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Inflation and Economic Security of the Older Population

Abstract

Because the older population are net lenders, they tend to be economically vulnerable to high and increasing inflation. This research used data from the Health and Retirement Study and its supplement, the Consumption and Activities Mail Survey, to assess the effects of inflation on the older population. The research employed two models. The first is an asset valuation model, which addresses how, given portfolio composition, household wealth changes in response to a permanent and unanticipated increase in inflation. The second is a simulation model to estimate how the economic position of a representative sample of the older population will evolve over the rest of their lifetime after an unanticipated increase in inflation. The model assumes an annual inflation rate of 2%, which increases permanently to 6% in 2020. The analyses provide insight on the effects of the inflation spike that occurred over the course of the COVID-19 pandemic. We show how results vary by education and marital status. We find overall that the typical person was likely affected only modestly by the inflation increase. The largest effects are concentrated among households with greater economic resources because a greater share of their portfolio tends to not be indexed to inflation. Conversely, those with fewer economic resources are relatively better protected from increases in inflation because Social Security benefits, which are adjusted for changes in the cost-of-living, constitute the most important retirement asset for them.

Citation

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1. Introduction

When the rate of inflation increases, lenders at fixed terms experience real losses because they are paid back in a currency with a purchasing power lower than what was originally anticipated. Because the older population are net lenders, they tend to be economically vulnerable to high and increasing inflation. Their harm from inflation varies by the composition of their household economic resources (Doepke and Schneider 2006). Some financial assets, such as stocks, convey ownership of real assets. The nominal value of such real assets will increase at the new inflation rate. Others, such as short-term certificates of deposit (CDs), pay a fixed-interest rate over a short time horizon. Such assets will decrease in real value in the short term, but adjust rapidly to the new interest rate according to the Fisher effect, which holds that nominal interest rates adjust to inflation so as to maintain a steady real interest rate. Those who lend money at nominal rates for longer periods, e.g., through long-term CDs, would not see such an effect, but instead suffer real losses. Similarly, those with noninterest bearing assets, such as cash and many defined benefit pension payments, will see erosion in real value from inflation: The payment streams from these assets are fixed in nominal terms. For such assets, the effects can be quite profound even under moderate inflation: Over 15 years, an inflation rate of 5% will reduce the real value of the annual benefit of a nominal DB plan by about 50%. Determining the effects of an increase in inflation on real wealth for the retired population requires empirical analysis of household-level assets and informed assumptions about the vulnerability of each asset type.

Using data from the Retirement History Survey, Hurd and Shoven (1985) assessed the loss of wealth incurred by the population ages 58 to 63 in 1989 and ages 68 to 73 in 1979 from unanticipated increases in inflation over that decade. They assumed no loss for housing assets, stock market holdings, Social Security, or other physical assets. Using observed data on maturities and interest rates, they calculated wealth losses of U.S. bonds, corporate bonds, pensions, and bank accounts, and wealth gains of debts. They found a 1-percentage point increase in the rate of inflation led to losses from 1% to 10% in different types of assets. At the same time, they found that those with debts realized gains: For example, real mortgage liabilities decreased by 6% for a 1% increase in inflation. The overall effect on wealth for most of the studied population was modest because of the heavy proportion of Social Security and housing in the wealth of most households.

In the years preceding the COVID-19 pandemic, inflation had been about 2% annually. In 2021 and 2022, however, inflation increased sharply, with the annual rate of increase in the Consumer Price Index for All Urban Consumers (CPI-U) exceeding 8% by the summer of 2022 (Figure 1). This presented a new period of economic vulnerability for the older population who, because of the previous long period of low inflation, may have become overly optimistic about inflation stability in managing their retirement assets.

In this paper, we use data from the Health and Retirement Study (HRS) and its substudy the Consumption and Activities Mail Survey (CAMS) to assess the effects of the 2021 to 2022 inflation spike on assets of persons 66 years or older. We first analyze "asset vulnerability," using the method of Hurd and Shoven to identify how inflation may affect the real value of different assets of the older population. We then use a previously developed model to estimate “economic vulnerability,” i.e., the impact of high and increasing inflation on economic well-being during retirement. This model accounts for all economic resources that households bring into retirement, including Social Security benefits and other annuities such as defined benefit (DB) pensions, and how their real value changes with inflation. It also accounts for economic liabilities such as taxes and the taxation of withdrawals from tax-advantaged accounts, as well as other shocks and features of retirement years. We stratify our analyses by education because it is fixed over the lifetime we are considering (older than 65) and because of the strong correlation between education and economic resources.

Like Hurd and Shoven, we find that the asset vulnerability of a large majority of older households is small. Those who own their homes will see their home value increase with inflation, keeping the real value of this asset constant and not vulnerable to loss. Those owning short-term assets such as savings accounts will incur a loss in such resources during a short adjustment period until the previous real rate of return is re-established. Those who own stocks will, like those who own housing, see the nominal value of such assets increase with inflation and so are not vulnerable to loss. Those who own long-term bonds will see the value of such assets decrease, and possibly quite substantially, but such assets are not prominent in the asset portfolios of most households and so their overall impact will be modest.

Similarly, we find that the typical older household is not very economically vulnerable: According to our model, the increase in inflation resulted in some reduction in real income but most households had enough wealth to maintain real consumption. The reduction in real income resulted in a reduction in bequests.

Our findings do have some caveats. While we can observe actual asset holdings in HRS data, we needed to make assumptions about yields and maturities, which are not recorded in HRS data, for some assets. We also assumed that the CPI-U measures inflation well for older populations. Finally, while we measure economic vulnerability caused by inflation for several subgroups of older persons, we recognize that individuals face different rates of inflation depending on the bundle of goods and services they purchase. This introduces heterogeneity beyond that due to portfolio composition.

