

# Parental Co-Residence and Asset Accumulation

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## Abstract

This paper develops and solves a model to examine how young adults' savings decisions are affected by co-residence and student loan payments. Co-residence is typically chosen by individuals who are younger and have lower incomes, making it more challenging for them to save compared to those who do not co-reside. Additionally, young adults are more likely to co-reside when housing costs are high and their preference for independent living is low. The model predicts that without the obligation of rental payments, the extra savings during co-residence are used to pay off student loans.

## 1 Introduction

A Pew Research Center report found that in 2021, multi-generational living increased for all age groups, particularly for young adults co-residing with their parents (Fry 2022). These young adults (YAs) are generally younger, less educated, and more financially constrained than individuals living outside of the parental home. In a 2022 survey conducted by PropertyManagement.com, the two most common reasons for moving back home were the goal of saving money and the inability to afford rent, respectively (PropertyManagement.com 2022). The Pew Research Center also found that financial issues top the list of reasons for the existence of multi-generational households, followed by the familiarity of this kind of arrangement, as well as the need to receive or give familial care (Cohn et al. 2022). A smaller share of adults say that a major reason for this arrangement is a change in relationship status, for companionship, or to provide or receive help with childcare. During the recent pandemic, many moved back in with their parents and remained there, with the focus of paying down debt and saving for a home as a close second (Ceizyk 2022). As this living arrangement is becoming more popular, it is important to understand its economic impacts, particularly since these individuals are more likely to be disadvantaged.

In this paper, I study how co-residence and student debt affect savings decisions. Looking at the YAs who move in and out of the parental home in the SIPP panel data, I observe the months leading up to a

move back home and find that employment and earnings drop, both of which increase at the month of the move-in and continue to do so thereafter. Without the obligation of rental costs, the individual can use this increase in income to increase their consumption, making it difficult for the YA to save for future debt payments or in preparation for moving out. It is also possible that the extra savings are used to pay off their student loans quicker.

This paper adds to the literature by developing and solving a model that looks at the asset accumulation of a young adult, while considering parental co-residence and debt payments. Parameters such as housing and moving costs, independent living preferences, and the permanent income growth factors are adjusted to see how behavior changes with it. I find that income is a very important factor in the decision to live with parents, since YAs with lower income are more likely to co-reside, particularly if they have lower housing costs and a higher preference for independent living. Individuals with a low preference for independent living are observed to be the most successful at paying off their debt. The model predicts that the extra savings from co-residence are used to pay off student loans. In general, co-residing YAs take longer to pay off their debt and are never able to save as much as those not coresiding due to low income.

## 1.1 Related Literature

My paper is related to the research studying labor market activity and its impacts on co-residence, as co-residence provides insurance against labor market risk. Consequently, employment shocks that reduced labor market activity increased the hazard of moving back home (Kaplan 2009; Engelhardt, Eriksen, and Greenhalgh-Stanley 2019), as did less job availability (particularly for college graduates) and lower wages (Matsudaira 2016; Albanesi, Gihleb, and Zhang 2022). After the move back home is made, research studying the economic outcomes differ in their findings. Some findings indicate that YAs moved back home to weaker labor markets, where their economic outcomes did not improve (Choi 2022; Chan, O'Regan, and You 2021). However, Krolkowski, Zabek, and Coate (2020) observed that after a job displacement, earnings completely recovered for YAs living in their parents' neighborhood, whereas earnings permanently declined the further the individual lived away from home. For working mothers, there were increases in both their labor supply and working hours due to the YA's parents' ability to provide childcare (Liao and Paweenawat 2022; Compton and Pollak 2014; Arpino, Pronzato, and Tavares 2014).

My paper is also related to the literature studying how individual differences affect the decision to co-reside. Houle and Warner (2017) observed that failing to attain a college degree increased the risk of moving back home, and the association between student debt and returning home was stronger for black than white youths. Bleemer et al. (2014) found that differences in academic backgrounds also impact the decision

to return home. In states with higher graduation rates, individuals respond more strongly to changes in tuition, with rises in schooling costs similarly increasing the likelihood of living at home. On the other hand, individuals who live in states with lower graduation rates are more impacted by the job market conditions. Demographics also play a role as young black adults react more strongly to rent, and their white counterparts to employment rates (Newman, Holupka, and Ross 2018). Surges in housing costs increase the number of YAs living at home as well (Ermisch 1999; Srinivas 2019; Cooper and Luengo-Prado 2018). Immigrants receiving DACA (Deferred Action for Childhood Arrivals) are less likely to live in a multi-generational household, which could in part be explained by the lower rental costs paid relative to the non-DACA-recipients (Gihleb, Giuntella, and Lonsky 2023).

Previous research has also studied the strong influence of finances on the decision to move back home. Individuals with high amounts of debt relative to income are more likely to live with their parents than those with less debt. The duration of time spent in the parental home is also directly correlated with low credit scores and delinquency (Dettling and Hsu 2018). However, not many papers have examined whether there is an improvement in asset accumulation after the move back home. In one paper, Rosenzweig and Zhang (2014) studied urban China and found that net of income, intergenerational co-residence was associated with higher savings when the individuals were young, but not when they were old. In a counterfactual exercise, Kaplan (2012) looked at how co-residence and financial transfers distorted the savings decisions of young males who did not go to college. He found that if the option to move back home was removed, asset accumulation would increase by 16 percent while the removal of financial transfers would increase assets by 10 percent. However, Kaplan did not study the actual amount of assets accumulated by the individual, as his focus was on co-residence as a valuable insurance channel against labor market risk. In this paper, I modify his model to focus on the financial side of this decision.

The remainder of this paper is organized as follows. Section 2 describes the dataset on the young adults. Section 3 outlines the structure of the model. Section 4 presents the simulation results and comparative statics. Section 5 concludes.

## 2 Data

The data used in this paper is from the 2014, 2018, 2019, and 2020 Survey of Income and Program Participation (SIPP), which covers the years from 2013 to 2019. SIPP is a nationally representative longitudinal household survey where families are interviewed multiple times, up to a four-year period. They provide detailed monthly information about income, employment, household composition, and government program participation. Respondents are asked at each survey to provide the person number of their parent(s) if they

live in the household, allowing the construction of a monthly panel of co-residence. Detailed categories of debt and assets are also provided.

## 2.1 Sample

The individuals of interest are YAs between the ages of 22-35 since this age group has already made the decision whether or not to attend college. Young adults with less than some college experience, have professional degrees (e.g., MD, JD), or are enrolled in school with student loans and not in their final year are removed from the sample. YAs with less than some college completed are unlikely to have educational debt, while those with a professional degree are likely to have a very large amount of student debt and high income; as a result, the analysis is not very interesting. Those for whom we cannot observe asset and debt amounts, or are missing sample weights are also dropped. I exclude individuals if they live outside the United States, live in Puerto Rico or the island areas, have no living parents, or have parents living with them (i.e., they are an owner of their primary residence and co-residence is observed). This leaves a final sample of 468,337 monthly observations, or 22,146 unique YAs.

## 2.2 Descriptive Statistics

Table 1 displays some summary statistics of the individuals included in the analysis. About 27% of YAs in the sample are observed to have lived at least a month with their parents. They are typically younger, more likely to be male, and less likely to be employed. They are also less likely to have a Bachelor's degree or higher compared to those who have never lived with their parents. The average duration spent co-residing is 18 months. The YA is not constantly moving in and out of the home when we examine the monthly data; there is a 0.16% probability of moving into the parental home if the YA was living outside in the last period and a 0.18% chance of transitioning from co-residence to independent living. Aggregating the data to the yearly level by defining an individual as having co-resided that year if they lived at least one month with their parent(s), the probability of moving out is 0.11% and 0.048% for moving back in. Details about the YA's financial situation are provided in Table 2. The individuals who are observed to co-reside at some point during the survey earn less than those who never co-resided. On average, they also have less debt and assets.

Conditional on having educational loans, student debt is a major component of the YA's overall debt; thus, this paper focuses on this category of debt. More than a quarter of YAs in the sample have student debt. For YAs who co-resided, it is the largest amount, and more than five times the size of their financial assets. About 30% of YAs in the entire sample has education debt, and it increases with the highest level

Table 1: YA Summary Statistics

	Full Sample	Co-Resided	Never Co-Resided
<b>Mean Age</b>	28.48	26.19	29.37
<b>Male</b>	46.87%	50.74%	45.35%
<b>Employed</b>	79.86%	72.13%	82.87%
<b>Education</b>			
Some College	31.07%	39.16%	27.91%
Associate's	15.61%	18.43%	14.52%
Bachelor's	38.73%	35.85%	39.86%
Master's	12.49%	5.88%	15.06%
Doctorate	2.10%	0.68%	2.65%
<b>Race</b>			
White	74.34%	70.27%	75.93%
Black	13.23%	16.94%	11.78%
Asian	8.62%	8.12%	8.82%
Other	3.81%	4.67%	3.47%
<b>Married</b>	39.80%	7.63%	52.16%
<b>A Parent</b>	37.20%	16.55%	45.21%
<b>Lives in Metro</b>	83.88%	85.19%	83.37%
<b>Homeowner</b>	23.90%	-	33.22%
<b>Mean Duration</b>	-	17.66	-
<b>Households</b>	18,393	5,083	11,251
Family Size	2.67	3.57	2.32
HH Size	2.99	3.70	2.71
<b>Individuals</b>	22,146	5,969	16,177
<b>Observations</b>	468,337	126,290	342,047

*Note.* An individual observed to live with their parents for at least one month in the sample is defined as co-resided. Those who never co-resided are never observed to live with their parents. Data is weighted using sample weights.

