Real Wage Growth at the Micro Level

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Victoria Gregory and Elisabeth Harding

Abstract

This paper investigates patterns in real wage growth in 2022 to determine whether wages have kept up with rising price levels, and how this differs among labor market participants. Using the CPS for wages and imputing expenditure data from the CEX, we measure separately nominal wage growth and inflation rates at the micro level. We find that there is more heterogeneity in the former, meaning that when we combine them, an individual's real wage growth is primarily driven by their nominal wage growth. In 2022, 57% of individuals experienced negative real wage growth, with older and less-educated workers, as well as job-stayers, being hit the hardest. Conversely, younger and highly-educated workers, as well as job-switchers, had higher real wage growth.

Keywords: Inflation, Real Wage Growth, Nominal Wage Growth, Macroeconomics, Labor, Consumption
JEL Codes: E24, E31, J31

1. INTRODUCTION

Until the beginning of 2021, the past decade saw consistent positive year-over-year real wage growth, demonstrating that wage growth outpaced the rising cost of living. However, in the past two years, the U.S. experienced high inflation combined with strong wage growth. With aggregate inflation reaching a high of 9 percent in June 2022 and average nominal wage growth soaring to 6.4 percent in 2022, most households experienced both rising wages and rising cost of living. The difference between these two values determines real wage growth. However, the contributions of these components may differ across individuals or households. The unequal impact of inflation across age, education, household size, and income is of great interest to policymakers.

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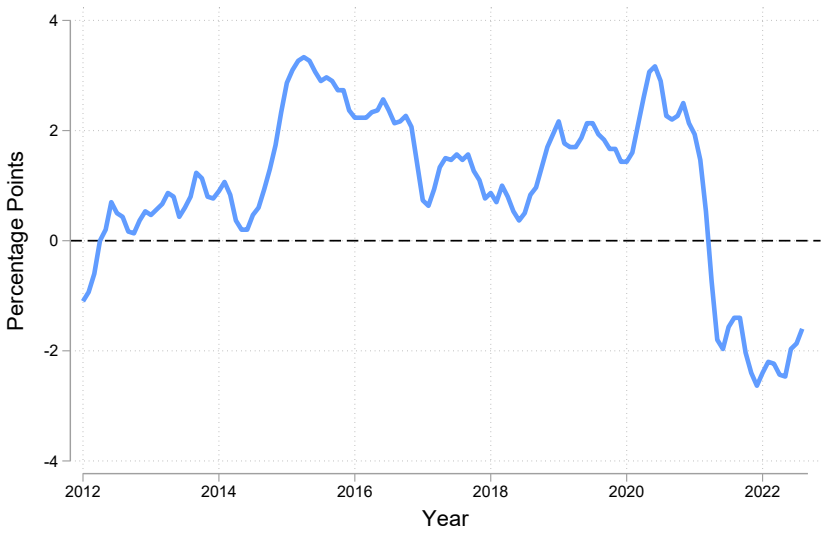
Figure 1
Aggregate Real Wage Growth



The above figure was constructed using the inflation estimates from the CPI as well as the Federal Reserve of Atlanta's Wage Growth tracker, which uses the CPS to calculate a three-month moving average of the median of overall unweighted year-over-year nominal wage growth.

Figure 1 depicts median real wage growth in the United States over the past decade. While workers saw increases in real wage growth in 2015 and 2020, it typically ranged from 1 percent to 3 percent until 2021. However, more recently, median real wage growth has hovered around -2 percent.

In this paper, we aim to explore the heterogeneity behind the negative values demonstrated in Figure 1 by analyzing the distribution of real wage growth in 2022 across households. Specifically, we examine nominal wage growth and inflation rates at the individual level to determine the real wage growth rates for each worker in our sample. However, measuring real wage growth at the individual level presents a challenge. To calculate individual real wage, we must observe both wage and consumption for each individual, but there is no current micro data that covers both consumption and nominal wage growth. We overcome this challenge by combining consumption data from the Consumer Expenditure Survey (CEX) and wage growth data from the Current Population Survey (CPS). We begin by pinpointing individuals in the CPS for whom we can observe wages 12 months apart. The CPS records wage information for individuals as they rotate out of the survey. We then follow the methodology of the Federal Reserve Bank of Atlanta's Wage Tracker to measure median nominal wage growth and find that the distribution of nominal wage growth has a wide range, with most values between -50 percent and 50 percent.

Rather than use the Bureau of Labor Statistic's measure of average inflation, we calculate individual inflation rates which account for differences in consumption patterns of different demographic groups. We impute consumption information from the CEX to the CPS based on demographic characteristics: age, education, income, and household size. This imputation estimates consumption baskets for our sample of individuals in the CPS, thus providing us with a data set of observed wage and imputed consumption. To measure inflation, we match CPI inflation series to our 19 CEX expenditure categories to calculate individual inflation rates based on the estimated consumption baskets. Unlike that of nominal wage growth, the distribution of inflation rates has a narrow range, from 7 percent to 13 percent for most individuals.

Lastly, we calculate individual real wage growth as the difference between an individual's nominal wage growth and inflation rate and analyze real wage growth across demographic groups. Our results highlight three important features of real wage growth in 2022. First, 57 percent of individuals experienced negative real wage growth, 10 to 15 percentage points higher than in typical years. Second, real wage growth varies significantly across demographic groups. Younger workers as well individuals that switched jobs experienced the highest real wage growth. The wage of workers older than 55 and individuals with children in the household were least likely to keep up with their rising cost of living. Third, the distributions of nominal wage growth and inflation suggest that variations in real wage growth are driven by variations in nominal wage growth. This is because we found a lot more heterogeneity in nominal wage growth compared to inflation across households.

