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Debt, jobs, or housing: What's keeping millennials at home?

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Staff Report No. 700
November 2014

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Debt, Jobs, or Housing: What's Keeping Millennials at Home?

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Abstract

Young Americans' residence choices have changed markedly over the past fifteen years, with recent cohorts entering the housing market at lower rates, and lingering much longer in parents' households. This paper begins with descriptive evidence on the residence choices of 1 percent of young Americans with credit reports, observed quarterly for fifteen years in the Federal Reserve Bank of New York's Equifax-sourced Consumer Credit Panel (CCP). Steep increases in the rate of living with parents or other substantially older household members have emerged as youth increasingly forsake living alone or with groups of roommates. Coupledom, however, appears stable. Homeownership at age thirty shows a precipitous drop following the recession, particularly for student borrowers. In an effort to decompose the contributions of housing market, labor market, and student debt changes to the observed changes in young Americans' living arrangements, we model flows into and out of co-residence with parents. Estimates suggest countervailing influences of local economic growth on co-residence: strengthening youth labor markets support moves away from home, but rising local house prices send independent youth back to parents. Finally, we find that student loans deter independence: state-cohort groups who were more heavily reliant on student debt while in school are significantly and substantially more likely to move home to parents when living independently, and are significantly and substantially less likely to move away from parents when living at home.

Key words: student loans, household information

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The role of first time homebuyers in the ongoing recovery of the U.S. housing market is the focus of growing interest and speculation. The National Association of Realtors (NAR) points to a drop in first time homebuyers' share of existing home purchases to 30 percent from its long-standing level of roughly 40 percent as a headwind in the housing recovery. NAR President Steve Brown cites student loans as the primary factor holding back first-time buyers (NAR 2014). The Consumer Financial Protection Bureau has discussed the potential for student debt to slow household formation among the young, and to delay homeownership (CFPB 2013). Agarwal, Hu, and Huang (2013) describe a steep decline in homeownership among 25 to 34 year olds in the Federal Reserve Bank of New York's (FRBNY) Consumer Credit Panel (CCP). Our recent FRBNY blog post relays time series evidence consistent with a retreat among young consumers in general, and student borrowers in particular, from housing and auto markets (Brown and Caldwell 2013).

At the same time, available evidence points to an ongoing increase in young Americans' rate of living at home with their parents, rather than forming new households. Recent work on household formation has emphasized its relationship to employment and to poverty. Dyrda, Kaplan, and Rios-Rull (2012) demonstrate a substantial influence of household formation responses to the business cycle on the Frisch elasticity of labor supply. Duca (2013) finds a close relationship between 1979-2013 time series on U.S. 18-64 year olds' rate of coresidence with parents and U.S. poverty rates. He infers that ongoing secular trends in poverty and inequality are producing a permanent shift in Americans' living patterns. Matsudaira (forthcoming) uses (cross-sectional) decennial Census data from 1960 to 2000 to demonstrate an increased prevalence of youth living with parents in regions with weaker youth labor conditions over the era. [1] The dual trends of decreasing early homeownership and extended coresidence with parents may portend slow recoveries of both consumption and the housing market, as young people living "at home" delay major purchases and general entry into economic life.

This paper investigates the residence choices of young people in the CCP, and their relationship to evolving local house prices, local employment conditions, and the student debt reliance of local college students. We document persistent upward trends in aggregate rates of coresidence with parents among 25 and 30 year olds. We discuss a range of coresidence

[1] The relationship between unemployment and parental coresidence has also been studied abroad: Becker *et al* (2010) find that perceived job security is negatively correlated with parental coresidence in Italy, while Klasen and Woolard (2008) find that unemployment delays household formation among young people in South Africa.

measurement concerns, demonstrate a similar upward trend using CPS data, and cite other sources suggesting a similar trend.[2] We note the rapid increase in student debt prevalence and balances over the period, which, like living with parents, shows little or no response in aggregate time series to the business cycle. The apparent similarity in the student debt and parental coresidence series raises the question of whether escalating student debt plays a meaningful role in the housing decisions of Millennials.[3]

Homeownership in the CCP declines from 2005 forward for 25 year olds, and from 2007 forward for 30 year olds, following steady or modestly increasing youth homeownership rates during the housing boom. Unlike the aggregate parental coresidence series, these homeownership trends suggest that early homeownership responded strongly to the events of the Great Recession. From this perspective, the decision to stay home with parents appears to be more closely tied to the student borrowing phenomenon, while housing choices (when not living with parents) appear to be more closely tied to economic conditions.[4] The failure of young homeownership to track the housing market recovery, however, remains a puzzle.

These aggregate trends, while informative, mask evolving local relationships among housing cost, labor markets, and youth residence choices. The fine geographic data and long panel of the CCP allow us to exploit time variation in local economic conditions and student debt reliance to learn more about the contributions of jobs, housing costs, and student debt to the decisive aggregate trends toward parents, and away from economic independence, that we observe for recent cohorts of young adults. In an approach that builds on Ermisch (1999), we model the fraction of young consumers who live with their parents, as well as the flows of young consumers into and out of parents' households over time, as a function of patterns in local unemployment, youth unemployment, house prices, household income, and student debt per recent graduate.[5]

Our stock regressions show that, holding other factors constant, young people living in areas with high overall and youth unemployment, high house prices, high student debt per graduate, and high household incomes and graduation rates also tend to have high rates of

[2] See, for example, Mykyta and Macartney (2011).
[3] Dettling and Hsu (2014) delve into the influence of overall debt levels and repayment troubles on recent cohorts' decision to live with parents, also using the CCP. Their analysis provides a rich picture of the dynamic debt experiences of young people who move home, and, subsequently, of those who are able to reclaim independence.
[4] See both Matsudaira and Duca.
[5] Ermisch poses the question in the context of British youth of the 1990s, who made co-residence choices under very different economic and social conditions, and for whom student debt was of little relevance.

parental coresidence. This evidence suggests that recent dynamics in unemployment and house prices may have increased parental coresidence, although a decomposition shows that student debt could play an even larger role in keeping young people at home, possibly explaining as much as 50% of the increase since 2003.

However, youth location data suffer from the problem of the missing counterfactual. We lack data on the neighborhood a coresident youth would choose should she decide to move out, as well as on the neighborhood of an independent youth's parents. The difference in the economic characteristics of parents' and children's neighborhoods may itself generate many of the relationships observed in stock estimates of the determinants of coresidence rates by region. Thus estimates from transition models describing the decision of an independent young person to move home, and a dependent young person to move out, may be more revealing.

The effects of local economic conditions are substantial but complex. Local economic growth, for example, has countervailing effects on the overall rate of youth coresidence with parents. A one percentage point increase in the state youth unemployment rate is estimated to decrease the probability of a coresiding young person's moving away from parents between ages 23 and 25 by 0.2 percentage points. This estimate is both sizable and highly significant. Labor market opportunities evidently enable youth independence. Increasing house prices, however, do not. A one standard deviation increase in the growth in zip-code-level house prices observed over two years in the sample is estimated to increase the probability that an independent young resident of the zip code moves home to parents by 0.37 percentage points. Hence the inflation in local prices associated with local economic growth, on the other hand, drives young people home.

Further, estimates from the transition models provide additional, and more credible, evidence of a substantial and significant negative effect of the ongoing escalation of student debt on the independence of youth. The model of the probability that a 23 year old living independently will move home during the following two years predicts that a $10,000 increase in state-cohort student debt per graduate leads to a 0.81 percentage point increase in the rate of moving home to parents. Even more strikingly, the model of the transition out of parents' homes for dependent 23 year olds predicts that a $10,000 increase in state-cohort student debt reliance decreases the two year move-out rate by 2.63 percentage points. The estimates rely on state-cohort debt aggregates for student debt variation; these are free of potentially confounding

information about the youth's abilities and character, and about her parents' degree of supportiveness. Further, the estimates remove any time-fixed or linearly time-varying state-level heterogeneity in, for example, support of education or of youth, relying instead on changes across birth year cohorts within a state for student debt variation. In addition, they control for a host of time-varying local conditions, including income, youth and total unemployment, graduation rates, and house prices. They indicate a higher rate of transition home to parents, and a substantially lower rate of transition away from parents, for cohorts that relied more heavily on student debt when compared to cohorts within the same state who relied less heavily on student debt.

Net effects of employment and housing market swings on coresidence with parents, therefore, are mixed. This may explain some part of the failure of aggregate residence trends to track the recent pronounced boom, bust, and recovery as one might predict. If children fund moves away from home out of labor income, and yet children's ability to support living away relies on cheap housing and consumer goods markets, then the net effect of local economic changes on coresidence with parents is ambiguous. Instead of aggregate boom-bust patterns, coresidence with parents may track relative employment and housing price patterns in locations favored by older and younger residents. Nevertheless, the influence of student debt on coresidence patterns appears unambiguous: as student debt balances and prevalence trend ever upward, young consumers, on net, trend toward home.

The paper proceeds as follows. We describe the New York Fed's Consumer Credit Panel in general, and as employed in this study, in Section I. Section II investigates broad trends in residence choices, debt, and economic conditions from 1999-2013, in both the CCP and other sources. In Section III, we lay out a simple empirical model of the stock of parental coresidence and flows into and out of the parents' home. Section IV reports and interprets findings based on the model, including decomposition analysis of the stock model, and Section V offers concluding thoughts.

I. Data

a. The FRBNY Consumer Credit Panel

The FRBNY Consumer Credit Panel (CCP) is a longitudinal dataset on consumer liabilities and repayment. It is built from quarterly consumer credit report data collected and

provided by Equifax Inc. Data are collected quarterly since 1999Q1, and the panel is ongoing. Sample members have Social Security numbers ending in one of five arbitrarily selected pairs of digits (for example, 10, 30, 50, 70, or 90), which are assigned randomly within the set of Social Security number holders. Therefore the sample comprises 5 percent of U.S. individuals with credit reports (and Social Security numbers). The CCP sample design automatically refreshes the panel by including all new reports with Social Security numbers ending in the above-mentioned digit pairs. Therefore the panel remains representative for any given quarter, and includes both representative attrition, as the deceased and emigrants leave the sample, as well as representative entry of new consumers, as young borrowers and immigrants enter the sample.[6]

In sum, the CCP permits unique insight into the question at hand as a result of the size, representativeness, frequency, and recentness of the dataset. Its sampling scheme allows extrapolation to national aggregates and spares us most concerns regarding attrition and representativeness over the course of a long panel.

While the sample is representative only of those individuals with Equifax credit reports, the coverage of credit reports (that is, the share of individuals with at least one type of loan or account) is fairly complete for American adults. Aggregates extrapolated from the data match those based on the American Community Survey, Flow of Funds Accounts of the United States, and SCF well.[7] However, because we focus on young people's coresidence decisions, we restrict our dataset to 25- and 30-year-olds, which have lower coverage than later ages; coverage ranges between 78 and 94% for 25-year-olds and between 91 and 100% for 30-year-olds, increasing from 1999 to 2007 and decreasing from 2007 to 2013 (compared to estimates from the US Census).[8] However, we do have some information about individuals not covered in the CCP; we know how many live in each state (based on Census figures), and we know that, in nearly all cases, they do not have consumer debt or credit (in which case they would be covered by Equifax). We use this information to analyze and bound our estimates below.[9]

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[6] See Lee and van der Klaauw (2010) for details on the sample design.

[7] See Lee and van der Klaauw (2010) and Brown et al. (2013) for details.

[8] We use the 2008 Census population projections as 'true' population data from 1999 to 2011 and the 2012 Census year-age population projects for 2012 and 2013. In each case, this is the most accurate available data on population size by age, year, and state.

[9] Lee and van der Klaauw (2010) extrapolate similar populations of U.S. residents aged 18 and over using the CCP and the American Community Survey (ACS), suggesting that the vast majority of US individuals at younger ages have credit reports. Jacob and Schneider (2006) find that 10 percent of U.S. adults had no credit reports in 2006, and Brown et al. (2013) estimate that 8.33 percent of the (representative) Survey of Consumer Finances (SCF)

We construct a cohort-level dataset from the CCP by extracting a panel of all individuals who turn 25 or 30 years old in each year between 1999 and 2013. Because the time-series aspect of our study drastically increases the number of observations, we only pull a random 1% sample of the covered U.S. population, instead of the full CCP 5%. There are 567,932 25-year-olds and 598,455 30-year-olds in the dataset, on whom we have 11.9 million and 17.1 million observations, respectively.

In order to calculate bounds on our coresidence estimates, for some applications (which will be clear below) we balance our panel by including null observations in all quarters in which Equifax provides no credit report for an individual (starting at age 18), as well as including null observations for individuals whom we do not observe as having a credit report at age 25 or 30 (imputing the number of such individuals at the state level from the U.S. Census). Our final, balanced dataset includes a total of 30.5 million observations.

b. Other data sources

Columns (1)-(4) of Table 1 summarize the additional data that we use in our aggregate analysis of parental coresidence. They provide average stock values of each characteristic across all individuals and years in our sample, and compare the levels of individuals who coreside with parents with those of individuals who live independently.

Annual county-level unemployment data are drawn from the Bureau of Labor Statistics's (BLS) Local Area Unemployment Statistics (LAUS) program. The unemployment data are reported on a monthly basis, and they cover a total of 3,145 counties. We calculate the youth unemployment rate at the state level using employment data from 18- to 30-year-old individuals in the CPS, aggregated from months to quarters.[10] The average youth unemployment rate across states over our sample is 9.7%, ranging from 1.8% in 2000 Connecticut to 22.1% in 2010 West Virginia.