2. Methods

Our data are from the HRS and the CAMS.[1] The HRS is a longitudinal survey of a representative sample of the U.S. population age 51 or older on subjects such as health care, housing, assets, pensions, employment, and disability. From the HRS, we measure economic resources as a combination of Social Security and pension benefits, earnings, housing wealth, post-tax nonhousing wealth, and pretax retirement accounts. The CAMS is a supplement to the HRS that measures spending in 39 categories to arrive at a measure of total spending.[2] The CAMS data aggregate to population levels

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[1] The HRS is funded by the National Institute on Aging (grant number NIA U01AG009740), with additional funding from the Social Security Administration; it is conducted by the University of Michigan. All data used in this study are publicly accessible for research purposes, subject to user registration (https://hrs.isr.umich.edu/).

[2] The number of spending categories varied somewhat across waves: Initially, CAMS queried 32 categories. A few categories were added in the following waves (2003 and 2005), and some categories were split to distinguish spending on goods versus spending on services. CAMS waves 2005 through 2019 queried spending in 39 categories.

that closely match aggregates from the Consumer Expenditure Survey (Hurd and Rohwedder 2012).

We employ two models in our analysis. The first is an asset valuation model, which addresses how, given the portfolio composition of a household, household wealth changes in response to a permanent and unanticipated increase in inflation. The second is a simulation model to estimate how the economic position of a representative sample of 66- to 69-year-old persons will evolve over the rest of their lifetime subsequent to an unanticipated increase in inflation. We briefly describe each of these models below. Further details of the models and our assumptions about interest rates are available in the Appendix.

2.1 Asset valuation model

Our asset valuation model requires assumptions about variations in interest rates in response to changes in inflation, as well as about the response of asset prices to changes in such rates. We assume that, over time, the real interest rate is unchanged. This implies that the nominal rate will change exactly with the inflation rate. This is the Fisher effect. Whether asset prices will change in response to interest rate changes will depend on whether the asset is indexed. If it is indexed, then the real price of the asset will not change as inflation and interest rates change. If it is not indexed, then the real price of the asset will depend on the duration and terms of contracts associated with the asset, with longer-term assets at nonindexed rates decreasing more in real value.

Following Hurd and Shoven, we categorize assets by their vulnerability to inflation. The first group comprises assets, such as housing and stocks, that are protected from inflation and incur no loss in real value when inflation increases. The second group comprises assets, such as money market funds, bank accounts, and other short- or medium-term financial instruments, that may incur losses from 1% to 4% of real value when inflation increases permanently by 1 percentage point, making them modestly vulnerable. The third group comprises assets, such as long-term bonds, which may incur losses of 5% or more in response to a 1-percentage-point increase in inflation, making them the most vulnerable group. Given assumptions we discuss further below, calculating asset vulnerability to inflation from this model is a straightforward procedure.

2.2 Simulation model to assess financial security at older ages

To estimate how the economic position of older persons may evolve after an unanticipated increase in inflation, we extend a model we developed in prior work to assess the financial security of the older population and how it varies by subgroups (Hurd and Rohwedder 2012, 2023a, 2023b). We begin with a brief overview of how this model is set up, and then discuss how we extend it for the analyses of the effect of inflation shocks. We then report the results of a validity check of the model where we compare model performance against an outside source of data and present the main results.

The main features of the simulation model as are as follows: We first calculate economic resources of a household at the baseline ages of 66 to 69.[3] We then estimate spending paths using CAMS panel data on spending. We simulate spending paths until death and track changes in economic resources. We seek to identify whether economic

[3] We select a married household if either spouse is in the age range and the other spouse is age 62 or older.

resources will support the simulated spending path. Our estimations and simulations account for differential mortality risk and, for couples, the lifespan for each spouse and the loss of returns to scale in consumption at widowing. We permit the rate of change in consumption to vary by marital status, age, and education because of the different levels of mortality risk by education and because of the complementarity between health and consumption. We incorporate the risk of large out-of-pocket spending on health care by assigning spending shocks from the observed distribution of such spending. We also account for taxes, which can substantially reduce resources available for consumption among households with large holdings of tax-advantaged savings but not for those with little tax liability. Most of the model elements permit heterogeneous response as a function of age, sex, marital status, and education.

In prior work, we used this model to perform repeated simulations of the spending path of each individual or couple to estimate the probability the individual or survivor would die with positive wealth (Hurd and Rohwedder 2012, 2023a, 2023b). We considered an individual to have adequate preparation for retirement when the fraction of our simulations indicating positive wealth at death was at least 0.95. Using HRS data through 2016 and CAMS data through 2015, we found 68% of those ages 66 to 69 were adequately prepared for retirement, but that single persons, the less educated, Black, and Hispanic persons were less likely to be prepared.

Here we focus on how a large, unexpected increase in inflation would affect economic well-being in years following the shock. We updated our previous model using 2018 HRS data and 2017 CAMS data. Most importantly, we introduced a much richer specification of rates of return on assets: In our prior work, we assumed that all assets had the same, fixed real rate of return, but in this new work, each asset type has a different real and nominal interest rate informed by observed differences in historical data. For example, we assume that in a steady state of 2% inflation, checking accounts pay a nominal rate of 0.5% or a real rate of -1.5%, and that bonds pay a nominal rate of 5.5% or a real rate of 3.5%.

To find baseline conditions, we simulate spending and wealth paths under an inflation rate of 2%, reflecting the steady rates of the 10 years prior to the COVID-19 pandemic. We draw a simulation sample in the age range 66 to 69 from multiple waves of CAMS/HRS, specifically from CAMS waves 2001 through 2017. The purpose of using multiple waves is to obtain a large enough sample to capture heterogeneity in economic circumstances: Small samples are unlikely to include the most and least vulnerable to inflation. We use the HRS core data to compile a complete inventory of economic resources at baseline, and the CAMS data to calculate an initial level of consumption.