Sources: Survey of Income and Program Participation (2014, 2018, 2019, 2020)

Table 2: YA Financial Summary Statistics

	Full Sample	Co-Resided	Never Co-Resided
<b>Monthly Earnings (&gt;0)</b>	\$4,238.00	\$2,901.42	\$4,691.47
<b>Individual Debt</b>			
Secured	\$35,779.85	\$2,579.59	\$48,796.72
Unsecured	\$13,342.28	\$10,566.12	\$14,430.74
Education (>0)	\$31,348.21	\$27,164.11	\$32,867.07
Share	33.42%	31.79%	34.05%
<b>Individual Assets</b>			
Financial Institution	\$9,192.65	\$5,511.00	\$10,636.13
All	\$114,477.80	\$39,463.49	\$143,888.80
<b>Housing Cost (&gt;0)</b>	\$1,221.38	\$882.05	\$1,249.75
Share	53.81%	14.74%	69.13%

*Note.* All values are CPI adjusted to 2019 dollar units. Data is weighted using sample weights.

Sources: Survey of Income and Program Participation (2014, 2018, 2019, 2020)

of education completed (Appendix Figures A.1b and A.1c). Panel (d) from Appendix Figure A.1 shows that individuals are making payments towards their debt, and by age 55, those with debt under the 88th percentile no longer have any student debt to pay.

### 2.3 Asset Accumulation and Co-residence

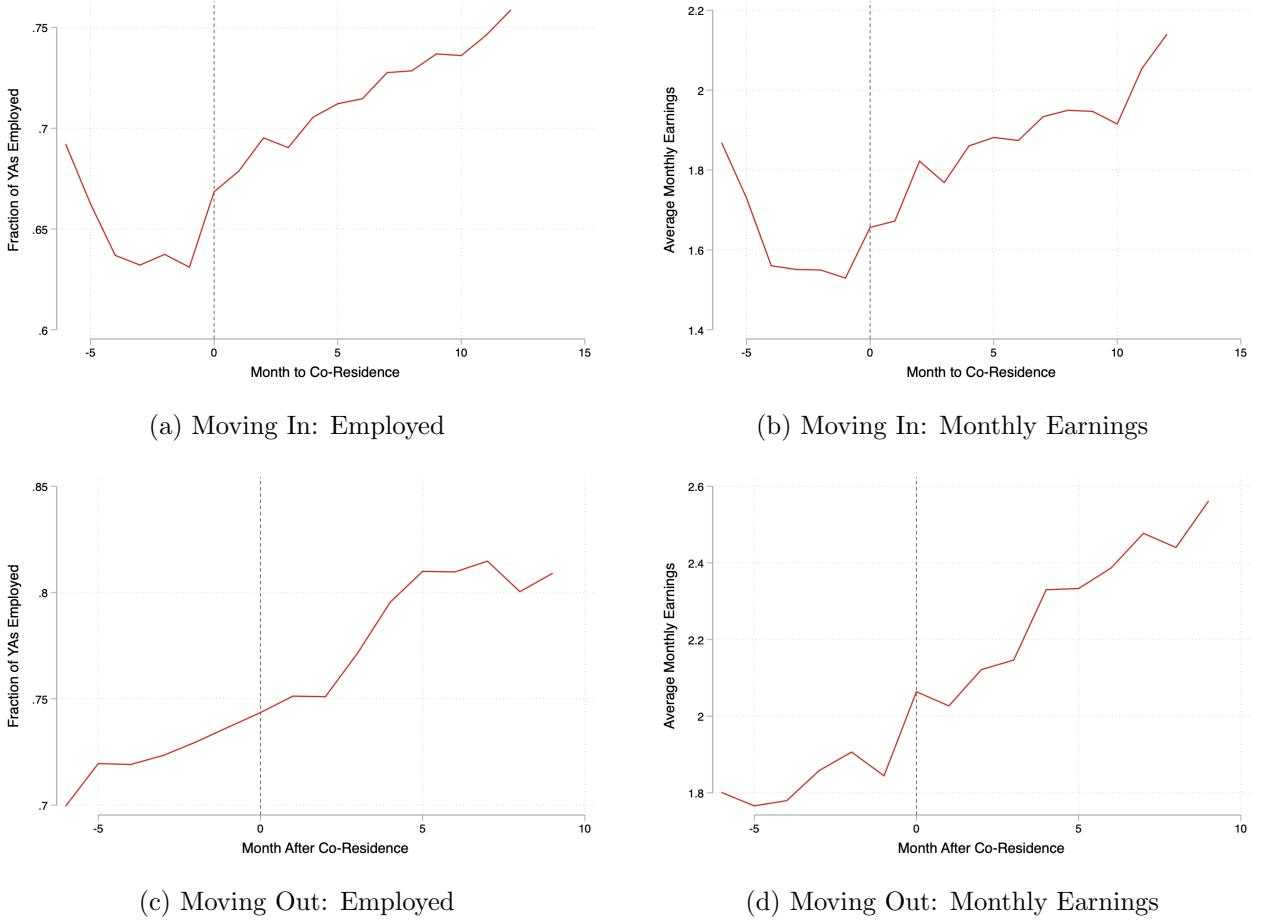
Earnings, debt, and assets all affect the YA's living arrangement. Co-residence is expected to be more likely when an individual has lower earnings and (net) assets, and a lower preference for independent living. However, it is difficult to predict how co-residence could affect one's ability to accumulate assets. It is possible that individuals are unsuccessful in accumulating assets during co-residence. Without the monthly obligation of rent payments, YAs could increase their consumption, hindering their ability to accumulate savings that would help the YA to move out in the future. If individuals have a staggering amount of debt, repayment may be prioritized over savings. However, larger payments could be made, and if debt is paid off faster, the individual may be able to save more and at a faster rate than another YA with the same amount of debt, but is not co-residing.

I filter the sample down to YAs who are observed to move from one co-residence state to another within the survey. This leaves a sample of 1,312 individuals corresponding to 34,398 monthly observations. From Figure 1, we see that the fraction employed and earnings decrease prior to moving back into the parental home, and increase afterwards. In the months leading to the YA moving out, both variables are generally on an upward trend. This supports previous findings that labor market activity has an impact on the decision to co-reside.

SIPP provides debt and asset data as yearly variables, so it is not possible to examine how savings and debt payments change monthly as individuals transition from one living arrangement to another. Instead, I compare the differences in average financial assets and student debt at each age. Figure A.2 in the appendix displays the differences between those who never co-resided and those who did. The differences in financial assets are statistically insignificant before age 31. Afterwards, there are some significant differences, where the YAs who co-resided have about \$6,000 to \$8,000 less in financial assets than those who did not. The differences in average debt are also insignificant for most ages. It becomes significant at ages 27 and 30 to 33, where the YAs who never moved back home have around \$8,000 to \$11,000 more in debt.

Appendix Figure A.3 presents the differences between those who are always observed to co-reside and those who transitioned at some point in the data. As with the analysis before, there are very little statistically significant differences between the two groups. In fact, the debt differences are never significant. YAs who always co-reside have around \$3,000 to \$7,000 more in financial assets at ages 24 to 26 and ages 28 to 30

Figure 1: Employment and Monthly Earnings



Panels (a) and (b) look at the first time a YA transitions from living independently to co-residing. Panels (c) and (d) use the first occurrence of leaving the family home. The top row looks at YAs up to 6 months prior and up to 12 months after the move back home. The bottom row examines YAs up to 6 months prior to moving out and up to 12 months afterwards. Monthly earnings are in thousands of dollars. Sources: Survey of Income and Program Participation (2014, 2018, 2019, 2020)

than those who do not.

To further look at how co-residence and student debt affect asset accumulation using an empirical approach, we would need more detailed information about the individual. While we are able to observe changes in income and co-residence status at a high frequency, we are unable to do so with assets and debts. As mentioned before, SIPP only provides yearly snapshots of education debt and assets, but monthly data on income and co-residence status. Understanding one's preference to live with or away from their parents, which is not captured in any survey data, is crucial. It is also useful to know whether the YA even has the option to move back home; however, data providing information on parental co-residence will allow us to see only who actually moves in. Observing the individual in a long panel is necessary as well, but sample sizes are usually small. Additionally, co-residence choice is likely to be endogenous to savings decisions, so

a structural approach is necessary to understand how choices differ when parameters such as debt, rental costs, and preferences change.

To save on computation time, the model described in the next section is solved at a quarterly level rather than monthly. Quarterly data on income is taken from the sum of wages received from January to March, April to June, July to September, and October to December. Co-residence status for each quarter is the living arrangement observed in the months of March, June, September, and December, which should not cause issues, as less than 1% of YAs live with their parents between 1 to 3 months. Data on student debt and assets are divided by 4 to get a quarterly estimate.

### 3 Model

Time is discrete and measured in quarters. The decision maker is a YA, who makes a decision every three months on how much to consume, how much debt to pay, and their living arrangement. In any quarter, the YA can be co-residing with their parent,  $r_t = 0$ , or not living in the parental home,  $r_t = 1$ .

#### 3.1 Preferences

The YA's utility is additive and time separable, defined over consumption, labor, and the living arrangement.

Utility  $U_t$  in month t is:

$$U_t = \frac{c_t^{1-\gamma}}{1-\gamma} - e_t v - (1 - r_t)z. \quad (1)$$

There is a fixed disutility  $v$  from working if the YA works ( $e_t = 1$ ) in quarter t. Preferences for independent living are represented by  $z$ . Total utility is given by

$$V_0 = E_0 \sum_{t=0}^T \beta^t U_t + \beta^{T+1} V_{T+1}, \quad (2)$$

where  $V_{T+1}$  is the terminal value function.

#### 3.2 Budget Constraint

The YA receives income  $y_t$  in quarter t, where income taxes in the amount  $\tau$  are paid. YAs also have savings  $a_{t-1}$  from the last period, which earns an interest of  $R = 1 + r_{free}$ .

Income can be used to purchase consumption goods, to save and earn interest, and to make a proportional payment  $f_t$  towards debt. If the young adult lives outside the family home, a monthly cost  $\chi$  of housing applies, and a fixed cost  $\kappa$  of moving is paid if  $r_t - 1 = 0$ ; there is no cost to moving back home. Thus, the

budget constraint is given by

$$c_t + f_t d_t + a_t + r_t(\chi + (1 - r_t - 1)\kappa) = (1 - \tau)y_t + Ra_{t-1}. \quad (3)$$

Here, it is assumed that the YA does not pay any housing costs while co-residing, which is reasonable since only 15% of YAs in the SIPP data paid for utilities and/or mortgage or rent while co-residing with their parents.

