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Essays on Economic Conditions and the Living Arrangements of Young Adults

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ESSAYS ON ECONOMIC CONDITIONS AND THE LIVING ARRANGEMENTS OF YOUNG ADULTS

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Abstract

This dissertation contains two essays on the relations between economic conditions and the living arrangements of young adults (22-34 year olds) in the 2000s. In the first chapter, I use data from the American Community Survey and the Current Population Survey for the period 2000-2018 to document recent trends in youth living arrangements and to estimate the impact of state-level economic conditions on individual-level residential outcomes. I find a steep increase in parental coresidence among young adults since 2000. The rise in coresidence is accompanied by declining outflows from the parental home as well as rising inflows into the parental home. Regression results show significant, positive effects of rents on the probability of living with parents relative to all other living arrangements; and significant, negative effects of rising rents on the probability of leaving the parental home. Rents are found to have a larger impact on the living arrangements of non-whites and non-college young adults compared to their respective counterparts. For such youths, rising rents also show a robust, positive association with the probability of returning to the parental home. Overall, rents explain between 9% and 14% of the rise in parental coresidence among young adults over the period 2000-2018. Although the 2000s are also characterized by declining labor market conditions of prime-age workers, changes in prime-age wages are found to explain no more than 5% of the increase in parental coresidence whereas prime-age employment rates show no robust associations with living arrangements.

In the second chapter, I take the analysis to the MSA-level and use data on 229 MSAs based on the 2000 Census and the American Community Survey to estimate novel, growth models of coresidence. I find significant, contemporaneous effects of growth in earnings and rents, respectively, on growth in parental coresidence among both non-college and college-educated young adults with larger effects on the less-educated. In the long run, however, only the effects of rents are significant such that MSAs which experience higher growth in housing costs during the housing boom of 2000-

2006 also experience higher growth in parental coresidence among all young adults over the entire 2000*s*. In contrast, changes in the employment rates of prime-age workers show no strong associations with living arrangements either contemporaneously or in the long-run. Overall, both chapters of my dissertation imply that rising rents are the main cause of rising coresidence in the 2000*s* to the extent the latter is an economic phenomenon.

Dedication

To my parents, A.T.K.M. Kamal and Habiba Kamal.

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Table of Contents

List of Tables

List of Figures

Chapter 1

New Perspectives on Economic Conditions and Parental Coresidence Among Young Adults, 2000-2018

1.1 Introduction

Parental coresidence among young adults is on the rise. Panel (a) of Figure 1.1 shows a small decline in coresidence rates between 1990 and 2000, and rising rates in the 2000s. Between 2000 and 2018, the fraction of young Americans, 22-34 years old, in coresident living arrangements increased by nearly 11 percentage points. Panel (b) of Figure 1.1 shows there are 6 million more coresident young adults in 2018 than in 1990.

As it turns out, the rise in parental coresidence coincides with rising housing costs and declining labor market conditions. Panel (a) of Figure 1.2 shows that real median gross rents increased by nearly 15% whereas the real median wages of young adults increased by just 5% over the period 2000-2018. Likewise, panel (b) shows that the employment to population ratio of young adults declined by about 10 percentage points between 2000 and 2010.

In this paper, I merge individual-level data on living arrangements from the American Community Survey and the Current Population Survey with panel data on state-level economic conditions to comprehensively study the extent to which the rise in parental coresidence among young adults in the 2000*s* is driven by unfavorable housing and labor market conditions. Understanding the causes of the rise in parental coresidence is important because it has implications for wealth-building (Choi, Zhu, and Goodman 2019), residential investment (Rappaport 2015) and migration (Chan, O'Regan, and You 2019), among other factors which affect the economy.

To summarize my main results, I find that rents affect parental coresidence broadly such that higher levels of rents predict higher rates of living with parents whereas rising rents predict lower transitions out of the parental home and, in some cases, higher transitions into the parental home. The living arrangements of non-whites and the less-educated are found to be more responsive to rents compared to their respective counterparts. Simulations show that rents alone can account for 9% to 14% of the rise in parental coresidence between 2000 and 2018. In contrast, I do not find consistent results on the effects of house prices, employment rates and wages on living arrangements.

The rest of the paper is organized as follows. Section 1.2 provides a brief review of the recent empirical studies on economic conditions and parental coresidence. Section 1.3 discusses the conceptual framework, the data used and my empirical models. Section 1.4 presents descriptive results on trends in living arrangements by youth characteristics as well as regional characteristics. Section 1.4 presents regression results. Section 1.6 concludes.

1.2 Related Studies and Contributions

Of particular relevance to this study are five recent papers. Matsudaira (2016) uses individual-level Census and American Community Survey (ACS) data on 15 million young adults, 19-34 years old, from 1960 to 2011 to estimate a two-way fixed effects model of coresidence and state-level housing and labor market conditions. The study finds significant effects of employment rates (of older men), predicted wages, and gross rents on the likelihood of living with parents that all lie in the expected directions. The results by gender show similar effects of economic conditions on males and females. However, the results by race show blacks and hispanics are more sensitive to economic conditions compared to whites, and the results by education show no consistent associations between education levels and sensitivity to economic conditions. Overall, Matsudaira's estimates imply that

changes in economic conditions alone can account for 70-80% of the actual changes in the coresidence rates of men, 25-34 years old; and 59-65% of the actual changes in the coresidence rates of women, 25-34 years old, between 1970 and 2011.

Rogers and Winkler (2014) also rely on ACS data and two-way fixed effects to estimate the impact of MSA-level rents, house prices, foreclosure rates and unemployment rates on the independent living arrangements of young adults, 22-34 years old, for the period 2006-2010. The authors use both level and growth measures of economic conditions as explanatory variables. The study only finds small, negative effects of rent levels and rent growth on living arrangements with a $100 increase in rents and a 1 point increase in rent growth lowering the probability of living independently by 0.01 and 0.001 percentage points, respectively. The results by race show that non-whites are more responsive to changes in rents compared to their white counterparts.

Lee and Painter (2013) use Panel Study of Income Dynamics (PSID) data on young adults, 18-35 years old, to study the impact of six recessions on housing outcomes relative to coresidence for the period 1979-2009, controlling for state-level housing and labor market conditions. The authors rely on median house prices and gross rents to characterize housing market conditions, and unemployment rates and average wages to characterize labor market conditions. Multinomial logit estimates show significant negative effects of recession dummies and unemployment rates, and positive effects of wages, on all housing outcomes. Higher rents are associated with a lower likelihood of transitioning from the parental home to living independently in rented housing but no effects on transitioning to owned housing. The results on house prices are the exact opposite. Separate estimates by race show larger effects of unemployment rates on ownership relative to coresidence for whites than for blacks, and no effects of either housing market variables on blacks.

Newman, Holupka, and Ross (2018) study the effects of housing and labor market conditions on household formation by race during the period 2001-2013. The authors merge PSID data on individuals, 21-24 years old, with MSA-level data on gross rents, average youth employment rates and annual earnings to estimate a two-way fixed effects model of coresidence. The standard results only show significant, negative effects of MSA-level employment rates on white young adults. However, estimates based on race-MSA-year measures of economic conditions show significant effects of rents only on black young adults such that a 10% increase in monthly rents raises the likelihood of coresidence among black young adults by 5%; and significant effects of employment rates only on white young adults such that a 1% increase in average youth employment rates lowers their likelihood

of coresidence by 1%.

Finally, Bleemer et al. (2017) is the only study to estimate both stock and flow models of coresidence using Consumer Credit Panel (CCP) data on young adults, 23 and 25 years old, for the period 2003-2015. Unlike the aforementioned studies, all outcomes are aggregated to the state or county level. For stock models of coresidence, the authors use state-level data to estimate a two-way fixed effects model that relates coresidence rates to house prices, and overall employment rates and wages. The authors find significant, negative effects of wages and house prices on coresidence: a $100 increase in wages lowers the share of young adults living with parents by 2.1 percentage points, and a standard deviation increase in house prices lowers coresidence by 0.53 percentage points. For flow models of coresidence, the authors use county-level data to regress the share of youths transitioning into (out of) the parental home over a two-year window on changes in rents, employment rates and house prices over the same window, using year fixed effects to test for robustness. The results show robust, negative effects of wages on **both** inflows and outflows. Because the CCP lacks information on the demographic characteristics of individuals, the authors are not able to provide separate estimates by gender, race or education.

I build on the aforementioned studies in several ways. First, I study all three coresidence outcomes using data at the individual-level: the probability of coresidence, transitions into the parental home and transitions out of the parental home. Second, I examine how economic conditions affect the housing choices of young adults when they leave the parental home, akin to Lee and Painter (2013), using newer data and larger samples. Third, this is the first paper to exploit the longitudinal features of CPS Basic Monthly data to provide descriptive and regression results on the outflows of young adults from the parental home. Finally, I provide separate results by gender, race and education of young adults whereas existing papers mainly provide results by race.

1.3 Empirics

1.3.1 Conceptual framework

For a theory of the relationship between coresidence and economic conditions, I rely on Kaplan (2012) where young adults and their parents engage in a dynamic game over the choice of living arrangements and the child's labor supply decisions. Initially, young adults live in the parental household. Each stage of the game begins with young adults experiencing shocks to employment

(for example, a job loss) and to the value of independence (for example, divorce). After experiencing these shocks, young adults choose between coresidence and living apart. Thereafter, the altruistic parent allocates his/her fixed income among private consumption, household goods and transfers. At the end of each stage, young adults make labor supply, consumption and savings decisions.

Young adults who live with their parents incur a fixed utility cost in terms of forgone independence but save on rents and enjoy higher housing consumption relative to living apart. Thus, the benefits of coresidence appear through consumption and decline along with the marginal utility of consumption. The model predicts a greater likelihood of living away from the parental home when the earnings and assets of young adults increase, and when there are positive shocks to the value of independence. Although not developed in detail, the model implies a greater likelihood of coresidence when housing costs rise: as young adults are responsible for rents only when living apart, an increase in housing costs necessarily implies an increase in the cost of living independently, all else constant.[1]

1.3.2 Data and Empirical Models

1.3.2.1 Stock Coresidence Model

My basic model of coresidence is

$$\begin{aligned} Y_{ist} = {} & \beta_0 + \beta_1 Rent_{st} + \beta_2 HousePrice_{st} \\ & + \beta_3 Empop_{st} + \beta_4 Wage_{st} \\ & + \Gamma X_{ist} + \alpha_s + \theta_t + \epsilon_{ist}. \end{aligned} \tag{1.1}$$

Equation (1.1) describes the relationship between the probability of coresidence and state-level economic conditions. The dependent variable, Y_{ist}, is 1 if young adult i in state s lives with his/her parents in year t, and 0 otherwise. The explanatory variables are real median gross rents denoted by $Rent_{st}$; real median house prices, $HousePrice_{st}$; the employment to population ratio of prime-age males, $Empop_{st}$; and the real median weekly earnings of all prime-age workers, $Wage_{st}$. Equation (1.1) also controls for individual-level characteristics in the vector X_{ist}; state fixed effects,

[1] Other economic models of living arrangements with similar predictions include McElroy (1985), Rosenzweig and Wolpin (1993) and Ermisch (1999). For a summary of the theoretical perspectives on coresidence outside of economics, see Mazurik, Knudson, and Tanaka (2020).

α_s; and year fixed effects, θ_t.[2]

The data for the dependent variable come from the American Community Survey (ACS) via IPUMS (Ruggles et al. 2020). The observations are limited to young adults, 22-34 years old. Individuals living in group quarters such as mental institutions and correctional facilities are dropped. I focus on ages 22 and above in line with recent papers on youth living arrangements as well as in line with recent studies on the labor market conditions of prime-age workers such as Kimbrough (2018) and Aguiar et al. (2017) which define young adults as individuals in their $20s$. The data on rents are also from the ACS (IPUMS) and are adjusted for inflation using the Consumer Price Index (1999=1). House prices are constructed by multiplying 2000 Census data on median house prices with the Purchase-Only Index (index has value of 1 in 2000) for each state.[3] Employment rates and wages are based on the Annual Social and Economic Supplement of the CPS (ASEC) via IPUMS (Flood et al. 2020).

Similar to Rogers and Winkler (2014) and Lee and Painter (2013), I use both rents and house prices to characterize housing market conditions. Although the two measures are highly correlated in levels, rents and house prices moved differently over the period 2000-2018. Rents increased steadily throughout the $2000s$ whereas house prices increased steeply during 2000-2005, declined steeply during 2007-2010 and have been on the rise since 2011. The two measures also differ theoretically in relation to coresidence. Whereas an increase in rents necessarily raises the cost of living independently, the same is not true of house prices. On the one hand, higher house prices imply greater down-payments and, therefore, a greater cost of owning a home. On the other hand, rising house prices signal future appreciation which can encourage young adults to live independently by becoming homeowners (Rogers and Winkler, 2014). To the extent house prices also reflect parental wealth, an increase in house prices enables parents to support separate living arrangements (Paciorek 2016; Bleemer et al. 2017).

I estimate Equation (1.1) using OLS with standard errors clustered by state and rely on within-state variation to identify the effects of housing and labor market conditions on the probability of coresidence. As in Matsudaira (2016), I estimate Equation (1.1) separately for different demographic groups. The sample for this analysis covers the period 2001-2018 and combines individual-level observations on $6,969,359$ young adults, 22-34 years old, with panel data on state-

[2]Baseline individual-level controls consist of age dummies and marital status dummies.
[3]The data on the Purchase-Only Index are from the Federal Housing Finance Agency (FHFA).

level economic conditions consisting of 969 state-year observations.

1.3.2.2 Flow Coresidence Models

1.3.2.2.1 Basic Flow Model

Because coresidence flows represent migration at the household-level, I model transitions into and out of the parental home as a function of *changes* in economic conditions similar to how some recent papers study the relation between inter-area migration and economic conditions by regressing changes in log population on changes in various measures of economic conditions (for example, Autor, Dorn, and Hanson 2013; Charles, Hurst, and Notowidigdo 2019; and Mian and Sufi 2014) There is also precedence for this approach in the literature on coresidence, namely Bleemer et al. (2017).

My base model of coresidence flows is

$$\begin{aligned} \Delta Y_{ist+1} = \beta_0 &+ \beta_1 \Delta Rent_{st+1} + \beta_2 \Delta HousePrice_{st+1} \\ &+ \beta_3 \Delta Empop_{st+1} + \beta_4 \Delta Wage_{st+1} \\ &+ \Gamma X_{ist} + \epsilon_{ist}, \end{aligned} \tag{1.2}$$

where ΔY_{ist+1} is an individual-level measure of a coresidence transition taking place within state s between the years t and t+1; $\Delta Rent_{st+1}$ is the change in real median gross rents; $\Delta HousePrice_{st+1}$ is the change in real median house prices; $\Delta Empop_{st+1}$ is the percentage point change in the employment to population ratio of prime-age men, 25-44 years old; $\Delta Wage_{st+1}$ is the change in real median weekly earnings of all prime-age workers; and X_{ist} captures individual-level characteristics as defined before. Both the dependent and the explanatory variables capture changes between t and t+1. The explanatory variables are standardized to have a mean of 0 and a standard deviation of 1.

In essence, Equation (1.2) represents a first-differenced version of Equation (1.1). As such, I do not control for state dummies in Equation (1.2) because the data on economic conditions are in first-differences and, therefore, uncorrelated with state-specific, time invariant determinants of living arrangements. I estimate Equation (1.2) for different young adults using pooled OLS with standard errors clustered by state. All estimates control for age dummies and marital status dummies. For robustness checks, I provide estimates of Equation (1.2) with controls for year fixed effects as in Bleemer et al. (2017).

1.3.2.2.2 Inflows

I merge ACS data on $3,634,539$ young adults, 22-34 years old, with 918 state-year observations covering the period 2001-2018 to estimate the relationship between changes in economic conditions and inflows. In this case, the dependent variable in Equation (1.2), ΔY_{ist+1}, is 1 for young adult i who changed homes within state s between the years t and t+1 and currently lives with his/her parents, and 0 if a young adult did not change homes and is currently living apart from his/her parents.[4] I limit the treatment group to young adults whose parents did not also change homes last year.

