CENTER for RETIREMENT RESEARCH at BOSTON COLLEGE

HOW DOES LOCAL COST-OF-LIVING AFFECT RETIREMENT FOR LOW AND MODERATE EARNERS?

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Abstract

This paper uses the *Health and Retirement Study* to explore how local cost-of-living affects Social Security replacement rates and household behavior. In theory, labor markets with high cost-of-living also offer more compensation. If this compensating differential is paid in wages, rather than benefits, it reduces the share of earnings replaced by Social Security due to the progressive benefit structure. This paper examines how important the cost-of-living penalty is, in practice, and whether it impacts households' saving or labor supply.

The paper found that:

- Households in high-cost areas do receive higher wages and lower Social Security replacement rates, but geographic variation in replacement rates is economically small.
- Unsurprisingly, given these findings, households' response is muted, with small adjustments concentrated among affluent households.

The policy implications are:

- Social Security's progressive benefit structure could penalize households whose local labor markets have high cost-of-living.
- Recent cohorts of beneficiaries have only faced a small penalty because wages have not kept pace with prices in high-cost areas.

Introduction

Households across the United States face very different cost-of-living, largely due to the cost of housing. House prices over the last 50 years have not only increased rapidly, but have also become more disparate, increasing fastest in already expensive areas due to structural limitations on the supply of housing.[1] To attract workers despite high prices, labor markets in these high-cost areas offer more compensation. However, Social Security benefits are calculated with a progressive formula that awards a higher replacement rate to workers at the bottom of the national earnings distribution. As a result, households working in high-cost labor markets could face a retirement income penalty if the compensating differential for housing involves higher wages.

The question is, how large is this cost-of-living penalty in practice? And, do workers – particularly low and moderate earners who rely on Social Security to fund their retirement – respond to low Social Security replacement rates by adjusting their behavior?

This study uses the *Health and Retirement Study* (HRS) to document the association between local cost-of-living – as proxied by the price of housing – and Social Security replacement rates. It then explores whether households respond, in three possible ways. First, workers in high-cost labor markets who can afford to save and have access to retirement plans may compensate for lower replacement rates by saving more during their working years. Second, workers who cannot or do not save may instead retire later, in order to enjoy a higher replacement rate from Social Security, allow their savings to grow, and reduce the number of years over which their assets need to spread. Finally, individuals may move to a lower-cost retirement destination, stretching out the value of their assets.

The paper reaches two conclusions. First, as expected, households in high-cost areas do receive higher wages and lower Social Security replacement rates, but geographic variation in replacement rates is economically small. Second – in consequence – households exhibit only a muted response. Specifically, households in high-cost areas accumulate sufficient financial assets to close the replacement-rate gap, but very few low and moderate-income households respond to high costs by retiring later or moving.

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[1] Saiz (2010). Retirees coping with high housing prices face a more difficult retirement regardless of their homeownership status. Renters in high-cost areas face higher costs throughout their retirement. Homeowners face higher property taxes and mortgage payments, which could limit their non-housing savings and frequently carry into retirement.

The rest of the paper proceeds as follows. The next section outlines how economic theory predicts a link between local cost-of-living and Social Security benefits, and discusses the three ways in which households might respond. The third section reviews previous literature. The fourth section introduces the data and methodology used in the analysis, while the fifth section presents results. The final section concludes that Social Security's progressive benefit structure could penalize households whose local labor markets have high cost-of-living. Recent cohorts of beneficiaries have only faced a small penalty because wages have not kept pace with prices in high-cost areas.

Background

Most U.S. households spend a large share of their budget on housing – around 40 percent of total expenditures, on average, followed by food and transportation (each about 15 percent).[2] Consequently, when households make decisions about where to live and work, they often factor house prices into their expected standard of living.[3] Over the last 50 years, housing supply constraints in certain coastal labor markets – such as the commuting zones around New York City and San Francisco – have caused prices to rise fastest in these already expensive areas.[4] As a result, firms in high-cost labor markets have enhanced their compensation packages in order to attract and retain workers of all skill levels.[5]

This compensating differential could put households in high-cost areas at a disadvantage when it comes to retirement income. Social Security calculates retirement and disability insurance benefits based on a national formula that is a progressive function of workers' lifetime earnings. If the compensating differential is paid through higher wages, then workers in high-cost labor markets receive lower Social Security replacement rates than otherwise identical workers in low-cost labor markets. A replacement-rate penalty of this type would particularly

[2] Klick and Stockberger (2021).
[3] While the link between house prices and cost-of-living is straightforward for renters, homeowners also face higher property taxes and mortgage payments that frequently carry into retirement (Butrica and Karamcheva 2020).
[4] Saiz (2010); Van Nieuwerburgh and Weill (2010); and Gyourko, Mayer, and Sinai (2013).
[5] Rosen (1979); Roback (1982); and Ganong and Shaog (2017). Wage gains in these cities due to enhanced productivity also lead to equivalent housing price increases as demand for access to high-wage jobs outpaces limited housing supply.

affect low and moderate earners who often lack access to employer-sponsored retirement plans and rely heavily on Social Security in retirement.[6]

Moreover, a replacement-rate penalty could impact households' saving and labor supply. First, households in expensive locations could accumulate more financial wealth over their lifetime, relative to earnings, to compensate for low Social Security replacement rates. Of course, homeowners in expensive locations automatically build wealth through their house. However, this study focuses on saving in employer-sponsored retirement plans as well as other financial accounts because few retired households tap their home equity to support daily consumption.[7]

Second, workers might delay retirement. Working longer has multiple benefits. It can provide more income than Social Security in the near term; and it reduces the number of non-working years across which households must spread their retirement assets. If the additional years of earnings are higher than the workers' lifetime average, working longer adds new high-earning years to the benefit calculation.[8] More importantly, delaying claiming Social Security also enhances benefits through the actuarial adjustment.[9]

Lastly, retired households could enhance their purchasing power in retirement by moving to a lower-cost location. Since Social Security benefits are a function of past earnings, workers in high-cost locations still receive more from the program in absolute terms, boosting their financial advantage in lower-cost communities. However, many retirees may prefer to retire in place, keeping the same house, neighborhood, and community they had while working.