### 3.3 Debt Payments

The YA can enter the model with debt (i.e., student loans), but cannot borrow to accumulate more debt within the model. In every quarter  $t$ , an individual chooses to make a proportional payment  $f_t \in \{0, \bar{f}, 1\}$ , where  $\bar{f}$  is a fixed payment fraction. If  $f_t < 1$ , the remaining debt accrues interest at the rate  $r_{debt} > r_{free}$ , the interest received from savings. To encourage debt payment in the early periods, a penalty of value  $\eta$  is added if the YA has debt, but chooses not to make any payments. Thus, debt evolves by

$$d_t + 1 = (1 + r_{debt})(1 - f_t)d_t + \eta * \mathbf{1}(f_t = 0, d_t > 0). \quad (4)$$

### 3.4 Income Process

YAs are either unemployed or employed in a given quarter. The YA transitions out of unemployment with probability  $\lambda_0$ , and remains employed with probability  $\lambda_1$ . Income is received if employed, and unemployment benefits  $\underline{\theta}$  are given if they are not:

$$y_t = \Lambda_\theta \theta_t e_t p_t + (1 - e_t) \underline{\theta} \quad (5)$$

where

$$P[e_t = 1 | e_t - 1] = [\lambda_0 \quad \lambda_1], \quad (6)$$

$$p_t = \Lambda_{\psi_t} \psi_t \Gamma_t p_t - 1 \quad (7)$$

The unemployment benefit is a fraction of the YA's permanent income. Period t's permanent income,  $p_t$ , consists of a growth factor  $\Gamma_t$ , a permanent income shock  $\psi_t$ , and last period's permanent income. Transitory income shocks are represented by  $\theta_t$ . Both permanent and transitory shocks are log normally distributed with standard deviations  $\sigma_\psi$  and  $\sigma_\theta$ , respectively. Markov matrices are used to represent the income shock probabilities. The transitory shock probability matrix  $\Lambda_\theta$  represents the probability, given permanent income  $p$  and start-of-period savings  $k$ , of experiencing that shock to end with cash-on-hand  $b$ , the money available

for consumption (i.e., after tax earnings plus the start-of-period assets minus any payments made for housing and reducing debt). The permanent Markov matrix,  $\Lambda_{\psi_t}$ , gives the probability of going from one permanent income level to another, given an AR(1) income process.

### 3.5 Recursive Formulation

For each  $t \neq T$ , the YA makes their discrete choices first before choosing how much to consume. YAs discount the future with discount factor  $\beta$ . The state variables are outstanding debt  $d_t$ , permanent labor income  $p_t$ , last period's employment status  $e_{t-1}$ , last period's living arrangement  $r_{t-1}$ , and this period's savings  $a_t$ . At the start of the period, employment, permanent income, and transitory income shocks are realized. Money saved from the last period accumulates interest, and the YA knows their cash-on-hand (i.e., after-tax income and savings). The YA then makes their discrete choices— their living arrangement and the payment towards their student debt. Any remaining assets from start-of-period savings, after deducting housing costs, moving expenses, and debt payments, are allocated to consumption. This is represented by the following value function:

$$V_t^1(a_t, d_t, p_t, e_{t-1}, r_{t-1}) = \max_{r_t, f_t, c_t} U_t(c_t, e_t, r_t) + \beta E[V_{t+1}^1(a_{t+1}, d_{t+1}, p_{t+1}, e_t, r_t)]$$

subject to

$$U_t = \frac{[c_t(1 - z(1 - r_t))]^{1-\gamma}}{1 - \gamma},$$

$$c_t = a_t + (1 - \tau)y_t - f_t d_t - r_t(\chi + (1 - r_{t-1})\kappa),$$

$$P[e_t = 1 | e_{t-1}] = [\lambda_0 \quad \lambda_1],$$

$$p_t = \Lambda_{\psi_t} \psi_t \Gamma_t p_{t-1},$$

$$y_t = \Lambda_\theta \theta_t e_t p_t + (1 - e_t) \underline{\theta},$$

$$\psi_t, \theta_t \sim lognormal,$$

$$a_{t+1} = Ra_t,$$

$$d_{t+1} = (1 + r_{debt})(1 - f_t)d_t + \eta * \mathbf{1}(f_t = 0, d_t > 0)$$

### 3.6 Initial Conditions and the Terminal Period

At  $t = 0$ , the YA is in the first quarter of the year in which they turn 22 years old. The initial financial assets  $a_0$ , student debt  $d_0$ , and permanent income (conditional on working)  $p_0$  values are taken from their joint distribution in the SIPP data for YAs between the ages of 22 to 24. The initial fraction of YAs employed and co-residing are set to match the data for the same group of individuals above. All YAs are assumed to have not made a payment in period  $t - 1$ .

Since the life cycle does not end at age 35, the model is solved for an additional 20 years to age 55, or 80 periods. Thus, the terminal age occurs in the first quarter of the year the individual turns 56 years old, or  $T = 136$ . Here, a basic life cycle model is solved. The terminal value function is:

$$V_T(a_T, d_T, p_T, e_T, r_T) = \tilde{V}_{56} \left( \frac{a_T - d_T}{p_T} \right) p_T^{1-\rho}, \quad (8)$$

where  $\frac{a_T - d_T}{p_T}$  represents the net assets normalized by permanent income.

### 3.7 Parameter Values

YAs are assumed to have a discount factor of  $\beta = 0.99$  and a coefficient of constant relative risk aversion of  $\gamma = 1.9$ . The YA's preference for living alone is set to 0.2, representing a 20% decrease in utility when living at home. The interest rate on assets is set to 3% annually, corresponding to a quarterly rate of 0.75%. The interest rate on student loans is set to 1.0625% (4.25% APR) to match the 2013-2019 average Stafford Loan interest rate. To follow the ideal timeline of 10 years for paying off a federal student loan debt (Hanson 2021), I set  $\bar{f} = 0.03075$ , which corresponds to a monthly proportional payment of 1.025%. For housing costs, I merged information from the U.S. Department of Housing and Urban Development's Office of Policy Development and Research about the Fair Market Rent (40th percentile) of a one-bedroom unit based on the reference year of the survey and the YA's state of residence and metro status. The average cost is \$747, but because housing cost refers to both the direct and indirect costs of housing,  $\chi$  is set to \$850 per month, or \$2,550 every quarter the YA lives outside the parental home. Moving costs is two months of housing cost, or \$1,700.

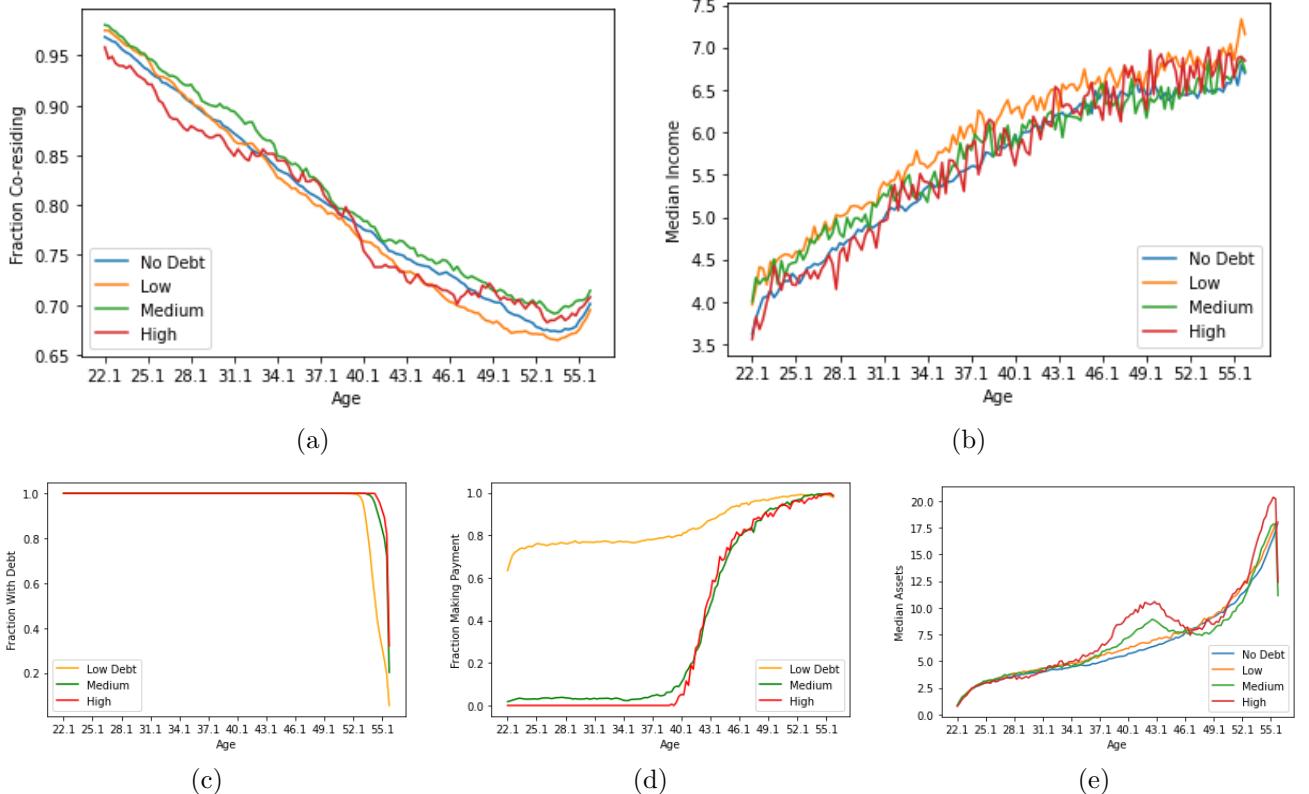
The disutility of working is assumed to be 0.15, and the income tax rate is set to 10%. To get a long run unemployment rate between 5-6%, the probability of moving from unemployment to employment ( $\lambda_0$ ) is set to 0.5, and the probability of being employed if employed in the last period ( $\lambda_1$ ) is 0.97. The permanent income growth factors are obtained from Cagetti (2003) for college graduates. If the YA is unemployed, they receive 30% of their permanent income, with the maximum value capped at \$5,600. For the standard

deviation of the income shocks, I used the estimates calculated from Gourinchas and Parker (2002) and converted them to quarterly values.