This paper contributes to several aspects of existing literature. Like Argente and Lee (2021) and Kaplan and Schulhofer-Wohl (2017), we study differences in the cost of living across households. While these papers incorporate more sources of these differences that we cannot account for here (like differences in shopping behavior and quality of items consumed), we are able to explore the connection with wage growth. In addition, these papers also use the Nielsen Consumer Panel and Retail Scanner data sets, which focus primarily on grocery stores and drug stores. In contrast, we are able to incorporate a much larger set of goods and services using the CEX. Accordingly, we also borrow some techniques from other papers that have used the CEX micro data to study household consumption baskets. For instance, Hobijn and Lagakos (2003) examine inflation inequality across the U.S. from 1987-2001 using consumption data from the CEX and aggregating expenditures into 19 categories to best match the CPI series, like we do here. Cravino, Lan, and Levchenko (2018) also use the CEX document the relative prices of good consumed across households but aggregate households into income percentiles and examine the distributional effects of monetary policy shocks on those consumption baskets. There are also several papers that perform related, but different, imputation techniques to link consumption data with other micro data sources. These include Blundell, Pistaferri, and Preston (2008) and Pretnar (2022). Finally, our work relates to papers which study the characteristics of the income growth distribution, like Guvenen et al. (2015). We find that the distributions we recover in this paper exhibit similar properties.

The rest of the article proceeds as follows. The following section briefly discusses literature related to our investigation. Section 2 discusses the data, its structure, and how it is used in combination to estimate real wage growth. Section 3 presents estimates of individual nominal wage growth, inflation, and real wage growth and their distribution across households and demographic groups, and Section 4 concludes.

2. DATA AND METHODOLOGY

We draw on two sources of micro data for our analysis. We use the Current Population Survey (CPS) for nominal wage growth and the Consumer Expenditure Survey (CEX) for data on household expenditures of different item categories. We then impute CEX data into the CPS to construct individual real wage growth rates. All of these steps are described below.

2.1 The CPS for Nominal Wage Growth

To measure year-over-year nominal wage growth for individuals from 2021 to 2022, we use the Current Population Survey (CPS) conducted by the Bureau of Labor Statistics (BLS). The CPS is a monthly survey that collects individual and household information, producing a broad body of data on demographic characteristics, employment, the labor force, and earnings. It covers a monthly sample of households across the fifty states and District of Columbia. Individuals in the CPS are interviewed a total of eight times. First, they are interviewed once a month for four consecutive months. Then, eight months later, they are interviewed for another four consecutive months. The fourth and eighth interviews are considered the Outgoing Rotation Groups in which individuals are asked for additional information beyond what is asked in the other interviews. In particular, they are asked about their earnings, meaning that for each individual we observe data on their earnings set twelve months apart. These data are pre-tax and focus on wage and salary earners, excluding those that are self-employed. For hourly and salaried workers, hourly and weekly earnings are collected, respectively.

Following the methodology of the Federal Reserve Bank of Atlanta's Wage Growth Tracker, we use the earnings data for wage and salary earnings to compute year-over-year nominal wage changes for each worker. We examine individuals who first are in the Outgoing Rotation Group in 2021 and appear in the Outgoing Rotation Group again in 2022, based on a match in their unique person ID number. We first confirm that these individuals match based on their age, gender, and race as well to avoid any coding errors in the ID number. We also restrict our sample to exclude agricultural workers. Weekly earnings for salaried workers are then converted to hourly by dividing weekly wage by usual hours worked per week (or actual hour worked is usual hours worked is not available). Finally, we calculate one-year log wage changes as follows:

$$\Delta y_i = \left[\log(y_{i,2022}) - \log(y_{i,2021})\right] \times 100$$

where $y_{i,2021}$ and $y_{i,2022}$ are wages in 2021 and 2022, respectively, for individual i.
Our final sample includes about 1,400 observations per month.

2.2 The CEX for Individualized Consumption Baskets

The Consumer Expenditure Survey (CEX) is nationwide household survey on expenditures and incomes collected by the Bureau of Labor Statistics. Expenditures are split into about 600 categories, called UCC's (Universal Classification Codes), of goods and services. For our analysis, we use any data collected that pertains

to spending during 2021. The CEX is comprised of two different surveys, the Interview and the Diary. The Interview survey asks consumers for expenditure information over a three-month period and typically covers large or recurring purchases, including vehicles, property, appliances, rent, and insurance. The consumer unit at the Interview Survey address is interviewed each quarter for up to four consecutive quarters and asked about the previous three months of expenditures. For example, an address that enters the Interview Survey in March 2021 will be asked about purchases in December 2020, January 2021, and February 2021. They can then be interviewed again in June, September, and December 2021. The sample depends on address rather than household, so if a consumer unit moves from the address, the new consumer unit at the address will be interviewed instead. The Diary Survey, on the other hand, collects weekly data on frequent expenditures, such as food, personal care, and medicine. Consumer units are interviewed for two consecutive weeks. While the Interview and Diary Surveys both follow the same consumer units across multiple time periods, the CEX treats each interview as separate, independent observations in the data. To maintain a representative sample and account for the relocation of households, the consumer unit is given a new identification number and weight each quarter or week in the Interview and Diary, respectively. This yields about 35,000 households in the Interview and 12,000 households in the Diary in 2021.

Because the Diary and Interview Surveys collect data on different households, we do not observe the complete consumption data of any household. For example, households in the Interview are not asked about grocery purchases, and households in the Diary are not asked about vehicle purchases. Further, households rarely report consumption in every UCC, and when these are aggregated to calculate population-wide expenditures by UCC, the BLS counts them as zeros.[1] We do the same before aggregating the UCCs into nineteen more broad categories, as shown in the first column of Table 1.