House price appreciation values are calculated at the zip code level using data from the CoreLogic housing price index (HPI). The CoreLogic HPI uses repeat sales transactions to track changes in sale prices for homes over time, with the January 2000 baseline receiving a value of

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households in 2007 include no member with a credit report. They also find a proportion of household heads under age 35 of 21.7 percent in the 2007 SCF, 20.64 in the 2007Q3 CCP, and 20.70 from Census 2007 projections, suggesting good representation of younger households in the CCP.

[10] CPS youth unemployment data is only available from 1999-2012.

100, and it is the most comprehensive monthly house price index available. We aggregate an annual index to avoid seasonal variation. The CoreLogic data cover a total of 6739 zip codes (representing 58% of the total U.S. population, and 63% of the 25- and 30-year-olds observed in our sample) in all 50 states and the District of Columbia.

Annual county-level income data for 3,142 counties are drawn from the Internal Revenue Service's (IRS) Statistics of Income (SOI) program, which annually aggregates household-level adjusted gross income as reported on US tax forms. Average aggregate household income across our population is $53,200, and is higher within the coresiding population.

Using the CCP's loan-level student loan balance data, we calculate the average student debt burden per graduate as the gross third-quarter student debt held by 24-year-olds in that state-year over the total number of college graduates from universities in that state-year, chained by the CPI to 2012 dollars. We calculate the total number of graduates using the Integrated Postsecondary Education Data System (IPEDS), summing over the number of graduates of four-year and two-year institutions who receive degrees within 150% of the normal completion time in that state-year; the IPEDS data are available every year after 2002. We also calculate the average graduation rate as the ratio of the total number of graduates to the total number of 24-year-olds in the state, as estimated by the US Census. The average graduation rate across states over our sample is 29.1%, and the average state-level per-graduate student debt burden is $20,100.

Finally, as one predictor of states' student debt reliance, we use state-level primary and secondary school spending data collected at the school district level for the US Census's Public Education Finances Report, measuring total current spending per enrolled student (as of fall of that school year). Spending per student averages $7,900.

II. Aggregate trends in the economic conditions facing young consumers and their residence choices

a. *Coresidence with parents: measurement and trends*

Each observation in the CCP includes the (anonymized) information in an individual's credit report at the end of that quarter (e.g. zipcode, birth year, total balances of 10 types of consumer debt, etc.) as well as the information in the credit reports of all members of that individual's household, where households are defined by street address (down to an apartment

number).[11] These data lead us to define coresidence (with parents) to be the circumstance in which a young person (here either a 25- or 30-year-old) resides at the same street address as at least one (Equifax-covered) individual who is between 15 and 45 years older than her, without regard to household head status or the relationship between the household members.[12] Data from the Center for Disease Control and Prevention's (CDC) National Vital Statistics System show that, for children born in 2012, 99.8% of mothers and 84.7% of documented fathers were within this age range (15-45).[13] Moreover, we define individuals who live in households of more than 10 people (3.7% of 25-year-olds and 3.6% of 30-year-olds) as *not* coresiding, because most situations in which one would live in such a large household (prison, military, trailer park) are not such that the individual is in their parents' household.[14] Note that our definition might overestimate the aggregate rate of coresidence with parents due to a possible lag between a young person's switching their home address and updating their credit report address (as reported by financial institutions), which might bias the aggregate coresidence rate upwards.

Figure 1 depicts the proportion of U.S. 25 and 30 year olds living with "parents" in the CCP from 1999-2013.[15] As above, we define living with parents as sharing an address, including an apartment number if one exists, with at least one household member who is 15-45 years older. Note that this includes a range of coresidence circumstances, including coresidence with a parent or parents in which the child is the economic dependent, coresidence with a parent or parents in which the parent is the economic dependent, coresidence with a spouse or partner's parents, coresidence with a grandparent, and even rooming with an older spouse or non-relative. Evidence from the CPS, available upon request from the authors, suggests that the overwhelming majority of households with this age profile consist of children living with parents or parents-in-

[11] See Avery et al. (2003) for a detailed discussion of the contents, sources, and quality of credit report data.
[12] We exclude household members with empty credit files, as those individuals' addresses may no longer be accurately recorded by their creditors, or thereby by Equifax itself.
[13] Analysis of the extent to which this criterion includes non-parent relatives (grandparents, uncles, and aunts) and non-relatives using the CPS is available from the authors. We find that we may capture a fair number of coresident grandmothers and aunts. Romantic cohabitation or marriage with partners 15 or more years older, however, is quite rare in the CPS. Hence the overwhelming majority of coresident households captured by this criterion involve a young person living with an older relative, most often parents or step-parents.
[14] We also assume that individuals whose address is listed as a post office box do not coreside (4% of 25-year-olds, and 5% of 30-year-olds).
[15] The median individual born in a year turns 25 around July 1st 25 years later. In order to capture the average characteristics of 25-year-olds in a year, then, we use the observations of those born 25 years earlier from the first quarter of the following year, allowing for a six month lag in order to measure characteristics, on average, in the middle of the year in which the individual is 25, and a one-quarter lag from the median time at which those individuals would be 25.5 years old to account for delays in Equifax data updating, in which loans typically first appear in the data about one quarter later than the origination date.

law. Hence from this point we refer to this living arrangement simply as "coresidence with parents".

For 30 year old CCP sample members, we observe an increase in the rate of coresidence with parents from 18.7 percent in 1999 to 31.5 percent in 2013. Note that this pattern is free of life-cycle effects, as we measure coresidence with parents for the cross-section of CCP sample members who are 30 years old in each year. This substantial growth in living with parents is approximately monotonic over the period, and proceeds at a steady pace.

Among 25 year olds, the rate of growth is similar, though the levels, as expected, are higher. Coresidence with parents for 25 year olds grows from 28.3 percent to 48.8 percent between 1999 and 2013. As with 30 year olds, the trend for 25 year olds is approximately monotonic and the growth in coresidence is steady, though coresidence declines slightly in 2013. Overall, the rate of coresidence with parents observed in the CCP grows by 68.4 percent for 30 year olds, and by 72.4 percent for 25 year olds, from 1999 to 2013. A striking change appears to have occurred since 1999 in the living arrangements of young consumers.[16]

There are several reasons why the coresidence rate measured using the CCP might differ from measures in other relevant sources. For example, a 2013 report from the Pew Research Center, based on their own analysis of the March Current Population Survey (CPS), reported that 32 percent of 18-31 year olds in 2007, 34 percent in 2009, and 36 percent in 2012 live with parents. However, the Pew analysis defines an individual as living with a parent only if she lives with a parent or step-parent, not a parent-in-law, and is not her- (or him-) self a head of household. Clearly, this narrows the definition of living with parents from the one used in our analysis.

Further, the CCP is unable to identify family relationships, though it does provide the age distribution of individuals living at the same address. Hence, our measure of coresidence with parents is an overestimate, as it contains the small minority of U.S. adults, described above, living with significantly older non-relatives or spouses. This should also increase our measure of coresidence relative to calculations like the Pew results. Another factor that might increase our

[16] This trend may be determined in part by social or demographic phenomena, rather than economic pressures. While the number of Americans aged 45-64 increased by 24 percent from 2002 to 2012 (U.S. Department of Health and Human Services Administration on Aging, http://www.aoa.acl.gov/Aging_Statistics/Profile/2013/3.aspx), the lifetime number of children per woman remained near two and, if anything, was very slightly increasing from 1970 to 2010 (Population Reference Bureau 2012). It is unclear, then, the extent to which changing demographics on their own can be expected to generate changes in the rate of coresidence with parents. In the interest of accounting for possible social and demographic changes, we allow for a time trend as we model the stock of co-residence below.

measure of coresidence relative to survey-based measures is the possibility that mailing address correspondence, even with the requirement that apartment numbers match, may not perfectly measure residence in a shared housing unit.

In addition, credit report coverage of younger U.S. individuals is extensive but not complete, as described above. To the extent that the five to 14 percent of the youth population of the U.S. that is not represented in the trends in Figure 1 lives with parents, these trends will reflect underestimates of the true underlying rate of coresidence with parents among young Americans. To the extent that the small unrepresented share of youth do not live with parents, the Figure 1 trends will be overestimates of the true rate of coresidence.

In order to address this concern, Figure 2 depicts the coresidence trends for 25 and 30 year olds when one assumes that all 25 and 30 year olds represented in the Census but not in the CCP (that is, individuals with no active credit history) live with parents, and then when one assumes that they live away from parents. This creates an upper and a lower bound on estimates of the coresidence rates of U.S. youth based on the CCP.

The more plausible assumption may be that Census youth not represented in the CCP live away from parents. Reasons behind this include institutional populations, such as military and prison populations, who generally live away from home and, we infer, have limited credit report coverage. Such populations tend to be young, and hence their credit report coverage and residence status are particularly relevant for this study of youth residence. According to the U.S. Bureau of Justice Statistics, 0.94 percent of U.S. resident adults were incarcerated at the end of 2011. Presumably the incarcerated shares of 25 and 30 year olds are greater. Similarly, as of 2010, 2.28 million U.S. adults were active duty or reserve members of the armed forces.[17] This represents 1.2 percent of adults 18-64 years of age. Again, shares of the population in the military are likely much larger at ages 25 and 30. Though prison and military populations may have actively updating credit files, they are presumably more likely to be among the small share of 25 and 30 year olds without active credit files, and are of course substantially more likely than other young consumers to live away from parents.

The estimated trend in coresidence with parents in which we assume all youth represented in the Census but not in the CCP live away from parents is represented in Figure 2 by the series with long dashes, lying in each case below the CCP-only trend. These lower trends

[17] See the National Defense Authorization Act for Fiscal Year 2013, H.R. 4310..

show an increase in coresidence with parents from 22.8 percent to 40.9 percent of 25 year olds, and from 16.5 to 28.4 percent of 30 year olds. Their slopes are quite similar to the CCP-only trends, while their levels are roughly four to six percentage points lower for the 25 year olds and two percentage points lower for the 30 year olds (for whom coverage in the CCP is fairly complete).

As a final check of our coresidence results using the CCP, we turn to the 1999-2012 waves of the CPS, and create coresidence measures designed to be similar to our CCP measures using the CPS. We construct U.S.-representative samples of 25 and 30 year olds in the CPS, using the CPS individual weights. From there, we create an indicator of coresidence with parents that equals one for any youth living in the same household with one or more individuals who are 15 to 45 years older.[18] The purple coresidence curves in Figure 2 panels (a) and (b) represent our coresidence calculations using these criteria in the CPS.

Coresidence rates measured in this manner in the CPS are similar to those based on the CCP and assuming Census youth not represented in the CCP live away from home, though the slope of the CPS coresidence curve is somewhat less steep. The inference that coresidence with parents rises markedly from 1999 to 2012 is accurate to both the CCP and the CPS series. For 25 year olds, the CPS coresidence curve lies quite close to the CCP curve that assumes youth without credit reports live away. Coresidence for 25 year olds in the CPS grows from 27 to 37 percent, for a 36 percent increase over the period. For 30 year olds, the CPS curve lies three to 10 percentage points below the CCP lower estimate, which in turn is quite close to the CCP-only estimate. The CPS curve depicts a steady growth in coresidence with parents from 1999 to 2010, followed by a very modest decline in coresidence with parents for 30 year olds in 2011 and 2012.

In sum, we observe a steady growth in coresidence with parents among U.S. youth. While the level of coresidence rates may be sensitive to measurement choices, the levels we obtain are similar enough across alternative methods and sources to suggest that our CCP measures are informative, and the marked upward trend in coresidence with parents is robust to all sources and methods discussed in this paper.

b. Trends in other living arrangements

[18] As on the CCP, we assume that any individual in a household of 10 or more persons is living away from parents.

Given general agreement that young Americans are staying home with parents at an increasing rate, what alternative living arrangements are they forsaking? Popular speculation suggests declining rates of first marriage among young people in the wake of the recession. After the release of the 2009 American Community Survey, Mather and Lavery (2010) noted a recession-era decline in the share of young people who had ever been married. Shortly after, Wolfers (2010) countered that this data artifact represented not a meaningful decline in stable relationships, but an ongoing increase in the age at first marriage in the U.S., coupled with an increase in cohabitation during the recession, which may have been motivated by a desire to cut living expenses. The relevant question for the current study, then, may be whether young Americans are choosing extended adolescence at home with parents in place of independent adulthood and marriage.

Our CCP measures do not allow us to measure the rates at which CCP sample members are marrying before and after the recession. They do not even allow us to measure cohabiting relationships, whether or not they involve marriage. What we can do, however, is look at trends in the rate at which young Americans coreside with one other adult of a similar age. The benefit of this approach is that it includes marriage with both opposite sex and same sex cohabitation, yielding a broader picture of trends in coresiding relationships over the period. The obvious drawback, however, is that it includes roommate pairs whose relationships are platonic. Our analysis of CPS household characteristics suggests that this later group is reasonably rare from at least the age of 30 onward.[19] Interpretation of trends in living with a single adult roommate of comparable age should, however, bear this inclusion in mind.

We categorize individuals who are not coresiding with parents into three types. An individual is defined as living alone if she is the only (Equifax-covered) resident at her street address. We then divide the remaining individuals into those who live with only one other person and those who live with more than one other person, excluding households with more than 10 people and individuals whose report lists a post office box address.