The question is whether geographic variation in replacement rates is sufficiently large in practice to induce these types of responses. Underlying this question is an even more basic one: do wages truly keep pace with fast-rising housing prices? Recent work suggests that they may not, at least for low-skilled workers.[10] In particular, Ganong and Shoag (2017) show that

[6] For example, Dushi, Iams, and Trenkamp (2017) estimated that 30 percent of workers with only a high-school education rely entirely on Social Security in retirement, and around 60 percent receive at least half of their retirement income from Social Security. In contrast, only 15 percent of workers with a college degree rely entirely on Social Security, and only 37 percent receive at least half of their retirement income from the program.
[7] Poterba, Venti, and Wise (2011). While workers in expensive locations might save more to substitute for lower replacement rates, enhanced home equity could instead crowd out other forms of saving.
[8] The benefit calculation is based on the average earnings of the 35 highest-earning years in a beneficiary's record.
[9] The actuarial adjustment increases monthly benefits for each month of later claiming to hold lifetime benefits roughly constant for the average person.
[10] Ganong and Shoag (2017); Glaeser at al. (2005); Gyourko et al. (2013); Hazell et al. (2022); and Van Nieuwerburgh and Weill (2010).

traditionally high-cost states no longer provide low-skilled workers with a compensating differential sufficient to offset the cost of housing, and that this real wage penalty explains why low-skilled workers no longer migrate to these states at the rate they once did.

Literature Review

Surprisingly few studies examine how local cost-of-living affects household behavior. On the savings front, prior research focuses on two adjacent topics: how homeownership affects total wealth in retirement; and whether the generosity of Social Security affects private saving.[11] Interestingly, neither of these literatures notes the interaction between cost-of-living and the Social Security replacement rate.

Meanwhile, an emerging body of work relates labor force participation at older ages to local economic conditions. For example, Black and Liang (2005), von Wachter (2007), Munnell et al. (2008), and Coile (2022) find that workers tend to retire early in areas with stagnant labor markets, marked by low cost-of-living, high unemployment, and low wages. Munnell et al. (2008) also shows that a high replacement rate from Social Security is correlated with early retirement at both the state and individual level. Adjacent research on Social Security Disability Insurance (DI) similarly finds that workers are more likely to go on DI when local labor markets are stagnant and the program offers a high replacement rate (Autor and Duggan 2003; Duggan and Imberman 2009). However, one recent study counterintuitively finds that workers are more likely to go on DI in areas with high cost-of-living (Schimmel Hyde et al. 2021).

The literature on geographic mobility at older ages is even more limited. Although early studies found that retirees were less likely to move to high-cost areas (Cebula 1993), more recent work does not find a strong relationship between local conditions and the decision to move (Banks et al. 2010; and Coile, Levine, and McKnight 2014).[12] Most moves at older ages are local, and around one-third are triggered by an adverse family or health event, rather than planned in advance (Calvo, Haverstick, and Zhivan 2009). Homeowners whose moves are

[11] For examples of the literature on homeownership, see Di, Belsky, and Liu (2007); Killewald and Bryan (2016); Turner and Luea (2009); and Wainer and Zabel (2020). In theory, additional home equity could crowd out other forms of saving, but past studies of that issue are inconclusive (Skinner 1989; and Engelhardt 1996). Similarly, a large set of papers investigates whether Social Security replacement rates affect the level of private saving, without reaching a clear consensus (see Quinby and Sanzenbacher 2020 for a review of this literature).

[12] In general, geographic mobility at younger ages has been declining over the past two decades. Less-educated workers have lower geographic mobility than their more-educated counterparts (Childers et al. 2019).

planned tend to be better educated and more financially secure than those whose moves are precipitated by shocks.

This study fills a gap in the literature by considering how local housing costs affect workers' saving, labor supply, and geographic mobility after controlling for local labor demand.

Data and Methodology

Data for the analysis come primarily from the HRS, a nationally representative longitudinal survey of older households. The survey has been fielded every two years between 1992 and 2020, with a new cohort of households added to the sample every four years. The sample for this analysis includes households who have agreed to link their public survey data with restricted lifetime earnings records from the Social Security Administration.[13] Households are observed when the highest lifetime earner – measured by Social Security Average Indexed Monthly Earnings (AIME) – is age 55 or 56 depending on the two-year HRS interval. This age range is picked so that most of the lower-earning households, who tend to retire earlier, have not yet started to draw down their savings.[14]

Restricted HRS data on place of residence are used to link retirees with their local housing market. The first step, however, is to define the geographic area of interest. Defining a small area (such as a neighborhood in a large city) produces the most variation in housing prices. Yet housing is also a consumption good, and choosing to live in an expensive neighborhood does not always imply a high cost-of-living. Broadening the geography ameliorates this issue, but too big an area may not reflect the housing stock within a reasonable commute of the household's workplace.

Our approach is to consider two levels of geography. The main analysis examines Metropolitan Statistical Areas (MSAs), defined by the Census Bureau to include a "core population nucleus" as well as adjacent communities with significant economic ties to the core. In practice, MSAs reflect combinations of counties and are closely related to commuting zones. As a robustness check, the analysis is replicated with counties as the geographic unit.

[13] Earnings data are linked for about two thirds of the full HRS sample, and are currently available through 2018. In some instances when administrative earnings data are unavailable, it is possible to reverse engineer the respondent's lifetime earnings history using self-reports about the timing and duration of past jobs, and assuming 1 percent real annual wage growth.

[14] Appendix Table A1 shows how the analysis sample is derived from the full sample of households in the HRS.