1. Based on our analysis, not doing so massively overstates the expenditure levels in their published tables.

Table 1
Matching CEX Expenditure Categories to CPI Series

	CEX Expenditure Category	CPI Series
1	**Food at Home**	Food at Home
2	**Food Away from Home**	Food Away from Home
3	**Alcoholic Beverages**	Alcoholic Beverages
4	**Owned Dwellings**	Owners' Equivalent Rent of Primary Residence
5	**Rented Dwellings**	Rent of Primary Residence
6	**Other Lodging**	Lodging Away from Home
7	**Utilities**	Fuels and Utilities
		Telephone Service
8	**Household Operations, Supplies, and Furnishing**	Household Equipment and Operations
		Information Processing other than Telephone
9	**Apparel**	Apparel
10	**Vehicles**	New and Used Motor Vehicles
11	**Gasoline**	Motor Fuel
12	**Other Vehicle Expenses**	Vehicle Parts and Equipment
		Vehicle Maintenance and Repair
		Motor Vehicle Insurance
		Motor Vehicle Fees
13	**Public Transportation**	Public Transportation
14	**Healthcare**	Medical Care
15	**Entertainment**	Recreation
16	**Personal Care**	Personal Care
17	**Reading**	Recreational Reading Materials
18	**Education**	Educational Books and Supplies
		Tuition, Fees, and Child Care
19	**Tobacco**	Tobacco

After aggregating, we obtain for each household a value for its expenditure on 19 different categories (with many zeros). When averaged over the whole sample using the appropriate weights, our mean expenditures line up well with those of the published tables: see the first two columns of Table 2 for a comparison. We also have the following demographic categories for both the CPS and CEX: household size, income, metropolitan status, geographic region, number of children under 18 years old in the household, age of reference person, race of reference person, ethnicity of reference person, marital status of the reference person, and education of reference person. Table 3 compares our CEX and CPS samples along these dimensions. The two samples are very similar, with the most major difference being that the CEX has a much larger share of households over 65. We make use of these variables in our imputation method and/or our analysis of the resulting real wage growth rates.

Table 2
Average Consumer Expenditures

	CEX Published Tables	Author Calculated	CPS Imputation
Food at Home	5259	4901	6961
Food Away from Home	3030	2948	3785
Owned Dwellings	7591	9580	13434
Rented Dwellings	4684	4259	5959
Utilities	4223	5515	6713
Household Equipment/Operations	5142	4999	5397
Vehicle Purchases	4828	4868	5951
Other Vehicle Expenses	3534	3364	4348
Healthcare	5452	6250	5311
Entertainment	3568	3598	3847

Table 3
Shares of Demographic Categories in the CEX and CPS

Household Size			Marital Status		
	CEX Share	CPS Share		CEX Share	CPS Share
1 Person	32.06	19.70	Married	50.43	57.34
2 People	33.73	33.32	Widowed	9.33	2.68
3-4 People	25.59	35.23	Divorced	15.73	13.13
5-6 People	7.31	10.17	Separated	2.17	2.01
7+ People	1.32	1.58	Never Married	22.35	24.84
Age			**Race**		
	CEX Share	CPS Share		CEX Share	CPS Share
Younger than 25	4.27	3.61	White	80.36	81.30
25-35	14.64	17.41	Black	10.80	9.76
35-45	16.56	23.76	Native American	0.58	0.93
45-55	16.16	23.61	Asian and Pacific Islander	6.20	6.37
55-65	18.84	22.65	Other	0.53	0.00
65 and Older	29.54	8.97	Two or More Races	1.54	1.64
Education			**Region**		
	CEX Share	CPS Share		CEX Share	CPS Share
Less than HS	8.27	4.72	Northeast	17.27	16.15
HS Degree	21.31	23.31	Midwest	20.69	21.07
Some College	28.69	26.79	South	33.91	36.35
At Least Bachelor's Degree	41.72	45.18	West	28.13	26.43
Ethnicity			**Metro Status**		
	CEX Share	CPS Share		CEX Share	CPS Share
Hispanic	13.88	12.77	Urban	94.14	82.52
Not Hispanic	86.12	87.23	Rural	5.86	17.48

To create inflation rates for items in our estimated consumption baskets, we construct a concordance between CEX expenditures and CPI series by aggregating the UCCs into nineteen expenditure categories and using non-seasonally adjusted indices for "All Urban Consumers" and "U.S. City Average.", following the

methodology of Hobijn and Lagakos (2003). For the CEX categories that do not match exactly to a CPI series, multiple CPI series are combined using the 2021 relative importance weights created by the BLS. For example, Utilities in the CEX matches to both the Fuels and Utilities CPI series as well as the Telephone Service in the CPI series. In this case,

$$W_u = \frac{w_f}{w_f + w_t} + \frac{w_t}{w_u + w_t}$$

where w_f is the CPI relative importance weight of Fuels and Utilities, w_t is the CPI relative importance weight of Telephone Service, and W_u is constructed CPI series for Utilities to match to the CEX.

2.3 Imputing CEX Expenditures into the CPS

2.3.1 Imputation Technique

A major challenge for researchers interested in individualized real wage growth is that there does not exist micro data containing both nominal wage growth and spending on a variety of items. We aim to overcome this by using the CEX data on expenditures to impute a consumption basket for each individual in the CPS. The idea is to estimate the relationship between spending and observable household characteristics in the CEX and apply these estimates to each individual in the CPS based on their own characteristics. To do so, we implement a methodology related to those of ... and ...

Because of the large number of zeros in our data (xx% of our observations at the UCC × household level are zeros), we model expenditures on UCC g with a hurdle model. This approach consists of two parts. The first models the probability of having a value zero (the selection model). The second models the values of the non-zero observations (outcome model). Let c_{ig} be household i's expenditure on UCC g. In our model, for each g,

$$c_{ig} = s_{ig} h_{ig}$$

s_{ig} is an indicator variable that determines selection:

$$s_{ig} = \begin{cases} 1 & \text{if } \boldsymbol{z}_i \boldsymbol{\beta}_g^s + \varepsilon_{ig}^s > 0 \\ 0 & \text{otherwise} \end{cases}$$

where $\boldsymbol{z_i}$ is a set of explanatory variables that vary by household, $\boldsymbol{\beta}_g^s$ is a vector of coefficients, and ε_{ig}^s is a standard normal error term.

h_{ig} is continuous and only observed if $s_{ig} = 1$. The outcome model is the following:

$$\log h_{ig} = \boldsymbol{x}_i \boldsymbol{\beta}_g + \varepsilon_{ig}$$

where x_i is a set of explanatory variables, $\boldsymbol{\beta_g}$ is a vector of coefficients, and ε_{ig} is a standard normal error term.

