A Real Great Compression: Inflation and Inequality in the 1940s

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Abstract

The 1940s stand out as a unique period in US history of substantive compression in wage inequality. In their seminal paper, Goldin and Margo (1992) document a significant narrowing in nominal wage differences across the board—by education, job experience, and occupation. Yet the American economy also experienced unusually high inflation during this decade. Different types of households may have experienced different rates of inflation, causing the shift in real wage inequality to differ from the shift in nominal wage inequality. In this paper, we calculate inflation rates for different groups of households during the 1940s in order to estimate changes in the distribution of real wages. Using micro-level data from the 1935-1936 Consumer Expenditure Survey for a sample of about 2,000 urban households, we construct consumption baskets by education, occupation, and income. We match the spending shares to published components of the CPI in order to compute group-specific price indexes. Differences in inflation experiences across groups turn out to be small because spending shares were similar across groups. We adjust Goldin and Margo's estimates of income differences across groups for group-specific inflation rates and show that their original estimates are largely insensitive to this adjustment. The Great Compression was "real" after all.

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1. Introduction

Most countries experienced substantial reductions in income inequality in the first part of the twentieth century, especially during the wars and the depression (Atkinson et al, 2011; Chancel and Piketty, 2021). In the United States, the 1940s specifically have been characterized as an era of a "Great Compression" in the distribution of wages. In their seminal paper, Goldin and Margo (1992) document a significant narrowing in the distribution of wages from 1940 to 1950 across the board—by education, job experience, and occupation. This era stands out as the only period of substantive increase in wage equality in the United States in almost a century, until perhaps the early 2020s.

Yet during the 1940s, the American economy also experienced the most severe increase in prices of the twentieth century (Rockoff, 1984). In the 2000s, inflation has tended to be higher for lower-income households (Jaravel 2021, Kaplan and Schulhofer-Wohl 2017, Argente and Lee 2021). If the same were true for the 1940s, then real wage inequality would not have compressed as much as nominal wage inequality, thereby potentially changing the implications of the Great Compression in nominal wages documented by Goldin and Margo. In this paper, we calculate inflation rates for different groups of households in order to assess the effects of changes in prices on the distribution of real incomes during the 1940s.

A small but growing literature studies differential inflation experiences across various socio-economic and demographic groups of the population primarily since the 1980s. A main approach within this literature consists of levering expenditure surveys to construct group-specific spending shares. For inflation experiences to differ across groups, there must be significant differences in expenditure shares between groups and prices must have varied significantly for these expenditure categories. For example, food inflation was particularly high in the 1940s, averaging more than 7 percent per year. In recent decades lower-income and less educated households have tended to spend a larger fraction of their budget on food. If this were also the case in the 1940s, then this item category would have contributed to higher inflation for lower-income and less educated workers. Other types of goods and services might also have contributed to differences in inflation across groups. Most modern evidence based on spending shares finds at most modest differences in inflation by income.[1] Whether the same was the case historically remains an unanswered question.

The Bureau of Labor Statistics (BLS) has been conducting nationwide expenditure surveys to understand workers' spending habits since the late nineteenth century. Most of the evidence from early surveys are only available at an aggregate level in published tables. However, constructing group-specific inflation rates requires information on expenditures by individual characteristics. We base our main estimates on information on household expenditures from the 1935-1936 Consumer Expenditure Survey (CEX), which was administered to 61,000 families by the Bureau

[1] See, among others, Michael (1979) and Hagemann (1982) for the 1970s, Garner et al. (1996) and Cage et al. (2002) for the early 1980s and early 1990s, McGranahan and Paulson (2006) for 1983-2005, and Klick and Stockburger (2021) for 2003-2018.

of Labor Statistics. Researchers at the ICPSR selected samples of urban and rural families and converted the files to machine-readable form. We use the urban sample, which covers 31 cities, and further restrict the data to the 1,918 families for which we have complete information on all components of spending.

Utilizing the micro-level data from the 1935-1936 CEX allows us to construct consumption baskets by detailed categories of education, occupation, and income. We then match a group's basket to price indexes for the 17 major item categories in the Consumer Price Index (CPI) from 1939 to 1949, which we obtain primarily from the BLS website.[2] One important concern is whether spending patterns in the mid-1930s, in the midst of the Great Depression, are a reasonable approximation for consumption baskets during the 1940s. Unfortunately, there are no similar household-level data available for the 1940s. Reassuringly, we show that the spending shares we compute from the 1935-36 data are broadly similar to aggregate shares reported in national consumer expenditure surveys undertaken in 1941 and 1950.

We start by comparing spending shares for each major item category across socioeconomic groups. When we contrast households by educational attainment of the husband, for example, we find that the category with the largest difference across groups is food. Families in which the husband has less education tend to spend a larger fraction of their budget on food, which is not surprising since lower-income families spend a larger fraction of their budget on necessities (Orchard 2022). The higher spending share for food is offset by lower spending shares on automobile purchases, household operation, and reading and recreation. Despite these differences, our key finding is that spending shares are not different enough across groups to imply material differences in inflation. Even for food, the category with the most significant discrepancies in shares, the contribution to the difference in inflation across groups amounts to less than 0.2 percentage points per year.

Similar spending shares across groups translate into small differences in estimated inflation rates by socioeconomic background. We find that inflation was only slightly higher for families with lower income and for which the husband has less education or works in a blue-collar occupation. For example, the difference between families where the husband has 8 or less years of education and families where the husband has 16 or more years of education is 0.21 percentage points per year, a rather small difference given that the average inflation across all families in the sample is 5.33 percent per year. Converting these estimates to cumulative growth rates from 1939 to 1949, the price level faced by families in the least-educated group rose by 70 percent over this period, whereas the price level faced by families in the most-educated group rose by 67 percent. That said, it is important to note that inflation was much higher in some years of the 1940s than others. Much of this variation has to do with price controls during the War period, an issue that we discuss in more detail in the paper. Yet even during peak inflation in 1942 and 1947, when the CPI increased by 11 and 14 percent respectively, differences across groups amounted to less than 1 percentage point.

[2] Price indexes for some specific categories, such as "reading and recreation" and "furniture, furnishings and household equipment," are not available on the BLS website. We fill in the gaps by using data reported in various BLS reports.

One important concern with our estimates is that the item categories that we use to compute group-specific price indexes may be too aggregated to elicit significant variation in prices. In fact, our methodology assumes that all households face the same changes in prices for each item category. This is a limitation shared with modern work utilizing expenditure shares to assess inflation experiences between population groups, even though these studies are able to consider a much larger number of categories than what is available for earlier decades.[3] A second line of research on inflation inequality studies variation in inflation rates across consumers using scanner data, which can help uncover heterogeneity in consumer preferences and allow for analysis of variation in prices for the exact same good. These much more granular data tends to find more significant variation across households, though the findings have changed over time. Data from the 1990s showed that lower income consumers paid lower prices for similar goods and experienced lower inflation rates relative to higher income consumers (Broda, Leibtag and Weinstein, 2009; Broda and Romalis, 2009). By contrast, evidence from the 2000s exhibits a more rapid increase in prices among lower income consumers (Jaravel, 2019; Kaplan and Schulhofer Wohl 2017), though it is possible that this pattern is primarily driven by the Great Recession (Argente and Lee, 2021). An important limitation of barcode-level data on expenditures and prices is that it only covers a subset of consumer goods, and excludes many other goods and services, such as gasoline, rent or education expenditures, that constitute a significant portion of a household's consumption.[4] Nevertheless, evidence from scanner data points to the importance of variations in product quality. While historical data does not allow for as much detailed by product quality as modern data, in robustness analysis we present inflation estimates based on a subset of items, such as food, for which we observe more detailed categories and show that our findings are unchanged.

Finally, we show the implications that group-specific inflation rates have on the evolution of relative real wages during the 1940s. Specifically, we adjust Goldin and Margo's estimates of relative wages by education, experience, and occupation for the relative inflation experienced by individuals with different characteristics over the decade. We show that estimates of relative real wages are very similar to the estimates of relative nominal wages. For example, relative nominal wages of workers with a high school education and 21 to 25 years of labor market experience fell from 1.37 times the wage of a worker with 8 or less years of education and the same amount of labor market experience in 1940 to 1.22 times in 1950. After adjusting for the fact that inflation was slightly higher for families with a more-educated but equally experienced husband, real wages in 1950 were still 1.25 times the real wage of the less-educated group. Thus, the key finding of our paper is that the significant narrowing of wage inequality during the 1940s was only slightly less pronounced after taking differences in inflation across groups into account. Thus, America experienced a "Real Great Compression" during this era.

Our paper contributes to the literature on the historical trends in income inequality by considering the importance of differential inflation across groups, an issue that has been largely ignored both in the historical and modern context. Given the difficulties of constructing consistent estimates of group-specific inflation over time, most of the work studying income and wealth inequality over the long-run or in a historical context is unadjusted by inflation (see, among others, Goldin and Margo, 1992; Piketty and Saez, 2003; Goldin and Katz, 2007). One

[3] For example, Klick and Stockburger (2021) have price data for 243 items across 32 distinct geographic areas.
[4] Jaravel (2019) shows that scanner data only covers about 15 percent of total expenditures in the US.

notable exception is Moretti (2013), who finds that accounting for inflation differences between people with a college education and people with a high school education leads to a material reduction in the relative wage increase across groups since the 1980s.[5] Our paper is the first, to our knowledge, to assess differences in real wage inequality in a period of high inflation. While adjusting for inflation is unlikely to make much of an impact at times when inflation is low, it has the potential to be a more significant factor during inflationary periods.

