

Echoes of Rising Tuition in Students' Borrowing, Educational Attainment, and Homeownership in Post-Recession America

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and Wilbert van der Klaauw

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The views presented here are those of the authors and do not necessarily reflect those of the Federal Reserve Bank of New York, or the Federal Reserve System

Background

- Rising student loan debt in US, UK, Australia, Netherlands, Norway, Sweden, New Zealand, Canada

Contributing factors:

- Increase in costs of higher education, enrolment growth
- changes in the financing of higher education, with students and their families bearing a greater share of costs
- Increased financing through student loans



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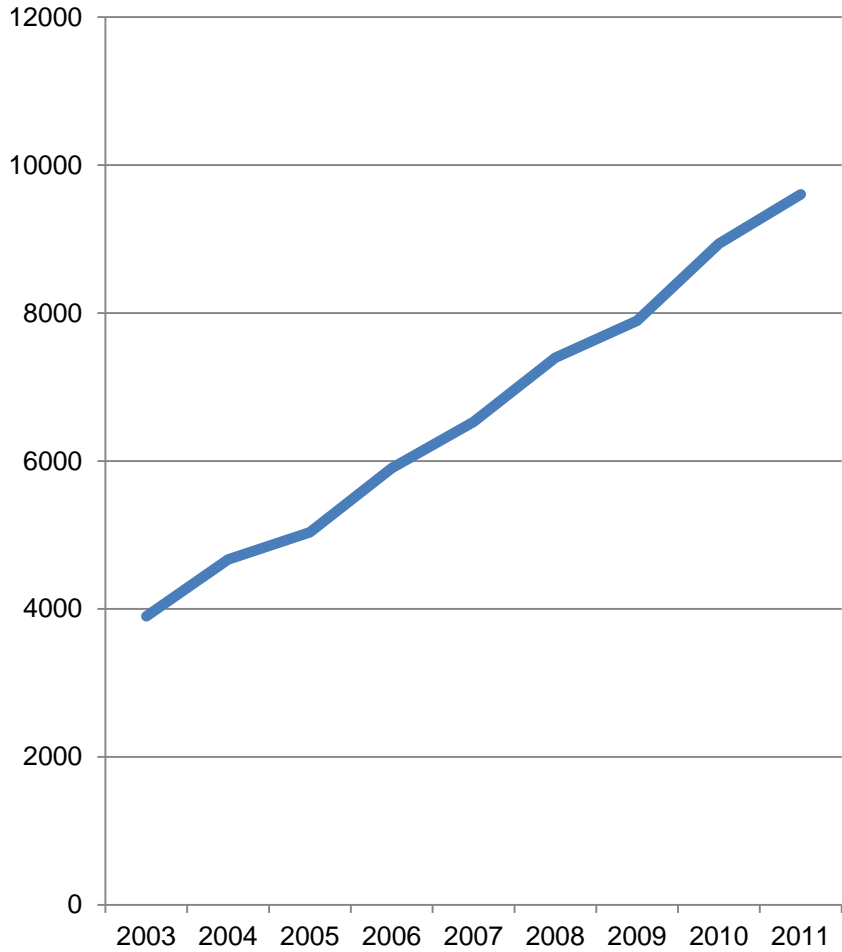
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 - Increased financing through student loans
-
- Growing concern in U.S. about implications for
 - the housing market
 - post-college consumption and wealth accumulation
 - Impact on family formation, living arrangements, fertility
 - Job finding, small business formation
 - overall economy

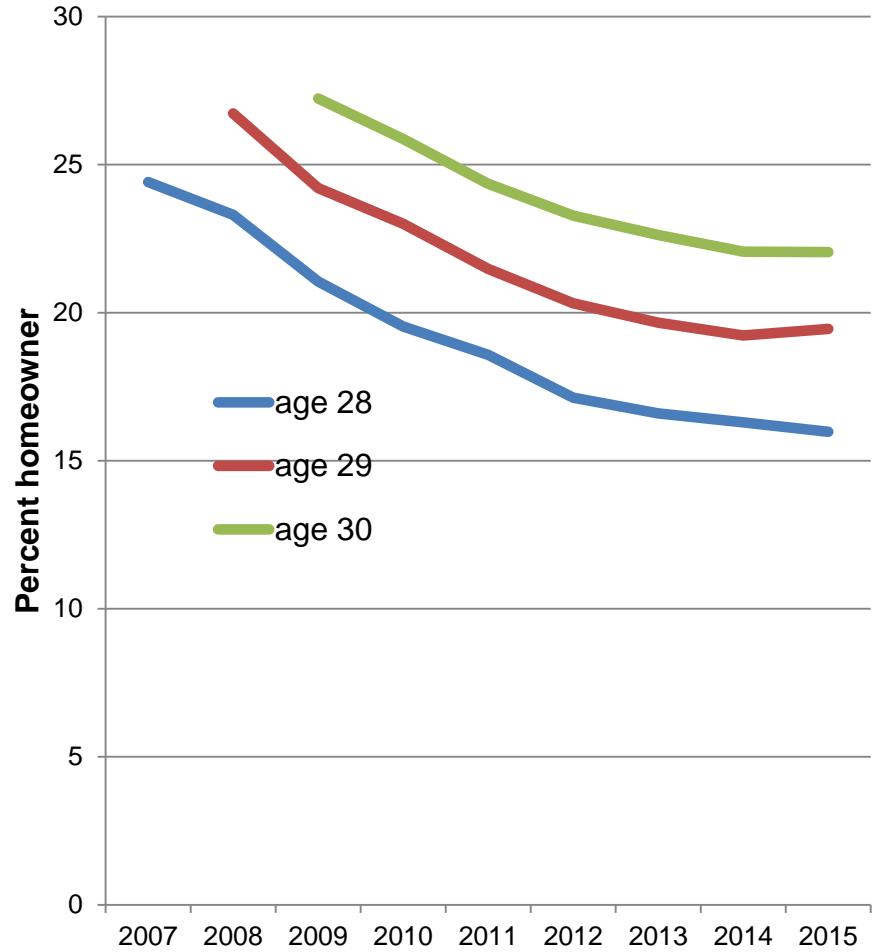


Trends in Student Debt and Homeownership

Student debt at age 24



Homeownership by age



Does Student Debt have Causal Impact on Early Homeownership?