We use multiple waves of CAMS to find the trajectory of consumption in late life, specifically from age 66 to death, by marital status and education. Our method is to find two-year rates of change in consumption calculated over persons or households observed in two adjacent waves of CAMS, and then to link together these changes to find the path of consumption. Our original model accounted for health care spending shocks; taxes, including state taxes, tax treatment of Social Security benefits, and taxes occurring when withdrawals are made from tax-advantaged Individual Retirement Accounts (IRAs); and differential mortality and widowing. For this project, we modified the model to account for differences in rates of return on assets, assuming, for example, that checking and savings accounts have a negative real return rate of 1.5%, and stock holdings have a positive real return rate of 6%. Based on the updated model, we produce trajectories of consumption and other measures of economic well-being prior to the recent inflation shock.

Once we have established baseline conditions, we launch a new simulation. We begin the simulation with a 2% inflation rate but increase it to 6% in 2020, where it remains for all subsequent periods included in the simulations. At the time of the inflation shock, the sample ranges in age from 69 (age 66 in 2017) to 88 (age 69 in 2001). The upper age limit is due to data limitations, specifically, the first CAMS wave was in 2001.

In the new, higher rate of inflation regime in effect from 2020 onward, values of DB pensions and annuity income flows erode. Further, as shown in a historical examination of rates, the relationship between inflation and higher nominal interest rates is temporarily disturbed following a jump in inflation. A number of interest rates increase only sluggishly to their new steady-state value, leading us to assume that there is an adjustment lag. For example, we assume that, in the first year of a 1% increase in inflation, the interest rate on checking and saving remains at its old rate (0.5%) and only adjusts to its new rate (1.5%) in year two of the inflation increase. This lag causes a one-time loss of 1% of asset value, which comes in addition to the steady-state real loss of 1.5%. Nevertheless, because most assets and income flows are protected, at least in part, by a Fisher effect in subsequent periods, the impact of inflation on economic preparation for the entire population is likely to be modest, although it will be important for some.

We seek to identify, following an unexpected increase in inflation, changes in rest-of-lifetime consumption, taxes, and bequests; rest-of-lifetime annuity income, including Social Security benefits; and chances of running out of money before death, i.e., dying with negative wealth.

2.2.1 Validity check

Because of the complexity of our model of economic vulnerability, we conducted a validity check, aiming to verify that our model captures an important observable outcome, the rate of change in wealth. The basic idea is to compare the implicit rate of wealth change produced by the model with observed rates of wealth change based on HRS panel wealth data. The latter were not used in the model construction and so the two rates need not be the same. If the model is incorrectly specified, we would expect the two measures of wealth change to differ.

Our model begins with an individual or couple at ages 66 to 69 and follows them until death, keeping track of spending, income, and wealth. The difference between spending and after-tax income (active saving) permits us to calculate the rate of wealth change. The accumulation of those changes from beginning to end permits the calculation of end-of-life wealth, the lifetime rate of change in wealth, and the annualized rate of change in wealth, with wealth decumulation expressed by negative values. We compare these calculations with observed real wealth changes estimated from longitudinal wealth change data in the HRS. If our model estimates of active saving and our rate of return assumptions are correct, the two estimates of the rate of wealth change will be similar.

Figure 2 shows the results of our comparisons. It shows for persons 65 or older three measures of longitudinal change in wealth from 2010 to 2018. These are changes in mean levels of population wealth (“ratio popln mean”), in median levels of population wealth (“ratio popln median”), and in median changes of individual wealth (“ind median”), as well as what the model estimated the change would be (“model”). The top panel shows these measures for singles by educational level, with the last set of columns showing changes for all singles. The bottom panel shows these changes for all persons by educational levels, with the last set of columns showing changes for all persons.[4] Note the difference in scales on the vertical axis for each panel because of the larger changes in wealth found for singles.

Among single persons without a high school education, there was an average annual rate of wealth decumulation of about 1%, as determined by the ratio of population average wealth (left-most bar). As determined by the ratio of population medians the level of wealth decumulation was about 10% per year. The main reason for the difference between means and medians is that stock market gains among a few individuals were substantial enough to offset small losses among many persons. Considering individual-level changes in wealth, we find a median annual decumulation rate of 18%. The difference among these numbers is a result of substantial heterogeneity in wealth change and possibly observation error. The fourth bar indicates that, among singles without a high school education, our model predicted an 8% annual rate in wealth decumulation, within the range of the other three measures.

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[4] We cannot make such a comparison for married persons because our model follows married persons after widowing: The average rate of change in consumption from the model is a blend of change while married and while widowed.

The results in other columns of both panels show that the decumulation rate is lower among those with more education, which, because of the positive correlation between education and wealth, indicates less wealth decumulation among those with greater wealth. The model rate of wealth change for all populations lies between the extremes of the three actual measures. For all persons, we see similar patterns, albeit at lower levels. Among all persons of all levels of education, we see small changes in wealth: An annual rate of accumulation of 0.2% in mean levels of wealth and annual rates of wealth decumulation of -2.0% in median wealth and -4.1% in wealth measured among each individual, and a model prediction of -1.6% decumulation.

Altogether, the similarity between observed changes of wealth and our model estimates lends credence to our baseline assumptions and methods.