Our paper also adds to our understanding of the Great Compression. Given the uniqueness and magnitude of the narrowing of the wage distribution during the 1940s, it is surprising that the groundbreaking work by Goldin and Margo (1992) has not led to more widespread efforts to understand this period. Related work has focused on further evaluating differences across other groups of workers (Margo and Finegan, 2002; Margo, 1995; Frydman and Molloy, 2012), assessing the role of unions (Frydman and Molloy, 2012; Collins and Niemesh, 2019), and reassessing the basic facts by exploiting the more comprehensive Census data that are now available to researchers (Jarowski and Niemesh, 2018). We add to this literature by focusing on the role of price increases.

We also contribute to a small but growing literature studying the heterogeneity in inflation experiences across socioeconomic and demographic groups. The findings in this literature vary by methodology—specifically, whether papers use expenditure shares matched to published price indexes or scanner data to calculate inflation for specific items—and period of analysis (see Jaravel, 2021, for a review of this literature). Most of this work has focused on modern (post-1970s) data, and therefore largely ignores periods of high inflation. We know much less about inflation patterns earlier in the century. Our paper takes a first step to fill in this gap by focusing in the 1940s, the period with the largest increase in prices of the twentieth century. At a time when inflation is again on the rise, and debates on who will pay its costs have resurfaced, it becomes ever more important to learn from past experience.

2. Data sources and sample

2.1 Consumer Expenditure Surveys over time

Since the late 19th century, the BLS has been conducting expenditure surveys to understand the spending patterns of American households. The content, design and geographic coverage of these survey instruments has varied significantly over time (Jacobs and Shipp, 1990). Initial surveys were concerned with understanding workers' conditions and are therefore not suitable for determining inflation patterns across the income distribution. Starting with the third survey, conducted between 1917 and 1919, these data became the basis to estimate weights for the Consumer Price Index.

A fourth survey focusing on urban wage and clerical workers was conducted during the Great Depression. The BLS collaborated with other government agencies to pursue the first-ever

[5] See also Costa (1999), who uses historical consumer expenditure surveys to estimate the trend in inequality in recreational expenditures from 1888 to 1991 to get insights into the evolution of living standards for poor and rich households over time.

nationwide survey of consumer purchases in 1935-1936 to study family consumption patterns of about 300,000 urban and rural families.[6] This survey was titled the Study of Consumer Purchases in the United States, but since later surveys were titled "Consumer Expenditure Survey" we refer to this survey as the 1935-36 CEX. A subset of 61,000 families—25,000 urban and 36,000 rural—were then selected for a series of extended questionnaires. The urban sample is the main basis of our analysis.

To be included in the 1935-1936 CEX, non-farm families must have included a husband and wife and had at least one wage earner in a clerical, professional or business occupation. Also, families with income below a nominal cutoff (which varied by city size) and those that received relief were excluded, as were recently-married couples and families residing in hotels, institutions and lodging houses. In the 1990s, researchers at the ICPSR selected samples of urban and rural families and converted the files to machine-readable form. We use the urban sample, which covers 2,480 families in 31 cities.[7] Two thirds of the sample completed the survey in 1936, while one third completed the survey in 1935. The amounts of spending reported generally refer to the prior 12 months, except for a module on food expenditures which records detailed categories of spending for the prior week.

While data on most categories of spending are available for all households in the ICPSR sample, the variable reflecting total spending on furniture is missing. We are able to get information on furniture spending from a detailed module that covers spending on furniture, furnishing and household equipment. However, this module is only available for 77 percent of families. Therefore, our main sample is based on the 1,918 urban families for which we have complete information on all components of spending. This smaller sample has a similar distribution of income, husband education and occupation, and location as the full sample of families. Results are robust to using the full sample of families and excluding furniture spending (results not shown).

In their sampling of the micro data, the ICPSR researchers decided to make it representative of the broader CEX survey rather than reweighting the data to be representative of the US population. Yet even these simpler efforts were non-trivial, given the structure of the original collection materials at the archives. Thus, we start by showing that the micro-samples in ICPSR are indeed representative of the original 1935-1936 CEX data. Table 1 compares expenditure shares in our sample by category to estimates from different published BLS reports. In columns 1 and 2, we compare expenditure shares in our sample with estimates from a BLS report based on the full survey, which reports shares for urban families with income above $500 and earnings between $300 and $2000.[8] When we restrict our micro data to these levels of income and earnings (in column 1), we find that the spending shares for each category are quite similar except for spending on food, which is a few percentage points lower in our sample, and spending on transportation and entertainment, which is a few percentage points higher. Despite these

[6] The surveys were conducted in 30 states, covering a total of 51 cities, 140 villages, and 66 farm counties.
[7] See the documentation for ICPSR collection 8908 for more details on the survey and digitalization process, available at https://www.icpsr.umich.edu/web/ICPSR/studies/8908
[8] "Money Disbursements of Wage Earners and Clerical Workers 1934-36" by Faith M Williams and Alice C Hanson, BLS Bulletin No. 638. Roughly half of the ICPSR sample fits the income and earnings restrictions used in the published report. One quarter of the ICPSR sample is excluded because at least one family member had earnings of more than $2,000, and one quarter is excluded because no family members earned at least $300.

differences, it seems that our main micro data are a representative sample of the full 1935-36 survey.

Since our strategy is to use 1935-36 expenditure shares to study differential price inflation from 1940 to 1950, one important concern is that spending patterns during the Great Depression may not be a good proxy for consumption shares in the 1940s. Unfortunately, there are no similar micro-level data for this period. While no comprehensive survey was run during the 1940s, a much smaller project covering only 1,300 urban families was undertaken in 1941-42 to obtain information on expenditures for all of 1941 and the first three months of 1942. The family-level records from this effort, which we refer to as the 1941 survey, are not available and the published tables in BLS reports do not report spending differences by education or occupation. Thus, we cannot use this survey to calculate inflation for these subgroups. But we can use the aggregate published data to contrast spending shares in the 1930s with the early 1940s. In columns 3 and 4 of Table 1, we compare our sample of urban families with spending shares from the 1941 survey.[9] We find that spending shares were broadly similar in 1935-36 and 1941, although spending on housing and utilities, automobiles and recreation was slightly higher in our sample, while spending on clothing and food was a bit lower.[10]

The war efforts may further complicate our understanding of consumption patterns during the 1940s. Even if wartime consumption was similar to depression-era spending patterns, consumers could have behaved quite differently after once the war ended and controls were lifted (Higgs, 1999). To assess this possibility, we contrast the expenditure patterns for all urban families in our data (column 3) with spending shares from the 1950 Consumer Expenditure Survey (column 5). The 1950 CEX was the next large-scale survey of family spending patterns after 1935-36, covering 12 thousand urban families. While the household-level data from this survey are not available, detailed tables were published in a BLS report.[11]

From 1935-36 to 1950, spending on housing had fallen somewhat, while spending on food, transportation, and furniture, furnishings and household equipment had increased. The decline in housing expenditures was concentrated among renters (see Appendix Table 1). Rent growth during the 1940s was much lower than inflation for most other item categories, which can probably explain why rental expenditures became a smaller fraction of total spending. A significant increase in homeownership over this 14-year period also contributed to the decline in the housing expenditure share, since housing expenditures tend to be a smaller fraction of total spending for owners than for renters. However, we estimate that the rise in homeownership reduced the aggregate housing expenditure share by 0.7 percentage points, only about 25 percent

[9] "Family Spending and Saving in Wartime" BLS Bulletin 822, 1945. For consistency with the earlier survey, we exclude the value of items received "in kind". For consistency with the 1935-36 sample we report data from Table 5 of the report, which includes only families with 2 or more persons.

[10] To be consistent with the definitions used in each BLS report, to compare with the published 1935-36 data we define housing expenditures for owner-occupants as their estimated rental value of their home, while to compare with the published 1941 data we define housing expenditures for owner-occupants as their expenditures for repairs, replacements, insurance, mortgage interest, taxes, refinancing charges and special assessments. In Section 4.1 we present more information on these two methods of measuring housing expenditures.

[11] "Study of Consumer Expenditures, Incomes and Savings; statistical tables: Urban US 1950" tabulated by the Bureau of Labor Statistics, US Dept of Labor, for the Wharton School of Finance and Commerce, University of Pennsylvania.

of the observed decline in the aggregate (see Appendix Table 1). Turning to other expenditure categories, the increase in spending on food and transportation may have been because price inflation for these categories was relatively high. Despite these differences, Table 1 shows that spending patterns were fairly similar on aggregate at the beginning and end of the decade, which supports our decision to use the 1935-36 spending shares to calculate inflation for the entire decade.

We return to this issue in Section 4.4, where we analyze how spending shares shifted from 1935-36 to 1950 for different socioeconomic groups. A unique reason why spending patterns may have varied over time and across groups during the 1940s pertains to the restrictions imposed during World War II. We describe the evolution of price controls and rationing, and their potential for temporary shifts in spending patterns in Section 3.2.

2.2 Representativeness of the 1935-36 CEX micro data

Since our analysis will focus on comparing spending shares and inflation estimates across various socioeconomic groups, it is important to understand whether these data are representative of the population. Though the survey was designed to cover a wide array of areas and families, it was not constructed as a probability sample of the U.S. population at that time. In Appendix Table 2, we compare the demographic and socioeconomic characteristics of our sample to data on urban families from the 1940 Census.[12]

We find that the distributions of husband's age, race and housing tenure are fairly similar. However, the husbands of the families in the ICPSR sample tend to have more schooling and are more likely to be in a white-collar occupation. Correspondingly, mean and median earnings (adjusted to 1936 dollars using the headline CPI) are somewhat higher in the ICPSR sample than in the 1940 Census. This difference is likely attributable to two reasons. One is that the 1935-36 CEX did not sample families receiving relief, therefore omitting many families at the lower end of the income distribution. A second reason is that the ICPSR sample covers all of the large and mid-size cities in the survey, but only about half of the small cities. Consequently the ICPSR sample will put more weight on families living in larger cities, and these families tend to have higher incomes than those in smaller cities.