Why might we care?

- Decreased aggregate homeownership and individual lifetime home ownership; potential welfare losses
- Delayed wealth building - implications for wealth inequality
- Housing Market:
 - Starter market – If you're trying to sell a starter home, you care
 - Trade-up market – If you're trying to sell a trade-up home, you care about ability of starter-home owners to sell and trade up



Roadmap for Presentation

- Recent trends in student loan borrowing and default
- Relationship between student debt and homeownership
 - Descriptive evidence
 - Causal evidence



Roadmap for Presentation

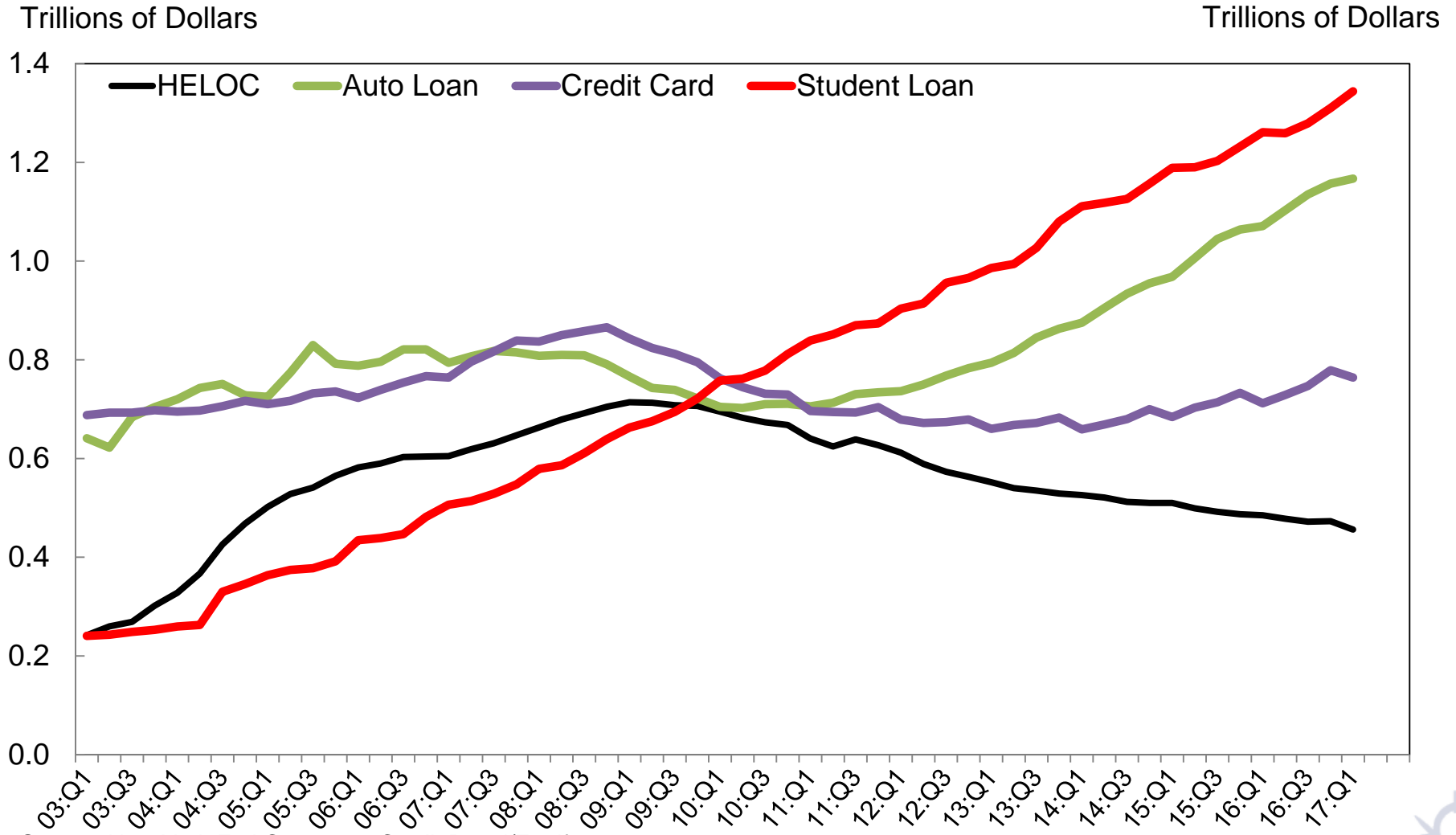
- Recent trends in student loan borrowing and default
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 - Descriptive evidence
 - Causal evidence
- Analysis based on NYFed Consumer Credit Panel (CCP)
 - 5% representative sample of US credit report holders in any given quarter. 1999Q1-2017Q3
 - Panel tracking
 - Has borrower-level information on student loan balances and payment status