## 4 Results

The model is solved using the endogenous grid method with Econ-ARK (2018). I use 33 grid points for student debt, 72 grid points for permanent income, 96 grid points for assets, 250 grid points for bank balances, and 240 grid points for the start-of-period money. The following analyses conditions on initial quarterly debt values. A YA is in the no-debt group if they have no debt, in the low-debt group if they have \$5,000 or less in debt, in the medium-debt group if they have between \$5,000 to \$10,000, and in the high-debt group if initial debt is more than \$10,000. From Figure 2a, we can see that the overall fraction of co-residing

Figure 2: Co-residing Simulated Moments by Initial Debt



Conditioning on initial debt values, panel (a) plots the fraction of YAs co-residing. Panels (b) plots the median income in thousands of dollars. Panel (c) and (d) display the fraction of YAs with debt and YAs making payments, respectively. Panel (e) plots the median assets, also in thousands of dollars.

YAs decreases with age, but at age 56, there are still less than 40% living independently. There are 1.24% of YAs who always live apart from their parents, 56.25% who always remain at home, and 42.51% who move

in and out of the parental home. The average duration is 75.28 periods, or 18.82 years. Individuals with medium initial debt values are more likely to live with their parents compared to the other debt groups. No one completely pays off their debt until around age 50, including those with the least amount of debt. There is a larger fraction of YAs in the medium-debt group who are making a payment in the earlier periods and paying off their debt faster (although not by much) than those with high initial debt levels, in which there is only a very small fraction who are making payments from the start. Those in the high-debt group start out with less income, and as income increases, we see more people in the group making a payment towards their debt. There is an increase in assets saved around age 34 to 40 for the medium and high-debt group, which is just before we see a spike in the number of YAs making a payment towards their debt.

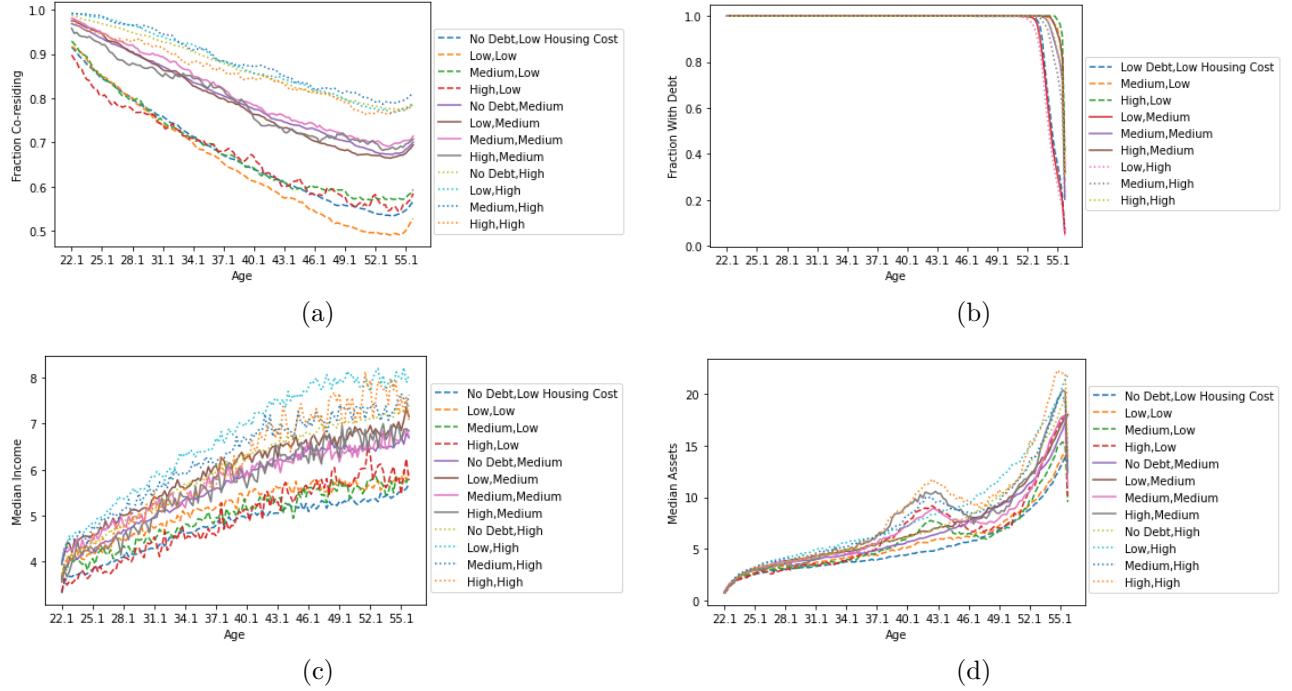
Comparing these results with the non-co-residing group (Appendix Figure A.4), we find that YAs who do not co-reside are able to completely pay off their debt much faster. However, they also have a higher median income than those co-residing, with the YAs in the highest debt group generally having the highest median income. Together, these results suggest that individuals who co-reside generally have less income, and thus less assets. If income is too low, saving is prioritized over paying debt. When there is enough saved, the YAs begins paying off their debt due to high interest rates.

#### 4.1 Housing Costs

To analyze how housing costs impact YAs' decisions, I changed the parameters on the quarterly rental and moving costs. "Low" housing and moving costs are set to \$1,800 (\$600 monthly) and \$1,200, respectively. "High" housing costs are \$1,100 monthly, or \$3,300 quarterly, so the corresponding moving cost is \$2,200. As expected, housing and moving costs have a positive relationship with the number of YAs remaining in the parental home; higher costs lead to a higher fraction of YAs co-residing at every age (Figure 3a). With low costs, 3.89% of YAs are always living away from home, 39.89% are always co-residing, and 56.22% are moving in and out of the parental home. For high housing costs, we see only 0.56% of YAs always living independently, 68.51% living with their parents, and 30.93% living both independently and with their parents. The average duration spent living at home is 65.46 and 82.45 periods for the low and high parameters, respectively.

Co-residence is highest for YAs experiencing high housing costs. It is also chosen by individuals who are facing low housing costs, and have extremely low income. Thus, they have difficulty in both saving and paying off debt. Co-residing YAs who face high rental costs, on average, save more than the co-residing YAs facing low or medium housing costs. They also tend to have higher median incomes relative to the other two groups. In general, we see that more YAs facing the highest housing costs make payments toward their

Figure 3: Changing Housing and Moving Costs on Co-residing YAs



Low housing and moving costs: \$1,800, \$1,200; medium: \$2,550, \$1,700; high: \$3,300, \$2,200. Panel (a) plots the fraction of YAs co-residing by their initial debt group and their housing cost. Panel (b) shows the fraction of YAs with debt for each debt group. Panels (c) and (d) plot the median income and assets in thousands of dollars, respectively.

debt at an earlier age than those with low or medium housing costs (Appendix Figure A.5a). Furthermore, they are able to pay off their debt quicker.

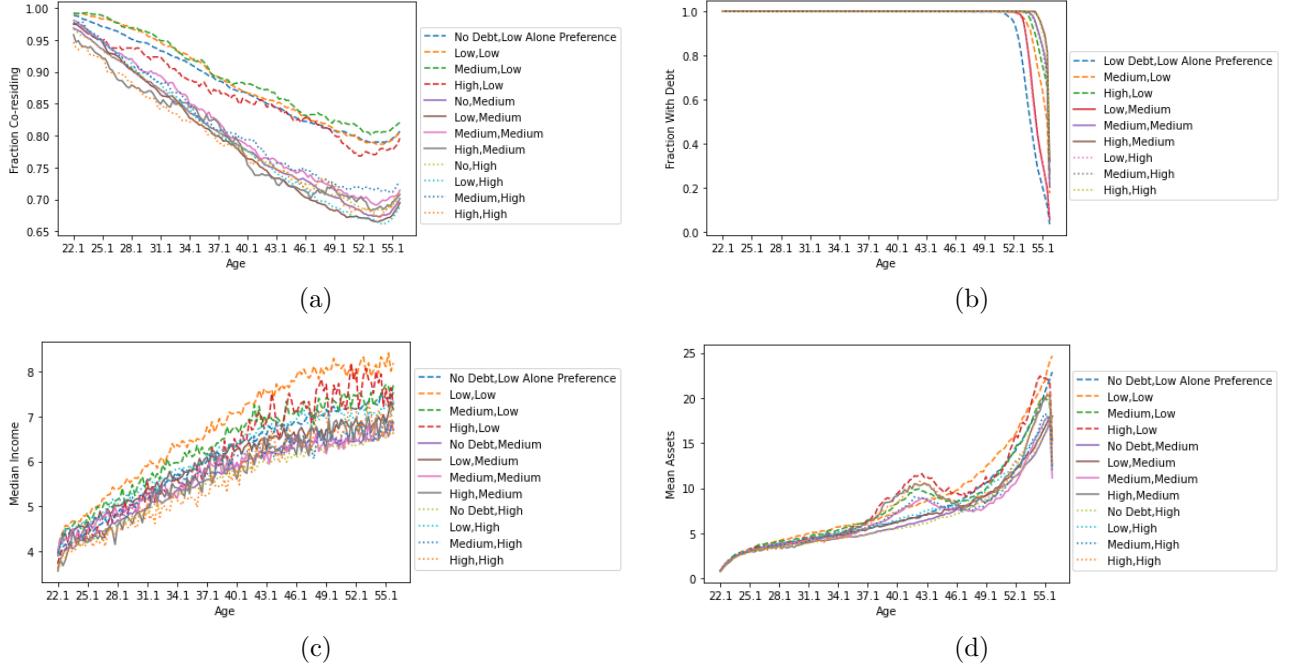
For YAs not co-residing, we see a similar pattern. YAs facing high housing costs have a higher median income, pay their debt much faster, and save more (Appendix Figure A.6). Here, we see a noticeable difference in assets saved between the high-housing-cost group and the medium and low cost groups because the YA facing a high housing cost will need to save more in order to afford next period's housing as well as to continue reducing their debt. This analysis suggests that when housing costs are high, YAs choose to live independently when they have enough income to both reduce their student debt and afford the high rental costs, so savings must be high. For those experiencing low housing costs, co-residence is chosen if income is very low.

