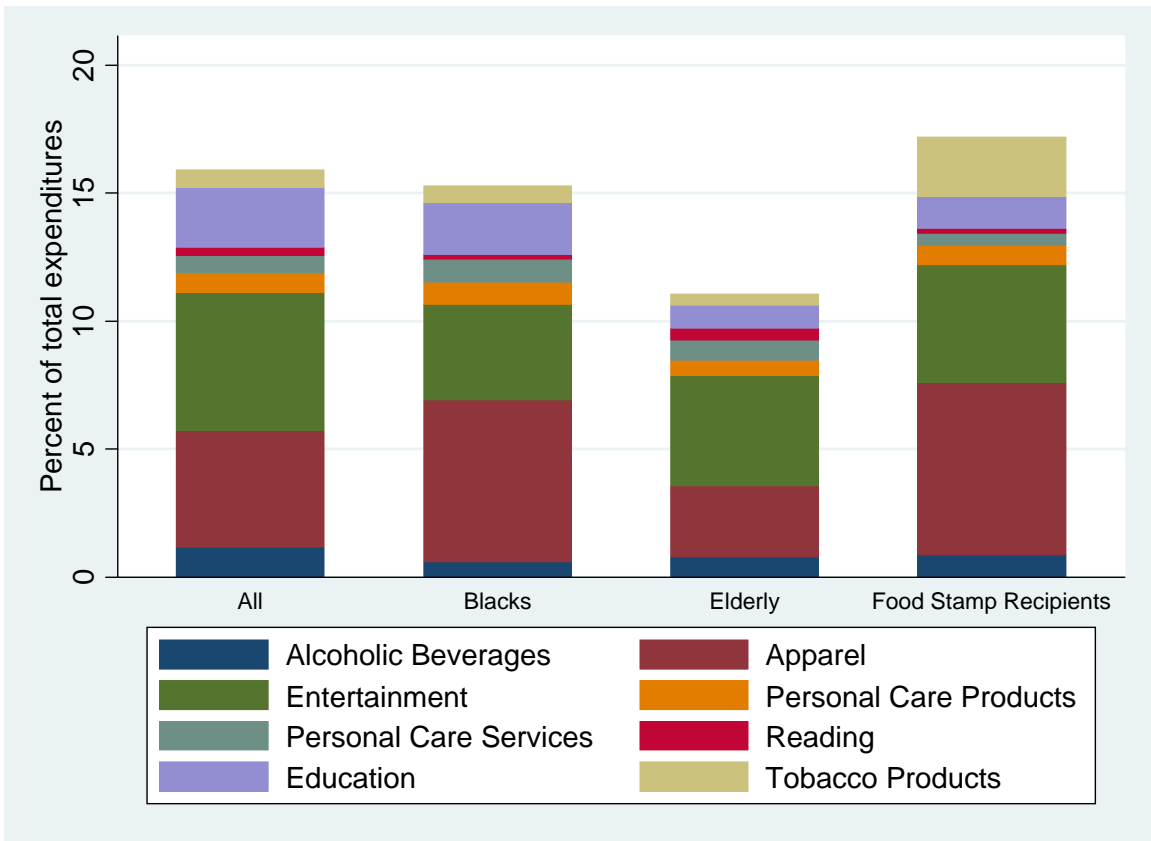




**Figure 2: Market Baskets by Demographic Group, 2004**



**Figure 3: Market Baskets by Demographic Group, Excluding Food, Housing, Health and Transportation, 2004**



**Figure 4: Expenditure Shares Within Transportation by Demographic Group, 2004**

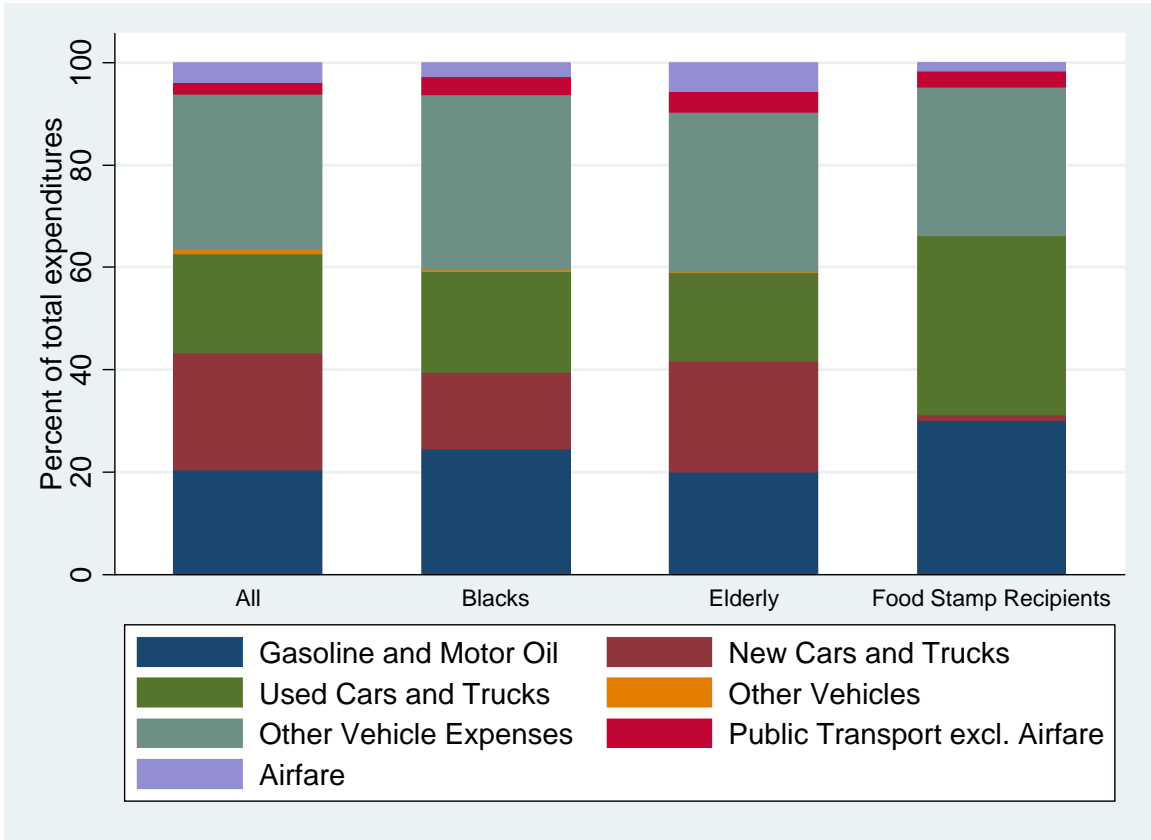
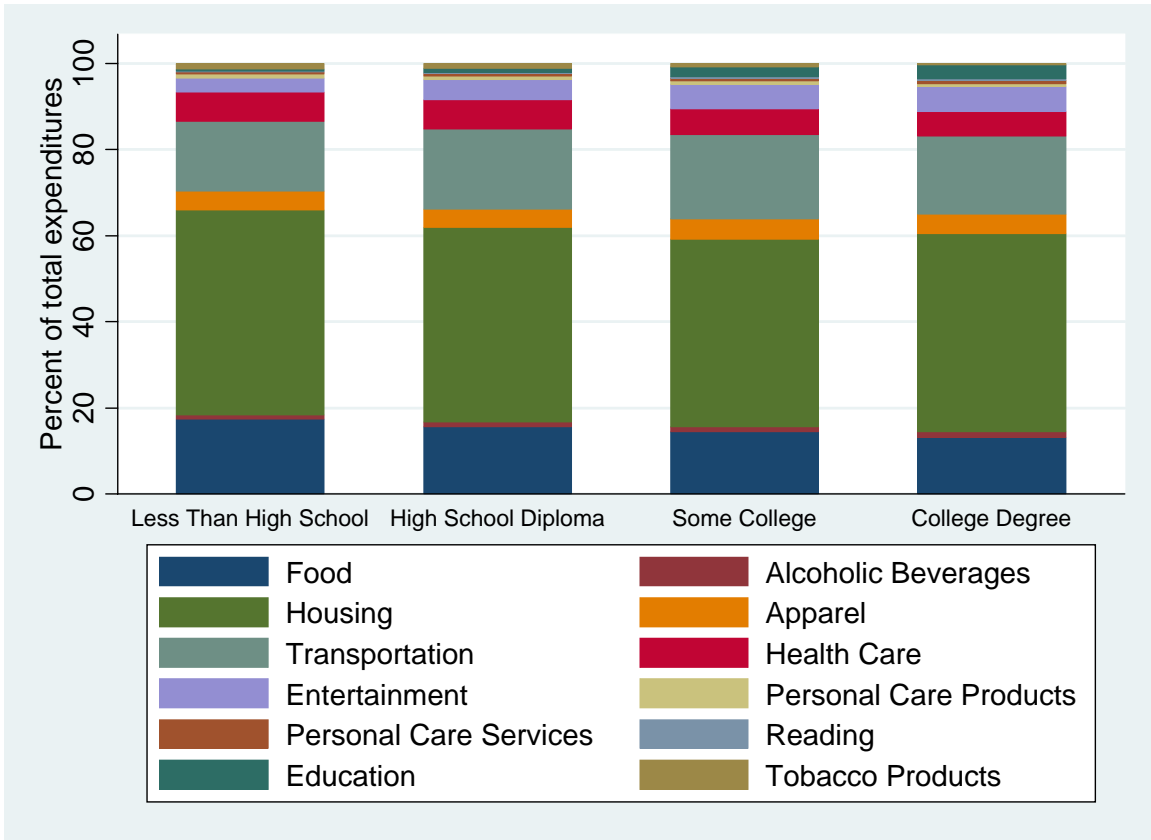
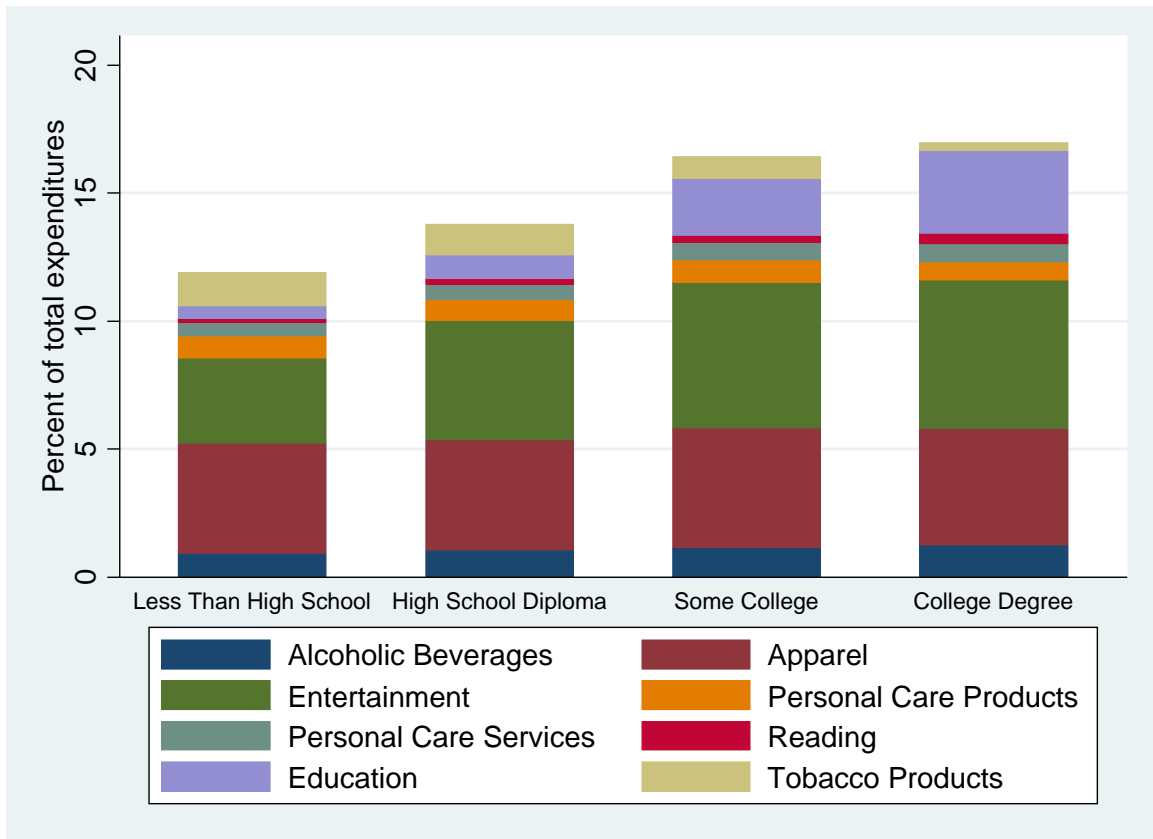


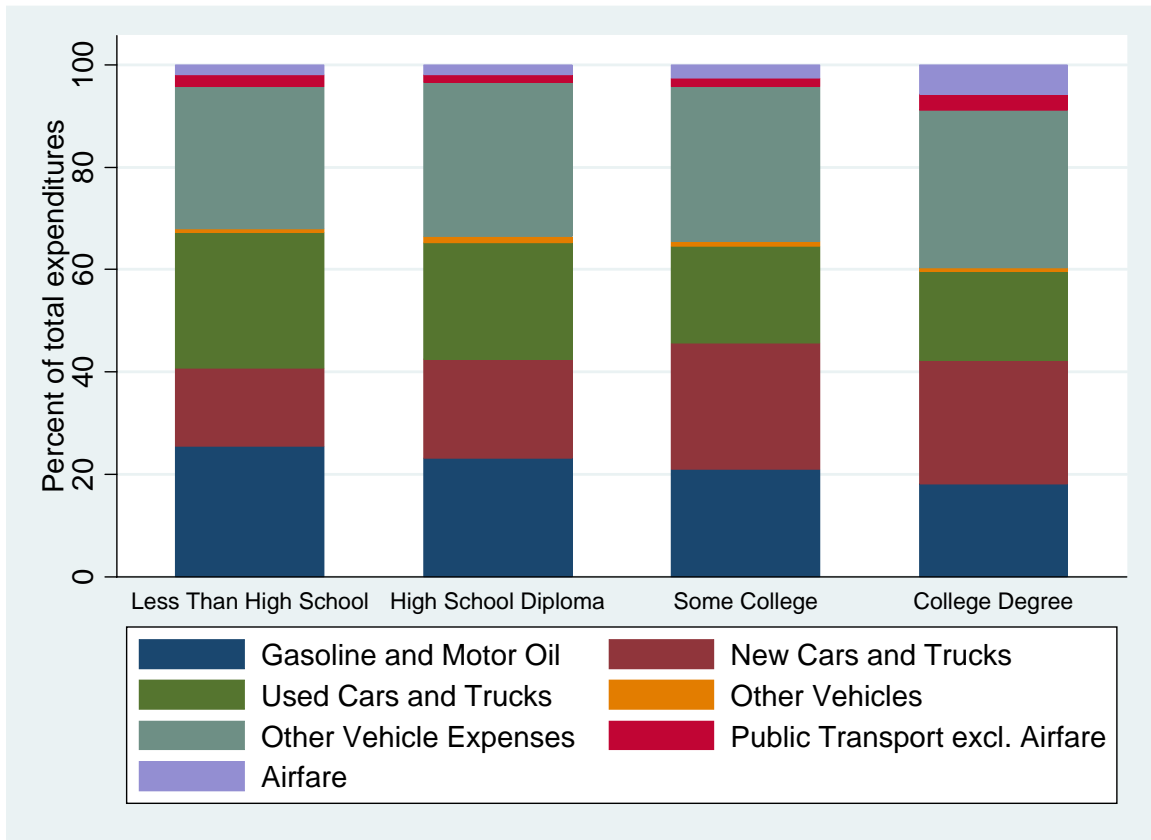
Figure 5: Market Baskets by Educational Attainment, 2004