Recent Trends in Student Debt and Defaults

Student Loans Defy Business Cycle

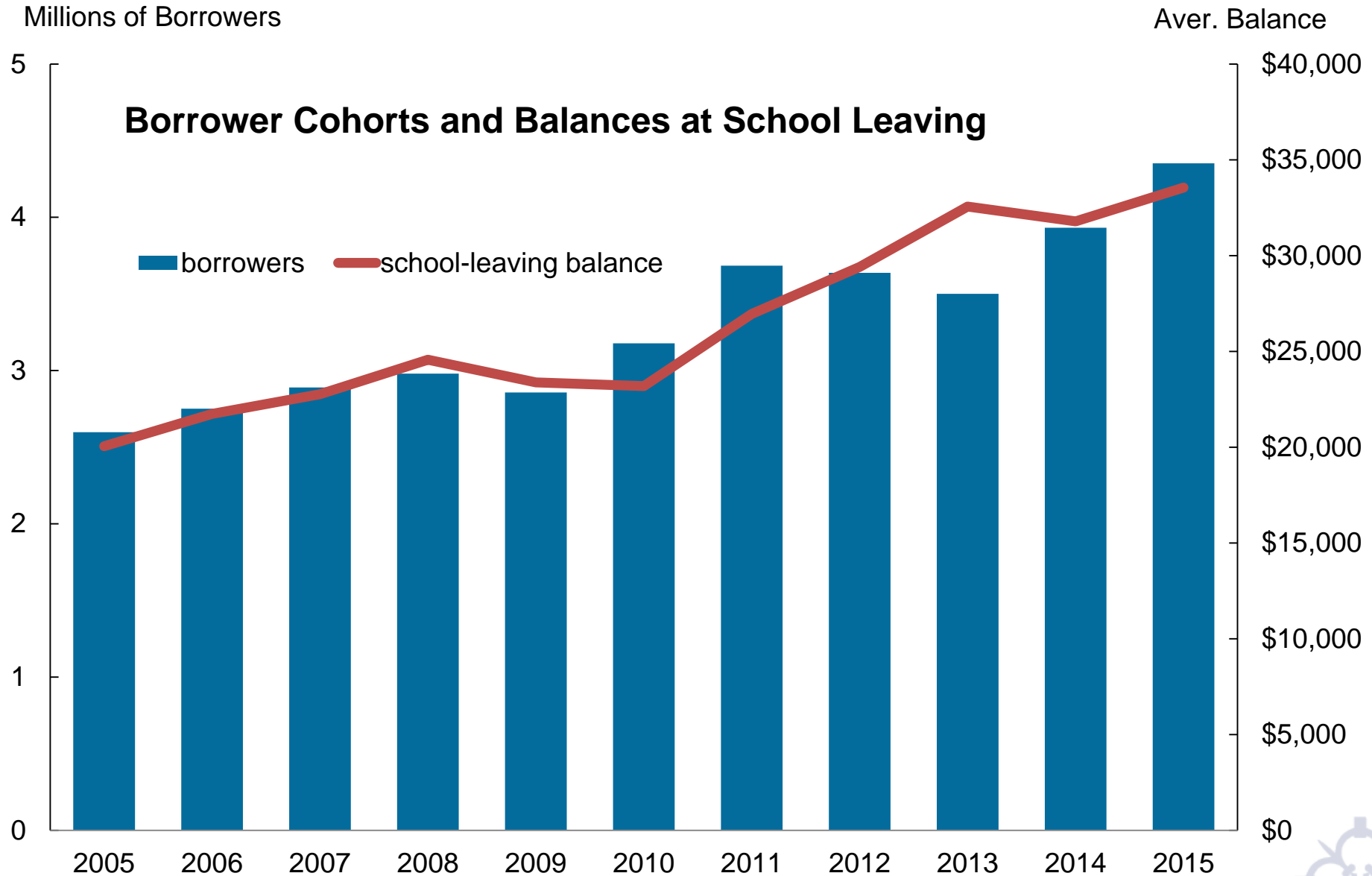
Non-mortgage balances



Source: New York Fed Consumer Credit Panel/Equifax