Figure 3 panels (a) and (b) show CCP trends from 1999 to 2013 in the rates at which 25 and 30 year olds, respectively, appear alone, with parents, with one adult of similar age to the file

[19] Calculations available from the authors.

holder, and with two or more adults of similar age.[20] The latter category we interpret as roommates. We find a consistent pattern across the two age groups, though, of course, the level and growth of coresidence with parents is much greater for 25 than for 30 year olds. At each age, the growth we observe in coresidence with parents appears to come at the cost of fewer young people living alone, and fewer young people living with young roommates. The rate of living alone, for example, falls from just above 26 percent for each age group in 1999 to 15 percent for 25 year olds, and 17 percent for 30 year olds, in 2013. The rates of living with roommates at the two ages follow a similarly steady decline. Cohabiting with one adult of similar age, however, follows a hump-shaped pattern for each group. For 25 year olds, the rate of such cohabiting relationships begins in 1999 at 16.6 percent, hovers for some years near 20 percent, and then gradually drops to 16.4 percent between 2008 and 2013, for a total loss over the period of 0.2 percentage points. Similarly, the rate for 30 year olds began at 24.1 percent in 1999, rose to a 2006 peak of 32.1, and dropped slightly between 2006 and 2013 to 28.7, for an overall growth in cohabiting relationships among 30 year olds over the period of 5 percentage points. In sum, the observed growth in coresidence with parents is balanced by steep declines in living alone and living with groups of roommates for 25 and 30 year olds. Surprisingly, we see no clear evidence of a decline in cohabiting relationships in favor of living at home with parents in these data.

c. Youth homeownership and student debt trends in the CCP

The past decade has brought a widely recognized escalation of student debt. The FRBNY Household Debt and Credit Report, based on CCP figures through 2013Q4, shows nominal aggregate student debt rising from $253 billion in 2003Q4 to $1.080 trillion in 2013Q4, for a total nominal growth of 327 percent over 10 years. The Office of Federal Student Aid (FSA), based on the National Student Loan Data System (NSLDS), reports an increase in nominal federal direct loan plus FFEL program and Perkins loan balances from $516 billion in 2007 to $1.040 trillion in the fourth quarter of 2013.[21] The private student loan market grew steadily during the boom of the mid-2000s, originations shrunk dramatically as a result of tightened underwriting standards in the wake of the Great Recession, and private student loan balances are

[20] By similar age, we mean 14 or fewer years older than the file holder. This cutoff is chosen to create mutually exclusive and exhaustive living arrangement categories.
[21] NSLDS federal loan balances reached $1.051 trillion in early 2014, and the CCP aggregate balance, which includes the private student loan market, reached 1.11 trillion in 2014Q1.

only recently beginning to recover. MeasureOne reports a growth of total private student loan balances among the seven leading lenders currently in the market from $44 billion in 2008Q3 to $63 billion in 2013Q3 (MeasureOne, 2013).[22] In sum, student borrowing has changed substantially from 2003 to 2013.

All of the above, however, describes the student loan market as a whole, including parent and student borrowers of all ages. More relevant to the residence choices of young Americans may be the trends in student debt among recent graduates (and dropouts). Figure 4 depicts the proportion of CCP 25 year olds participating in the student debt market, along with the mean student loan balance of 25 year olds in each year, among those 25 year olds who have student debt. Once again, the only financial variables appearing in this paper pertain to student loans. They are reported in 2012 U.S. dollars. We observe an increase from 25 percent in 2003 to 45 percent in 2013 of 25 year olds with positive student debt, for an 80 percent growth in 25 year olds' rate of participation in student debt markets over the decade. Mean student loan balances at 25 among those with positive student debt balances between the ages of 22 and 25 nearly doubled over the period, from $10,649 in 2003 to $20,932 in 2013. In sum, the remarkable aggregate growth in student debt over the decade from 2003 to 2013 is more than reflected in the student debt growth we observe for 25 year olds in the CCP. More students are enrolling in college, and students in college are borrowing more to fund their educations. As speculated by the NAR, the CFPB, and various arms of government, we might expect the burden of increasing educational debt to delay standard life-cycle economic milestones, such as living independently and the purchase of first homes.

Next we turn to trends in early homeownership in the CCP. Figure 5 depicts the trend in homeownership among all 25 and 30 year olds represented in the CCP.[23] We infer homeownership based on the presence of home-secured debt, whether mortgage or home equity-based loans, on the sample member's credit report. Further, as some couples may include only one member's name on the mortgage, we record an individual with no home-secured debt on her or his own credit report, but who is living with one adult of similar age who holds home-secured

[22] Some of this growth in private student loans among the seven leading lenders may reflect buying debt from other lenders.

[23] Note that Figure 5 reflects all youth in the CCP as well as the small portion of youth represented in the Census but not in the CCP. We assume that 25 and 30 year olds not covered by the CCP (and who thus do not have Equifax credit reports) are not homeowners, as (we infer) they almost certainly cannot have mortgages. The qualitative findings all persist in the CCP-only sample.

debt, as a homeowner.[24] The presence of home-secured debt on the credit report is a particularly reliable proxy for homeownership at young ages, and its absence a reliable proxy for non-homeownership, as very few 30 year old homeowners in the U.S. own their homes outright. In the figures, we trace the proportions of 25 and 30 year olds who have owned homes over the past 4 years, inferred based on the preceding four years of linked data in the panel. The object of interest is whether the individual currently owns or has ever owned a home, and four years of history is a reasonably good proxy for ever owning at these very young ages. Similar results obtain where we track the rate of current homeownership and the rate of ever owning over the full course of the panel. The potential difficulty with the latter measure is that the look-back window available in the CCP lengthens as the panel progresses, creating time dependence in the quality of the measure of homeownership. However, homeownership measures based on all three approaches are very similar for these young age groups.

We find that homeownership among 30 year olds grew modestly from 43.2 in 2003 to 44.4 percent in 2006-7. After its peak at 44.4 percent, it dropped off dramatically following the housing market crisis, to 42.6 in 2008 and 31.9 percent by 2013. Hence we observe more than a 10 percentage point drop in the share of 30 year olds who have owned their own homes over the course of five short years. This hump-shape in homeownership corresponds to the cohabitation pattern discussed earlier. However, the decline in homeownership for 30 year olds in recent years has been much larger than that for cohabitation.

Homeownership rates among 25 year olds are, as expected, substantially lower. Perhaps more surprising is the timing of their growth and decline relative to the housing market boom and bust. Speculation regarding the source of the boom and bust, and its relationship to sub-prime lending and easy credit for buyers with limited funds for down payments, suggests a housing market that grew to reach younger and younger consumers. The CCP time trends on early homeownership appear to tell a different story. Homeownership among 25 year olds grew from 22.7 percent in 2003 to a peak of 22.9 percent in 2005. This increase appears reasonably modest, in the face of softening sub-prime lending standards and historically low down payments. From its peak in 2005, homeownership among 25 year olds fell to 22.5 percent in

[24] Evidence from our sample indicates a sharp change in the rate at which young couples include both members in a mortgage following the Great Recession. This is discussed in a companion paper on student debt and homeownership. Whether we credit couples' mortgages to each other or not. we find that homeownership at age 30 declines markedly after 2007.

2006 and continuing to decline until it reached 12.1 percent in 2013. Thus the drop in homeownership among 25 year olds led the downturn in the housing market by roughly a year, and peak homeownership at 30, traditionally the median age of first home purchase in the U.S., was reached a full two years later.[25] Clearly the youngest homeowners had a different relationship to the housing boom and bust than traditional first time buyers.

Figure 6 relates the timing of the homeownership decline to that of the increase in the rate of living with parents for each age group. Declines in homeownership coincide with increases in living with parents for both age groups. At 25, homeownership drops steadily from 2005 through 2013, and the rate of living with parents shows a steady increase throughout the 2003 to 2013 window. At 30, living with parents increases throughout, but appears to accelerate after 2006. Shortly after, in 2007, homeownership reaches its peak and then declines steeply until 2013, at which point 30 year olds in the CCP are equally likely to be living with a parent or to own a home.

c. Prevailing macroeconomic conditions and youth residence choices

So far we have seen approximately unbroken upward trends in coresidence with parents among 25 and 30 years over the years from 2003 to 2012, and a substantial change in aggregate homeownership at 30 around the Great Recession. All of this raises questions regarding the relationships among youth residence choices and the prevailing economic conditions under which these choices are made.

Figure 7 represents trends in broader economic conditions and youth residence choices in a common space. Aggregate U.S. student debt, as measured in the CCP, is represented by the yellow line, and follows a steep upward path, without wavering around the recession. Total unemployment for the U.S. is drawn from the Bureau of Labor Statistics (BLS) monthly Labor Force Statistics for 1999-2014. Represented by the dark red line, it showed a modest decline during the economic boom of the mid-2000s, followed by a steep increase from 5.0 percent in 2008 to 10.0 percent in late 2009, and a subsequent recovery. The recent recovery in unemployment has been gradual but substantial: total unemployment among the adult population participating in the workforce, seasonally adjusted, fell from 10.0 percent in late 2009 to 5.8 percent in the October 2014 BLS Employment Situation release. Unemployment among youth

[25] See Lautz (2011) for recent median ages at first purchase.

aged 18-30, based on our own calculations in the CPS, followed a similar modest decline in the boom and then increased even more sharply, from 6.8 percent in late 2006 to a maximum of 14.8 percent in early 2010. Its recent recovery involves a decline from 14.8 percent at its 2010 maximum to 11.3 percent in the end of 2012. The monthly CoreLogic house price index, here represented by the purple line, increased from a normalized value of 100 in January 2000 to a peak of 200 in 2006, fell to a 2011 trough of 134, and since then has moved through an unsteady recovery to reach 165 by late 2013. In sum, while aggregate student debts have followed a steep, unbroken upward trajectory since 2003, both employment and house prices have experienced a pronounced boom, bust, and recovery.

One question, then, is to what degree the residence choices of the young track the recent, pronounced business cycle. To the extent that they move with the boom and bust, residence choices may appear to be driven by economic conditions, such as youth labor markets and the cost of housing. To the extent that their changes are gradual and persist throughout the boom, bust, and recovery, however, they may appear to be driven instead by young consumers' recent, unprecedented accumulation of student debt.

In Figure 7, as before, the upward trend in coresidence with parents appears steady, and suggests little direct relationship to broad economic indicators such as unemployment measures and the house price index. This would seem to suggest that the decision to stay home with parents, or to move back in, relates more closely to the recent changes in the debt burden of higher education than to swings in youth labor markets and the cost of housing.

However, the analysis presented in Figure 7 is unsophisticated, and, as such, poses more questions than it resolves. In terms of the aggregate trends, the steady increase in coresidence with parents may reflect not a failure to respond to aggregate conditions, but offsetting effects of, for example, job and housing markets on residence decisions among the young. The failure of all youth residence decisions to reflect the recent recovery in employment and house prices remains a mystery.

Finally, these aggregate trends, while informative, may mask evolving local relationships among housing cost, labor markets, and youth residence choices. The fine geographic data and long panel of the CCP allow us to exploit time variation in local economic conditions and student debt reliance to learn more about the contributions of jobs, housing costs, and student debt at the local level to the decisive aggregate trends toward parents, and away from economic

independence, that we observe for recent cohorts of young adults. Motivated by this potential in the CCP, and by the questions raised by the relationships among the national trends, in the following section we present an empirical model of parental coresidence. First, we describe a lagged stock model explaining the revealed coresidence decisions of 23- and 25-year-olds as a function of local unemployment, youth unemployment, house prices, and student debt per recent graduate, a linear decomposition of which provides a simplified visualization of the conditions associated with parental coresidence. Then, to account for differences in the economic characteristics of regions where young people live alone, and where their parents live, we separately model the flows of young CCP consumers into and out of parents' households over time as a function of changes in the economic and social conditions of young consumers' initial locations.

III. Empirical model

a. Stock of young people living with parents

Figure 7 shows that the trend in 25-year-old parental coresidence appears more similar to the trend in student debt than to unemployment rates or the house price index at the national level, but does not capture geographic variation in these relationships or allow us to weigh the relative contributions of each feature of the environment to a young person's residence choice. As a first, descriptive, step, we estimate a model of the likelihood that, at a given time, a child is living with his or her parents as a function of local socioeconomic conditions. In anticipation of the flow model to come, we consider individuals at two ages, 23 and 25. Define Y_{it} as an indicator for whether individual *i* living in location *l* at time *t* coresides with her parents. We model the likelihood that an individual lives with her parents as a function of the conditions in her locality one year earlier, including fixed effects by state to control for unobserved differences in culture and policy.[26] We thus estimate the following linear probability model:

$$\Pr(\mathrm{Y}_{it+1} = 1 \mid X_{ilt}, Z_{c(i)l}, i, l, t) = X_{ilt}\beta + Z_{c(i)l}\gamma + \delta_{s(l)} + \varepsilon_{ilt}, \qquad (1)$$

where X_{ilt} represents a vector of individual *i*, location *l*, period *t* characteristics the levels of

[26] Hence the lagged regressors are observed when the estimation sample youth are 22 and 24.

which may influence the residence choice of individual *i* at *t+1*. This vector includes county-level unemployment, state-level youth unemployment (based on our calculations in the CPS), and zip code-level CoreLogic house price index, and may include a linear time trend representing an unobserved national cultural trend. The vector $Z_{c(i)l}$ represents characteristics of individual *i*'s cohort, *c(i)*, and location *l* that do not vary by *t*, which include both state-level average student debt per graduate and the state-level college graduation rate in state *s(l)* when *i* was age 24. We include these aggregate state-cohort education measures as proxies for individual student debt reliance that are relatively free of the influence of confounding individual (observed and unobserved) characteristics. The vector of state fixed effects is denoted $\delta_{s(l)}$. Idiosyncratic error ε_{ilt} is clustered at the state level.

b. Flow home to parents from independent living

Next, in order to refine our understanding of the relationships among economic conditions and Millennials' lingering in parents' households, we estimate the dependence of the choice to move away from parents, and the choice to move home, on a variety of individual and local characteristics. A model of the overall stock of young people living with parents in a region poses several challenges to interpretation. First, persistent heterogeneity in the fundamental socioeconomic characteristics of U.S. localities is likely to drive the resulting estimates. Countervailing effects of persistent levels of child and parent need may lead to unpredictable, and difficult to interpret, estimated relationships. Less affluent regions, for example, may be characterized by children more in need of parental support, but also parents less able to offer support.