2.3 Price data

We obtain the majority of the price data for specific item categories from the BLS website. Appendix Table 3 provides a detailed list of our sources. There are, however, a few cases in which the price indexes are not readily available. In these cases, we construct them from published reports.

[12] The 1935-36 CEX recorded the age, educational attainment, race and occupation of the husband. The occupation is reported in text form, so we use string cleaning and machine learning techniques to match the text strings to 1950 occupation codes. See Appendix A for details. The 1940 data are from the 1% 1940 IPUMS sample (Ruggles et al. 2022).

Specifically, the price indexes for "reading and recreation" and "other" spending are from the 1967 Handbook of Labor Statistics.[13] For the category of "furniture, furnishings and household equipment", we use a price index called "housefurnishings" as reported in Appendix Table F of BLS report 966 and Table D1 of the 1950 Handbook of Labor Statistics.[14] For the category of household operation, we use an index for household operation reported in BLS report 966. This report only has data through 1948, so we estimate the growth rate from 1939 to 1949 as the ratio of the 1939-48 growth rate to the growth rate of the headline CPI over this same period, multiplied by the growth rate of the headline CPI from 1939 to 1949.

3. Results

3.1 Heterogeneity in Consumption Patterns

We begin our analysis by studying differences in consumption patterns across household types. Table 2 reports spending shares for each major item category by educational attainment of the husband. We start with fairly broad spending categories because they are the easiest to match to the price indexes that are available for the entire 1939 to 1949 time period.

For most item categories, spending shares are fairly similar across groups. The category exhibiting the largest difference by education levels is food. Families in which the husband has less education tend to spend a larger fraction of their budget on food, which is not surprising since lower-income families tend to spend a larger fraction of their budget on necessities (Orchard 2022). The higher spending share for food is offset by lower spending shares on automobile purchases, household operation (which includes domestic services, laundry services, and cleaning supplies), and reading and recreation. Their lower spending on automobile purchases reflects a lower propensity to purchase a car: in this sample only 16 percent of the families in the lowest education group had purchased a car in the survey year, compared with 25 percent in the highest education group. Conditional on having purchased a car in the schedule year, the price of the car was about 20 percent of total household spending for all five groups.[15]

Housing expenditures in 1935-36 were a much smaller fraction of total expenditures than in recent decades (McGranahan and Paulson, 2006). For our baseline results, we follow the CPI methodology in defining housing expenditures as rent for renter households and the owner's estimate of rent for their home for owner-occupied households.[16] In Section 4.1 we show that results are similar when we use owner expenditures on mortgage interest, taxes, insurance, etc. instead of the owner's estimate of rent.

[13] Specifically, "other" includes goods and services other than food, housing, apparel & upkeep, transportation, medical care, personal care, and reading & recreation.

[14] Neither report explains what item categories this index includes, but we believe it includes all types of furnishing, furniture and household equipment because it is reported in the first column of Appendix Table F as "All Housefurnishings" and subsequent columns of the table report price indexes for various types of furnishings, furniture and household equipment.

[15] We use the gross purchase price of the car, which includes any amount that the family might have paid using the trade-in value of a currently-owned car.

[16] We exclude lodging away from home because we do not have a price index for this category. Spending in this category was 1.7 percent of total spending, on average.

Appendix Table 4 reports spending shares for each quintile of the income distribution and by occupation. As with educational attainment, differences across groups other than for food are fairly small. These results are consistent with a study conducted by the National Resources Committee, which found that spending patterns across occupation groups were similar in the 1935-36 survey data (NRC 1939, page 17).

3.2 Price Changes from 1939 to 1949

In the last column of Table 2, we report the price change that we use for each specific item category. (See Appendix Table 3 for the exact mapping between categories of spending and price indexes.) We focus on the price changes from 1939 to 1949 since our ultimate goal is to assess implications for changes in income inequality between the 1940 Census and 1950 Census, and incomes reported in the Census reflect incomes in the prior year.

Price changes from 1939 to 1949 were largest for food. Since families with less-educated husbands spent a larger fraction of their budget on food, we would expect this component of spending to boost general inflation for this group. However, this boost is modest: families in the lowest category of educational attainment spent 8.4 percentage points more of their budget on food than families in the highest category, but food inflation was only 2.3 percentage points higher than average. Thus, differences in food spending across households should have raised inflation for the least-educated group by only about 0.2 percentage points (on average over this 10-year period) relative to the most-educated group. Categories with relatively low price growth include rent, electricity, medical care and tobacco. Spending shares for these groups were fairly similar across categories, so we would not expect them to create a material difference in general inflation across groups.

The 1940s was one of the periods of most elevated inflation rates in documented American history, in no small part because of the war effort. To combat inflation, the federal government enacted price (and wage) controls. Yet the coverage and strength of these policies, as well as rationing of goods, varied substantially over time (Rockoff, 1984). Though there were some discussions to introduce price controls as early as 1939, price controls only started in earnest in May 1940. This early phase, which lasted until April 1942, was relatively permissive. Many goods and services were excluded from controls altogether, and while some controls were formal, others were based on informal agreements. The enactment of the General Maximum Price Regulation in 1942 led to a four-year period of much broader and stricter controls. While the initial set of rules were relatively ineffective at curbing inflation, the “Hold-the-Line” order passed in April 1943 essentially prohibited most price increases.

The strong enforcement of this order resulted in moderate inflation until the controls began to relax in February 1946. Prices began to increase at that time, and inflation picked up even further in late 1946, when most price controls were removed. By November of that year, only controls for sugar, rice and rent remained. Of these, only rent controls persisted long after the war ended. The majority of the population lived in areas under federal rent control in 1946. Though they were introduced as an emergency measure related to the war, they were not relaxed until late in the 1940s, and they continued to exist in many places into the 1950s (Fetter, 2016). Thus, most of the effects of the war operating through price controls should not have affected inflation much

by 1950, other than perhaps for housing rents. In fact, inflation moved down in 1948 and 1949 as many of the supply constraints that had pushed up inflation during the war eased.

3.3 Group-Specific Inflation Estimates

We calculate headline inflation for each socioeconomic group as the weighted average of price changes for each item category, where the weights are the spending shares calculated using the 1935-36 family-level spending data. Thus, these inflation estimates assume that all households face the same changes in prices for each item category. Research using data from the 2000s has found that price changes do vary across households within these broad item categories (Jaravel, 2019; Argente and Lee, 2021; Kaplan and Schulhofer Wohl, 2017). We will return to this issue below, where we present inflation estimates from 1939 to 1949 based on detailed categories of food, and estimates from 1939 to 1948 based on detailed categories other than food.

It is important to note that our methodology does not allow for any change in spending shares over time. Therefore it is similar in spirit to a Laspeyres index, which uses spending shares in time period t as weights for price changes from period t to t+1.[17] The Consumer Price Index also uses a Laspeyres-type method. In Table 1, we showed that shifts in aggregate spending shares between 1935 and 1950 were relatively modest. In the Robustness Section, we will show that our results are similar when we calculate alternate inflation estimates that use spending shares from the 1950 survey. This evidence suggests that keeping the consumption basket fixed over time is unlikely to significantly bias the main finding—that real and nominal differences in relative wages between 1940 and 1950 were fairly similar.

Table 3 presents estimates of headline inflation by education, occupation and income group.[18] All categories except laborers have at least 100 observations, which seems like large enough samples to obtain reliable estimates. The average across all families is 5.33 percent per year, only slightly lower than the 5.52 percent growth rate of the published CPI index. The inflation estimates are quite similar across groups, with inflation tending to be slightly higher for families with lower income and for which the husband has less education or works in a blue-collar occupation.

The largest difference across groups is between families where the husband is a laborer and families where the husband is in a professional occupation, and this difference is only 0.25 percentage points per year. The estimate for laborers might not be very precise because of the small sample size. Nevertheless, if we calculate inflation for each family using its expenditure shares and regress inflation on indicators for each occupation category, the coefficients on the indicators for professional and laborer are statistically significantly different from one another.[19] Other important differences are found between families where the husband has 8 or less years of education and families where the husband has 16 or more years of education, with inflation differing by 0.21 percentage points per year. Converting these estimates to cumulative growth

[17] The difference is that we do not use shares from time t but shares from a few years prior to time t.
[18] Since we defined income quintiles based on the full sample of 2480 families, there are not exactly 20 percent of families in each income group when we restrict to a sample with complete spending data.
[19] The test has an F-statistic of 26 with a p-value of 0.0000.

rates from 1939 to 1949, the price level faced by families in the least-educated group rose by 70 percent over this period, whereas the price level faced by families in the most-educated group rose by 67 percent.

As discussed above, inflation was much higher in some years of the 1940s than others. In Figure 1 we show annual inflation estimates by education group.[20] Differences across groups were largest in 1947, when inflation was highest. In that year, inflation for families with the lowest educational attainment was 13.2 percent compared with 12.4 percent for the families with the highest educational attainment. Inflation was not always higher for the less-educated group. For example, inflation was lower for this group in 1944 and 1949, partly because rent fell in those years and housing expenditures are a larger fraction of spending for this group. Also, price growth in these two years was unusually high for a few categories in which this group has lower spending shares, such as reading and recreation and automobiles. These differences notwithstanding, however, the differences across groups are dwarfed by the large fluctuations in overall inflation over time.