3. Results

3.1 Inflation vulnerability of assets

How much the value of assets changes in response to an unexpected increase in the rate of inflation depends on whether the asset has a rate of return indexed to inflation (such as Treasury Inflation Protected Securities), the duration or maturity of the asset, and the speed of adjustment of the asset value to the new equilibrium. Consider, for example, changes resulting from inflation to the value of a consol bond, which never matures and pays a fixed nominal amount each pay period. Inflation causes the holder of the bond to be paid in dollars with purchasing power that is steadily reduced over time. Under the assumption that the real interest rate remains fixed, an increase in inflation leads to a point-for-point increase in the nominal interest rate. Therefore, an increase in inflation from 2% to 3% will reduce the value of the consol by one-third. Assets with fixed maturities will see a lesser reduction in real value: A 10-year bond under these conditions would see its value diminish by about 5%. Very short-term assets would, theoretically, see essentially no reduction in value caused by inflation because their nominal rate of return would adjust immediately to the new inflation rate. Nevertheless, an examination of the historical relationship between inflation and short-term interest rates suggests that there is about a one-year lag in adjustment, so that even short-term assets may suffer a loss in real value from a permanent increase in inflation of 1%.

Table 1 shows average asset holdings by category among those 65 or older from HRS 2018 and the assumed change in asset value for an increase in inflation from 2% to 3%. Overall, the average value of all assets for individuals we analyze is $562,465, nearly half of which is in housing (with an average asset value of $270,345).

As noted above, we assume the real value of fixed assets such as stocks, housing, and transportation does not change in response to inflation, while individuals may even see a net gain in wealth from the real reduction of mortgages and other debt during inflationary times. For assets whose real value changes in response to inflation, we distinguish two stages in the change of asset values: first-year and permanent (second-year). For example, informed by our study of historical data, we assume bonds lose 1% of their real value in the first year of an increase in inflation because of a slow adjustment of interest rates to inflation and then an additional 4% afterward, or a total of 5% by the second year. We apply these assumed adjustment factors to the portfolios of all HRS households 65 or older in wave 2018. Table 2 shows several measures of the estimated vulnerability of the population to changes in these asset values resulting from inflation, stratified by marital status and level of education. That is, it shows the percent change (mostly decreases) in the real value of total net household assets for a 1% permanent inflation shock. The first column, “population mean” is the percentage change in the average assets in the population or subpopulation were the inflation rate to increase from 2% to 3% suddenly and permanently. The second column shows the median of the individual or household changes.

We see that an increase in inflation would have a greater effect, on average, on single persons. For such persons, a sudden and permanent increase in inflation would result in a mean decrease of wealth by 0.23%. However, we interpret such an increase as minor. If, for example, inflation were to increase from 2% to 6%, then the reduction in wealth would be 0.92%. But even that small increase is not relevant for most persons or households because the mean changes in wealth are distorted by the holdings of a relatively small number of households that had very large percentage changes. More relevant is the median change in wealth: We find that for single persons wealth would decrease only 0.01% following a 1% increase in inflation, and that a historically high increase in inflation of 10% would result in only a 0.1% decrease in median wealth. Median wealth losses from inflation for married persons would not be much greater.

Larger losses of wealth from inflation are more evident among college graduates where a 1% increase in the inflation rate would result in a median 0.19% loss of net wealth. There is considerable variation across percentiles: For example, in the total population, the 25th percentile of the distribution of the change in the real wealth was -0.50%. This implies that an inflation shock such as that associated with the pandemic from 2% to 6% would have resulted in real wealth changes about four times the size of those shown in Table 2.

3.2 Inflation vulnerability of economic well-being

We next turn to how changes in inflation may affect overall vulnerability of economic well-being. Using our extended simulation model for assessing the financial security of the older population over their remaining life cycle, we analyze the effect of an inflation shock of about the size that was associated with the COVID-19 pandemic, a jump from 2% to 6% inflation. We study how this change affects the accumulation of wealth, spending, and bequests among persons with initial ages of 66 to 69 years. Table 3, Panel A, shows the balance sheets of single persons in this age group by level of education. The columns in the table show, on a rest-of-lifetime basis, the components of total inflows and total outflows. The inflows are initial wealth, remaining earnings, and accumulation of annuity payments (Social Security payments, DB pensions, and private annuities); the outflows are taxes, consumption, paydown of mortgage and other debt, and bequests.[5] Panel B shows the deviation from A caused by a permanent change in inflation from 2% to 6% in year 2020 of the simulations. Table 4 presents the same information for married persons.

Single persons have much less wealth than married couples. Singles have a mean level of initial wealth of $259,900 and couples have $809,100. This difference persists even when holding education constant. Among college graduates, singles have a mean wealth of $588,500, while married couples have mean wealth of $1,600,900. At

[5] Distributions from IRAs are shown separately because their movement triggers taxes. IRA balances are included in initial wealth and in bequests.

the same time, there is a strong education gradient for both singles and married couples, with college graduates having a level of mean initial wealth that is eight times that of those without a high school education among singles and nearly six times among married couples.

Under a constant inflation rate of 2%, singles without a high school education have a low level of initial wealth and their mean and median bequests are negative: That is, they typically die with negative wealth, having consumed all their resources before dying. They withdraw less than $4,000 from IRAs and pay less than $4,000 in taxes. Singles with higher levels of education receive, consume, and bequeath more. Among single college graduates, the median level of bequests is $221,800, and the mean level is $374,700, both levels more than twice that of singles with some college education but no degree. We find 72.2% of single college graduates will die with positive wealth, while only 46.1% of single persons without a high school education will do so. Among married persons, majorities at each level of education die with positive wealth, with median bequests varying from $153,700 for those without a high school education to $675,600 for those who are college graduates, and mean bequests varying from $234,600 for those without a high school education to $1,114,200 for college graduates.

Panel B of Tables 3 and 4 show changes when inflation increases unexpectedly to an annual rate of 6% in 2020. Because the increase occurs several periods after the baseline years of the simulations, all initial conditions such as initial wealth were unchanged.

There appears to be little change in consumption among the least educated singles, with lifetime consumption decreasing only $300 on a base of about $205,600. The reason for the small change is that this group’s resources are well protected from inflation: About 60% of their resources are in annuities, which, for this group, would be primarily Social Security benefits, which, in turn, are indexed to price change. The real value of lifetime annuity payments to this group would decrease by $1,600 on a base of $125,900.