Second, the location of residence of the child in a stock regression of coresidence on individual and local characteristics poses a fundamental problem. When a child lives with a parent, local characteristics are measured in the parent's neighborhood, and not in the child's best alternative location. When a child lives independently, the reverse is true. Assume, for example, that housing prices and unemployment are more favorable in parents' neighborhoods than in children's neighborhoods, in keeping with typical life-cycle patterns of consumption in the U.S. (and as suggested by Table 1). Then the problem with the location of measurement generates a spurious positive relationship between local house prices and living with parents, and

a spurious negative relationship between the local unemployment rate and living with parents. Of course several other concerns arise round the interpretation of stock regressions of coresidence with parents.

Therefore we turn to models of the flows of children into and out of parents' households. There are two major differences between these flow models and a straightforward differencing of equation 1 above. First, we separately model the flow into and the flow out of parental coresidence, as the effect of local economic conditions on whether a child moves away from home may be very different from the effect of those same conditions on whether a child moves home. Second, since we model two-year flows of parental coresidence, between the ages of 23 and 25, we no longer lag the geographic characteristics by a year in identifying their effect on parental coresidence. Instead, in most instances, we estimate the dependence of the decision to move home or away on the change in conditions over the two year estimation window in the youth's initial location. However, student debt per graduate and graduation rate in the youth's location at age 24 are time-fixed characteristics, and, nevertheless, we expect that the stock of education debt may influence the decision to move.[27] Hence we permit these characteristics to influence the transition probability through their level at *t* rather than through their (null) flow from *t* to *t + 1*.

Consider first the decision to move home to parents. We begin with a sample of children who, at time *t*, live away from parents, and, therefore, are at risk of moving home. Maintaining the definitions above, we estimate the model of moving home in a sample of CCP youth for whom $Y_{it} = 0$. The outcome of interest is Y_{it+1}, an indicator for whether a member of this group moves home between periods *t* and *t* + 1. The estimates below pertain to the probability of a change in residence over a period of two years.

We estimate the linear probability model

$$\Pr(Y_{it+1} = 1 \mid Y_{it} = 0, X^H_{ilt}, X^H_{ilt+1}, Z^H_{c(i)l}, i, l) = (X^H_{ilt+1} - X^H_{ilt})\beta^H + Z^H_{c(i)l}\gamma^H + \delta^H_{s(l)} + \varepsilon^H_{ilt}, \quad (2)$$

where superscript *H* denotes factors influencing the probability of moving "home". In the flow equations, X_{ilt} includes a national time trend, which is constant when differenced.

[27] Note that age-24 student debt at the cohort level is measured in the middle of the two-year flow, which may be a source of endogeneity; however, our estimates are qualitatively similar when the model is estimated using student debt from age 23 or 22.

Further, the flow estimates reported in Tables 3 (4) account for a vector of state-level fixed effects in the probability of moving home (away). Our intention in estimating flow models with fixed effects is to allow the model to account for differences in the stability of residence choices in different states. For example, a state in which coresidence is rare, like Montana, may be characterized by a different baseline flow home among independent youth than a state in which coresidence is common, like New York. However, our qualitative results are robust to excluding the vector of state fixed effects.

Importantly, in the flows home, location *l* is defined as the child's location at time *t*, and all local characteristics at *t* and *t* + 1 are measured for location *l*. This avoids the problem of measuring location characteristics of the parent for children living at home and location characteristics of the child's preferred independent location for those moving away.

c. Flow away from parents to independent living

We estimate a similar model for the probability that a youth living independently moves back in with parents between periods *t* and *t* + 1. The (obvious) changes made in this case are the following: we estimate using a sample in which all youth initially live with parents, *i.e.*, $Y_{it} = 1$, and therefore each sample youth faces a risk of moving out. The expression for the linear probability model estimated in the sample of youth coresiding with parents, then, is

$$\Pr(Y_{it+1} = 0 \mid Y_{it} = 1, X^A_{ilt}, X^A_{ilt+1}, Z^A_{c(i)l}, i, l) = (X^A_{ilt+1} - X^A_{ilt})\beta^A + Z^A_{c(i)l}\gamma^A + \delta^A_{s(l)} + \varepsilon^A_{ilt}, \qquad (3)$$

where all arguments are defined analogously to those in expression (1). In this case, all location characteristics are measured for location *l*, the youth's location away from home in period *t*. Superscript *A* denotes factors influencing the probability of moving "away".

Note that we will be able to estimate the dependence of the probability of moving in with parents on economic conditions in the youth's chosen independent location, and the dependence of the probability of moving away from parents on conditions in the parent's location. Owing to the unobservability of locations not chosen, what we will not be able to explore is the dependence of the youth's decision to move home on the characteristics of the parent's location, and the dependence of the youth's decision to move out on the characteristics of the youth's preferred independent location.

d. Endogeneity concerns in the flow models

The most obvious endogeneity concerns in the context of our broader youth co-residence question involve individual student debt. Were we to estimate expressions (2) and (3) using individual student debt, the debt the young person has accumulated, and has not yet repaid, would presumably be endogenous to parental co-residence for a host of reasons. First, whether a young person is currently accumulating or paying down student debt presumably reflects measured and unmeasured aspects of the youth's broader financial and life circumstances, and these, in turn, influence co-residence. Second, the literature has documented substantial heterogeneity in parents' financial generosity.[28] At the individual level, parental generosity may act as a third factor, determining both parental contributions for college, hence student debt, and parents' willingness to house their adult children. Third, individual heterogeneity in features such as debt-aversion, risk tolerance, and diligence may drive both the level or change in individual student debt and the decision to move home or away. Finally, individual ability and educational attainment are likely both to be correlated with the student debt level and to influence co-residence with parents.

Given the many sources of endogeneity of individual student loan level and growth to youth residence outcomes, we estimate the dependence of co-residence with parents on student debt by proxying for student debt with the mean student debt cost of a degree in the youth's state-cohort, as described above. We estimate both flow models including state fixed effects, and hence the coefficient on state-cohort student debt is identified by changes across cohorts within a state in the mean debt price of a degree. Such differences are relatively free of confounding family characteristics like generosity and debt aversion, and instead are influenced by changes (within state) from cohort to cohort in factors including tuition at state colleges and the generosity of federal, state, and institution-level grant and loan aid.[29]

One possible concern regarding reverse causality arises from the individual youth's influence on labor and housing markets in the location she leaves, should she decide to move. A youth who moves away from one location to another, if unemployed, can be expected to decrease the total and youth unemployment rates in the original location. If employed, she

[28] Brown, Scholz, and Seshadri (2012), McGarry and Schoeni (1995).
[29] Note that we control for state economic conditions that might otherwise appear in the mean state-cohort student debt price of a degree through youth unemployment, total unemployment, and house prices.

increases the unemployment measures in the origin. Assuming movers are more likely to be unemployed than the population of young people overall, this mechanical source of endogeneity could bias coefficients on the unemployment measures downward. Of course, to the extent that the unemployment measure responds with a lag rather than contemporaneously, the estimates will not be biased. This seems to be a likely possibility. Further, this source of reverse causality of youth residence choices is not a concern if moves to and from parents' households all occur within the relevant location. For example, to the extent that all moves home or away occur within the same county, no unemployment coefficient will be affected.

Assuming youth in our model influence the housing market as well, a similar type of reverse causality could affect the coefficients on house prices. Assuming that a child living in a parent's basement does not lead the parent to demand more housing, the departure of a youth who lives at home has no effect on house prices. Hence we are less concerned about the effect of reverse causality on the house price coefficient in the moving out regression. A youth who has been living independently and returns home, however, leaves the origin housing market and therefore decreases total housing demand in the origin. As each youth in the moving home regression exerts this influence, this source of mechanical reverse causality could bias the estimated coefficient on house prices in the moving-home regression downward. As in the case of unemployment, to the extent that the resulting effects on house prices appear with a lag, or that moves between parent and independent youth locations fail to cross locations, this is not a concern. However, house prices in the estimation are measured at the zip code level, and so it is reasonably likely that youth moving back home will cross zip code lines and exert spurious downward pressure on house price effects in the moving-home regression.

Standard endogeneity concerns deriving from observable and unobservable individual and local characteristics that are fixed over the two year window are accounted for by the transition approach we take to estimation. Obvious examples include child ability, parent generosity, and persistent regional characteristics. Remaining major concerns regarding the endogeneity of changes in local characteristics to youths' transitions home and away seem most likely to arise from third factors determining both changes in local characteristics from t to t+1 and youths' interest in living with parents. An immediate example is changing local economic conditions. Their effect is likely to be picked up by some combination of total employment and house price measures. Given this, we interpret total employment and house price coefficients as though they

contain both direct effects of employment and house prices, and indirect effects of local economic conditions. So far we have not found that this changes our inferences based on the estimates substantially. Concerns regarding third factors influencing local levels of student debt among recent graduates are more relevant, and we discuss them along with the model results in the following section, providing first-pass instrumental analysis to allay these concerns.

IV. Results

a. Stock of young people living with parents

Table 2 reports the coefficient estimates for the stock parental coresidence model in expression (1) for 23- and 25-year-olds. Our baseline specification is shown in column (5), which includes each of the covariates listed above as well as state dummies to control for unobserved permanent cross-state differences in culture and policy. We find, as expected, that geographic areas with a higher overall unemployment rate, a higher youth unemployment rate, a higher house price index, and higher student debt per college graduate tend to have higher rates of parental coresidence, with each effect individually statistically significant at the 5% level. Columns (1) to (4) show that the coefficient magnitudes are not substantially mutually dependent; in particular, a comparison between columns (4) and (5) shows that the estimated magnitude of the relationship between student debt per graduate and parental coresidence is not mediated by the college graduation rate, suggesting its robustness to separately controlling for educational attainment. Indeed, we find a positive relationship between graduation rate and parental coresidence, suggesting that, separate from the effect of student debt, regions with a high proportion of young college graduates are also likely to have a high level of parental coresidence among 23 and 25-year-olds.[30]

In order to understand the magnitude of the relationship between each economic characteristic and the increased rate of parental coresidence since 2000, we perform a simple linear decomposition of the regression. In the top panel of Figure 8, we consecutively fix each economic characteristic at its 2000 level (except for student debt per graduate and the graduation rate, which are fixed at their 2003 levels) and model the resulting expected rate of parental

[30] Higher co-residence with parents in locations with higher graduation rates may reflect, among other things, delayed entry to the marriage market for college graduates, and parent-level heterogeneity in supportiveness.

coresidence among 25-year-olds.[31] Beginning with the red line, which depicts the predicted coresidence rates from the baseline regression with time-varying characteristics, we fix characteristics at their 2000 (2003) levels, adding fixed characteristics in the order: total unemployment, youth unemployment, house price index, household income, student debt per graduate, and, finally, graduation rate. The top panel shows that changes in the overall unemployment rate, household income, and graduation rate have only very modest associations with the rate of parental coresidence. The bottom panel of Figure 8 shows the additive proportion of the variation of parental coresidence that the stock model attributes to each covariate; it suggests that house prices accounted for roughly 20% of the increase during the mid-2000s, while youth unemployment accounted for as much as 25% of the increase during the Great Recession. However, student debt per graduate claims the largest share of the increase, accounting for as much as 50% of the increase in the likelihood of a young person's living with parents.

One challenge to the interpretation of the relationship between student debt per graduate and the rate of parental coresidence presented above is the possible existence of a secular unobserved trend in parental coresidence, perhaps related to a cultural change regarding young people's living with their parents. If there exists such a secular cultural trend, then the correlation between parental coresidence and student debt per graduate (which has increased steadily, though at a slightly decreasing rate, every year on average across states) may be incidental. We test this conservative hypothesis by including a national linear time trend in our stock specification, shown in column (6) of Table 2. Including a time trend attenuates all of the estimated coefficients, including the coefficient on student debt per graduate, but the student debt estimate remains positive and statistically significant at the 1% level, and both the youth unemployment rate and the house price index also maintain their positive and statistically significant coefficients at the 10% level. Figure 9 shows a decomposition of these conservative estimates, suggesting that, conditional on a secular cultural trend unrelated to student debt, student debt only explains about 10% of the increase in parental coresidence since 2004, with another 10% being explained by house prices during the mid-2000s. An alternative specification including year dummies instead of a linear time trend, a more flexible control for unobserved

[31] Note that student debt is first measured in our data in 2003, and hence we delay the student debt and graduation baselines until data permit the addition of the student debt control. The estimates include an indicator for missing education measures, which is set to one during the earliest years of the sample.

national culture shocks, yields very similar results. However, given that student debt is measured at the state level (implying that, at the individual level, it is measured with extreme imprecision), this model is extremely conservative; another interpretation of the time trend is as a second noisy measure of the effect of student debt on parental coresidence, implying that the attenuation of the student debt coefficient is (at least in part) spurious.

A substantial problem with our stock model of parental coresidence is the fundamental mechanical problem of measuring our economic characteristics at the geographic level; if there are systematic economic differences between regions where young people live independently and the regions where their parents live, then the economic characteristics, even though they are lagged by one year, may be endogenously determined by an individual's parental coresidence decision. Indeed, the positive correlation between income and parental coresidence suggests that this endogeneity is present in our model; it is more reasonable to interpret that coefficient as evidence that young people's parents live in higher-income counties than those young people *would* live were they living independently than as evidence that higher-income young people live with their parents with greater frequency.