We use the same set of explanatory variables in the selection and the outcome equations to remain agnostic as to what household features may be associated with expenditures (and the presence or lack of data in some cases). These are: family size (1 person, 2 people, 3-4 people, 5-6 people, 7+ people), education (less than high school, high school diploma, some college/associate's, and bachelor's and higher), and family income (< $10,000, $10,000–25,000, $25,000–40,000, $40,000–60,000, $60,000–75,000, $75,000–100,000, $100,000–150,000, $150,000+).[2]

We estimate 19 hurdle models, one for each UCC category g.[3] With the estimates $\boldsymbol{\beta}_g^s$ and $\boldsymbol{\beta}_g$ in hand, we then use them to construct predicted values of expenditure on each UCC category for every CPS respondent in our sample. The explanatory variables we used in the CEX are also available in the CPS and the binning of the categories is made consistent across the two data sets.[4]

2. Household income and family size are only available in brackets from the CEX.

3. Although many categories are asked about both in the Diary and Interview surveys, some expenditures including Food at Home, Food Away from Home, and Alcohol are only collected in the Diary. In these cases, we only estimate the model on households in the Diary.

4. Note that although the CEX surveys households and the CPS surveys individuals, we have information on household characteristics in the CPS and thus use this information to generate the predicted expenditures.

2.3.2 Validation

In this section, we embark on a brief detour to show that our imputation approach yields sensible results for consumption of the CPS respondents. In the rightmost column of Table 2, we report the average consumption in each UCC category for in our imputed CPS data. These line up very closely with both the CEX's published tables and our own calculations from the CEX microdata.

As another check, we look at the expenditure shares (an individual's share of imputed consumption spent on a given UCC category) of the most popular categories as a function of household income.[5] These are displayed in Table 4. Our imputation results in expenditure shares that are qualitatively and quantitatively in line with those of the published tables of the CEX. For example, we reproduce the fact that poorer household use more of their budget on necessities like food at home, rented dwellings, and utilities.

Table 4
Share of Expenditure By Income

	Less than $10,000	$10,000-25,000	$25,000-40,000	$40,000-60,000	$60,000-75,000	$75,000-100,000	$100,000-150,000	More than $150,000
Food	13.5	12.5	11.4	10.4	9.9	9.8	9.5	9.0
Food Away from Home	5.1	5.1	5.0	5.4	5.4	5.2	5.8	5.8
Owned Dwellings	8.0	6.7	8.6	11.7	13.5	15.3	18.5	20.7
Rented Dwellings	20.7	24.2	20.9	16.7	14.2	10.9	7.2	4.8
Utilities	11.7	11.5	11.3	11.4	11.0	10.8	10.1	8.4
Household Equipment/Operations	6.4	6.2	6.4	6.7	6.9	6.9	7.3	8.1
Vehicle Purchases	7.0	5.2	7.1	7.3	7.8	9.1	9.0	10.1
Other Vehicle Expenses	4.9	5.8	6.2	6.7	7.1	7.1	6.7	5.9
Healthcare	4.8	6.2	6.5	6.9	7.1	7.3	7.7	6.3
Entertainment	3.9	4.3	4.2	4.5	4.5	4.8	5.4	6.0

2.4 Individualized Inflation Rates and Real Wage Growth

Having established that we have credible estimates for expenditures for individuals in the CPS, we then use them as the basis for our individualized inflation rates.

To do this, we apply the CPI series that correspond to the 19 expenditure categories that we estimated for each individual in our sample in the CPS. This matching exercise can be found in Table 1. For each individual, we calculate the share of total expenditure for each expenditure category, then multiply by the expenditure's inflation rate, and sum across all expenditure groups. More precisely,

$$\pi_i = \sum_{g=1}^{19} \frac{c_{ig}}{C_i} \pi_g$$

where π_i is household i's inflation rate in 2022, c_{ig} is an individual's expenditure on group g, C_i is an individual's total expenditure, and π_g is the inflation rate of group g from the CPI series.

An individual's real wage growth is then calculated as the difference between their nominal wage growth and inflation rate.

5. In principle, we can do the same for other household characteristics, but the expenditure shares exhibit the most variation along the income dimension. The shares along other dimensions also match up well with the published tables.

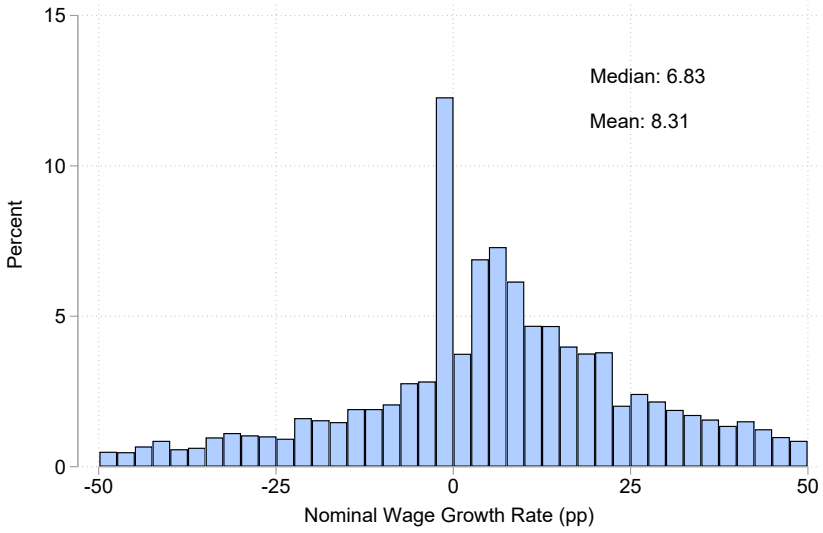
3. RESULTS

This section first reports our findings separately about the two components of real wage growth: nominal wage growth inflation rates. Then we put them together and analyze real wage growth.