## 4.2 The Preference for Living Alone

Another interesting parameter I would like to study is the preference for living alone. “Low” preference for independent living is set to 0.15 while “high” preference is set to 0.3. If a YA has a low preference, they

are more likely observed to be co-residing (Figure 4a). The average duration for a YA with a low preference parameter is 82.38 periods, and 75.75 periods for a high parameter value. Among those with a low preference for independent living, 0.51% of YAs are observed to always be living away from the family home, 70.53% always co-residing, and 28.96% moving between the two arrangements at least once. For YAs with a high preference, 1.19% are always living independently, 56.32% are always co-residing, and 42.29% are moving.

Figure 4: Changing the Independent Living Preference Parameter



Low preference for independent living: 0.15; medium: 0.2; high: 0.3. Panel (a) plots the fraction of YAs co-residing and panel (b) plots the fraction of co-residing YAs with debt at each age. Panels (c) and (d) presents the median income and assets in thousands of dollars, respectively.

The behavior of YAs with a medium or a high preference for living alone are very similar. The median income for these groups are generally lower than that of a YA with a low preference parameter. A larger fraction of those with a high preference are paying off their debt compared to those with a medium preference (Appendix Figure A.5b). For every debt group, YAs with a low preference parameter are able to pay off their debt quicker than the other two groups, as there are a higher number of individuals paying their debt.

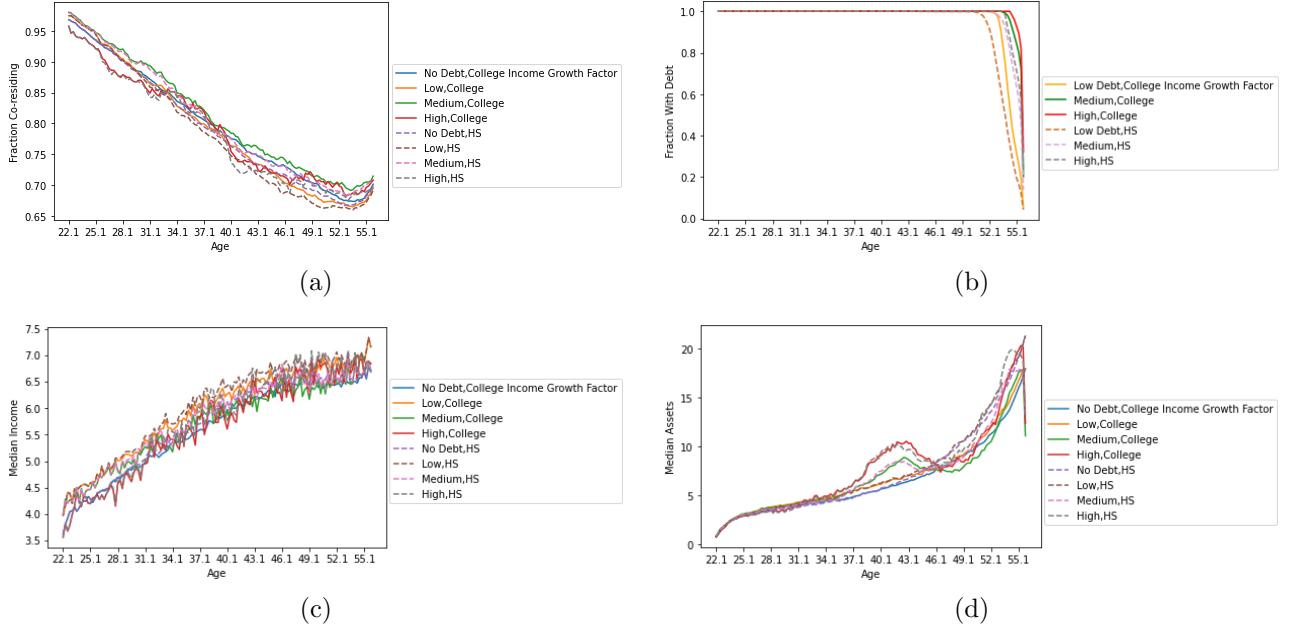
Those who have a low preference parameter do not co-reside only if they have a very high income (Appendix Figure A.7). Furthermore, there are about 10% of YAs in the low and high initial debt groups with a low preference parameter who are able to pay all their debt by age 33. With their high income, they are able to save more even with the housing and debt payments being made. Together, these findings tell us that YAs with a high preference for independent living will only co-reside if income is low, and a YA with a

low preference will only live independently if their income is very high. Regardless of the living arrangement, individuals with a low preference for independent living are able to pay off their debt the quickest and save more than those with a medium or high preference.

### 4.3 Income Growth Factors: High School Graduates

In this section, I redo the previous analysis using Cagetti's (2003) income growth factor estimates for high school graduates. The results are similar to the analysis using college graduate income growth factors. The simulation finds that 1.25% always live independently, 55.33% always co-reside, and 43.42% switch between the two, with an average duration of 74.11 quarters. If they co-reside, their income is slightly higher than co-residing YAs with college income growth factors. However, the YAs with high school income growth factors are paying off their debt quicker than those with college income growth factors. YAs with a college income growth factor save more in the earlier part of the model, but towards the end, save less than those with a high school income growth factor (Figure 5d).

Figure 5: HS v. College Income Growth Factors



Panel (a) plots the fraction of YAs co-residing for each growth factor. Panels (b) plots the fraction of co-residing YAs with debt. Panels (c) and (d) presents the median income and assets, respectively, in thousands of dollars.

When housing costs are low (high), 3.94% (0.56%) are observed to always live outside the parental home, 39.18% (67.64%) are always co-residing, and 56.88% (31.8%) are switching their living arrangement. The average co-residing duration is 64.12 quarters for a YA experiencing a low housing cost and 81.31 quarters if the housing costs are high. Individuals facing higher housing costs are more likely to live at home than

those facing low or medium costs (Appendix Figure A.8). They are also able to pay off their debt quicker, as they usually have a higher median income relative to the other two groups. Those facing low housing costs have the lowest median income at all ages, and tend to save the least. At the older ages, there is a much larger median income gap between the co-residing YAs who face low housing costs and the co-residing YAs with medium or high housing costs when we use high school income growth rates as opposed to the gap for YAs when we use college graduate income growth rates.

For YAs with a low (high) preference for independent living, 0.52% (1.21%) never live in the parental home, 69.64% (55.52%) never live independently, and 29.84% (43.27%) both co-resided and lived away from the parental home. The average duration spent at home for a YA with a low preference is 81.57 quarters and 74.45 quarters for those with a high preference. YAs with the lowest preference parameter are more likely to be co-residing relative to a YA with a medium or high preference parameter (Appendix Figure A.9). They choose to live independently only when their income is very high, while the other two groups choose to co-reside only when their income is low. Individuals with a low preference parameter are able to pay off their debt quicker, tend to have a higher median income, and save more relative to the other two groups when co-residing.

## 5 Conclusion

This paper examines how co-residence and student loan debt affect savings outcomes. A model is built, solved, and simulated using initial conditions taken from the 2014 and 2018-2020 SIPP panel data. The model focuses on the YA making the decision of their co-residence status and how much debt they would like to pay off. I find that income is a very important factor in the YA's decision to co-reside. Lower-income individuals are more likely to co-reside than those with higher income. With less income and consequently less savings, it takes much longer to pay off their debt. As income increases, so do savings and payments made towards reducing debt. When housing costs are low, the YAs who choose co-residence are those who make very little income and are unable to make payments towards their debt or to save. If an individual were to have a high preference for independent living, income would need to be very low for them to choose to co-reside. Individuals with a low preference are observed to be the most successful at paying off their debt. The model predicts that the extra savings from the lack of rental payments during co-residence are used to pay off student loans. Additionally, co-residing YAs are never able to save as much as non-co-residing YAs because their incomes are too low.

Future work on this topic includes further improvement of the model. YAs are not completely paying off their debt until much later in the model, even with the addition of a penalty when there is no payment.

There is also a large fraction of YAs still choosing to co-reside at the older ages.