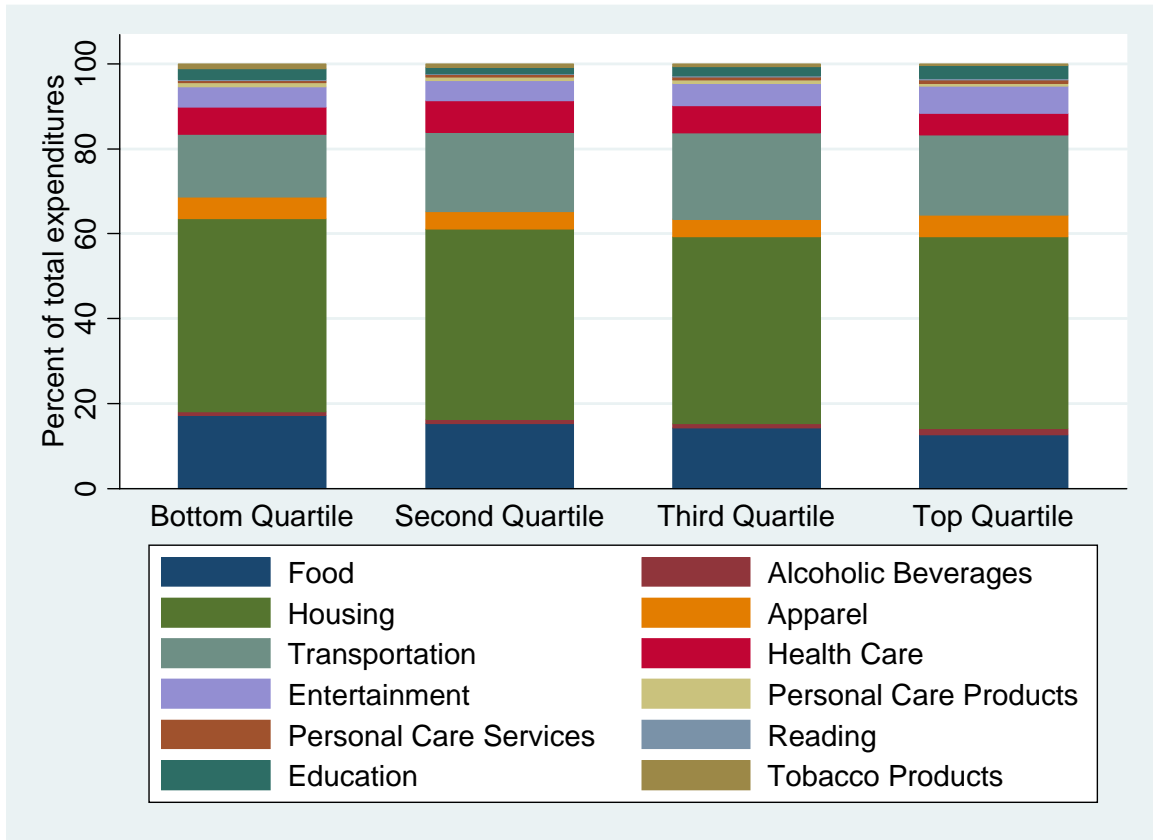
**Figure 6: Market Baskets by Educational Attainment, Excluding Food, Housing, Health and Transportation, 2004**



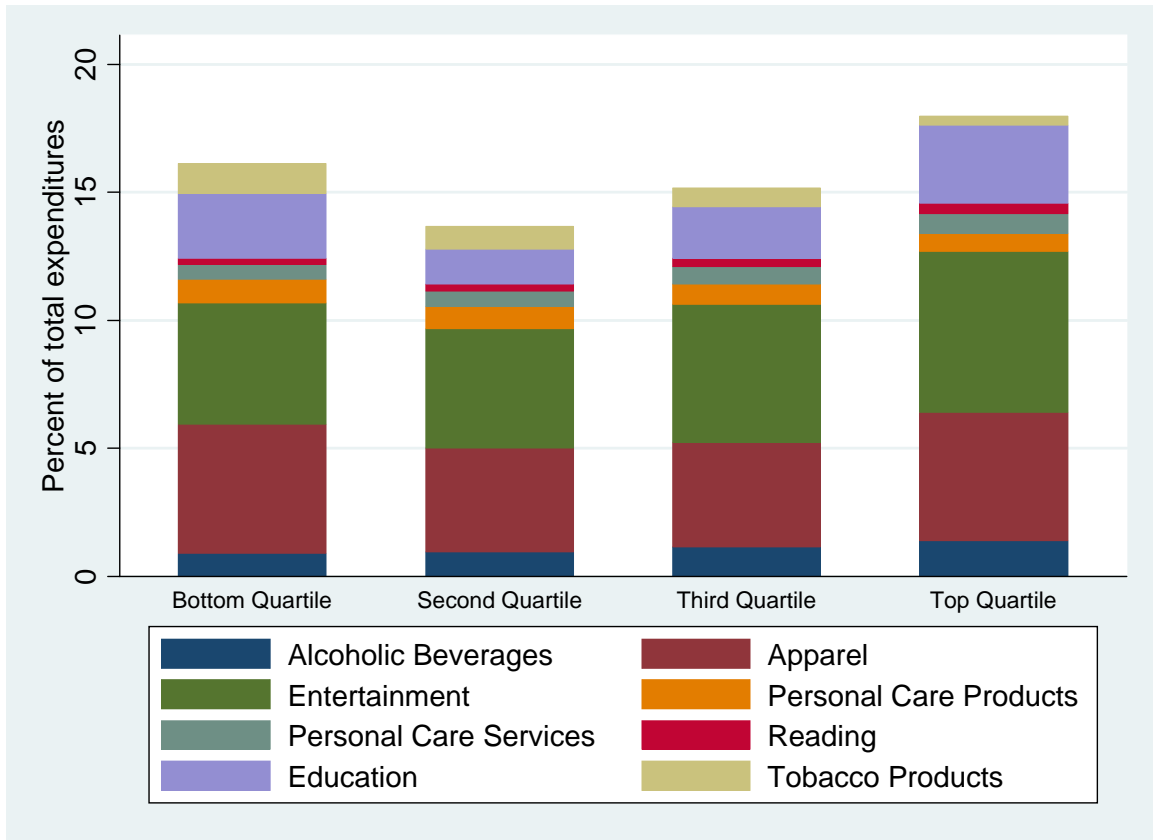
**Figure 7: Expenditure Within Transportation by Educational Attainment, 2004**



**Figure 8: Market Baskets by Equivalent Income, 2004**



**Figure 9: Market Baskets by Equivalent Income, Excluding Food, Housing, Health and Transportation, 2004**





**Figure 10: Expenditure Within Transportation by Equivalent Income, 2004**

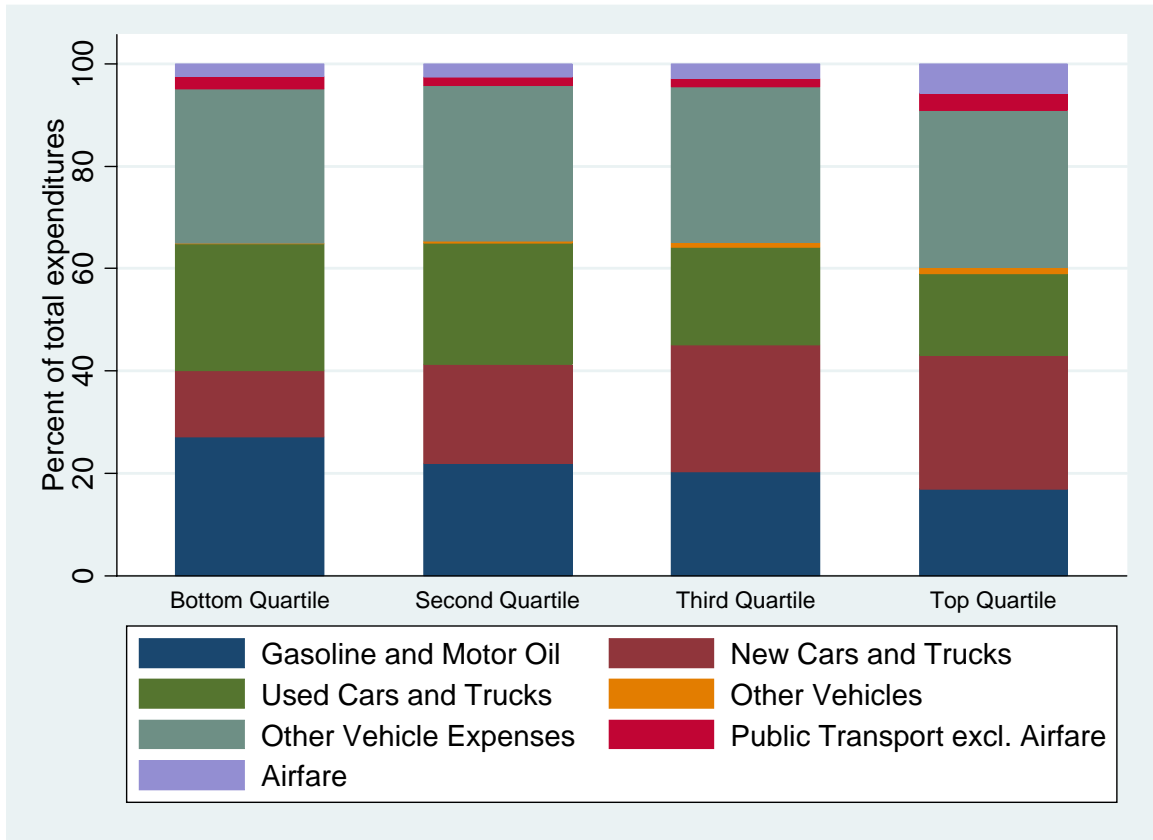
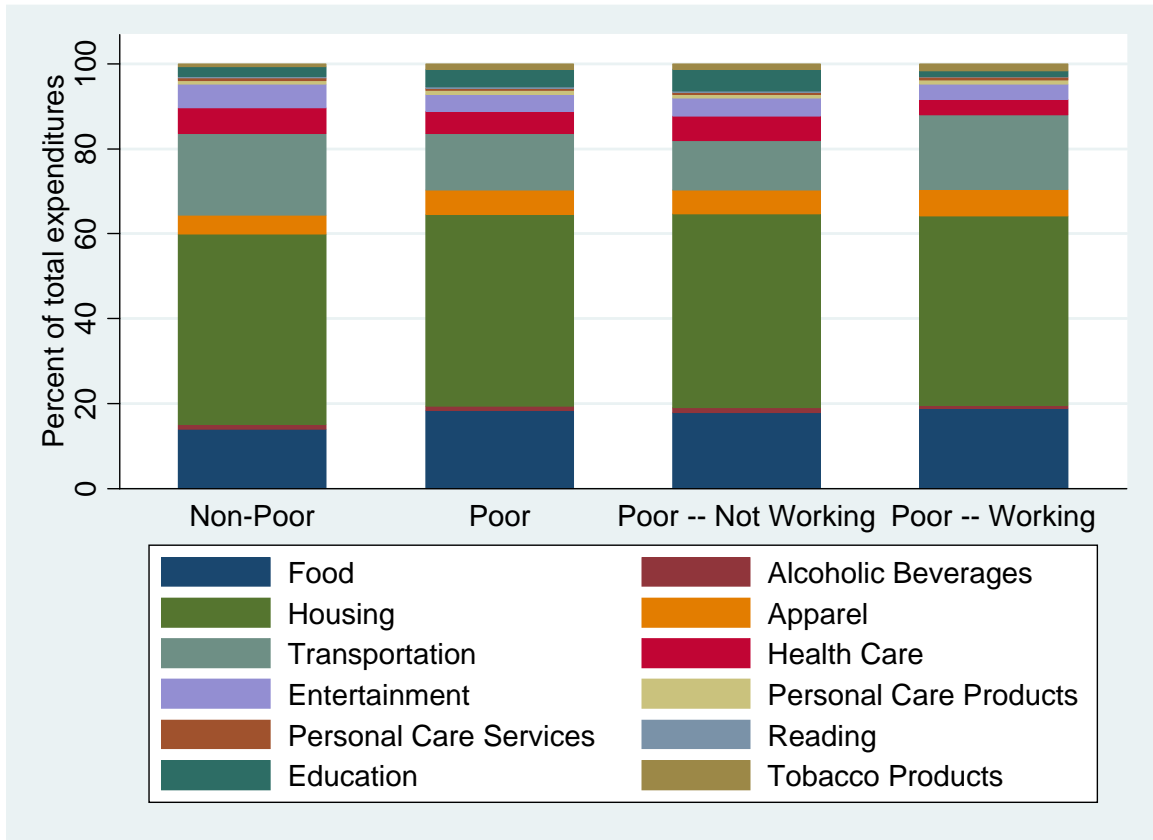
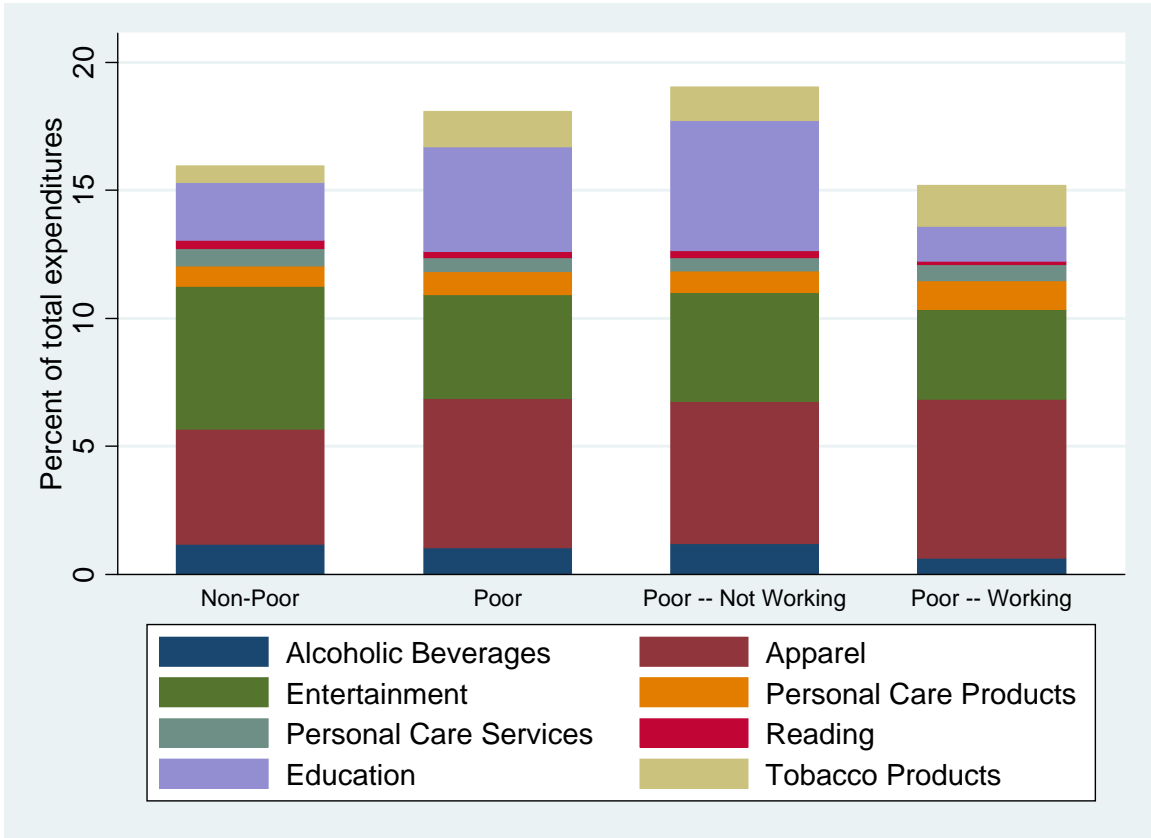