One available means of addressing this concern is to employ economic condition measures drawn at a coarser geographic level. While this weakens the informative variation available to identify the model, it lessens the problem of measuring dependent youth in the parent's location and independent youth in the child's location. Give that interstate moves are comparatively rare, we re-estimate the model measuring all geographic characteristics at the state level. Column (7) shows that our results largely persist even when all demographic characteristics are measured at the state level instead of the county or zip-code level; however, cross-state mobility poses an intransigent problem for our stock analysis.

Finally, any estimate of student debt may capture not only the intensive margin, how much debt is held by each debt-holder, but also the extensive margin, people's decision to go to college conditional on college's cost. Because we aggregate to the state level, the presence of student debt does not indicate college attendance; however, there may be heterogeneity in the price discrimination techniques of universities across states, with states that provide more financial assistance to low-income students (relative to others) having a different population of college attendees than states with less such heterogeneity. In order to avoid identifying such differential pricing schemes across states, which may lead to effects on the extensive margin, we

test the robustness of our student debt estimate by instrumenting student debt per graduate with the four-year average of state education spending when the individual was age 18-21. This instrument is extremely powerful, with a first-stage F-statistic of over 100,000, and plausibly affects parental coresidence through the intensive margin alone, particularly when considered at the aggregate level. Two-stage least squares estimates of the model are presented in column (8) of Table 2; the estimated coefficient on student debt per graduate is nearly double its un-instrumented value and is highly statistically significant, suggesting that the extensive margin was indeed biasing the effect of student debt on parental coresidence downward.

b. Flow home to parents from independent living

Table 3 reports the coefficient estimates for the moving home model in expression (2). The relevant scales of measurement are as follows: The dependent variable is set to 100 for a youth who moves and 0 for a youth who does not. Unemployment measures and the graduation rate among current 24 year olds in the state, similarly, range from 0 to 100. Recall that the CoreLogic house price index takes a value of 100 in January 2000 for each zip code, and hence measures growth in house prices relative to January 2000.

Our preferred specification appears in column (4) of Table 3. Here we find that an increase in local house prices has a positive and highly significant effect on the probability that the young adult moves home. In fact, we estimate that a one standard deviation increase in the house price change over the two years leads to a 0.37 percentage point increase in the probability of a youth moving home over two years. Further, looking across the Table 3 specifications, we see that the house price coefficient is particularly robust to the inclusion (or exclusion) of other regressors, such as local income, student debt reliance, and graduation rate.

Total unemployment and the local house price index, taken together, provide a measure of the strength of local demand. As demand increases in the youth's independent location, that location's total unemployment decreases and its house prices increase. We observe a negative, in some cases significant, coefficient on total unemployment and a positive and consistently significant coefficient on house price index in the moving home regression. Together, these results suggest that strengthening local demand conditions in the youth's independent location increase the likelihood that the youth moves back home. One interpretation of these results is that, conditional on the youth labor market, stronger demand in the youth's independent location

increases prices, particularly house prices, and these increased prices drive the youth home to her parents.

The reverse causality generated mechanically by the shifting populations in this case works against our finding a positive effect of house prices on moving home, implying that this point estimate of a 0.011 percentage point increase in the rate of moving home for every one percent increase in local house prices over the January 2000 base prices is a lower bound estimate of the true effect. Further, the extent of this reverse causality problem may be large given that house prices are measured at the zip code level, and many young people may cross zip codes to return to parents. Note that the 0.011 percentage point increase is reasonably substantial when one considers the magnitude of the swings in house prices over the period. As noted, the standard deviation of the zip code-level house price index over the period in our sample is 44.7. The average homeowner in the CCP experienced roughly a 50 percentage point increase in house price over the boom, and roughly a 25 percentage point decrease over the housing market bust. Additional variation in these experiences at the regional level enhances the effect of house prices on coresidence with parents estimated for this sample.

On the other hand, the reverse causality problem actually works toward finding a spurious negative effect of total unemployment on moving in with parents, as unemployed youth leaving the county at higher rates exert negative pressure on the unemployment coefficient. Further, the total unemployment coefficient becomes smaller and insignificant with the inclusion of income, graduation rate, and student debt. Together these mechanical endogeneity concerns lead us to infer a substantial positive effect of housing costs in the independent location on the odds that a child moves home to parents, and a modest, possibly insignificant negative effect of both total unemployment and youth unemployment in the independent location on moves home.

The estimates in column (4) demonstrate a significantly higher rate of moving home in states with higher debt cost of a college degree in the youth's graduating cohort. An increase of $10,000 in the debt cost of a degree is associated with a 0.8 percentage point increase in the probability of an independent young resident of the state moving home over the course of two years.[32] This effect is robust to controlling for the share of college graduates among the youth's

[32] Our effect is about twice the size of that estimated by Dettling and Hsu (2014), who study the effect of individual-level student debt on parental coresidence. Two factors may contribute to the difference in estimates. First, Dettling and Hsu's population is individuals age 18 to 30, which will lead their independent youth sample to be older than ours (since the likelihood of living with ones' parents substantially decreases in age) and thus perhaps less sensitive

cohort in the state, which, unsurprisingly, is associated with a lower propensity to move home.[33] These estimates provide further, and perhaps more credible, evidence of a positive effect of growing student debt burdens on young people's propensity to live with parents.

The aggregated student debt measure employed here is an improvement over measures involving the level or change in individual student debt, which clearly carries with it a host of other information regarding the student's life stage and her parent's degree of supportiveness. The aggregated measure responds to state by cohort variation in the generosity of financial aid and the availability of student loans, providing extensive sources of variation in the reliance on student debt to support higher education. Further, specifications including state fixed effects in the transition probability account for time-fixed variation in the propensities of states to support youth and education, and so the student loan coefficients are identified from changes over time, within states, in cohorts' student debt reliance.

In sum, the estimates of independent youths' flow home to parents indicate significant and not insubstantial homeward pressure exerted by both increasing house prices and a greater reliance on student loans among members of the youth's graduating cohort.

c. Flow away from parents to independent living

Table 4 reports the coefficient estimates for the model of the decision to move away from home. Where the larger and more significant effects on the move home are exerted by house prices and student debt in Table 3, here we find that youth unemployment and student debt exert the greatest influence on the decision to seek independence.

Looking again at the preferred specification reported in column (4), we see that a one percentage point increase in state-level youth unemployment leads to a 0.2 percentage point decline in the rate of moving away from parents over two years. During times of high youth unemployment, all else equal, young people are estimated to respond with a substantial decline

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to student debt. Second, their use of individual-level debt suggests that their result might be attenuated by the contribution of an unmeasured third factor: parental coresidence might result from high family generosity, which would also lead to low student debt levels, depressing the estimated effect of debt on coresidence.

[33] The estimated decline in the probability of moving home with the state-cohort graduation rate is insignificant at standard levels of confidence. This estimate may appear to be at odds with the stock estimates, which show a higher rate of parental co-residence at ages 23-25 in state-cohorts with higher graduation rates. However, what the combined stock and flow (home and away) estimates indicate is that, all else equal, state-cohorts with higher graduation rates both linger longer at home and exhibit less churning in their location. This is not necessarily a surprising relationship between co-residence and education.

in the probability of leaving home. The intuition behind this relationship is straightforward, as independent living is costly, and typically demands a stable income source. Moreover, the problem of mechanical endogeneity arising from location choices is particularly weak in this case, as youth unemployment is measured at the state level, so that in order to influence the unemployment calculation the youth would have to cross state borders.

Student loans are, once again, estimated to encourage coresidence with parents. The Table 4, column (4), student loan coefficient is large, negative, and highly significant. It indicates that a $10,000 increase in average student debt per graduate in the youth's state-cohort decreases the probability of moving out of her parent's home over the two years by 2.63 percentage points. The student loan estimate is not sensitive to the inclusion of the state-cohort graduation rate, which, perhaps surprisingly, is estimated to be strongly negatively associated with moving away from home.[34] As before, the aggregated state-cohort student debt reliance is purged of features of the individual student's situation, or her parents' level of supportiveness. As before, given the state fixed effects included in the estimation, the effect of state-cohort student debt is identified using variation between cohorts in a given state in student debt reliance, and to the specification accounts for time-fixed regional variation in degree of support for youth and education.

Again, total unemployment and house prices can be taken as indicators of broader economic conditions, this time in the parent's location. Here we find very modest estimates of the effect of local economic conditions on youths' propensity to leave home, with modest and insignificant coefficients on changes in county total unemployment, county median income, and zip code house prices over the period. This may be the net result of ambivalent effects of strengthening local economic conditions on youths' capacity for independence. While strengthening economic conditions may improve the ability of youth to secure employment and fund independent households, and of parents to bankroll moves away from home, strengthening local conditions may also give rise to increasing local prices, particularly housing prices, which encourage continued coresidence.

In sum, estimates from the model of the flow away from parents paint a picture of stagnation in response to weakening labor market opportunities and growing student debt burdens. They provide evidence that the escalating student debt we've observed over the 2003-

[34] Recall that the combination of stock and flow model estimates reflect that state-cohorts with higher graduation rates move away from parents considerably more slowly, and also experience less churning in their locations.

2013 period may be leading to extended coresidence with parents for the most recent youth cohorts, and that the challenging youth job markets of the recent recession further obstructed young workers' path to independence.

V. Discussion and Conclusions

This paper investigates young people's parental coresidence rates in the CCP, and the relationships among coresidence decisions and local house prices, local employment conditions, and the student debt reliance of local college students. Evidence from the CCP shows that coresidence with parents has been persistently increasing for 25- and 30-year-olds since 1999, while the number of 25- and 30-year-olds living alone or with more than one non-parent has declined (defining parents as people 15-45 years older than the youth). This trend is corroborated by similar analysis in the CPS. Simultaneously, homeownership has decreased for both age groups. Both the fraction of individuals who have student debt and those individuals' average balances have steadily increased over the same period.

Panel estimates relying on geographic variation in economic conditions at the zip code-, county-, and state-level reveal mixed effects of local economic growth on young Americans' propensity to live independently. While a one percentage point drop in state youth unemployment is estimated to increase the two-year rate of moving away from parents by 0.2 percentage points, a one standard deviation increase in house price gains over the two year period increases the probability that an independent youth moves home by 0.37 percentage points. On net, then, it appears to be not the overall strength of the local economy, but the relative circumstances of youth labor markets and goods markets where middle-aged parents tend to live and where independent youth tend to live, that shapes the trend in coresidence with parents.

Finally, we find that a high state-level student loan balance per college graduate among a young person's cohort both significantly increases the rate at which independent young people transition to living with their parents and significantly slows the rate at which dependent youth transition away from their parents. Estimates indicate that a $10,000 increase in average student debt among a youth's state cohort leads to a 0.81 percentage point increase in the likelihood of moving home to parents, and to a 2.63 percentage point *decrease* in the likelihood of moving out of one's parents' household. Given that student debt has been increasing since 1999, this

suggests that a substantial portion of the persistent increase in coresidence with parents among recent youth cohorts can be explained by increasing student debt balances.

Section II describes substantial recent changes in both young Americans' rate of transition from parents' homes to independence and their rate of entry into the housing market. The estimates presented here explore the dependence of the co-residence decision on local conditions in terms of housing, youth employment, and the student debt price of education. In a companion paper, to be posted soon, we use related methods to study the dependence of early homeownership on these same factors.

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Figure 1: Coresidence with parents among 25 and 30 year olds in the CCP, 1999-2013

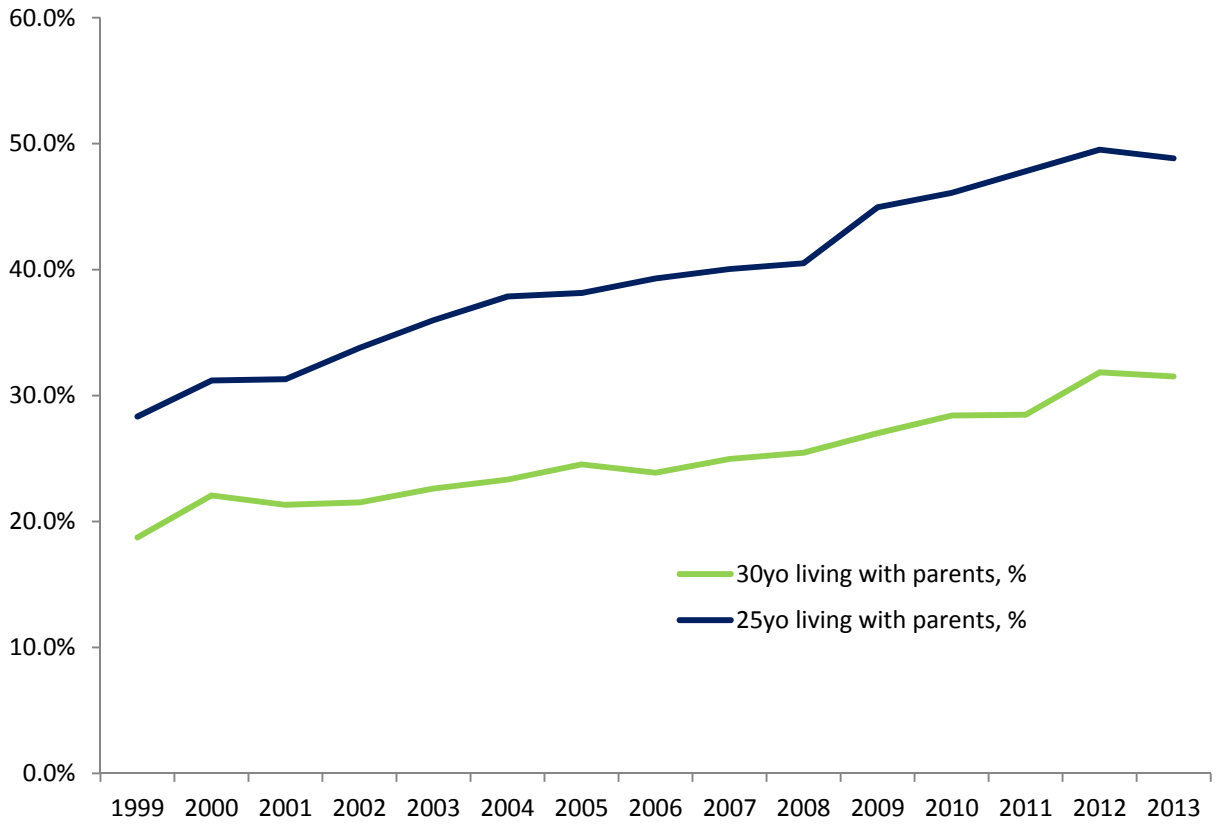

Figure 2a: Measurement of living with parents at 25, CCP with and without Census correction