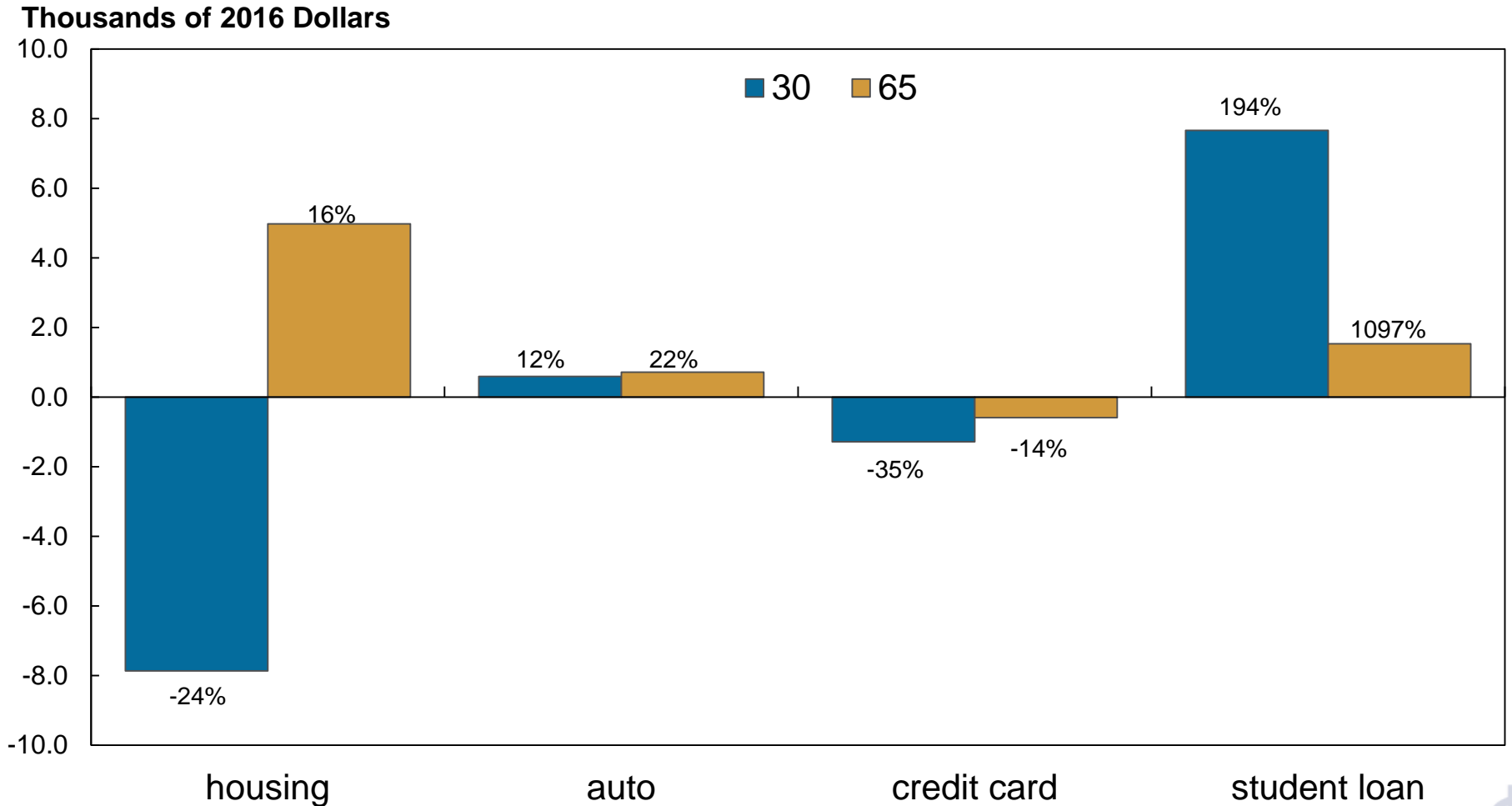


More New Borrowers and Larger Balances



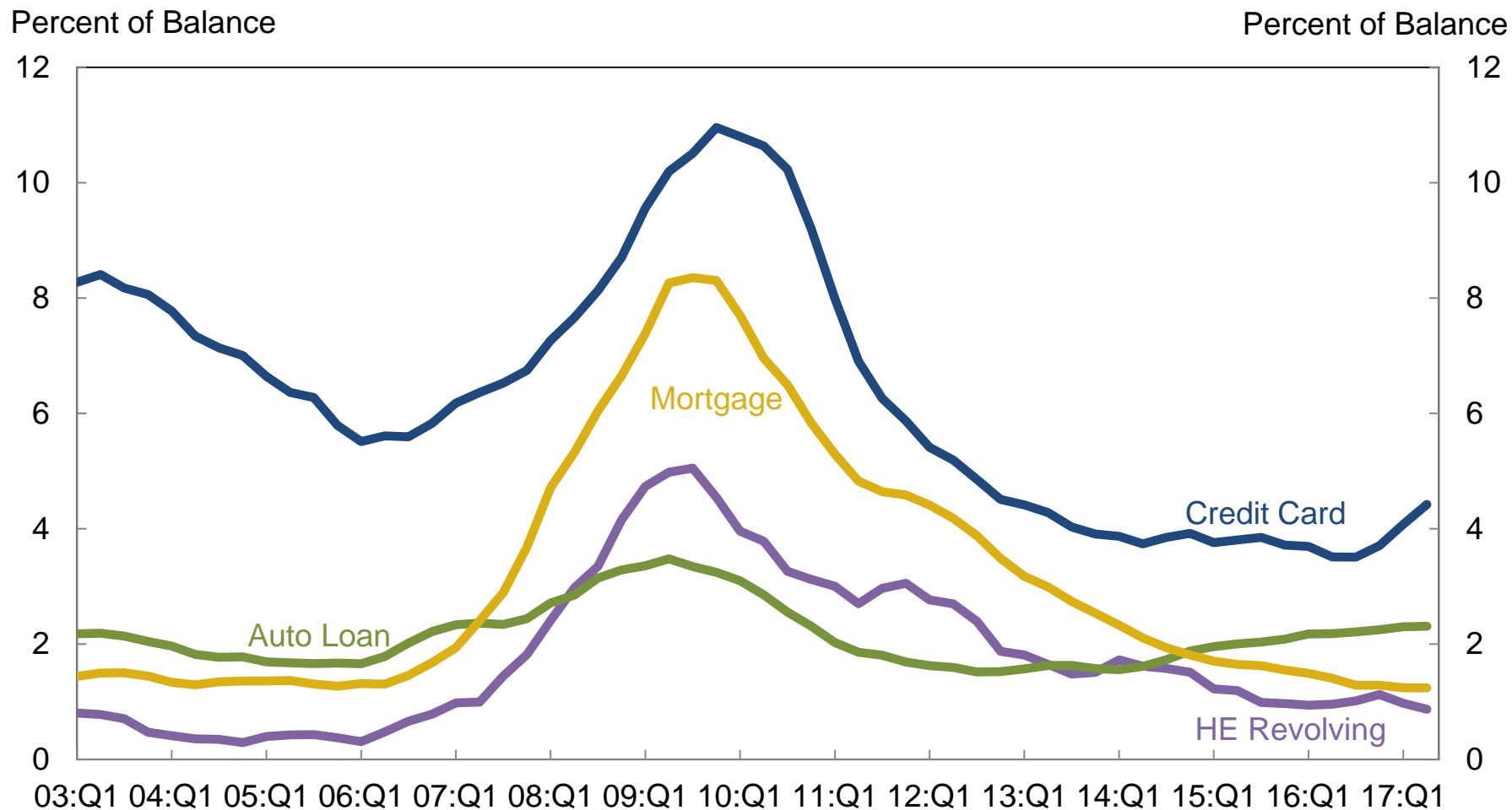
Decline in Housing Debt among Younger Borrowers Offset by Increase in Student Debt