3.4 Revisiting Goldin and Margo's estimates

Returning to the estimates of inflation over the entire 1939-1949 period, in Table 4 we assess their implications for changes in relative wages between the 1940 and 1950 Census. The first two columns replicate estimates of relative wages by education and occupation as reported in Tables 2 and 3 of Goldin and Margo (1992). The relative wages by education are reported separately for different groups of labor market experience because wages rise with experience and less-educated workers tend to have more labor market experience. The third column reports relative inflation for each group. Unfortunately, due to the small sample size of the ICPSR data, we do not have sufficient information to construct reliable estimates for all categories of labor market experience in the Goldin and Margo paper. However, we use our estimates of group-specific inflation to adjust the nominal relative wages. Specifically, the fourth column presents relative wages in 1950 adjusted for relative inflation over the decade—i.e. relative real wages.

The estimates of relative real wages are very similar to the estimates of relative nominal wages. For example, relative nominal wages of workers with a high school education and 21 to 25 years of labor market experience fell from 1.37 times the wage of a worker with 8 or less years of education and the same amount of labor market experience in 1940 to 1.22 times in 1950. After adjusting for the fact that inflation was slightly higher for families with a more-educated husband, real wages in 1950 were still 1.25 times the real wage of the less-educated group. Thus, the narrowing of wage inequality was only slightly less pronounced after taking differences in inflation across groups into account.

4. Robustness

[20] Because vehicle production was shifted to military vehicles during World War II, automobile prices are not available for 1942 to 1946. For these years we set the expenditure share for auto purchases to zero and re-normalize the spending shares for all other categories. This assumption is somewhat extreme since some families might have purchased used cars during this period, but we do not have data on used car prices or expenditures on used vehicles during this period.

We have found that inflation differed little across types of families from 1940 to 1950, despite the high rate of inflation during this period and the material differences in inflation across broad categories of item types. In this section we explore the robustness of this baseline result to various alternative methods.

4.1 Housing expenditures

Housing is one of the main components of household spending, amounting to about 13-18 percent for the average household in the sample. It is also one of the most difficult categories to measure appropriately. Ideally, a measure of inflation faced by consumers would use the price of shelter for its housing component because shelter is the service consumed by the residents living in a home. Estimating the price of shelter is relatively straightforward for renters because it can be measured using rents. However, the price of shelter is not observed for owner-occupants. In our baseline results, the expenditure share for owner-occupants is based on the rent that the owners think they would have to pay if they were to rent the home where they reside. This is the same way that expenditure shares are calculated for owner-occupants in the modern CPI. In the modern CPI, the change in the shelter price for owner occupants is an index called "owners' equivalent rent," which is based on rents paid by tenants.[21] Since this index is not available for the 1940s, in our baseline results we use a price index for rent of primary residence to measure the change in the price of shelter for owner occupants as well as for renters.

In short, our baseline results are based on two assumptions: that the owners' estimate of the rent for their home is a good proxy for their cost of shelter, and that the growth in the price of shelter for owner occupants was the same as the growth in the price of shelter for renters. Since 40 percent of families in the 1935-36 survey were owner-occupants, our baseline estimates could be biased by a substantial amount if either of these assumptions are flawed. Importantly, since homeownership rates differed across groups, as shown in column 1 of Table 5, any bias imparted by these assumptions would also differ across groups.

An alternative way to measure the cost of shelter for owner-occupants is to add up all of their direct expenditures related to owning the home: mortgage interest, repair and replacement costs, property taxes, insurance, special assessments, and mortgage refinancing charges.[22] Column 3 of Table 5 reports housing expenditure shares using this direct measure for owners and rent for renters. For comparison, Column 2 reports housing expenditure shares from our baseline. The direct ownership expenditures tend to be lower than the owner's estimate of the rental value of their home, causing the housing expenditure share to be lower when this alternate measure is used. However, as with the owner's estimate of rental value there is relatively little variation across groups. We find similar patterns when we calculate housing expenditures using both methods for homeowners only, in columns 4 and 5 of the table.

[21] Under their current methodology, the BLS calculates an index for owners' equivalent rent by adjusting rent changes of tenant-occupied units for differences in housing characteristics between tenant-occupied and owner-occupied units. They also subtract utilities from rental payments when calculating owners' equivalent rent, which they do not do for tenants' rent.

[22] In keeping with the definitions used in the 1941 and 1950 surveys, we exclude expenditures on mortgage principal and structural additions because they are considered investment.

In order to assess the assumption that the change in the price of shelter was the same for owner-occupants as it was for renters, a natural strategy would be to calculate our own estimate of owners' equivalent rent and compare it to the index for tenants' rent. The BLS calculates owners' equivalent rent as a weighted average of rent growth for different Census block groups, with locations where owner-occupants are more likely to live getting a larger weight. We cannot follow this strategy because we do not have detailed data on rent growth for different neighborhoods. Instead, we calculate the change in direct ownership costs and compare it to rent growth.[23] Specifically, using a BLS report published in 1956 that summarizes results from the 1950 consumer expenditure survey, we calculate average expenditures for owner-occupied dwellings as the average expenditures on owner-occupied dwellings among all families of 2 or more persons divided by the fraction of families reporting expenditures for owner-occupied dwellings.[24] We find that owner expenses were about $385 in 1950, whereas they were $219 in the 1935-36 survey. Therefore owner expenditures increased by 4.13 percent per year over this roughly 14-year period. When we do a similar calculation for renters we find that renter expenses increased by 2.31 percent per year, quite similar to the growth rate of the CPI for tenants' rent of 2.22 percent per year over this period. If we assume that the ratio of the growth rate for owners' expenses to the growth rate for rent was the same from 1939 to 1949 as it was from 1936 to 1950, we find that owner expenditures increased by 3.45 percent per year from 1939 to 1949. Column 6 of Table 5 shows estimates of headline inflation using this estimate for the change in the price of shelter for owner occupants instead of rent growth. This alternate inflation measure also uses the direct owner expenditures instead of the owner's estimate of rent. The alternate inflation estimate is higher than our baseline estimate for two reasons: the increase in owner costs was larger than the increase in rent, and the smaller housing expenditure share for owners puts less weight on an item category for which price growth was relatively low. Nevertheless, differences across groups remain quite small since the alternate housing expenditure shares do not differ much across groups.

4.2 Detailed Item Categories

The extant research on inflation inequality disagrees on the extent to which inflation has varied across groups over time. Some studies suggest that these differences are more pronounced when the estimates are derived from more detailed spending categories (Jaravel, 2021). For example, Jaravel (2019) finds that income inequality largely arises within detailed product categories. He shows that inflation differences between the top and bottom quartiles of income between 2004 and 2015 are almost 4.7 times larger when he studies 256 distinct categories than when he uses only 22 spending items.

The level of detail can matter if price trends differ within broad item categories and if different types of households tend to purchase items with different price trends. For example, consider the category of clothing. If the prices of high-quality fashion-brand clothing increase at a different

[23] Another strategy could have been to calculate the change in the owner's estimate of rent, but the 1950 survey did not ask owners to estimate the rental value of their home.

[24] "Study of Consumer Expenditures, Incomes and Savings; Statistical tables: Urban U.S.-1950" tabulated by the Bureau of Labor Statistics, U.S. Dept. of Labor, for the Wharton School of Finance and Commerce, University of Pennsylvania. Volume 4, Table 2. Expenditures are reported separately for nine classes of city size and location, so we take a weighted average across groups using the number of owner-occupied families in each group as weights.

rate than the prices of low-quality clothing, inflation would differ for families depending on the type of clothing that they tend to purchase. But an inflation estimate based only on the average price change for all clothing would not capture these differences.

The BLS does not publish price indexes for many specific item categories for the 1939-49 time period. However, the 1967 Handbook of Labor Statistics reports price indexes for a range of food items and the 1935-36 CEX included a module that collected detailed data on food expenditures over the previous 7 days. We are able to match 35 of the food spending categories in the 1935-36 CEX to specific BLS price indexes that we hand-collect from the Handbook. Examples of item categories include apples, eggs, poultry and coffee—see Appendix Table 5 for the complete list of items included. The categories are detailed enough that we would expect some differences in spending patterns across socioeconomic groups. For example, one might expect differences across groups in the propensity to purchase various types of fresh fruit and vegetables versus canned or processed fruit and vegetables. Also one might expect differences in the propensity to purchase different types or cuts of meat. In Table 6, we report food inflation by socioeconomic group. Differences across groups are still quite minor because the spending shares do not vary much across groups. To illustrate, Appendix Table 6 shows that spending shares by education group are quite similar for five items with relatively high price growth and five items with low price growth. If anything, food inflation tends to be slightly higher for higher-income households, partly offsetting the inflation differences that we calculated in our baseline estimates.

While we are not aware of any other price indexes for detailed spending categories that span the entire 1939-49 period, BLS Bulletin 966 does report a number of detailed price indexes for 1939 to 1948.[25] Using these indexes we are able to create an estimate of general inflation based on 45 non-food categories, whereas our baseline estimates only contain14 non-food categories. Specifically, we are able to distinguish between 5 categories of spending on household operations, 7 categories of personal care, 9 categories of medical care, 10 categories of spending on transportation, and 3 categories of tobacco-related expenses. We are also able to separate spending on movies and newspapers from spending in other reading and recreation, and we are able to separate furniture from household furniture, furnishings and equipment.[26] See Appendix Table 7 for the mapping between spending and price indexes. For this analysis we also use the detailed food categories, for a total of 87 expenditure categories.

As with the food categories, we would expect spending for some of the detailed non-food categories to vary across socioeconomic groups. For example, we have spending on cigars separately from cigarettes, private nurses in hospitals separately from hospital beds, and household domestic services separately from cleaning supplies and other household operation expenditures. Nevertheless, Table 6 shows that even using these much more granular data, inflation estimates are very similar across groups. It turns out that the spending shares tend to be fairly similar, even for items that one might expect to differ more across groups such as movie admissions, beauty salon services, and cigars.