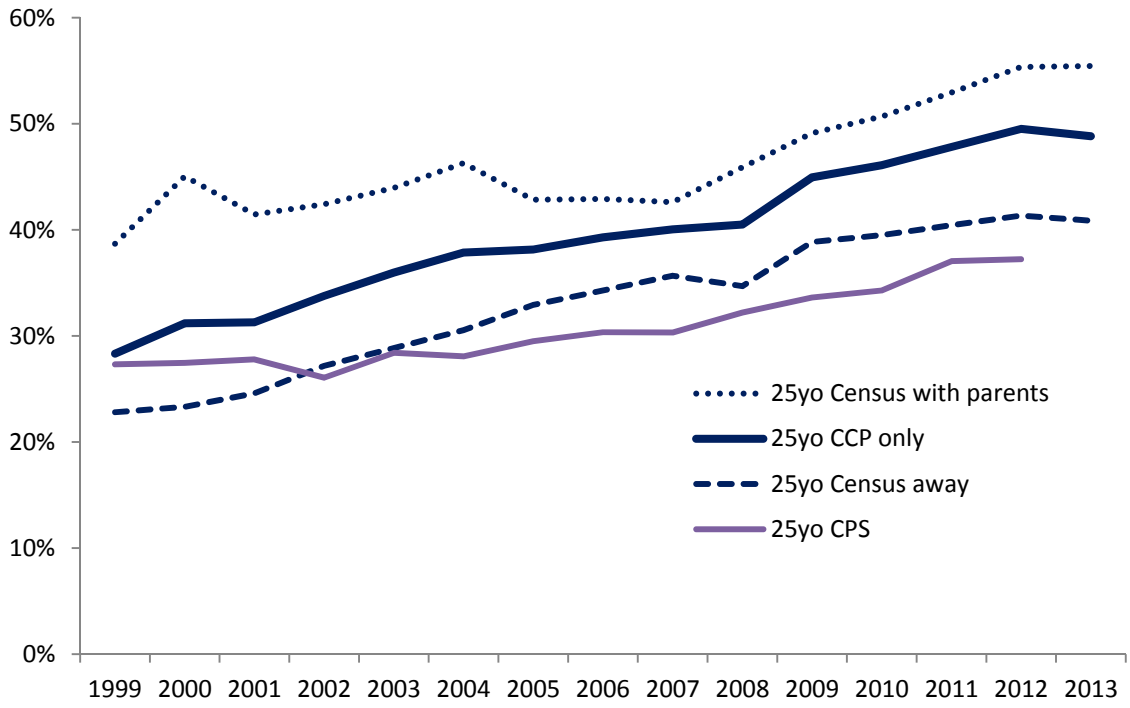

Figure 2b: Measurement of living with parents at 30, CCP with and without Census correction