2003-2016 Change in Real Debt Balances by Age of Borrower



Credit Quality Has Improved, Delinquency Rates Fallen

Transition into Serious Delinquency (90+) by Loan Type



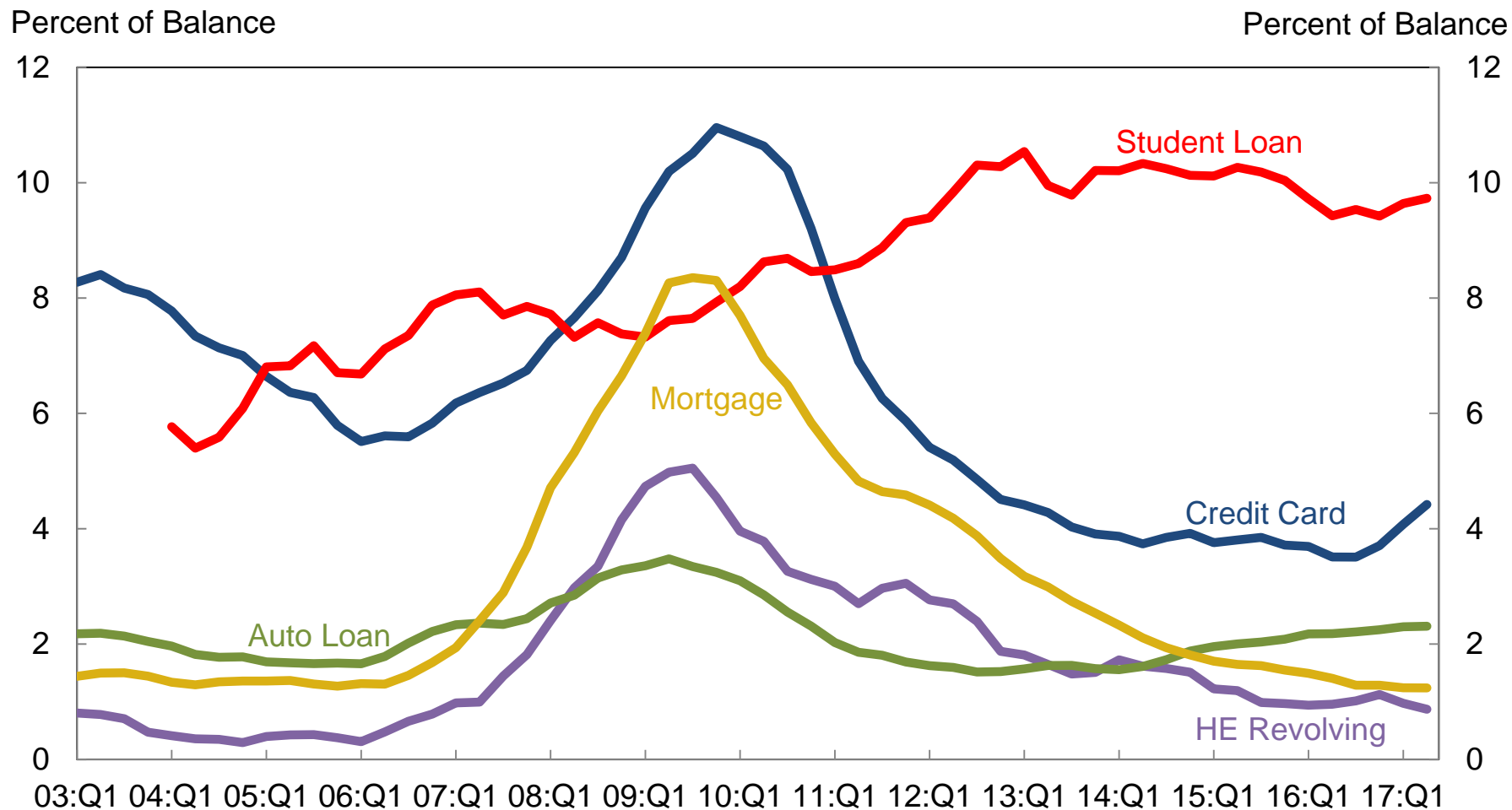
Source: New York Fed Consumer Credit Panel/Equifax

