Returning to the Nest:
Debt and Parental Co-residence Among Young Adults

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This version: September 2, 2014[*]

Abstract

This paper examines the relationship between a young adults' debt burden and the decision to co-reside with a parent. Using a quarterly panel of young adults' credit histories, and controlling for age, county, and quarter fixed effects, and local demographic characteristics, unemployment rates, and house prices, we estimate the relationship between current period debt and subsequent decisions to co-reside with a parent. Our results indicate that indebtedness – as measured by average loan balances, declining credit scores and delinquency on accounts – increases flows into parental co-residence. Moreover, after moving in, delinquency and low credit scores increase time spent in co-residence. We find that the changing debt portfolios of young adults over this period – characterized by rising student loan debt and small declines in credit card, auto and mortgage debt – can predict 30 percent of the observed increase in flows into co-residence, and 26 percent of the observed increase in time spent in co-residence.

JEL Codes: D14 J11 D91
Keywords: consumer debt, household formation, delinquency, boomerang generation

1   Introduction

Between 2005 and 2014, the fraction of young adults aged 18 to 31 who live with their parents rose 15 percent.[1] Not only is this rate of change unprecedented, but the fraction of young adults residing with parents has reached a historic high of 36 percent. This new trend has grabbed the attention of journalists and policy makers alike, who have popularized terms like the "boomerang generation," referring to young adults who move back in with their parents after having lived on their own.[2] Young adults who "boomerang" are generally described as unable to live independently due to poor economic outcomes. Debt, and particularly student loans, among young adults has also expanded substantially over the past decade. Nearly 40 percent of young adults carried student loans in 2010, up from 26 percent in 2001, and aggregate student loan balances have exploded in recent years, exceeding $1 trillion in 2013 (Dettling and Hsu, 2014; Federal Reserve Bank of New York, 2014). In this paper, we focus on the role of consumer debt in explaining young adults' decisions to move into and out of parental co-residence.

Conceptually, consumer debt and a young adult's decision to live with a parent are related in a number of ways. In the standard life-cycle model a young adult will tend to want to consume at higher levels than their current income permits, since young adults are generally on the steep part of the age-earnings profile. Borrowing enables young adults to smooth consumption over time by shifting resources from higher-earning periods in the future. Furthermore, since debt may be used to finance human capital investments, borrowing may enable young adults to raise their permanent income. But lenders generally make decisions to extend credit based on current income, so a young adult may find themselves unable to obtain their desired amount of credit. Moreover, expectations of future income are not always realized, and unexpected shocks can make what was once an optimal debt burden unmanageable. For a young adult who has exhausted his ability to borrow or his taste for

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[1]Author's calculation from the Current Population Survey. The fraction of young adults living at home rose from 31.3 percent in first quarter of 2005 to 35.9 percent in first quarter of 2014.

[2]See, for example, Parker (2012).

debt, parental co-residence might be an alternative mechanism to smooth consumption.

High levels of indebtedness can also mechanically make it more difficult for a young adult to live on his own, especially if he has had trouble making timely payments. Consumers with poor credit records face higher costs of borrowing and limited access to additional credit. Moreover, potential landlords, mortgage lenders and employers often use credit scores to screen applicants. All of these factors can jeopardize a young adult's financial stability and create incentives to move into parental co-residence.

In this paper, we are interested in identifying the causal relationship between consumer debt and parental co-residence among young adults. Our primary data source is a quarterly panel of data on young adult's credit histories, obtained from a large credit reporting bureau. Importantly, the data includes information on the age of all individuals residing at the young adult's address each quarter, which allows us to determine if an individual co-resides with a parent. Our main empirical strategy is to estimate a series of ordinary least squares (OLS) regressions which relate an individual's indebtedness in quarter t to the decision to move into parental co-residence between t and $t+1$, controlling for age, quarter and county fixed effects, a rich set of demographic characteristics at the Census-block level and county-quarter unemployment rates and median home prices.

Our results indicate that increases in indebtedness —as measured by larger account balances, declines in credit scores, and delinquency on accounts— are associated with statistically significant and economically meaningful increases in the likelihood an individual will move into parental co-residence in the following period. The estimates indicate that larger balances on student loans, credit cards and auto loans increase flows into parental co-residence, as do declining credit scores and mild delinquency. We also find heterogeneous effects by credit risk and parental characteristics: larger account balances and declining credit scores differentially increase transitions into parental co-residence for individuals whose credit scores are subprime in period t, and delinquency differentially increases transitions for young adults with higher socioeconomic status parents.

We also estimate the effects of debt on durations spent in co-residence after moving in, and find that, after moving in, lower credit scores and delinquency both increase the time spent in parental co-residence, while larger balances decrease time spent in co-residence. Overall, we find that the changing debt portfolios of young adults over this period – characterized by rising student loan debt, and declines in credit card, auto and mortgage debt – can explain 30 percent of the observed increase in flows into co-residence, and 26 percent of the observed increase in time spent in co-residence. We interpret these results as evidence that parental co-residence is used as a consumption-smoothing mechanism for weathering periods of financial stress.

The main scholarly contribution of this paper is to empirically examine the relationship between the debt behavior of young adults and subsequent decisions to co-reside with their parents. First, we clarify the mechanisms by which financial stress ultimately leads to parental co-residence. We show that debt is an important determinant of co-residence, even after controlling for labor and housing market conditions. Second, given that life-cycle models of behavior predict borrowing at young ages, we shed light on how borrowing affects other decisions made by young adults. Our results speak to the possibility that parental co-residence is used to smooth utility when young adults have exhausted their ability or willingness to borrow. Third, we contribute to the economic demography literature on household formation by addressing the role of changing financial circumstances. Finally, the concept of the "boomerang" generation has received considerable policy and media attention, and we provide new empirical evidence using high frequency data on the extent of this phenomenon.

2   Background and Relevant Literature

In the standard neo-classical life-cycle models of consumer behavior, borrowing and saving are critical mechanisms for maximizing utility across time periods (see, for example,

Modigliani and Brumberg, 1954; Friedman, 1957; Carroll, 1997). Current period consumption decisions are based not only on current income, but on expected income in future periods, or permanent income. In order to smooth utility over time, a rational consumer borrows during periods in which his income is low or his expenditures are high. Since young adults are generally on the steep section of the age-earnings profile, the life-cycle model predicts that young adults will tend to consume at higher levels than their current income permits. Borrowing in the present enables young adults to smooth utility by shifting resources from higher-earning periods in the future to the present.

Although economists recognize that current consumption should be based on permanent income, lenders evaluate borrowers based on their current income and current debt-to-income ratios. This means that even if it is perfectly rational for an individual to borrow, lenders may not be willing to extend the individual credit. If a young adult exhausts his ability or willingness to borrow, moving into parental co-residence might be an alternative mechanism to smooth utility by reducing living expenses in the current period. Individuals may also vary in their disutility of debt and disutility of living with parents, and some will prefer to smooth via borrowing and others via co-residing with parents.

High levels of debt (relative to income) or delinquency adversely affect credit reports and scores, which can create additional problems that make it difficult to live on one's own. A low credit score can make it difficult to purchase or rent a home, whichdirectly affects a young adult's housing choices. A poor credit record can also limit access to credit, and might prevent a young adult from purchasing a vehicle, a key component to independent living in some areas. Many employers also check the credit reports of job candidates, so low scores could jeopardize one's ability to obtain employment as well. A poor credit history can also create problems with insurance companies, cell phone providers, or utility companies, among others. Lastly, recent research suggests that those with low credit scores may even have a harder time finding a mate, which could also discourage independent living (Dokko and Li, 2014).

Young adults may view the option to live with a parent as insurance against general financial risk. Kaplan (2012) finds that aggregate patterns of consumption, labor elasticities, and saving rates of low-income men are consistent with parental co-residence as insurance. In our context, having the option to co-reside with parents in the future may encourage additional borrowing in the present. For example, a young adult might take on an otherwise unhealthy debt-to-income ratio in order to search for a higher paying job, or take out extra student loans to attend a more expensive university. In each of these cases, if he ends up in a future state in which his income is too low or his expenditures are too high, he could use parental co-residence as an alternative utility-smoothing mechanism. Thus, if downside risk is realized, an individual may have too many financial difficulties–perhaps by missing loan payments or exhausting their ability to borrow–to live on their own, and move back home.

Within the body of literature examining the economic circumstances of young adults, there is a growing interest in young adult's living arrangements and how they are related to the economic environment in which young adults live. Much of the research has focused on the effects of changes in labor and housing markets on the headship rate, that is, the rate at which young adults become independent household heads or spouses. This work generally finds that higher house prices and weak labor markets tend to depress the headship rate and encourage "doubling up" (see, for example, Yelowitz, 2007; Rogers and Winkler, 2013; Lee and Painter, 2013; Paciorek, 2013). Our paper will differ from most previous research as we will focus specifically on the transition into and out of parental co-residence after a period of independent living. Moreover, our primary focus will be on the role of consumer debt, rather than labor or housing markets, although we will control for those variables. As a preview of our results, we find that when we control for debt characteristics, fluctuations in the county-level unemployment rate and higher median home prices exert a relatively modest positive effect on the decision to "boomerang," and no effect on the length of time at home.

Our paper also contributes to a growing literature on the effects of consumer debt on

young adult decisionmaking. Chiteji (2007) provides an overview of debt holding among young adults and its relationship to various "markers of adulthood," including homeownership, marriage and parenthood. Using panel data, she does not find strong evidence that debt holding depresses attainment of these markers of adulthood. In contrast, Shand (2008) shows that debt balances are generally negatively correlated with contemporaneous homeownership and marriage rates using cross-sectional data. Rothstein and Rouse (2011) analyze data from a highly selective university and find that young adults who took out more student loans later chose higher-paying jobs. Our paper contributes to this literature by examining how experiences with debt on a number of dimensions influence choices in living arrangements.

3 Empirical Strategy

The main empirical approach used in this paper is to relate debt characteristics in quarter t to living arrangements inquarter $t+1$ for a sample of young adults. To do so, we require panel data on individual's debt balances and living arrangements. In this section, we describe the main data sources and how we construct the relevant independent and dependent variables.

3.1 Data

Our main data source is the Federal Reserve Bank of New York Consumer Credit Panel/Equifax (CCP/Equifax).[3] The CCP/Equifax is an individual-level panel data set of consumer credit reports, obtained from one of the three main credit bureaus in the U.S. The data have been collected quarterly since 1999 and consist of a five percent random sample of U.S. consumers with credit histories (the "primary sample"), as well as all individuals residing at each primary sample member's address. Once an individual enters the primary sample, he is followed on a quarterly basis until he exits the sample (usually due to death), and the sample is refreshed each quarter as new individuals enter the credit market.

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[3]Additional information about the dataset, including sampling and methodology, can be found in Lee and van der Klaauw (2010) and http://www.newyorkfed.org/microeconomics/ccp.html

The CCP/Equifax includes detailed information on items typically found in a credit report, such as the amounts borrowed on various accounts, whether the account is past due or in deferment, as well as the individual's Equifax Risk Score, which is a type of credit score. For our analysis, we examine each of these measures, both separately and interacted with each other so that we are able to capture a broad picture of an individual's debt holding and overall financial situation. We will focus our analysis on four categories of consumer debt: student loans, automobile loans, credit cards and first mortgages on homes. The data also include information on the Census block of residence and age of the sample member each quarter. Table 1 summarizes these measures of debt-holding as well as all other variables used in our analyses.

As described below in Section 3.2, we focus our analysis on the period from 2005 to 2014 to facilitate interpretation of our results over a period of nearly uniformly rising parental co-residence. We limit the sample to young adults ages 18 to 31 who are in the sample continuously for at least eight quarters, and for whom we are able to match all of the relevant explanatory variables of interest. Our final sample consists of 1,814,074 individuals for a total of 28,940,309 person-quarter observations. Because our sample size is very large, in both our regression tables and our discussion we will describe the precision of our estimates in terms of significance levels that are lower than those commonly used: 0.0001, 0.00005, and 0.00001, and we will emphasize the economic significance of our estimates.[4]

While our data have very rich account-level information, they include limited demographic characteristics; only the individual's age and Census block of residence are available.[5] To overcome this limitation, we proxy for the demographic characteristics of the individual sample member by merging to the data information on the average demographic and economic characteristics of the individual's Census block of residence, which were tab-

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[4]We selected these significance levels based on suggestions by Cameron and Trivedi (2005) to use $\sqrt{lnN}$ as the critical value for a two-sided t-test, as well as by Good (1982) to scale estimated p-values by $\sqrt{(N/100)}$ to calculate the equivalent p-value for a sample size of 100. The sample size for the duration analysis is smaller, and and we use significance levels of 0.0005, 0.00025, and 0.00005.