1.3.2.2.3 Outflows

I estimate the impact of economic conditions on outflows using American Community Survey (ACS) and Current Population Survey (CPS) data separately. When using ACS data, I examine outflows and housing choices jointly. My outcomes are: (1) transitions to owned housing, where a young adult leaves the parental home and moves into his/her own house, and (2) transitions to rented housing, where a young adult leaves the parental home and moves into rented housing. In the first case, the dependent variable in Equation (1.2), ΔY_{ist+1}, is 1 for young adult i who changed homes within state s between the years t and t+1 and currently lives independently in his own house that is owned with mortgage or loan, and 0 if a young adult did not change homes and is currently living with his/her parents. The sample for this analysis contains $1,525,067$ individual-level observations. In the second case, the dependent variable is 1 if a young adult changed homes within state s between the years t and t+1 and currently lives independently in rented housing, and 0 if a young adult did not change homes and currently lives with his/her parents. This sample contains $1,913,458$ individual-level observations.

Note, because the ACS provides no information about prior household characteristics the treatment group may include young adults who did not actually leave the parental home. For example, a young adult who lives by himself in a rented house in year t but then moves into his own house in year t+1. However, such transitions are unlikely. As documented in Dodini, Larrimore, and Schuetz (2016) , most young adult renters in 2014 alone could not qualify for a mortgage or afford a down-payment. Moreover, according to the National Association of Realtors the average age of repeat home purchasers is 52 as of 2013 which implies the transitions of independent young

[4] Over 80% of all migrations between 2000 and 2018 take place within states according to ACS data.

adults from one owner-occupied housing into another are also highly improbable. However, I am less confident about the extent to which my treatment group consists of young adults that transition from one rented housing to another rented housing between the years t and t+1 without having lived with their parents in year t.

I do not encounter similar problems when studying outflows using CPS data as I am able to reasonably distinguish between young adults who leave the parental home and those who do not. In this case, ΔY_{ist+1} is 1 if a young adult is present in his parents' house in t but not t+1, and 0 if a young adult is present in his parents' house in t as well as t+1. Given the 4-8-4 rotation pattern characterizing CPS surveys, year t corresponds to the first four surveys whereas year t+1 corresponds to the final four surveys. Thus, I rely on the disappearance of young adults from households within the 8-month break between the fourth and fifth surveys to measure outflows.

The CPS-based analysis relies on a constructed panel of matched households that participate in at least the first five surveys.[5] The final sample consists of observations on $51,309$ young adults who are 22-34 years old.

The limitations of using the CPS to study outflows include smaller samples compared to the ACS as well as the complete lack of information on the circumstances surrounding the disappearance of young adults from households. Although unlikely in light of declining trends in overall mortality, a disappearance may be triggered by death rather than the seeking of independence. Moreover, as the CPS provides no information on where youths end up once they leave the parental home, my analysis is limited to estimating the impact of economic conditions on just outflows rather than outflows and housing choices jointly.

All measures of outflows are regressed on the same set of economic conditions and baseline youth characteristics. Additionally, I am able to control for parent characteristics in the model based on longitudinal CPS data. I control for the gender, education and home-ownership status of the in-charge parent (that is, the householder). In the absence of direct data, I use home-ownership status to proxy for parental wealth and college-education to proxy for permanent income.[6] In theory, the effects of higher parental income on coresidence are ambiguous. On the one hand, higher parental income is associated with higher financial transfers which lowers the reservation wages of young adults for living apart. On the other hand, higher parental income is associated with higher housing

[5]Households are matched on the age, sex and race characteristics of the householder. I track households across surveys using the methods of Drew, Flood, and Warren (2014).

[6]I do not rely on reported current earnings to construct parental income due to the preponderance of missing data.

consumption in coresidence (Kaplan 2012). Empirical studies similarly find mixed results on the effects of parental income and wealth on coresidence. For example, Newman, Holupka, and Ross (2018) find no significant effects of either parental income or wealth on the household formation of white and black youths in the 2000*s* whereas Whittington and Peters (1996) find positive effects of parental income on coresidence for younger kids but negative effects for older kids, suggesting that parents prefer younger kids to stay at home.

1.4 Descriptive Results

1.4.1 Summary Statistics

Table 1.1 presents summary statistics of the dependent and the independent variables appearing in this study. On average, non-whites and the less-educated are more likely to be in coresidence and less likely to leave home relative to their counterparts. Young adults are also more likely to rent than own when they do move out, and only a small fraction of non-coresident young adults return to the parental home each year. The summary statistics on economic conditions indicate steeper changes in housing costs relative to employment and wages over the period 2000-2018.

1.4.2 Trends in Parental Coresidence by Demographics, 2000-2018

Figures 1.3 to 1.7 document aggregate trends in the living arrangements of young adults, 22-34 years old, by gender, race, education, marital and employment characteristics, respectively. In each figure, panel (a) documents trends in the fraction of young adults that live with their parents (stock coresidence rates), panel (b) documents trends in the fraction of coresident young adults that move out of the parental home each year (outflows) and panel (c) documents trends in the fraction of non-coresident young adults that return to the parental home each year (inflows). The data on stock coresidence rates are three-year moving average and based on the ACS. The data on coresidence flows are five-year moving average and based on the ACS for inflows and the CPS for outflows. All data are weighted using person-level weights.

Although this is not the first paper to document the changes in the living arrangements of young adults in the 2000*s*, it is the first, to my knowledge, to provide insights on the evolution of parental coresidence using both stock and flow data. In summary, Figures 1.3-1.7 show rising

coresidence rates, declining outflows and rising inflows among all young adults in the 2000s.

Figure 1.3 shows males are the most likely to live with their parents, the least likely to move out and the most likely to move back in. Males also experience the steepest increase in coresidence rates at 13 percentage points whereas the corresponding number is 10 percentage points for females. Both genders experience a decline of 3 percentage points in outflows. However, males experience a slightly larger increase in inflows at 1.2 percentage points compared to 1 percentage point for females between 2000 and 2018.

According to Figure 1.4, whites generally have the lowest rates of coresidence and the highest rates of leaving home. Non-whites experience a consistent decline in outflows since 2000 whereas the outflows of whites gently decline until 2009 and, thereafter, remain constant. The association between inflows and race is not as straightforward. While whites are less likely to return home than blacks, they are more likely to return home than hispanics. Conversely, non-white inflows consistently increase throughout the 2000s whereas white inflows increase until 2007 and remain constant since. Overall, hispanic youths experience the steepest increase in coresidence between 2000 and 2018 at 17 percentage points compared to 13 percentage points for black youths and 10 percentage points for white youths.

Figure 1.5 implies that college-education is associated with the lowest rates of coresidence, the lowest rates of inflows, and the highest rates of outflows.[7] However, the link between education and living arrangements is not entirely "linear". Among non-college young adults, high-school dropouts are less likely to live with their parents than either high-school graduates or those with some college education. High-school dropouts are also less likely to move back in compared to high-school graduates, and about as likely to move back in as those with some college education. Overall, coresidence rates increase by 13 percentage points for both high-school dropouts and those with some college education, 16 percentage points for high-school graduates, and 8 percentage points for college-graduates.

Figure 1.6 shows that married young adults are the least likely to live with their parents, the most likely to move out and the least likely to move back in. However, married young adults experience a steeper decline in outflows after 2004 relative to unmarried young adults. Overall,

[7]Conventional wisdom associates rising rates of parental coresidence among college-educated young adults with student loans. However, the empirical evidence on the relation between student loans and coresidence is mixed. For example, Dettling and Hsu (2018) use Consumer Credit Panel Data for the period 2005-2014 and estimate significant, positive effects of student loan balances on entry into coresidence. In contrast, Houle and Warner (2017) use NLSY 97 data and generally find no significant associations between student debt and returning home.

coresidence rates increase by 12 percentage points for unmarried youths and by about 3 percentage points for married youths.

As with education, Figure 1.7 implies that the link between living arrangements and employment is somewhat tenuous. Although employed young adults have the lowest rates of coresidence, out-of-labor-force (OLF) youths are less likely to live with their parents relative to unemployed youths, and are about as likely to move back in as employed young adults. Conversely, employed and unemployed young adults have similar rates of outflows for much of the 2000s whereas OLF youths have the lowest outflows over the entire sample period. Overall, coresidence rates increase by nearly 20 percentage points for non-working youths, and by just 10 percentage points for employed youths.

1.4.3 Observed vs Counterfactual Trends in Parental Coresidence, 2000-2018

The rise in coresidence also coincides with significant shifts in the demographic composition of young adults. According to Figure 1.8, the white and married shares of the young adult population, 22-34 years old, decline by, respectively, 10 percentage points and 15 percentage points between 2000 and 2018. Over the same period, the share college-educated increases by 10 percentage points whereas the share employed is about the same in 2018 as in 2000.[8] In this section, I provide descriptive evidence on the relation between changes in the demographic composition of young adults and the overall increase in coresidence over the 2000-2018 period by applying ACS data to the equation below

$$Y_t = \sum_g Y_{gt} \times s_{gt}, \tag{1.3}$$

where Y_t is the overall coresidence rate in year t, Y_{gt} is the coresidence rate of group g in year t, and s_{gt} is the population share of group g in year t. According to Equation (1.3), the overall coresidence rate is equal to the weighted sum of group coresidence rates where the weights correspond to the population shares of respective groups. For example, if s_g is the share of white young adults, then the overall coresidence rate can be expressed as the weighted sum of white and non-white coresidence rates.

[8] Population shares are calculated using ACS data (IPUMS).

I rely on Equation (1.3) to generate counterfactual coresidence rates based on constant (year 2000) demographic shares. The results of this exercise are presented in Figure 1.9. For reference, actual coresidence rates increase by about 12 percentage points over the period 2000-2018 according to ACS data.

If the white and non-white shares of the young adult population remained at their respective 2000 levels, coresidence rates would have increased by 11 percentage points. Thus, changes in the racial composition of young adults are not a significant contributor to the observed trends in coresidence in the 2000*s*. Similarly, coresidence rates would have increased by 13 percentage points and 11 percentage points, respectively, had the educational and employment composition of young adults remained constant. Thus, changes in education and employment are not the major factors behind the increase in parental coresidence among young adults in recent times. However, coresidence rates would have increased by just 7 percentage points had the marital shares of the young adult population remained at their 2000 levels. As such, declining marriage appears to be a major driver of coresidence among young adults in the 2000*s*. Common factors such as housing costs and wages may lead young adults to delay marriage and moving out of the parental home.

1.4.4 Trends in Parental Coresidence by Region, 2000-2018

Are young adults more likely to live with their parents in less prosperous regions of the United States? Here, I provide preliminary, descriptive evidence on the relationship between economic conditions and parental coresidence over the period 2000-2018, using data aggregated to the level of region-year. Following Austin, Glaeser, and Summers (2018), I divide the United States into three broad regions: the prosperous coastal states, the relatively well-off western heartland, and the economically depressed eastern heartland.

I begin by documenting the regional differences in housing costs and labor market conditions over the 2000*s*. Panels (a) and (b) of Figure 1.10 show that housing costs are the highest in the coastal states. For example, median gross rents in the coastal states are, on average, $150 and $190 higher than in the western and eastern heartlands, respectively. In contrast, rents are only $40 higher in the western heartland than in the eastern heartland. The coastal states also experience the largest growth in housing costs at 20% in median gross rents and 25% in median house prices over the sample period.

Panel (c) of Figure 1.10 shows, in line with the findings of Austin, Glaeser, and Summers

(2018), that prime-age male employment rates are consistently the lowest in the eastern heartland, the highest in the western heartland, and in-between in the coastal states. According to panel (d), not only does the eastern heartland have the lowest wages, but it also experiences declining wages between 2000 and 2014 whereas other regions experience stable wages throughout the 2000s.

I now turn to the regional differences in parental coresidence among young adults in Figure 1.11. Panel(a) shows that coastal states have the highest rates of coresidence in the 2000s. This region also experiences the largest growth in coresidence at 10 percentage points which is about the same as the national increase in coresidence over the sample period. In contrast, coresidence rates increase by about 6 percentage points in both the western heartland and the eastern heartland. According to Panel (b), coastal states also have the lowest rates of outflows although the eastern heartland is not too far behind. The results on inflows in Panel (c) are less clear. On average, inflows are the highest in the eastern heartland. However, coastal states experience the largest increase in inflows at 1.5 percentage points whereas the eastern heartland experiences the smallest increase in inflows at just 1 percentage point.

Overall, it is difficult to discern a clear relationship between the living arrangements of young adults and economic conditions from the information provided in Figures 1.10 and 1.11. If housing costs are the main drivers of coresidence, then why are coresidence rates not the lowest in the eastern heartland where housing costs are the lowest? Likewise, if labor market conditions are the main determinants of living arrangements, then why are coresidence rates not the lowest in the coastal states where wages are the highest?

1.4.4.1 Parental Coresidence in Expensive and Cheap States, 2000-2018

Figure 1.12 provides a more direct look at the relationship between housing costs and coresidence over the period 2000-2018. Expensive states are made up of states that lie above the 75^{th} percentile ($685) in the distribution of year 2000 real median gross rents whereas cheap states lie below the 25^{th} percentile ($508).[9] Panels (a) and (b) indicate that expensive states have the highest rates of coresidence as well as the lowest rates of leaving home in the 2000s. Expensive states also experience an increase of 10 percentage points in coresidence between 2000 and 2018 whereas cheap states experience an increase of just 5 percentage points over the same period. In contrast, panel

[9]Expensive states consist of Alaska, California, Colorado, Connecticut, Hawaii, Maryland, Massachusetts, Nevada, New Hampshire, New Jersey, New York, Virginia, Washington. Cheap states consist of Alabama, Arkansas, Kentucky, Louisiana, Missuouri, Montana, New Mexico, North Dakota, Oklahoma, South Dakota, West Virginia, Wyoming.

(c) shows little difference in inflows. Overall, Figure 1.12 implies that housing costs are positively associated with coresidence, negatively associated with outflows and not associated with inflows.

1.4.4.2 Parental Coresidence in High Manufacturing and Low Manufacturing States, 2000-2018

Figure 1.13 compares the living arrangements of young adults in high-manufacturing states and low-manufacturing states over the period 2000-2018. High-manufacturing states comprise of states that lie above the 75^{th} percentile (20%) in the distribution of year 2000 manufacturing employment share of prime age workers whereas low-manufacturing states lie below the 25^{th} percentile (12%).[10] The data on initial manufacturing employment are from ASEC (IPUMS).

Manufacturing employment has been on a steep decline since 2000. Exploiting variation across commuting zones over the period 2000-2016, Charles, Hurst, and Schwartz (2018) estimate that manufacturing decline alone can account for as much as 50% of the decline in the employment rates of prime-age men in the $2000s$. In a related study that also exploits variation across commuting zones, Autor, Dorn, and Hanson (2018) estimate significant negative effects of manufacturing-related trade shocks on the employment rates, wages, marriage rates and fertility rates of young adults 18-39 years old, over the period 1994-2014. To the extent the rise in coresidence is associated with the deteriorating labor market conditions of prime age workers, one expects to see a greater share of young adults living with their parents in states that experience a larger decline in manufacturing employment between 2000 and 2018.

Panel (a) of Figure 1.13 shows that although high-manufacturing states have slightly higher rates of parental coresidence among young adults, both states experience an 8 percentage point increase in coresidence between 2000 and 2018. Panel (b) indicates that high-manufacturing and low-manufacturing states have similar outflows throughout the $2000s$. Panel (c), on the other hand, shows similar rates of inflows prior to 2007, and higher inflows in high-manufacturing states after 2007. Overall, Figure 1.13 implies that labor market conditions are inversely associated with coresidence rates and inflows, and not associated with outflows.

[10] High manufacturing states consist of Indiana, Connecticut, Vermont, Arkansas, New Hampshire, Alabama, Minnesota, North Carolina, Iowa, South Carolina, Wisconsin, Ohio, Michigan. Low manufacturing states consist of Alaska, Nevada, South Dakota, Maryland, New Mexico, Arizona, Florida, North Dakota, Hawaii, Wyoming, District of Columbia, Louisiana, Montana.

1.5 Regression Results

1.5.1 Impact of Economic Conditions on the Probability of Coresidence, 2000-2018

Tables 1.2-1.4 report the estimates of Equation (1.1) by gender, race and education, respectively. In each table, I present three columns of results under each demographic group. The main results are reported in columns numbered (1) where both rents and house prices are used to estimate Equation (1.1). Because these variables are highly correlated, columns numbered (2) report the estimates of Equation (1.1) where rents are the only measure of housing costs. Likewise, columns numbered (3) present estimates where house prices are the only of measure of housing costs.