Note: 4 Quarter Moving Sum



Credit Quality Has Improved, Delinquency Rates Fallen Except for Student Loans

Transition into Serious Delinquency (90+) by Loan Type

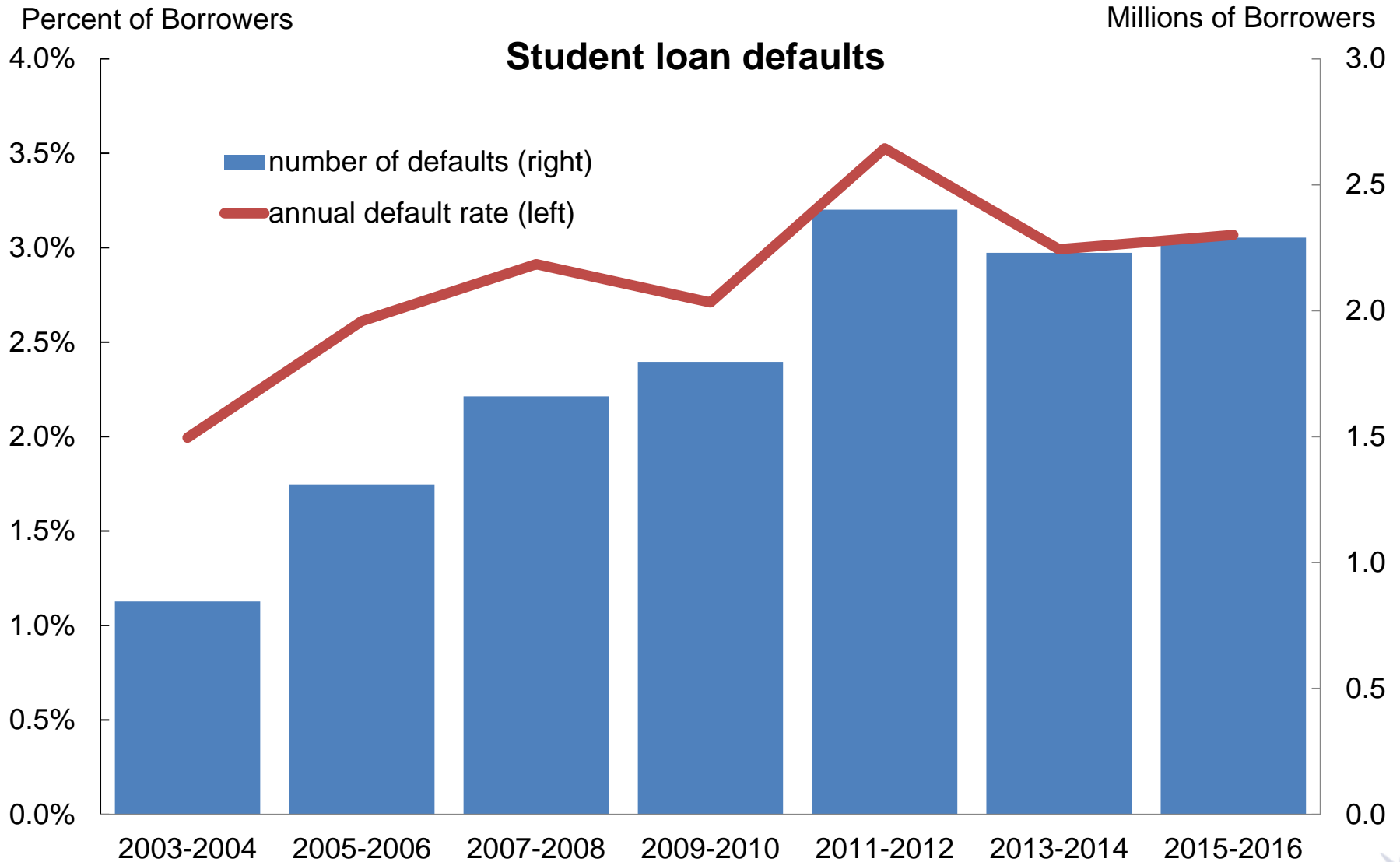


Source: New York Fed Consumer Credit Panel/Equifax

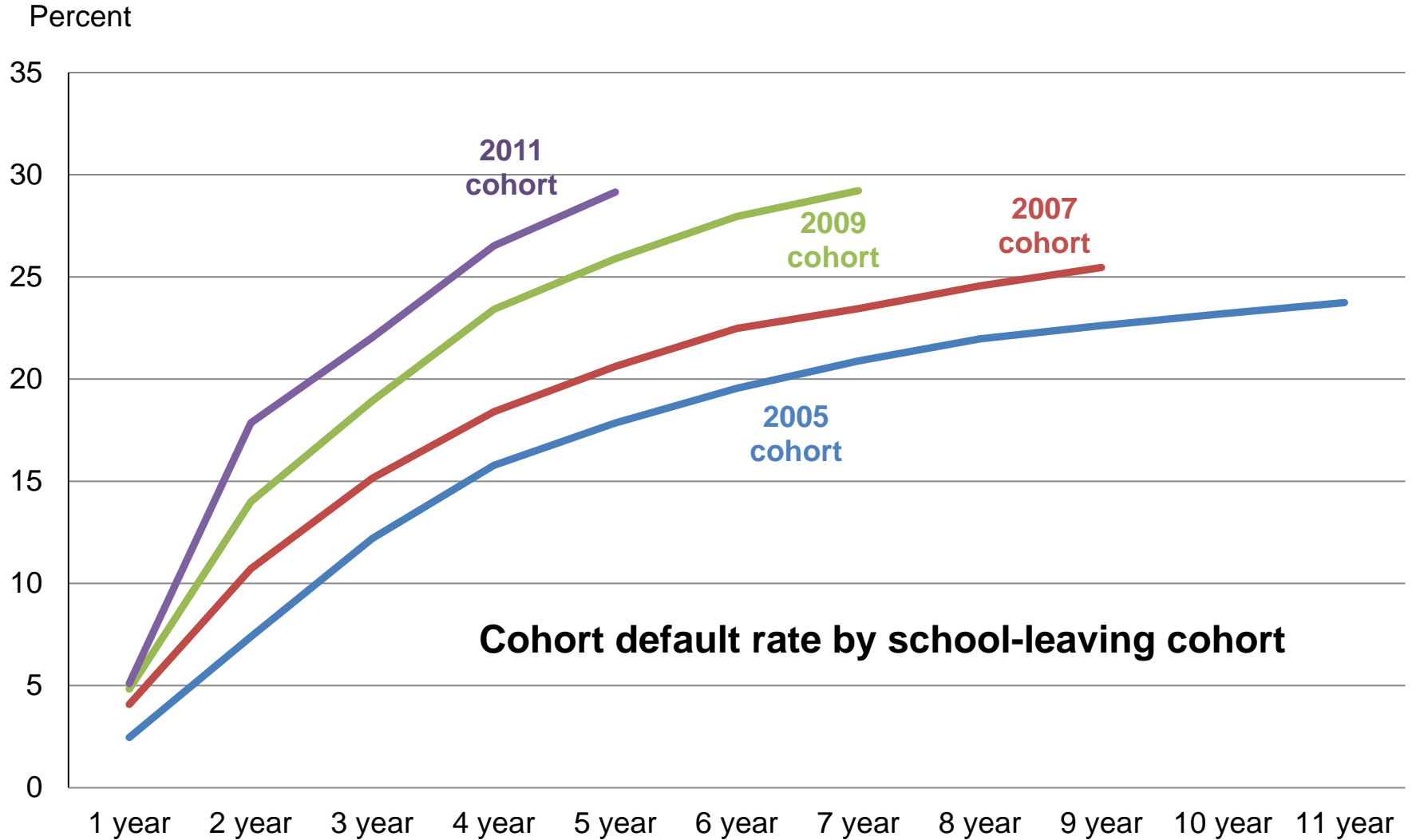
Student loan data are not reported prior to 2004 due to uneven reporting