There are greater changes among singles who graduated college. Our simulations indicate that an increase in inflation from 2% to 6% in 2020 would reduce lifetime annuity payments for single college graduates by $18,100. Some of this is due to their holdings of nonindexed DB plans, which are more common among college graduates than among those who did not graduate high school. Some of the reduction in annuity payments for all groups is due to a lag in the cost-of-living adjustment (COLA) of Social Security payments. Some differences by education also reflect differing survival rates. Those without a high school education survived just 13 years in the simulations, while college graduates survived 18 years, meaning college graduates spent more of their remaining years after the increase in inflation (activated in 2020). Hence, the value of remaining annuity payments changed more for single college graduates than it did for those who did not graduate high school. Taxes did not change for singles without a high school education but decreased slightly for those with college education. Because the bend points of the federal income tax schedule are indexed to inflation, the reduction in taxes is due to a change in real flows rather than to inflation per se. While resources diminish for college graduates, however, their consumption changes little. The loss of resources led to reduced bequests rather than reduced consumption. Across all groups of singles, the spike in inflation would increase by only 0.5% the proportion running out of wealth.

With a steady inflation rate of 2%, total resources of married couples are about three times those of single persons. Across all married persons, there is about a 14% chance of running out of wealth before death. Compared to singles, there is more change resulting from a spike in inflation, particularly for the more educated. Under our simulation married college graduates would see their lifetime annuity payments decrease by $67,500, or 7.3% of the total they could expect under a steady 2% inflation rate. College graduates would also see their remaining lifetime tax payments decrease by $10,300, or 3.5%, while other married couples would see little change in their taxes. There would be little change in consumption: the loss of annuity wealth would be largely offset by decreased bequests rather than decreased consumption.

Overall, our findings suggest that those with the most resources would be the most affected by an unexpected increase in inflation. Much of the loss would be in annuity wealth, either DB pension plans that do not adjust with inflation or Social Security payments whose COLAs lag inflation. The longer lifespans of couples and of those with higher levels of education also contribute to their higher levels of losses as annuity payments are reduced for longer periods. We found little impact on consumption, with the losses among those with greater resources more likely to result in decreased bequests. The considerable variation we find in vulnerability across households would be affected further by differences in what older individuals purchase: Households whose consumption bundles were more heavily weighted toward consumption components that had more sharply rising prices would have experienced a greater inflation shock than the 6% we assumed in the simulations. For example, people who use more energy for heating and cooling because of their local climate would have experienced a greater inflation shock than the average.

4. Discussion

Our overarching finding is that those likely to be most affected by an increase in the inflation rate are those with greater economic resources. Social Security plays a leading role in this outcome: While it is an important asset for (almost) all older Americans, it is distributed more evenly across the population than other types of assets so that its inflation protection has the greatest benefits for those with the fewest assets.

Nonetheless, inflation does remain a concern for at least three reasons. First, our research shows considerable variation in vulnerability as a function of economic resources and spending levels. Second, older individuals themselves express considerable concerns about inflation, and those concerns *per* se reduce well-being.

Third, we used the CPI-U to adjust for inflation, but whether this is appropriate for the older population is a valid question. The issue is whether a separate price index is needed for the older population. This is plausible because of the different bundle of goods and services purchased by them, especially in health care. This issue has been investigated several times (Boskin and Hurd 1985; Boskin Commission 1996; Goda et al. 2012), with some suggesting a Consumer Price Index for the Elderly (CPI-E) might be more appropriate. Using a CPI-E would have several implications for the wealth of the older population and their well-being following increases in inflation. Goda et al. (2012), for example, estimate that had Social Security COLAs from 1983 to 2007 been indexed to the CPI-E rather than the CPI-U then Social Security benefits would have increased by 8% more than they did.

5. Conclusion

Inflation remains an ongoing concern among older Americans (Board of Governors 2023). And, indeed, some older persons are economically vulnerable to increases in inflation. Such vulnerability varies by sources of financial support and is greater for persons whose assets are not indexed to inflation. Vulnerability also varies by individual variation in the bundles of goods and services that individuals purchase. Such individual variation can make it inappropriate to use a price index based on the average bundle in the population for calculating economic vulnerability resulting from inflation.

Our analysis found that those most vulnerable to inflation among the older population are those with the highest levels of education who also have the most economic resources. Such individuals are likely better able to compensate for inflation shocks. Indeed, most of the effects of higher inflation on this subgroup was on bequests, with their consumption changing little. Social Security benefits, being indexed to inflation, play a critical role in cushioning the effects of inflation on economic security overall, as they constitute a substantial portion of economic resources for older Americans.

Our analysis did not specifically address what would happen if Social Security were not indexed, but it is easy to see the importance. At 6% inflation, for example, a nonindexed Social Security benefit would be worth 79% less in 10 years. For single persons lacking a high school education, our analysis finds that Social Security benefits constitute 61% of lifetime economic resources. Over a long lifetime, many in this group would become destitute were Social Security not indexed.

Our analysis does suggest ways that Social Security benefits could be improved. The lag in the COLA of Social Security benefits results in a permanent reduction of about 0.5% for every percentage point increase in inflation. *Ex post* adjustments of benefits for realized inflation could eliminate this loss.

In summary, we found that, as a group, older Americans are quite well protected from the effects of inflation. This is true whether measuring its effects by the composition of assets and the vulnerability of each asset type to moderate inflation changes or by the impact on economic well-being after retirement.