[25] "Consumers' Prices in the United States 1942-48," BLS Bulletin 966.

[26] Unfortunately, we are not able to create detailed categories of spending for clothing because the ICPSR data sample did not record these detailed expenditures, even though they were included in the survey The dataset includes variables for these detailed categories, but the values are equal to zero for all observations.

4.3 Car Prices

Another significant item where we may be underestimating heterogeneity across households is automobile purchases. Our baseline estimates assumed that car prices increased by the same amount for all households, regardless of what type of car they tend to purchase or whether they purchased new or used vehicles. However, among families in the 1935-36 CEX that purchased a car in the schedule year and only had one car, 66 percent of those with a husband with 8th grade education or less bought a used car, while only 19 percent of those with a husband with 16 or more years of education bought a used car.[27] Thus there appears to be substantial differences across groups in the propensity to buy a new versus used car.

The BLS does not publish a price index for used cars for the 1940s, so in our baseline estimates we used the new automobile price index for all car purchases.[28] We are in the process of searching for volumes of the Kelley Blue Book from the late 1930s and late 1940s, which might allow us to calculate our own price index for used cars. In the meantime, we have data from a figure reporting average used car prices by age of car from the 1950 volume of Automobile Facts and Figures. Based on estimating values from the figures, we calculate that the prices of used cars rose by 12, 12, 14 and 25 percent (annual rate) for cars that were 1 year old, 2 years old, 3 years old, and 7 years old, respectively.[29] These increases are all much larger than the increase in the BLS price index for new cars of 6.7 percent per year from 1939 to 1949. However, the increase in the price of a used car of a given age will reflect the quality difference between cars produced in different years as well as pure price changes. Nevertheless, these calculations suggest that price increases for used cars were likely larger than price increases for new cars, although the magnitude is difficult to gauge.

Even conditional on buying a new or used car, different types of households may tend to purchase different makes of cars, or different models within a particular car make. In the 1935-36 survey, we can identify 10 different car makes with at least 7 new car purchases in the schedule year.[30] We calculate the average price of the new car by make. Table 7 shows the distribution of families by socioeconomic group that purchased low-priced cars, medium-priced cars and high-priced cars. There is a modest amount of sorting by group, with 79 percent of families in the lowest education group purchasing a low-priced car make, compared with only 57 percent of families in the highest education group. Since we also know the price paid by each family, we can examine the price paid given the car make for 5 makes for which we have enough observations. We find little difference across groups in prices paid given the make of the car. Specifically, when we regress the log of the car's purchase price on indicators for make and education of the husband, the coefficients on the family type indicators are small and insignificantly different from zero.

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[27] For this analysis we must limit to families with only one car because for families with multiple cars we cannot distinguish which car was purchased in the schedule year. Among families that purchased a car in the schedule year, 8 percent owned more than one car.

[28] The series for used car and truck purchases starts in December 1952.

[29] The figure does not show car prices in 1949 for cars that are 4 to 6 years old because passenger cars were not produced during World War II.

[30] For this analysis we use the full sample of 2450 families since we want to have the largest possible sample size.

It is difficult to assess the implications of different types of cars purchased for inflation since we do not have much data on changes in car prices in the 1940s. The BLS Bulletin 966 includes price indexes for three car makes: Ford, Chevrolet, Plymouth. All of these makes are in the "low priced" category in Table 7—their average prices in the 1935-36 CEX were $700, $730 and $770 respectively. The BLS price indexes for each of these car makes rose at similar rates from 1939 to 1948—at 7.0, 5.7 and 6.6 percent, respectively. We don't know whether more expensive car makes might have undergone very different price trends over the 1940s.

In summary, the biggest differences in car purchase patterns across socioeconomic groups (conditional on purchasing a car at all) appears to be whether the family chose to buy a new or used car. It seems likely that used car prices rose by more than new car prices, which would have boosted inflation for families with lower incomes and husbands with less education and in blue collar occupations. If we assume that used car prices rose by 10 percent per year, which is probably an overestimate given the data on used car prices cited above, then our estimate of the difference in inflation between the lowest and highest education group increases from 0.22 percentage points in our baseline to 0.28 percentage points. And the difference between the lowest and highest income groups increases from 0.10 to 0.13 percentage points. Despite this increase, the magnitudes are quantitatively small relative to the average inflation of 5.3 percent per year.

4.4 Shifts in Spending Patterns from 1935-36 to 1950

Our baseline results used spending patterns in 1935-36 to weight each category of spending. We have already shown above that aggregate spending patterns were fairly similar in 1941 and 1950 as they were in 1935-36. However, these similarities might mask important shifts in spending patterns for particular socioeconomic groups. In this section we calculate spending shares by socioeconomic group from the 1950 consumer spending survey to assess this possibility.

Table 8 reports expenditure shares by education of husband from the 1950 consumer expenditure survey. We draw these estimates from the tables published in the 1956 BLS report mentioned above.[31] Estimates are reported separately for nine combinations of city size and location, so we average across these categories using the number of families in each category as weights. It is important to note, however, a few distinctions across surveys that may affect comparability. Unlike the 1935-36 CEX, which focused solely on families, the 1950 survey included single consumers as well as families with at least two people. Also, the report uses a slightly different set of education categories, as it combines those with 12 years of education with those with 9 to 11 years it includes those with 16 years of education with the 13 to 15 category rather than the 17+ category. The reported categories of spending are also slightly different from the ones that we used for our baseline results: electricity is included with other utilities, and expenses for automobile operation like insurance and maintenance are included with gasoline.[32]

[31] Most estimates are from Volume 2, Table 7. We supplement with on transportation expenditures from Volume 10, Table 7.

[32] We still use the price index for motor fuel for this category since the majority of expenses in this category will be gasoline.

Despite the slightly different categories of families and items, the patterns across groups are quite similar to those found in the 1935-36 survey. The item category with the largest difference across groups is still food, with a 9 percentage point difference between the families with the most-educated husbands and the least-educated husbands. When we calculate expenditure shares in the 1935-36 survey using the same education categories as the 1950 survey, we find a difference in food expenditure shares across groups of 9.6 percentage points. One might have expected food expenditure shares to have risen more for less-educated families since food price inflation was higher than average and food is a necessity, but this was not the case. The food expenditure share for families with 8 years or less increased from 32.6 percent in 1935-36 to 34.4 percent in 1950, while for those with 17 years or more it increased from 23.0 percent in 1935-36 to 25.5 percent in 1950.

The last row of the table reports an estimate of headline inflation using the 1950 expenditure shares as weights. The results are quite similar to our baseline results, with inflation for the lowest education category being 0.26 percentage points higher than inflation for the highest education category. When we calculate inflation using these same education groups but expenditure shares from the 1935-36 survey, we find a difference of 0.29 percentage points.[33] It is worth noting that the inflation estimates that use the 1950 spending patterns are higher than those that use the 1935-36 spending patterns because more weight is put on the categories of food and furniture/furnishing/household equipment, and price inflation was higher than average for these categories.

Naturally, it would be interesting to be able to measure consumption patterns at other points during the 1940s, especially to understand whether the imposition and subsequent lifting of price controls affected different types of households differently. As we discussed above, no similar nationwide consumption surveys were collected during this period. Suggestive evidence from smaller surveys conducted during the war suggest that indeed consumption did change over this period. Specifically, as shown in Appendix Table 8, the fraction of spending devoted to food and clothing increased during the war, while the fraction of spending devoted to automobiles and recreation fell.[34] Since food and automobile expenditures differed across families in the 1935-36 and 1950 surveys, it is quite possible that these shifts in spending were not the same across groups. Nevertheless, since our main goal is to adjust income data measured in 1939 and 1949 for changes in prices between these two points in time, variation within the decade is less relevant for our analysis than the contrast between these two years. Our validation exercises contrasting consumption shares from the 1935-36 CEX to the 1950 survey and, at least on aggregate, to the 1941 data, are reassuring.

5. Conclusions

The 1940s are a unique period of significant narrowing in the wage distribution in America. They are also a decade of high inflation rates, yet the potential impact of unequal inflationary experiences on the distribution of income during this era has been unexplored.

[33] For this estimate we use the item categories from our baseline estimates.

[34] The current version of Appendix Table 8 shows data for Portland in 1945 and Denver in 1948 because the 1935-36 CEX covered these two cities. A direct comparison of spending shares in these cities confirms the conclusions stated in the text. In future work we plan to digitize data for more cities for the 1945-48 period.

In this paper, we combine detailed data on expenditures by socioeconomic group with price changes by item category to estimate group-specific inflation rates from 1940 to 1950. We find that differences in spending patterns across groups were small for most item categories, leading to similar estimated inflation rates for all groups. The differences across groups ranged between 0.1 and 0.25 percentage point per year, only about one twentieth of the average inflation rate over this period. Differences across groups were also small relative to the large compression in wage inequality from 1940 to 1950 documented by Goldin and Margo (1992). We conclude that the compression in nominal wages documented by Goldin and Margo (1992) across the board—by education, income, and occupations—is essentially unchanged when one considers real wages.

Although our results are robust to various alternate assumptions and specifications, the sparseness of historical data is an impediment to measuring inflation inequality with as much specificity as research using modern data. These studies tend to find larger differences across groups when using price and expenditure data for very detailed item categories. While we are able to investigate how our estimates change when more detail is added for a subset of items, the available information in the 1940s is less granular than in recent decades. Therefore our estimates may understate the true differences in inflation across groups. Keeping these concerns in mind, it is also possible that the variation in consumption patterns across groups was limited by a narrower choice set of consumption goods in the early twentieth century. Rising incomes, increasing returns to scale, and technological changes that allow for highly customized products may have contributed to increase product variety over time, by favoring innovation and entry for high-end products (Jaravel, 2019 and also Jaravel, 2021 for a review of this literature). Thus, inflation may have a larger impact on the income distribution today than it did in the past. Assessing this possibility empirically is a promising avenue for future research.