Figure 11: Market Baskets by Poverty Status, 2004



**Figure 12: Market Baskets by Poverty Status, Excluding Food, Housing, Health and Transportation, 2004**



**Figure 13: Expenditure Within Transportation by Poverty Status, 2004**

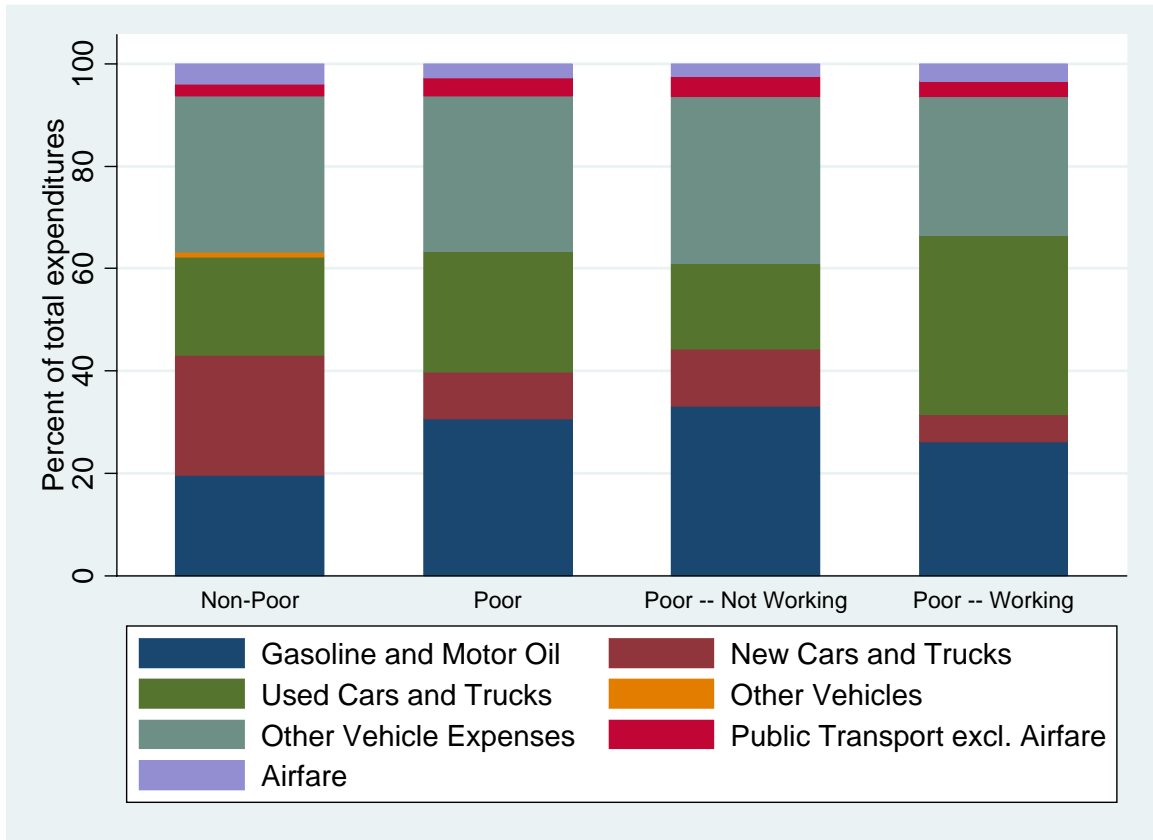


Figure 14a: Rental Equivalence Shelter Expenditure Share, by Demographic Group

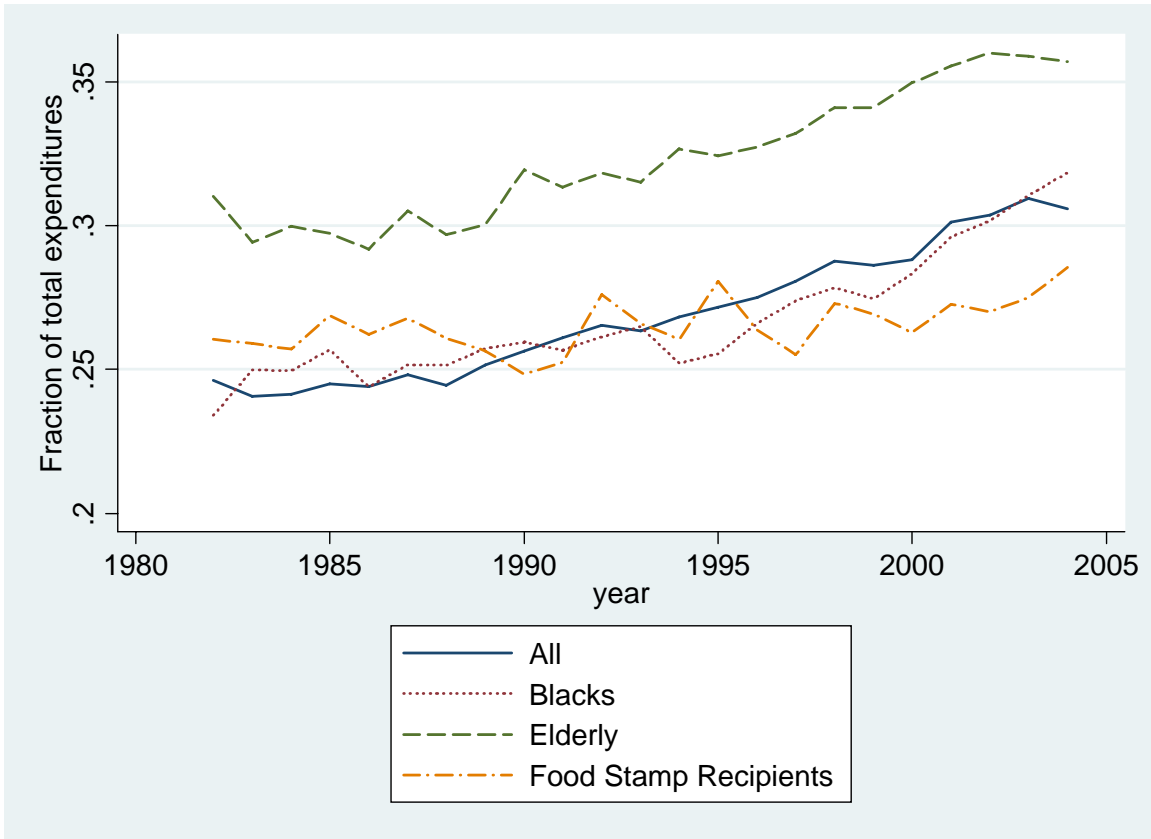


Figure 14b: Outlay Based Shelter Expenditure Share, by Demographic Group

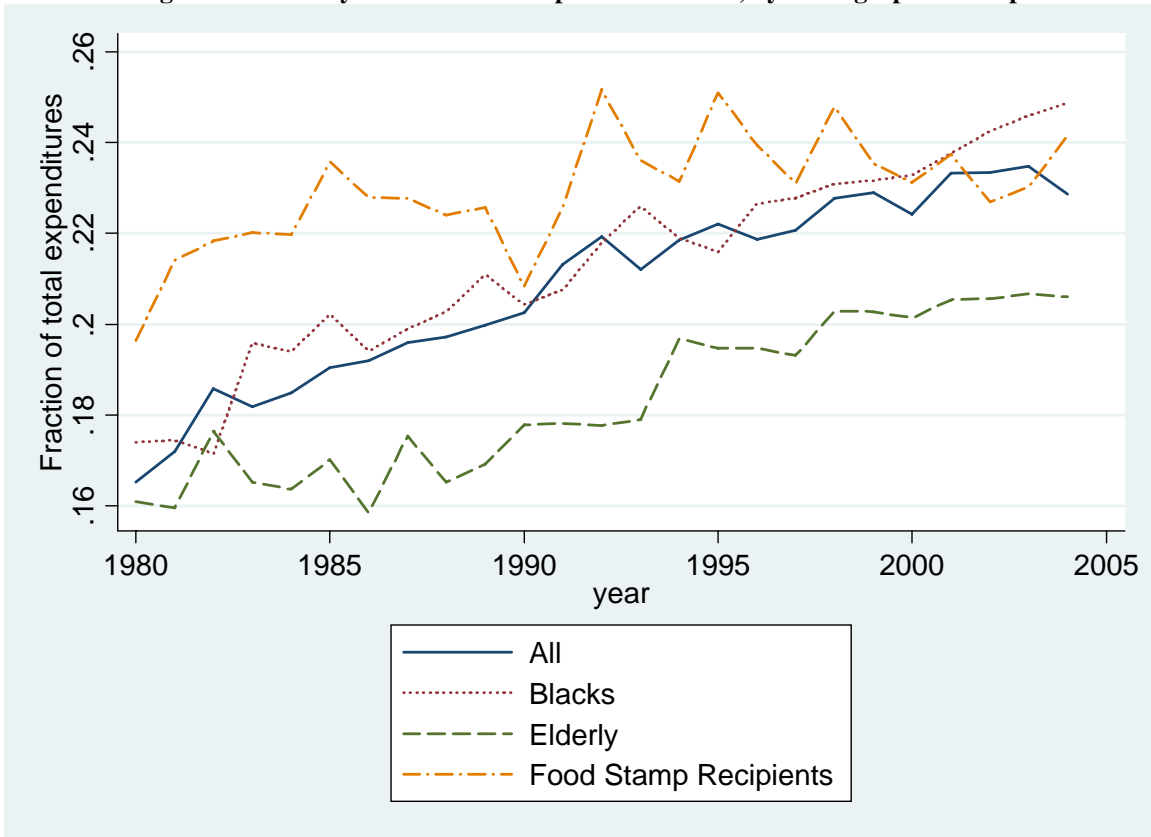


Figure 15a: Rental Equivalence Based Shelter Expenditure, by Educational Attainment

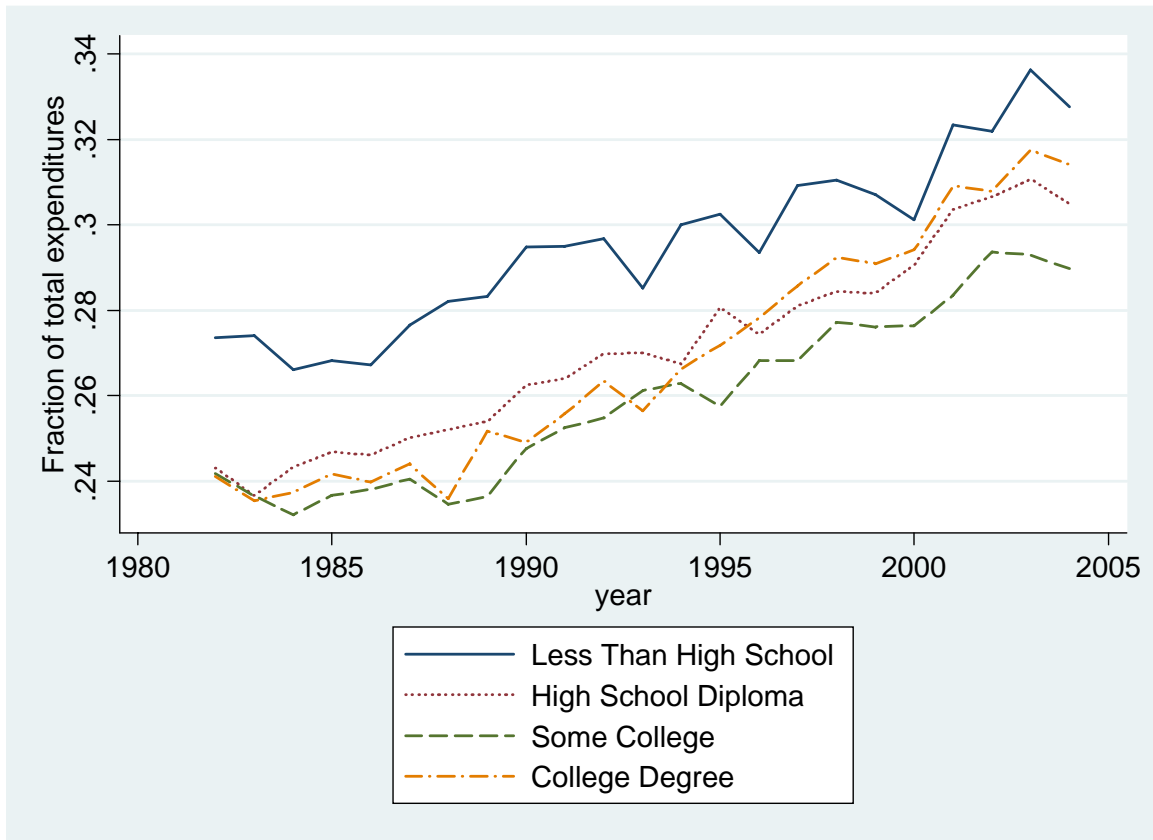


Figure 15b: Outlay Based Shelter Expenditure, by Educational Attainment

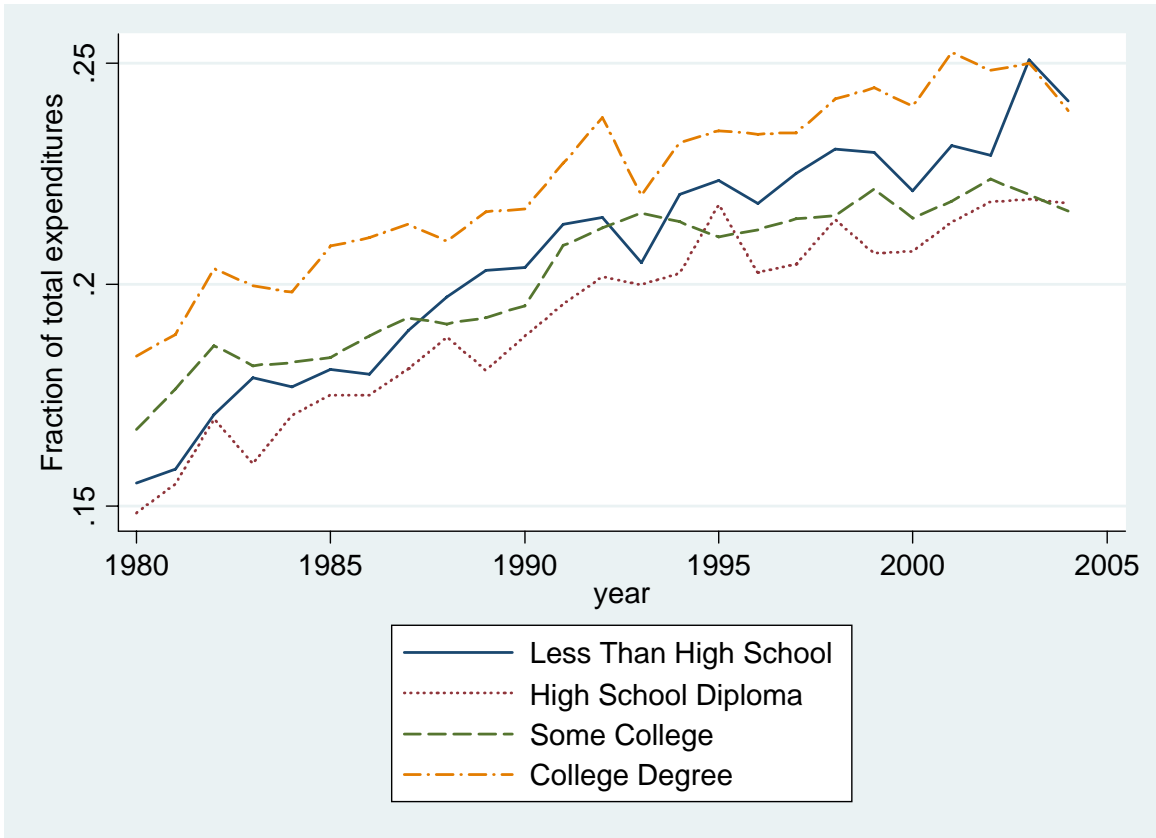




Figure 16a: Rental Equivalence Shelter Expenditure Share by Equivalent Income Quartile