[5]Federal law prohibits the collection of information on race, ethnicity, sex or marital status in most credit applications, so these are not included in the credit report data.

ulated from the 2000 Census. We use information on the race, ethnicity and sex of the Census block's inhabitants. We also include information on median income (by age-group), educational attainment, and school enrollment for the Census block-group of residence. Finally, we merge in information on trends in local economic conditions, as measured by the county-level quarterly unemployment rate and median home price. Unemployment rates were obtained from the Bureau of Labor Statistics Local Area Unemployment Statistics Series.[6] County-quarter median home prices were calculated by scaling county-level median home prices, obtained from the 2000 Census, by the appropriate value from the quarterly Federal Housing Financing Agency (FHFA) home price index (HPI).[7]

The CCP/Equifax also includes information from the credit reports of all individuals residing at the same address as the primary sample member each quarter. Thus, when an individual in the primary sample changes residences, we observe not only the new geographic location, but also the presence and age of any other household members at the new address. This is imperative for our analysis because the relative ages of household members allow us to infer whether or not an individual resides with a parent in each quarter he is in the sample. Using the Current Population Survey (CPS), where ages and familial relationships between household members are known, we identify all age pairs where there is at least 90 percent probability that the relationship between household members is parent-child.[8] Any

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[6]The BLS provides these unemployment rates at a monthly frequency, and we use rates reported for March, June, September, and December.

[7]The FHFA index is only available at the level of metropolitan statistical areas and for non-urban portions of states, thus we match to the county using MSA-county crosswalks, as described in Dettling and Kearney (2014). This measure describes the movement of real median house prices at the county-level over time. Ideally, we would also include a measure of rental prices, which might be more a more salient measure of prices for this group. The correlation between county-quarter real median house prices and Zillow's county-month estimated median rent prices for March, June, September and December is 0.81 for 2010:Q4 through 2014:Q2. However, to the best of our knowledge, however, there is no data source for rental prices at the local level over the entiretime period we study. In the robustness checks, we also alternatively estimate the model using state rental vacancy rates as a proxy for rental prices.

[8]There are several important differences between the CCP/Equifax and CPS. First, the CPS groups individuals by "household," a definition which is broad and includes various different arrangements of people who occupy a housing unit, but the CCP/Equifax is only able to identify groups of individuals living at the same address. Second, the CCP/Equifax is a nationally representative sample of the U.S. population with credit reports, while the CPS is a nationally representative sample of the U.S. population. For these reasons we must impose some additional restrictions to accurately compare the two data sources and correctly identify parent-child relationships in the CCP/Equifax, the details of which are included in the appendix.

observations in the CCP/Equifax in which young adults share an address with an older adult in one of these age pairs are coded as "living with a parent."[9]

Our primary outcome of interest is whether an individual transitioned from living independently to co-residing with a parent, which we identify from changes in the address listed on the credit report and the "living with parent" variable. To clarify, living "independently" is any arrangement other than parental co-residence, which includes (but is not limited to) living alone, with a spouse/partner, or with a roommate. We define a transition to have occurred when an individual spent at least two quarters not co-residing with a parent followed by at least two quarters co-residing with a parent. The two-quarter limitation ensures we are not just identifying brief transitions, such as those between semesters at college, and ensures that our results are not merely driven by seasonal variation in transitions. As summarized in table 1, the transition rate from independent living to parental co-residence is 1 percent, and the transition rate from parental co-residence to independent living is 6 percent.

3.2   Trends in Debt and Parental Co-residence

Figure 1 displays quarterly trends in parental co-residence since 1989, calculated from the CPS. Note that there is considerable seasonal variation in co-residence, which tends to spike in the June CPS and fall in the December and March CPS due to school enrollment periods. As seen on the smoothed line, which abstracts from this seasonal variation, the fraction of young adults co-residing with a parent was fairly stable over most of this thirty-year period: usually between 31 and 32 percent. Around 2005, however, the fraction of young adults living with their parents began to grow steadily, reaching a historic high of approximately 36 percent in 2013. Using the CCP/Equifax, we can delve a bit further into this increase in the stock of young adults residing with a parent and examine both flows into co-residence and, for young adults that move in, the median length of time spent in co-residence. We find that

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[9]Nearly all age pairs where a young adult is between the ages of 18 and 31 and the other household member is between 25 to 35 years older, as well as a large fraction of age pairs where the other household member is 18 to 38 years older, are included.

between 2005 and 2013, the fraction of young adults moving into co-residence each quarter rose 0.1 percentage points (8 percent), and the median duration of co-residence also rose 2 quarters (18 percent). This suggests both factors help explain changes in the stock, and our analysis will focus on the role of debt in explaining changes in both of these patterns.

Figure 2 displays trends in average loan balances and delinquency of young adults for the period 2005 to 2014, calculated from the credit report data. Panel (a) plots mean loan balances, separately for student loans, auto loans, credit cards, and mortgages, and panel (b) displays delinquency rates on the four types of loans. Both mean balances and delinquency rates are calculated using all sample observations and are not conditional on having a particular loan type in order to best describe patterns in the population. Several notable patterns emerge. First, average balances on credit cards and auto loans were relatively flat before the financial crisis and then declined modestly, and auto loan balances recovered somewhat since 2011. However, these small changes are overshadowed by much larger developments in student loans: average balances on student loans more than doubled, exceeding 12 thousand dollars in 2014. Student loan delinquency among young adults has also increased sharply, from less than four percent in 2005 to nearly ten percent in 2014. Over the sample period, delinquency on credit cards fell markedly, and delinquency on auto loans and mortgages remained fairly stable.

In this paper, we are interested in how consumer debt evolves over time, and specifically how it might affect individual's propensities to co-reside with a parent. To illustrate how debt evolves with these transitions, figure 3 plots the time path of average delinquency rates and credit scores for individuals who made the transition from living on their own to living with parent in (a) and as a comparison, individuals who moved, but continued to live on their own in (b). Note that we expect the general moves in figure 3b to be a combination of individuals upgrading residences, those moving to enter different living arrangements, as well as those downgrading residences for the same financial reasons one might move in with parents. Therefore, this is not exactly a counterfactual to the transition into parental co-

residence, but the comparison can still be informative. In both figures 3a and 3b the sample before/after a move is limited to individuals who move exactly once and are observed eight quarters before or after the move. To be clear, this means the sample used to calculate the means to the left of zero is not the same as the sample used to calculated the means to the right of zero. Since individuals must naturally age over the eight quarters they are observed up until or after a move, and age may have its own separate effect on the delinquency and credit scores, we plot age-adjusted delinquency rates and credit scores.[10]

As seen in figure 3a, in the quarters leading up to the move, mean delinquency rates rise markedly, from 9 percent to nearly 14 percent, and mean credit scores fall, from 632 to 626. After the move, both delinquency rates and credit scores stabilize, and after one year since the transition into co-residence, delinquency rates begin to fall and credit scores begin to rise. For individuals who move locations but continue to live on their own (figure 3b), mean delinquency rates are fairly stable before and after the move, hovering around 10 percent before the move, and 11 percent after the move. Mean credit scores rise before the move, and continue to rise after the move. There appears to be a slight increase in delinquency and decline in credit scores in the quarters immediately surrounding the move, which might reflect additional expenses and credit inquiries associated with moving. The different patterns for the two types of moves provides *prima facie* evidence that individuals tend to transition into parental co-residence after a period of increasing financial hardship, and that these effects do not generalize to all movers.

3.3 Empirical Specification

Our goal in this paper is to uncover the relationship between an individual's indebtedness and their decision to co-reside with a parent. Since we are interested in identifying whether debt has a causal effect on an individual's choice to co-reside with a parent, we focus on the relationship between debt in quarter t and the probability that an individual transitions

[10]Age-adjusted delinquency rates and credit scores were calculated using the entire sample, not the limited sample used for the construction of this figure.

from/to living on their own between *t* and *t+1.* We estimate a linear probability model according to the following specification:

$$y_{it,t+1} = {}_1debt_{it} + {}_2x_{it} + {}_3block\,chars_{bt} + {}_4county\,chars_{ct} + \epsilon_{it} \tag{1}$$

For most of our analysis $y_{it,t+1}$ is an indicator for whether an individual i transitioned from living on their own to living with a parent between period *t* and period *t+1,* which we refer to as $movein_{it,t+1}$. We will also investigate the length of time spent in co-residence.[11]

Our main independent variables of interest $debt_{it}$ are a set of measures of an individual's indebtedness, including account balances and delinquency status for each of the four categories of debt, as well as changes in the credit score. For account balances we construct the total balance in each category ($balance_{it}$). For delinquency, we construct an indicator for whether an individual is delinquent on an account in quarter t ($past\,due_{it}$), as well as separate indicators for being delinquent one quarter ($past\,due\,mild_{it}$) and more than one quarter ($past\,due\,severe_{it}$). For credit score growth, we construct a measure of the percent change in the credit score between quarter *t-1* and t ($\%\Delta credit\,score_{it-1,t}$) . Note that each of the independent variables is measured in period *t*, prior to when we observe if the individual has moved between *t* and *t+1.*

We also include a vector of individual-level controls available in the credit report data (x_{it}), which includes the individual's credit score, and age and county of residence fixed effects. The credit score is a composite measure of credit-worthiness which reflects a borrower's overall perceived riskiness.[12] Since our data are missing information on income and assets, we control for the individual's credit score to ensures that the estimated effects of debt are

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[11]More details on the estimation of the duration models used are provided in section 4.5.

[12]The Equifax credit score is determined by payment history, credit utilization, length of credit history, types of credit used, and new credit accounts. Although income is not a direct component of the credit score, it may be indirectly reflected if higher income borrowers spend more and are offered more credit. We therefore control for the level of credit score in all of our analyses. For the purposes of our analysis, credit scores are potentially preferable to measures of income or wealth, which are missing from our data. Negative transitory income shocks may not be captured in lower frequency income or wealth measures, but could quickly damage credit if payments are missed.

net of any differential effects of overall credit riskiness and financial well-being. *block chars$_{bt}$*
refers to the block/block-group characteristics, which include sex, race/ethnicity, education
levels (high school dropout, high school degree, some college, college, post-graduate degree),
school enrollment (in both undergraduate and graduate school). It also includes median
income, which is matched by the individuals block-group and age-group (18-24 and 25-34).
county chars$_{ct}$ refers to the county-quarter unemployment rate and the median home price.

To assign a causal interpretation to $_1$ we must assume that $debt_{it}$ is exogenous to the
choice to move in/out of parental co-residence between *t* and *t+1*. If our empirical strategy
was to relate contemporaneous debt to living arrangements, we would surely face the problem
of reverse causality, since it would be impossible to separate the effect of debt on the choice
to live with a parent from the effect of living with a parent on debt levels. Thus, it is
imperative that we exploit the panel nature of our data and focus on the effects of debt in
the periods prior to the one in which the individual moves in with a parent.

The reverse causation threat to assigning a causal interpretation to $_1$ is the possibil-
ity that individuals who have already decided to move in with parents in a future period
systematically become more/less indebted in an earlier period. In this context, reverse cau-
sation requires behavior to change deterministically based on future events. For instance,
to preview our results, we find that four-quarter declines in the credit score increase the
probability of entering parental co-residence in the next period. The reverse causality inter-
pretation of this result requires that the young adult decided to move in with his parents,
but not for some time; and because of that decision, abused credit in such a way that his
credit score declined. Note that this story is distinct from that proposed by Kaplan (2012),
which posits that having the insurance option of co-residence may lead to greater risk taking
and debt accumulation. If the realization of downside risk leads a young adult to exercise the
co-residence option, this pattern would still imply a causal effect of debt itself on parental
co-residence.

Finally, since our data have no information on individual employment or health, we are

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forced to be agnostic about the potential *causes* of problems managing debt. For example, a spell of unemployment or a health shock could lead an individual to accumulate debt, and this elevated debt may lead an individual to co-reside sometime in the future.[13] Our analysis will separately control for local unemployment rates at quarter t in order to proxy for contemporaneous employment shocks, but we do not attempt to separate how past economic conditions might have affected the current level of indebtedness. Thus, we interpret our results as reflective of the effect of debt on co-residence, but note that it is outside the scope of this work to explain the mechanisms via which an individual becomes indebted.[14]

4   Results

4.1   Loan Balances

As an initial investigation into the role of debt in parental co-residence decisions we examine one of the simplest measures of debt-holding: loan balances. An important caveat is the possibility that greater loan balances may simply reflect greater income or capacity to borrow. For example, a greater student loan balance may reflect a higher level of education, and a greater auto loan balance may reflect a more expensive car purchased due to higher income. That being said, large balances may pose high psychic costs, and individuals may choose to live with a parent in order to repay more quickly. Table 2 panel A displays the results of separate regressions for the four categories of debt examined: student loans, credit cards, auto loans and mortgages. [15]

Table 2 panel A indicates that for each of the categories of debt except mortgages,

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[13]Some incapacitating health problems, such as stroke, may lead to both increased debt as well as parental co-residence, however, these types of shocks are not common among young adults.

[14]A tangential literature addresses the causes of debt accumulation, both overall and across different types of households. For example, Sullivan (2008) shows low-asset households increase their unsecured borrowing in the face of temporary income shortfalls due to unemployment, while the those with the lowest assets (who likely have little access to credit) and wealthier households (who have assets from which to dissave) do not.