The results in Table 1.2 show similar effects of economic conditions on male and female living arrangements. Thus, a $100 increase in rents raises the likelihood of living with parents by 1 percentage point for both genders whereas a $100 increase in wages lowers coresidence by about 1.3 percentage points for males and females. The effects of house prices are comparatively smaller with a $\$10,000$ increase implying a decrease of just 0.07 percentage points in the likelihood of coresidence. However, the main estimates show no significant associations between employment rates and the living arrangements of either gender.

The results by race in Table 1.3 show larger effects of housing costs on the living arrangements of non-whites. Thus, a $100 increase in rents raises the likelihood of coresidence by 1.6 percentage points for blacks, 1.3 percentage points for hispanics and by just 0.9 percentage points for whites. Likewise, weekly wages have a larger impact on the living arrangements of hispanics relative to whites such that a $100 increase lowers the probability of coresidence by 1.5 percentage points for hispanics and by just 1 percentage point for whites. For blacks, the effects of wages are sensitive to the choice of housing variables. In contrast to rents and wages, the main results do not show robust effects of house prices and employment rates on the living arrangements of either whites or non-whites.

Table 1.4 shows larger effects of rents on the living arrangements of non-college young adults. Thus, a $100 increase in rents raises coresidence by 1.4 percentage points for young adults without a college degree and by just 0.9 percentage points for young adults with a college degree. Wages, on the other hand, show similar correlations such that a $100 increase lowers the likelihood of coresidence by 1.2 percentage points for non-college as well as college-educated young adults. Although house prices

consistently show negative associations with the living arrangements of both groups, the estimated effects are not statistically significant. Likewise, the main results on employment rates show no significant associations with living arrangements.

In Table 1.5, I present simulations that estimate the counterfactual changes in coresidence that would have occurred over the 2000s for each demographic group if only rents or wages had changed. I compute the predicted change in coresidence implied by changing rents by multiplying the actual change in rents between 2000 and 2018 with the estimated impact of rents for each demographic group. I compute the predicted change in coresidence implied by changing wages similarly.

The results in Table 1.5 show that economic conditions account for little of the overall increase in parental coresidence among young adults in the 2000s. Nevertheless, the results also imply larger effects of housing costs relative to wages. Thus, rents explain 10% of the change in parental coresidence among males and whites, 12% of the change among females, 14% of the change among blacks, 9% of the change among hispanics, 12% of the change among the less-educated, and 11% of the change among the college-educated. In contrast, wages explain 4% of the change in coresidence among males, females, whites and the less-educated; 2% of the change among blacks and hispanics, and 5% of the change among the college-educated.

1.5.2 Impact of Changing Economic Conditions on Coresidence Flows, 2001-2018

1.5.2.1 Impact of Changing Economic Conditions on Inflows, 2001-2018

Tables 1.6-1.8 report the estimates of Equation (1.2) for inflows by gender, race and education, respectively. In each table, I present two columns of results under each demographic group. Columns that are numbered (1) and (2) present the estimates of Equation (1.2) with and without controls for year fixed effects, respectively.

Changing rents consistently show positive correlations with inflows. However, these correlations are significant and robust to year fixed effects only for hispanics and non-college young adults. Thus, a standard deviation increase in changing rents raises the probability of returning home by 0.13 to 0.23 percentage points for hispanics in Table 1.7, and by 0.14 to 0.16 percentage points for non-college young adults in Table 1.8. In contrast, changing house prices, employment rates and

wages do not show robust associations with the inflows of any group. Overall, therefore, changing economic conditions appear to play little to no role in explaining the rise in inflows among young adults in the 2000s. .

1.5.2.2 Impact of Changing Economic Conditions on Transitions to Owned and Rented Housing, ACS Data, 2001-2018

The estimates of Equation (1.2) for outflows based on ACS data are presented by gender, race and education, respectively, in Tables 1.9-1.11. In each table, panel (a) presents the estimates of Equation (1.2) when the dependent variable measures transitions from the parental home to owned housing, and panel (b) presents the results when the dependent variable measures transitions from the parental home to rented housing. As before, columns numbered (1) and (2) present estimates with and without controls for year fixed effects.

The results by gender in Table 1.9 show robust, negative effects of changing rents on the outflows of both males and females. For males, changing rents have similar effects on both kinds of transitions. Thus, a standard deviation increase in rents lowers transitions to owned housing as well as rented housing by about 1 percentage point. For females, changing rents have a larger impact on transitions to rented housing such that a standard deviation increase in rents lowers transitions to rented housing by about 2 percentage points and transitions to owned housing by 1.4 percentage points. Overall, changing rents have a larger impact on female outflows.

Table 1.9 also shows robust, positive correlations between changing house prices and transitions to owned housing for male young adults although the estimate based on controls for year fixed effects is significant only at the 10 percent level. The rest of the results in Table 1.9 do not show robust associations with the outflows of either gender.

The results by race in Table 1.10 show significant, negative effects of changing rents and changing employment rates primarily on the outflows of non-whites. The results in panel (a) show comparable effects of changing rents on the outflows of whites and hispanics whereas the estimated effects for blacks are small and only significant at the 10 percent level. Although not shown, the effects of changing employment rates are not robust to alternative employment measures such as the unemployment rate. Panel (b) consistently shows larger effects of changing rents on the outflows of non-whites. A comparison of the results in panels (a) and (b) indicate that changing rents exert a larger impact on transitions to renting relative to owning for blacks and hispanics. For example, for

hispanic youths a standard deviation increase in rents lowers transitions to rented housing by 3.3 percentage points and transitions to owned housing by just 1.8 percentage points.

The results by education in Table 1.11 show robust effects of changing rents on the outflows of both non-college and college-educated young adults in panel (a), and only non-college young adults in panel (b). Panel (a) implies that changing rents have a larger impact on transitions to owned housing for college-educated young adults. Thus, a standard deviation increase in rents lowers transitions to owned housing by 1.6 percentage points for the college-educated and by just 1 percentage point for the less-educated. Conversely, panel (b) implies that a standard deviation increase in rents lowers transitions to rented housing by about 2 percentage points for non-college young adults and by just 0.6 percentage points for college-educated young adults.

1.5.2.3 Impact of Changing Economic Conditions on Outflows, CPS Data, 2001-2018

Tables 1.12-1.14 report the estimates of Equation (1.2) for outflows based on longitudinal CPS data. The dependent variable in this case is the probability that a coresident young adult leaves the parental home between the years t and $t+1$. Because the CPS contains no information about the housing choices of young adults that move out, the estimates here provide information on the impact of changing economic conditions on outflows in the general sense. As before, results are presented with and without year fixed effects for each demographic group under, respectively, columns (1) and (2).

Similar to the preceding results, changing rents show robust, negative correlations with the outflows of most young adults, and stronger correlations with the outflows of females, non-whites and non-college young adults compared to their respective counterparts. For example, Table 1.13 shows that a standard deviation increase in rents is associated with declines of 2.7 percentage points and 1 percentage point in the likelihood of moving out among hispanics and whites, respectively. In contrast, the effects of changing house prices, employment rates and wages are not robust to year fixed effects in the majority of estimations.

At the household level, parental education and home-ownership status are positively associated with the outflows of most young adults although it is not clear to what extent these associations imply a positive correlation between parental income/wealth and the living arrangements of young adults. For example, college-educated parents likely have higher income than their less-educated counterparts and, therefore, can make more transfers which lowers the reservation wages of young

adults for living apart. Alternatively, young adults from educated households are more likely to live apart due to differences in upbringing rather than income.

1.6 Conclusion

In this study, I examine the effects of state-level rents, house prices, employment rates and wages on parental coresidence among young adults, 22-34 years old, for the period 2000-2018. I study both stock and flow measures of coresidence using individual-level ACS and CPS data. This is the first paper to exploit the longitudinal features of CPS Basic Monthly data to provide both descriptive and regressions results on coresidence transitions in the $2000s$.

Estimates of two-way fixed effects models show robust effects of rents and wages on coresidence that lie in the expected directions. Thus, higher rents predict higher rates of coresidence whereas higher wages predict lower rates of coresidence. Simulations based on the results from the fixed-effects models imply that rents alone can explain between 9% to 14% of the rise in coresidence in the $2000s$ whereas wages explain no more than 5%. Similar to previous empirical studies, I find that the living arrangements of non-whites and non-college young adults are more responsive to changes in housing costs than their respective counterparts. Pooled OLS estimates with year fixed effects show that young adults in states experiencing steeper growth in rents are more likely to return home and less likely to form independent households compared to young adults in states experiencing gentler growth in rents, although the results on inflows are only significant for hispanics and non-college young adults. In contrast, I do not find consistent results on the effects of house prices, employment rates or wages on living arrangements. Overall, rents are the main cause of rising coresidence to the extent the latter is an economic phenomenon.

Table 1.1: Summary Statistics

	N	Mean	S.D.
Probability of coresidence			
Males	3,381,214	0.24	0.43
Females	3,588,145	0.18	0.38
Whites	4,460,565	0.19	0.39
Blacks	678,055	0.28	0.45
Hispanics	1,187,567	0.22	0.42
Not-college	4,652,025	0.24	0.42
College+	2,317,334	0.15	0.36
Probability of returning home			
Males	1,642,402	0.03	0.17
Females	1,992,137	0.02	0.15
Whites	2,464,979	0.03	0.16
Blacks	298,120	0.04	0.19
Hispanics	579,943	0.02	0.14
Not-college	2,331,807	0.03	0.17
College+	1,302,732	0.02	0.14
Transitions to owned housing			
Males	832,201	0.15	0.36
Females	692,866	0.21	0.41
Whites	932,908	0.24	0.42
Blacks	174,389	0.06	0.23
Hispanics	264,885	0.10	0.30
Not-college	1,094,285	0.13	0.33
College+	430,782	0.31	0.46
Transitions to rented housing			
Males	1,009,141	0.30	0.46
Females	904,317	0.40	0.49
Whites	1,136,703	0.37	0.48

Table 1.1 continued from previous page

	N	Mean	S.D.
Blacks	242,083	0.32	0.47
Hispanics	342,440	0.30	0.46
Not-college	1,395,204	0.32	0.46
College+	518,254	0.43	0.49
General Outflows			
Males	28,864	0.19	0.39
Females	22,445	0.20	0.40
Whites	32,553	0.22	0.41
Blacks	6,394	0.15	0.36
Hispanics	7,707	0.14	0.35
Not-college	39,618	0.18	0.38
College+	11,691	0.24	0.43
State-Level Economic Conditions			
Rents ($)	969	644.78	142.04
House Prices ($)	969	142,805.54	73,349.03
Empop (%)	969	0.83	0.04
Wages ($)	969	567.01	66.25
Change in Rents ($)	918	5.70	18.91
Change in House Prices ($)	918	2,277.68	13,413.16
Change in Empop (% points)	918	-0.00	0.03
Change in Wages ($)	918	2.18	23.75

Notes: The data on the probability of coresidence, the probability of returning home, transitions to owned housing and transitions to rented housing are from the ACS. The data on general outflows are based on the CPS (Basic Monthly). Rents refer to monthly median gross rents and are based on ACS. House Prices refer to median house prices and are based on 2000 Census and the FHFA. Empop refers to the employment to population ratio of men who are 25-54 years old and are based on ASEC. Wages refer to the median weekly earnings of workers who are 25-54 years old and are based on ASEC. Rents, House Prices and Wages are adjusted for inflation using the CPI (1999=1).

Table 1.2: Impact of Economic Conditions on the Probability of Coresidence by Gender, 2001-2018

	Males			**Females**		
Dependent Variable: Probability of Coresidence	(1)	(2)	(3)	(1)	(2)	(3)
Rents (in $100)	.011***	.0097**		.011***	.0095**	
	(.004)	(.0046)		(.0032)	(.0036)	
House Prices (in $10,000)	-.00071**		-.00041	-.00066***		-.00037**
	(.00034)		(.00027)	(.00024)		(.00017)
Empop	-.00067	-.019	-.0059	.0045	-.012	4.2e-06
	(.032)	(.032)	(.033)	(.021)	(.022)	(.023)
Wages (in $100)	-.013***	-.015***	-.011***	-.011***	-.012***	-.0084***
	(.0041)	(.004)	(.0041)	(.0032)	(.0032)	(.0031)
Both housing variables	yes	no	no	yes	no	no

Notes: All regressions control for state fixed effects, year fixed effects and individual-level age, race, education and marriage characteristics. Columns (1) control for both rents and house prices. Columns (2) exclude house prices from estimation. Columns (3) exclude rents from estimation. Standard errors in parentheses are clustered by state; *,**,*** indicate significance at the 0.1, 0.05, 0.01 level, respectively.

Table 1.3: Impact of Economic Conditions on the Probability of Coresidence by Race, 2001-2018

	Whites			**Blacks**			**Hispanics**		
Dependent Variable: Probability of Coresidence	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Rents (in $100)	.0087***	.0074**		.016***	.014***		.013***	.012**	
	(.0025)	(.0028)		(.0046)	(.0042)		(.0048)	(.0053)	
House Prices (in $10,000)	-.00064		-.00035	-.0011		-.00051	-.00063**		-.00046
	(.0004)		(.0003)	(.00086)		(.0006)	(.00031)		(.00028)
Empop	.02	.0072	.014	.0015	-.021	-.0046	.0062	-.019	.0092
	(.025)	(.025)	(.026)	(.053)	(.049)	(.052)	(.03)	(.033)	(.035)
Wages (in $100)	-.01***	-.012***	-.0085***	-.0067*	-.0091**	-.00046	-.015**	-.018***	-.014*
	(.0026)	(.0026)	(.0026)	(.0039)	(.0036)	(.0042)	(.0061)	(.0057)	(.0071)
Both housing variables	yes	no	no	yes	no	no	yes	no	no

Notes: All regressions control for state fixed effects, year fixed effects and individual-level age, education and marriage characteristics. Columns (1) control for both rents and house prices. Columns (2) exclude house prices from estimation. Columns (3) exclude rents from estimation. Standard errors in parentheses are clustered by state; *,**,*** indicate significance at the 0.1, 0.05, 0.01 level, respectively.

Table 1.4: Impact of Economic Conditions on the Probability of Coresidence by Education, 2001-2018

	Non-College			College+		
Dependent Variable: Probability of Coresidence	(1)	(2)	(3)	(1)	(2)	(3)
Rents (in $100)	.014***	.013***		.0088***	.007**	
	(.0037)	(.0043)		(.0023)	(.0028)	
House Prices (in $10,000)	-.00057		-.00021	-.0008*		-.00051
	(.00037)		(.00025)	(.00041)		(.00031)
Empop	.012	-.0021	.0043	.0092	-.011	.0056
	(.026)	(.026)	(.028)	(.025)	(.025)	(.024)
Wages (in $100)	-.012***	-.014***	-.01**	-.01***	-.012***	-.0078**
	(.0038)	(.0035)	(.0043)	(.003)	(.0029)	(.0029)
Both housing variables	yes	no	no	yes	no	no

Notes: All regressions control for state fixed effects and year fixed effects. All regressions also control for individual-level age, race and marriage characteristics. Columns (1) control for both rents and house prices. Columns (2) exclude house prices from estimation. Columns (3) exclude rents from estimation. Standard errors in parentheses are clustered by state; *,**,*** indicate significance at the 0.1, 0.05, 0.01 level, respectively.

Table 1.5: Actual vs Predicted Changes in Coresidence, 2000-2018

	Actual Change (in percentage points)	**Predicted Change from Rents** (in percentage points)	**Predicted Change from Wages** (in percentage points)
Males	13	1.27	0.56
Females	11	1.27	0.47
Whites	10	1	0.43
Blacks	13	1.84	0.29
Hispanics	17	1.5	0.65
Non-College	14	1.61	0.52
College	9	1.01	0.43

Notes: Predicted changes are calculated by multiplying the observed change in rents (wages) over the period 2000-2018 with their respective coefficient estimates in Tables 1.2-1.4.