Note: 4 Quarter Moving Sum

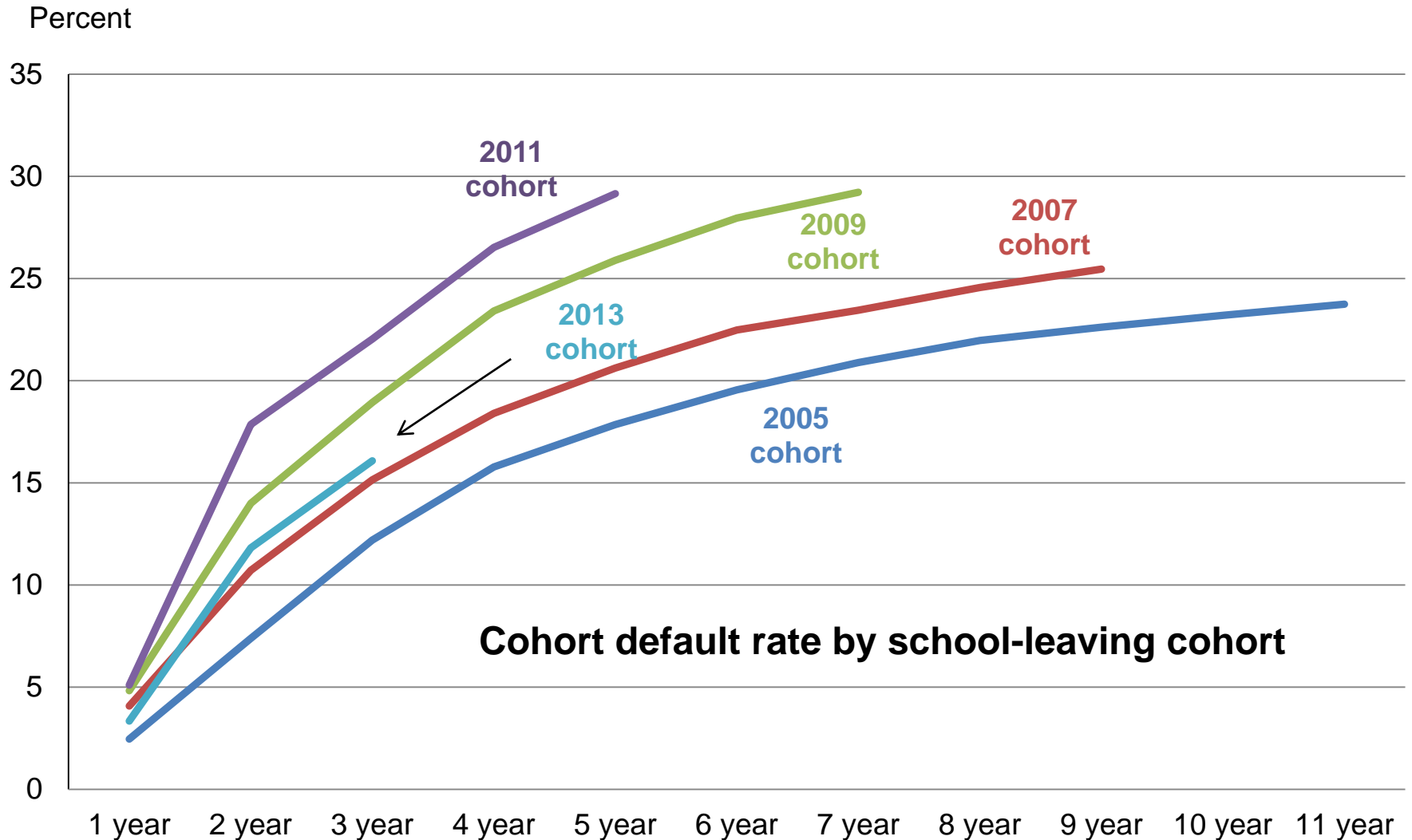
Student Loan Defaults Peaked in 2011-2012



Highest Default Rate from 2011 Cohort;



Highest Default Rate from 2011 Cohort; 2013 Cohort Shows Improvement





Relationship between Homeownership and Student Debt

First Some Descriptive Evidence

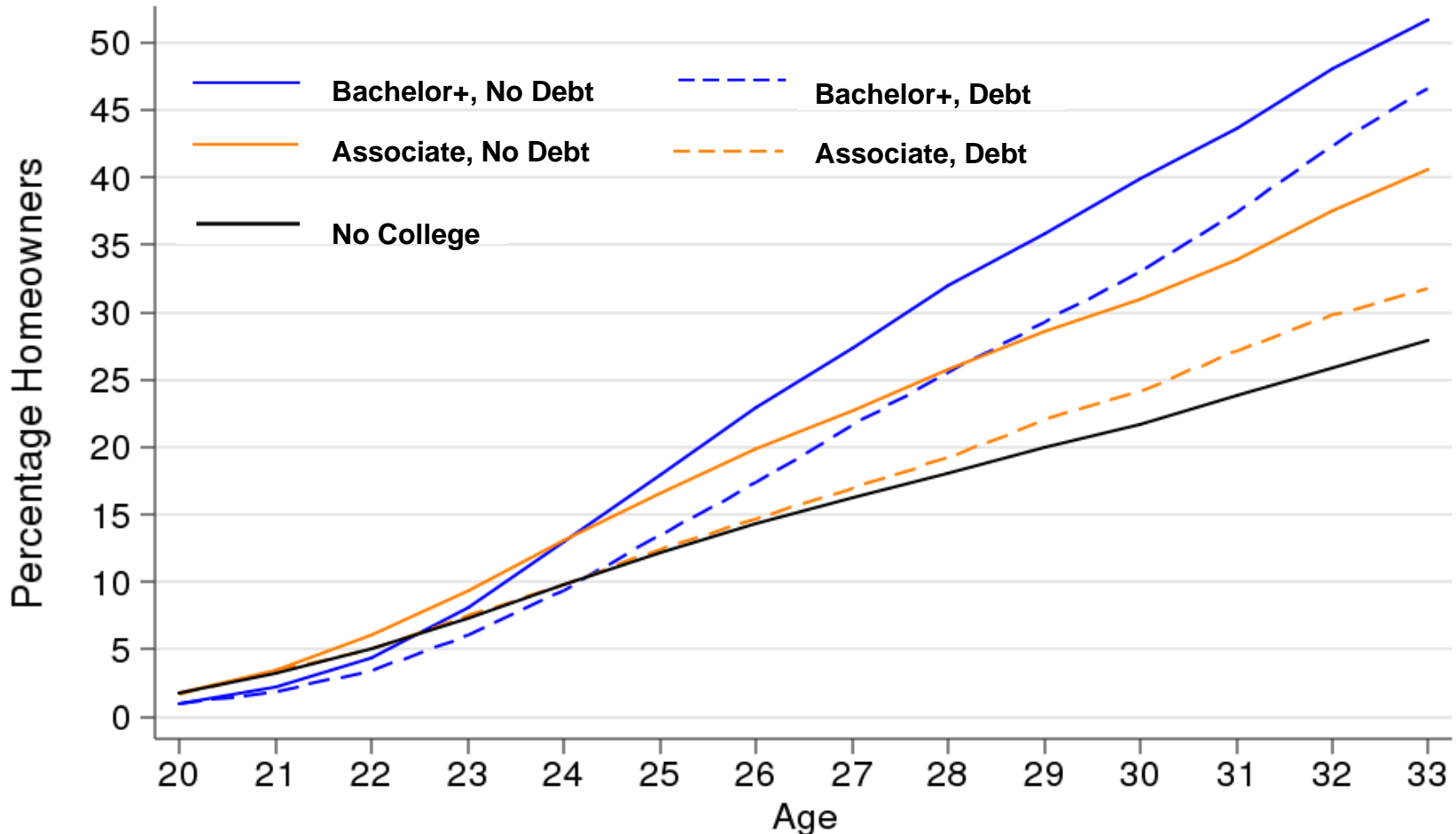
(work with Raji Chakrabarti and Nicole Gorton)