3.1 Nominal Wage Growth

Figure 2 depicts the distribution of nominal wage growth. We find the median nominal wage growth rate to be 6.83 percent in 2022, and the mean to be 8.31 percent. The distribution of nominal wage growth has two characteristics that stand out. First, the mass point around zero shows that many individuals, around 12 percent, experienced stable year-over-year wages: their paychecks did not change at all in nominal terms. Second, the wide range in distribution demonstrates that many workers experienced extreme wage changes. These features of the wage growth distribution – many small wage changes and very high kurtosis – are consistent with what has been documented by Guvenen et al. (2015) using U.S. administrative data.

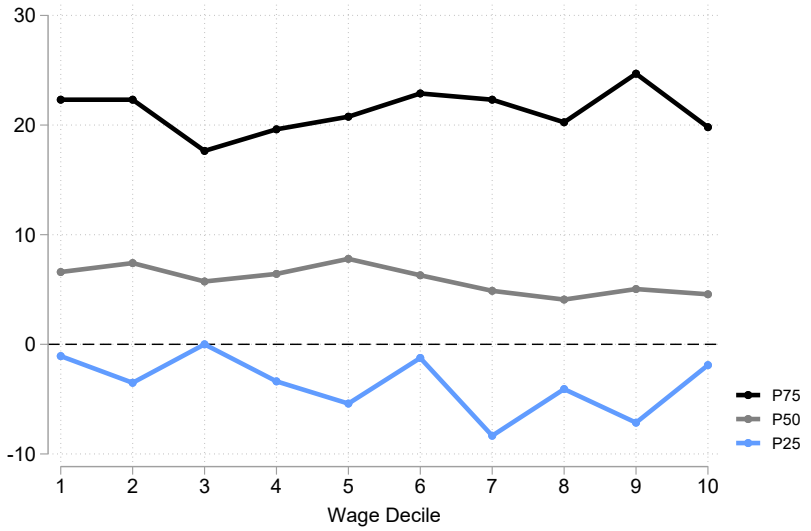
Figure 2
Nominal Wage Growth Distribution



This figure displays a percent histogram of the year-over-year nominal wage growth calculated for individuals in the CPS. Source: Authors' calculations

Next, to see who is getting significant wage changes, we examine how nominal wage growth varies by wage decile, depicted in Figure 3. Overall, the median of the nominal wage growth distribution is still positive across all wage deciles, especially for lower wage workers. In fact, among the lowest deciles, nearly 75% of them experienced positive wage growth. For the most part, the median and the 25th percentile of growth declines as you move up the wage distribution. Interestingly, the upper tail of the wage growth distribution is stable at all wage levels: the top quarter saw nominal wage growth of a bit over 20%, regardless of whether they are high- or low-wage workers.

Figure 3
Nominal Wage Growth by Wage Decile



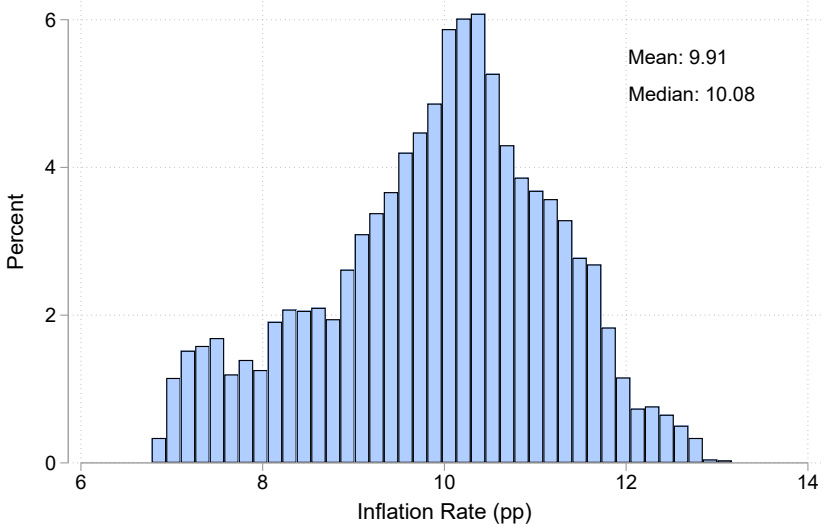
The above figure plots nominal wage growth at the 25th percentile, median, and 75th percentile by wage decile. Source: Authors' calculations.

We have yet to consider how inflation cuts into these positive nominal wages. This will be addressed after we study the distribution of inflation rates for these workers.