[15]Credit card balances here reflect balances at the time the lender submits reports to the credit reporting agency (often statement balances) that are not necessarily carried over to the next month. Those who pay off their credit cards in full each month generally still have non-zero balances on the credit report.

greater loan balances are associated with increased propensities to move in with a parent in the following quarter. This suggests that on average, any income effects signaled by large loan balances are swamped by a behavioral effect wherein large balances incentivize moving in with a parent. Although the results are precisely estimated, the effects are economically fairly small: an additional $10,000 in student loans is associated with a 0.05 percentage point increase in the propensity to move in, which represents a 4.6 percent increase at the mean of $movein_{it,t+1}$. The effects are similar for auto loans, and slightly larger for credit cards. Note that larger mortgage balances exert a very small, negative effect on moving in. This is expected, since greater mortgage balances reflect homeownership, and parental co-residence would not necessarily reduce expenses for young adult homeowners in nearly the same way that renters can immediately save on housing expenses by moving in with parents.[16]

Because loan balances alone can simply be a signal of one's income and the amount of credit one can acquire, we would like to be able control for an individual's income or wealth in order to isolate the effect of debt from income. Since our data are missing information on income and assets, we control for the individual's credit score at time t in all our analyses. Our next exercise is to consider whether there are interaction effects between balance size and the credit score. To isolate these effects, we examine the effect of loan balances separately for prime and subprime borrowers. Credit scores which are prime (above 660) signal an individual has a demonstrated reputation for being able to manage debt, while credit scores which are subprime (below 660) indicate that the borrower is considered risky and either has had problems with debt in the past, or may have problems in the future.[17] This analysis will allow us to distinguish the effects of loan balances on those individuals who may be having problems managing the debt from the effects on those who are not.

Panel B of Table 2 interacts the loan balance with subprime status. As seen in the

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[16]In appendix table A.2, we also present results where we examine the effects of the balance at different points in the distribution of positive balances, which indicates the effects generally increase with balance size.

[17]The results are not sensitive to the specific score used as the cutoff; estimates using 620, for example, yield qualitatively similar results, with even larger magnitudes for the group with lower scores.

coefficients on the interaction term $balance_{it} * subprime_{it}$, larger loan balances are associated with increased probabilities of moving in for subprime borrowers relative to prime borrowers. In fact, for student loans, credit cards and auto loans, the effect of a large balance is at least 76 percent larger for subprime borrowers than prime borrowers, and for auto loans, balances exert virtually no effect on move-in probabilities for prime borrowers. We interpret this as suggestive that the interaction with prime status indeed nets out some of the income-related aspects of large balances. The smallest differential effect of balances between prime and subprime borrowers is on student loans, perhaps because student loan balances are less tied to current consumption than the other forms of debt: student loans reflect human capital investments that may or may not translate directly to current income, while credit card spending is directly tied to recent purchases, and auto loans are collateralized by vehicles owned by the borrower. For mortgages, the effect of balances on move in probabilities are negative for both prime borrowers and subprime borrowers alike, although the effects are closer to zero for subprime borrowers.

Table 2 also displays the coefficients on the credit score and the economic controls in the model.[18] As expected, a higher credit score reduces the probability of moving in with a parent in the following quarter. Focusing on the economic measures, increases in the county-quarter median home price and unemployment rate both increase the probability an individual will move in with a parent. This indicates that individuals facing worse labor market conditions (and hence, increased likelihood of unemployment) display increased probabilities to move in with a parent. The results for home prices are consistent with individuals residing in more expensive housing markets being priced out of living independently.

The coefficients on the unemployment rate and median home price are economically fairly small: column (1) indicates that a one percentage point rise in the unemployment rate increases the probability an individual will move in with a parent by 0.01 percentage points

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[18]Appendix table A.1 displays the coefficients on the other controls used in the model. Each of the demographic controls enter the model in a sensible way, with similar effects in regressions for each of the four loan types, suggesting that block-level measures indeed proxy for individual demographics.

(1.6 percent at the mean), and a $10,000 increase in the median home prices increases the probability an individual will move in with a parent by 0.008 percentage points (0.7 percent at the mean). To put these numbers in perspective, between the first quarter of 2005 and the first quarter of 2014, mean balances on student loans increased from approximately $5,300 to $12,000, and mean unemployment rates increased from 5.4 percent to 6.8 percent. Our estimates indicate these changes in student loan balances and unemployment rates would increase flows into co-residence by 3.2 percent and 1.6 percent, respectively.[19] Moreover, estimating the model without the economic controls (not shown) does not change the estimated coefficients on the debt variables in any measurable way, which indicates that debt and economic conditions exert separate effects on co-residence. While this does not rule out the possibility that *individual* unemployment spells lead to problems managing debt (and hence, co-residence), it does indicate that contemporaneous *local* unemployment rates are not an omitted variable biasing our estimates of the effect of debt.[20] We interpret this as suggestive evidence that debt itself has an effect on co-residence separate from any current labor market effects on co-residence.

4.2 Changes in Credit Scores

Thus far we have presented evidence that larger amounts of debt increase the probability of moving in with a parent. While suggestive, these results are potentially muddled by differential income and wealth effects, since individuals with greater means may simply have more spending power and access to credit, and therefore carry larger balances. While we at least partially alleviate this problem by controlling for the individual credit score in all specifications, we now focus directly on the effects of movements in the credit score on co-

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[19]In section 4.6, we provide additional analyses comparing the effects of debt and economic conditions on trends in co-residence.

[20]Recent research by Gyourko and Tracy (2013) indicates that local unemployment rates are a poor measure of individual employment risk, as measurement error in the proxy can lead to attenuation bias. Therefore, we additionally estimate the model with county-quarter fixed effects in the robustness checks, to address the possibility of attenuation bias due to measurement error in the county-quarter unemployment rate or house price measures. Again, we find no change in the coefficient on $debt_{it}$.

residence. By analyzing changes in credit scores, while still controlling for the level, we can isolate the effects of changing financial circumstances on different types of borrowers. Changes in credit scores reflect changes in individuals' interactions with credit, and can signal the emergence of problems managing debt; for example, a declining score can reflect missed payments or a decline in utilization.

Table 3 displays the results. Column (1) estimates equation 1 for the independent variable $\%\Delta credit\ score_{it-1,t}$, which is the percentage change in credit score between period *t-1* and *t*. The estimates indicate that a larger increase in the credit score is associated with a statistically significant decline in the probability that an individual will move into parental co-residence, or to be consistent with the previous results, a larger decline in the credit score leads to an increase in the probability a young adult will move in with a parent. This point estimate implies that, holding all else equal, moving from the median to 25th percentile credit score (a 15 percent decline) increases the probability an individual will move in with a parent by 0.1 percentage points, or about 10 percent at the mean of $movein_{it,t+1}$. Column (2) alternatively estimates equation (1) for the one year percentage change in the credit score ($\%\Delta credit\ score_{it-4,t}$). The results are nearly identical to those found using the one quarter change. This suggests short and long run declines in the credit score exert similar effects, which is likely because credit scores tend to change slowly (recall the average one-quarter change in credit scores is 0.3 percent). Note also that the coefficient on the level of the credit score ($credit\ score_{it}$) is negative, indicating that both an increasing credit score and a higher credit score separately decrease the probability an individual will move in with a parent.

Next we re-estimate the model interacting the credit score growth rate with an indicator for having a subprime score in quarter *t*. The effect of changes in credit scores is likely to be different for higher-risk and lower-risk borrowers: scores that decline but remain high are likely due to inquiries and new credit utilization, whereas scores that decline among risky borrowers likely signify problems with repayment. Indeed, very few borrowers with prime

scores are delinquent on any accounts.[21] Conceptually, these are two very different scenarios. The first could reflect an improving financial situation, such as a new mortgage or auto loan, whereas the second is most likely indicative of a worsening financial situation. Columns (3) and (4) of Table 3 present these results. In each case, the coefficient on $\Delta creditscore_{i,t-1,t} * subprime_{it}$ is negative and statistically significant, while the coefficient on $\Delta creditscore_{i,t-1,t}$ is small in magnitude and less precisely measured. This indicates that for borrowers whose score falls and remain prime, a falling score has little measurable effect on co-residence. On the other hand, a falling score leads to a statistically significant increase in co-residence for young adults who are subprime at t.

4.3 Delinquency

Account balances and credit scores do not directly capture the effects of *problematic* debt, since individuals with greater means may be able to access more credit, and large purchases can damage the credit score. Therefore, our next exercise is to examine delinquency, an aspect of the credit report that provides clear insight into problems managing debt. This measure also offers the cleanest interpretation, since it is stripped of any income or wealth effects. That being said, delinquency may be just a small part of the overall effect of debt on co-residence, especially if individuals choose to co-reside with a parent to *avoid* delinquency. Table 4 displays the results of estimating equation (1) using ordinary least squares for the dependent variable $movein_{it,t+1}$ and the independent variable $pastdue_{it}$. Table 4 column (1) displays estimates the effect of being past due on any type of account on co-residence, and indicates that overall, delinquency increases the probability an individual moves in with a parent by 0.12 percentage points. At the mean of $movein_{it,t+1}$, this is equivalent to a 12 percent increase in flows into co-residence.

Column (2)-(6) of panel A of Table 4 display the results separately for delinquency on each type of account. Because an individual who is not past due can be either current, or simply

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[21]In our sample, 0.23 percent of prime and 23.7 percent of subprime credit report-holders are past due on any account.

not have the particular type of account, we additionally include an indicator for having a particular type of account and being current on payments, which we label $current_{it}$. In all cases except mortgages, the coefficient on $current_{it}$ indicates that being current on payments increases flows into co-residence relative to not having the type of loan, which is consistent with the balance results presented earlier. For all categories of loans except student loans and mortgages, delinquency also increases flows into co-residence, both relative to those who do not have a loan and relative to those who are current on a loan.

While the negative coefficient on student loan delinquency might seem surprising, it appears to reflect regulations on repayment unique to student loans: individuals experiencing financial difficulties may apply for a deferment of payments on their federal student loans, which is an alternative to missing payments during periods of financial stress that is not available for the other types of loans.[22] Our data do include information about student loan deferment, so our next exercise is to consider the effects of deferment as well as delinquency. Deferments, however, can begranted for reasons other than hardship, most notably for school enrollment, and the data do not include the reason for the deferment. Our proposed solution is to focus on deferments for individuals over age 22, so that we exclude cases where deferment is most likely due to school enrollment.[23] In column (3) of panel A of Table 4 we re-estimate the model with an indicator variable $past\,due/defer_{it}$, which takes on a value of one if an individual is delinquent, or if he has at least one student loan in deferment and is over age 22. The coefficient on $past\,due/defer_{it}$ on a student loan is positive and statistically significant, suggesting that delinquency/deferment on a student loan leads to a 0.18 percentage point

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[22]For more information on federal student loan deferment, see `https://studentaid.ed.gov/repay-loans/deferment-forbearance`. Those who do not qualify for deferment may also pursue forbearance, which cannot be identified in our data. Deferment is possible for some private loans, which comprise a minority of all student loans, but policies are lender specific. We hesitate to interpret deferment as a measure of individual unemployment for several reasons. First, deferments are granted for reasons other than unemployment. Second, deferments are not automatically granted, and not all unemployed individuals may seek them. Deferments for unemployment last six months, after which a borrower can re-apply, for a maximum deferment of three years. Thus, an unemployment spell may end before, or extend beyond, the deferment period. We interpret deferment as simply an alternative to delinquency exercised by individuals who may have become past due had the deferment not been available.

[23]The results are not sensitive to using cutoffs at age 21 or 23.

increase in flows into parental co-residence (18 percent at the mean). Between 2005 and 2013, delinquency/deferment rates on student loans rose from 13.4 percent to 26.2 percent, and this estimate implies this change would lead to a 2.3 percent increase in flows into co-residence.

Next, we estimate equation (1) with separate regressors for mild delinquency (30-89 days) and severe delinquency (90+ days). Table 4 panel B column (1) displays the results of this analysis for delinquency on any type of loan, where each coefficient is interpreted as relative to being current on all accounts.[24] This exercise indicates that while mild delinquency increases transitions into co-residence, severe delinquency has a small and statistically insignificant effect. Because our dependent variable is a flow into co-residence, an individual who moves in with a parent after becoming mildly delinquent is no longer in the sample the following quarter when he might have become severely delinquent. Therefore, we interpret the strong effects of mild delinquency and weak effects of severe delinquency as indicative that individuals who develop problems with debt and are willing and able to move in with a parent, choose to do so *prior* to entering severe delinquency. Continuing to live alone in severe delinquency may reveal that parental co-residence is an extremely undesirable or unavailable option for that individual. This suggests parental co-residence is indeed used to smooth consumption, often pre-emptively, as opposed to being a "last resort" option.

Columns (2)-(6) of table 4 panel B investigate delinquency on each loan type separately. In this case, we again include the dependent variable $current_{it}$ and an indicator for deferment on student loans after age 22. With the exception of student loans, we find that mild delinquency exerts larger effects on transitions into co-residence than does severe delinquency, consistent with the results found in column (1). For credit cards and auto loans, mild delinquency increases transitions into co-residence by 5 and 4 percent, respectively. For credit cards, severe delinquency also increases transitions into co-residence, but the effects are about the half the size of the effects on mild delinquency. For student loans, those

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[24]An individual is considered current on all accounts if he is not past due on any account, which includes individuals who have no accounts on the credit report.

with deferments are the most likely to move into parental co-residence. Mildly delinquent borrowers are somewhat more likely to move into co-residence than individuals who do not have a student loan, but are less likely than those who are current on their student loans. Severely delinquent student loan borrowers are less likely to move into co-residence than those with or without student loans, regardless of the loan status. We interpret this as suggestive that, consistent with our previous results, young adults who are willing and able to co-reside may prefer to enter co-residence prior to becoming severely delinquent.