Table 1.6: Impact of Changes in Economic Conditions on Inflows by Gender, 2001-2018

	Males		**Females**	
Dependent Variable: Probability of Returning Home	(1)	(2)	(1)	(2)
Change in Rents	.00081	.0012	.00089**	.001
	(.00049)	(.00084)	(.00035)	(.00068)
Change in House Prices	-.00039	.000066	-.00016	.00028**
	(.00028)	(.00015)	(.00019)	(.00013)
Change in Empop	.00042**	.00036	.00032**	.00014
	(.00019)	(.00022)	(.00016)	(.00021)
Change in Wages	-.00033	-.0003	4.7e-06	-.00026
	(.00027)	(.00026)	(.00022)	(.00023)
year	no	yes	no	yes

Notes: All explanatory variables are standardized. All regressions control for individual-level age, race, education and marriage characteristics. Columns (1) do not control for year fixed effects. Columns (2) control for year fixed effects. Standard errors in parentheses are clustered by state; *,**,*** indicate significance at the 0.1, 0.05, 0.01 level, respectively.

Table 1.7: Impact of Changes in Economic Conditions on Inflows by Race, 2001-2018

	Whites		**Blacks**		**Hispanics**	
Dependent Variables: Probability of Returning Home	(1)	(2)	(1)	(2)	(1)	(2)
Change in Rents	.00056	.00067	.00071	.0004	.0013*	.0023*
	(.00038)	(.00063)	(.00076)	(.00096)	(.00067)	(.0014)
Change in HousePrices	-.0006*	.000023	-.00044	-.000045	-.000077	.00014
	(.00033)	(.00019)	(.00071)	(.00072)	(.000054)	(.00012)
Change in Empop	.00036*	.00021	.001*	.0002	.00022	.00027
	(.00019)	(.0002)	(.0006)	(.00059)	(.00023)	(.00033)
Change in Wages	-.000095	-.00021	.00037	-.00027	-.00039	-.00026
	(.00022)	(.00023)	(.00052)	(.00057)	(.00056)	(.0005)
year	no	yes	no	yes	no	yes

Notes: All explanatory variables are standardized. All regressions control for individual-level age, education and marriage characteristics. Columns (1) do not control for year fixed effects. Columns (2) control for year fixed effects. Standard errors in parentheses are clustered by state; *,**,*** indicate significance at the 0.1, 0.05, 0.01 level, respectively.

Table 1.8: Impact of Changes in Economic Conditions on Inflows by Education, 2001-2018

	Non-College		**College+**	
Dependent Variable: Probability of Returning Home	(1)	(2)	(1)	(2)
Change in Rents	.0014***	.0016**	.00016	.00018
	(.00038)	(.00073)	(.00045)	(.00069)
Change in HousePrices	-.00033	.00029**	-.00012	-.000059
	(.00022)	(.00012)	(.0002)	(.00023)
Change in Empop	.00017	.00023	.00046***	.00019
	(.00017)	(.00023)	(.00015)	(.00018)
Change in Wages	-.00012	-.00017	-.000092	-.00036
	(.00025)	(.00024)	(.00023)	(.00028)
year	no	yes	no	yes

Notes: All explanatory variables are standardized. All regressions control for individual-level age, race and marriage characteristics. Columns (1) do not control for year fixed effects. Columns (2) control for year fixed effects. Standard errors in parentheses are clustered by state; *,**,*** indicate significance at the 0.1, 0.05, 0.01 level, respectively.

Table 1.9: Impact of Changes in Economic Conditions on Different Outflows by Gender, 2001-2018

	Males		**Females**	
Dependent Variable: Probability of Moving Out (ACS)	(1)	(2)	(1)	(2)
(a) Results for transitions to owned housing				
Change in Rents	-.0068***	-.0097***	-.0094***	-.014***
	(.002)	(.0031)	(.0025)	(.0039)
Change in House Prices	.0043**	.0016*	.0047**	.0011
	(.0019)	(.00092)	(.0023)	(.0011)
Change in Empop	-.0062***	-.00081	-.0081***	-.0011
	(.0007)	(.00073)	(.00088)	(.0011)
Changes in Wages	-.0023***	-.00014	-.002	.00074
	(.00084)	(.00088)	(.0013)	(.0012)
(b) Results for transitions to rented housing				
Changes in Rents	-.011***	-.012**	-.018***	-.019***
	(.0032)	(.005)	(.0035)	(.0054)
Changes in House Prices	.0013	.0022	-.00038	.0011
	(.0016)	(.002)	(.001)	(.0017)
Changes in Empop	-.0065***	.00073	-.01***	-.00025
	(.0011)	(.00081)	(.0014)	(.00098)
Changes in Wages	-.0033***	.00083	-.0041***	.0014
	(.00091)	(.0013)	(.001)	(.0016)
year	no	yes	no	yes

Notes: The dependent variables are based on ACS data. All explanatory variables are standardized. All regressions control for individual-level age, race, education and marriage characteristics. Columns (1) do not control for year fixed effects. Columns (2) control for year fixed effects. Standard errors in parentheses are clustered by state; *,**,*** indicate significance at the 0.1, 0.05, 0.01 level, respectively.

Table 1.10: Impact of Changes in Economic Conditions on Different Outflows by Race, 2001-2018

	Whites		Blacks		Hispanics	
Dependent Variable: Probability of Moving Out (ACS)	(1)	(2)	(1)	(2)	(1)	(2)
(a) Results for transitions to owned housing						
Change in Rents	-.0096***	-.011***	-.0037*	-.0044*	-.0081***	-.018***
	(.0027)	(.0039)	(.0022)	(.0023)	(.0023)	(.0059)
Change in House Prices	.0062*	.0016	.0038**	.00065	.0037***	.0017
	(.0033)	(.0018)	(.0016)	(.00078)	(.0012)	(.0014)
Change in Empop	-.0076***	-.00032	-.0067***	-.0022**	-.0082***	-.0025*
	(.00087)	(.0009)	(.00079)	(.00092)	(.0016)	(.0013)
Change in Wages	-.0025**	.0005	-.0029***	-.00019	-.00036	.00044
	(.0011)	(.0012)	(.0007)	(.00075)	(.002)	(.0019)
(b) Results for transitions to rented housing						
Change in Rents	-.0086*	-.0063	-.02***	-.028***	-.024***	-.033***
	(.0043)	(.0065)	(.0066)	(.0096)	(.0036)	(.01)
Change in House Prices	.0028	.0041	-.0039*	-.00024	-.000048	.00036
	(.0024)	(.0034)	(.002)	(.0033)	(.00062)	(.0011)
Change in Empop	-.0078***	.00067	-.0081***	.001	-.012***	-.0057**
	(.0013)	(.001)	(.0023)	(.0022)	(.0012)	(.0022)
Change in Wages	-.0036***	.0018	-.0057***	-.0016	-.0036	-.0003
	(.0012)	(.0014)	(.0018)	(.0027)	(.0028)	(.0028)
year	no	yes	no	yes	no	yes

Notes: The dependent variables are based on ACS data. All explanatory variables are standardized. All regressions control for individual-level age, education and marriage characteristics. Columns (1) do not control for year fixed effects. Columns (2) control for year fixed effects. Standard errors in parentheses are clustered by state; *,**,*** indicate significance at the 0.1, 0.05, 0.01 level, respectively.

Table 1.11: Impact of Changes in Economic Conditions on Different Outflows by Education, 2001-2018

	Non-College		College+	
Dependent Variable: Probability of Moving Out (ACS)	(1)	(2)	(1)	(2)
(a) Results for transitions to owned housing				
Change in Rents	-.0078***	-.011***	-.013***	-.016**
	(.0018)	(.0032)	(.0041)	(.006)
Change in House Prices	.0045**	.00046	.0064**	.0035
	(.002)	(.0007)	(.0031)	(.0022)
Change in Empop	-.0058***	-.00046	-.013***	-.0024
	(.00079)	(.00083)	(.0015)	(.0016)
Change in Wages	-.0022*	.00004	-.0034**	.00091
	(.0011)	(.00091)	(.0016)	(.002)
(b) Results for transitions to rented housing				
Change in Rents	-.017***	-.018***	-.0043	-.0061
	(.0032)	(.0047)	(.0055)	(.0086)
Change in House Prices	-.0011	.00018	.0032	.0052
	(.00075)	(.0011)	(.0032)	(.0043)
Change in Empop	-.0084***	.00058	-.006***	.0014
	(.0014)	(.00083)	(.0015)	(.0016)
Change in Wages	-.0047***	.00096	-.0014	.0017
	(.00092)	(.0012)	(.0022)	(.0029)
year	no	yes	no	yes

Notes: The dependent variables are based on ACS data. All explanatory variables are standardized. All regressions control for individual-level age, race and marriage characteristics. Columns (1) do not control for year fixed effects. Columns (2) control for year fixed effects. Standard errors in parentheses are clustered by state; *,**,*** indicate significance at the 0.1, 0.05, 0.01 level, respectively.

Table 1.12: Impact of Changes in Economic Conditions on General Outflows by Gender, 2001-2018

	Males		**Females**	
Dependent Variable: Probability of Moving Out (CPS)	(1)	(2)	(1)	(2)
State-Level Variables				
Change in Rents	-.0078***	-.0084**	-.011***	-.015***
	(.0029)	(.0038)	(.0028)	(.0035)
Change in House Prices	.0032**	-.00094	.00099	-.0012
	(.0013)	(.0017)	(.0013)	(.0016)
Change in Empop	-.0042	.00082	-.0013	.0021
	(.0033)	(.0038)	(.0036)	(.0043)
Change in Wages	.0012	.0039	-.0012	-.0012
	(.0027)	(.0031)	(.0028)	(.003)
Parent Characteristics				
Male	.0058	.0052	.00054	-.00018
	(.0058)	(.0057)	(.0056)	(.0054)
Married	.0014	.00027	-.0079	-.0076
	(.0071)	(.0069)	(.0067)	(.0065)
College+	.0079	.0091	.033***	.034***
	(.0062)	(.0062)	(.0075)	(.0075)
Home-owner	.0086	.0095	.023***	.02***
	(.0062)	(.0059)	(.0063)	(.0069)
year	no	yes	no	yes

Notes: The dependent variable is based on CPS data. All explanatory variables are standardized. All regressions control for the age, race, education and marriage characteristics of the young adult. Parent characteristics refer to the characteristics of the householder. Columns (1) do not control for year fixed effects. Columns (2) control for year fixed effects. Standard errors in parentheses are clustered by state; *,**,*** indicate significance at the 0.1, 0.05, 0.01 level, respectively.

Table 1.13: Impact of Changes in Economic Conditions on General Outflows by Race, 2001-2018

	Whites		**Blacks**		**Hispanics**	
Dependent Variable: Probability of Moving Out (CPS)	(1)	(2)	(1)	(2)	(1)	(2)
State-Level Variables						
Change in Rents	-.0071*	-.01**	-.0019	-.0036	-.022***	-.027***
	(.0036)	(.0044)	(.0047)	(.0071)	(.0035)	(.0057)
Change in House Prices	.0055***	.0033	-.003	-.011**	.0022**	-.0013
	(.0016)	(.0021)	(.0035)	(.0057)	(.0011)	(.0027)
Change in Empop	-.0019	.0039	.0057	.01**	-.018***	-.017**
	(.0025)	(.0028)	(.0045)	(.0051)	(.0059)	(.0074)
Change in Wages	-.002	.000058	.0031	.004	.0048	.0025
	(.0025)	(.0029)	(.0067)	(.0074)	(.0047)	(.006)
Parent Characteristics						
Male	.0067	.0058	.018	.018	-.02	-.02
	(.0051)	(.005)	(.013)	(.013)	(.014)	(.014)
Married	.00016	-.00072	-.012	-.013	.0049	.0056
	(.0083)	(.0082)	(.011)	(.011)	(.0089)	(.009)
College+	.018**	.019***	.012	.015	.036**	.038**
	(.007)	(.007)	(.017)	(.017)	(.016)	(.016)
Home-owner	.019**	.018**	.027**	.025**	.0084	.0057
	(.0084)	(.0084)	(.012)	(.012)	(.0098)	(.01)
year	no	yes	no	yes	no	yes

Notes: The dependent variable is based on CPS data. All explanatory variables are standardized. All regressions control for the age, education and marriage characteristics of the young adult. Parent characteristics refer to the characteristics of the householder. Columns (1) do not control for year fixed effects. Columns (2) control for year fixed effects. Standard errors in parentheses are clustered by state; *,**,*** indicate significance at the 0.1, 0.05, 0.01 level, respectively.

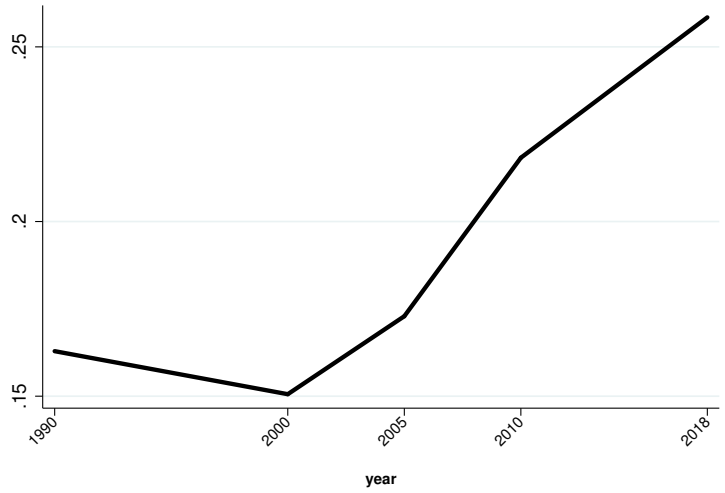
Table 1.14: Impact of Changes in Economic Conditions on General Outflows by Education, 2001-2018

	Non-College		College+	
Dependent Variable: Probability of Moving Out (CPS)	(1)	(2)	(1)	(2)
State-Level Variables				
Change in Rents	-.009***	-.011***	-.0097*	-.011*
	(.0023)	(.0029)	(.0051)	(.0055)
Change in House Prices	.0017*	-.0013	.0032*	-.0012
	(.00098)	(.0016)	(.0017)	(.0022)
Change in Empop	-.0038*	-.001	-.0015	.0081
	(.0022)	(.0027)	(.0045)	(.0055)
Change in Wages	-.00033	.0013	.00055	.0019
	(.0024)	(.0026)	(.0035)	(.0048)
Parent Characteristics				
Male	.0043	.0037	.0057	.0047
	(.0044)	(.0044)	(.0077)	(.0076)
Married	-.0062	-.0064	.009	.0087
	(.0055)	(.0054)	(.011)	(.011)
College+	.0081	.0096	.033***	.035***
	(.0064)	(.0064)	(.0096)	(.0096)
Home-owner	.02***	.017***	.019	.0056
	(.0051)	(.0051)	(.012)	(.012)
year	no	yes	no	yes

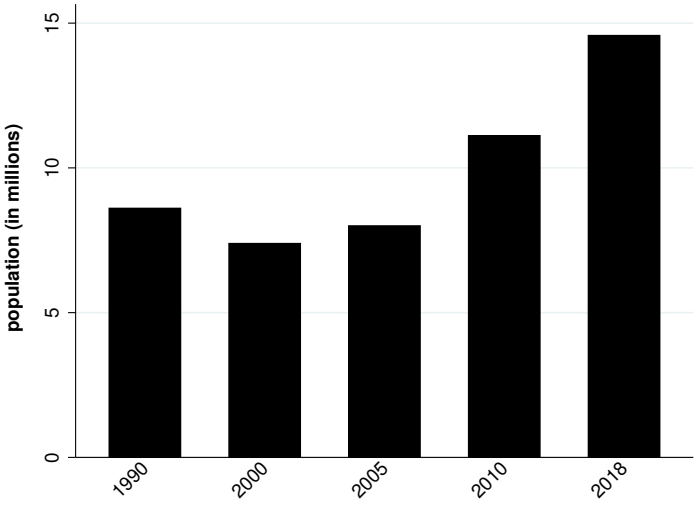
Notes: The dependent variable is based on CPS data. All explanatory variables are standardized. All regressions control for the age, race and marriage characteristics of the young adult. Parent characteristics refer to the characteristics of the householder. Columns (1) do not control for year fixed effects. Columns (2) control for year fixed effects. Standard errors in parentheses are clustered by state; *,**,*** indicate significance at the 0.1, 0.05, 0.01 level, respectively.