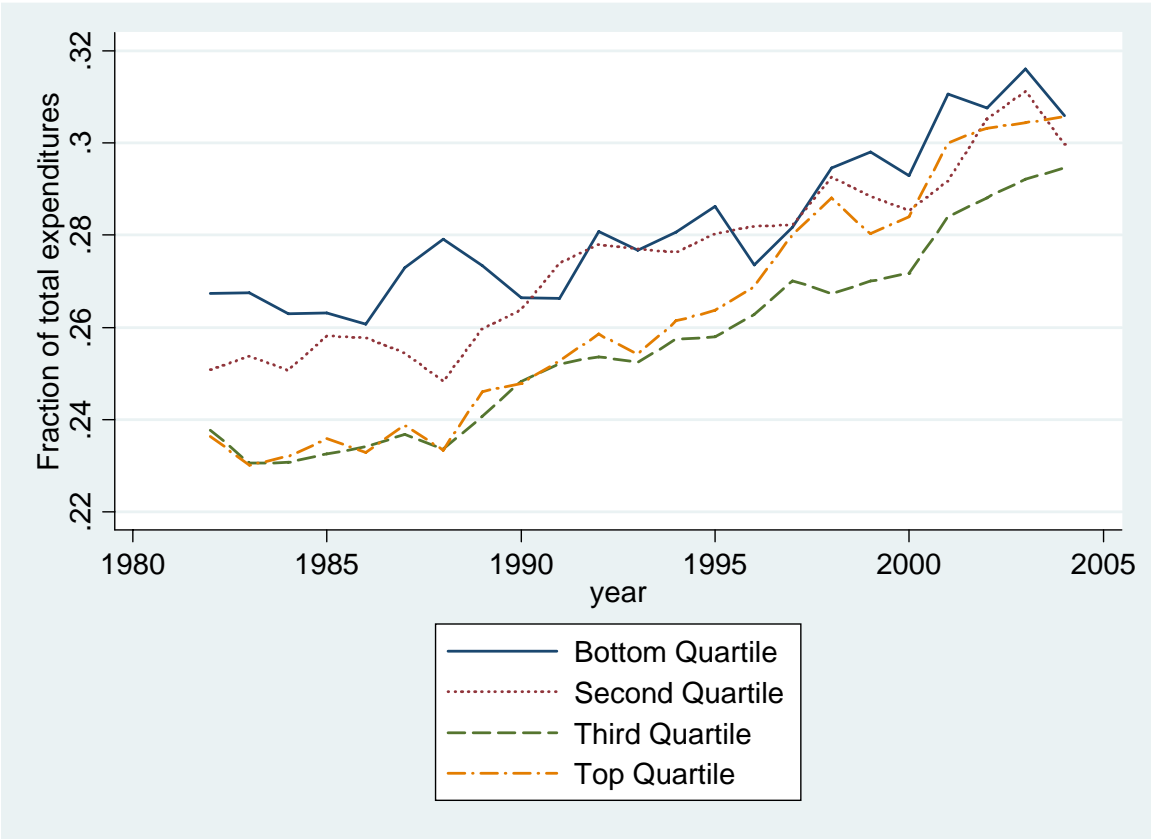


Figure 16b: Outlay Based Shelter Expenditure Share by Equivalent Income Quartile

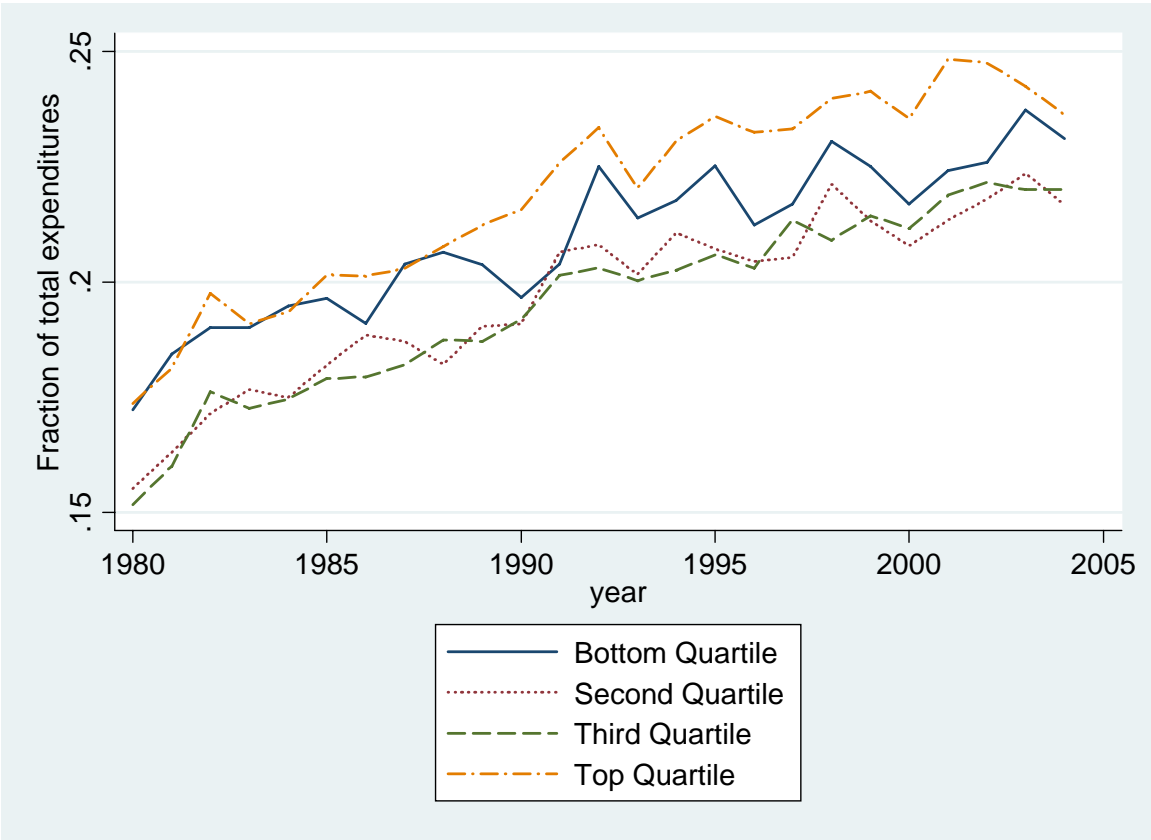


Figure 17a: Rental Equivalence Based Shelter Expenditure Share, by Poverty Status