Finally, column (6) examines the effects of delinquency on mortgage debt on parental co-residence. Being mildly delinquent on mortgages reduces the probability of moving in with a parent, while being severely delinquent exerts a positive, but statistically insignificant effect on transitions into co-residence. This is sensible since those with mortgages are homeowners, and we expect a homeowner's living arrangements to be less responsive to mild levels of delinquency; co-residence will not reduce living expenses as easily as it might for a renter.

4.4   Heterogeneity by Socioeconomic Background

Next, we consider whether young adults of different socioeconomic backgrounds –as measured by parental income, education and distance from a parent's home– respond differently to debt. *Ex ante*, it is not clear which groups might display a greater response. On the one hand, higher income parents may be able to provide their children with additional means of support and/or greater access to informal credit. If so, young adults from higher income families may not need to borrow as much in formal credit markets in the first place, or they may have an alternative buffer if debt becomes unmanageable. On the other hand, a higher income parental household may reside in a larger home and the financial means to absorb a young adult if he should wish to move back. Co-residence might seem more costly for a young adult who lives further away from a parent, but the ability to have moved further away at young age may simply proxy for parental income.

To capture parental characteristics, we must limit the sample to individuals who we

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observe to have co-resided with a parent before moving out on their own, at which time they become at risk for returning home. For this subset of individuals, we capture the characteristics of the Census block of residence at the time when the individual lived with a parent, and use those characteristics to proxy for the parent's income and level of education. For income, we use the median income among 45-64 year-olds and for education, we use the fraction of individuals with a college or graduate degree. We also collect the parent's county of residence during the period of past co-residence. For these analyses, we restrict our focus to the two broad measures of debt: credit score changes and delinquency on any account.

Table 5 panel A reports interactions between parental characteristics and young adults' credit score growth, and panel B reports interactions between parental characteristics and young adult delinquency. Column (1) repeats the analyses from tables 3 and 4 on this limited sample for comparison. Columns (2) and (3) include interactions with parent income and education. As shown by the level terms, higher parental income and education both increase the probability that a young adult will move in. We interpret this as indicative that parents with higher incomes and levels of education are more likely to have the space and resources to house an adult child. The interaction terms between parental income/education and delinquency indicate that individuals with higher income/education parents are more likely to move in when when they are past due than individuals with lower income/education parents. The interaction effects for credit score growth are imprecisely measured, indicating that declining credit scores do not influence co-residence decisions differentially by parental income and education. Column (4) interacts credit score growth and delinquency with the distance between the parents county of residence and the young adults' county of residence.[25] This exercise indicates that individuals who live further from home are more likely to move in overall, but there is no differential effect of debt. We interpret this as evidence that living farther away from a parent is an alternative proxy for parental income, which appears to

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[25]We use great circle distances (e.g., "as the crow flies") between county centroids, downloaded from the Center for Transportation Analysis in the Oak Ridge National Laboratory, at `http://cta.ornl.gov/transnet/SkimTree.htm`.

dominate any additional costs of moving home from further away.

4.5 Time Spent in Co-residence

Our next exercise is to examine when a young adult decides to move out of co-residence after having opted to move in. It is not clear *ex ante* that the decision to move out would necessarily be symmetric to the decision to move in. In fact, it seems highly likely the decision to move out will be more nuanced and idiosyncratic than the decision to move in: a period of financial distress may force an individual to move in with a parent, but a return to financial solvency does not necessarily force, or even create a sense of urgency for an individual to move out. Since parental co-residence is rarely an absorbing state for young adults, we focus our analysis on the duration of time spent in co-residence, as opposed to simply whether or not an individual will move out. To study this, we analyze duration models, which allow for time-varying covariates and rates of exiting co-residence. We define a spell in co-residence (called $duration\,coreside_{it}$) to begin when a young adult moves from living alone to living with parents, at which time he is then at risk for moving out, and the spell ends when the young adult moves out of parental co-residence.[26] We estimate accelerated failure time survival regressions, which allow us to analyze how time-varying covariates influence the duration of parental co-residence. Because we are interested in in the evolution of indebtedness and individuals can substitute across debt types over time, we include balance and delinquency on all loan types, as well as credit scores, in a single specification. Note that we omit mortgages from this analysis, since very few young adults living at home have mortgages. The model includes all of the controls includes in equation (1): age, county, and quarter fixed effects, block-level demographics and county-level economic conditions.

Table 6 displays results, reported as time ratios, where each column heading indicates

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[26]We exclude from this analysis individuals who we do not observe having living independently in prior period. For these individuals, the beginning of their spell cannot be analogously defined because we do not know how long the individual has been in parental co-residence. We include only the first spell for any young adults with multiple spells.

the distributional assumption used for the log of the error term.[27] The results are largely consistent across specifications, and in what follows we describe the preferred specification, the gamma model, which is reported in column (4).[28] The results indicate that larger student loan and auto loan balances decrease the duration of time spent at home: a $10,000 increase in loans decreases the duration of co-residence 1.5 percent for student loans and 4.9 percent for auto loans. Credit card balances also slightly reduce the time spent at home, though the effects are not precisely measured. Similarly, for each loan type, being current on payments reduces the duration with parents by 10 to 18 percent, relative to not having that loan type. This indicates that young adults who have debt and can manage their debt payments move out sooner than young adults who have no loans.

For student loans, each loan status except severe delinquency reduces durations in co-residence relative to having no student loans. Delinquency of 90 days or more, however, is associated with a 7.5 percent increase in the duration in co-residence. A student loan in deferment increases time spent in co-residence relative to being current, but durations are still almost 10 percent lower than those without student loans. Recall that deferment is an alternative to delinquency offered to young adults who are in financial hardship and may otherwise not be able to make payments. This indicates that deferment enables a young adult to reduce the length of time spent in co-residence, relative to those who become severely delinquent during the period of co-residence.

For auto loans, severe delinquency increases time spent in co-residence relative to mild delinquency and being current. For credit cards, being current and being seriously delinquent have similar effects on the duration, around 20 percent less time than those without any

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[27]Time ratios are exponentiated coefficients. A time ratio of 1.1, for example, means that a marginal increase in the covariate is associated with a 10% increase in the duration of co-residence, while a time ratio of 0.9 indicates a 10 percent reduction of the duration.The median duration of co-residence, accounting for the right censoring in the data, is 12 quarters.

[28]The gamma distribution yields lower Akaike information criterion and Bayesian information criterion values than alternative distributions, which are also displayed in descending AIC/BIC order in table 6. These, as welll as estimates of Cox proportional hazards models and competing risks regressions (where aging out is the competing risk), all yield similar results. OLS estimates using completed spells are reported in appendix table A.3.

credit cards at all. The fact that having an auto loan or credit card in any payment status decreases time at home relative to having no loans suggests that those who do not use these types of credit are fundamentally different than borrowers, and may face credit constraints or an unwillingness to borrow and therefore rely on longer spells of parental co-residence to smooth consumption.

In contrast to the results for moves into co-residence, we find differently signed effects based on the measure of debt used. While delinquency and low credit scores increase time spent in co-residence, holding any debt and having a larger balance reduce time spent in co-residence. We interpret this result as indicative that the accumulation of debt itself is not necessarily problematic for young adults, and in fact,borrowing prudently may enable a young adult to exit co-residence more quickly. This suggests that residing with a parent and borrowing are both important consumption smoothing mechanisms.

Interestingly, the point estimates on the measures of local economic conditions indicate that neither unemployment rates nor house prices have statistically significant or economically meaningful effects on the duration of co-residence. This indicates that after moving into co-residence, short term changes in the local economy exert no effect on young adults' decisions of when to move out. One possible explanation is that young adults do not look for jobs or to buy homes in the areas where their parents live.

4.6 Interpreting the Magnitude of the Effects

Our next exercise is to consider how the estimated effects of debt relate to aggregate changes in young adults' co-residence patterns. We implement simple back of the envelope calculations to calculate the effect of changes in the overall portfolio of debt and debt characteristics held by young adults on transitions into co-residence and durations of co-residence in the period studied. For comparison, we also repeat this exercise examining changes in our measures of local economic conditions (county unemployment rates and house prices).

To examine changes in flows into co-residence, we compute annual averages of all of

our debt and economic variables, and use coefficients from a regression which relates all debt variables to $movein_{it,t+1}$ to predict the total change in the move-in rate induced by movements in debt characteristics and local economic conditions, holding all other covariates constant at the sample mean.[29] Figure 4 (a) displays the total effect of debt in the solid line and economic conditions in the dashed line. This exercise indicates that overall, debt exerts a much greater influence on flows into parental co-residence than economic conditions, with the magnitude of the total effects of debt on average about twice as large as the effects of economic conditions throughout the period.

Figure 4 (a) also indicates that trends in the total effects of debt better match trends in co-residence than trends in the total effects of economic conditions. As indicated in figure , the overall share of young adults co-residing with parents was still fairly stable in 2005, so to understand how well changing debt portfolios and changing economic conditions predict changes in co-residence, we can compare the total effects of each to 2005 as a base year. Relative to 2005, fluctuations in unemployment rates and home prices predict a decline in move-in rates for most of the period. An exception occurs betwee 2009-2010, where there is a relative increase in the effect of economic conditions on move in rates. In contrast, the evolution of debt-holding predicts increases in co-residence relative to 2005 throughout the period, with an escalation after 2011.Our estimates indicate that the change in the mix of debt held by young adults between 2005 and 2013 would lead to a 6.2 percent rise in quarterly flows into co-residence, while the change in economic conditions between 2005 and 2013 would lead to a 4.9 percent *decline* in quarterly flows into co-residence. During this period, quarterly flows into co-residence rose 7.6 percent. This implies that that changes in the debt mix can predict 30 percent of this rise in flows into co-residence over this period, while changing economic conditions are unable to account for the increase in co-residence.

Next, we perform a similar back of the envelope calculation on durations in co-residence.

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[29]Debt characteristics include all loan balances by type, credit score growth, credit score levels, deliquency by loan type (mild and severe), current by type, and student loan deferment. Economic characteristics include unemployment rates and home prices.

We use coefficients estimated from the gamma survival regression and the sample of of young adults that we observe transitioning into co-residence to analyze changes in the predicted median duration induced by debt and economic conditions, separately. Figure (b) displays the results of this analysis. As we saw in figure (a), the effects of changes in debt better match changes in median durations over time. In fact, changes in debt characteristics predict a 4.6 percent increase in median durations between 2005 and 2013. During this period, median durations increased about two quarters. This implies that debt can predict about 26 percent of the estimated increase in median time spent in co-residence. Changes in local economic conditions alone predict an increase of only 2.3 percent, and recall that those estimates were not statistically significant in our preferred specification.[30]

4.7 Extensions and Robustness Checks

We have implemented a number of extensions and robustness checks on the model specification and construction of the data. For brevity, we present results using the independent variables overall delinquency and credit score growth only. First, we investigate the role of possible interaction effects of debt characteristics with local economic conditions. The intuition behind this exercise is to uncover if debt is disproportionately more problematic in weaker labor markets and/or more expensive housing markets. In columns (1) and (2) of Table 7, we report results from regressions that include the interaction of our debt measures with county-quarter unemployment rates and home prices. Note that these two conditions are measured at the location where the young adult lives on his own. In each case, the effect of $debt_{it}$ and $county\,chars_{ct}$ are unchanged, and there coefficient on the interaction terms are small and statistically insignificant, indicating that $debt_{it}$exerts the same effect on $movein_{it,t+1}$in different local economic environments.

Next, we examine altering our measures of economic conditions. Thus far, we have used

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[30]These estimated effects were very close to zero, and imprecisely estimated, in all of the survival regressions. Two of the specifications yielded small positive effects of unemployment on duration, while the other two yielded small negative effects.

the unemployment rate at the county-quarter level. It is possible, however, that this does not adequately capture the labor market circumstances for young adults, who may face different employment prospects than older adults. Age-specific unemployment rates are available for ages 16-19, 20-24, and 25-34 at the state-year level, so we add those to our analysis in table 7 column (3).[31] The inclusion of the youth unemployment rates does not change the effect of $debt_{it}$ and the effect of the county-quarter unemployment rate also remains positive in both specifications. Contrary to expectations, the state-annual youth unemployment rate has a *negative* coefficient, although the effects are economically fairly small: a 10 percentage point increase in youth unemployment rate in the state of residence –a very large change in the unemployment rate– decreases the probability of moving in by only 0.16 percentage points (1.5 percent at the mean). We interpret this as a sign that state-year level unemployment rates provide overly aggregated information about young adults' labor market prospects.

Next, we alternatively estimate a more flexible version of our model using county by quarter fixed effects. The purpose of this analysis is to ensure our estimates of the effect of $debt_{it}$ on flows into co-residence aren't biased by an omitted characteristic of the local environment. This is also ensures that attenuation bias due to measurement error in the local labor or housing market variables do not bias our estimates of the effect of $debt_{it}$. Results of this analysis are displayed in table 7 column (4). Note that because local economic characteristics only vary at the county-quarter level, they are perfectly correlated with the county-quarter fixed effects and are therefore omitted from this analysis. When compared to the original results found in table 4 , there is virtually no change in the coefficients on $debt_{it}$.