Figure 1.1: Trends in Parental Coresidence Among Young Adults, 1990-2018

(a) Coresidence rates



(b) Coresident population

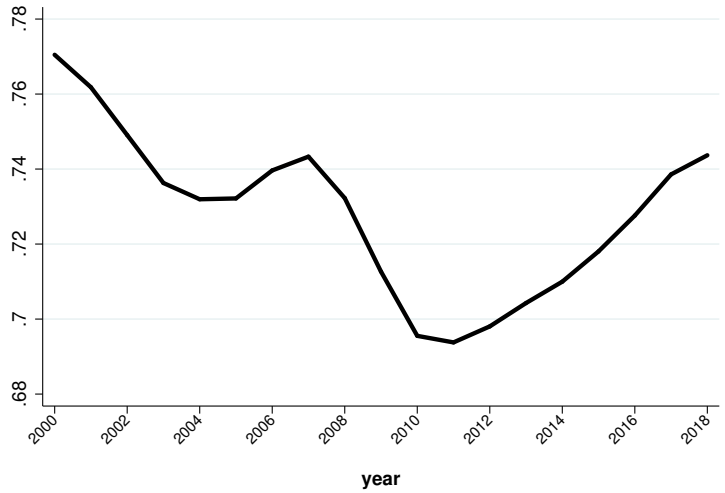


Notes: This figure shows trends in parental coresidence among young adults, 22-34 years old, over the period 1990-2018. Panel (a) shows trends in coresidence rates. Panel (b) shows trends in the size of the coresident population. These graphs are based on Census data for the years 1990 and 2000, and ACS data for the rest of the years.

Figure 1.2: Trends in Rents, Wages and Employment, 2000-2018

(a) Median Gross Rents and Median Youth Wages

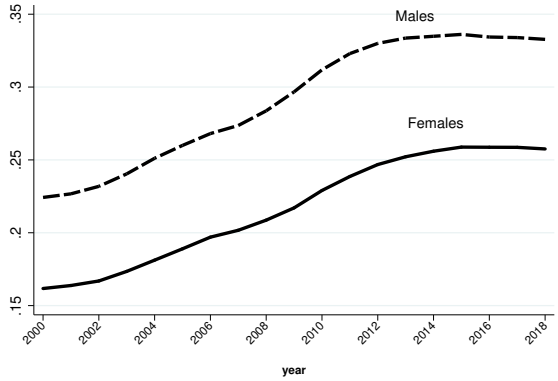
(b) Youth Employment Rates



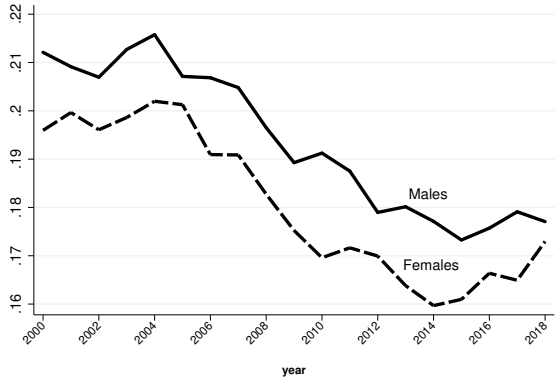
Notes: This figure shows nation-level trends in housing and labor market conditions over the period 2000-2018. Panel (a) shows growth in real median gross rents and real median weekly wages of young adults. Panel (b) shows trends in the employment to population ratio of young adults. The graphs are based on ACS and ASEC data.

Figure 1.3: Trends in Parental Coresidence by Gender, 2000-2018

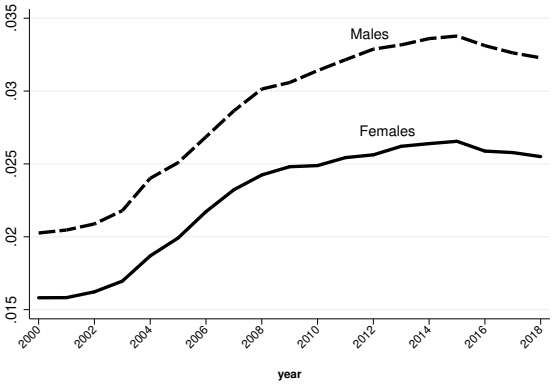
(a) Stock coresidence rates



(b) Outflows



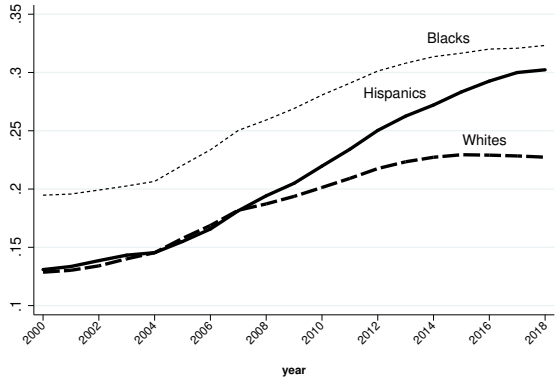
(c) Inflows



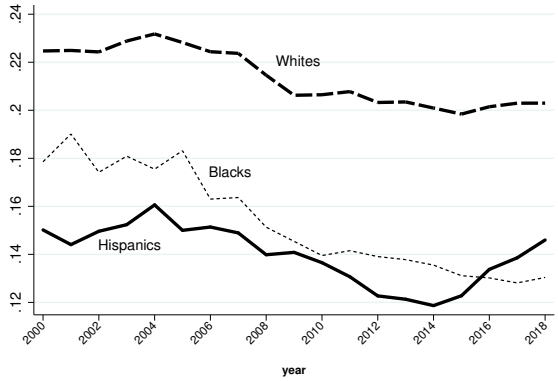
Notes: This figure shows trends in the coresidence outcomes of young adults, 22-34 years old, by gender during 2000-2018. The vertical axis in each panel measures shares. Stock coresidence rates and inflows are based on the ACS. Outflows are based on the CPS.

Figure 1.4: Trends in Parental Coresidence by Race, 2000-2018

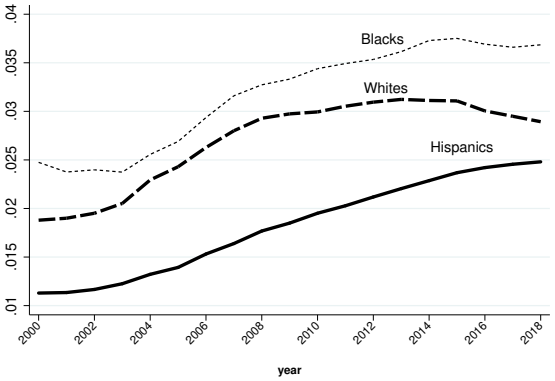
(a) Stock coresidence rates



(b) Outflows



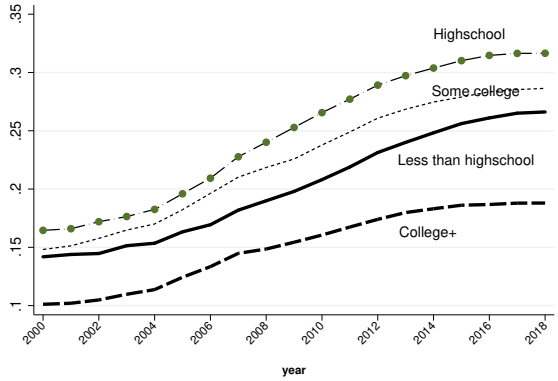
(c) Inflows



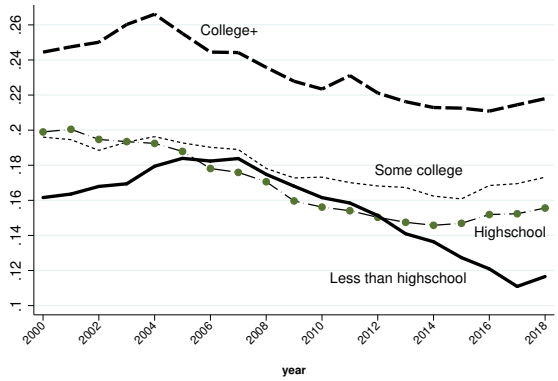
Notes: This figure shows trends in the coresidence outcomes of young adults, 22-34 years old, by race during 2000-2018. The vertical axis in each panel measures shares. Stock coresidence rates and inflows are based on the ACS. Outflows are based on the CPS.

Figure 1.5: Trends in Parental Coresidence by Education, 2000-2018

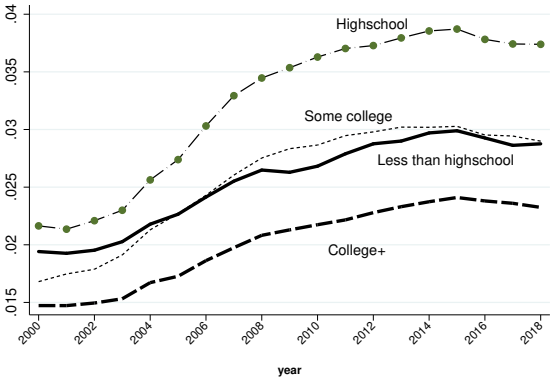
(a) Stock coresidence rates



(b) Outflows



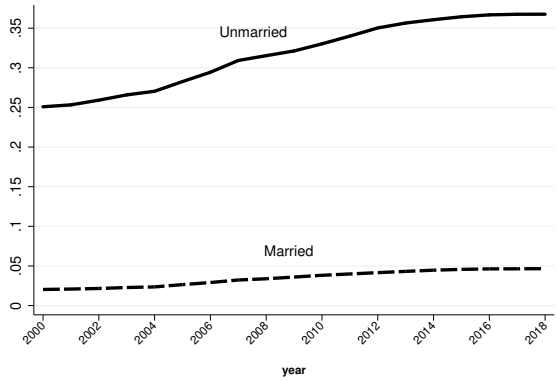
(c) Inflows



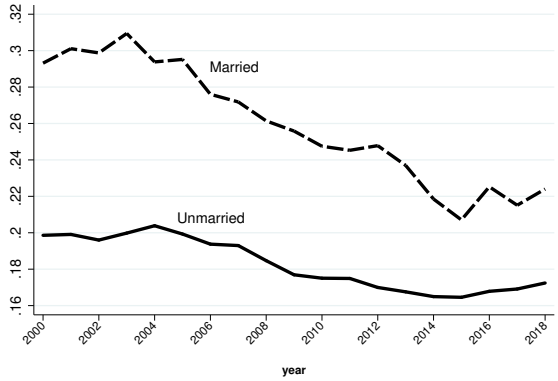
Notes: This figure shows trends in the coresidence outcomes of young adults, 22-34 years old, by education during 2000-2018. The vertical axis in each panel measures shares. Stock coresidence rates and inflows are based on the ACS. Outflows are based on the CPS.

Figure 1.6: Trends in Parental Coresidence by Marriage, 2000-2018

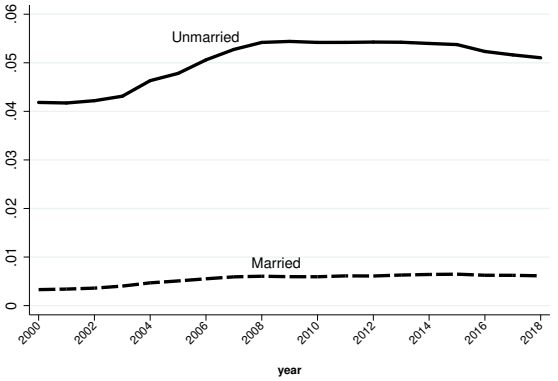
(a) Stock coresidence rates



(b) Outflows



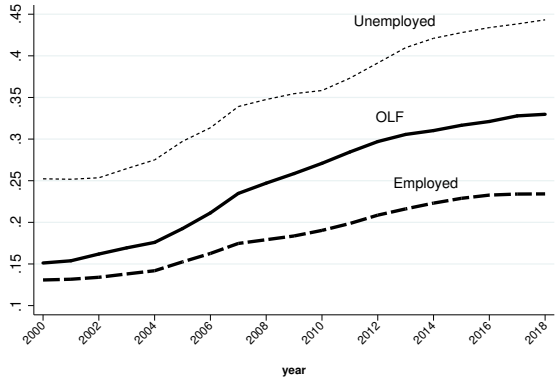
(c) Inflows



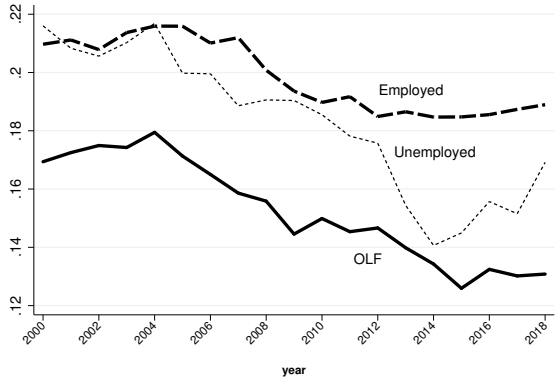
Notes: This figure shows trends in the coresidence outcomes of young adults, 22-34 years old, by marriage during 2000-2018. The vertical axis in each panel measures shares. Stock coresidence rates and inflows are based on the ACS. Outflows are based on the CPS.

Figure 1.7: Trends in Parental Coresidence by Employment, 2000-2018

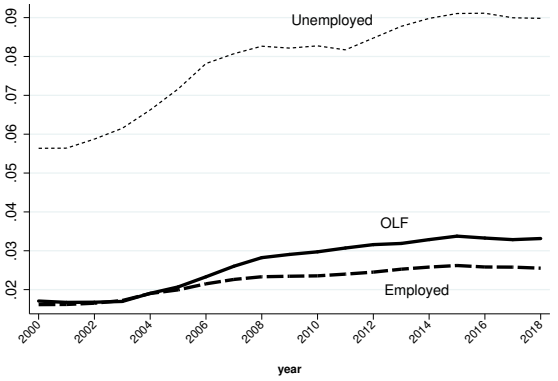
(a) Stock coresidence rates



(b) Outflows

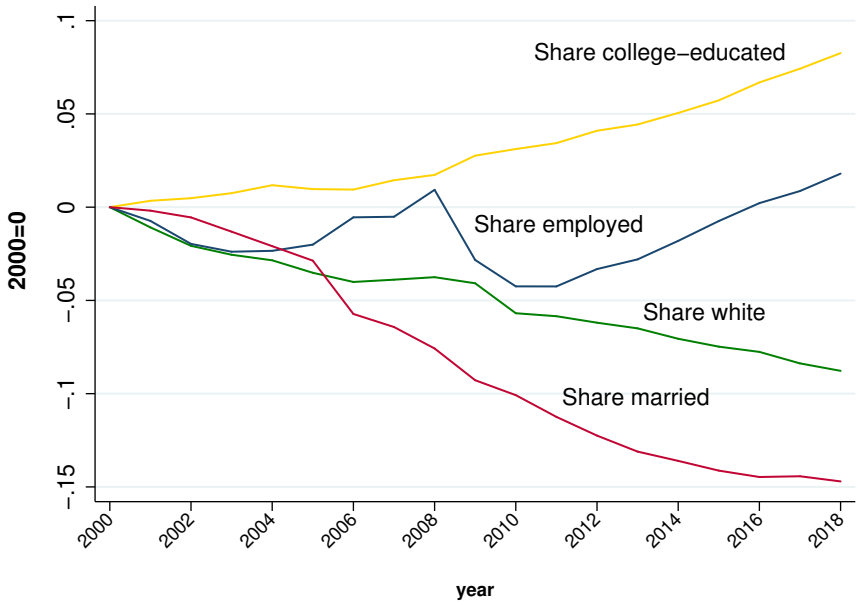


(c) Inflows



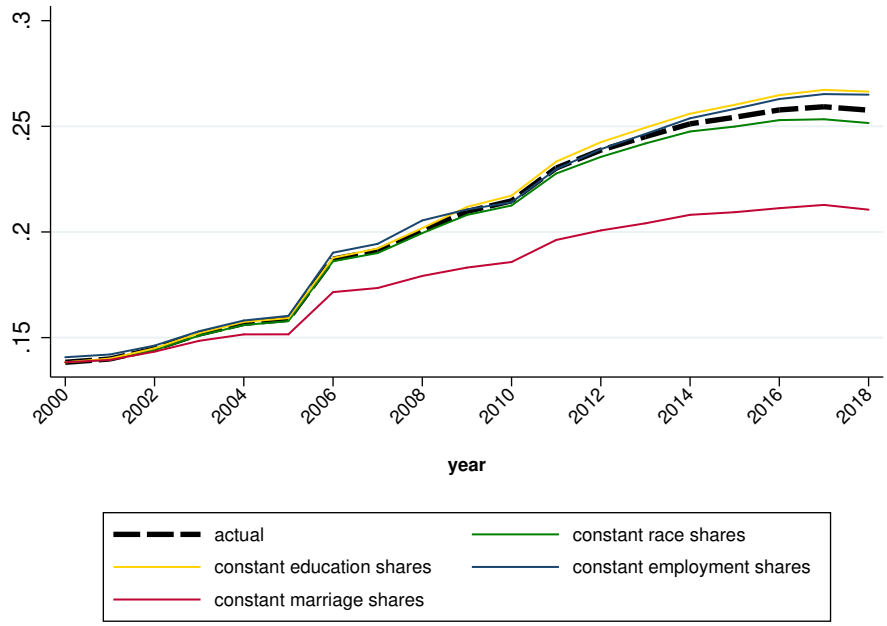
Notes: This figure shows trends in the coresidence outcomes of young adults, 22-34 years old, by employment during 2000-2018. The vertical axis in each panel measures shares. Stock coresidence rates and inflows are based on the ACS. Outflows are based on the CPS.