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Table 1
Comparison of Expenditure Shares in ICPSR Sample of 1935-36 CEX to Published BLS Reports

	Household Income>500 300<=Earnings<=2000		All Urban Families		
	ICPSR Sample	1935-36 Published	ICPSR Sample	1941 Published	1950 Published
	(1)	(2)	(3)	(4)	(5)
Food	30.8	34.6	29.3	30.8	31.1
Housing and utilities	25.1	25.0	20.0	18.5	15.1
Housing	18.3	17.6	13.8	--	11.1
Utilities	6.7	7.4	6.2	--	4.0
Household operation	4.6	3.9	5.5	5.2	4.7
Furniture, furnishing, equipment	3.2	4.1	3.6	5.3	7.1
Clothing	9.5	10.9	10.6	12.1	11.5
Transportation	11.2	8.5	13.3	12.1	13.8
Automobile related	--	--	12.0	9.7	12.1
Other transportation	--	--	1.3	2.3	1.7
Personal care	2.2	2.0	2.2	2.2	2.2
Medical care	4.6	4.0	4.9	4.7	5.2
Entertainment	7.3	5.6	8.1	7.5	7.2
Recreation	--	--	5.2	4.4	4.5
Reading			1.0	1.0	0.9
Tobacco	--	--	1.8	2.1	1.8
Education	0.6	0.5	1.1	0.8	0.6
Other	1.0	0.9	1.4	0.8	1.5

Note. Columns 1 and 3 authors' calculations from ICPSR collection 8908. Column 2 from BLS Bulletin 638 "Money Disbursements of Wage Earners and Clerical Workers 1934-36." Column 4 from BLS Bulletin 822 "Family Spending and Saving in Wartime." Column 5 author calculations from 1956 BLS report "Study of Consumer Expenditures Incomes and Savings: Statistical Tables Urban US 1950", Table 2 in Volumes 2, 5, 9 and 10.

Table 2
Expenditure Shares by Education of Husband in 1935-36

	8 years or less	9 to 11 years	12 years	13 to 15 years	16 years or more	Price Change 1939-49 (annual rate)
Food	31.9	29.6	27.9	26.3	23.4	7.8
Housing	17.2	16.7	18.1	16.2	16.0	1.9
Electricity	1.9	1.9	1.9	1.7	1.7	-0.6
Other utilities	5.0	4.3	4.0	3.5	3.4	6.7
Household operation	4.0	5.2	5.1	6.2	7.0	3.9
Furniture, furnishing, equip.	2.9	3.9	3.2	4.4	3.5	6.4
Clothing	9.7	10.3	10.3	10.5	10.7	6.6
Automobile purchase	5.4	5.6	5.6	6.0	7.7	6.7
Gasoline	2.6	3.0	3.4	3.4	3.3	4.0
Other transportation	3.3	3.7	3.7	4.2	4.1	3.3
Personal care	2.2	2.2	2.1	2.1	1.9	5.4
Medical care	4.9	4.6	4.8	4.5	4.5	3.7
Reading & recreation	5.1	5.7	6.1	6.7	7.3	5.2
Tobacco	2.0	1.9	1.7	1.6	1.5	3.9
Other	2.0	1.5	2.1	2.6	4.0	3.9
Share of sample	38.9	18.5	17.3	10.8	14.5	--

Note. Housing expenditures are rent for renters and the owner's estimate of rent for owners. Other expenditures include education and occupation-related expenses. The price index for "other" excludes food, housing, apparel & upkeep, transportation, medical care, personal care and reading & recreation. The price index for housing is the index for rent of primary residence. The price index for furniture, furnishing and household equipment is an index for "household furnishing" that we believe includes furniture and equipment (see text for details). The price index for household operation is only available through 1948. We assume that the ratio of the growth rate of this index to the growth rate of the headline CPI from 1939 to 1949 is the same as its value from 1939 to 1948.

Table 3
Inflation by Group, 1939-1949

	Number of Observations	Share of Observations	Inflation (percent change, annual rate)
Education of husband			
<=8 years	747	38.9	5.43
9 to 11 years	354	18.5	5.38
12 years	331	17.3	5.26
13 to 15 years	208	10.8	5.29
>=16 years	278	14.5	5.22
Occupation			
Blue collar	706	37.3	5.41
White collar	1186	62.7	5.30
Craft	300	15.9	5.44
Operative	221	11.7	5.38
Laborer	59	3.1	5.52
Service	126	6.7	5.38
Professional	700	37.0	5.27
Clerical	486	25.7	5.36
Household Income			
Bottom quintile	407	21.2	5.39
Second quintile	395	20.6	5.36
Middle quintile	385	20.1	5.33
Fourth quintile	374	19.5	5.34
Top quintile	357	18.6	5.29

Table 4
Relative Wages in 1940 and 1950

	Relative Nominal Wage		Relative Inflation	Relative Real Wage
	1940	1950		1950
College – High School				
1 to 5 years experience	1.742	1.357	--	--
6 to 10 years experience	1.728	1.369	0.985	1.393
11 to 15 years experience	1.777	1.461	0.988	1.476
16 to 20 years experience	1.652	1.421	0.999	1.422
21 to 25 years experience	1.408	1.449	0.999	1.452
26 to 30 years experience	1.475	1.466	0.992	1.478
31 to 35 years experience	1.393	1.367	0.995	1.374
36 to 40 years experience	1.357	1.189	--	--
Some College – High School				
1 to 5 years experience	1.195	1.029	--	--
6 to 10 years experience	1.184	1.151	0.993	1.160
11 to 15 years experience	1.219	1.147	0.995	1.150
16 to 20 years experience	1.316	1.215	1.002	1.219
21 to 25 years experience	1.164	1.276	1.007	1.268
26 to 30 years experience	1.126	1.063	0.997	1.065
31 to 35 years experience	0.989	1.084	1.019	1.065
36 to 40 years experience	0.999	1.204	--	--
High School – 8th Grade				
1 to 5 years experience	1.376	1.442	--	--
6 to 10 years experience	1.463	1.322	--	--
11 to 15 years experience	1.377	1.299	0.971	1.338
16 to 20 years experience	1.385	1.267	0.989	1.281
21 to 25 years experience	1.371	1.221	0.975	1.252
26 to 30 years experience	1.427	1.286	0.989	1.300
31 to 35 years experience	1.354	1.25	0.973	1.285
36 to 40 years experience	1.283	1.326	0.979	1.354
White Collar – Average	1.256	1.177	0.997	1.181
Blue Collar – Average	0.860	0.891	1.008	0.884
Professional	1.474	1.254	0.994	1.261
Clerical	0.988	0.940	1.003	0.938
Craft	1.039	1.023	1.010	1.013
Operative	0.856	0.861	1.005	0.857
Laborer	0.630	0.750	1.018	0.737
Service	0.737	0.779	1.005	0.775

Table 5
Housing Expenditure Shares and Inflation by Socioeconomic Group

		Housing Expenditure Share				Headline Inflation using Owner Expenses
		All Households		Owners Only		
	Percent Owners	Using Rent for All (Baseline)	Using Owner Expenses	Using Rent	Using Owner Expenses	
	(1)	(2)	(3)	(4)	(5)	(6)
Education of head						
<=8 years	40.4	17.2	13.8	17.4	9.6	5.63
9 to 11 years	34.2	16.7	14.1	18.1	10.8	5.55
12 years	39.9	18.1	14.6	19.9	10.9	5.47
13 to 15 years	36.1	16.2	13.5	15.2	8.9	5.45
>=16 years	45.7	16.0	12.8	16.8	10.1	5.42
Occupation						
Blue collar	38.4	17.0	14.0	17.7	10.5	5.61
White collar	40.0	16.7	13.6	17.2	9.8	5.49
Craft	38.3	16.8	13.7	18.0	10.5	5.63
Operative	39.4	16.8	14.0	16.4	10.1	5.56
Laborer	37.3	17.9	14.6	20.4	11.6	5.73
Service	37.3	17.9	14.8	18.8	11.0	5.57
Professional	43.7	16.4	12.9	17.2	9.5	5.47
Clerical	34.6	17.4	14.8	17.4	10.4	5.52
Household income						
Bottom quintile	31.2	20.7	16.9	22.4	10.8	5.61
Second quintile	34.4	18.9	15.4	20.2	10.2	5.56
Middle quintile	40.8	17.7	14.4	18.3	10.1	5.53
Fourth quintile	43.0	16.8	13.6	18.3	10.8	5.53
Top quintile	49.3	14.6	11.9	14.7	9.3	5.46

Table 6
Alternate Inflation Estimates by Group, 1939-1949

	Food Inflation 1939-49 Based on 42 categories	Headline Inflation 1939-48 Based on 87 categories
Education of husband		
<=8 years	7.53	5.93
9 to 11 years	7.55	5.94
12 years	7.55	5.79
13 to 15 years	7.55	5.89
>=16 years	7.54	5.86
Occupation		
Blue collar	7.53	5.94
White collar	7.55	5.92
Craft	7.54	5.95
Operative	7.52	5.91
Laborer	7.45	6.02
Service	7.55	5.90
Professional	7.55	5.92
Clerical	7.54	5.91
Household Income		
Bottom quintile	7.46	5.88
Second quintile	7.53	5.88
Middle quintile	7.50	5.82
Fourth quintile	7.55	5.86
Top quintile	7.62	6.05