Next, we consider an alternate behavioral explanation for the increase in co-residence over this period: perhaps it has simply become more acceptable for young adults to co-reside with parents. We use the fraction of young adults in each county-quarter co-residing with a parent (called *coresidence rate$_{ct}$*) as a measure of social acceptability and include

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[31]For our analysis sample, the correlation between the county-quarter unemployment rates and the age-specific state-year unemployment rates is 0.61.

this as an additional control variable in the model. Results are displayed in column (5) of table 7. For both the credit score (panel A) and delinquency (panel B) specifications, the coefficient on *coresidence rate_{ct}* is negative. This indicates that young adults are less likely to move in with a parent when more of their peers have already done so. Moreover, the coefficients on *debt_{it}* are unchanged. This is contrary to what we would have expected if increasing acceptability of co-residence drove the increase in co-residence.

Finally, we include in column (6) of table 7 an alternative measure of the local housing market: rental vacancy rates, which can be used to proxy for rental prices.[32] In both the credit score and delinquency analyses, the coefficient on *rental vacancy rate_{st}* is negative, indicating that higher vacancy rates, or lower rental prices, reduce the probability of moving in with parent, although the estimates are not statistically significant. The coefficients on *debt_{it}* are also unchanged.

5 Conclusion

This paper investigates the impact of debt holding on young adult's decisions to co-reside with a parent. Using quarterly panel data of young adult's credit histories, we find that increased indebtedness and problems managing debt – as measured by larger account balances, falling credit scores and delinquency on account(s)– increase flows into parental co-residence. We find that changes in aggregate patterns in young adults' debt-holding between 2005 and 2013 – characterized by increases in student loan debt and delinquency and declines in credit card and auto debt – can explain 30 percent of the increase in flows into co-residence and 26 percent of the increase in median time spent in co-residence. This highlights the importance of financial circumstances in explaining the recent "boomerang" phenomenon.

Our paper also speaks to the ways that individuals smooth utility over the life-cycle. We find that young adult borrowers holding more debt, and especially those who are have

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[32]Rental vacancy rates by state and quarter were obtained from U.S. Census Bureau and can be downloaded at http://www.census.gov/housing/hvs/data/rates.html.

problems managing debt, are more likely to opt to co-reside with a parent. This suggests that co-residence is a way for young adults to smooth utility when borrowing becomes difficult or more costly. We also find that after moving in, delinquency and lower credit scores increase the duration of parental co-residence, but greater balances decrease the duration. This suggests that both borrowing prudently and changing living arrangements can help young adults weather periods of financial distress. While our paper provides new evidence on the role of debt in explaining parental co-residence decisions, we leave it to future research to uncover the reasons young adults opt to accumulate debt burdens that ultimately result in changes in living arrangements.

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6 Tables and Figures

Figure 1: Fraction of Young Adults 18-31 Residing with a Parent 1990-2014
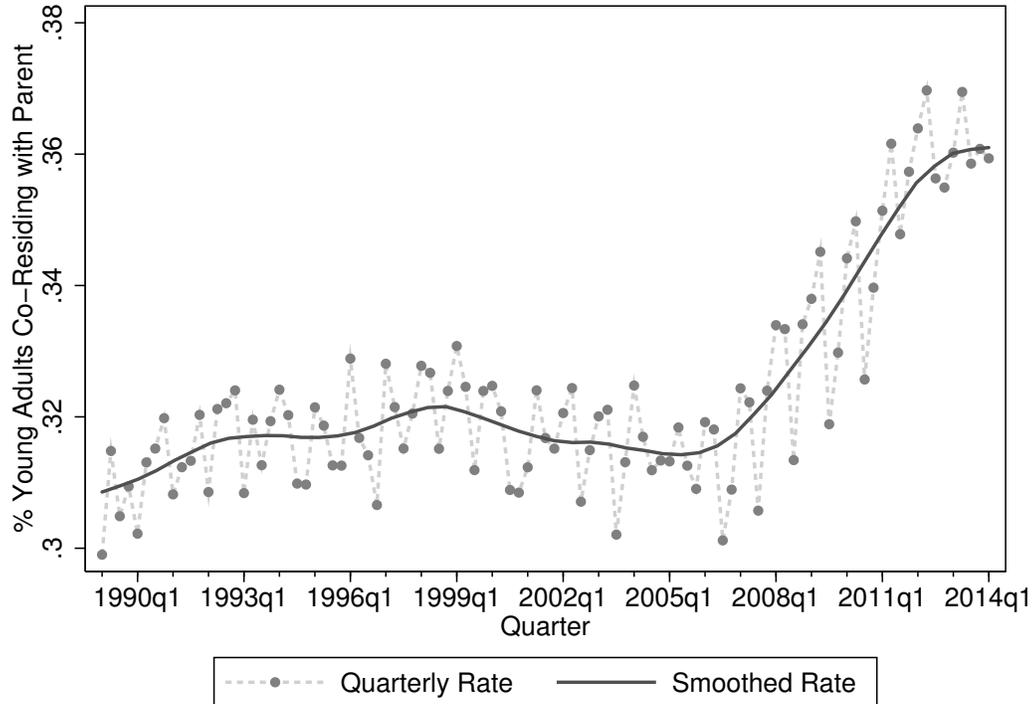
Notes: The dotted lines displays trends in the fraction of young adults co-residing with a parent, calculated quarterly. The solid line represents a local polynomial fitted to the quarterly data. Rates of co-residence are calculated from the March, June, September and December Current Population Survey (CPS) 1990-2014. An individual is living with a parent if the relationship with the household head is child, stepchild or foster child.

Figure 2: Trends in Loan Balances and Delinquency

(a) Mean Balances
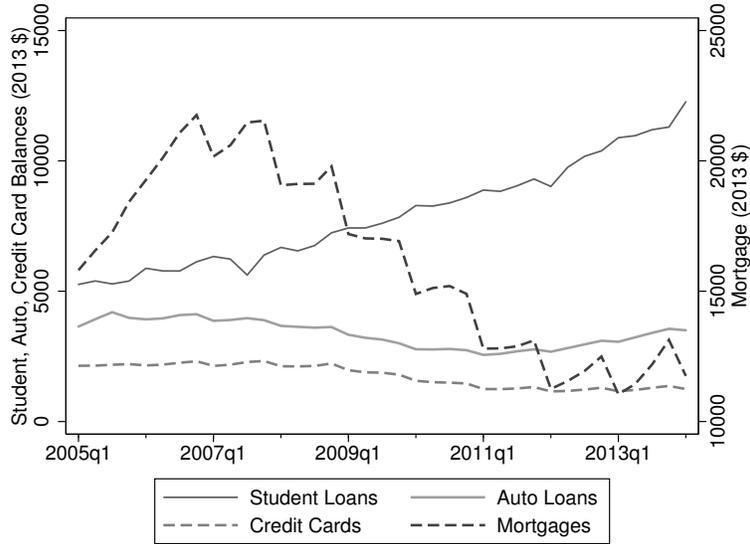
(b) Delinquency
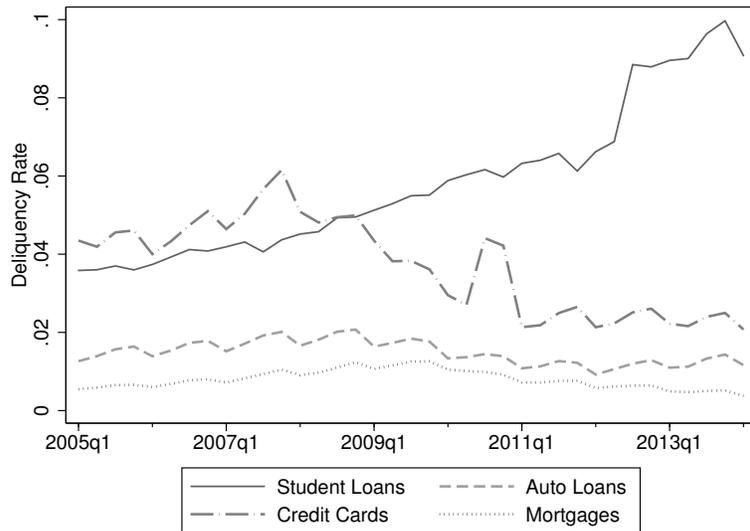
Notes: Displayed are trends in unconditional mean balances and delinquency rates on student loans, auto loans, credit cards, and mortgages. Balances are reported in 2013 dollars. In panel (a), the scaling on the right axis is different than left axis, since mortgage debt tends to be several orders of magnitude larger than student loan, credit card and auto debt. Data Source: CCP/Equifax.

Figure 3: Evolution of Delinquency and Credit Scores Before and After Co-residing with Parent

(a) Young Adults Who Move Into Parental Co-residence
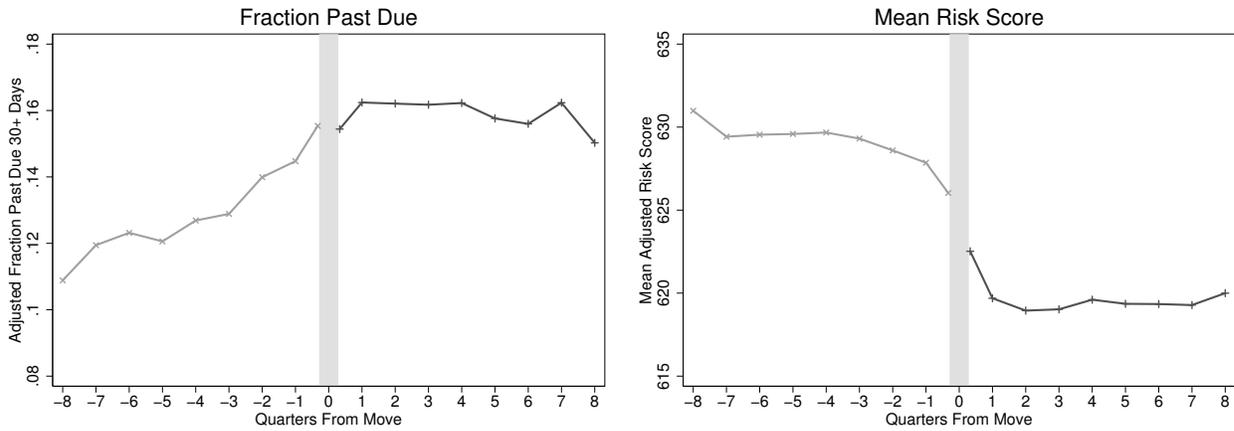
(b) Young Adults Who Move and Remain Independent
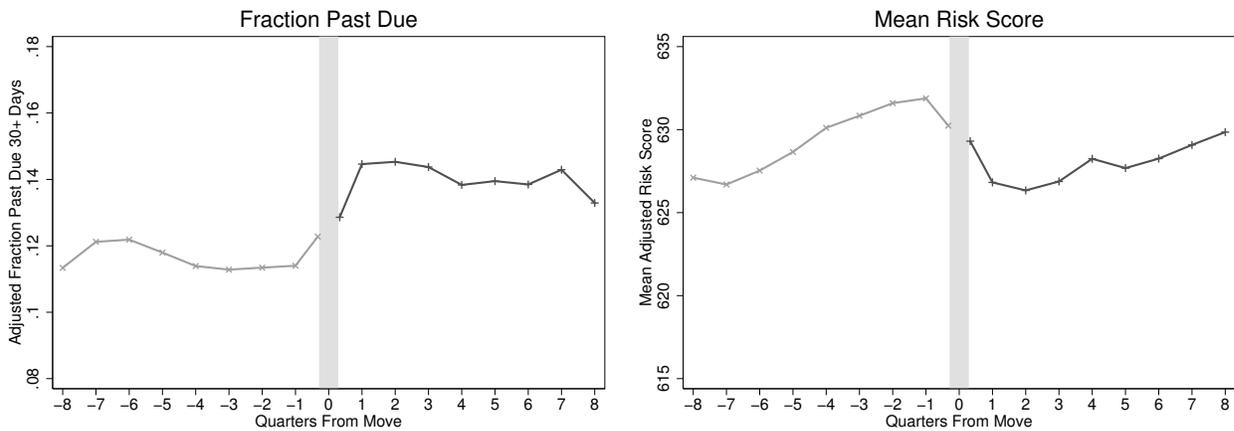
Notes: Displayed are age and quarter adjusted mean residual credit scores for sample members who were observed to have moved into parental co-residence (a) or moved out of parental co-residence (b) once during the sample period, calculated for each quarter before and after a move. The pre-move sample is limited to individuals who were present eight quarters prior to their observed move, and the post-move sample is limited to individuals who were present in the sample eight quarters after their observed move. Data source: CCP/Equifax.