3.2 Inflation Rates

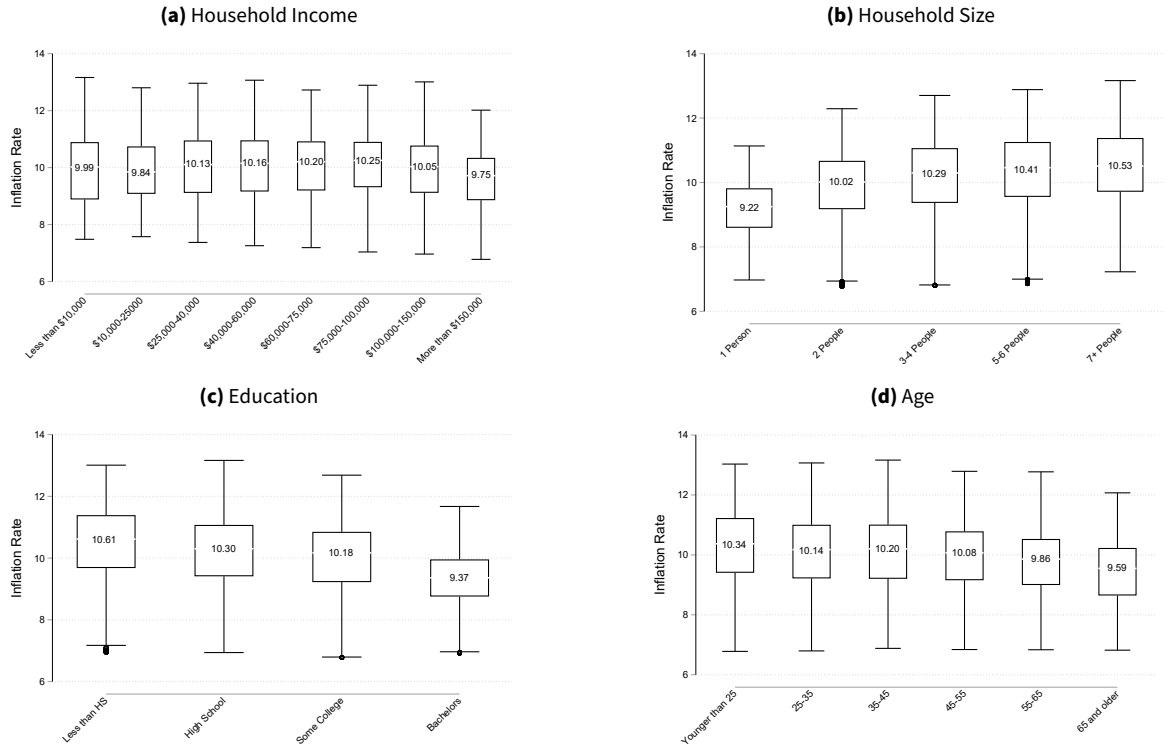
In Figure 4, we plot the distribution of inflation rates for the individuals in our CPS sample. The median household experienced a 10% increase in the price level of the goods basket it consumed from 2021 to 2022. Overall, individual inflation rates range from about 7% to 13%. By construction, the heterogeneity is due to individuals consuming different shares of each item category. Evidently, there is a lot less variation in terms of annual inflation rates compared to nominal income growth rates. This observation suggests that much of the variation in real growth rates will be driven by wages rather than prices of consumer goods.

Figure 4
Inflation Rate Distribution



Nevertheless, we can also use our imputation to examine which demographic groups experienced the highest inflation rates in 2021 - 2022. We explore this in Figure 5. Panel (a) shows that we do not find a great deal of heterogeneity with respect to income: the highest income bracket has the lowest inflation rate, but below that there is no clear pattern.[6] However, we do find more stark variations along the dimensions of household size, education, and age of the household head. Consumers who are in large households, have low education levels, or are young saw the highest inflation rates. At the same time, the household size, education, and age groups with the lowest inflation rates also had the least amount of heterogeneity within their groups. Appendix 1.1.1 reports the same statistics across other dimensions we can observe in the CPS, over which we find little variation.

Figure 5
Distribution of Inflation by Demographic Group



These box plots depict the distribution of inflation rates by demographic groups and report the median inflation rate in each category.

3.3 Real Wage Growth

Finally, we subtract each individual's inflation rate off their nominal wage growth to arrive at their value for real wage growth. Figure 7 depicts this distribution.

We find that the median worker experienced a 3.15% drop in their real wages between 2021 and 2022. In fact, for 57% of workers, their inflation rate was above their nominal wage growth rate, meaning that their wages did not keep pace with inflation. This is unusual relative to previous decades: according to Rich, Tracy, and Krohn (2022), the share of workers whose wages fail to keep up with inflation has ranged from 42 to 48 percent over the past 25 years. The high proportion of negative real wage earners has only come close to that of 2022 twice in the past two decades: it was 54 percent in 2008 and 56 percent in 2011.

Turning to the heterogeneity, we find substantial variation in real wage growth rates: majority range from -60 percent to 60 percent with a large mass falling between 0 and -12.5 percent. This range encompasses many of the individuals who saw no change in nominal wages between 2021 and 2022. Because inflation rates have a much narrower spread than nominal wage growth rates, we can attribute much of these differences in real wage growth to variation in nominal growth rates, rather than inflation.

6. Other papers, like Argente and Lee (2021), find that lower-income households experience much higher inflation rates, but that this is because of differences in product quality and shopping behavior, which we cannot address here.

Figure 6
Real Wage Growth Distribution

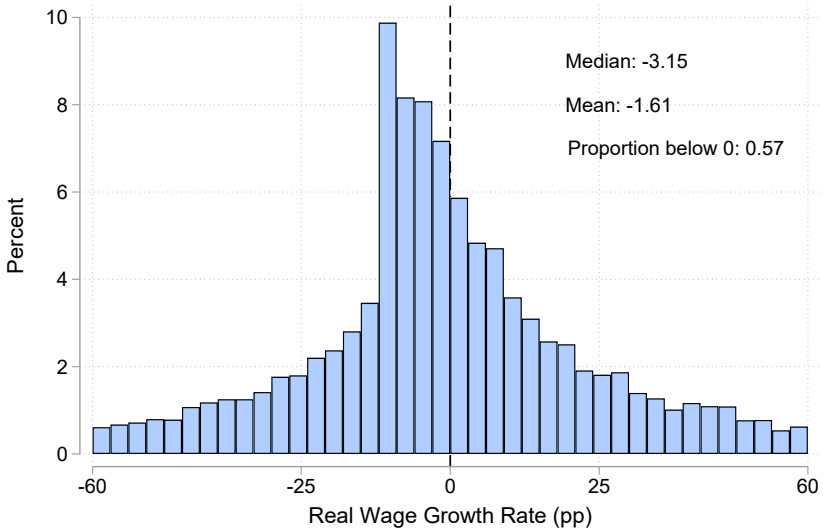
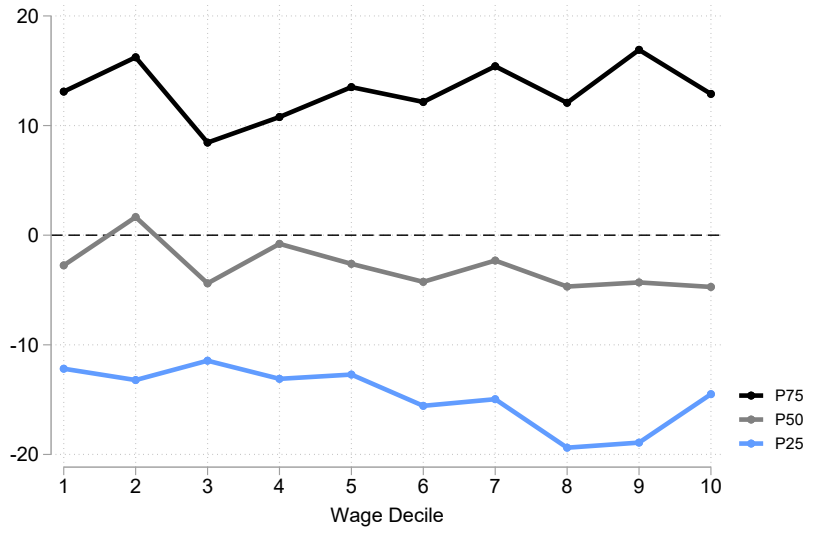