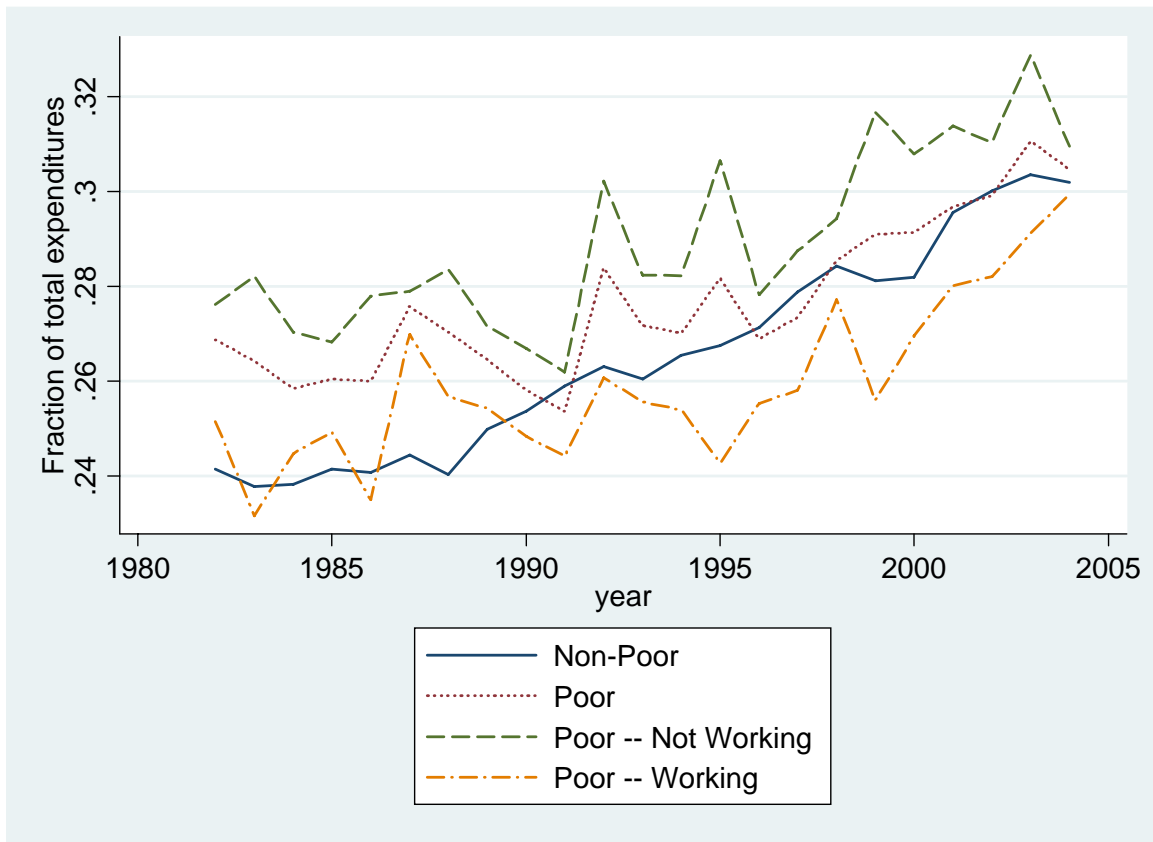


Figure 17b: Outlay Based Shelter Expenditure, by Poverty Status

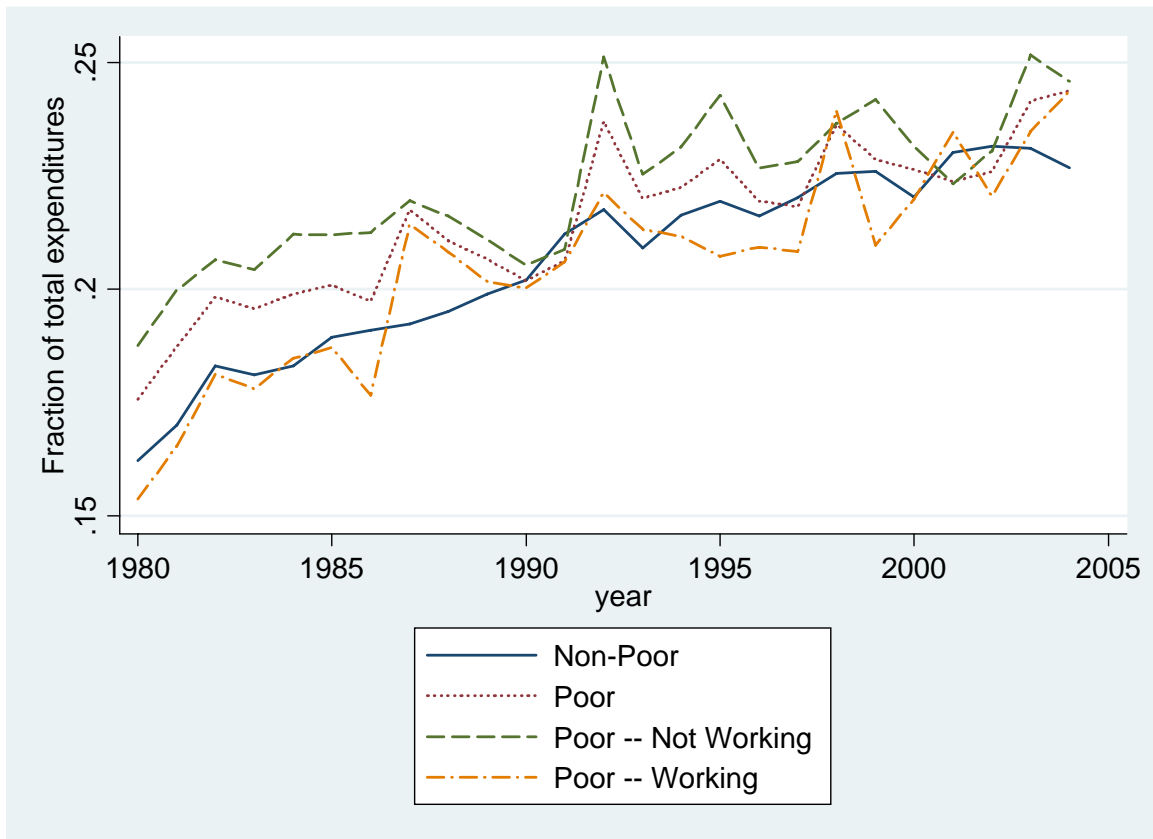


Figure 18: Expenditure Share on Tobacco by Demographic Group

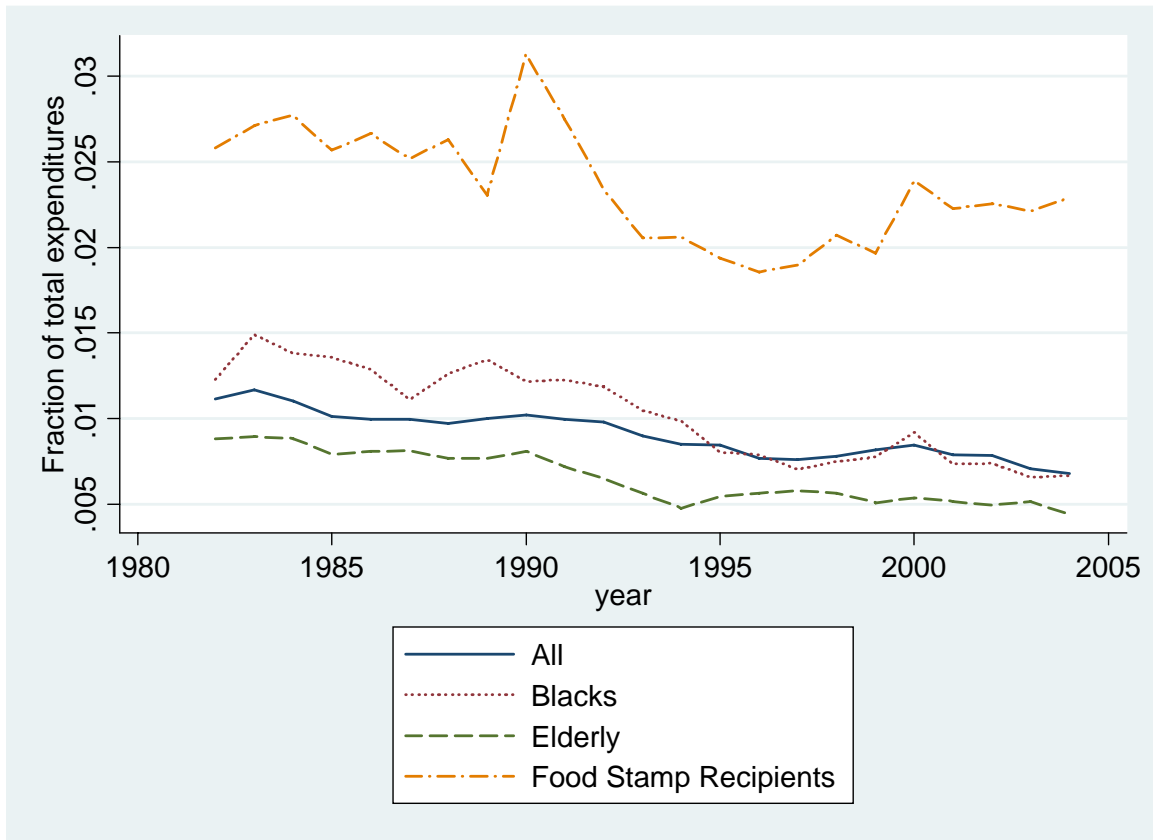
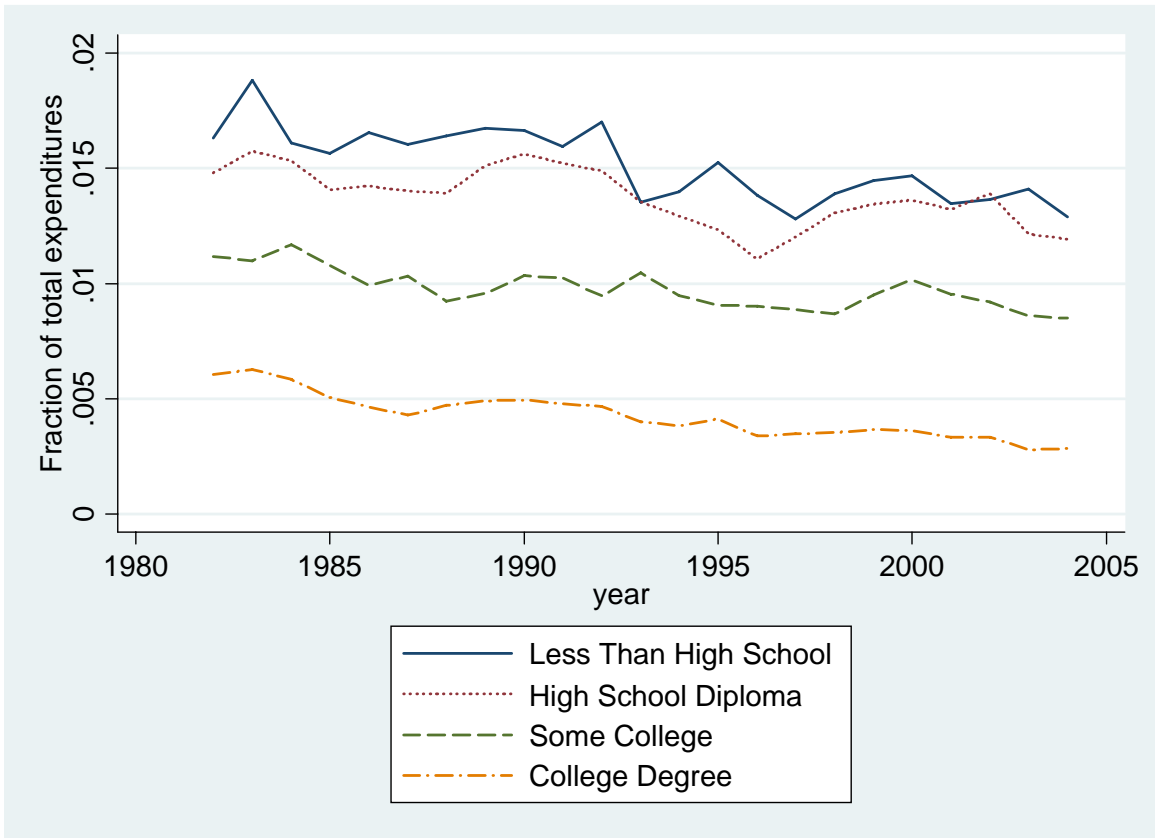


Figure 19: Expenditure Share on Tobacco by Educational Attainment



**Figure 20: Expenditure Share on Tobacco by Equivalent Income Quartile**

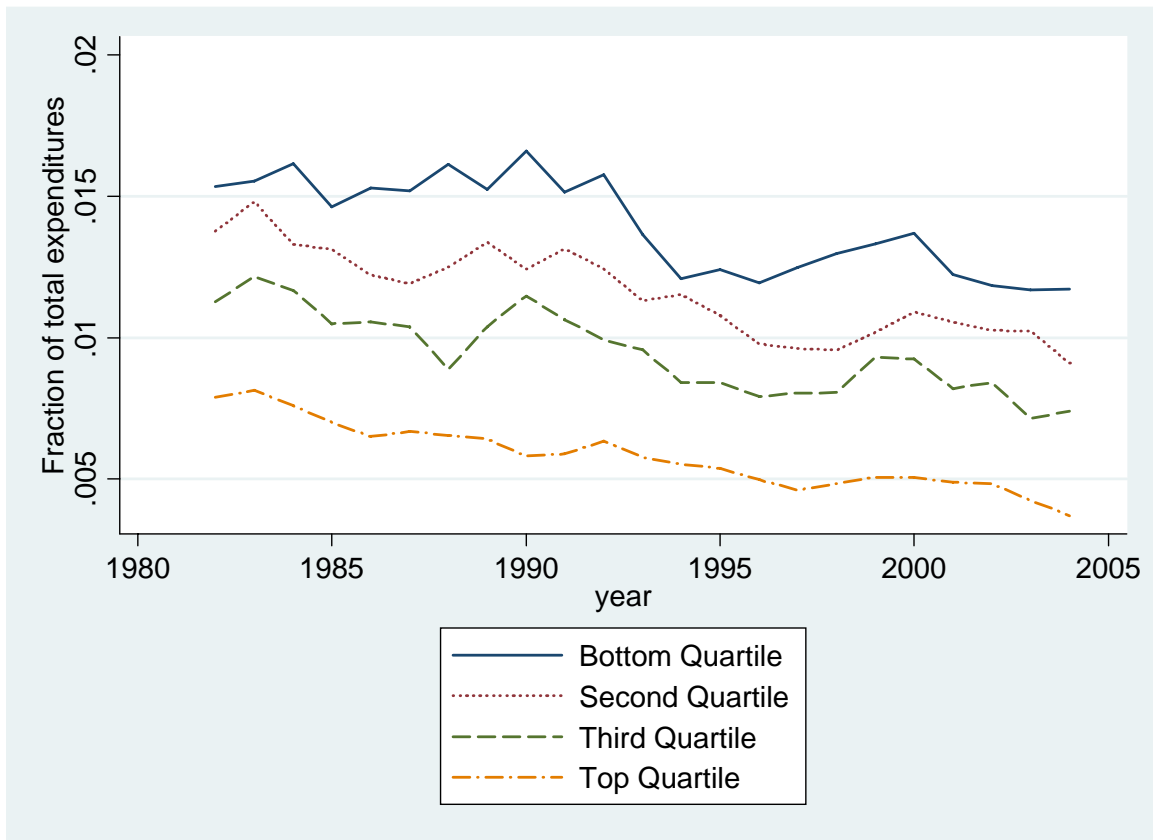


Figure 21: Expenditure Share on Tobacco, by Poverty Status

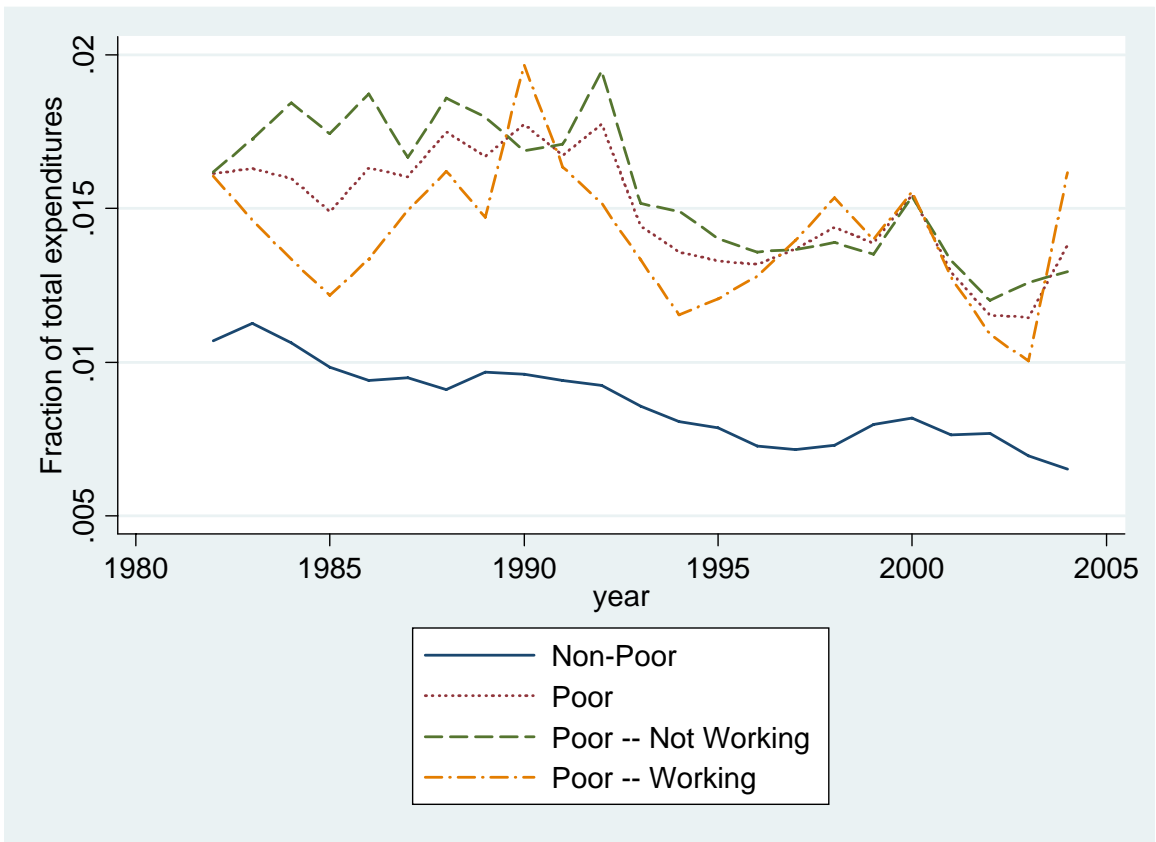




Figure 22: Health Care Expenditure by Demographic Group

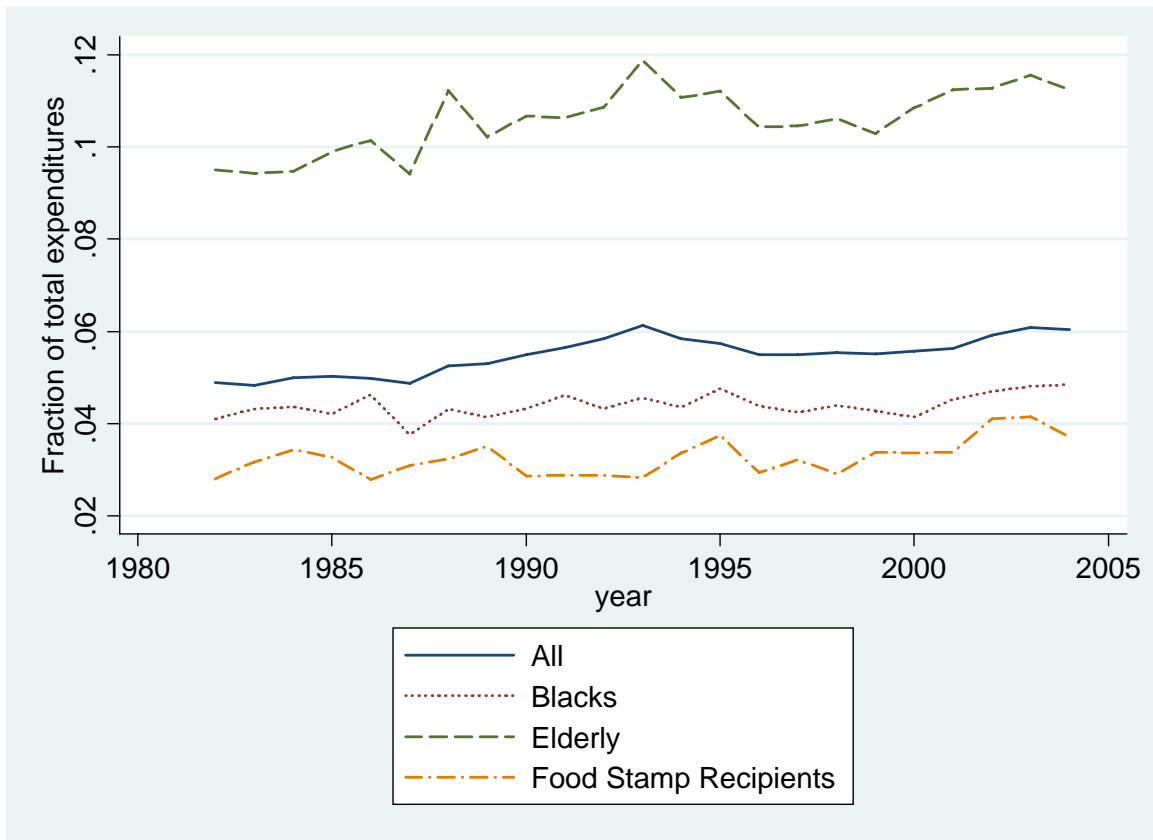
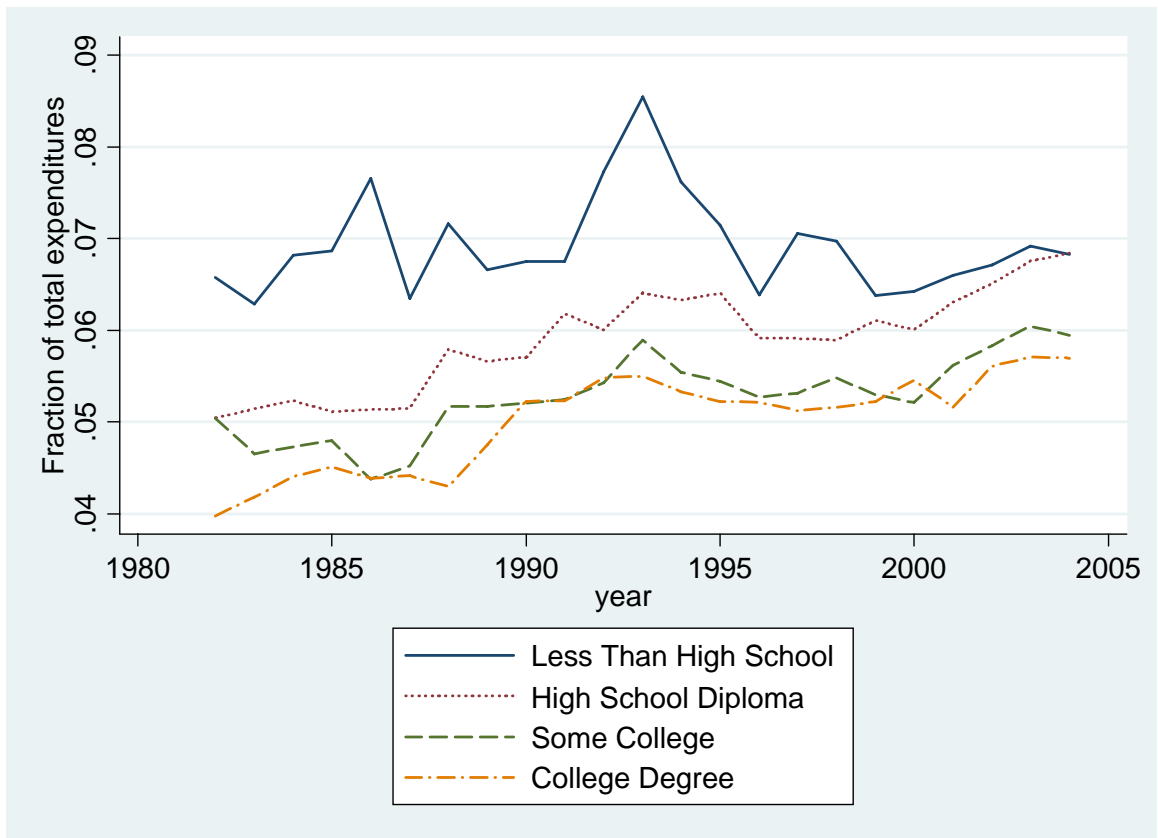