Figure 4: Comparing Effects of Debt and Economic Conditions 2005-2013

(a) Flows into Co-Residence

(b) Durations in Co-Residence
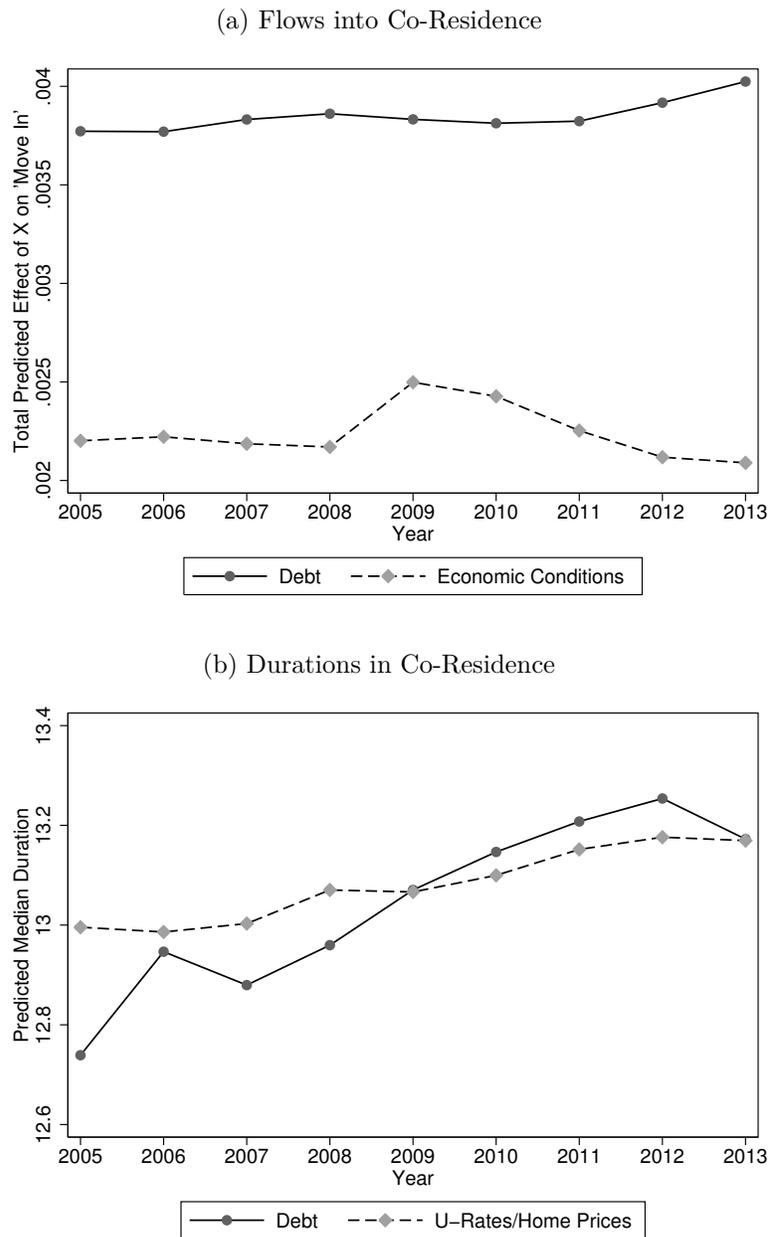
Notes: Displayed are the predicted effects of the debt mix (all debt variables used throughout the paper) and economic conditions (unemployment rates and median home prices) on the propensity to move in (a) and the median duration in co-residence (b), estimated using the specification described in the text.

Table 1: Summary Statistics

	Mean	SD		Mean	SD
Credit Report Characteristics					
Living with Parent	0.360	0.480	Age	25.6	3.50
			Credit Score	6.358	0.968
Move In$_{t,t+1}$	0.010	0.101	Credit Score Growth$_{t-1,t}$	0.003	0.060
(N=28940309)			Credit Score Growth$_{t-4,t}$	0.010	0.099
Move Out$_{t,t+1}$	0.058	0.233	Current on All Accounts	0.869	0.337
Median Duration in Co-Residence	12 Quarters		Past Due 30-89 Days on Any Account	0.046	0.210
(N=2024708)			Past Due 90+ Days on Any Account	0.075	0.263
Student Loans			*Credit Cards*		
Balance ($10,000s)	0.782	1.964	Balance ($10,000s)	0.177	0.477
Have Account	0.381	0.486	Have Account	0.534	0.499
Current	0.325	0.469	Current	0.496	0.500
Past Due 30-89 Days	0.009	0.093	Past Due 30-89 Days	0.019	0.135
Past Due 90+Days	0.037	0.189	Past Due 90+Days	0.019	0.137
Deferment (Over Age 22)	0.115	0.319			
Auto Loans			*Mortgages*		
Balance ($10,000s)	0.337	0.864	Balance ($10,000s)	1.634	5.598
Have Account	0.302	0.459	Have Account	0.135	0.341
Current	0.287	0.453	Current	0.127	0.333
Past Due 30-89 Days	0.012	0.107	Past Due 30-89 Days	0.005	0.071
Past Due 90+Days	0.003	0.058	Past Due 90+Days	0.003	0.056
Aggregate Variables					
% White	0.688	0.322	% Less than HS	0.191	0.145
% Black	0.118	0.231	% High School	0.279	0.109
% Hispanic	0.126	0.215	% Some College	0.281	0.088
% Other, Non-Hispanic	0.067	0.113	% College	0.161	0.106
% Male	0.490	0.068	% Post-Secondary	0.089	0.086
% Enrolled Undergrad	0.056	0.075			
% Enrolled Graduate	0.014	0.023	County Unemployment Rate	7.092	2.804
Median Income ($10,000s)	3.641	2.463	County Median Home Price	17.101	11.213

Notes: Displayed are means and standard deviatons of the independent and dependent variables used in the analysis for the sample of young adults aged 18-31 who are living alone in quarter t and included in the main estimation sample, with the exception of "Move Out$_{t,t+1}$" and "Living with Parent" which are for the sample living at home in quarter t, and for all young adults in our sample, respectively. Sources are the Equifax/CCP (top panel) and Census, FHFA and BLS (bottom panel).

Table 2: Effect of Balances on Moving into Parental Co-residence

	(1) Student Loans	(2) Credit Cards	(3) Auto	(4) Mortgage
Dependent Variable: $\text{Movein}_{it,t+1}$				
Panel A				
Balance_{it}	0.000473***	0.000885***	0.000643***	-0.000164***
	(0.000013)	(0.000123)	(0.000036)	(0.000003)
Credit Score_{it}	-0.000346***	-0.000347***	-0.000370***	-0.000122***
	(0.000021)	(0.000021)	(0.000021)	(0.000021)
$\text{Unemployment Rate}_{ct}$	0.000121***	0.000118***	0.000124***	0.000122***
	(0.000020)	(0.000020)	(0.000020)	(0.000020)
$\text{Median Home Price}_{ct}$	0.000076***	0.000077***	0.000075***	0.000092***
	(0.000008)	(0.000008)	(0.000008)	(0.000008)
Observations	28940309	28940309	28940309	28940309
Individuals	1814074	1814074	1814074	1814074
Panel B				
$\text{Balance}_{it}*\text{Subprime}_{it}$	0.000279***	0.000963	0.001175***	0.000105***
	(0.000024)	(0.000317)	(0.000098)	(0.000006)
Balance_{it}	0.000369***	0.000381***	0.000096	-0.000195***
	(0.000015)	(0.000047)	(0.000029)	(0.000004)
Credit Score_{it}	-0.000258***	-0.000269***	-0.000187***	-0.000036
	(0.000021)	(0.000032)	(0.000024)	(0.000022)
$\text{Unemployment Rate}_{ct}$	0.000120***	0.000119***	0.000126***	0.000123***
	(0.000020)	(0.000020)	(0.000020)	(0.000020)
$\text{Median Home Price}_{ct}$	0.000076***	0.000077***	0.000075***	0.000094***
	(0.000008)	(0.000008)	(0.000008)	(0.000008)
Observations	28940309	28940309	28940309	28940309
Individuals	1814074	1814074	1814074	1814074

Notes: Sample is young adults age 18-31 living alone in quarter t. The dependent variable is an indicator which is equal to one if an individual transitioned from living alone in quarters t and $t-1$, to living with a parent in quarters $t+1$ and $t+2$. All specifications include age, quarter, and county fixed effects, and Census block demographic characteristics. Balances are expressed in \$10,000s. Standards errors adjusted for clustering at the person level are in parentheses. * $p < .0001$, ** $p < .00005$ *** $p < .00001$.

Table 3: Effect of Changes in Risk Score on Moving into Parental Co-residence

	(1)	(2)	(3)	(4)
Dependent Variable: Movein$_{it,t+1}$				
%Δ Credit Score$_{it-1,t}$	-0.006931***		0.000718	
	(0.000339)		(0.001070)	
%Δ Credit Score$_{it-1,t}$*Subprime$_{it}$			-0.008445***	
			(0.001123)	
%Δ Credit Score$_{it-4,t}$		-0.006659***		-0.002032
		(0.000214)		(0.000673)
%Δ Credit Score$_{it-4,t}$*Subprime$_{it}$				-0.005069***
				(0.000698)
Credit Score$_{it}$	-0.000270***	-0.000135***	-0.000288***	-0.000171***
	(0.000021)	(0.000022)	(0.000021)	(0.000023)
Unemployment Rate$_{ct}$	0.000121***	0.000120***	0.000120***	0.000120***
	(0.000020)	(0.000022)	(0.000020)	(0.000022)
Median Home Price$_{ct}$	0.000078***	0.000086***	0.000077***	0.000086***
	(0.000008)	(0.000009)	(0.000008)	(0.000009)
Observations	28940309	24703093	28940309	24703093
Individuals	1814074	1792944	1814074	1792944

Notes: Sample is young adults age 18-31 living alone in quarter t. The dependent variable is an indicator which is equal to one if an individual transitioned from living alone in quarters t and $t-1$, to living with a parent in quarters $t+1$ and $t+2$. All specifications include age, quarter, and county fixed effects, and Census block demographic characteristics. Standards errors adjusted for clustering at the person level are in parentheses. * $p < .0001$, ** $p < .00005$ *** $p < .00001$.

Table 4: Effect of Deliquency Status on Moving into Parental Co-residence

	(1) Any Loans	(2) Student Loans	(3) Student Loans	(4) Credit Cards	(5) Auto	(6) Mortgages
Dependent Variable: Movein$_{it,t+1}$						
Panel A						
Past Due$_{it}$	0.001208***	-0.000812***		0.004559***	0.003518***	-0.001055***
	(0.000067)	(0.000084)		(0.000117)	(0.000161)	(0.000155)
Past Due/Defer$_{it}$			0.002179***			
			(0.000057)			
Current$_{it}$		0.002607***	0.001964***	0.002320***	0.002191***	-0.004780***
		(0.000047)	(0.000057)	(0.000041)	(0.000044)	(0.000046)
Credit Score$_{ct}$	-0.000081	-0.000554***	-0.000245***	-0.000289***	-0.000353***	0.000246***
	(0.000024)	(0.000022)	(0.000021)	(0.000022)	(0.000021)	(0.000023)
Unemployment Rate$_{ct}$	0.000120***	0.000118***	0.000116***	0.000127***	0.000123***	0.000117***
	(0.000020)	(0.000020)	(0.000020)	(0.000020)	(0.000020)	(0.000020)
Median Home Price$_{ct}$	0.000077***	0.000078***	0.000076***	0.000086***	0.000075***	0.000081***
	(0.000008)	(0.000008)	(0.000008)	(0.000008)	(0.000008)	(0.000008)
Observations	28940309	28940309	28940309	28940309	28940309	28940309
Individuals	1814074	1814074	1814074	1814074	1814074	1814074
Panel B						
PastDueMild$_{it}$	0.003125***	0.001198***	0.000772	0.006032***	0.004561***	-0.001774***
	(0.000100)	(0.000208)	(0.000207)	(0.000167)	(0.000188)	(0.000185)
PastDueSevere$_{it}$	0.000064	-0.001397***	-0.001511***	0.003077***	-0.000044	0.000147
	(0.000079)	(0.000096)	(0.000096)	(0.000151)	(0.000280)	(0.000268)
Defer$_{it}$			0.003539***			
			(0.000067)			
Current$_{it}$		0.002616***	0.002030***	0.002329***	0.002191***	-0.004782***
		(0.000047)	(0.000057)	(0.000041)	(0.000044)	(0.000046)
Unemployment Rate$_{ct}$	0.000121***	0.000118***	0.000116***	0.000127***	0.000123***	0.000116***
	(0.000020)	(0.000020)	(0.000020)	(0.000020)	(0.000020)	(0.000020)
Median Home Price$_{ct}$	0.000078***	0.000078***	0.000077***	0.000086***	0.000075***	0.000081***
	(0.000008)	(0.000008)	(0.000008)	(0.000008)	(0.000008)	(0.000008)
CreditScore$_{it}$	-0.000145***	-0.000559***	-0.000503***	-0.000312***	-0.000354***	0.000249***
	(0.000024)	(0.000022)	(0.000022)	(0.000022)	(0.000021)	(0.000023)
Observations	28940309	28940309	28940309	28940309	28940309	28940309
Individuals	1814074	1814074	1814074	1814074	1814074	1814074

Notes: Sample is young adults age 18-31 living alone in quarter t. The dependent variable is an indicator which is equal to one if an individual transitioned from living alone in quarters t and $t-1$, to living with a parent in quarters $t+1$ and $t+2$. All specifications include age, quarter, and county fixed effects, and Census block demographic characteristics. Standards errors adjusted for clustering at the person level are in parentheses. * $p < .0001$, ** $p < .00005$ *** $p < .00001$.