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Tables and figures

Table 1: Average household asset holdings among those 65 or older in HRS wave 2018, and assumed change in asset values for a 1% increase in inflation

	Average value	First year change (assumed)	Permanent change (assumed)
Stocks	128,894	0.0%	0.0%
Bonds	14,908	-1.0%	-5.0%
Checking and saving	55,598	-1.0%	-1.0%
CDs	9,880	-1.0%	-1.0%
Housing	270,345	0.0%	0.0%
IRAs	98,244	-0.5%	-2.1%
Transportation	16,724	0.0%	0.0%
Mortgages	-26,660	1.0%	8.6%
Other debts	-5,468	1.0%	1.0%
Total	562,465	--	--
After two years	561,343		-0.20% (actual)

Table 2: Percent change of real wealth for a 1% increase in the rate of inflation

	Population	Individual		
	Mean	**Median**	**P25**	**P75**
Marital Status				
Single	-0.23	-0.01	-0.52	0.01
Married	-0.18	-0.03	-0.48	0.52
All	-0.20	-0.02	-0.50	0.09
Education				
<HS	0.24	0.00	-0.04	0.00
HS	-0.09	-0.03	-0.46	0.02
Some college	-0.08	-0.02	-0.50	0.73
College grad	-0.31	-0.19	-0.81	0.46
All	-0.20	-0.02	-0.50	0.09

Table 3: Balance sheet of single persons; Panel A: permanent 2% inflation; Panel B: change resulting from inflation jump from 2% to 6%

			Mean present values						Bequests		
	N	**initial wealth**	**Earn-ings**	**Annuities**	**IRA pymnts**	**Taxes**	**Consump-tion**	**Mortg payoff**	**median**	**mean**	**percent positive**
Panel A. Permanent 2% inflation											
< high-school	274	73.2	7.8	125.9	3.8	3.6	205.6	3.6	-7.4	-4.9	46.1
high-school	417	225.9	16.6	227.8	20.4	18.3	276.5	7.7	79.5	168.9	69.6
some college	266	298.0	26.9	268.9	37.6	38.9	357.9	17.9	66.4	179.9	61.4
college grad	168	588.5	48.8	378.6	60.8	78.1	537.9	26.1	221.8	374.7	72.2
All	1,125	259.9	21.7	235.2	26.4	28.5	317.5	11.9	49.0	159.9	62.3
Panel B. 2% inflation; then unexpected increase to 6%											
< high-school	0	0.0	0.0	-1.6	0.0	0.0	-0.3	-0.1	-0.9	-1.2	-0.4
high-school	0	0.0	0.0	-5.3	-0.4	0.2	-0.5	-0.4	-2.3	-4.6	-0.6
some college	0	0.0	0.0	-8.6	-0.9	-0.3	-0.6	-1.6	-2.3	-6.1	-0.4
college grad	0	0.0	0.0	-18.1	-1.4	-1.6	-0.6	-2.5	-11.9	-13.5	-0.6
All	0	0.0	0.0	-7.0	-0.5	-0.2	-0.5	-1.0	-1.9	-5.5	-0.5

Note: in thousands of 2017 dollars

Table 4. Balance sheet of married persons; Panel A: permanent 2% inflation; Panel B: change resulting from inflation jump from 2% to 6%

			Mean present values						Bequests		
	N	**initial wealth**	**Earn-ings**	**annuitie s**	**IRA pymnts**	**Taxes**	**Consump -tion**	**Mortg payoff**	**median**	**mean**	**% positive**
Panel A. Permanent 2% inflation											
< high-school	221	272.3	20.1	340.3	16.6	22.1	366.1	10.5	153.7	234.6	79.7
high-school	625	503.2	34.8	497.8	61.5	62.2	526.2	13.2	325.1	434.8	86.3
some college	369	870.5	53.9	591.3	115.5	135.4	667.8	23.6	395.9	689.5	85.0
college grad	363	1,600.9	94.8	921.3	248.4	354.7	1,094.8	54.5	675.6	1114.2	88.6
All	1,578	809.1	51.0	594.9	110.8	140.9	667.6	24.8	364.9	622.5	85.6
Panel B. 2% inflation; then unexpected increase to 6%											
< high-school	0	0.0	0.0	-4.9	-0.1	0.2	-0.5	-0.4	-2.8	-4.3	-0.4
high-school	0	0.0	0.0	-12.9	-1.2	0.9	-1.2	-1.2	-8.5	-11.3	-0.4
some college	0	0.0	0.0	-22.8	-3.2	1.4	-1.5	-2.6	-22.9	-20.1	-0.3
college grad	0	0.0	0.0	-67.5	-11.1	-10.3	-3.0	-8.1	-37.0	-45.9	-1.4
All	0	0.0	0.0	-26.6	-3.8	-1.6	-1.6	-3.0	-16.9	-20.3	-0.6