Table 7
New Car Purchases by Price of Car Make

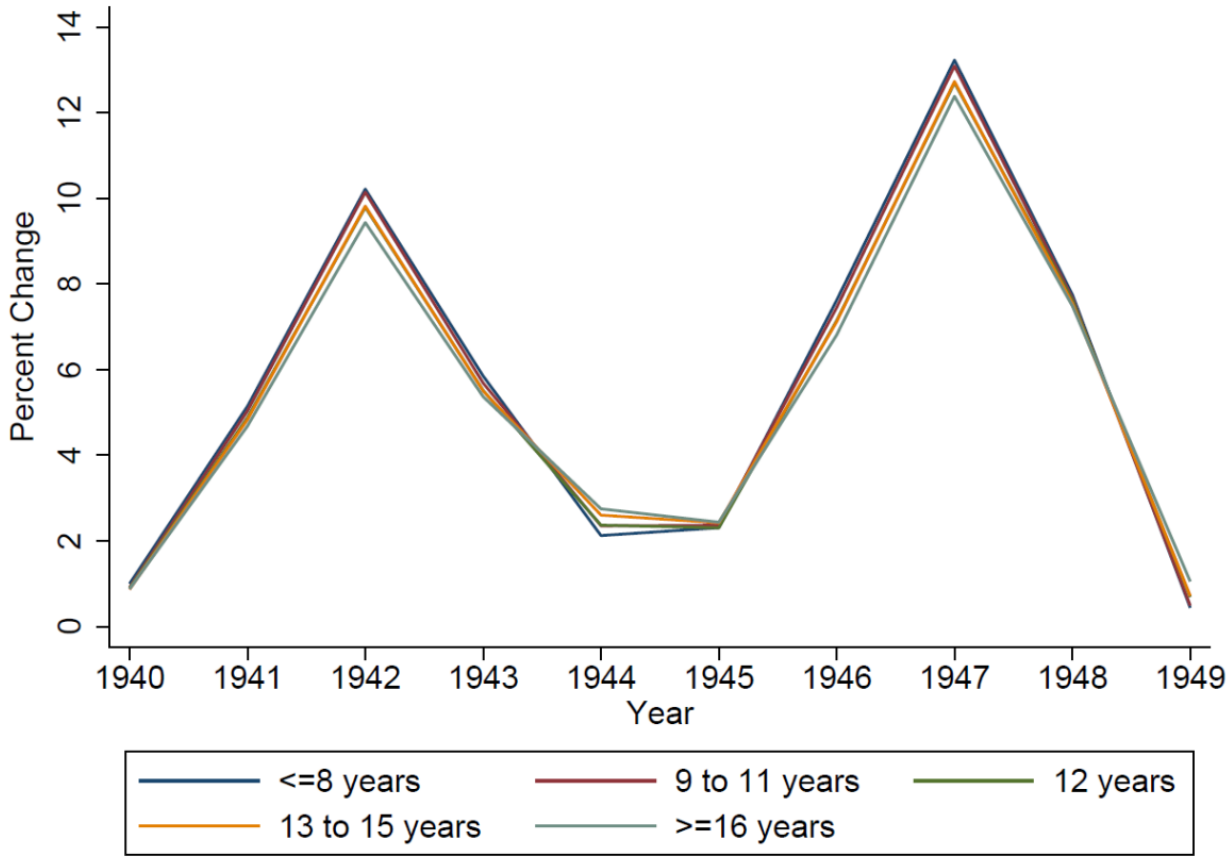
	$900 or less (Ford, Chevrolet, Plymouth, Terraplane, Pontiac)	$900 to $1100 (Dodge, Oldsmobile)	More than $1100 (Chrysler, Buick, Studebaker)
Education of husband			
<=8 years	79.2	13.2	7.5
9 to 11 years	79.5	13.6	6.8
12 years	64.8	20.4	14.8
13 to 15 years	58.8	29.4	11.8
>=16 years	57.3	20.0	22.7
Occupation			
Blue collar	80.4	13.7	5.9
White collar	64.1	19.9	16.0
Craft	74.1	18.5	7.4
Operative	86.7	6.7	6.7
Laborer	100	0	0
Service	8.75	12.5	0
Professional	59.1	19.1	21.7
Clerical	78.0	22.0	0.0
Household Income			
Bottom quintile	71.4	14.3	14.3
Second quintile	88.9	11.1	0
Middle quintile	87.9	9.1	3.0
Fourth quintile	76.7	16.7	6.7
Top quintile	49.5	25.3	25.3

Table 8
Expenditure Shares in 1950 by Education of Husband in 1950

	8 years or less	9 to 12 years	13 to 16 years	17 years or more	Price Change 1939-49 (annual rate)
Food	34.4	30.8	28.2	25.5	7.8
Housing	10.5	11.7	12.5	12.8	1.9
Utilities	4.8	3.8	3.3	3.2	3.3
Household operation	3.9	4.5	6.0	7.5	3.9
Furniture, furnishing and equip.	6.4	7.0	7.2	8.4	6.4
Clothing	11.2	11.4	11.9	11.8	6.6
Automobile purchase	6.1	7.0	7.1	6.5	6.7
Automobile operation	4.5	5.5	5.3	5.0	4.0
Other transportation	2.0	1.7	1.7	1.7	3.3
Personal care	2.3	2.3	2.2	1.9	5.4
Medical care	5.3	5.2	5.1	4.9	3.7
Reading, recreation & education	5.3	6.0	6.5	7.6	5.2
Tobacco	2.0	1.8	1.4	1.1	3.9
Other	1.5	1.3	1.5	2.0	3.9
Headline inflation	5.73	5.63	5.55	5.47	--
using 1935-36 spending patterns	5.43	5.32	5.28	5.14	--

Note. Housing expenditures are rent for renters and the owner's expenditures for owners.

Figure 1
Annual Inflation by Education of Husband, 1939-1949



Appendix Table 1
Housing Expenditure Shares in 1935-36 and 1950

	1935-36	1950
All Families	13.8	11.1
Renters	16.5	13.6
Owner-occupants	10.0	9.8
Counterfactual using 1950 homeownership rate	13.1	--
Homeownership rate	39.5	52.6

Note. The sample used to calculate the housing expenditure shares for renters and owners in 1950 includes single consumers in addition to families of at least two people. The homeownership rate of this sample is 48.7 percent and the aggregate housing expenditure share is 11.7 percent. The counterfactual housing expenditure share in 1935-36 is calculated as the average of housing expenditure shares for renters and owners, using the 1950 homeownership rate to weight each component.

Appendix Table 2
Comparison of ICPSR Sample of 1935-36 CEX with 1940 Census

	ICPSR Sample	1940 Census
Age		
Less than 30	13.4	14.0
30 to 39	33.5	27.9
40 to 49	27.7	27.6
50 to 59	16.2	20.0
60 or older	9.2	10.5
Education		
8 years or less	39.0	56.4
9 to 11 years	18.5	16.6
12 years	17.3	15.1
13 to 15 years	10.8	5.8
16 years or more	14.5	6.2
Occupation		
White collar	62.7	35.6
Blue collar	37.3	64.4
Professional and managerial	37.0	16.9
Clerical and sales	25.7	18.7
Craft	15.9	22.7
Operative	11.7	21.8
Laborer	3.1	10.5
Service	6.7	9.3
Housing tenure		
Homeowner	39.5	30.7
Renter	60.5	69.3
Race		
White	91.2	93.0
Black	8.8	7.0
Annual earnings of husband (1936 dollars)		
Mean	1706	1451
Median	1500	1296

Note. 1940 Census includes male heads of household, married with spouse present, in cities and not living on a farm or rural areas, and with family earnings of at least $300.

Appendix Table 3
Linkage of Spending Categories to Price Indexes

Spending Category	Price Index Name	Price Index Source
Food	Food	BLS website: CUUR0000SAF1
Housing	Rent of primary residence	BLS website: CUUR0000SEHA
Electricity	Electricity	BLS website: CUUR0000SEHF01
Other utilities	Fuel oil and other fuels	BLS website: CUUR0000SEHE
Household operation	Household operation, total	BLS Bulletin 966, Appendix Table G
Furniture and furnishing	Housefurnishings	Handbook of Labor Statistics 1950, Table D1
Clothing	Apparel	BLS website: CUUR0000SAA
Automobile purchase	New vehicles	BLS website: CUUR0000SETA01
Gasoline	Motor fuel	BLS website: CUUR0000SETB
Other transportation	Transportation services	BLS website: CUUR0000SAS4
Personal care	Personal care	BLS website: CUUR0000SAG1
Medical care	Medical care	BLS website: CUUR0000SAM
Reading and recreation	Reading and recreation	Handbook of Labor Statistics 1967, Table 105
Tobacco	Tobacco and smoking products	BLS website: CUUR0000SEGA
Other	Other goods and services	Handbook of Labor Statistics 1967, Table 105

Note. The price index for "other goods and services" excludes food, housing, apparel & upkeep, transportation, medical care, personal care and reading & recreation. The price index for "housefurnishings" includes furniture and household equipment; see text for details. The price index for household operation is only available through 1948. We assume that the ratio of the growth rate of this index to the growth rate of the headline CPI from 1939 to 1949 is the same as its value from 1939 to 1948.