The *American Community Survey* (ACS) provides housing prices across MSAs and counties from 2005 onward. To impute house prices in earlier years, the Federal Housing Finance Agency (FHFA) calculates a cross-year price index for MSAs from 1992 to 2005 that can be applied to the ACS data using backwards iteration. In addition, the ACS and the *Current Population Survey* (CPS) provide tightness measures of the local labor market that are used to control for labor demand.[15]

The first stage of the analysis establishes a relationship between local house prices and Social Security replacement rates using the following Ordinary Least Squares (OLS) regression:

$$PIA_i/AIME_i = \beta_0 + \beta_1 * \log(H_i) + \beta_2 * X_i + \epsilon_i\beta_1 \qquad (1)$$

The dependent variable is the ratio of household i's combined Social Security Primary Insurance Amount (PIA_i) relative to combined AIME, calculated from the administrative earnings data.[16] The independent variable of interest is H_i, the median housing price in the MSA where household i lives. If house prices drive up wages in the manner predicted, then β_1 will be negative and statistically significant. Since house prices are correlated with other household-level and local-economic characteristics that also affect earnings, the regression includes a vector of controls (X_i) that includes: the birth year, education, race/ethnicity, marital status, gender, and health status of the household head; the education and health status of the spouse (if present); and local labor demand as proxied by the prime-age employment rate in the household's MSA.[17] Note that, in this and all subsequent analyses, nominal dollar values have been converted to real 2020 dollars.

The analysis then turns to behavioral impacts, starting with the effect on savings. This stage of the analysis adapts equation (1) as follows:

$$W_i/AIME_i = \beta_0 + \beta_1 * \log(H_i) + \beta_2 * X_i + \epsilon_i \quad (2)$$

[15] We use the ACS when available and the CPS to fill in missing counties.
[16] The PIA and AIME are largely independent of the actual claiming age, except insofar as additional years at the end of a career may add higher-earning years to the AIME calculation. To that limited extent, both are calculated based on the household's actual retirement age, which might, in turn, be influenced by cost of living. If this is the case, then the estimated relationship between cost of living and the replacement rate is positively biased. However, given that we find little evidence of endogenous retirement, the bias is likely quite small in practice.
[17] Spousal variables are coded as zero for unmarried respondents.

The dependent variable in equation (2) is the ratio of household i's net worth (W_i) to combined annualized AIME when the household head is age 55.[18] If higher housing costs encourage saving, then β_1 should be positive. In initial specifications, net worth includes the present discounted value of the head and spouse's Social Security benefits and defined benefit pensions, total balances in defined contribution accounts, the net value of any residences, plus other financial assets, minus debt.[19] Additional specifications focus solely on financial assets, which include the present discounted value of defined benefit pensions, defined-contribution and IRA account balances, and all other financial assets (net of debt).

The next step examines the impact of housing costs on retirement timing, using the OLS regression:

$$C_i = \beta_0 + \beta_1 * \log(H_i) + \beta_2 * X_i + \epsilon_i \qquad (3)$$

where C_i represents the household head's anticipated Social Security claiming age, as of age 55. Expected claiming age is used rather than actual age in order to maximize the size of the analysis sample; however, as a robustness check we also regress the head's actual retirement age on local housing prices.[20] The independent variables for both of these analyses are defined as before, with the addition of annualized household AIME as a control variable. If households respond to higher housing costs by working longer, β_1 should be positive.

Finally, the analysis examines whether workers in high-cost MSAs are more likely to migrate using the following linear probability model:

$$M_i = \beta_0 + \beta_1 * \log(H_i) + \beta_2 * X_i + \epsilon_i \qquad (4)$$

where M_i is an indicator taking the value of one if household i moves to a different MSA by age

[18] AIME in this specification is pro-rated to only include earnings through the year in which the head is age 55. To reduce influence from a few extremely high-wealth households, total wealth is Winsorized at the one-percent level (at both the top and bottom of the distribution), and these households are dropped from the analysis of financial wealth.

[19] Hou and Sanzenbacher (2020) describe the detailed methodology for calculating household net worth in the HRS.

[20] Retirement age is defined as the earliest age at which the respondent reports being retired, since some workers subsequently decide to unretire.

70.[21] The independent variables for this analysis are identical to equation (3). Again, if households are more likely to relocate out of high-cost areas, β_1 should be positive.

To begin, these regressions are estimated on the entire sample of households. But since the focus of this paper is on low and moderate earners, we also split the sample into households where the head lacks a college degree versus those where the head has a college degree, and re-run the regressions separately for each group.[22]

Results

To provide context for the analysis, Table 1 displays summary statistics for the non-college and college-educated households in the sample. As expected, the non-college household heads are less likely to be white, more likely to be in poor health, and less likely to be working at age 55. They are also nearly twice as likely to rent their current home – 44 percent of non-college households rent at age 55, versus only 25 percent of the college-educated households. And they are less likely to live in high-cost areas, as measured by the median housing price in their MSA. Consistent with prior literature, only a modest share of either group moves to a different MSA by age 70, but the non-college households are much less likely to move than the college-educated group.

One theoretical prediction is that only college-educated households will respond by saving more, since non-college households lack retirement savings plans and other financial vehicles. To assess the assumption underlying this hypothesis, the last rows of Table 1 estimate the mean of various asset classes for households in the middle tercile of total wealth for each education group. As assumed, the non-college households only have around 60 percent of the wealth accrued by college-educated households, and 80 percent of their wealth comes from Social Security. For this group, most non-Social Security wealth is built through purchasing a house.

[21] The age-70 cutoff is chosen to provide a reasonable opportunity for households to move without reducing the sample size too dramatically (since the youngest cohort in the HRS is not yet observed past age 65). Mechanically, households in high-cost locations are more likely to move to lower-cost locations than households already residing in low-cost locations. For this reason, the analysis focuses on the decision to move irrespective of the new destination. If high housing costs drive the decision to move, then households in high-cost areas should be more likely to relocate overall than those currently in low-cost locations.

[22] We define earnings capacity by education level rather than observed wages because education is typically determined long before retirement, whereas households might try to boost their later-life earnings in response to high housing costs.

Do Social Security Replacement Rates Vary Geographically?

With this context in mind, the first step in the analysis is to assess how Social Security replacement rates vary across low- and high-cost MSAs. Each year, we rank the national population by the median house price in their MSA. We then divide the population into thirds and use the house-price cutoffs generated by this division to define low, medium, and high-cost MSAs. These tercile indicators are merged onto the HRS data, so that each household in the sample can be identified as living in a low, medium, or high-cost MSA.[23]

Figure 1 shows the average median house price for HRS households in the bottom, middle, and top terciles, by education. Regardless of education, households in the bottom two terciles experience relatively similar housing costs ($140,000 to $220,000), whereas those in the top tercile face costs that are nearly double (around $400,000).