Note: in thousands of 2017 dollars

Figure 1: Percent price change from prior year in Consumer Price Index

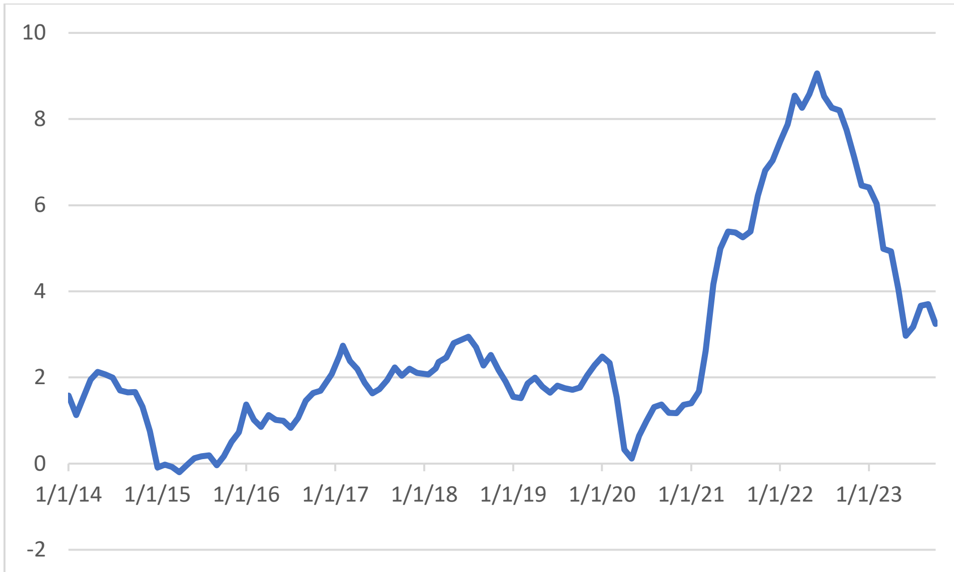
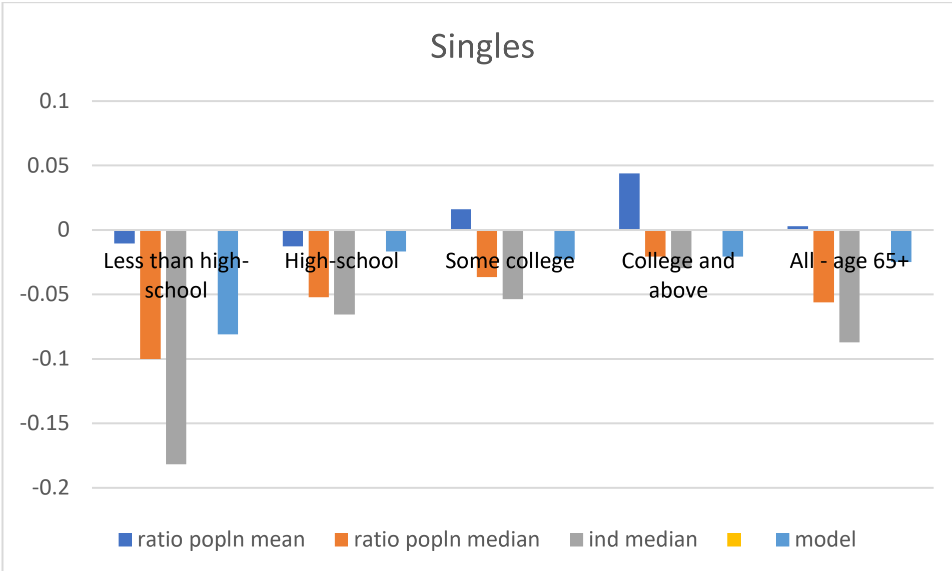
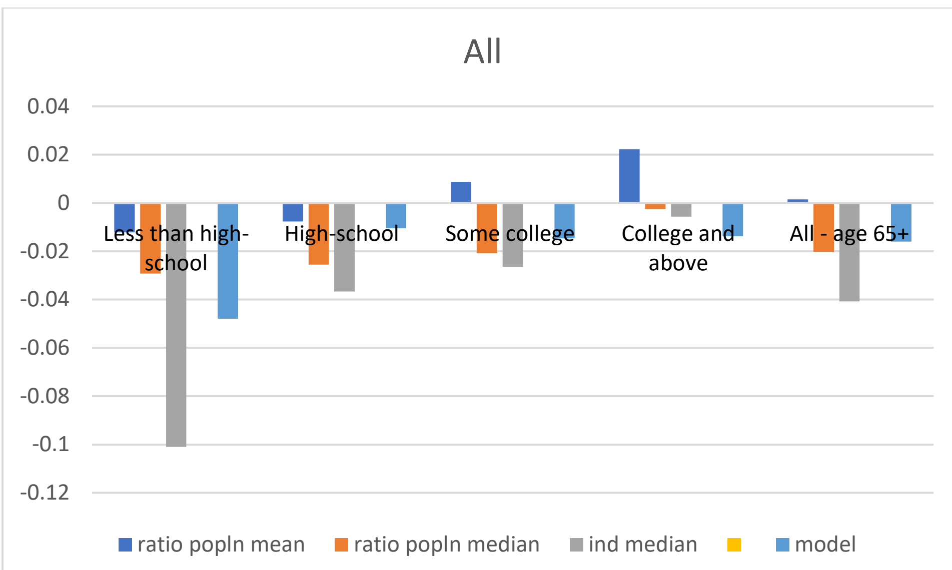


Figure 2: Comparison of estimated annual rates of change of wealth, longitudinal actual real rates and model estimated real rates by education





Appendix

Simulation model

The objective of our simulation model is to quantify how a permanent increase in the inflation rate will affect the economic position of a representative sample of persons initially 66 to 69 years of age over their remaining lifetimes. The model, summarized here, is also described elsewhere (Hurd and Rohwedder 2012, 2023a, 2923b) in more detail. Model inputs include initial wealth, annuities, and earnings. Outputs are spending, taxes, and bequests. The model was initially designed to assess economic preparation for retirement; individuals were considered to be adequately prepared for retirement if, in at least 95% of the simulations for them, they had positive wealth at death.

We begin by observing initial conditions — including wealth, income flows, and level of spending — of single persons and married couples in this age group using HRS waves from 2000 to 2018. We include couples if either spouse is in the age range 66-69 and the other spouse is 62 or older. Spending in our model follows an empirically determined path, with the initial level determined by CAMS data and change following that observed in the CAMS data by marital status, level of education, and age. Asset values evolve according to real rates of return in Table A1 and to active saving; that is to withdrawals from or additions to the various assets. For mortgages, we assume a 5% annual payoff of the beginning principal and that the payoff is fixed nominally. Because of inflation, the real value of the payoff decreases over time. When inflation is high, the real total lifetime payoff is lower than it is when inflation is low. The real value of the mortgage is the nominal value (after accounting for payoffs) adjusted for prices.