Figure 1.8: Trends in Demographic Composition of Young Adults, 2000-2018



Notes: This figure shows trends in the demographic composition of young adults, 22-34 years old, over the period 2000-2018 based on ACS data.

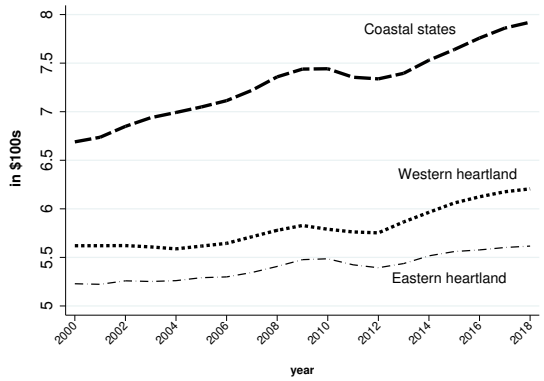
Figure 1.9: Observed vs Counterfactual Trends in Parental Coresidence, 2000-2018



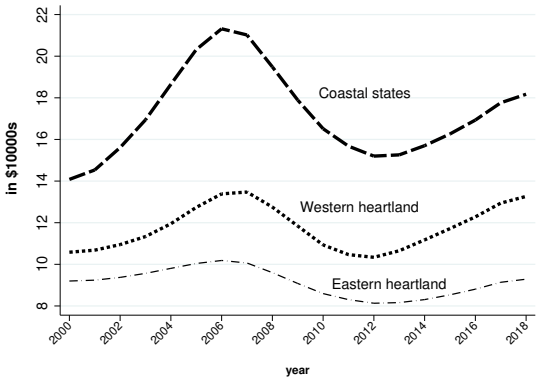
Notes: This figure compares observed/actual trends in parental coresidence in the 2000*s* to the changes in coresidence that would have occurred if the racial, educational, marital or employment shares of the young adult population remained at their 2000 values. All data are from the ACS.

Figure 1.10: Trends in Economic Conditions by Region, 2000-2018

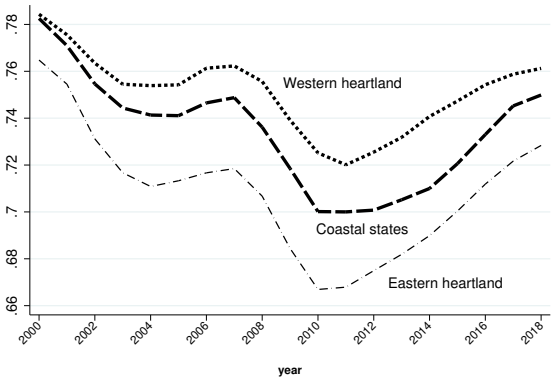
(a) Real Median Gross Rents



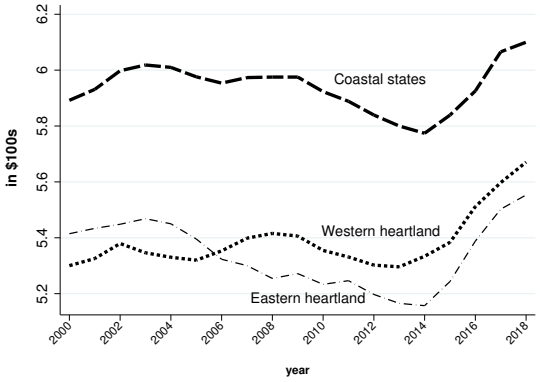
(b) Real Median House Prices



(c) Prime-age Male Employment Rates



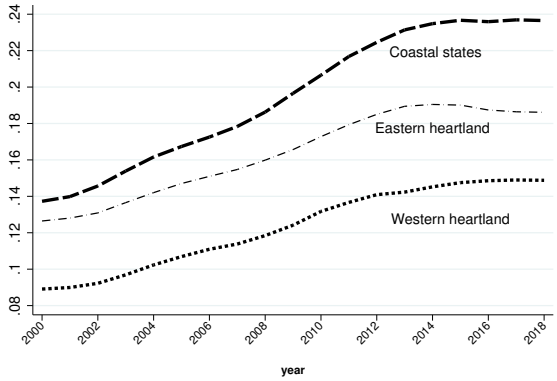
(d) Prime-age Real Median Weekly Wages



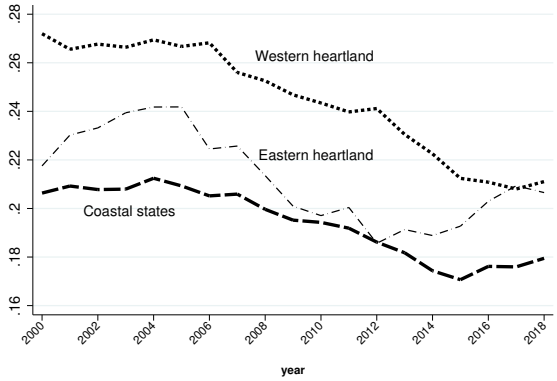
Notes: This figure shows trends in economic conditions by region where regions are as defined in Austin, Glaeser and Summers (2018). Data sources include the 2000 Census, ACS, ASEC and FHFA.

Figure 1.11: Trends in Parental Coresidence by Region, 2000-2018

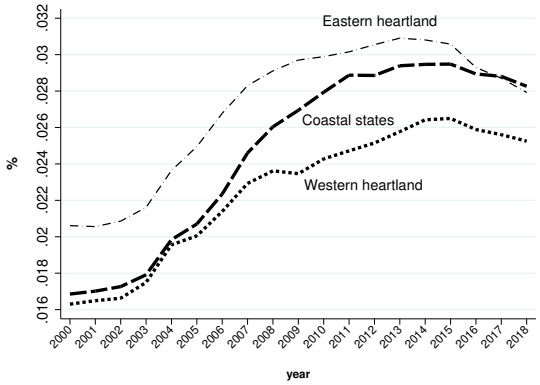
(a) Stock coresidence rates



(b) Outflows



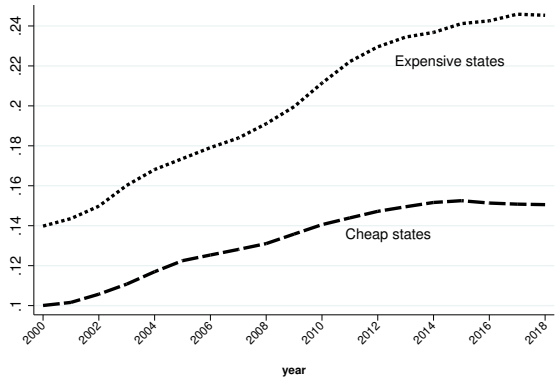
(c) Inflows



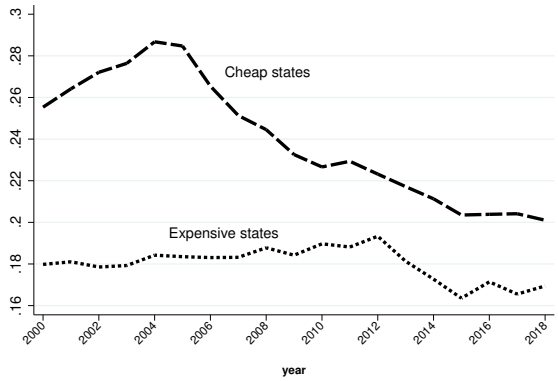
Notes: This figure shows trends in the coresidence outcomes of young adults, 22-34 years old, by region where regions are as defined in Austin, Glaeser and Summers (2018).

Figure 1.12: Parental Coresidence in Expensive States and Cheap States, 2000-2018

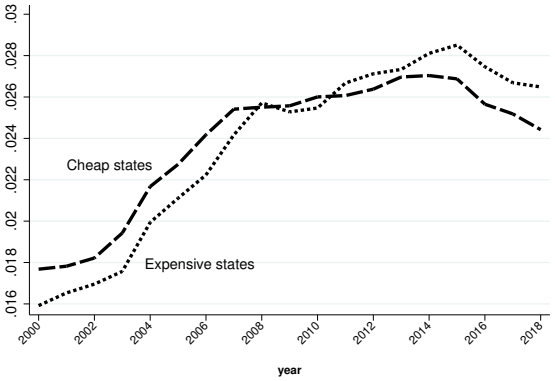
(a) Stock coresidence rates



(b) Outflows



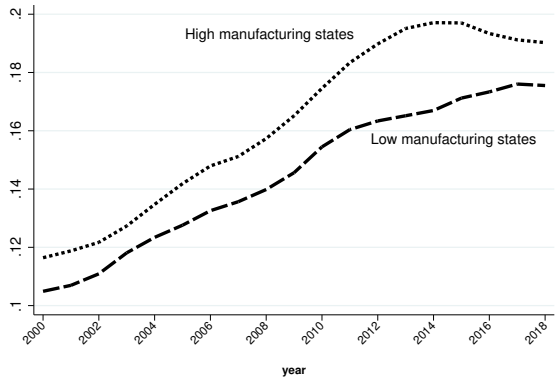
(c) Inflows



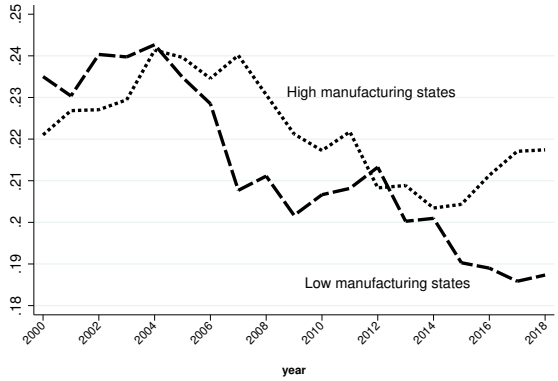
Notes: Expensive states lie above the $75th$ percentile in the distribution of year 2000 real median gross rents. Cheap states lie below the $25th$ percentile in the distribution of year 2000 real median gross rents.

Figure 1.13: Parental Coresidence in High and Low Manufacturing States, 2000-2018

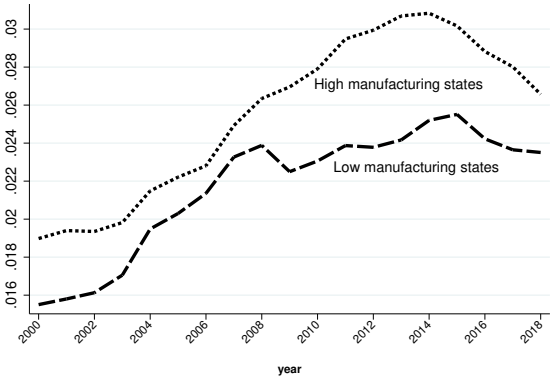
(a) Stock coresidence rates



(b) Outflows



(c) Inflows



Notes: High manufacturing states lie above the $75th$ percentile in the distribution of year 2000 manufacturing employment share of prime-age workers. Low manufacturing states lie below the $25th$ percentile in the distribution of year 2000 manufacturing employment share of prime-age workers.

Chapter 2

Local Economic Conditions and Parental Coresidence Among Young Adults, 2000-2018

2.1 Introduction

The 2000*s* are challenging times for young Americans. In contrast to young adults of the 1980*s* and 1990*s*, young adults of the new millennium face higher housing costs and worse labor market conditions (Cooper and Luengo-Prado 2018). Economic theory predicts that, under such circumstances, young adults can enjoy higher consumption by living with their parents than on their own (Ermisch 1999, Kaplan 2012). As it turns out, the 2000*s* are also characterized by rising rates of parental coresidence (Matsudaira 2016; Choi, Zhu, and Goodman 2019).

Recent studies on the labor market conditions of prime-age workers document steeper declines in the employment rates, wages and labor force participation rates of non-college males relative to all other workers (see, for example, Charles, Hurst, and Notowidigdo 2016; and Binder and Bound 2019). Whereas much has been written about the causes of these differential declines, scholars have not devoted as much attention to the residential implications of worsening labor market conditions for younger workers. Likewise, recent studies on youth living arrangements mainly focus on gender and/or race, and overlook how changing economic conditions in the 2000*s* differently affected the

residential outcomes of non-college and college-educated young adults.

I address these gaps by investigating the relationship between local economic conditions and the living arrangements of non-college and college-educated young adults, 22-34 years old, using Census and American Community Survey data on 229 MSAs for the period 2000-2018.

My paper is characterized by three levels of analysis. First, akin to the approach of Autor, Dorn, and Hanson (2013, 2018), my main model relates changing living arrangements to changing economic conditions by stacking data on MSAs for the intervals 2000-2006, 2006-2012 and 2012-2018, which roughly correspond to the housing boom, the Great Recession and the subsequent recovery. Second, akin to the approach of Charles, Hurst, and Notowidigdo (2016, 2019), I use cross-sectional data on MSAs to examine if changing economic conditions have durable effects on living arrangements. Finally, I estimate a two-way fixed effects model by combining individual-level data on living arrangements with panel data on MSA-level economic conditions for the period 2000-2018. In contrast, existing empirical studies based on local labor market data are mainly characterized by one level of analysis where static measures of living arrangements are regressed on contemporaneous, static measures of economic conditions (for example, Haurin, Hendershott, and Kim 1993; Hughes 2003 and Rogers and Winkler 2014).

To summarize my main results, I find significant contemporaneous and long-run effects of changing rents on parental coresidence. Estimates based on aggregate data show stronger contemporaneous associations between changing rents and the living arrangements of non-college young adults, and similar effects of changing rents on less-educated and more-educated young adults in the long-run. Estimates based on individual-level data also show larger, contemporaneous effects of growth in rent on the likelihood of coresidence among the less-educated.

This paper proceeds as follows. Section 2.2 discusses the data used and the various empirical models that I rely on to examine the associations between local economic conditions and living arrangements. Section 2.3 presents descriptive results on the evolution of parental coresidence based on the economic characteristics of MSAs, followed by regression results. Section 2.4 concludes.

2.2 Data and Estimation Methods

2.2.1 Basic Framework

The starting point of my analysis is

$$Y_{mt} = b_t ECON_{mt} + \gamma_t X_{mt} + \alpha_m. \tag{2.1}$$

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Equation (2.1) describes the relationship between the living arrangements of young adults and socio-economic conditions in MSA m in year t. The dependent variable, Y_{mt}, is the fraction of young adults in MSA m that live with their parents in year t. This is a function of $ECON_{mt}$ which is a vector of MSA-level economic conditions, X_{mt} which is a vector of MSA-level demographic conditions, and α_m which refers to MSA fixed effects. I assume the effects of economic and demographic conditions vary by time which is why their respective coefficients have time subscripts.