Figure 23: Health Care Expenditure by Educational Attainment



**Figure 24: Expenditure Share on Health Care by Equivalent Income Quartile**

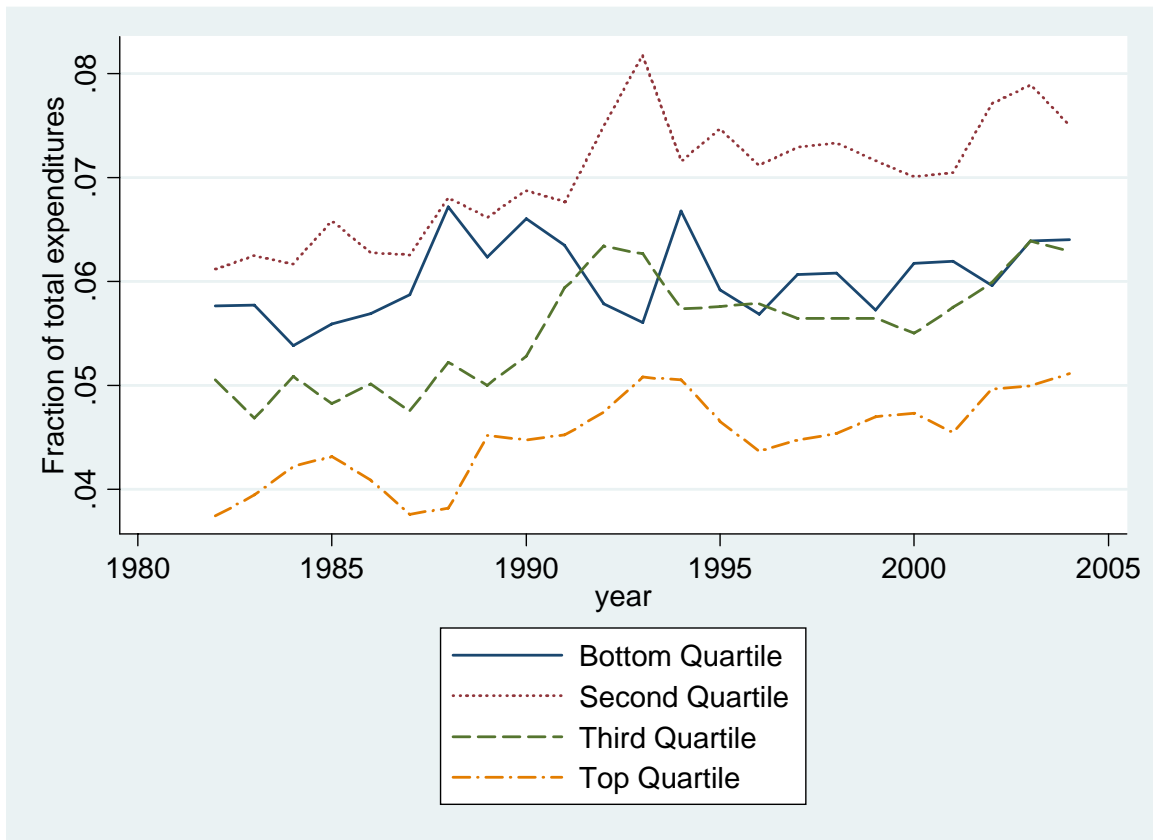


Figure 25: Health Care Expenditure, by Poverty Status

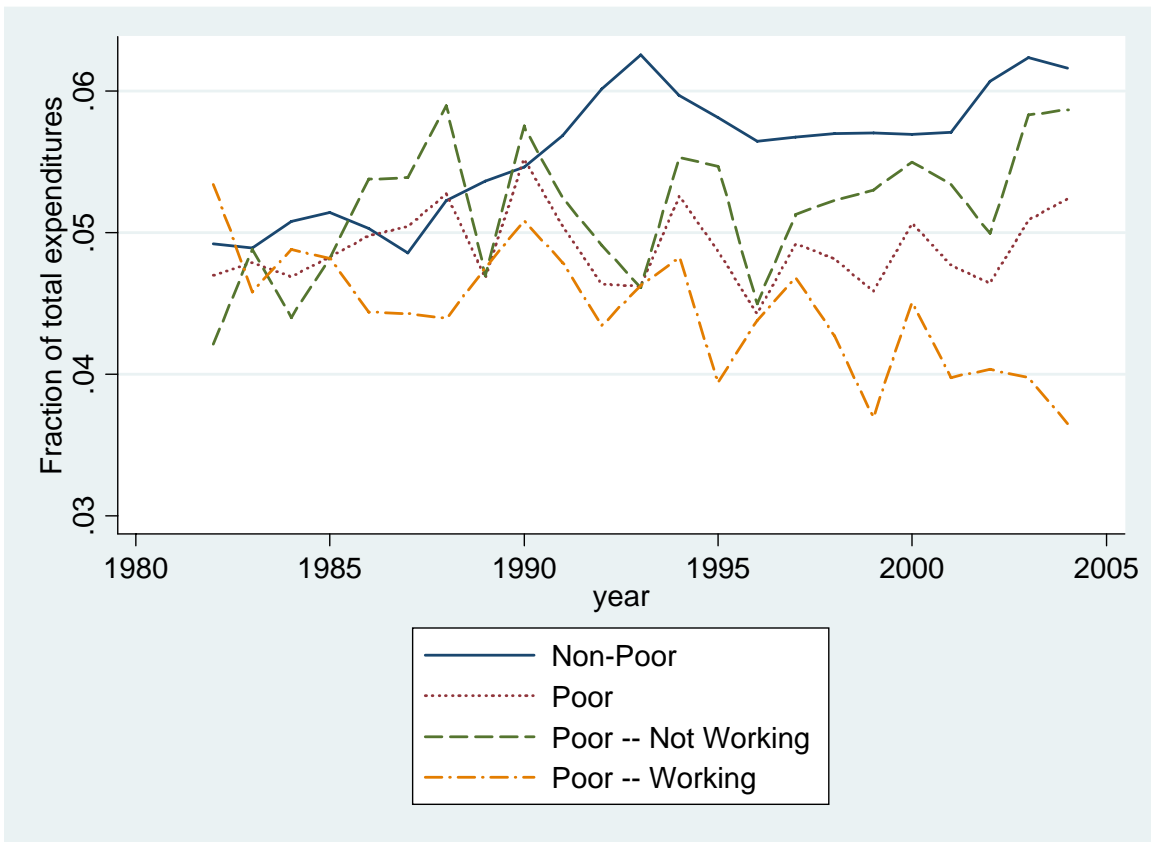


Figure 26: Gasoline and Motor Fuel Expenditure by Demographic Group

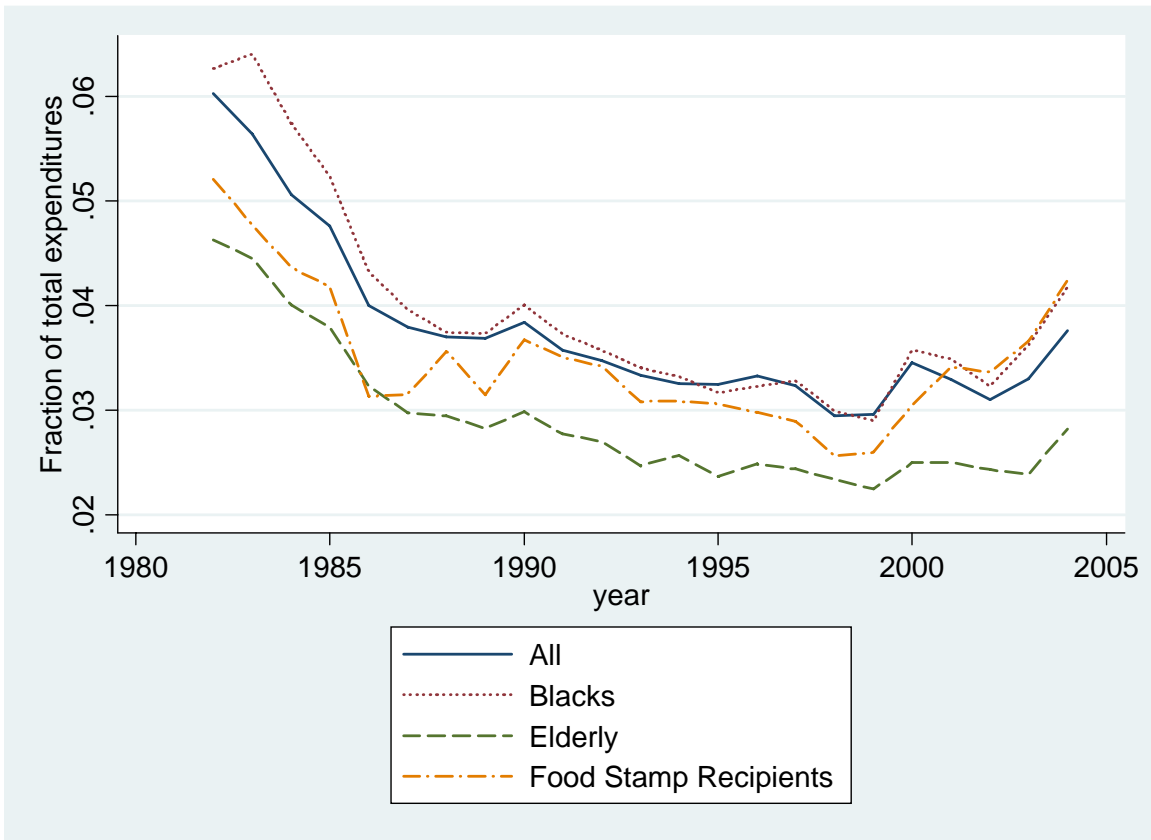


Figure 27: Gasoline and Motor Fuel Expenditure by Educational Attainment