Yet, Social Security benefits do not exhibit the same pattern. Figure 2 shows that, across education groups, the average replacement rate earned by households in low-cost MSAs is only three to six percentage points higher than that received by households in the highest-cost MSAs. Specifically, non-college households living in low-cost MSAs have a 59-percent replacement rate on average, whereas their counterparts in high-cost MSAs only earn 53 percent. Similarly, college-educated households in low-cost MSAs receive a 49-percent replacement rate, while their counterparts in high-cost MSAs earn 46 percent.

The relative flatness of Social Security replacement rates is due to the fact that wages have not fully kept pace with cost-of-living in the most expensive MSAs (consistent with prior literature). Figure 3 presents average annualized household AIME by housing cost tercile and household education. Non-college households in the lowest-cost MSAs have $37,000 in annualized AIME, on average, while those in the highest-cost MSAs have $42,000. College-educated households in the lowest-cost MSAs have an annualized AIME of $62,000, compared to $70,000 in the highest-cost MSAs. So, whereas housing costs double from the bottom to the top terciles (see Figure 1), AIME only rises about 13 percent.

Table 2 formalizes this finding with regression results from equation (1). After controlling for household characteristics, doubling the median house price in a household's MSA (equivalent to moving from the first to the third tercile, as shown in Figure 1) is associated with a

[23] We take this approach rather than simply dividing households in the HRS into terciles because small sample sizes in the HRS make the ranking unrepresentative of the national distribution of housing costs.

2.4-percentage-point decrease in the replacement rate.[24] Although this relationship is highly statistically significant, it is economically small. It is also quite similar for both non-college and college-educated households (2.9 percentage points and 1.9 percentage points, respectively). Reassuringly, the coefficients on other household characteristics, such as health status and gender of the head, come in with their expected signs.[25]

At this point, a question arises whether the weak link between housing costs and AIME is due to the level of geography – namely, whether MSAs are so large that they mask local variation in wages. To explore this possibility, we replicate the descriptive analysis at the county level. Interestingly, the results tell a consistent story even at this significantly smaller level of geography.[26] A parallel concern is that high cost-of-living only truly impacts a small number of superstar cities, and that we miss this dynamic by examining population-weighted terciles. We address this issue by defining a "high-cost MSA" as being in the top population-weighted quintile, and get the same results. Since the basic relationship between housing costs and replacement rates does not appear to be sensitive to reasonable modeling choices, the rest of the analysis sticks to the methodology described earlier.

Does Cost-of-living Impact Households' Behavior?

Although the next phase of the analysis considers households' response to local cost-of-living, results from the previous section suggest that this exercise should be approached with tempered expectations.

This section begins by asking whether households respond to high cost-of-living by saving more. Table 3 displays the regression results for total wealth. As expected, the coefficient on local house price is positive and statistically significant for the entire sample (column 1), as well for college-educated heads (column 3). To interpret the magnitude of the effect in this case, recall that the dependent variable is a ratio, with the unit of measurement being annualized household AIME. Doubling the median price in a household's MSA is associated with additional wealth worth four times (annualized) AIME. For college-educated

[24] Since house price is measured in logs, the impact of a 100-percent increase is calculated as: $\beta_1 * [\ln(2 * H_i) - \ln(H_i)] = \beta_1 * \ln(2) = -0.034 * 0.7 = -0.024$.

[25] The negative coefficient on marital status is due to married households having higher AIME – even at the individual level – than otherwise similar non-married households.

[26] These results are not shown, but are available from the authors upon request. Replicating the results in the next section at the county level also tells a consistent story, and so these results are not shown.

households, doubling the median house price is associated with additional wealth worth five times AIME.

However, this size of an effect seems improbably large, and several of the coefficients on other household characteristics are also counterintuitive – households where the head is Hispanic or female have higher wealth relative to AIME than those with white male heads; and those where the spouse has a college degree have lower wealth than those where the spouse is not college educated. These odd results are explained by the inclusion of housing and Social Security wealth in the dependent variable: housing mechanically drives up total wealth in high-priced areas, while Social Security replacement rates are higher for low-earners. Hence, Table 4 focuses on financial wealth relative to annualized AIME. In this preferred specification, doubling the median house price is associated with additional financial assets worth two times AIME (column 1). As predicted, the relationship between cost-of-living and saving is slightly more pronounced for college-educated households, but this difference is largely due to greater statistical noise for the non-college group.

The next question is whether this additional saving is sufficient to close the replacement rate gap. To get a rough sense, recall that, in our sample, the annualized AIME of college-educated households in high-cost areas is $69,108 (see Figure 3), implying a monthly Primary Insurance Amount (PIA) of $2,649 and additional savings of just under $123,000.[27] In 2021, households could use these savings to purchase a 100-percent joint and survivor annuity on the private market yielding around $280 per month.[28] This private annuity would bring their total monthly income to just under $3,000 per month ($2,649+$280) for a replacement rate of 0.52 ($3000*12/69,108) – just above the 0.49 replacement rate they would likely earn from Social Security in lower-cost MSAs (see Figure 2).

Turning to labor supply, Table 5 presents regression results for the relationship between the expected claiming age of the household head and local housing costs. As predicted, the coefficient on median house price is positive – indicating that workers expect to claim later when they live in high-cost areas, all else equal – but it is small in magnitude and statistically insignificant for both non-college and college-educated workers. Yet claiming age may be less

[27] From Table 4, Column 3, log(2)*2.56*69,108=188,305.
[28] This calculation assumes a 100-percent joint and survivor annuity with a three-percent COLA for a 65-year-old man and a 60-year-old wife. The price quote was obtained from Annuity Shopper archives (available at https://www.immediateannuities.com/pdfs/as/annuity-shopper-2021-01.pdf).

sensitive than the worker's actual retirement age, particularly for workers who retire before Social Security's earliest eligibility age of 62. Hence, Table 6 replicates the analysis with the household head's earliest reported retirement age as the dependent variable. The conclusion is similar to claiming age.