I first-difference Equation (2.1) to obtain

$$\begin{aligned} \Delta Y_{mt} = b\Delta ECON_{mt} + ECON_{mt\text{-}1}\Delta b_t \\ + \gamma \Delta X_{mt} + X_{mt\text{-}1}\Delta\gamma_t. \end{aligned} \tag{2.2}$$

In Equation (2.2), ΔY_{mt} is the change in parental coresidence in MSA m between some initial period t-1 and some later period t. This is a function of changes in local economic and demographic conditions given by, respectively, $\Delta ECON_{mt}$ and ΔX_{mt}; as well as initial levels of economic and demographic conditions given by, respectively, $ECON_{mt\text{-}1}$ and $X_{mt\text{-}1}$. Because of first-differencing, Equation (2.2) is not a function of time-invariant MSA-specific effects.

2.2.2 Stacked Regression Model

The main regression analog of Equation (2.2) is given by

$$\begin{aligned} \Delta Y_{m\tau} = \beta_1 \Delta ECON_{m\tau} + \beta_2 ECON_{mt\text{-}1} \\ + \Gamma_1 \Delta X_{m\tau} + \Gamma_2 X_{mt\text{-}1} + \theta_\tau + \eta_{m\tau}. \end{aligned} \tag{2.3}$$

In Equation (2.3), the unit of analysis if $m\tau$ where m is an MSA and τ is an interval. I estimate Equation (2.3) by stacking six-year equivalent first-differences for the intervals 2000 to 2006, 2006 to 2012 and 2012 to 2018. This model allows me to exploit differential changes in economic conditions during, respectively, the housing boom, the Great Recession and the post-recession period.

The dependent variable in Equation (2.3), $\Delta Y_{m\tau}$, measures the change in parental coresidence among young adults in MSA m over interval τ. The explanatory variables are embodied in the vector $\Delta ECON_{m\tau}$ and measure changes in local housing and labor market conditions over an interval. The rest of the regressors serves as control variables with $\Delta X_{m\tau}$ measuring changes in local demographic conditions, $ECON_{m\text{t-}1}$ capturing local economic conditions at the start of each interval, $X_{m\text{t-}1}$ capturing local demographic conditions at the start of each interval, and θ_τ capturing time (interval) fixed effects.

I create a panel of 229 MSAs based on data from the 2000 Census and from various years of the American Community Survey (ACS) to estimate Equation (2.3). [1] To increase the precision of my estimates, I obtain 2006 data by pooling ACS samples from 2005 to 2007. Similarly, I obtain 2012 data by pooling ACS samples from 2011 to 2013, and 2018 data by pooling 2017 and 2018 ACS samples. All data are obtained from IPUMS (Ruggles et al. 2020).

I use the change in log median monthly gross rents, the change in log median annual earnings of prime-age workers, and the change in the employment to population ratio of male prime-age workers as my explanatory variables in the vector $\Delta ECON_{m\tau}$. The corresponding *levels* of rents, earnings and employment at the start of each interval are contained in $ECON_{m\text{t-}1}$.[2]. These serve as controls for the differential exposure of MSAs to housing and labor market shocks.

I use changes in, respectively, the white, black, hispanic, college-educated and married shares of the prime-age population as demographic controls in the vector $\Delta X_{m\tau}$. The corresponding levels of these characteristics are contained in the vector $X_{m\text{t-}1}$, and serve as additional controls. Overall, these demographic controls are meant to account for the effects of migration, changing culture and other social trends that are possibly correlated with economic conditions and living arrangements.

The explanatory variables are standardized to have a mean of 0 and a standard deviation of 1. As such, the coefficients of interest in the vector β_1 show the effects of a one standard deviation change in respective economic conditions over a six-year period on parental coresidence. I estimate

[1] I follow 2013 definitions of MSAs.

[2] Rents and wages are adjusted for inflation using the Consumer Price Index (1999=1)

Equation (2.3) using OLS with standard errors clustered by state and weighted by the year 2000 population of prime-age individuals in MSAs.

2.2.3 Long-Run Model

While Equation (2.3) allows me to exploit differential changes in economic conditions between various intervals of the 2000s, the model only captures the immediate effects of changes in housing and labor market conditions on living arrangements. To the extent the rise in doubling-up among young adults in the 2000s is an economic phenomenon, and given the persistence of dependent living arrangements beyond the Great Recession, it is worth examining if the effects of changing housing and labor market conditions are long-lasting.

I am only aware of two studies in this regard. Paciorek (2016) pools 1980 and 2000 Census data to estimate the impact of MSA-level rents, house prices and unemployment rates on various individual-level residential outcomes. He finds larger effects of rents and house prices compared to the effects of unemployment rates on the probability that a young adult lives with his/her family. Thus, a 20% increase in rents increases the probability of living with family by 2 percentage points whereas a 10 percentage point increase in unemployment rates raises the probability of living with family by just 0.02 percentage points. Similarly, Laeven and Popov (2017) find significant, negative effects of MSA-level house price growth over the period 2001-2011 on the ability of young householders in 2011 to purchase their first home relative to older householders.

I am the first to examine the effects of changes in economic conditions over the period 2000-2006 on parental coresidence over the entire 2000s. The period 2000-2006 coincides with several economic shocks such as the recession following 9/11, the housing boom and the decline in manufacturing employment. My model is

$$\begin{aligned}\Delta Y_{m\text{2000-2018}} = \beta_1^{LR}\Delta ECON_{m\text{2000-2006}} + \beta_2^{LR} ECON_{m2000} \\ + \Gamma_1^{LR}\Delta X_{m\text{2000-2006}} + \Gamma_2^{LR} X_{m2000} + \eta_m.\end{aligned} \tag{2.4}$$

In Equation (2.4), the unit of analysis is the MSA. The dependent variable, $\Delta Y_{m\text{2000-2018}}$, is the change in parental coresidence among young adults between 2000 and 2018. The explanatory variables, as embodied in $\Delta ECON_{m2000-2006}$, are the change in log median monthly gross rents,

the change in log median annual prime-age earnings and the change in employment rates of prime-age males over the 2000-2006 period. The control variables consist of changes in the white, black, hispanic, college-educated and married shares of the local prime-age population over the period 2000-2006 as well as the year 2000 economic and demographic characteristics of MSAs. Once again, I use standardized measures of the explanatory variables for regression.

The coefficients of interest are embodied in the vector β_1^{LR}, and measure the effects of a standard deviation change in respective economic conditions during the 2000-2006 period on living arrangements over the entire 2000s. As before, I use OLS with standard errors clustered by state and weighted by the year 2000 prime-age population in MSAs to estimate Equation (2.4).

2.3 Results

2.3.1 Trends in Local Economic Conditions and Living Arrangements, 2000-2018

Table 2.1 presents weighted summary statistics on changes in economic conditions and parental coresidence among young adults (22-34 years old) in 229 MSAs over various intervals of the 2000s. Overall, between 2000 and 2018, the average MSA experiences higher growth in parental coresidence among non-college young adults relative to college-educated young adults, and higher growth in rents compared to earnings and employment.

The changes in living arrangements and economic conditions vary considerably between the housing boom, the Great Recession and the post-recession period. Although increasing in every period, the average MSA experiences larger increases in coresidence during the housing boom and the Great Recession relative to the post-recession period. Likewise, the average MSA experiences larger increases in rents during the housing boom and the post-recession period relative to the Great Recession, and larger increases in wages and employment in the post-recession period than in the rest of the 2000s. Thus, higher growth in coresidence occurs during periods characterized by higher growth in rents relative to earnings and employment.

Figures 2.1-2.3 provide a closer look at the relationship between changes in economic conditions and changes in youth living arrangements between 2000 and 2018. In Figure 2.1, I compare changes in parental coresidence in high-rent MSAs and low-rent MSAs. High-rent MSAs lie in the

90^{th} percentile in the distribution of rent *growth* between 2000 and 2018 whereas low-rent MSAs lie below the 10^{th} percentile. The data imply that higher growth in rents is associated with higher growth in parental coresidence, with stronger associations seen for non-college young adults. For example, parental coresidence among non-college males increases by 1.4 percentage points in high-rent MSAs and by just 0.8 percentage points in low-rent MSAs over the 18-year period.

In a similar fashion, Figure 2.2 compares changes in parental coresidence in high-earnings MSAs and low-earnings MSAs. There appears to be no correlation between earnings and parental coresidence among non-college young adults. However, there is a clear, negative relationship between earnings and the living arrangements of college-educated young adults. For example, parental coresidence among college-educated males increases by 8 percentage points in low-earnings MSAs and by just 5 percentage points in high-earnings MSAs between 2000 and 2018.

Finally, Figure 2.3 compares changes in living arrangements in high-employment MSAs and low-employment MSAs. Overall, there appears to be a weak, positive relationship between employment and parental coresidence. Considering the correlations among growth in local rents, wages and employment (see, for example, Saks 2008 and Osei and Winters 2018), it is not clear to what extent the positive associations in Figure 2.3 reflect the confounding effects of rents.

2.3.2 Impact of Changes in Economic Conditions on Changes in Living Arrangements, 2000-2018

Table 2.2 presents the estimates of Equation (2.3), that is, the stacked regression model. Panel (a) reports the results for males, and panel (b) for females. All regressions control for changing demographics as well as the initial economic and demographic characteristics of each MSA.

Changing rents and wages show significant associations with the living arrangements of most young adults. In line with theory, higher growth in rents is associated with higher growth in coresidence whereas higher growth in earnings is associated with lower growth in coresidence. Both variables show stronger correlations with the living arrangements of non-college young adults. Among men, a standard deviation increase in rent growth over a six-year period is associated with increases of 0.4 and 0.06 percentage points in coresidence for non-college and college-educated young adults, respectively. Likewise, a standard deviation increase in prime-age earnings over a six-year period lowers coresidence among the less-educated by 0.7 percentage points but raises coresidence

among the more-educated by 0.2 percentage points although the latter is not statistically significant.

Among women, higher growth in rents increases coresidence by 0.5 percentage points for the less-educated and by 0.4 percentage points for the more-educated with both results significant at the 1 percent level. Likewise, higher growth in earnings lowers coresidence by 0.6 percentage points for non-college females and by 0.5 percentage points for college-educated females although the latter is significant only at the 10 percent level.

Changing employment shows a signification association only with the living arrangements of college-educated males. This association is inverse such that a standard deviation increase in employment over a six-year period leads to a 1 percentage point decrease in parental coresidence over the same interval.

The smaller impact of changing economic conditions on parental coresidence among college-educated young adults suggests that the latter possibly rely on alternative residential arrangements during periods of economic decline. That is, whereas non-college young adults stay in the parental home longer or return home in response to, for example, rising rents; college-educated young adults are more likely to double-up with roommates instead of relying on their parents for shelter. Indeed, when I estimate Equation (2.3) using the change in the fraction of young adults, 22-34 years old, that live with roommates, I find larger effects of changing rents and wages on college-educated young adults relative to non-college young adults.[3]

2.3.3 Impact of Changes in Economic Conditions over 2000-2006 on Changes in Living Arrangements over 2000-2018

Table 2.3 reports the estimates of Equation (2.4) where the dependent variable measures the change in parental coresidence between 2000 and 2018, and the explanatory variables measure changes in economic conditions between 2000 and 2006. The results show durable effects of changing rents on the living arrangements of most young adults. Thus, a standard deviation increase in rents during the housing boom raises parental coresidence by about 0.7 percentage points among the less-educated and by 0.8 percentage points for college-educated males. In contrast, the correlations between changing labor market conditions during the housing boom and parental coresidence over the entire 2000*s* are, in general, not significant.

A comparison of the results in Tables 2.2 and 2.3 indicates that rising rents exert a greater

[3]Results available upon request.

impact on living arrangements in the long-run than contemporaneously. This is plausible to the extent that (1) rising rents are associated with lower MSA-level employment growth in the long-run (Gabriel and Painter 2020), and (2) young adults respond to declining local wages and employment on the "residential margin" by moving back in with parents or staying longer with their parents instead of migrating to better local labor markets (Chan, O'Regan, and You 2019). [4]

2.3.4 Impact of Local Economic Conditions on Individual-Level Living Arrangements, 2000-2018

The preceding results, which are based on aggregated MSA-level data, suggest that rising housing costs and declining wages are the main economic determinants of rising parental coresidence among young adults in the 2000s. To what extent is this story confirmed with individual-level data? I examine this by merging individual-level data on young adults, 22-34 years old, with panel data on 229 MSAs for the period 2000-2018. I rely on the 2000 Census for year 2000 data, and ACS for the years 2005-2018.[5] My model is

$$\begin{aligned} Y_{imt} = \alpha + \beta^{IND} ECON_{mt} + \Gamma^{IND} X_{imt} \\ + \phi_m + \theta_t + \nu_{imt}. \end{aligned} \tag{2.5}$$

The dependent variable in Equation (2.5), Y_{imt}, measures the liklihood of coresidence. It is equal to 1 if young adult i in MSA m lives with his/her parents in year t, and 0 otherwise. The explanatory variables, as embodied in the vector $ECON_{mt}$, are log median gross rents, log median prime-age earnings and the employment to population ratio of prime-age males, all at the MSA-level. The control variables, as embodied in the vector X_{imt}, consist of dummies for age, race and marital status of the young adult. Equation (2.5) also controls for MSA and year fixed effects denoted by, respectively, α_m and θ_t. The coefficients of interest are contained in the vector β^{IND} and measure the effects of economic conditions on whether young adults live with their parents. I rely on within-MSA variation to identify these effects.

The estimates of Equation (2.5) are reported in Table 2.4. All regressions are based on OLS

[4] Indeed, the results from estimating Equation (2.4) with the change in log earnings over the period 2000-2018 as the dependent variable indicate that higher growth in rents during the housing boom is associated with lower growth in wages over the entire 2000s. Results available upon request.

[5] Data at the metropolitan level are not available from 2001 to 2004 in the ACS.

with standard errors clustered by state. In line with the preceding results, an increase in MSA-level rents is associated with a higher likelihood of living with parents whereas an increase in MSA-level earnings implies the opposite. Rents have a larger impact on the living arrangements of non-college males and females. Thus, a 10% increase in rents raises coresidence by 1 percentage point for non-college young adults and by 0.6 percentage points for those with a college-degree. In contrast, a 10% increase in earnings decreases coresidence among both non-college and college-educated young adults by 0.8 percentage points. As with previous findings, MSA-level employment rates show no strong associations with living arrangements with either education group.

2.4 Conclusion

In this study, I rely on a sample of 229 MSAs to the study the relationship between parental coresidence among young adults, 22-34 years old, and economic conditions over the period 2000-2018. I estimate three different models of coresidence. Results from a stacked regression model based on panel data at the MSA-level show significant contemporaneous effects of changing rents and wages on parental coresidence with larger effects on the living arrangements of non-college young adults. Results from a cross-sectional model show durable effects of changing rents such that higher growth in rents over the 2000-2006 period leads to higher growth in coresidence for most young adults over the entire 2000*s*. Finally, results from a two-way fixed effects model based on a combination of individual-level and MSA-level data show significant positive effects of area-level rents and negative effects of areal-level earnings on the probability a young adult lives with his/her parents, with higher growth in rents exerting a larger impact on the living arrangements of the less-educated. In contrast, I do not find strong associations between changing prime-age employment rates and living arrangements in any of my models. Thus, housing affordability is the main cause of rising coresidence among young adults in the 2000*s* to the extent the latter is an economic phenomenon.

Table 2.1: Descriptive Statistics on Changes in Parental Coresidence and Changes in Economic Conditions in MSAs over the 2000*s*

	2000-2006		**2006-2012**		**2012-2018**	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Change in Parental Coresidence						
All Males	3.34	1.89	5.60	2.46	0.88	2.36
Non-College Males	4.59	2.20	6.36	2.74	2.11	2.80
College+ Males	2.18	2.77	4.32	3.55	0.72	3.58
All Females	2.61	1.51	4.38	1.93	1.12	1.91
Non-College Females	3.63	1.74	5.13	2.14	2.19	2.39
College+ Females	1.68	2.16	3.53	2.54	0.66	2.39
Change in Economic Conditions						
Change in Log Rents	8.99	7.15	1.59	5.18	9.31	6.26
Change in Log Earnings	1.82	3.75	-7.85	4.84	6.84	3.79
Change in Empop	1.04	2.63	-1.84	1.82	3.80	1.66

Notes: This table reports the summary statistics for the baseline sample of 229 MSAs. It is based on 2000 Census and ACS data. Means and standard deviations are multiplied by 100. All statistics are weighted using the year 2000 population of prime-age individuals in each MSA as weights.