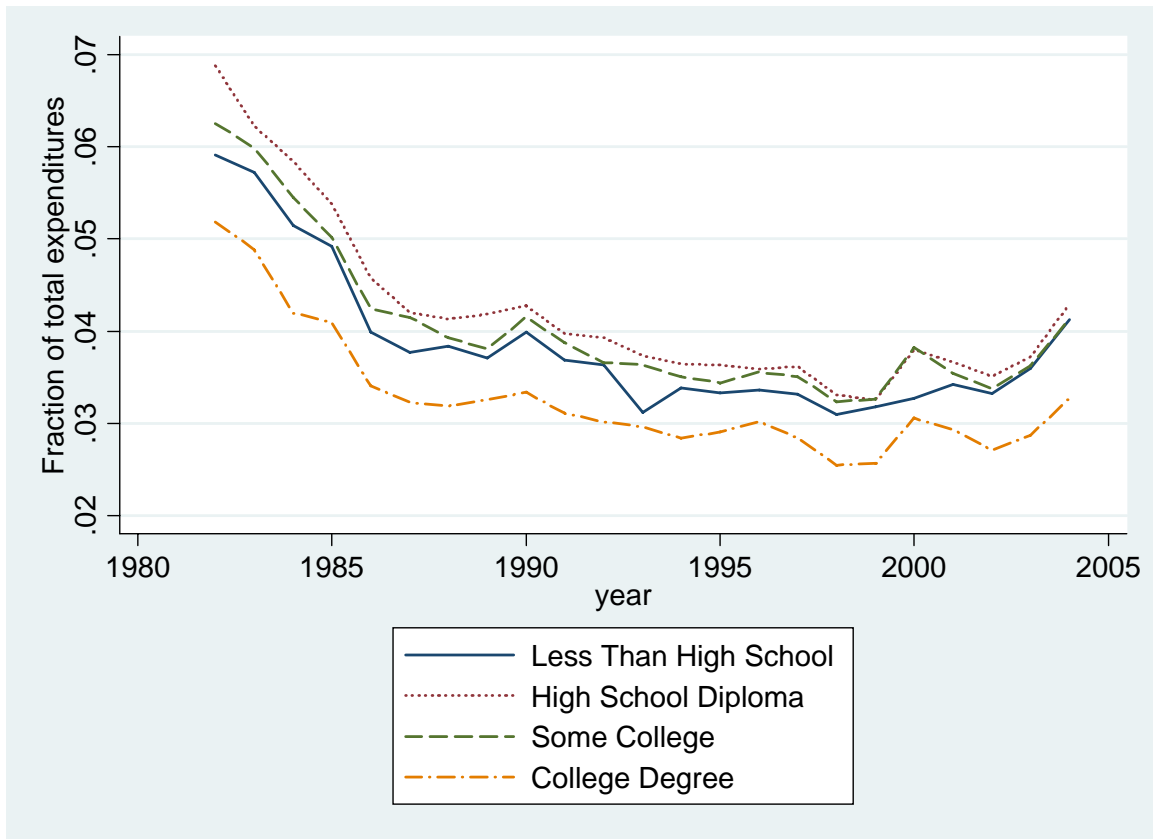
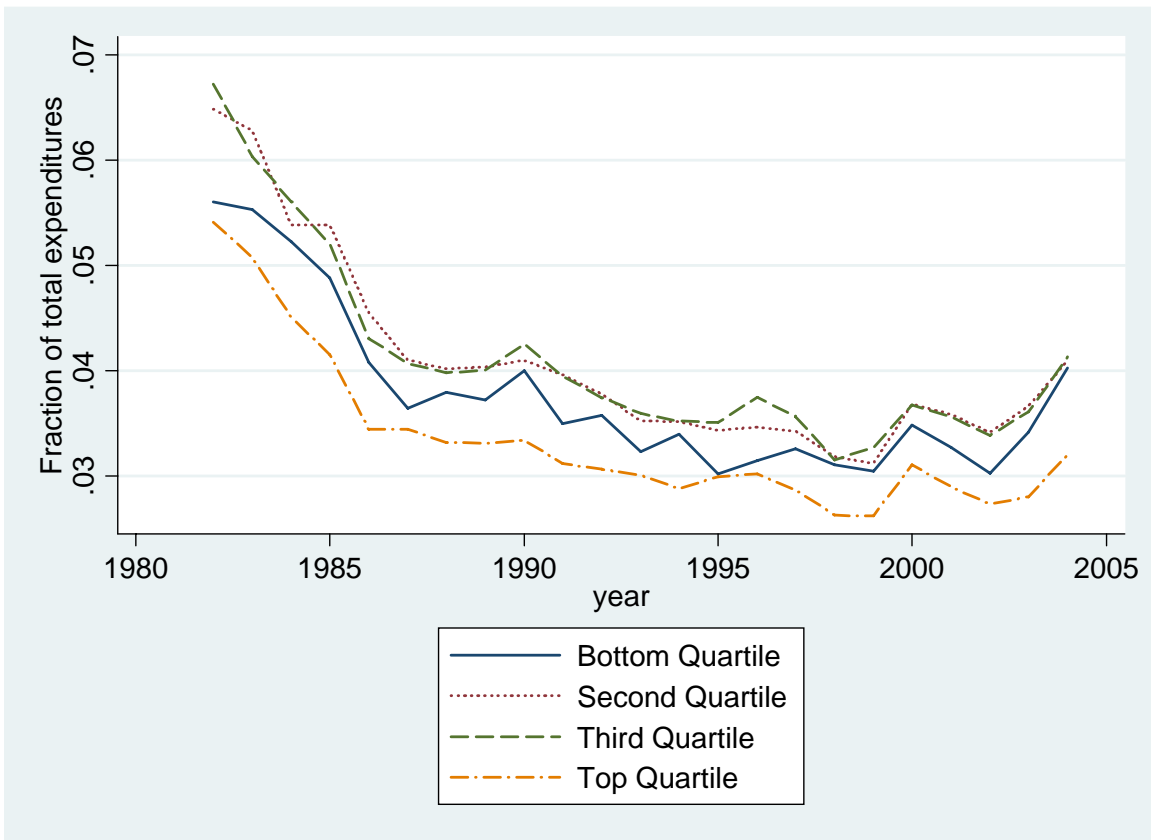
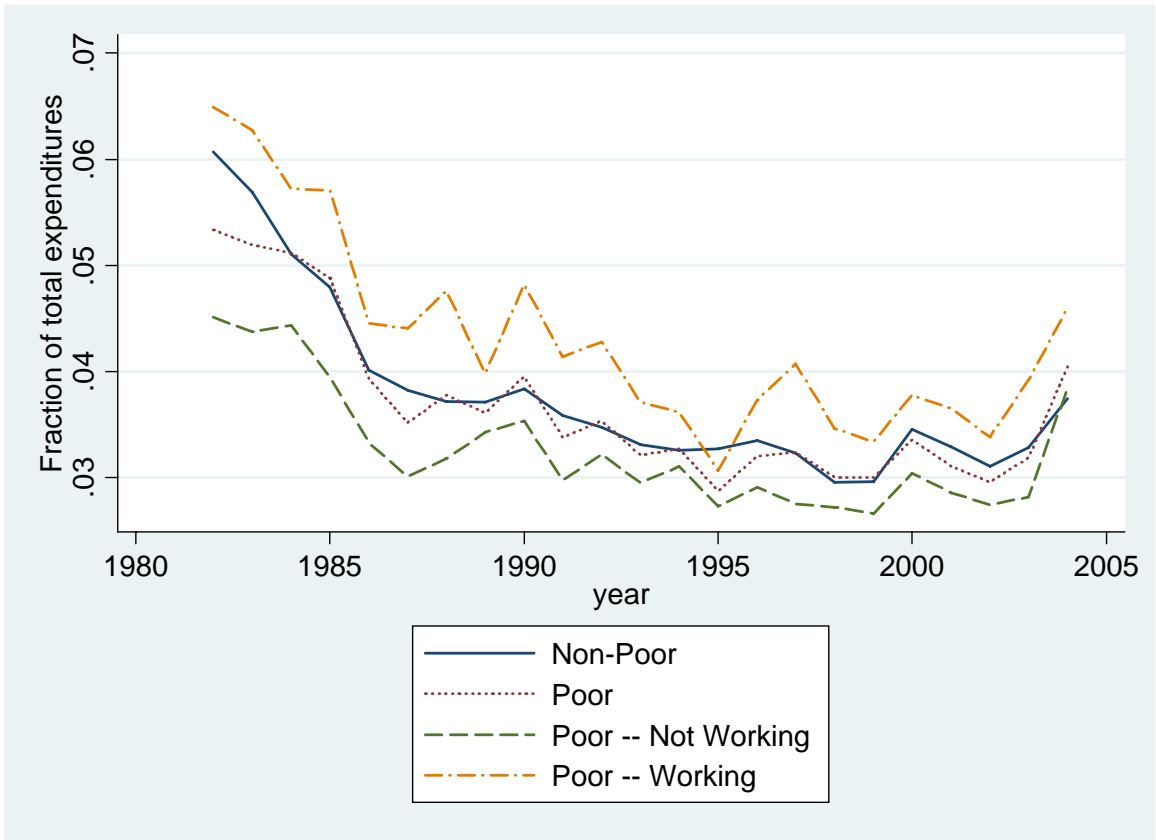


Figure 28: Gasoline and Motor Fuel Expenditure Share by Equivalent Income Quartile

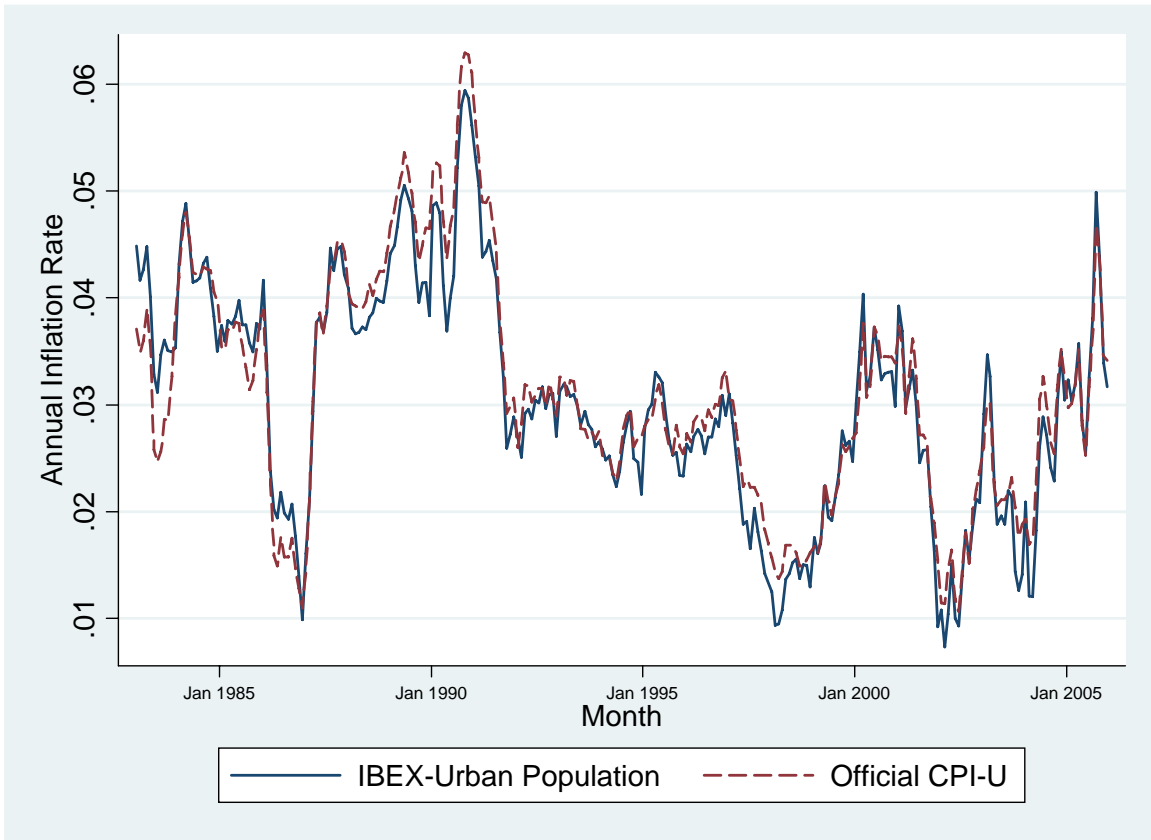


**Figure 29: Gasoline and Motor Fuel Expenditure, by Poverty Status**

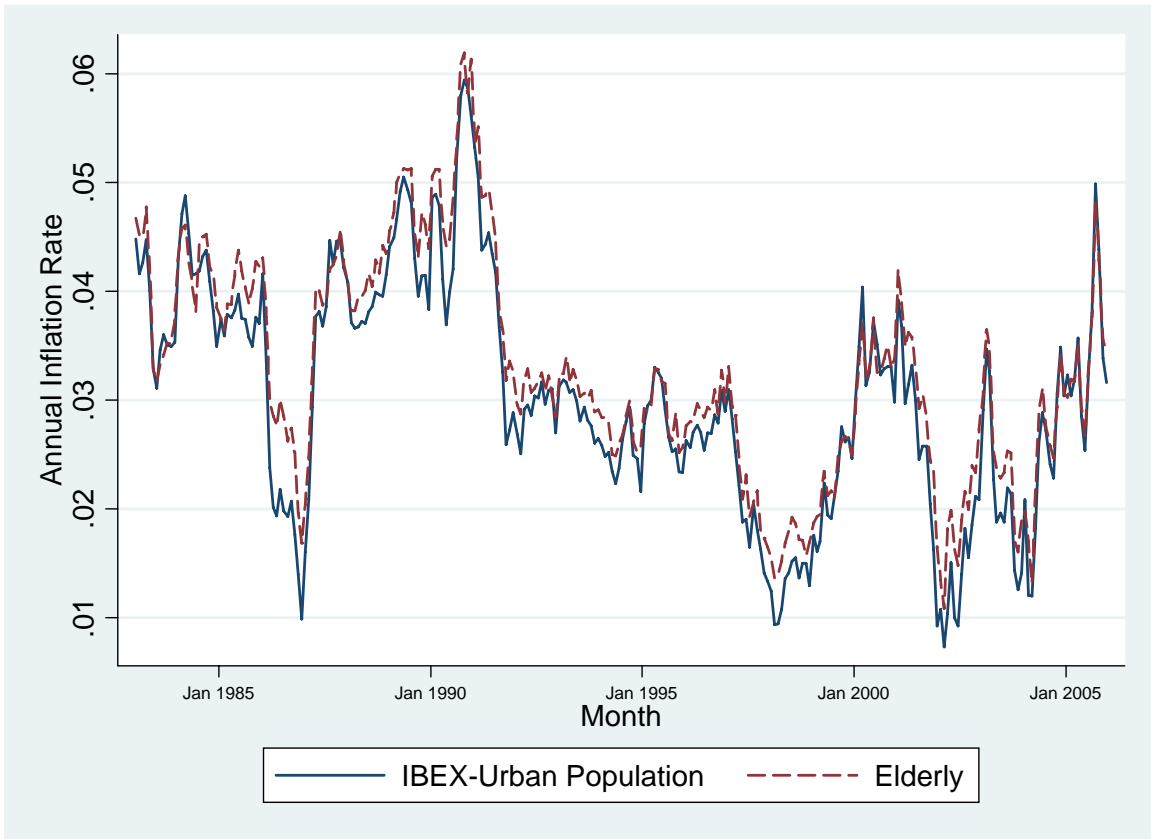




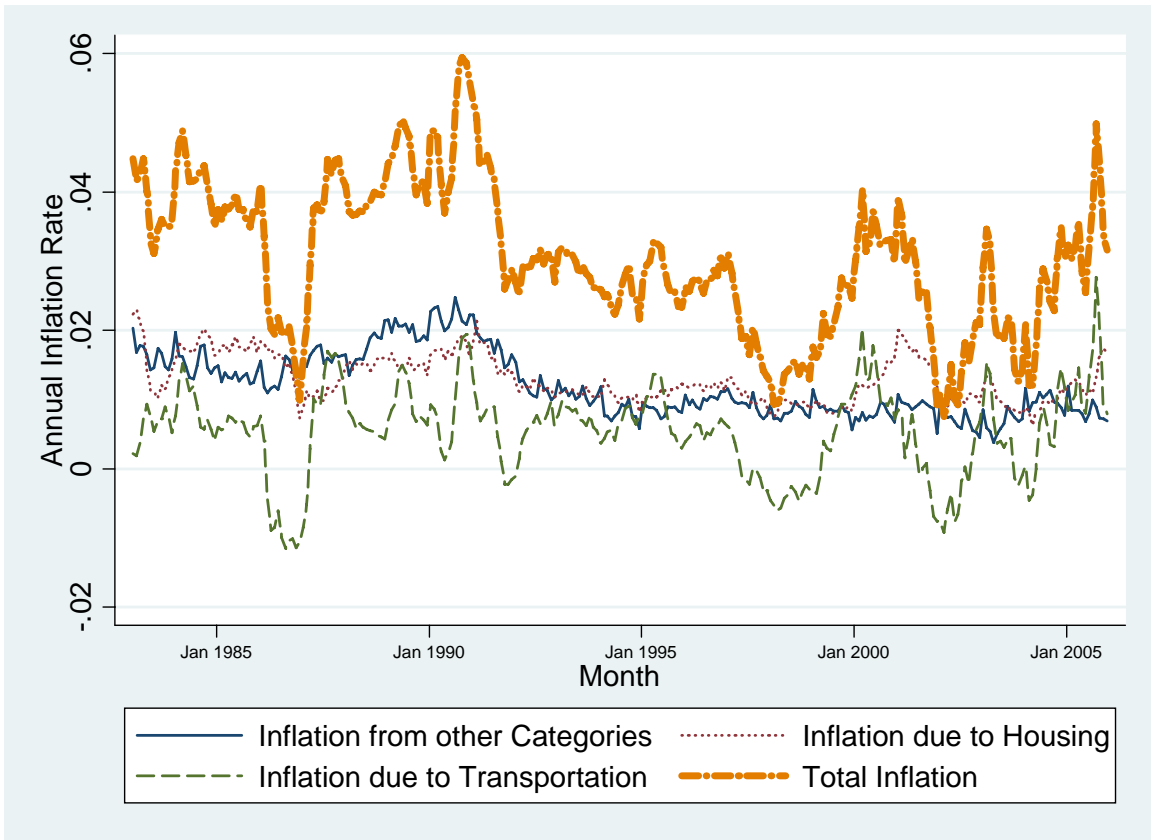
**Figure 30: Overall Inflation, Rental Equivalence Based**