Income sources in the model include Social Security benefits, privately purchased annuities, DB pensions (which we assume are not indexed to inflation) and, for those holding them, required minimum distribution withdrawals for IRAs. We also estimate taxes paid on income, with the tax function of the model producing both average and marginal tax rates as estimated from HRS data on respondents. We include provisions in the tax code that give special treatment to Social Security income.

From baseline conditions, we simulate spending over time. If, in a given simulated year, spending exceeds after-tax income, then assets are drawn down in proportion to holdings of financial assets. If other financial assets are at 0, then the model calculates what additional IRA withdrawals are necessary to cover consumption. If still more assets are needed to finance consumption, then the model calculates necessary withdrawals from housing equity.

The simulations track assets and consumption of single persons until death, couples until the death of one spouse, and then the surviving spouse as a single person until death. The simulations show lifetime accumulation of spending (consumption), taxes paid, annuity holdings, and other elements, summarizing them as real present values.

We use multiple CAMS and HRS waves to generate the sample for the simulations. By combining waves we are able to approximate better the heterogeneity in economic circumstances across persons and households that would lead to differences in inflation vulnerability. Each person or household in the simulation sample was observed in the age band 66 to 69 in at least one of the CAMS waves 2001 through 2017, and in the previous or following HRS wave. (If multiple observations in CAMS, we use the last observation.) Our baseline aims to approximate conditions in the years before the COVID-19 pandemic: We simulate an observation until death under a steady-state assumption of inflation of 2% and rates of returns to assets as shown in Table A1. Under the alternative, we simulate the observation until 2020 in which year inflation jumps to 6% where it remains until the end of the simulations, affecting prices and rates of return on assets accordingly. Table A1 shows adjustment lags, derived from historical observation of lags between price increase and interest rate increases, for several types of assets. At the time of the inflation shock, the sample ranged in age from 69 (initially age 66 in 2017) to 88 (initially age 69 in 2001). The limitation on the upper age range is imposed by the data: The first wave of CAMS was in 2001.

For some short-term assets, such as checking and savings accounts, the losses are relatively small because short-term interest rates increase in response to the increase in inflation. But, because of the lag in adjustment of nominal rates to the new inflation rates, there is always a loss in the first year for bonds, bank accounts, and IRAs. For bonds, losses continue because of the fixed nominal return for the duration of the bond. For example, for U.S. bonds, we assume a 10-year maturity and a nominal rate of 5.5%, which, under 2% inflation, yields a real rate of 3.5%. From theoretical considerations a 1% increase in the rate of inflation would result in a loss of real value of 5%, but an examination of historical data indicates a lag in the adjustment of interest rates and bond prices. Consequently we impose a loss 1% of the bond in the first year of the inflation shock, and a second year loss of an additional 4% in real value. We assume DB pension plans are not indexed, resulting in a permanent and increasing reduction in the real value of their benefits as inflation increases.

Although Social Security benefits are indexed, an increase in inflation causes a permanent reduction in their real value because of the lag in the COLA. The one-time reduction in the year of inflation changes with additional increases to benefits in the following year. When inflation jumps permanently from 2% to 6%, the permanent reduction to Social Security lifetime benefits is 3.3%. The gain we calculate in wealth from reduction in real value of mortgage debt is based on a fixed nominal rate for 20-year mortgages.

Table A1. Approximate yields in 2020 and assumed maturities; ssumed inflation rate = 2%

				% real gain for 1% increase in inflation	
Instrument	**Long-run real rate (%)**	**Base nominal interest rate (%)**	**Maturity (years)**	**In first year**	**In second year**
Stocks	6	8	-	0	0
US Bonds	3.5	5.5	10	-1	-5
Corporate bonds	3.5	5.5	10	-1	-5
Bank accounts	-1.5	0.5	0	-1	0
Checking, saving, MM, CD	-1.5	0.5	0	-1	0
Housing	1.8	3.8		0	0
Mortgages	2.5	4.5	20	-	-
IRAs etc	4	6		-0.5	-2.1
Other debt	8	10	0	1	1
Transportation	-4.5			-	-

Sources:

Stocks: internet search

Bonds etc.: Economic Report of the President 2023

Housing: internet search

IRA: blend of stocks and long/medium: 55% stocks; 45% long; estimate from HRS

Medium and short: assume one-year lag in adjustment of nominal return

Inflation vulnerability of assets.

We use the information in Table A1 to find the change in real asset value from a 1% permanent increase in inflation. As a benchmark, consider a consol bond (infinite horizon) with face value of $100 that pays $6 annually and the inflation rate is 2%. Under the assumption that the real rate remains constant, an increase in inflation to 3% would result in a price decrease of the bond of about 33%.

Because historical data suggest that rates only adjust sluggishly to changes in inflation, we calculate the immediate change (first year) and the eventual, final change (second year). The first-year gain in total asset position is just the weighted average of asset holdings where the weights are the percentage gains or losses in the Table A1. For example, if a household owns $100 in stocks and $100 in U.S. bonds, the first year gain would be (0*100-1*100)/(200), or - 0.5%. In the long run, however, the bonds would lose $5, so that the percentage gain would be -2.5%. Thus, the vulnerability of this household to an increase in the annual rate of inflation from 2% to 3% would be a loss of 2.5% of wealth. This household has some vulnerability because it is a net lender. If a household, however, has $400 in mortgage debt, then it would gain $4-$1, or $3, on an asset position of -$200, realizing a gain of +1.5%. It would gain because it is a net borrower.

We calculate for each household with a respondent 65 or older in HRS 2018 the percentage “gain” from changes in inflation. Because the great majority of households in this age range are net lenders, most gains will be negative. Our calculations do not take Social Security or other income flows into account, which the simulation model does.