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Table 5: Effect of Debt on Moving into Parental Co-residence, by Parental Characteristics

	(1)	(2)	(3)	(4)
Dependent Variable: Movein$_{it,t+1}$				
Panel A				
%Δ Credit Score$_{it-1,t}$	-0.007244***	-0.006563	-0.008733***	-0.007686***
	(0.001033)	(0.002537)	(0.001465)	(0.001090)
%Δ Credit Score$_{it-1,t}$*Income		-0.000017		
		(0.000442)		
Parent Income		0.000574***		
		(0.000025)		
%Δ Credit Score$_{it-1,t}$* College			0.021566	
			(0.014334)	
Parent College			0.005547***	
			(0.000777)	
%Δ Credit Score$_{it-1,t}$* Distance				0.000335
				(0.000260)
Parent Distance				0.000131***
				(0.000014)
Credit Score$_{it}$	-0.000989***	-0.001213***	-0.001053***	-0.001008***
	(0.000060)	(0.000060)	(0.000060)	(0.000060)
Observations	6300399	6300399	6300399	6300399
Individuals	502869	502869	502869	502869
Panel B				
Past Due$_{it}$	0.002307***	-0.000477	0.001557***	0.002544***
	(0.000205)	(0.000379)	(0.000257)	(0.000212)
Past Due$_{it}$*Income		0.000516***		
		(0.000067)		
Parent Income		0.000510***		
		(0.000026)		
Past Due$_{it}$* College			0.010289**	
			(0.002437)	
Parent College			0.004408***	
			(0.000799)	
Past Due$_{it}$* Distance				-0.000176**
				(0.000042)
Parent Distance				0.000152***
				(0.000015)
Observations	6300399	6300399	6300399	6300399
Individuals	502869	502869	502869	502869

Notes: Sample is young adults age 18-31 living alone in quarter t. The dependent variable is an indicator which is equal to one if an individual transitioned from living alone in quarters t and $t-1$, to living with a parent in quarters $t+1$ and $t+2$. All specifications include age, quarter, and county fixed effects, Census block demographic characteristics, and county-quarter unemployment rates and median home prices. Balances are expressed in $10,000s. Parent-young adult distances expressed in 100s of miles. Standards errors adjusted for clustering at the person level are in parentheses. * $p < .0001$, ** $p < .00005$ *** $p < .00001$.

Table 6: Effect of Debt on Duration Spent in Co-Residence: Survival Analysis

	(1) Exponential	(2) Weibull	(3) Log Normal	(4) Gamma
Student Loan Balance$_{it}$	0.985***	0.986***	0.984***	0.985***
	(0.001)	(0.001)	(0.002)	(0.002)
Current$_{it}$	0.855***	0.863***	0.878***	0.899***
	(0.007)	(0.006)	(0.007)	(0.007)
Past Due Mild$_{it}$	0.996	0.998	1.016	1.026
	(0.028)	(0.026)	(0.029)	(0.029)
Past Due Severe$_{it}$	1.069*	1.072***	1.075**	1.075**
	(0.018)	(0.017)	(0.018)	(0.018)
Deferment$_{it}$	0.896***	0.903***	0.906***	0.918***
	(0.008)	(0.008)	(0.009)	(0.010)
Auto Loan Balance$_{it}$	0.979***	0.980***	0.955***	0.951***
	(0.002)	(0.002)	(0.004)	(0.005)
Current$_{it}$	0.826***	0.835***	0.836***	0.847***
	(0.005)	(0.005)	(0.007)	(0.007)
Past Due Mild$_{it}$	0.759***	0.772***	0.774***	0.788***
	(0.017)	(0.016)	(0.019)	(0.019)
Past Due Severe$_{it}$	0.924	0.932	0.887	0.866
	(0.043)	(0.040)	(0.041)	(0.040)
Credit Card Balance$_{it}$	0.993	0.996	0.977	0.969**
	(0.007)	(0.006)	(0.007)	(0.007)
Current$_{it}$	0.841***	0.845***	0.820***	0.820***
	(0.006)	(0.005)	(0.006)	(0.006)
Past Due Mild$_{it}$	0.727***	0.733***	0.684***	0.679***
	(0.014)	(0.013)	(0.013)	(0.013)
Past Due Severe$_{it}$	0.845***	0.843***	0.790***	0.778***
	(0.018)	(0.017)	(0.016)	(0.015)
Credit Score$_{it}$	0.917***	0.923***	0.909***	0.910***
	(0.004)	(0.003)	(0.004)	(0.004)
Unemployment Rate$_{ct}$	0.999	0.999	1.001	1.001
	(0.003)	(0.003)	(0.003)	(0.003)
Median Home Price$_{ct}$	0.997	0.997	0.997	0.997
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	2024708	2024708	2024708	2024708
Individuals	244901	244901	244901	244901

Notes: Results reported are time ratios estimated for parametric accelerated failure time survival models. Columns are labeled with the distributional assumptions for the log of the error term. Sample is young adults age 18-31 living with a parent in quarter t, who were observed to have lived alone and then transitioned into co-residence at some point in the past. The dependent variable is the duration of co-residence; the spell ends when a young adult transitions from living with a parent in quarters t and $t-1$, to living with independently in quarters $t+1$ and $t+2$. All specifications include age, quarter, and county fixed effects, and Census block demographic characteristics. Balances are expressed in \$10,000s. Standards errors are in parentheses.* $p < .0005$, ** $p < .00025$, *** $p < .00005$.

Table 7: Robustness Checks

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable: Movein$_{it,t+1}$						
Panel A						
%Δ Credit Score$_{it-1,t}$	-0.007478***	-0.005823***	-0.006928***	-0.006863***	-0.006929***	-0.006932***
	(0.000898)	(0.000605)	(0.000339)	(0.000340)	(0.000339)	(0.000339)
%Δ Credit Score$_{it-1,t}$* Rate$_{ct}$	0.000078					
	(0.000117)					
Unemployment Rate$_{ct}$	0.000120***	0.000120***	0.000209***		0.000130***	0.000130***
	(0.000020)	(0.000020)	(0.000022)		(0.000020)	(0.000020)
%Δ Credit Score$_{it-1,t}$* Home Price$_{ct}$		-0.000066				
		(0.000031)				
Median Home Price$_{ct}$	0.000078***	0.000078***	0.000066***		0.000075***	0.000074***
	(0.000008)	(0.000008)	(0.000008)		(0.000008)	(0.000008)
Credit Score$_{it}$	-0.000270***	-0.000270***	-0.000268***	-0.000267***	-0.000270***	-0.000270***
	(0.000021)	(0.000021)	(0.000021)	(0.000021)	(0.000021)	(0.000021)
Youth Unemployment Rate$_{st}$			-0.000163***			
			(0.000018)			
Co-residence Rate$_{ct}$					-0.010300***	
					(0.001025)	
Rental Vacancy Rate$_{st}$						-0.000046
						(0.000012)
County-Quarter FE	No	No	No	Yes	No	No
Observations	28940309	28940309	28940309	28940309	28940309	28940309
Individuals	1814074	1814074	1814074	1814074	1814074	1814074
Panel B						
Past Due$_{it}$	0.001593***	0.001138***	0.001207***	0.001203***	0.001208***	0.001209***
	(0.000135)	(0.000101)	(0.000067)	(0.000067)	(0.000067)	(0.000067)
Past Due$_{it}$* Rate$_{ct}$	-0.000057					
	(0.000017)					
Unemployment Rate$_{ct}$	0.000128***	0.000120***	0.000208***		0.000129***	0.000129***
	(0.000020)	(0.000020)	(0.000022)		(0.000020)	(0.000020)
Past Due$_{it}$* Home Price$_{ct}$		0.000005				
		(0.000005)				
Median Home Price$_{ct}$	0.000078***	0.000077***	0.000066***		0.000075***	0.000073***
	(0.000008)	(0.000008)	(0.000008)		(0.000008)	(0.000008)
Youth Unemployment Rate$_{st}$			-0.000163***			
			(0.000018)			
Co-residence Rate$_{ct}$					-0.010304***	
					(0.001025)	
Rental Vacancy Rate$_{st}$						-0.000046
						(0.000012)
County-Quarter FE	No	No	No	Yes	No	No
Observations	28940309	28940309	28940309	28940309	28940309	28940309
Individuals	1814074	1814074	1814074	1814074	1814074	1814074

Notes: Sample is young adults age 18-31 living alone in quarter t. The dependent variable is an indicator which is equal to one if an individual transitioned from living alone in quarters t and $t-1$, to living with a parent in quarters $t+1$ and $t+2$. All specifications include age, quarter, and county fixed effects, Census block demographic characteristics, and county-quarter unemployment rates and median home prices. Standards errors adjusted for clustering at the person level are in parentheses. * $p < .0001$, ** $p < .00005$ *** $p < .00001$.

Appendix

A.1 Identifying Parental Co-residence in the CCP/Equifax

To identify when young adults co-reside with parents, we employ the address match variable in the CCP/Equifax, which allows us to link together credit reports of individuals living at the same address. Our goal is to construct a co-residence variable that takes the value of one when the young adult is inferred to live with parent(s), and zero otherwise; this variable forms the basis for $movein_{it,t+1}$, as well as the duration of co-residence.

We begin by matching to the CCP/Equifax information from the Current Population Survey (CPS) on relationships between household members. We construct a set of age pairs where there is at least a 90 percent probability that the relationship is parent-child, and code observations in which young adults share an address with an older adult in one of these age pairs as a young living with a "likely parent."[33] We additionally sum the number of household members and the number of "likely parents" quarterly for each young adult in the sample in each quarter.

In the CCP/Equifax, "households" are defined simply as a group of individuals at the same address, while the CPS is able to restrict "households" to omit those in living arrangements such as dormitories and institutional housing. Thus, using only the "likely parent" variable we find a small number of unusually large households, and we would tend to over-identify parent-child relationships. Therefore, we use the following algorithm to modify the "likely parent" variable and identify parental co-residence. First, we examine each individual's spell at a given address (henceforth a "person-location" spell) and calculate the standard deviation of household size. We omit from the sample all individuals where the standard deviation of household size is above the 99th percentile of that distribution. Second, we calculate the the median number of "likely parents" throughout the person-location spell, and code individuals as "living with a parent" only if the median is less than or equal

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[33]Our definition of a "child" includes individuals labelled child, step-child or foster child of the household head/spouse.

to two. Third, we examine the fraction of the Census block that includes group quarters housing, and we only code individuals as "living with a parent" only if there are no group quarters on the block. Henceforth, we will refer to this set of restrictions as our algorithm for identifying parent-child relationships in the CCP/Equifax.

We chose our primary algorithm for identifying parent-child relationships in the CCP/Equifax by matching to the trends in parental co-residence found in the CPS. To do so, we calculate the fraction of adults ages 18-31 living with a parent for March, June, September and December of each year in both the CPS and CCP/Equifax. In order to match the two, we must take into account the fact that the credit report data is not representative of the United States population like the CPS data, but instead is representative of the population of individuals *with credit reports*. Since flows of young adults into this sample may change over time as credit markets and economic conditions change, the composition of the credit report data sample members changes over time. Moreover, because we restrict the sample to individuals who are in the sample at least eight consecutive quarters, there are no inflows into the sample after 2011. In practice, this means that the age composition of the credit report sample varies over time, and in particular, becomes older after 2011, because it is not refreshed by new, typically younger, entrants into the credit market. Thus, we chose from several thousand alternative algorithms for identifying a parent-child match by minimizing the root mean-squared difference between the age-adjusted residuals of trends in parental co-residence in the CPS and the CCP/Equifax.[34]

Figure A.1 displays both the level and age-adjusted residual trends in parental co-residence in the CCP/Equifax and CPS. Figure A.1 (a) displays the raw trends, and indicates we are able to match the general trends in parental co-residence found in the CPS fairly closely, although the CCP/Equifax tends to slightly overstate parental co-residence.

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[34]Possible alternate algorithms we considered include restricting by the number of household members (between 5 and 30), the number of likely parents (between 2 and 10) and the fraction of the block that is group quarters (between 0 and 100 percent). In practice, there was very little difference in resulting trends in co-residence, because these modification affect relatively few individuals. The root mean squared errors ranged from 0.000767 and 0.000976.

Once we make the age adjustment, displayed in figure A.1 (b) the match is improved, and we are able to capture both the seasonality in parental co-residence and the general upward trend, which provides support for the ability of our algorithm to correctly identify parent-child relationships. However, we are careful to note that since our data is not representative of the population at large, but instead is representative of individuals with credit reports, even the age-adjusted trends would not necessarily be expected to match perfectly. An important caveat to our analysis is that our results should be interpreted as applying only to the population of young adults with credit reports.