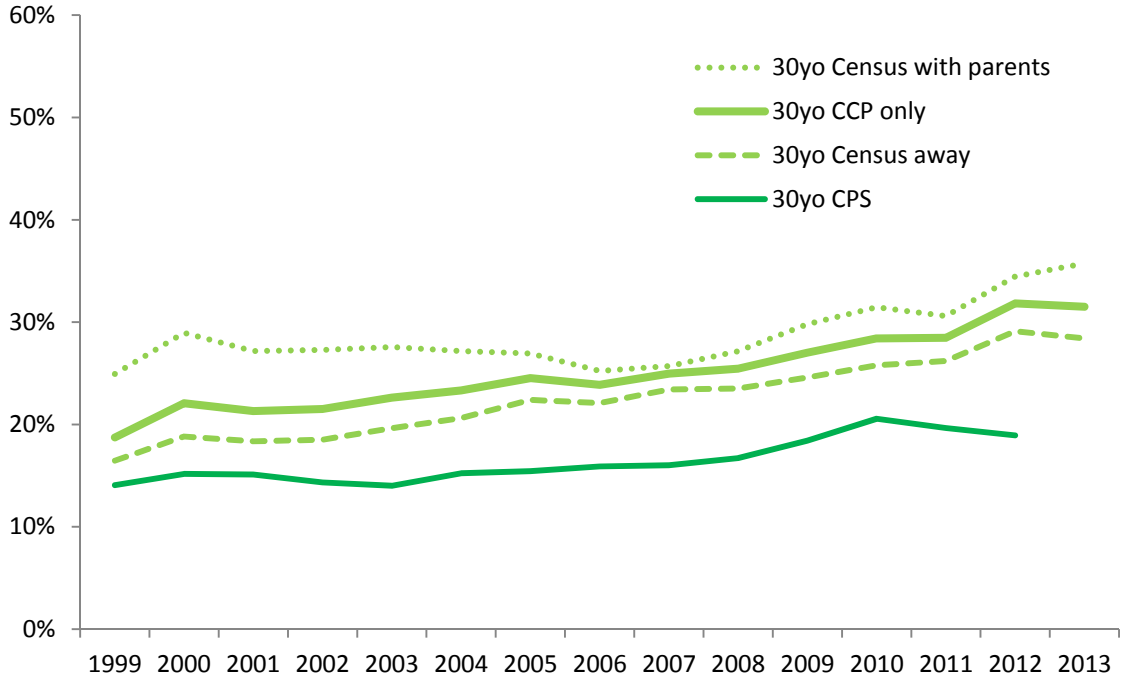

Figure 3a: Residence arrangements of 25 year olds in the CCP, 1999-2013

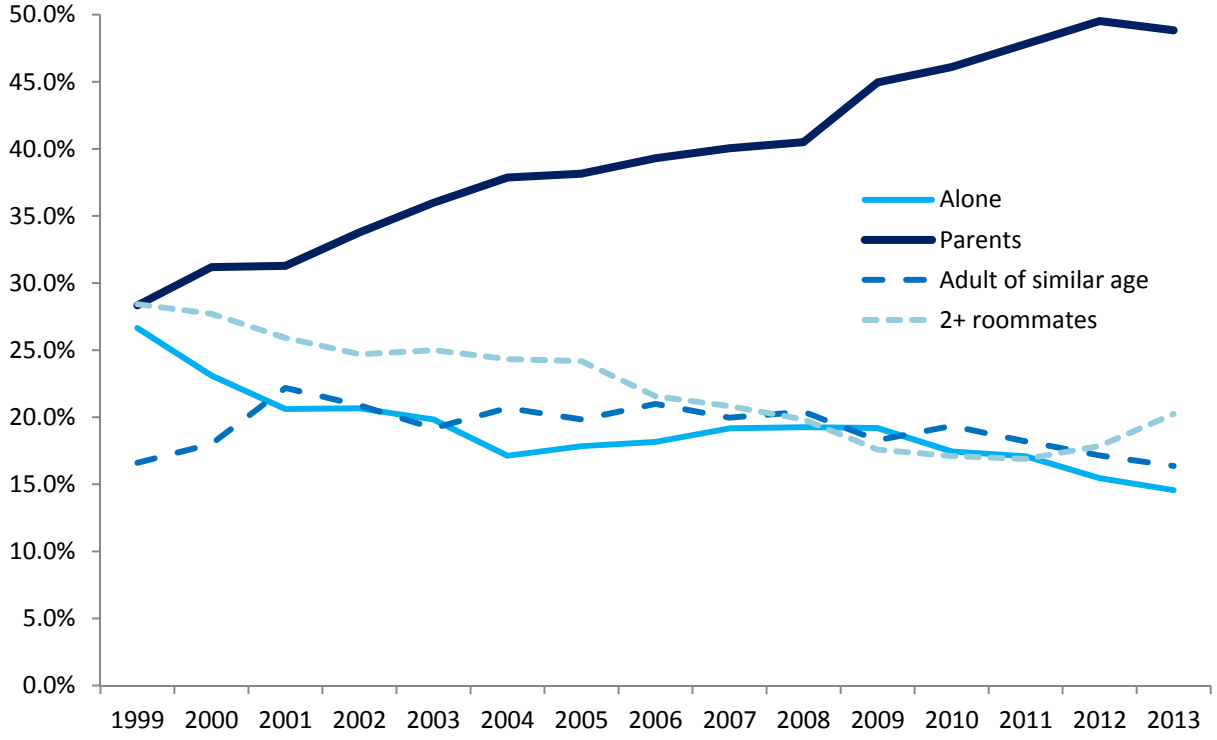

Figure 3b: Residence arrangements of 30 year olds in the CCP, 1999-2013

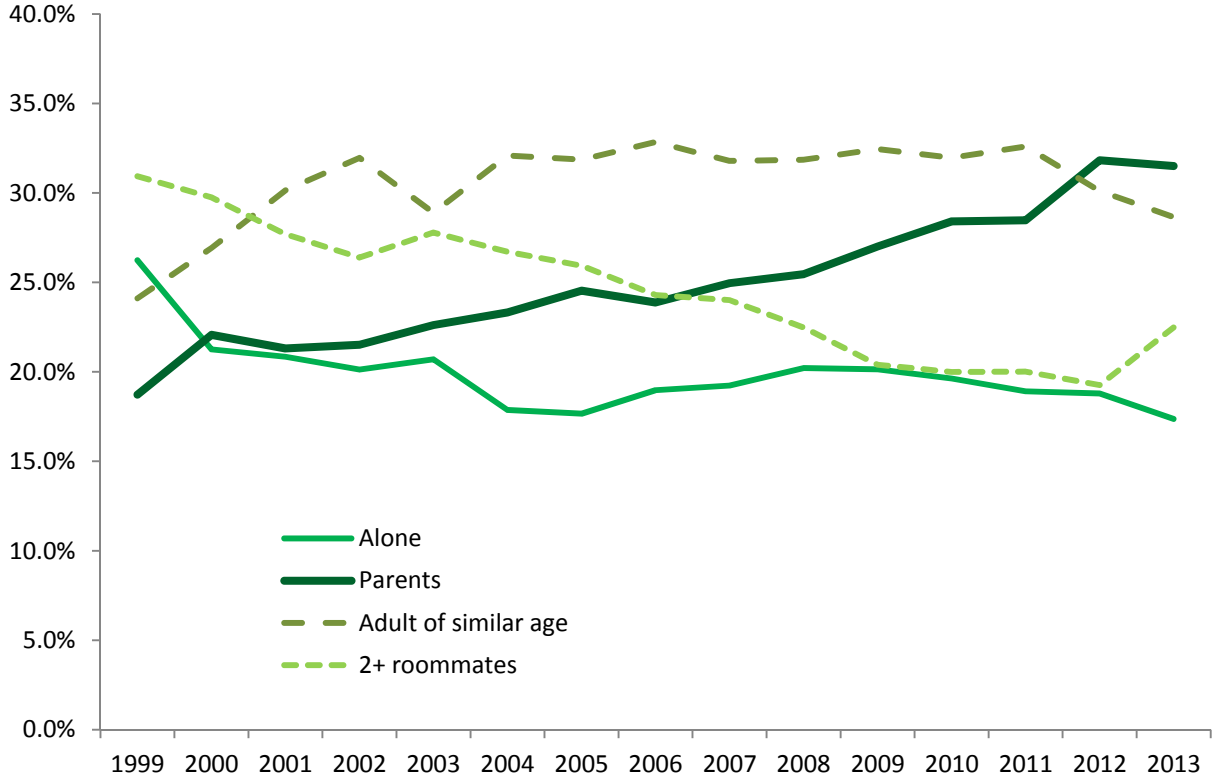

Figure 4: Student debt prevalence and mean among 25 year olds

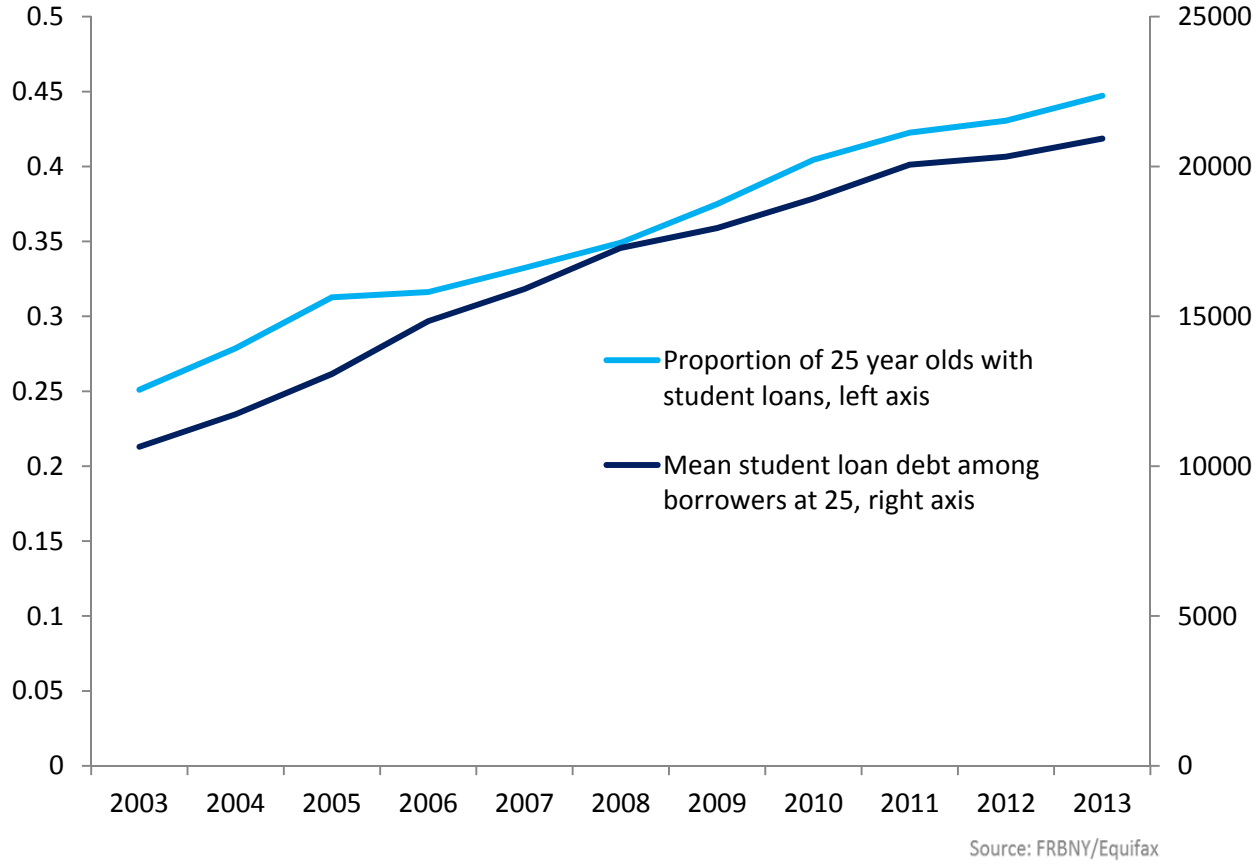

Figure 5: Homeownership among 25 & 30yos in the CCP, 1999-2013
Inferred from debt over past 4 years

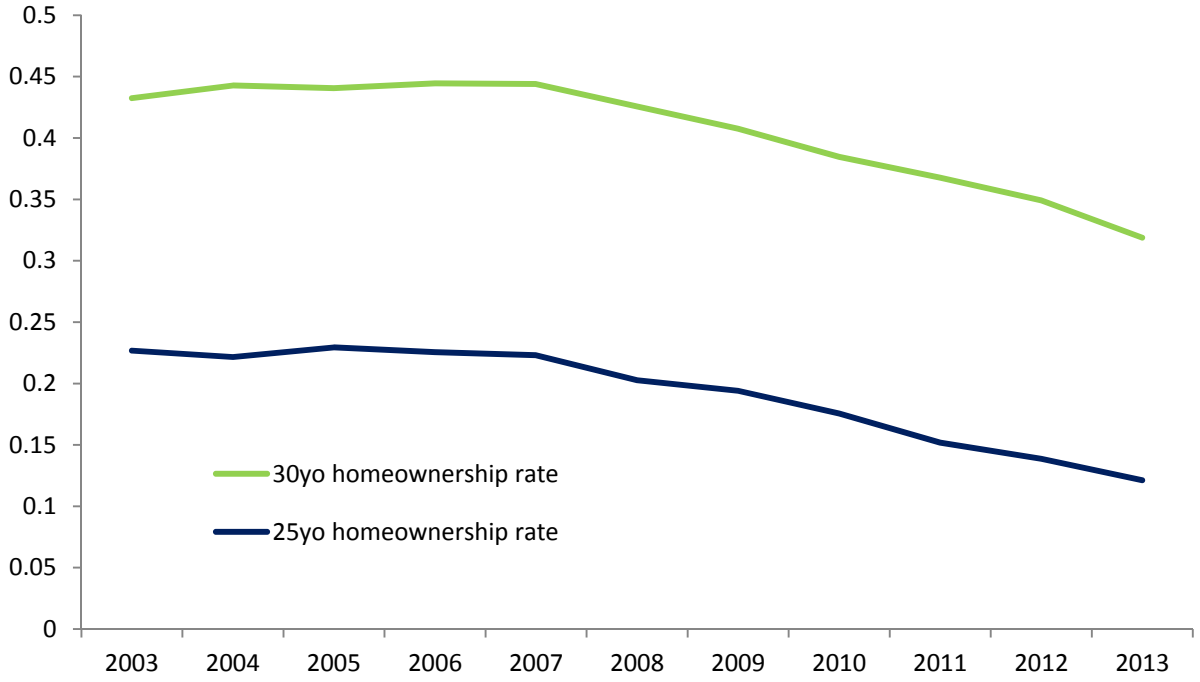

Figure 6: Homeownership and living with parents among 25 and 30 year olds in the CCP, 1999-2013