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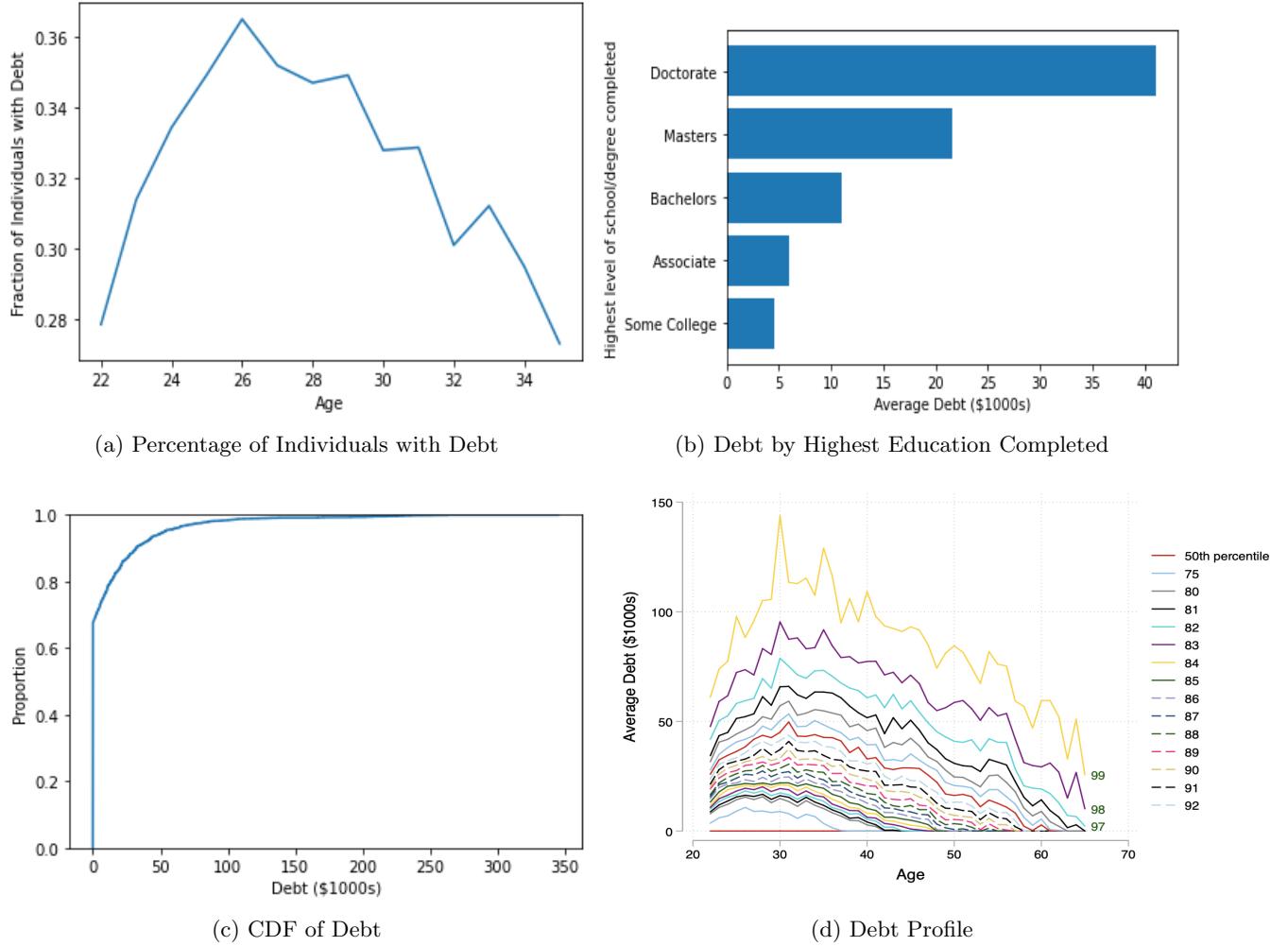
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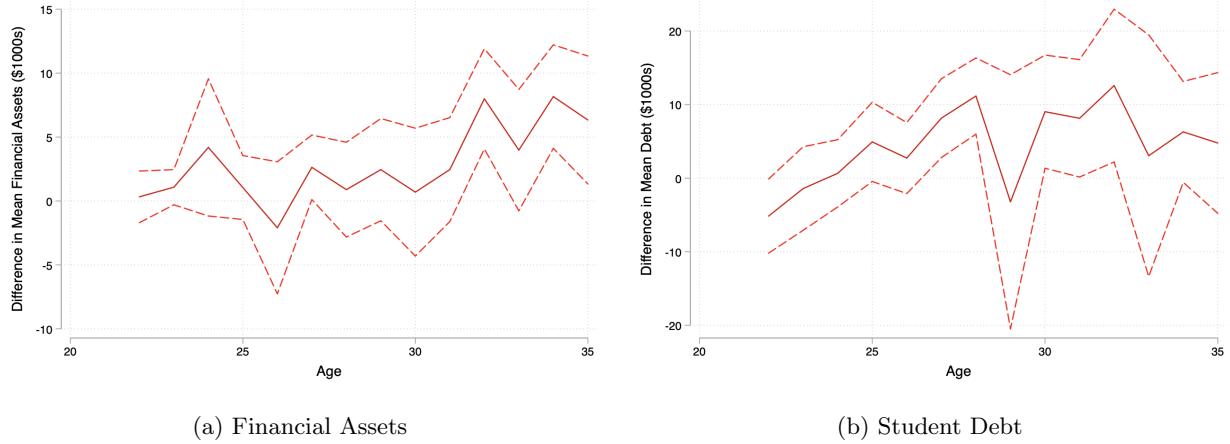
## Appendix

Figure A.1: Education Debt at a Glance



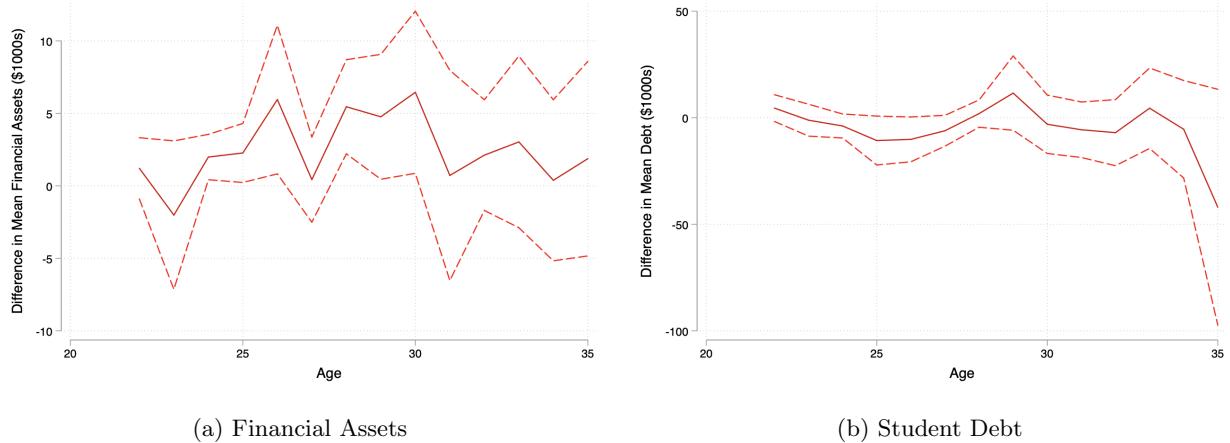
Panel (a) plots the fraction of YAs with debt at each age. Panel (b) plots the average student debt, in thousands of dollars, for each education level. Panel (c) plots the cumulative distribution function of student loans for everyone in the final sample, while panel (d) plots the debt profile of survey respondents between ages 22 to 65 that are similar to the YAs in the final sample. Sources: Survey of Income and Program Participation (2014, 2018, 2019, 2020)

Figure A.2: Differences in Means between Never and Always Co-resided



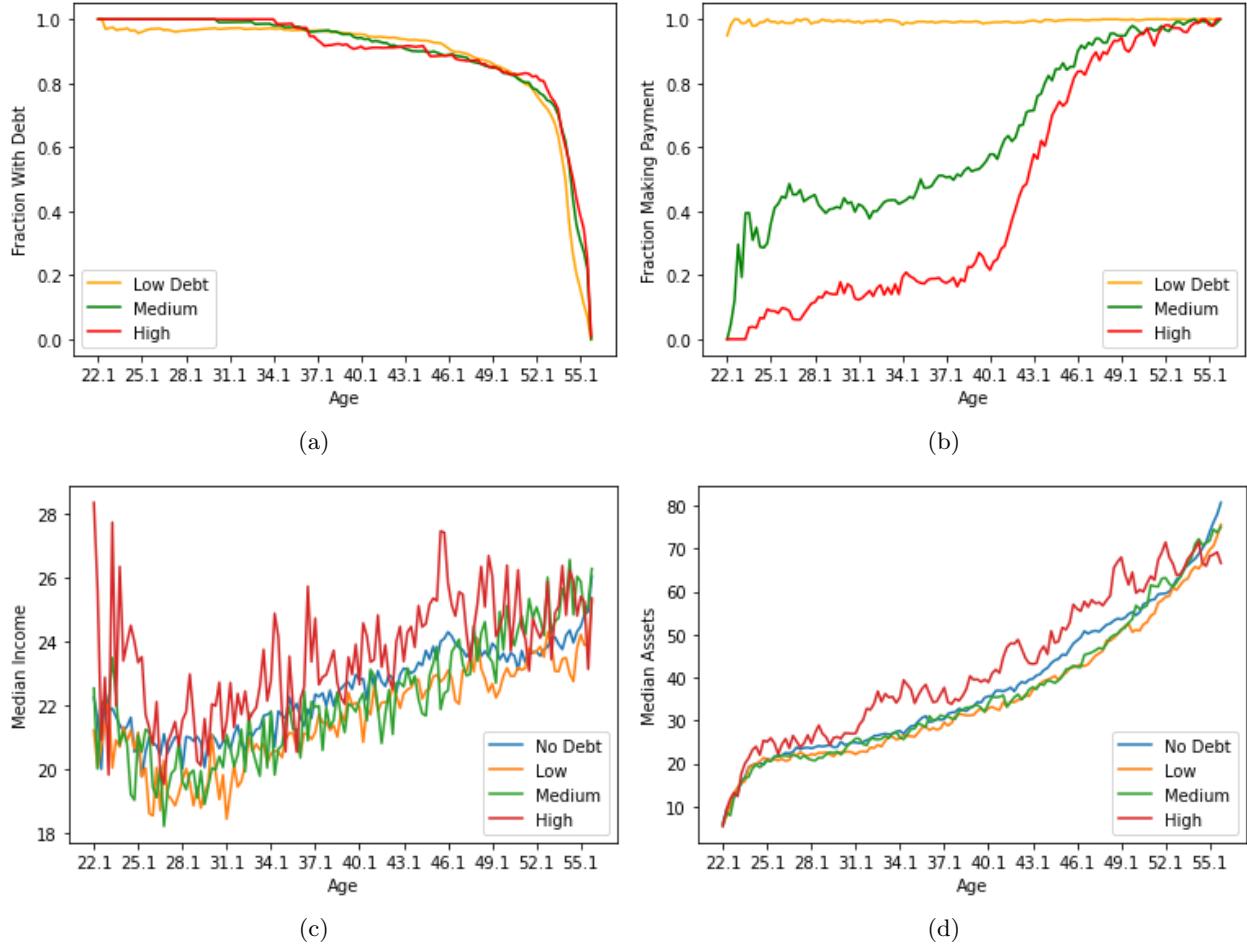
Plots of the differences in mean between YAs who never co-resided and YAs who always co-resided. The difference is obtained by subtracting the mean of the never co-resided group by the always co-resided group. A negative value implies that those who co-resided have a higher average. Panel (a) presents the differences in means for financial assets by age. Panel (b) conditions on the YAs who reported having student debt. Sources: Survey of Income and Program Participation (2014, 2018, 2019, 2020)