Appendix Table 4
Expenditure Shares by Income and Occupation in 1935-36

	Income Quintile					Occupation	
	1st	2nd	3rd	4th	5th	Blue Collar	White Collar
Food	35.5	32.3	29.4	28.0	23.9	31.6	26.8
Housing	20.7	18.9	17.7	16.8	14.6	17.0	16.7
Electricity	2.1	2.1	2.0	1.9	1.5	1.9	1.8
Other utilities	6.7	5.2	4.4	4.0	2.9	4.8	3.9
Household operation	3.5	4.1	4.6	4.8	7.1	4.1	5.8
Furniture, furnishing, equip.	2.4	3.4	3.5	3.2	3.9	3.1	3.6
Clothing	8.2	9.3	9.3	10.3	11.7	9.5	10.6
Automobile purchase	2.7	3.7	6.0	7.3	7.3	5.3	6.4
Gasoline	2.0	2.6	3.3	3.3	3.3	2.7	3.2
Other transportation	2.6	3.1	3.5	3.9	4.4	3.3	3.9
Personal care	2.3	2.2	2.1	2.1	2.0	2.2	2.1
Medical care	4.4	4.7	4.5	4.5	4.9	4.9	4.6
Reading & recreation	4.0	5.0	5.6	5.9	7.4	5.5	6.3
Tobacco	2.0	2.0	1.9	1.8	1.5	2.1	1.7
Other	1.1	1.4	2.1	2.2	3.6	2.0	2.6

Note. Housing expenditures are rent for renters and the owner's estimate of rent for owners. Other expenditures include education and occupation-related expenses.

Appendix Table 5
Linkage of Detailed Food Items to Price Indexes

Item Category	Price Index
Beef steak round	Steak, round
Pot roast chuck	Chuck roast
Beef rib roast	Rib roast
Veal cutlets	Veal cutlets
Other beef and veal	Beef and veal
Pork chops	Pork chops
Whole ham	Whole ham
Bacon	Bacon
Other pork	Pork
Other meat	Meats
Poultry	Poultry
Fresh fish	Fish, fresh or frozen
Canned salmon and other fish, cured fish, canned seafood, other seafood	Fish (includes fresh or frozen fish, canned fish and frozen seafood)
Eggs	Eggs
Sugar, molasses, corn syrup, jellies, jams, preserves, candy, other sweets, chocolate, cocoa, packaged desserts	Sugar and sweets
Butter	Butter
Vegetable shortening	Margarine
Salad and cooking oil, mayonnaise, cod liver oil, lard	Fats and Oils
Apples	Apples
Bananas	Bananas
Oranges	Oranges
Carrots	Carrots
Lettuce	Lettuce
Cabbage	Cabbage
Potatoes, white and sweet	Potatoes
Onions	Onions
Other fresh fruit and vegetables	Fresh fruit and vegetables
Dried beans: navy, lima, peas, lentils	Dried beans
Canned peas	Canned green peas
Canned tomatoes	Canned tomatoes
Other processed fruit and vegetables	Processed fruit and vegetables
Flour: white, graham, rye	Flour
White bread	White bread
Corn flakes	Corn flakes
Other grain products	Cereals and bakery products
Milk: Whole (bottled and loose), buttermilk	Unweighted average of fresh grocery milk and fresh delivered milk
Evaporated milk	Evaporated milk
Cheese	Cheese
Ice cream, cream, skimmed milk, dry milk, other milk	Dairy products
Coffee	Coffee, can and bag
Tea, fruit juice, soft drinks and other drinks	Nonalcoholic beverages
Other food	Total food

Note. Price indexes collected by authors from the 1967 Handbook of Labor Statistics, Table 109.

Appendix Table 6
Food Expenditure Shares by Education of Husband in 1935-36

	8 years or less	9 to 11 years	12 years	13 to 15 years	16 years or more	Price Change 1939-49 (annual rate)
Beef steak round	2.8	2.6	2.8	2.4	2.1	9.5
Butter	5.1	5.1	5.2	4.8	4.9	8.4
Eggs	5.3	5.4	5.2	4.9	5.0	8.3
Coffee	2.8	2.4	2.6	2.4	2.3	8.9
Bananas	1.1	1.2	1.1	1.2	1.0	10.7
Milk	9.9	10.3	10.5	10.0	10.7	5.8
White bread	6.3	5.6	5.2	4.9	4.3	5.7
Grain ex. White bread and flour	6.4	5.8	6.1	6.5	6.1	4.9
Processed fruits and vegetables	5.3	5.4	5.7	5.7	5.3	6.2
Sweets	4.6	4.3	4.3	4.5	4.1	5.8

Note. Expenditure shares are defined based on total spending on food at home. Price indexes from the 1967 Handbook of Labor Statistics, Table 109.

Appendix Table 7
Linkage of Detailed Non-Food Items to Price Indexes

Item Category	Price Index
Clothing	Apparel
Housing	Rent of primary residence
Electricity	Electricity
Other utilities	Fuel oil and other fuels
Household operation	
Household help: cook, cleaner, laundress	Domestic services
Laundry services	Laundry bundle services
Telephone services	Residential telephone services
Cleaning supplies	Cleanser and scouring powder
Other household operation	Household operation
Furniture, furnishing and household equipment	
Household furnishing and equipment	Housefurnishings
Furniture	Furniture
Personal care	
Husband's personal care services	Men's haircuts
Wife's personal care services	Beauty shop services
Toothpaste	Toothpaste
Shaving cream	Shaving cream
Toilet soap	Unweighted average of indexes for floating and hardmilled toilet soap
Cold cream, powder, rouge, nail polish, perfume, brushes, combs, razors, files, other toilet articles	Toilet goods
Other personal care	Personal care
Medical care	
Physician office visits	General practitioners' fees, office visits
Physician home visits	General practitioners' fees, house visits
Dentist	Dentists' fees
Medical specialists	Surgeons' and specialists' fees
Optical: Oculist and glasses	Optical services
Hospital room or bed	Hospital rates
Private nurse in hospital	Hospital rates, private nurse
Medicines and drugs	Prescriptions and drugs
Other medical expenses	Medical care, excluding drugs
Recreation and reading	
Movies, adults	Motion picture admissions, adults
Movies, children	Motion picture admissions, children
Newspapers: daily and weekly	Newspapers
Other recreation and reading	Reading and recreation
Tobacco	
Cigarettes	Cigarettes
Cigars	Cigars
Other tobacco and smokers' supplies	Tobacco products
Transportation	
Automobile purchase (new and used)	New automobiles
Gasoline	Gasoline
Motor oil	Motor oil

Tires and tubes	Tires
Auto repairs, replacements and service	Auto repairs
Auto license and registration fees	Auto operations' licenses and fees
Automobile insurance	Automobile insurance
Other auto-related (garage rent, parking, fines and damages, tolls, auto accessories, other auto)	Total transportation
Bus, trolley, taxi, train, ferry boat, rent of automobile, interurban bus	Streetcar and bus fares
Railroad fare, including Pullman	Railroad fares, coach
Other expenses	Other

Note. Collected by authors from the BLS Bulletin 966, Appendix Tables F and G.

Appendix Table 8
Aggregate Expenditure Shares During the 1940s

	1935-36	1941	1944	1945 (Portland)	1948 (Denver)	1950
Food	29.3	30.9	35.9	34.4	29.1	31.1
Housing, fuel, light and refrigeration	20.2	18.7	17.5	15.2	15.8	15.1
Household operation	5.5	5.3	5.3	4.9	5.1	4.7
Furnishing and equipment	3.6	5.0	3.3	4.7	6.9	7.1
Clothing	10.6	12.0	16.0	14.3	13.0	11.5
Automobile	12.0	9.6	3.9	6.2	11.0	12.1
Other Transportation	1.3	2.4	2.4	2.7	1.8	1.7
Medical care	4.8	4.7	5.5	6.4	6.3	5.2
Personal care	2.2	2.2	2.4	2.3	2.3	2.2
Recreation	5.2	4.4	2.8	3.5	4.3	4.5
Reading	1.0	1.0	1.1	1.1	0.8	0.9
Education	1.1	0.9	0.6	0.8	0.6	0.6
Tobacco	1.8	2.1	2.0	1.5	1.5	1.8
Other	1.4	0.8	1.3	2.0	1.4	1.5

Note. Spending shares in 1941 and 1944 are from "Consumer spending in World War II: the forgotten consumer expenditure surveys," *Monthly Labor Review* August 2015. Spending shares in 1945 and 1948 are author calculations from the Handbook of Labor Statistics 1950 Table D7.

Appendix A. Assignment of Occupation Codes

In this section, we describe our methodology for matching occupations from the 1935-36 Study of Consumer Purchases, which were recorded as text, to the 1940 Census occupational classification system. Our first step was to clean the text responses. We fix typos, make every character lowercase, and remove any non-alphabetic character. In addition, we remove all words related to the rank of a respondent's job, such as assistant. The second step is to tokenize the descriptions of the Census occupation descriptions and remove articles. Next, we create a new column for each tokenized word from the Census occupation descriptions. For example, what used to be "Chauffeurs and drivers, bus, taxi, truck, and tractor" in one column is now "chauffeurs", "drivers", "bus", etc. in six separate columns. We then preform a fuzzy merge of each tokenized word with the survey responses using the Jaro-Winkler distance metric, which is string metric for measuring the distance between two sequences. After the merge we have a Jaro-Winkler distance for each tokenized word, and we mark the lowest distance as a successful match.

To give a concrete example, consider a response of "assistant truck driver" in the 1935-36 CEX. The cleaning process would drop the word assistant, and the response would have a low Jaro-Winkler measure for the tokenized words "truck" and "drivers" in the Census occupation code 420, so we would have a successful match. Other survey reponses that are matched to occupation code 420 include "motor truck driver", "Truck driver", and "drives truck".

While imperfect, this method of matching was successful for about 85 percent of observations. The Jaro-Winkler measure had a range from 0 to .37 with a mean of .14. We found that most matches with a Jaro-Winkler distance below .27 were a successful match. However, there were both successful and unsuccessful matches above and below the 0.27 distance, so we checked all observations and manually corrected mistakes.