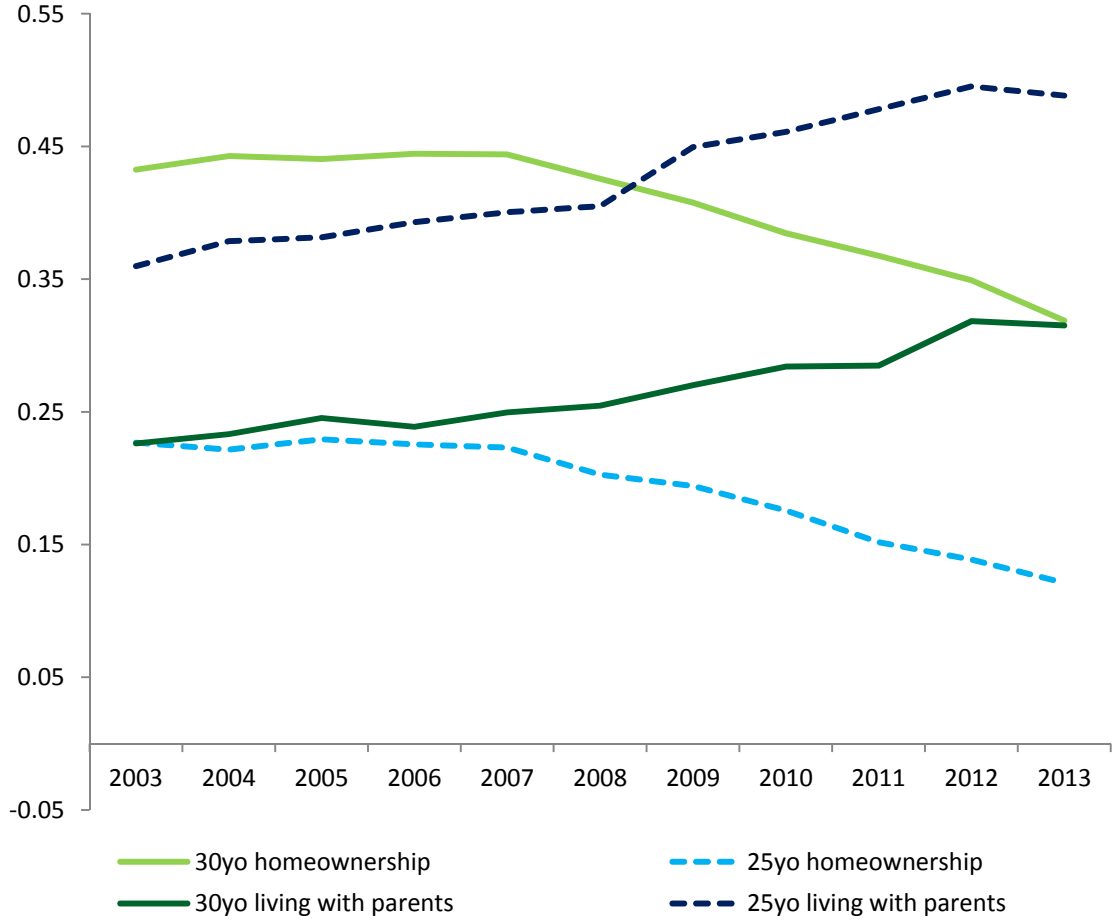

Figure 7: National residence choices and economic conditions, 1999-2014

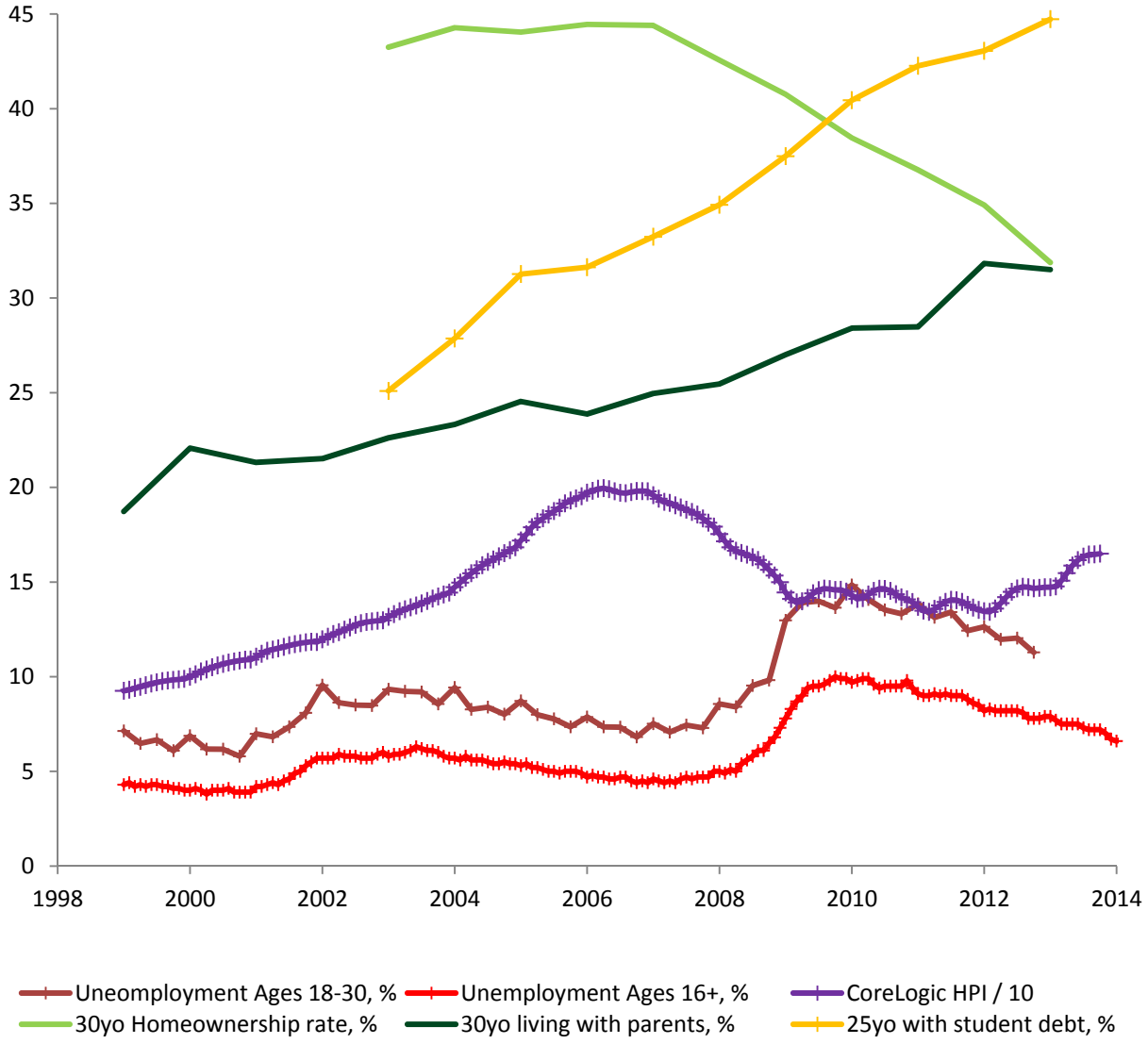

Figure 8: Decomposition of Stock Regressions, Standard Model

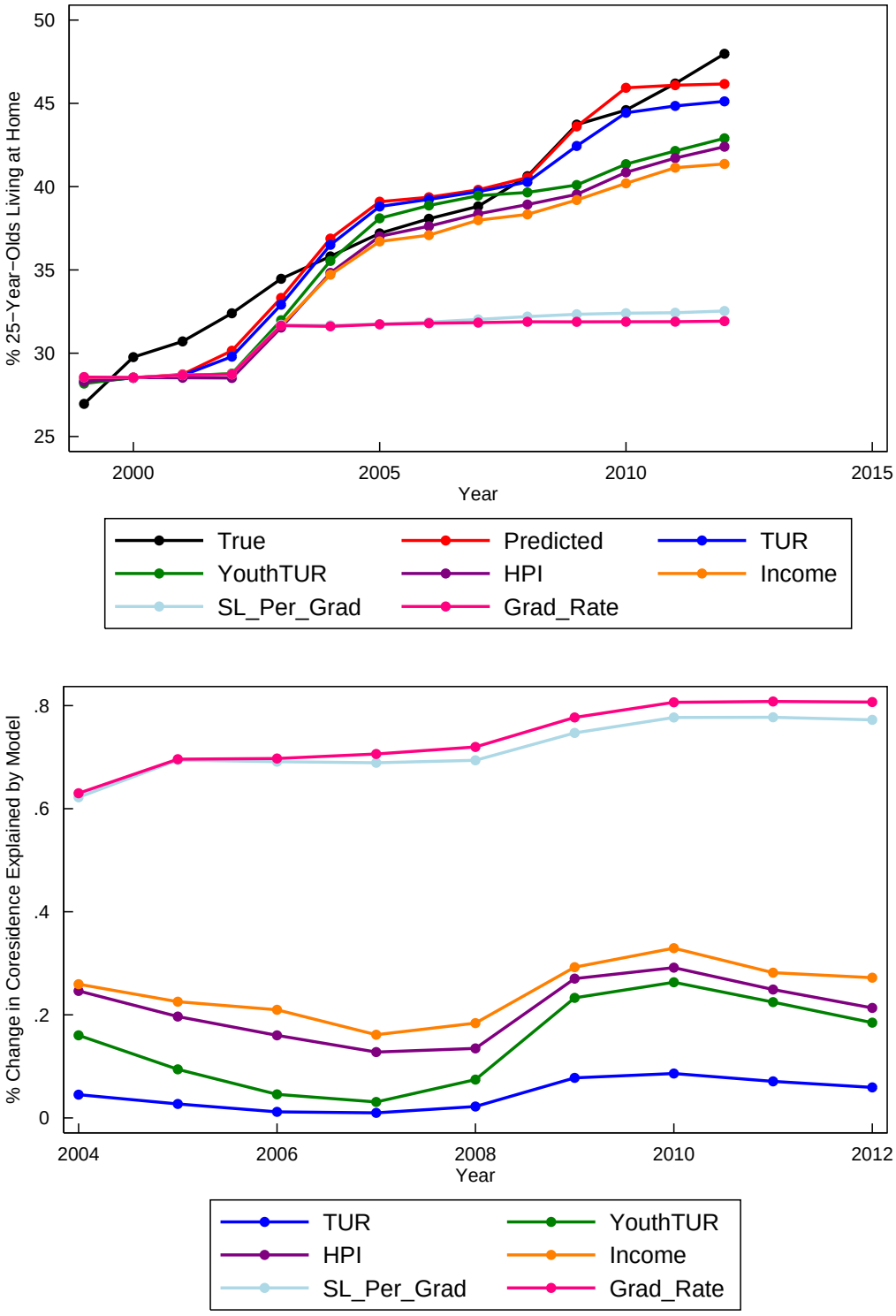

Figure 9: Decomposition of Stock Regressions, Time Trend Model

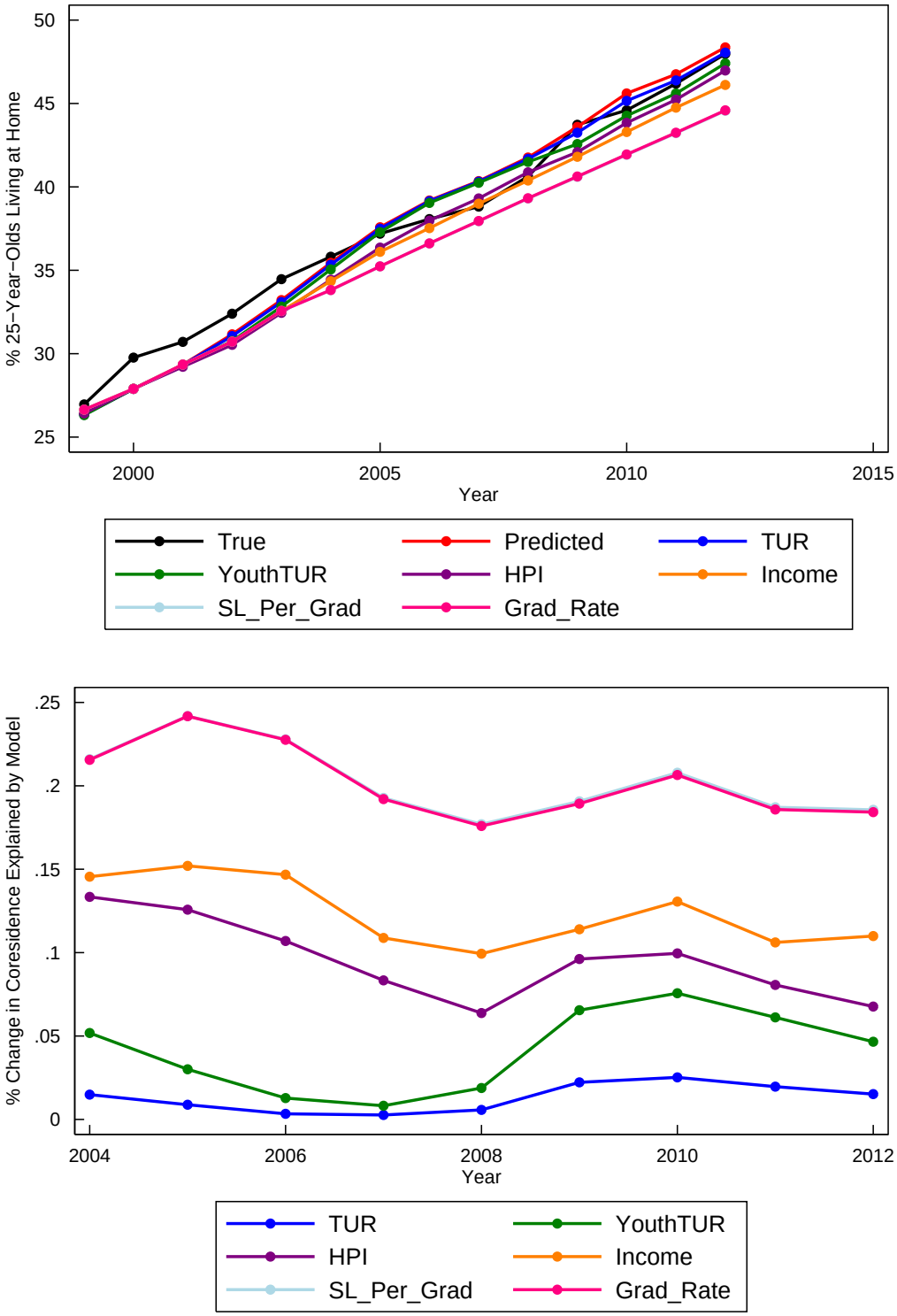

Table 1: Summary Statistics

	%	Stock Values			Flow Values		
	Missing	All	No Parents	Parents	All	No Parents	Parents
TUR	0.5	7.0	6.9	7.3	0.4	0.4	0.4
		(3.0)	(3.0)	(3.0)	(2.4)	(2.4)	(2.5)
Youth TUR	3.8	9.7	9.4	10.0	1.0	1.0	1.1
		(3.2)	(3.1)	(3.3)	(3.2)	(3.2)	(3.3)
House Price Index	37.4	144.4	141.2	148.6	4.7	6.8	2
		(44.7)	(43.5)	(46.0)	(34.2)	(33.4)	(34.9)
Income ('000s)	0.1	53.2	52.1	54.9	1.8	1.7	1.9
		(15.4)	(14.9)	(16.0)	(4.4)	(4.5)	(4.2)
SL Per Grad ('000s)	19.7	20.1	19.3	21			
		(7.4)	(7.3)	(7.6)			
Grad. Rate	19.7	29.1	29.2	29.1			
		(10.7)	(10.6)	(10.7)			
Education Spending	0.0	7.9	7.6	8.3			
		(2.4)	(2.3)	(2.6)			
Observations		1092992	647313	445679	546824	315349	231475

Stock values are the regional averages across our 23- and 25-year-old sample.

Flow values are the average two-year changes, between age 23 and 25, across our sample.

Note: Student debt and graduation rates are only reported after 2002. HPI is only reported for urban areas.

Table 2: Stock Regression of 25-Year-Old Parental Coresidence

Regression Model:	Standard OLS					Time Trend OLS	State-Level OLS	Instrumental 2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TUR	1.894***	0.759***	0.717***	0.279***	0.240**	0.072	1.043***	0.075
	(0.128)	(0.164)	(0.154)	(0.103)	(0.105)	(0.083)	(0.102)	(0.112)
Youth TUR		0.995***	0.950***	0.408***	0.388***	0.112*	0.053	0.275***
		(0.117)	(0.108)	(0.074)	(0.072)	(0.056)	(0.063)	(0.067)
HPI	0.078***	0.078***	0.073***	0.021**	0.023**	0.019*	0.035***	0.013
	(0.006)	(0.005)	(0.006)	(0.009)	(0.009)	(0.010)	(0.006)	(0.009)
Income ('000s)			0.136***	0.095***	0.093***	0.077***	0.234***	0.081***
			(0.030)	(0.026)	(0.025)	(0.024)	(0.082)	(0.024)
SL Per Grad ('000s)				0.479***	0.481***	0.084***	0.346***	0.711***
				(0.056)	(0.054)	(0.030)	(0.056)	(0.090)
Grad. Rate					0.137***	-0.006	0.106***	0.141***
					(0.035)	(0.033)	(0.033)	(0.038)
Age 25 Dummy	-5.021***	-5.837***	-5.933***	-4.334***	-4.282***	-6.066***	-4.767***	-3.974***
	(0.378)	(0.352)	(0.353)	(0.403)	(0.397)	(0.307)	(0.390)	(0.400)
Time Trend						1.305***		
						(0.084)		
Constant	6.155***	2.921**	-3.747*	2.561	0.854	10.392***	-10.551***	-1.490
	(1.413)	(1.202)	(2.051)	(2.135)	(2.159)	(2.207)	(3.031)	(2.563)
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Instrument	No	No	No	No	No	No	No	Yes
State-Level Demos	No	No	No	No	No	No	Yes	No
R^2	.029	.032	.033	.038	.038	.039	.034	.037
N	1,092,992	1,092,992	1,092,992	1,092,992	1,092,992	1,092,992	1,092,992	1,092,992
Mean of Dep. Var.	38	38	38	38	38	38	38	38

OLS estimates of a regression of the dependent variable on various controls.
Standard errors in parentheses. *,**,*** denote significance at the 10, 5, and 1 % levels, respectively.

Table 3: Flow Regression of Parental Coresidence: Moving In

Regression Model:	Standard OLS				Instrumental Reg.
	(1)	(2)	(3)	(4)	(5)
TUR	-0.122**	-0.123**	-0.056	-0.056	-0.070
	(0.055)	(0.051)	(0.046)	(0.046)	(0.049)
Youth TUR	0.072*	0.053	-0.034	-0.032	-0.019
	(0.040)	(0.039)	(0.041)	(0.041)	(0.039)
HPI	0.014***	0.017***	0.012***	0.011***	0.005
	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Income ('000s)		-0.079***	-0.011	-0.013	-0.012
		(0.019)	(0.031)	(0.030)	(0.027)
SL Per Grad ('000s)			0.082***	0.081***	-0.021
			(0.024)	(0.024)	(0.048)
Grad. Rate				-0.030	-0.034
				(0.022)	(0.021)
Constant	15.402***	15.562***	12.581***	13.055***	16.052***
	(0.214)	(0.217)	(0.689)	(0.798)	(1.593)
State FEs	Yes	Yes	Yes	Yes	Yes
Instrument	No	No	No	No	Yes
R^2	8.4e-03	8.7e-03	9.3e-03	9.3e-03	9.1e-03
Number of Obs.	315349	315349	315349	315349	315349
Mean of Dep. Var.	21	21	21	21	21

OLS estimates of a regression of the dependent variable on various controls.
Standard errors in parentheses. *,**,*** denote significance at the 10, 5, and 1 % levels, respectively.
Note: TUR, Youth TUR, HPI, and Income are measured as flows; SL Per Grad and Grad. Rate are measured as stocks.

Table 4: Flow Regression of Parental Coresidence: Moving Out

Regression Model:	Standard OLS				Instrumental Reg.
	(1)	(2)	(3)	(4)	(5)
TUR	-0.221	-0.295	-0.083	-0.082	-0.142
	(0.201)	(0.207)	(0.163)	(0.159)	(0.156)
Youth TUR	0.144	0.103	-0.213*	-0.208*	-0.179*
	(0.155)	(0.151)	(0.118)	(0.116)	(0.108)
HPI	0.062***	0.072***	0.001	0.000	-0.017***
	(0.014)	(0.015)	(0.007)	(0.006)	(0.005)
Income ('000s)		-0.367***	-0.025	-0.032	-0.031
		(0.067)	(0.042)	(0.043)	(0.040)
SL Per Grad ('000s)			-0.268***	-0.263***	-0.521***
			(0.056)	(0.052)	(0.095)
Grad. Rate				-0.147***	-0.136***
				(0.041)	(0.048)
Constant	43.790***	44.524***	49.570***	51.515***	59.042***
	(0.219)	(0.319)	(1.720)	(1.388)	(2.567)
State FEs	Yes	Yes	Yes	Yes	Yes
Instrument	No	No	No	No	Yes
R^2	.016	.017	.027	.027	.027
Number of Obs.	231475	231475	231475	231475	231475
Mean of Dep. Var.	36	36	36	36	36

OLS estimates of a regression of the dependent variable on various controls.
Standard errors in parentheses. *,**,*** denote significance at the 10, 5, and 1 % levels, respectively.
Note: TUR, Youth TUR, HPI, and Income are measured as flows; SL Per Grad and Grad. Rate are measured as stocks.