Lastly, Table 7 displays regression estimates for the association of housing costs and the propensity to move across MSAs. The coefficient on median house price comes in positive, as anticipated, but is only statistically significant at the 10-percent level. Low power in this case is probably due to the small number of observations – only 540 households observed at age 70 could be linked to the data on house prices. Nevertheless, the regression suggests that doubling the median house price is associated with a 7-percentage point increase in the probability of moving to a different MSA before age 70 (column 1).[29] Since the overall rate of moving in our sample is around 10 percent (see Table 1), this result implies that households retiring in high-cost areas are about twice as likely to move as those in low-cost areas.

However, consistent with prior literature, we find that affluent households are much more likely to use this strategy. Household AIME is predictive of moving, while Black and Hispanic households are much less likely to move. Further strengthening the point, Table 8 shows that living in a high-cost area strongly predicts moving among homeowners, but much less so among renters (although the sample size of renters is too small to rule out substantial effects).

Conclusion

Across the country, workers with similar skills earn different compensation to reflect the cost of housing in their local labor market. Yet, Social Security benefits are determined by a national formula that does not take local price levels into account. If the compensating differential for housing translates to higher wages, then workers in high-cost labor markets could end up with lower replacement rates – benefits relative to lifetime earnings – than otherwise similar workers in less-expensive areas. Additionally, if high cost-of-living results in substantially lower replacement rates, then workers may respond by saving more, working longer, or retiring in a lower-cost location.

[29] To derive this result from column 1 of Table 7, note that ln(2)*0.1 = 0.7.

This paper uses the HRS linked to data on housing costs from the ACS and CPS to examine how important these geographic disparities are in practice. The results show that, despite wide geographic variation in housing costs, Social Security replacement rates are actually quite uniform. Lifetime earnings have not kept pace with housing costs in the most expensive labor markets, suggesting a potential structural mismatch between the labor and housing markets in these areas.

Perhaps unsurprising given the finding of very little variation in replacement rates, households' response appears fairly muted. Those households who do respond tend to be more affluent to begin with: college-educated households save enough in retirement plans and other accounts to close the Social Security gap, and homeowners in expensive housing markets are the most likely to move.

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Tables and Figures

Table 1. *Characteristics of Household Heads at Age 55-56, by Education, 1992-2018*

Demographic characteristics	Mean	
	No college degree	College degree
Married	58.5%	65.4%
Age of spouse (if married)	53.3	54.1
Spouse has BA degree	15.1%	36.3%
White non-Hispanic	58.3	74.4
Black non-Hispanic	15.9	11.9
Hispanic	20.7	6.0
Other race/ethnicity	5.1	7.7
Health limits work	24.7	14.2
Spouse's health limits work	13.8	10.2
Moved by 70 to a new MSA	7.9	15.9
Rent current home	43.9	24.6
Resides in high-cost MSA*	33.7	44.0
Employment characteristics	**Mean**	
	No college degree	College degree
Working	70.6%	83.3%
Retired	15.9	10.2
Unemployed	4.9	3.5
Not working due to disability	5.5	1.4
Not working for other reason	3.1	1.6
Prime-age employment rate in MSA	77.4	78.0
Expected claim age	64.3	65.4
Age first claim to be retired	56.8	58.4
Financial characteristics	**Mean of middle wealth quintile (2020 dollars)**	
	No college degree	College degree
Total wealth	$287,000	$466,000
Social Security wealth	221,000	278,000
Retirement wealth+	21,000	82,700
Housing wealth	46,000	81,000
Financial wealth	19,000	106,000
Annualized household AIME	35,000	54,000
Age 55 median housing price	234,000	266,000

*A high-cost MSA is defined as being in the third population-weighted tercile of all MSAs, ranked based on median house price in the year the household head turns age 55.

+Retirement wealth includes the present value of defined benefit pensions as well as the combined account balances of defined contribution and IRA plans.

Sources: Authors' estimates from the *Federal Housing Finance Agency HPI* (1992-2005), *American Community Survey* (2005-2018), *Current Population Survey* (1992-2018), and the *Health and Retirement Study* (1992-2018).

Table 2. *Regression Results for the Relationship Between Social Security Replacement Rates and Household Characteristics, by Education, 1992-2018*

Variables	(1)	(2)	(3)
	All	No college degree	College degree
Log median housing price	-0.034***	-0.042***	-0.028***
	(0.008)	(0.015)	(0.009)
Married	-0.032***	-0.036**	-0.029***
	(0.009)	(0.015)	(0.011)
College	-0.057***		
	(0.007)		
Spouse college	-0.021***	-0.032**	-0.021**
	(0.007)	(0.012)	(0.009)
Health limitations	0.058***	0.041**	0.072***
	(0.010)	(0.016)	(0.014)
Spouse health limitations	0.041***	0.040***	0.045***
	(0.009)	(0.015)	(0.011)
Black Non-Hispanic	0.051***	0.071***	0.040***
	(0.009)	(0.015)	(0.011)
Hispanic	0.041***	0.060***	0.004
	(0.012)	(0.016)	(0.017)
Other	0.028	0.026	0.029
	(0.019)	(0.038)	(0.021)
Female	0.041***	0.046***	0.039***
	(0.007)	(0.013)	(0.008)
Prime-age employment rate	-0.095	-0.278*	0.056
	(0.092)	(0.157)	(0.114)
Constant	1.020***	1.281***	0.767***
	(0.108)	(0.187)	(0.129)
Observations	5,494	2,325	3,169
R-squared	0.120	0.091	0.098
Birth Year FE	Yes	Yes	Yes

Notes: Spousal variables are coded as zero for unmarried respondents. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Sources: Authors' estimates from the *Federal Housing Finance Agency HPI* (1992-2005), *American Community Survey* (2005-2018), *Current Population Survey* (1992-2018), and the *Health and Retirement Study* (1992-2018).