Figure 6 breaks this down by decile of earnings in the same way as Figure 3 does for the nominal wage growth distribution. The general pattern remains the same: the values are just shifted downward after accounting for inflation. This finding indicates that the inflation rates within these deciles neither offset nor amplified the general patterns in wage growth.

Figure 7
Real Wage Growth by Wage Decile



A similar story emerges when we break things down by demographic group. Figure 8 highlights the median real wage growth for a few of the categories.[7] For example, real wage growth decreases as the age of the worker increases. Despite the fact that workers less than 25 years old saw the highest median inflation rate of any age group at 10.24 percent, they are the only demographic group that experienced a positive real wage

7. In Appendix 1.2.1, we present the same statistics for a broader set of characteristics.

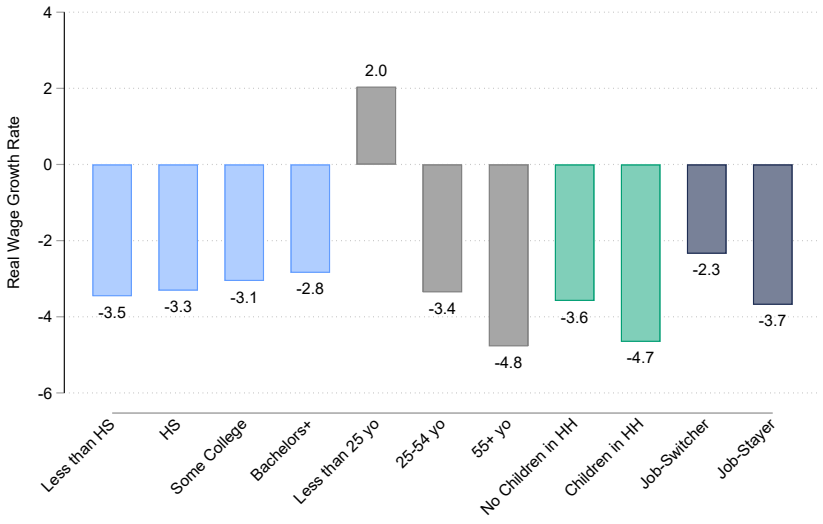
growth rate, 2.0 percent. This is 5.4 percentage points higher than workers between 25 and 54 years old and almost 7 percentage points higher than workers over the age of 54. Since young workers are often experience the highest rates of wage growth across all stages of the business cycle, it is not surprising that we found that this held true in 2021–2022. But we did learn that even in this period of high inflation, the median worker under age 25 still came out ahead.

Figure 8 also shows that the real wage growth rates across the education distribution are more aligned than across age groups. Workers with less than a high school education experienced both the highest inflation rates and lowest real wage growth rates while workers with college degrees saw low inflation rates and high real wage growth rates. Households with children also saw a larger drop in real wages compared to households without children.

Finally, we note the important differences between job-switchers and job-stayers. Job-switchers are those who are observed to have a change of employer between their 2021 and 2022 CPS interviews.[8] Job stayers encompass everyone else. In Figure 8, we show that job switchers experienced higher real wage growth rates than job-stayers: their median real wage growth was 1.4 percentage points higher. This difference holds up even when controlling for the other demographic factors.

Variations in real wage growth become more dramatic when zooming into smaller groups which combine these demographic characteristics. For example, workers that are less than 25 years old, hold a college degree, have no children in the household, and switched jobs in 2022 saw a positive real wage growth rate of 13.33 percent. On the other hand, workers that are at least 55 years old, do not hold a high school degree, have at least one child in the household, and stayed in their jobs in 2022 saw a negative real wage growth rate of -22.20 percent, 35.53 percentage points lower than someone with their “opposite" characteristics.

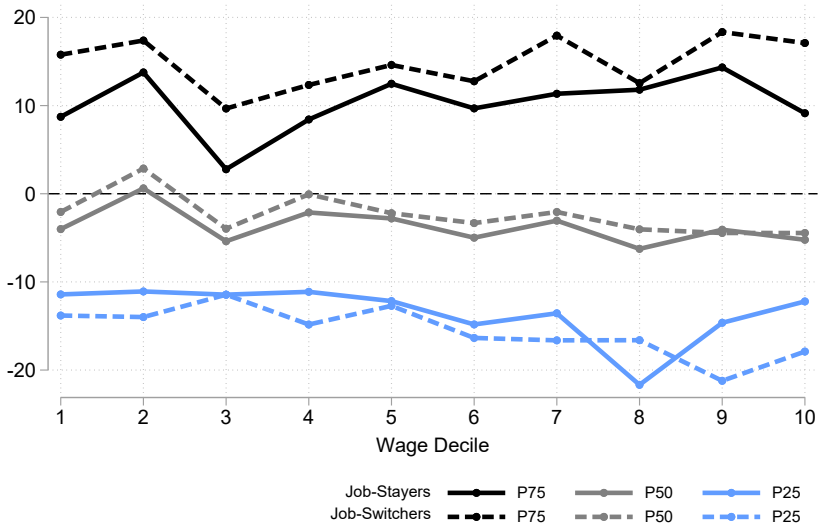
Figure 8
Real Wage Growth by Demographic Group