Figure A.3: Differences in Means between Always Co-resided and Observed Movers



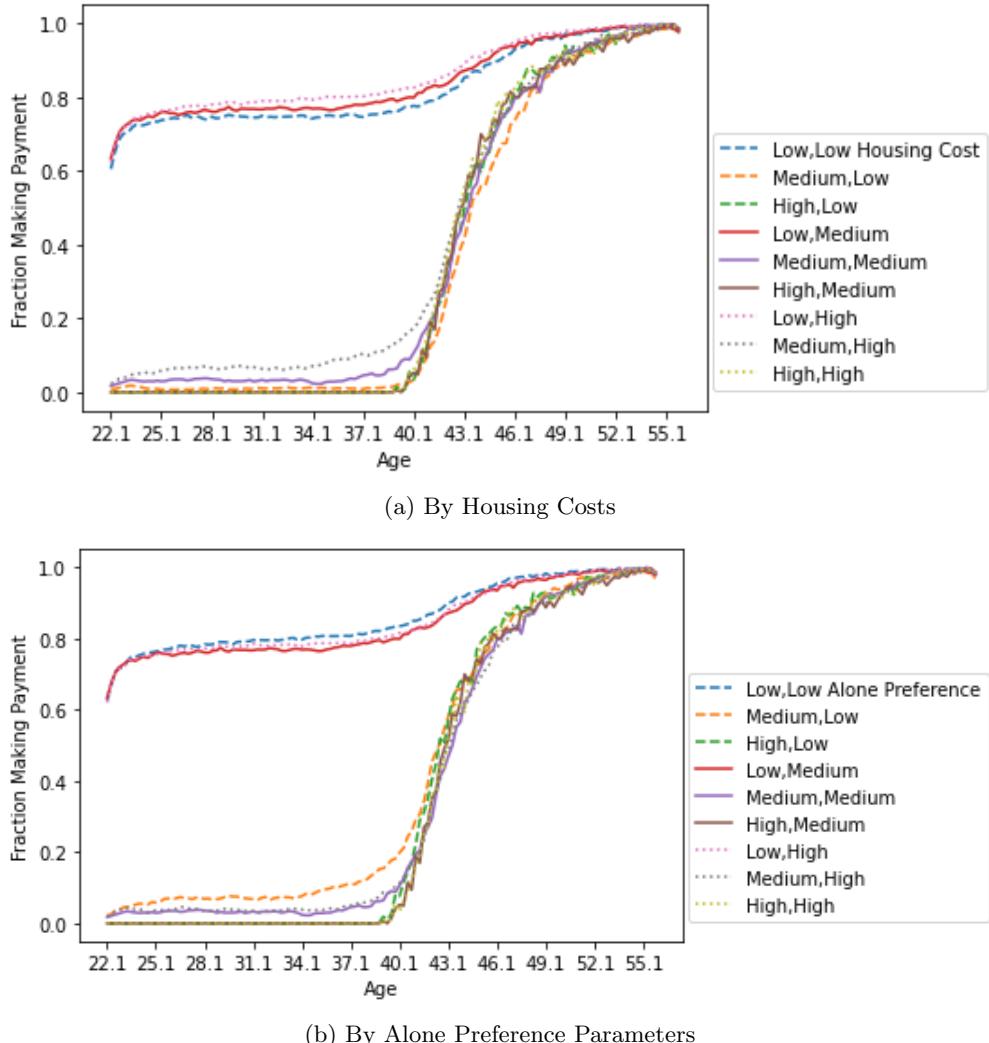
Plots of the differences in mean between YAs who always co-resided and YAs who transition from living arrangement to another. The difference is obtained by subtracting the mean of the always co-resided group by the movers group. A negative value implies that those who transitioned at some point in the survey have a higher average. Panel (a) presents the differences in means for financial assets by age. Panel (b) conditions on the YAs who reported having student debt. Sources: Survey of Income and Program Participation (2014, 2018, 2019, 2020)

Figure A.4: Moments for Non-Co-residing YAs



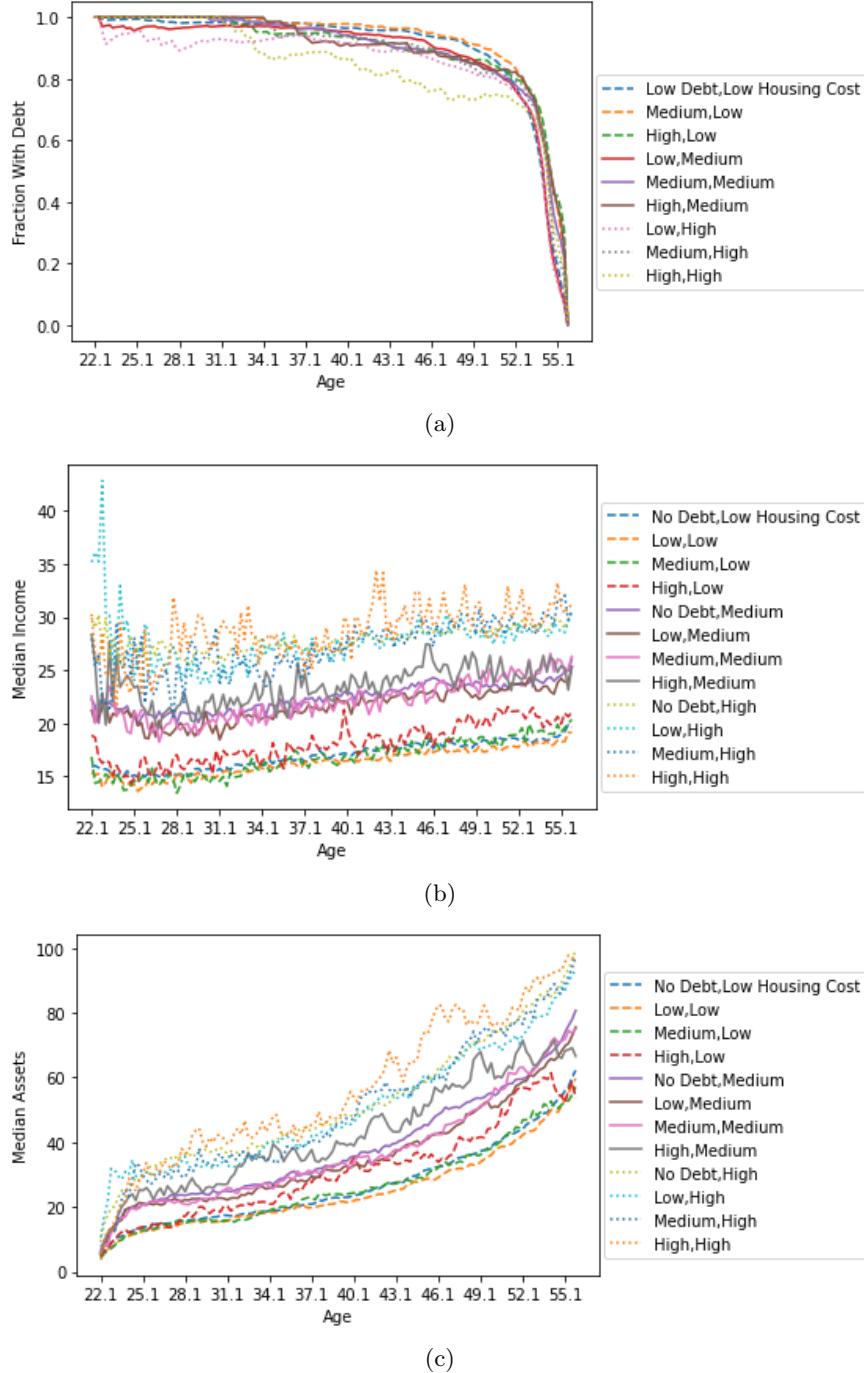
Conditioning of initial debt values, panel (a) plots the fraction of YAs with debt. Panel (b) includes only the non-co-residing YAs with debt. Mean income and assets in panel (c) and (d) are in thousands of dollars.