Table 3. *Regression Results for the Relationship Between Total Wealth Relative to Annualized AIME and Household Characteristics, by Education, 1992-2018*

Variables	(1)	(2)	(3)
	All	No college degree	College degree
Log median housing price	5.270***	0.827	7.435***
	(2.008)	(3.880)	(2.328)
Married	5.616***	9.794**	3.128
	(2.109)	(3.812)	(2.403)
College	0.239		
	(1.729)		
Spouse college	-4.763***	-7.837***	-3.732*
	(1.710)	(2.676)	(2.161)
Health limitations	4.594*	8.759*	1.264
	(2.742)	(4.900)	(2.715)
Spouse health limitations	-0.001	-0.057	-0.061
	(2.730)	(5.194)	(2.865)
Black Non-Hispanic	-3.581**	-3.162	-3.491
	(1.728)	(3.020)	(2.151)
Hispanic	8.426***	7.974*	6.028
	(3.231)	(4.425)	(5.163)
Other	5.152	11.085	3.687
	(4.361)	(11.118)	(4.501)
Female	8.903***	15.346***	5.651***
	(1.834)	(4.087)	(1.812)
Prime-age employment rate	-48.703	-98.230	-12.211
	(29.884)	(66.292)	(24.309)
Constant	-12.215	69.772	-57.146**
	(31.064)	(66.976)	(27.536)
Observations	5,391	2,270	3,121
R-squared	0.046	0.079	0.039
Birth Year FE	Yes	Yes	Yes

Notes: Spousal variables are coded as zero for unmarried respondents. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Sources: Authors' estimates from the *Federal Housing Finance Agency HPI* (1992-2005), *American Community Survey* (2005-2018), *Current Population Survey* (1992-2018), and the *Health and Retirement Study* (1992-2018).

Table 4. *Regression Results for the Relationship Between Financial Wealth Relative to Annualized AIME and Household Characteristics, by Education, 1992-2018*

Variables	(1)	(2)	(3)
	All	No college degree	College degree
Log median housing price	2.662**	2.872	2.563*
	(1.101)	(1.956)	(1.312)
Married	2.458**	3.858*	1.750
	(1.146)	(2.197)	(1.336)
College	3.428***		
	(0.840)		
Spouse college	0.148	0.308	0.130
	(0.903)	(1.407)	(1.126)
Health limitations	-0.122	2.275	-2.259*
	(1.247)	(2.210)	(1.245)
Spouse health limitations	-2.616***	-2.839	-2.889***
	(0.963)	(1.885)	(1.052)
Black Non-Hispanic	-3.179***	-2.535***	-3.692***
	(0.712)	(0.857)	(1.070)
Hispanic	-3.162***	-3.555***	-2.334
	(0.971)	(1.033)	(2.014)
Other	1.513	9.729	-1.374
	(2.756)	(9.266)	(2.004)
Female	2.245**	3.380*	1.831*
	(0.876)	(1.811)	(1.008)
Prime-age employment rate	6.714	-0.452	10.59
	(11.87)	(17.04)	(16.88)
Constant	-31.67***	-33.53*	-25.70
	(11.97)	(19.39)	(15.77)
Observations	5,391	2,270	3,121
R-squared	0.041	0.077	0.026
Birth Year FE	Yes	Yes	Yes

Notes: Spousal variables are coded as zero for unmarried respondents. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Sources: Authors' estimates from the *Federal Housing Finance Agency HPI* (1992-2005), *American Community Survey* (2005-2018), *Current Population Survey* (1992-2018), and the *Health and Retirement Study* (1992-2018).

Table 5. *Regression Results for the Relationship Between Expected Claiming Age and Household Characteristics, by Education, 1992-2018*

Variables	(1)	(2)	(3)
	All	No college degree	College degree
Log median housing price	0.139	0.101	0.174
	(0.140)	(0.249)	(0.171)
Log annualized household AIME	-0.0815	-0.0373	-0.122
	(0.0752)	(0.108)	(0.104)
Married	-0.350**	-0.00200	-0.582***
	(0.169)	(0.264)	(0.219)
College	0.788***		
	(0.142)		
Spouse college	0.409***	0.403	0.503**
	(0.158)	(0.263)	(0.200)
Health limitations	-1.597***	-2.066***	-1.298***
	(0.256)	(0.370)	(0.341)
Spouse health limitations	0.218	-0.208	0.459
	(0.210)	(0.303)	(0.279)
Black Non-Hispanic	-1.036***	-0.639**	-1.193***
	(0.164)	(0.271)	(0.205)
Hispanic	-0.352*	-0.0772	-0.517
	(0.200)	(0.259)	(0.322)
Other	-0.789***	-0.227	-0.972***
	(0.286)	(0.557)	(0.333)
Female	0.0218	0.407*	-0.212
	(0.130)	(0.237)	(0.155)
Prime-age employment rate	4.259***	7.468***	1.956
	(1.649)	(2.530)	(2.120)
Constant	58.98***	56.44***	61.41***
	(2.074)	(3.373)	(2.667)
Observations	4,021	1,532	2,489
R-squared	0.128	0.122	0.119
Birth Year FE	Yes	Yes	Yes

Notes: Spousal variables are coded as zero for unmarried respondents. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Sources: Authors' estimates from the *Federal Housing Finance Agency HPI* (1992-2005), *American Community Survey* (2005-2018), *Current Population Survey* (1992-2018), and the *Health and Retirement Study* (1992-2018).

Table 6. *Regression Results for the Relationship Between Retirement Age and Household Characteristics, by Education, 1992-2018*

Variables	(1)	(2)	(3)
	All	No college degree	College degree
Log median housing price	-0.0884	-0.0813	-0.0585
	(0.324)	(0.563)	(0.390)
Log annualized household AIME	1.570***	1.710***	1.417***
	(0.213)	(0.330)	(0.268)
Married	0.930**	1.397**	0.431
	(0.387)	(0.621)	(0.498)
College	0.416		
	(0.344)		
Spouse college	-1.390***	-2.236***	-0.819*
	(0.385)	(0.749)	(0.445)
Health limitations	-4.552***	-5.458***	-3.897***
	(0.417)	(0.643)	(0.545)
Spouse health limitations	-0.0446	0.349	-0.467
	(0.466)	(0.679)	(0.631)
Black Non-Hispanic	-0.294	-0.755	0.0590
	(0.427)	(0.698)	(0.495)
Hispanic	1.967***	2.478***	1.173
	(0.524)	(0.709)	(0.822)
Other	0.774	2.075	0.387
	(0.729)	(1.459)	(0.794)
Female	0.917***	1.724***	0.376
	(0.351)	(0.597)	(0.419)
Prime age employment rate	12.08***	19.26***	7.041
	(4.379)	(6.228)	(6.073)
Constant	36.66***	28.33***	43.29***
	(5.500)	(8.359)	(7.007)
Observations	2,363	1,038	1,325
R-squared	0.391	0.424	0.376
Birth Year FE	Yes	Yes	Yes

Notes: Spousal variables are coded as zero for unmarried respondents. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Sources: Authors' estimates from the *Federal Housing Finance Agency HPI* (1992-2005), *American Community Survey* (2005-2018), *Current Population Survey* (1992-2018), and the *Health and Retirement Study* (1992-2018).