We view the job-switcher vs. job-stayer distinction as important because unlike the other dimensions that we studied, this one is to some extent controllable by the worker: they can search for new jobs in pursuit of wage increases. Therefore, we explore further the differences between job-switchers and job-stayers by breaking up the statistics in Figure 7. The results are shown in Figure 9, revealing that at all wage levels, the largest differences between switchers and stayers come mainly from the upper parts of the distribution. Although at all deciles, the median job-switcher does better than the median job-stayer, this is especially true for at the 75th percentile of wage growth, where the gap between them is much greater. These large real wage changes also do not differ much across wage levels. Unlike the median among switchers, the highest percent increases in real wages for the bottom earners are similar to those of the top earners.

8. To identify individuals that switch jobs, we generate twelve-month lags for industry, employer, and employment activity. We define job-switchers as those whose industry, employer, or activity changes between their first and second reports of wage.

Figure 9
Real Wage Growth by Wage Decile for Job Stayers and Switchers



4. CONCLUSION

In this article, we explored patterns in real wage growth in 2022 to pinpoint the individuals whose wages are most likely and least likely to keep up with the rising cost of living. To overcome the lack of up-to-date data on wage and consumption, we use the CPS Outgoing Rotation Groups to track workers' wages 12 months apart and estimate their consumption by imputing expenditure information from the CEX. We find considerable variation in both nominal wage growth and inflation, with some coherent patterns across demographic groups. However, the distribution of nominal wages has a greater range than that of inflation, suggesting that a given person's real wage growth is driven mainly by their nominal wage growth. We also find that 57 percent of individuals experienced negative real wage growth in 2022, which is 10 to 15 percentage points higher than the average year. The workers hit with the lowest real wage growth are generally older, less educated, have children in the household, and did not switch jobs in 2022. On the other hand, the real wages of young, highly educated, job-switching workers, and those without children fared relatively well in 2022.

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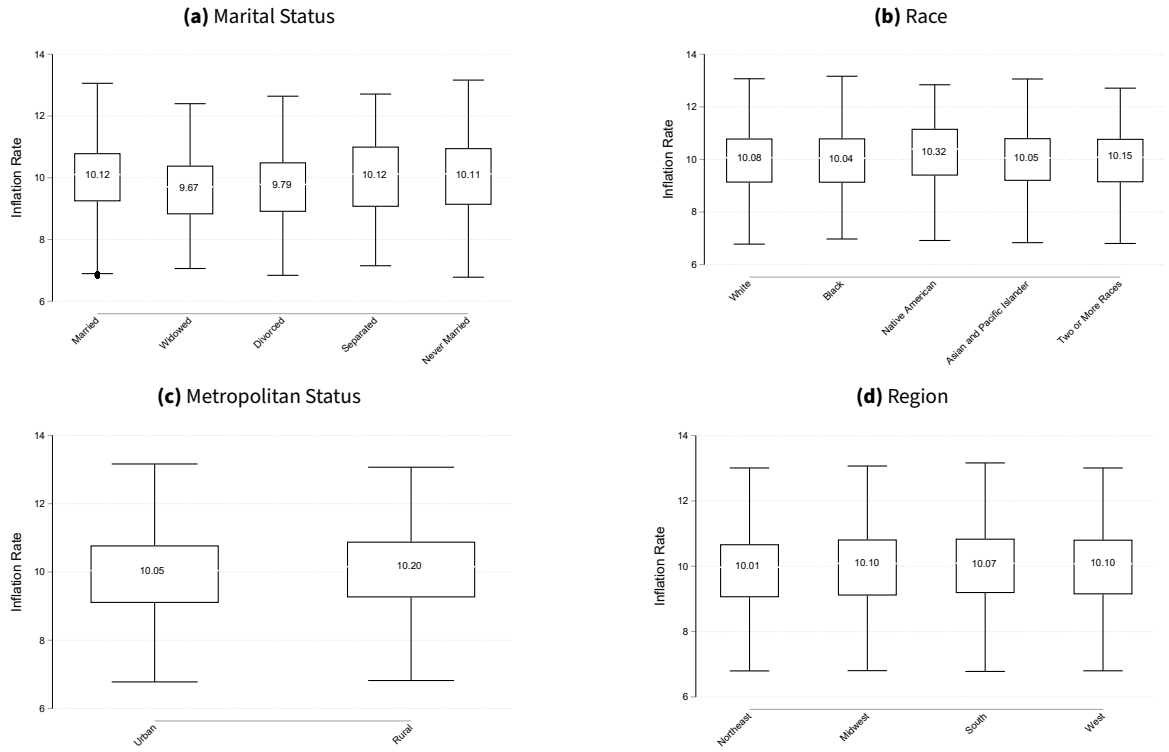
APPENDIX 1.

Appendix 1.1 Inflation Rate Distribution

While the following demographic groups were not used to impute consumption information from individuals in the CEX to individuals in the CPS, Figure Appendix 1.1.1 depicts their inflation rates for reference.

Figure Appendix 1.1.1

Distribution of Inflation by Demographic Group



Appendix 1.2 Real Wage Growth Distribution

While inflation typically varies only within one percentage point across demographic groups, real wage growth often varies to a greater degree across different characteristics. Figure Appendix 1.2.1 extends Figure 9.

Figure Appendix 1.2.1
Distribution of Inflation by Demographic Group