A.2   Construction of Debt Measures

We measure delinquency based on information about amounts past due on different categories of accounts, which is recorded as past due 30-59 days, 60-89 days, 90-119 days, 120-149 days, and 150 days plus. The 150 days plus category also includes accounts which are in collections. CCP/Equifax additionally includes information on accounts which are in serious derogatory status, which is an account which has had bankrupcy in the past 7 years.[35] We convert the information on amounts past due into an indicator variable for deliquency status based on whether or not an individual is delinquent on any loan in that category of debt (or overall). If an individual is delinquent on multiple accounts, we assign the individual to the status of the loan with the most severe category of delinquency. Since our data on moving behavior is quarterly, for the cases where we are interested in the length of time past due, we turn the measure of delinquency into a quarterly variable: current on account, past due 30-90 days, or past due 90 days or more.

Examination of the data indicates that in some cases, accounts are first reported as past

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[35] "Serious derogatory" events on accounts include reposession, charge-off, collection, bankruptcy, foreclosure, among others. Balances that are serious derogatory remain on the credit report for seven years, so for our sample these marks are absorbing states that may not reflect the young adult's current financial state. Second, since many lenders charge off loans with such events, excluding "serious derogatory" balances allow us to better align with lender-reported delinquency measures. In addition, consumer debt collection litigation is available in many states. Judgements are rarely paid off in full, in spite of the fact that judgements are often lower than actual amounts (Hynes, 2008), so including serious derogatory balances would result in a deceptively high amount owed.

due by 120 or more days (or more). Because of the panel nature of our data, we can use this information to infer whether that individual was also mildly past due (30-89 days) the previous quarter, but the status was not reported by the creditor. For credit cards, autos, and mortgages this occurs approximately 10 percent of accounts which are past due apear in the credit report as 120 or more days past due. For student loans, approximately 20 percent of accounts initially appear as 120 days past due. This adjustment does not qualitatively alter our results, and we believe it yields a more accurate and up-to-date measure of delinquency, since some loan issuers may not report deliquency in a timely fashion, or every quarter..

Our main loan balance measure is the total balance in each category of debt, which is the sum of balances on all separate accounts an individual holds in those categories. Some of those accounts are jointly held, shared, or co-signed, and we adjust the total balance to reflect the fact the individual is only responsible for part of the balance. In particular, assign fifty percent weight to joint, shared and co-signed accounts. For example, if an individual had $10,000 in individually held student loan debt, and $8,000 in jointly held student loan debt, we would assign that individual $14,000 in total student loan debt.

A.3 Appendix Figures and Tables

Figure A.1: Matching Trends in Parental Co-residence in the CPS and Credit Report Sample

(a) Raw Means

(b) Mean Age-Adjusted Residuals
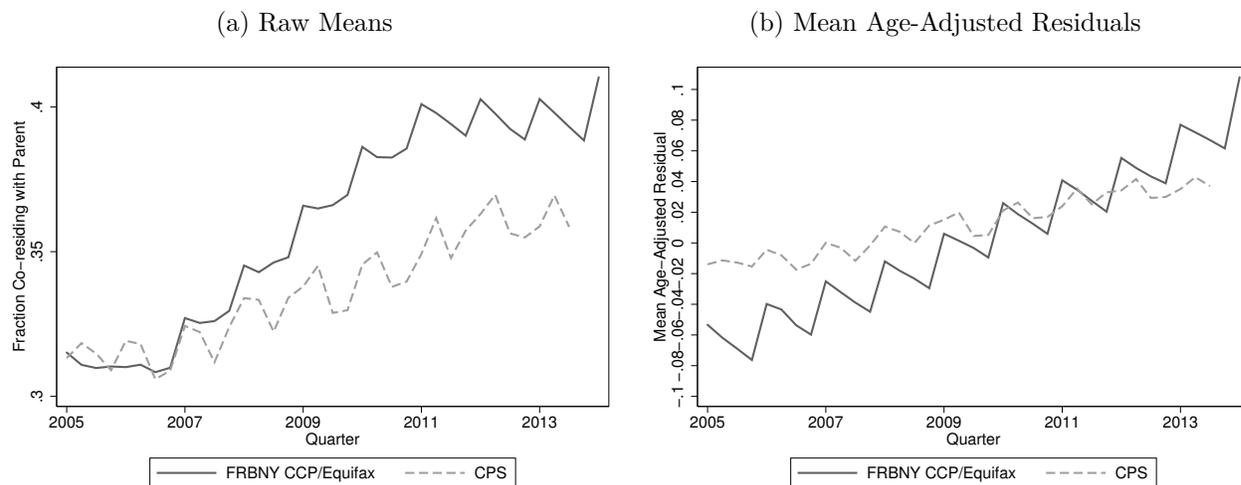
Notes: Displayed are quarterly means and mean age-adjusted residuals of the fraction of young adults co-residing with parents. Source is the Current Population Survey basic monthly data for March, June, September and December and the Consumer Credit Panel/Equifax. Parental co-residence is defined by the relationship with the household head (child, stepchild or foster child) in the CPS and was inferred based on age differences between adults with credit reports residing at the same address in the CCP/Equifax, as described in the text.

Table A.1: Effect of Demographic and Other Variables on Transitions Into Co-residence

	(1) Student Loans	(2) Credit Cards	(3) Auto	(4) Mortgage
Panel A				
Balance_{it}	0.000473***	0.000885***	0.000643***	-0.000164***
	(0.000013)	(0.000123)	(0.000036)	(0.000003)
Credit Score_{it}	-0.000346***	-0.000347***	-0.000370***	-0.000122***
	(0.000021)	(0.000021)	(0.000021)	(0.000021)
$\text{\% Black (NH)}_{bt}$	-0.001399***	-0.001263***	-0.001297***	-0.001470***
	(0.000106)	(0.000107)	(0.000106)	(0.000106)
$\text{\% Hispanic}_{bt}$	0.000098	0.000098	0.000045	-0.000150
	(0.000160)	(0.000161)	(0.000160)	(0.000160)
$\text{\% Other}_{bt}$	0.002294***	0.002245***	0.002276***	0.001904***
	(0.000235)	(0.000235)	(0.000235)	(0.000236)
$\text{\% Male}_{bt}$	0.000092	0.000053	0.000052	0.000069
	(0.000286)	(0.000286)	(0.000286)	(0.000286)
$\text{Median Income}_{bt}$	-0.000083***	-0.000091***	-0.000091***	-0.000044*
	(0.000011)	(0.000011)	(0.000011)	(0.000011)
$\text{\% Enrolled Undergrad}_{bt}$	0.021442***	0.021628***	0.021722***	0.021297***
	(0.000385)	(0.000386)	(0.000386)	(0.000386)
$\text{\% Enrolled Grad}_{bt}$	0.015596***	0.016984***	0.017240***	0.015920***
	(0.001153)	(0.001157)	(0.001158)	(0.001156)
$\text{\% Less than HS}_{bt}$	-0.000672	-0.001138	-0.001245	-0.000915
	(0.000474)	(0.000474)	(0.000474)	(0.000474)
$\text{\% High School}_{bt}$	-0.001241	-0.001852*	-0.002087***	-0.001465
	(0.000464)	(0.000464)	(0.000464)	(0.000464)
$\text{\% Some College}_{bt}$	0.000928	0.000418	0.000134	0.001056
	(0.000482)	(0.000483)	(0.000483)	(0.000483)
$\text{\% College}_{bt}$	0.004695***	0.004491***	0.004444***	0.004942***
	(0.000683)	(0.000684)	(0.000684)	(0.000684)
$\text{Unemployment Rate}_{ct}$	0.000121***	0.000118***	0.000124***	0.000122***
	(0.000020)	(0.000020)	(0.000020)	(0.000020)
$\text{Median Home Price}_{ct}$	0.000076***	0.000077***	0.000075***	0.000092***
	(0.000008)	(0.000008)	(0.000008)	(0.000008)
Observations	28940309	28940309	28940309	28940309
Individuals	1814074	1814074	1814074	1814074

Notes: Table reports coefficients for Census block demographic characteristics and county-quarter unemployment rates and median home prices omitted from table 2. Sample is young adults age 18-31 living alone in quarter t. The dependent variable is an indicator which is equal to one if an individual transitioned from living alone in quarters t and t-1, to living with a parent in quarters t+1 and t+2. All specifications include age, quarter, and county fixed effects. Standard errors adjusted for clustering at the person level are in parentheses. * $p < .0001$, ** $p < .00005$, *** $p < .00001$.

Table A.2: Effect of Loan Balances on Transitions Into Co-residence: Analysis Across the Distribution of Balances

	(1) Student Loans	(2) Credit Cards	(3) Auto	(4) Mortgage
Dependent Variable: MoveIn$_{it,t+1}$				
Percentile of Balances				
0-25th$_{it}$	0.001235***	0.002522***	0.002198***	-0.004315***
	(0.000074)	(0.000066)	(0.000074)	(0.000068)
25th-50th$_{it}$	0.001505***	0.002081***	0.002305***	-0.004911***
	(0.000074)	(0.000062)	(0.000073)	(0.000066)
50th-75th$_{it}$	0.002171***	0.002394***	0.002313***	-0.004884***
	(0.000075)	(0.000060)	(0.000071)	(0.000068)
75th-90th$_{it}$	0.002846***	0.003258***	0.002523***	-0.004353***
	(0.000094)	(0.000073)	(0.000088)	(0.000089)
90th+$_{it}$	0.004042***	0.002924***	0.001957***	-0.003270***
	(0.000113)	(0.000081)	(0.000101)	(0.000120)
CreditScore$_{it}$	-0.000294***	-0.000480***	-0.000388***	0.000166***
	(0.000021)	(0.000021)	(0.000021)	(0.000022)
Unemployment Rate$_{ct}$	0.000119***	0.000126***	0.000123***	0.000118***
	(0.000020)	(0.000020)	(0.000020)	(0.000020)
Median Home Price$_{ct}$	0.000075***	0.000085***	0.000075***	0.000076***
	(0.000008)	(0.000008)	(0.000008)	(0.000008)
Observations	28940309	28940309	28940309	28940309
Individuals	1814074	1814074	1814074	1814074

Notes: Sample is young adults age 18-31 living alone in quarter t. The dependent variable is an indicator which is equal to one if an individual transitioned from living alone in quarters t and $t-1$, to living with a parent in quarters $t+1$ and $t+2$. All specifications include age, quarter, and county fixed effects, Census block demographic characteristics, and county-quarter unemployment rates and median home prices. Standard errors adjusted for clustering at the person level are in parentheses. * $p < .0001$, ** $p < .00005$, *** $p < .00001$.

Table A.3: Effect of Debt on Length of Time in Parental Co-residence (Movers Only)

	Any	Student Loans	Credit Cards	Auto	Mortgage
	(1)	(2)	(3)	(4)	(5)
	All	Student Loans	Credit Cards	Auto	Mortgage
Dependent Variable: Stay 3 Years+$_{it}$					
Panel A					
Balance$_{it}$		-0.002957***	-0.024657***	-0.004729	0.000793*
		(0.000562)	(0.002939)	(0.001718)	(0.000278)
CreditScore$_{it}$		-0.028219***	-0.029095***	-0.028542***	-0.028703***
		(0.001481)	(0.001483)	(0.001481)	(0.001484)
Unemployment Rate$_{ct}$		-0.003062	-0.003028	-0.003093	-0.003052
		(0.001413)	(0.001412)	(0.001413)	(0.001413)
Median Home Price$_{ct}$		0.000051	0.000042	0.000036	-0.000009
		(0.000580)	(0.000580)	(0.000580)	(0.000580)
Observations		95666	95666	95666	95666
Individuals		91480	91480	91480	91480
Panel B					
Past Due Mild$_{it}$	0.002113	0.013300	-0.028836***	-0.015930	-0.010080
	(0.018583)	(0.013716)	(0.008152)	(0.010908)	(0.020344)
Past Due Severe$_{it}$	0.006642	0.010944	-0.028650**	0.027062	0.029942
	(0.018545)	(0.009323)	(0.008974)	(0.025559)	(0.025522)
Defer$_{it}$		-0.008292			
		(0.003730)			
Current $_{it}$		-0.009465*	-0.038839***	-0.027649***	0.028694***
		(0.003219)	(0.003144)	(0.002734)	(0.005376)
CreditScore$_{it}$	-0.025429***	-0.027436***	-0.026630***	-0.028773***	-0.029285***
	(0.001897)	(0.001553)	(0.001668)	(0.001515)	(0.001504)
Unemployment Rate$_{ct}$	-0.003060	-0.003049	-0.003174	-0.003168	-0.003062
	(0.001413)	(0.001413)	(0.001411)	(0.001413)	(0.001413)
Median Home Price$_{ct}$	0.000038	0.000022	-0.000119	0.000013	0.000024
	(0.000580)	(0.000580)	(0.000580)	(0.000579)	(0.000580)
Observations	95666	95666	95666	95666	95666
Individuals	91480	91480	91480	91480	91480

Notes: Sample is young adults age 18-31 living with a parent in quarter t, who were observed to have lived alone and then transitioned into co-residence at some point in the past. The dependent variable is an indicator which is equal to one if an individual transitioned out of parental co-residence after at least three years in co-residence. Censored spells are excluded. All specifications include age, quarter, and county fixed effects, Census block demographic characteristics, and county-quarter unemployment rates and median home prices, measured at the quarter the individual moved in. Balances are expressed in \$10,000s. Standard errors adjusted for clustering at the person level are in parentheses. * $p < .005$, ** $p < .0025$ *** $p < .0005$.