Table 7. *Regression Results for the Relationship Between Moving to a Different MSA and Household Characteristics, by Education, 1992-2018*

Variables	(1)	(2)	(3)
	All	No college degree	College degree
Log median housing price	0.104*	0.0525	0.163
	(0.0606)	(0.0545)	(0.113)
Log annualized household AIME	0.0276*	0.0168	0.0456*
	(0.0149)	(0.0244)	(0.0234)
Married	0.0225	0.0730	-0.0173
	(0.0481)	(0.0563)	(0.0789)
College	0.0392		
	(0.0370)		
Spouse college	-0.0519	-0.0431	-0.0681
	(0.0473)	(0.0609)	(0.0703)
Health limitations	-0.0376	-0.0361	-0.0512
	(0.0375)	(0.0408)	(0.0643)
Spouse health limitations	0.00195	-0.00603	0.0347
	(0.0477)	(0.0562)	(0.0739)
Black Non-Hispanic	-0.113***	-0.0908**	-0.111**
	(0.0315)	(0.0406)	(0.0485)
Hispanic	-0.0944***	-0.0894**	-0.168***
	(0.0355)	(0.0429)	(0.0621)
Other	-0.0793	-0.0835	-0.0318
	(0.0719)	(0.0550)	(0.124)
Female	0.0270	0.106**	-0.0249
	(0.0438)	(0.0534)	(0.0644)
Prime age employment rate	-0.229	0.0307	-0.398
	(0.396)	(0.324)	(0.666)
Constant	-1.211*	-0.754	-1.889
	(0.706)	(0.555)	(1.434)
Observations	540	239	301
R-squared	0.061	0.089	0.073
Birth Year FE	Yes	Yes	Yes

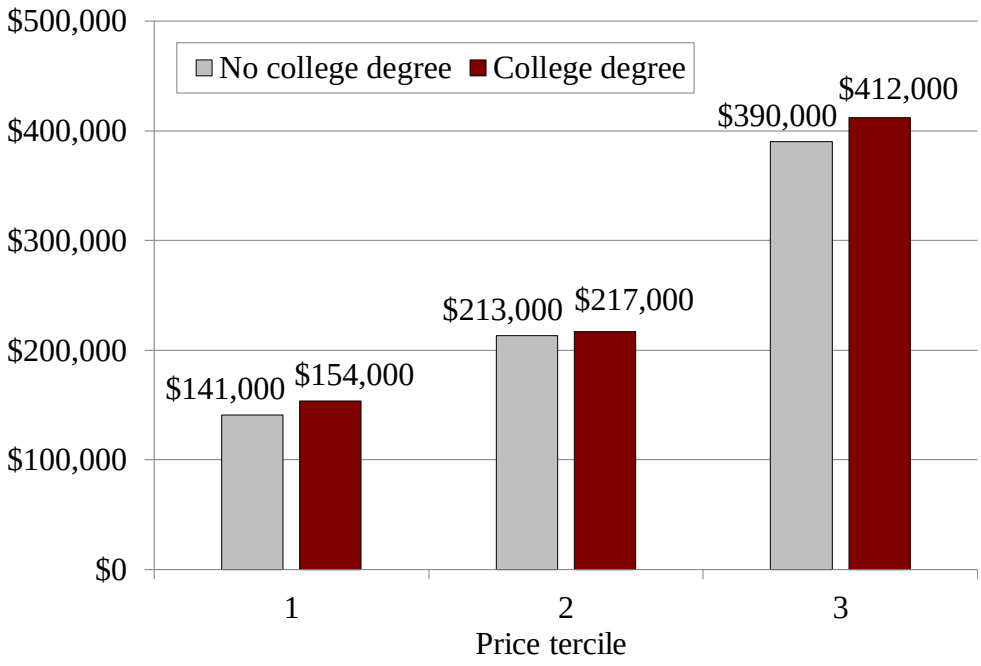
Notes: Spousal variables are coded as zero for unmarried respondents. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Sources: Authors' estimates from the *Federal Housing Finance Agency HPI* (1992-2005), *American Community Survey* (2005-2018), *Current Population Survey* (1992-2018), and the *Health and Retirement Study* (1992-2018).

Table 8. *Regression Results for the Relationship Between Moving to a Different MSA and Household Characteristics, by Homeownership Status, 1992-2018*

Variables	(1)	(2)	(3)
	All	Own	Rent
Log median housing price	0.104*	0.143**	0.0556
	(0.0606)	(0.0723)	(0.0846)
Log annualized household AIME	0.0276*	0.0267	0.0439
	(0.0149)	(0.0170)	(0.0323)
Married	0.0225	0.0287	0.0663
	(0.0481)	(0.0562)	(0.105)
College	0.0392		
	(0.0370)		
Spouse college	-0.0519	-0.0313	0.00848
	(0.0473)	(0.0475)	(0.165)
Health limitations	-0.0376	0.0127	-0.155**
	(0.0375)	(0.0506)	(0.0687)
Spouse health limitations	0.00195	0.0162	-0.208**
	(0.0477)	(0.0559)	(0.103)
Black Non-Hispanic	-0.113***	-0.125***	-0.0609
	(0.0315)	(0.0316)	(0.0910)
Hispanic	-0.0944***	-0.117***	-0.122
	(0.0355)	(0.0435)	(0.0856)
Other	-0.0793	-0.0968	
	(0.0719)	(0.0807)	
Female	0.0270	0.0416	-0.0598
	(0.0438)	(0.0452)	(0.0971)
Prime age employment rate	-0.229	-0.693	1.249
	(0.396)	(0.429)	(0.798)
Constant	-1.211*	-1.308	-1.936**
	(0.706)	(0.824)	(1.153)
Observations	540	423	117
R-squared	0.061	0.073	0.200
Birth Year FE	Yes	Yes	Yes