Figure A.5: Co-residing YAs Paying Debt



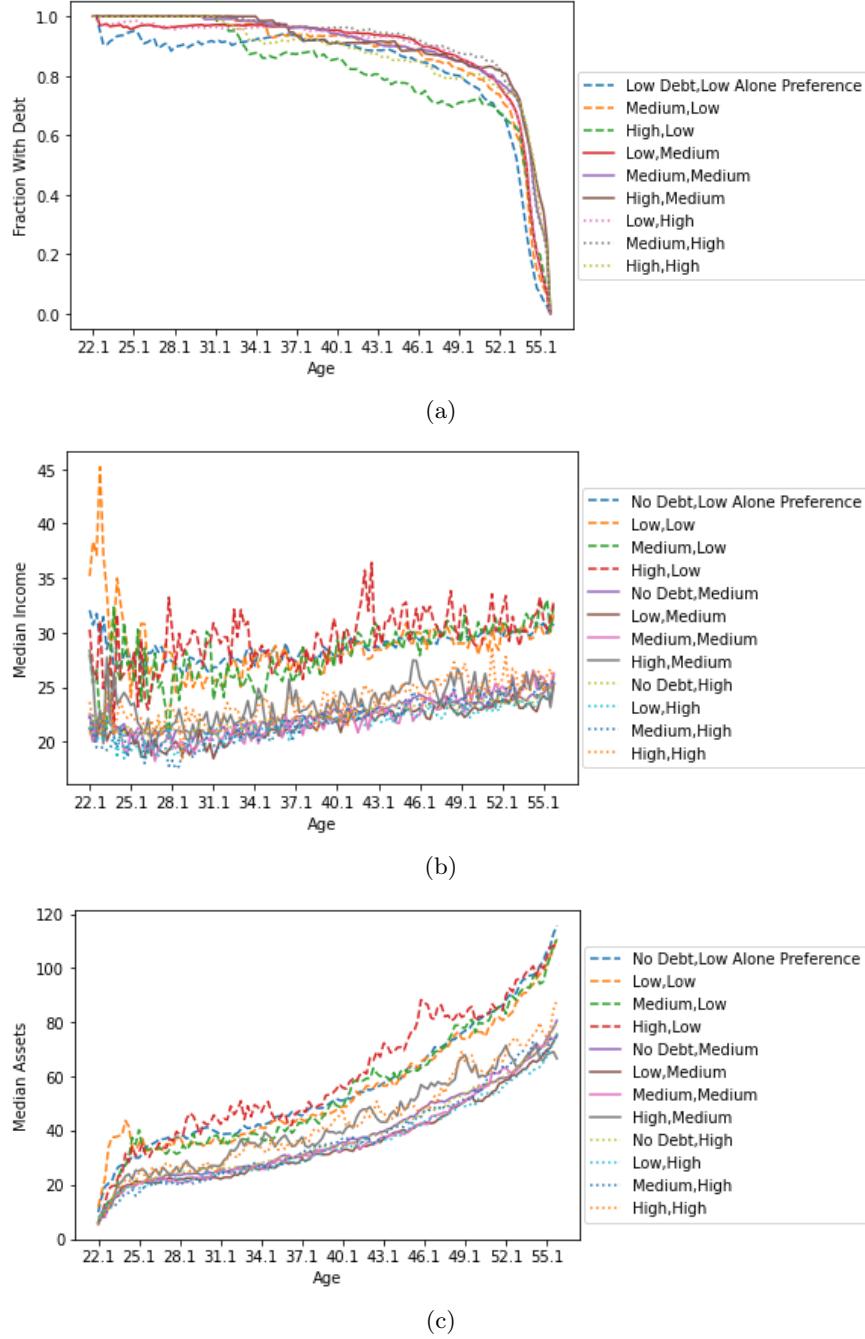
Plots of the fraction of young adults making a payment to reduce their debt by housing and moving costs in panel (a) and by the preference for living alone in panel (b). They are grouped by initial debt levels and housing cost.

Figure A.6: Changing Housing and Moving Costs – Non-Co-residing YAs



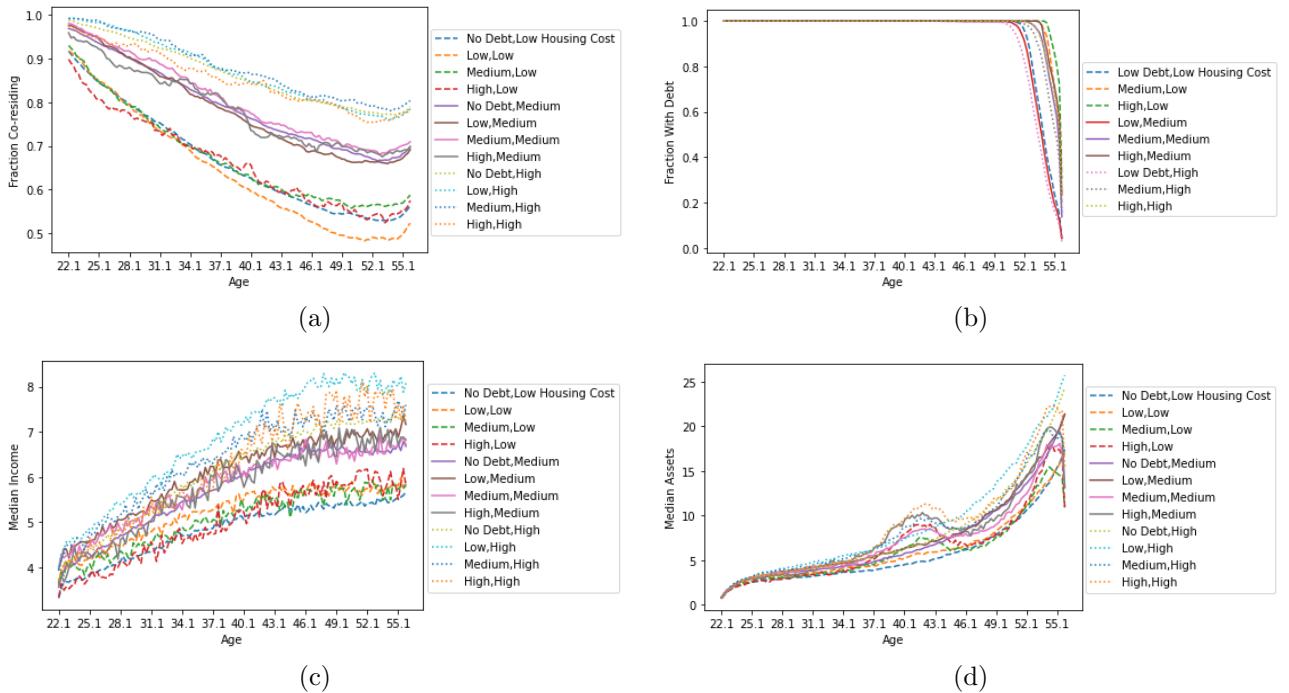
Low housing and moving costs: \$1,800, \$1,200; medium: \$2,550, \$1,700; high: \$3,300, \$2,200. Panel (a) plots the fraction of YAs not co-residing. Panel (b) and (c) plot the median income and assets, respectively, which are in thousands of dollars.

Figure A.7: Changing the Independent Living Preference Parameter – Non-Co-residing YAs



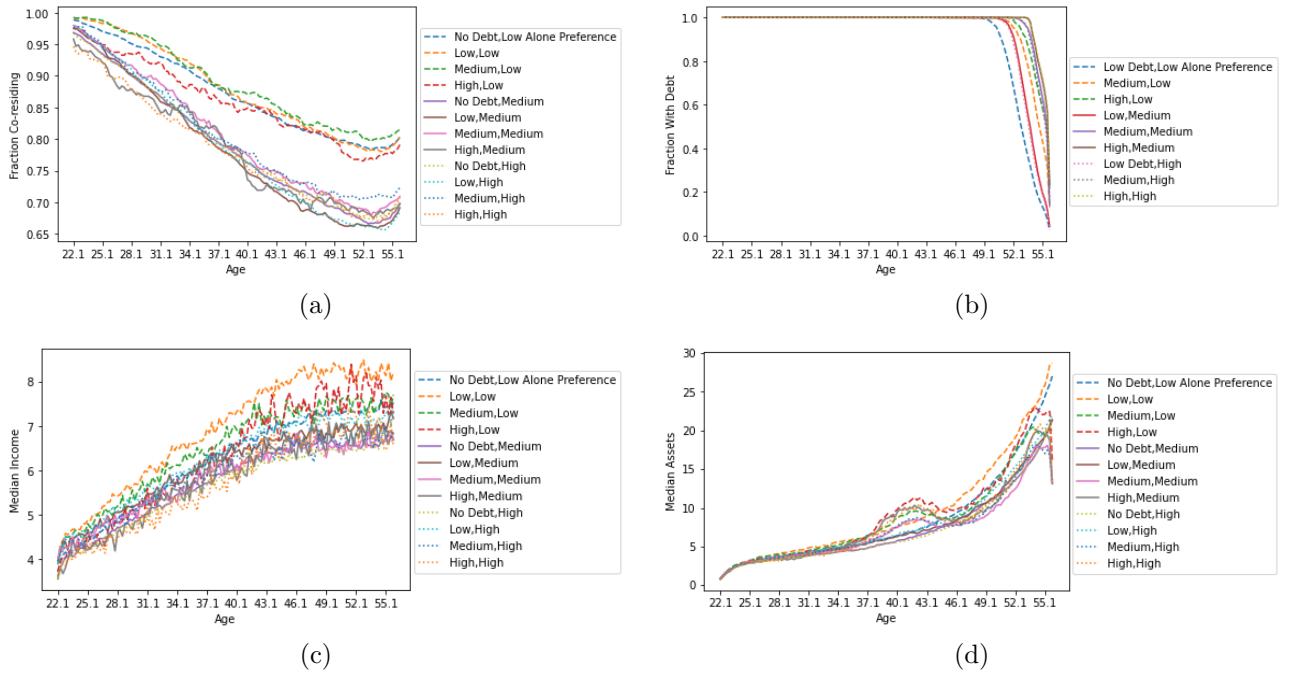
Low preference for independent living: 0.15; medium: 0.2; high: 0.3. Panel (a) plots the fraction of YAs with debt. Panels (b) and (c) plot the median income and assets in thousands of dollars, respectively.

Figure A.8: Changing Housing Costs – HS Income Growth Factors



Low housing and moving costs: \$1,800, \$1,200; medium: \$2,550, \$1,700; high: \$3,300, \$2,200. Panel (a) plots the fraction of YAs co-residing. Panel (b) includes only the co-residing YAs with debt. Median income and assets in the bottom row are in thousands of dollars.

Figure A.9: Changing the Preference Parameter – HS Income Growth Factors



Low housing and moving costs: \$1,800, \$1,200; medium: \$2,550, \$1,700; high: \$3,300, \$2,200. Panel (a) plots the fraction of YAs co-residing. Panel (b) plots the fraction of co-residing YAs with debt. The bottom row shows the median income and assets in thousands of dollars.