**Figure 31: Overall Urban Inflation vs. Inflation for the Elderly, Rental Equivalence Based**



**Figure 32: Overall Contributions to Inflation, Rental Equivalence Based**



**Figure 33: Contributions to Inflation: Core vs. Non-Core, Rental Equivalence Based**

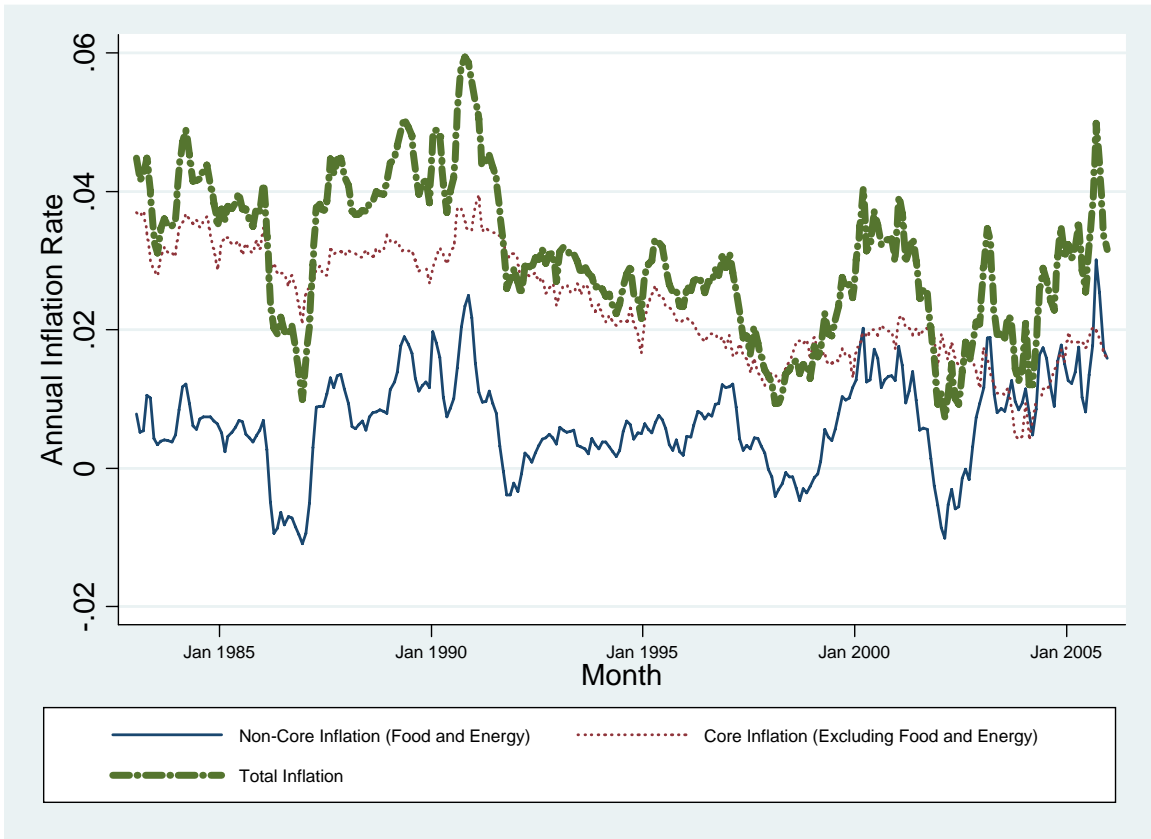
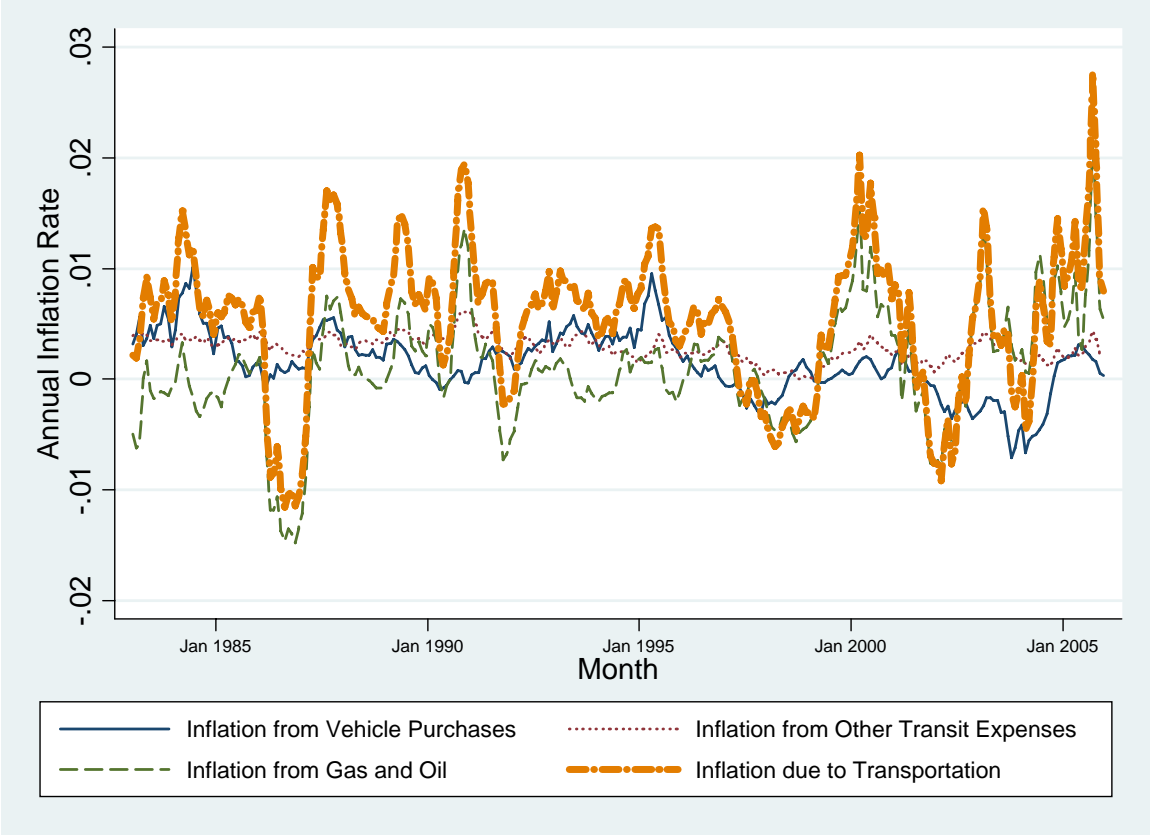
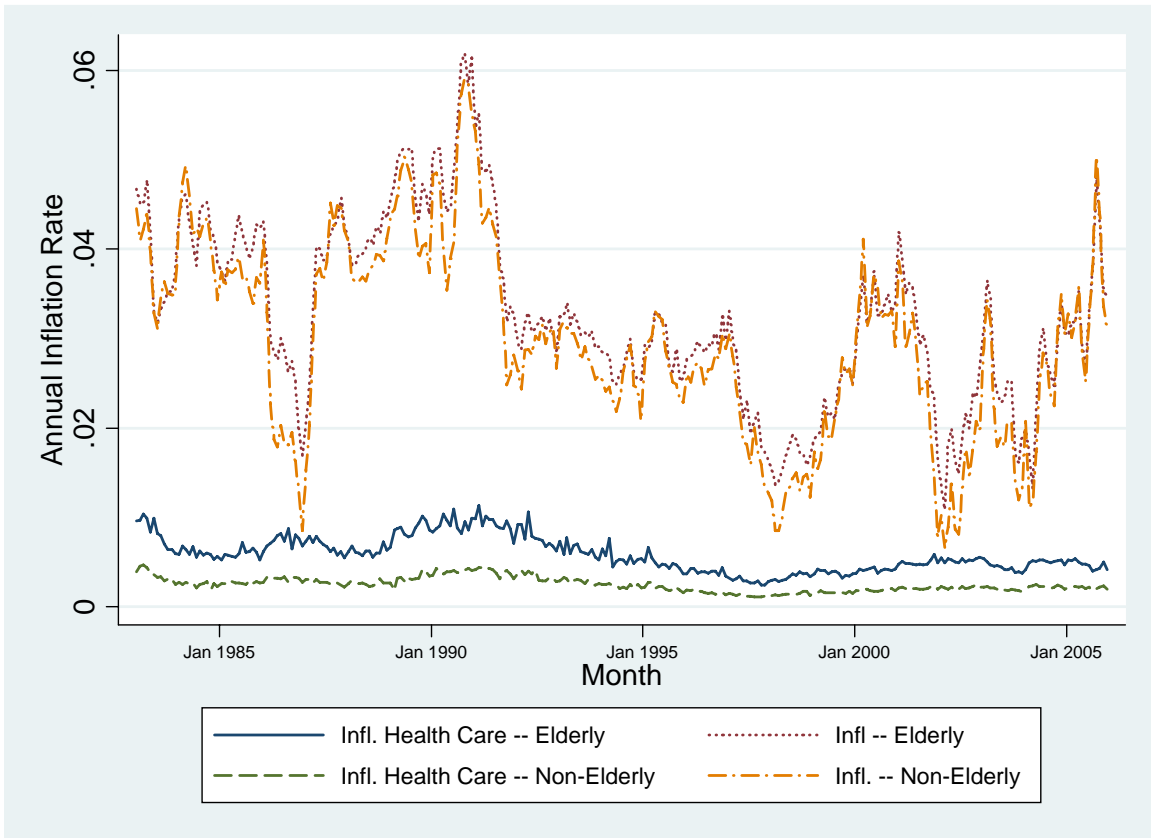


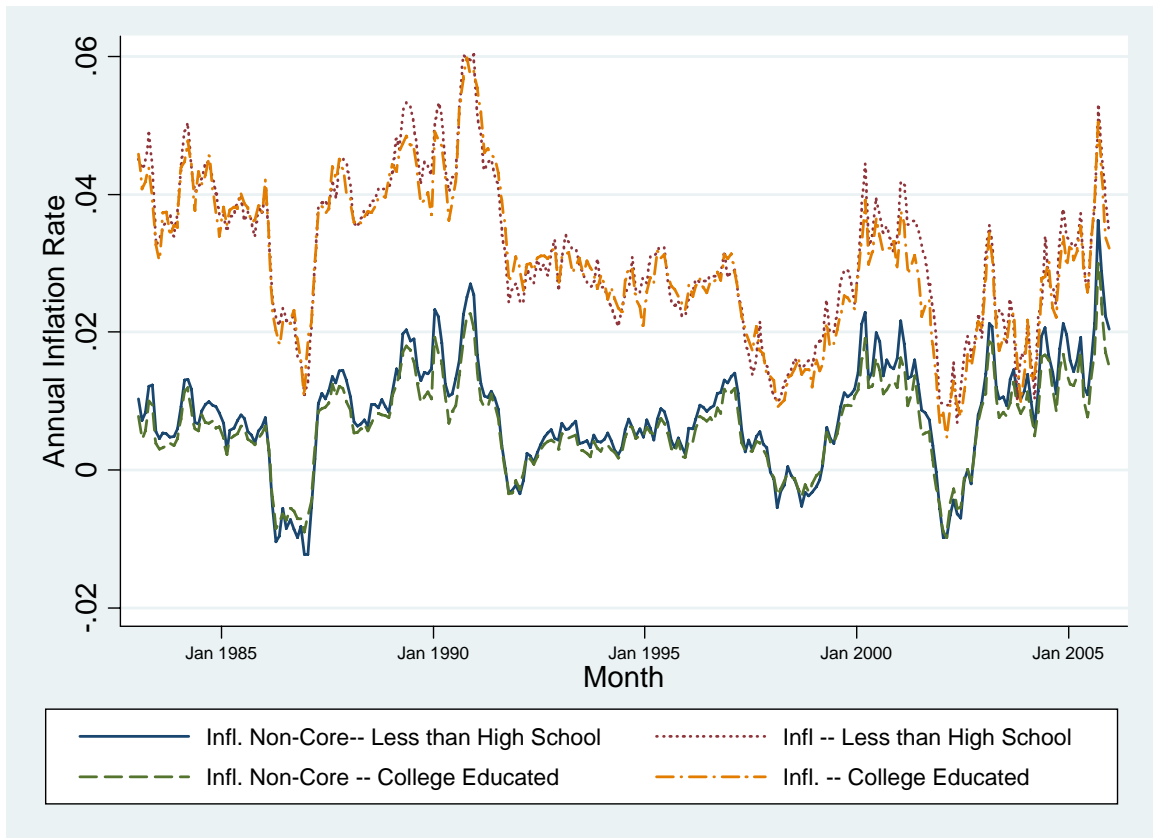
Figure 34: Inflation Within Transportation, Rental Equivalence Based



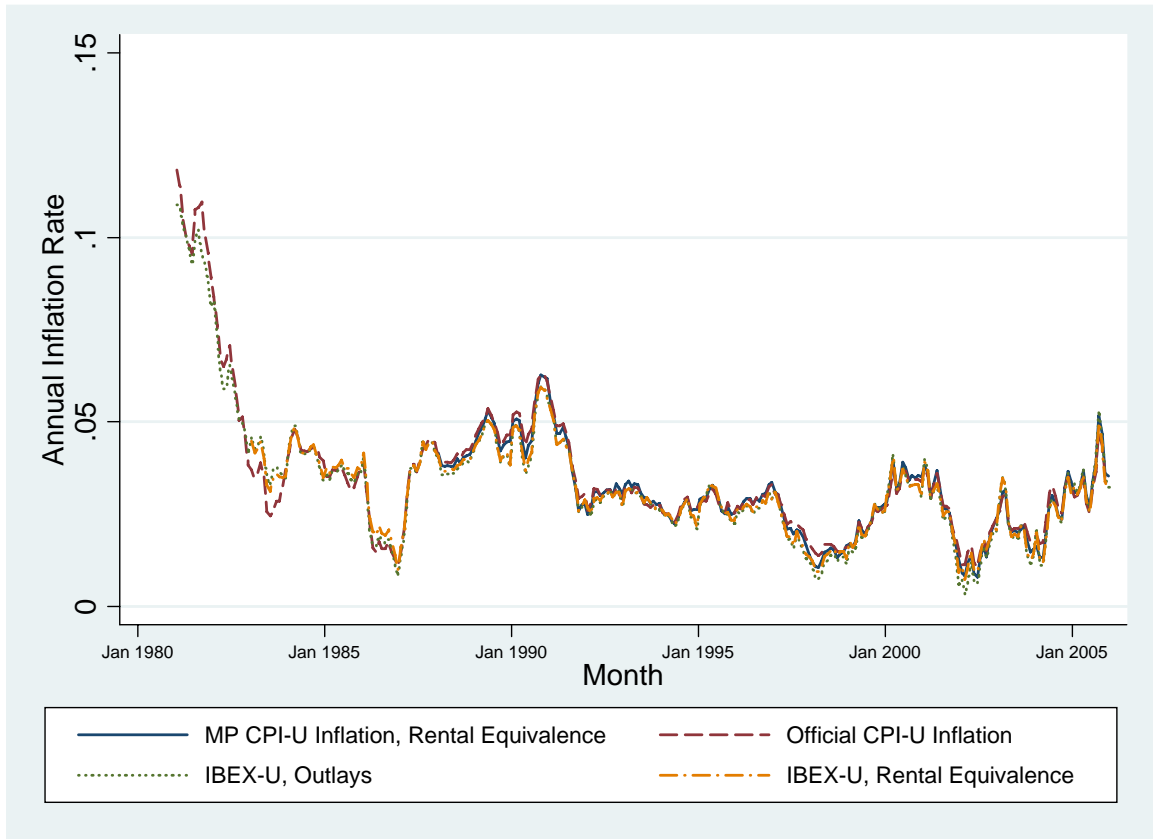
**Figure 35: Inflation Contributions Elderly vs Non-Elderly, Rental Equivalence Based**



**Figure 36: Inflation Contributions Less than High School vs College Educated, Rental Equivalence Based**



**Figure 37: CPI-U Inflation Compared to Calculated Inflation Measures**





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