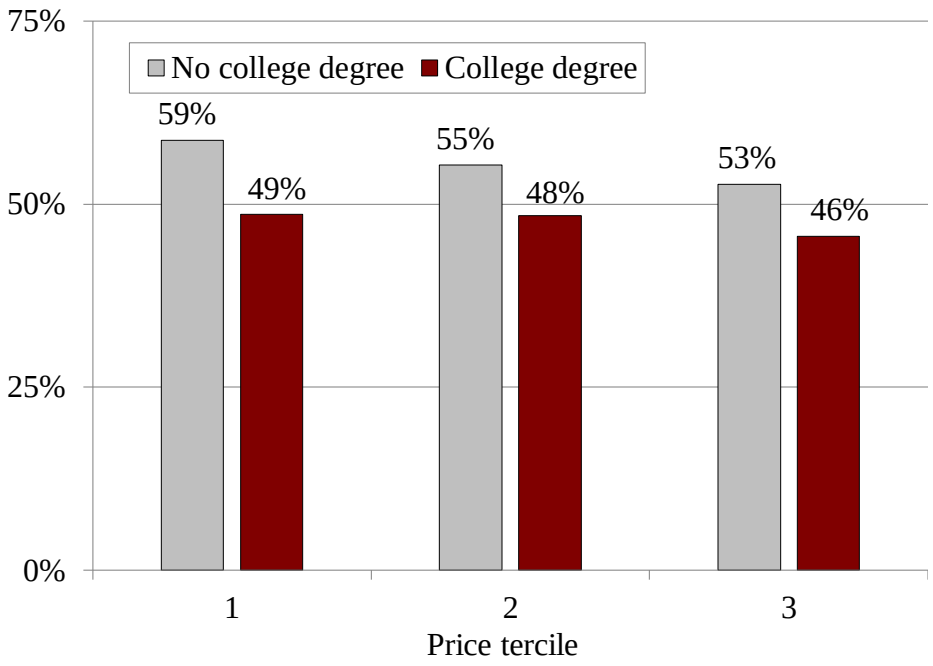
Notes: Spousal variables are coded as zero for unmarried respondents. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Sources: Authors' estimates from the *Federal Housing Finance Agency HPI* (1992-2005), *American Community Survey* (2005-2018), *Current Population Survey* (1992-2018), and the *Health and Retirement Study* (1992-2018).

Figure 1. *Average Median House Price in the MSAs of HRS Households, by Price Tercile, 1992-2018, in Real 2020 Dollars*



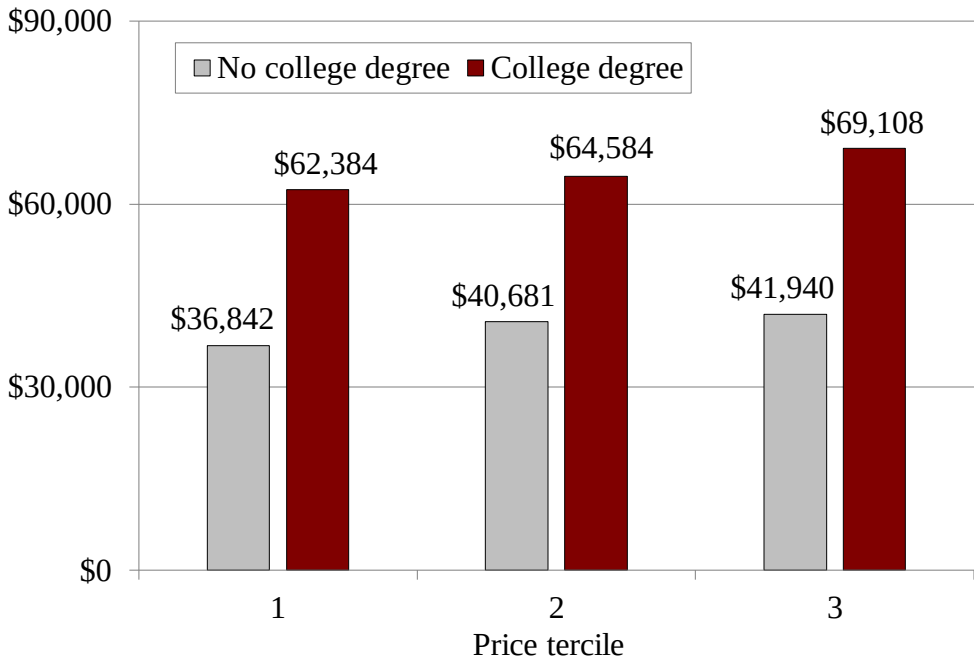
Note: the sample is split into households where the head lacks a college degree and those where the head has a college degree.
Sources: Authors' estimates from the *Federal Housing Finance Agency HPI* (1992-2005), *American Community Survey* (2005-2018), and the *Health and Retirement Study* (1992-2018).

Figure 2. *Average Social Security Replacement Rate of HRS Households, by MSA Price Tercile, 1992-2018*



Note: the sample is split into households where the head lacks a college degree and those where the head has a college degree.
Source: Authors' estimates from the *Federal Housing Finance Agency HPI* (1992-2005), *American Community Survey* (2005-2018), and the *Health and Retirement Study* (1992-2018).

Figure 3. *Average AIME of HRS Households, by MSA Price Tercile, 1992-2018, in Real 2020 Dollars*



Note: the sample is split into households where the head lacks a college degree and those where the head has a college degree.
Sources: Authors' estimates from the *Federal Housing Finance Agency HPI* (1992-2005), *American Community Survey* (2005-2018), and the *Health and Retirement Study* (1992-2018).

Appendix

Table A1. *Derivation of the Analysis Sample*

Criterion	Number of households
All households in the HRS	27,423
With linked or public earnings records	17,006
Observed at age 55	13,090
With geographic data	5,917

Source: Authors' calculations from the *Health and Retirement Study* (1992-2018).

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