Table 2.2: Impact of Changes in Economic Conditions on Changes in Parental Coresidence, 2000-2018

Dependent variable: Change in Parental Coresidence	**All**	**Non-College**	**College+**
(a) Results for Males			
Change in Log Rents	.0025**	.0043**	.00064
	(.0012)	(.0017)	(.0013)
Change in Log Earnings	-.0046*	-.0069***	.0017
	(.0025)	(.0025)	(.0033)
Change in Empop	-.00079	.002	-.01***
	(.0038)	(.0045)	(.003)
r2	.57	.49	.27
(b) Results for Females			
Change in Log Rents	.0042***	.0052***	.0036***
	(.00072)	(.001)	(.0012)
Change in Log Earnings	-.0058***	-.0058***	-.0054*
	(.002)	(.0019)	(.0027)
Change in Empop	.0029	.0034	-.00071
	(.0026)	(.0025)	(.0022)
r2	.53	.43	.32

Notes: This table reports the estimates of the stacked regression model based on panel data on 229 MSAs for the intervals 2000-2006, 2006-2012 and 2012-2018. All regressions control for changing demographics as well as the initial economic and demographic characteristics of MSAs. All regressions are weighted using the year 2000 population of prime-age individuals in each MSA.

Table 2.3: Impact of Changes in Economic Conditions over 2000-2006 on Changes in Parental Coresidence over 2000-2018

Dependent Variable: Change in Parental Coresidence, 2000-2018	**All**	**Non-College**	**College+**
(a) Results for Males			
Change in Log Rents, 2000-2006	.0078*	.0067**	.0079**
	(.004)	(.0027)	(.0038)
Change in Log Earnings, 2000-2006	.001	.0012	.0084*
	(.0041)	(.0046)	(.0049)
Change in Empop, 2000-2006	.0066	.0077	-.0055
	(.0062)	(.0065)	(.0039)
r2	.66	.7	.42
(b) Results for Females			
Change in Log Rents, 2000-2006	.0057*	.0074***	.0038
	(.003)	(.0027)	(.003)
Change in Log Earnings, 2000-2006	.0047	.0068*	.0049
	(.0031)	(.0036)	(.0036)
Change in Empop, 2000-2006	.0028	.0042	-.0022
	(.0055)	(.0051)	(.0055)
r2	.65	.68	.46

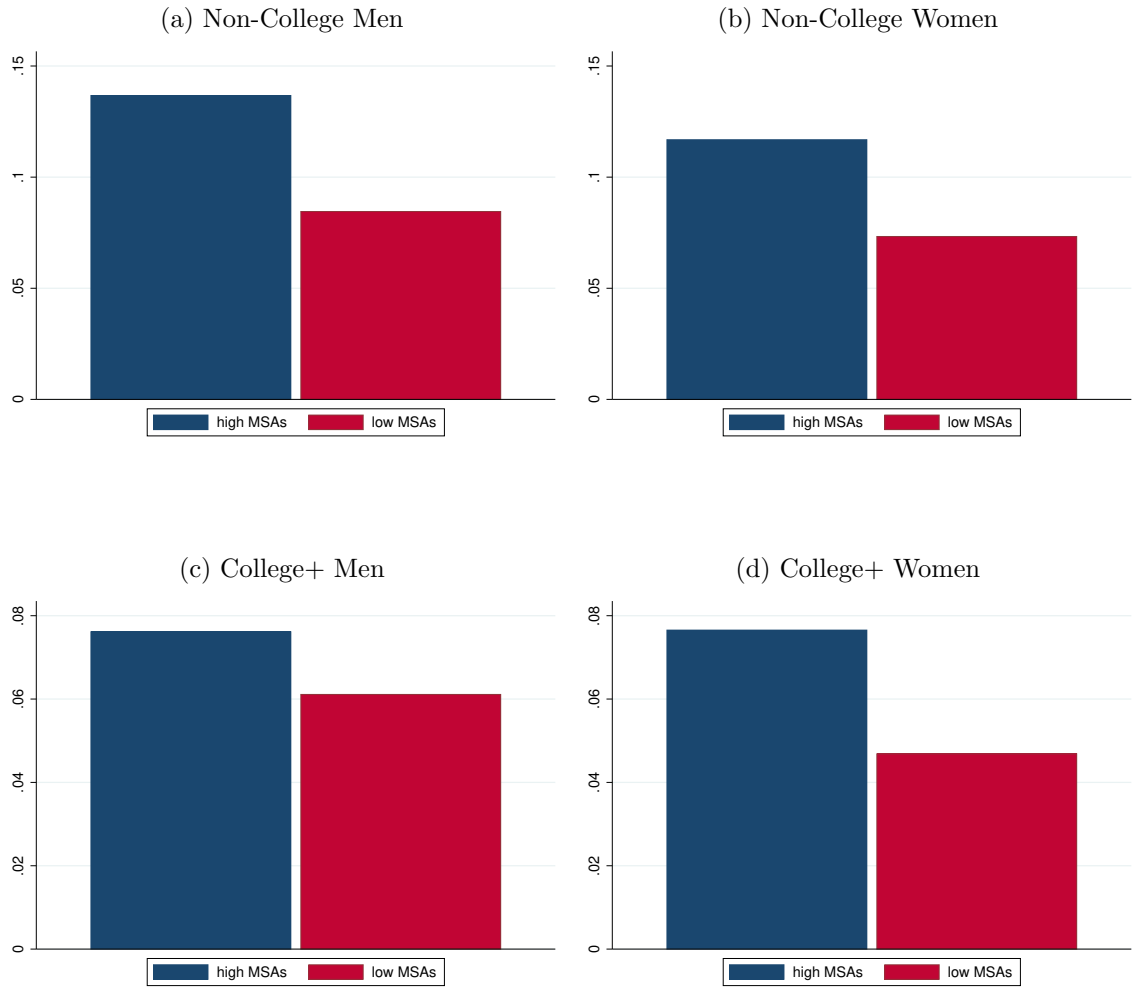
Notes: This table reports the estimates of the long-run model where the dependent variable is measured over the period 2000-2018 and the explanatory variables are measured over the period 2000-2006. All regressions control for changing demographics as well as the initial economic and demographic characteristics of MSAs. All regressions are weighted using the year 2000 population of prime-age individuals in each MSA.

Table 2.4: Impact of Local Economic Conditions on the Probability of Coresidence, 2000-2018

Dependent variable: Probability of Coresidence	**All**	**Non-College**	**College+**
(a) Results for Males			
Log Rents	.073***	.093***	.048***
	(.017)	(.017)	(.016)
Log Earnings	-.11***	-.085***	-.084***
	(.03)	(.025)	(.025)
Empop	.023	.017	.0097
	(.053)	(.051)	(.056)
r2	.21	.21	.19
N	3078104	2119269	958835
(b) Results for Females			
Log Rents	.073***	.095***	.055***
	(.015)	(.014)	(.019)
Log Earnings	-.1***	-.075***	-.084***
	(.027)	(.024)	(.023)
Empop	.077*	.08*	.017
	(.045)	(.044)	(.046)
r2	.18	.17	.19
N	3256323	2028122	1228201

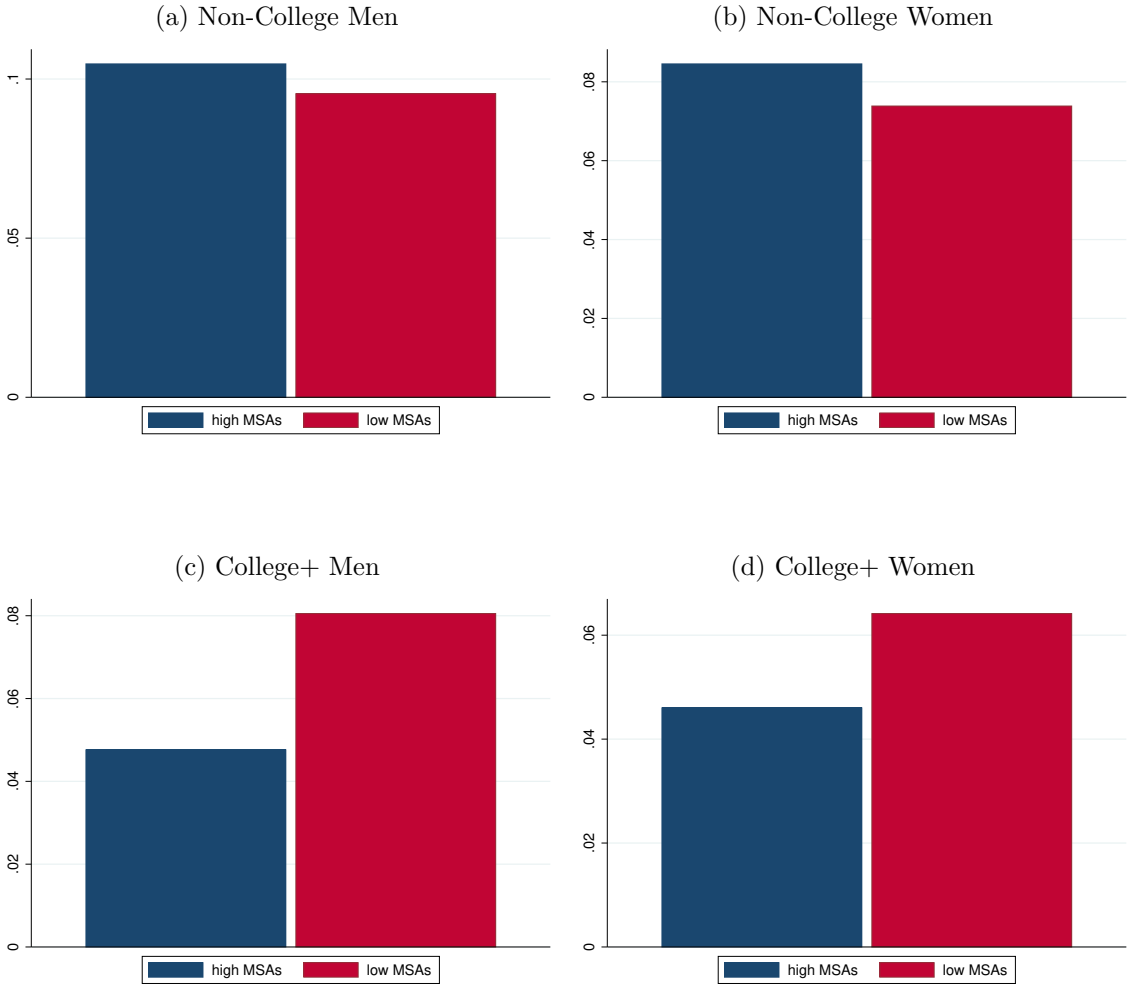
Notes: This table reports the estimates from the two-way fixed effects model of coresidence using individual-level data on living arrangements and panel data on economic conditions for 229 MSAs. All regressions control MSA fixed effects, year fixed effects as well as the age, race and martial characteristics of young adults.

Figure 2.1: Change in Parental Coresidence in High-Rent MSAs and Low-Rent MSAs, 2000-2018



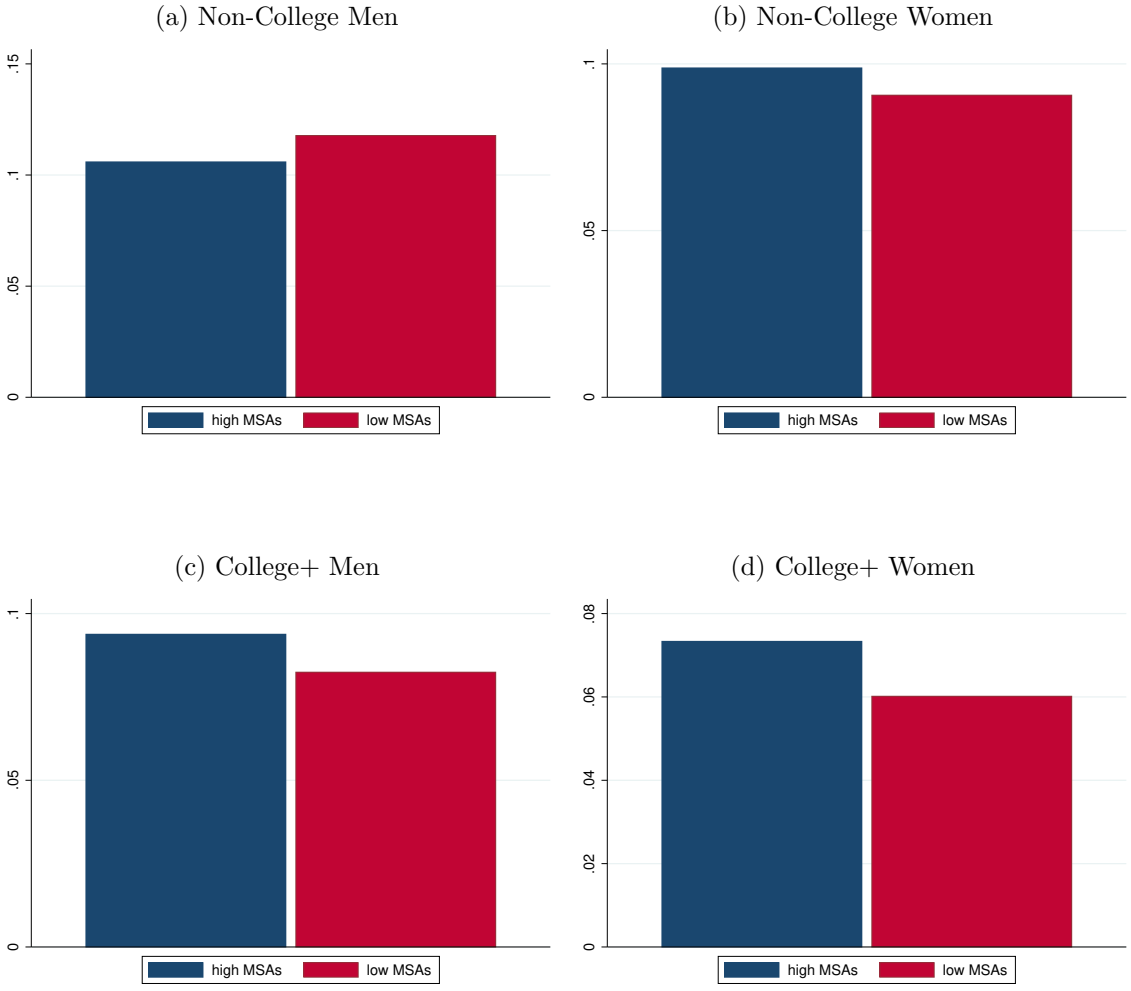
Notes: For each gender-education, the height of the blue bar measures the change in the share of young adults (22-34 years old) that lives with their parents in high-rent MSAs and the height of the red bar measures the change in the share that lives with their parents in low-rent MSAs over the period 2000-2018. High-rent MSAs lie above the 90^{th} percentile in the distribution of growth in median rents between 2000 and 2018. Low-rent MSAs lie below the 10^{th} percentile in the distribution of growth in median rents between 2000 and 2018. Data sources include the 2000 Census and the ACS.

Figure 2.2: Change in Parental Coresidence in High-Earnings MSAs and Low-Earnings MSAs, 2000-2018



Notes: For each gender-education, the height of the blue bar measures the change in the share of young adults (22-34 years old) that lives with their parents in high-earnings MSAs and the height of the red bar measures the change in the share that lives with their parents in low-earnings MSAs over the period 2000-2018.High-earnings MSAs lie above the 90^{th} percentile in the distribution of growth in the median earnings of prime-age workers between 2000 and 2018. Low-earnings MSAs lie below the 10^{th} percentile in the distribution of growth in the median earnings of prime-age workers between 2000 and 2018. Data sources include the 2000 Census and the ACS.

Figure 2.3: Change in Parental Coresidence in High-Employment MSAs and Low-Employment MSAs, 2000-2018



Notes: For each gender-education, the height of the blue bar measures the change in the share of young adults (22-34 years old) that lives with their parents in high-employment MSAs and the height of the red bar measures the change in the share that lives with their parents in low-employment MSAs over the period 2000-2018. High-employment MSAs lie above the 90^{th} percentile in the distribution of the change in male prime-age employment rates between 2000 and 2018. Low-employment MSAs lie below the 10^{th} percentile in the distribution of the change in male prime-age employment rates between 2000 and 2018. Data sources include the 2000 Census and the ACS.

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