- Is homeownership related to education and student debt?
 - Homeownership defined as ever having a mortgage by that age
 - Reliable proxy as all-cash purchases rare among young homebuyers
- Does relationship between student debt and homeownership vary with (i) degree type, (ii) amount of debt
- Analysis based on a unique merger of CCP and National Student Clearinghouse
 - Merger restricted to 1980-86 birth cohorts



College Attendance Associated With Higher, Debt with Lower Homeownership

Homeownership Rate By College Attendance, Degree Type, Student Debt Status And Age



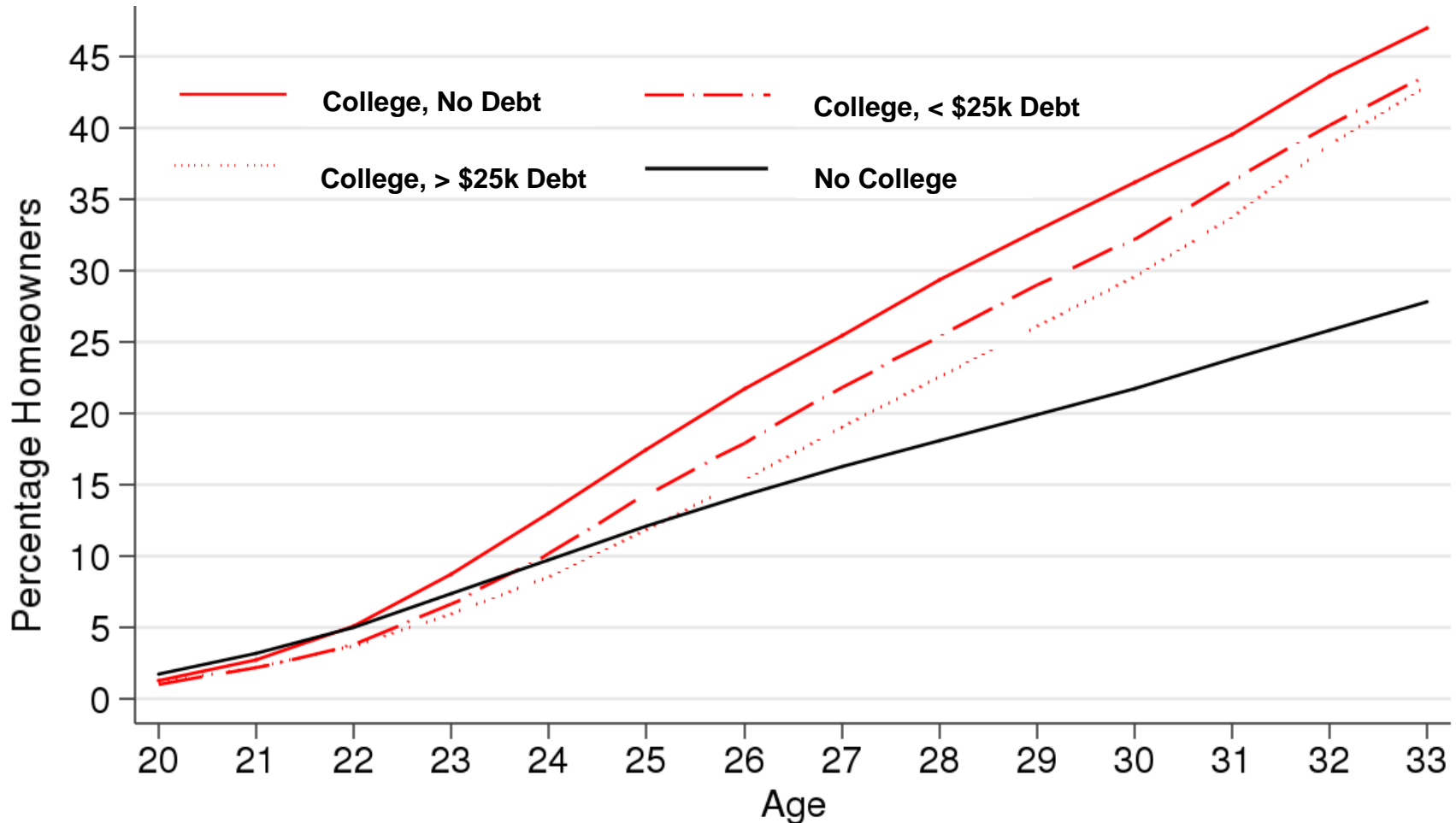
Bachelor's+ includes bachelor's and higher-level degrees.

Sources: *New York Fed Consumer Credit Panel/Equifax and National Student Clearinghouse*



Higher Student Debt Balance Associated With Lower Homeownership Rates

Homeownership Rate By College Attendance, Debt Balance Above \$25k, And Age

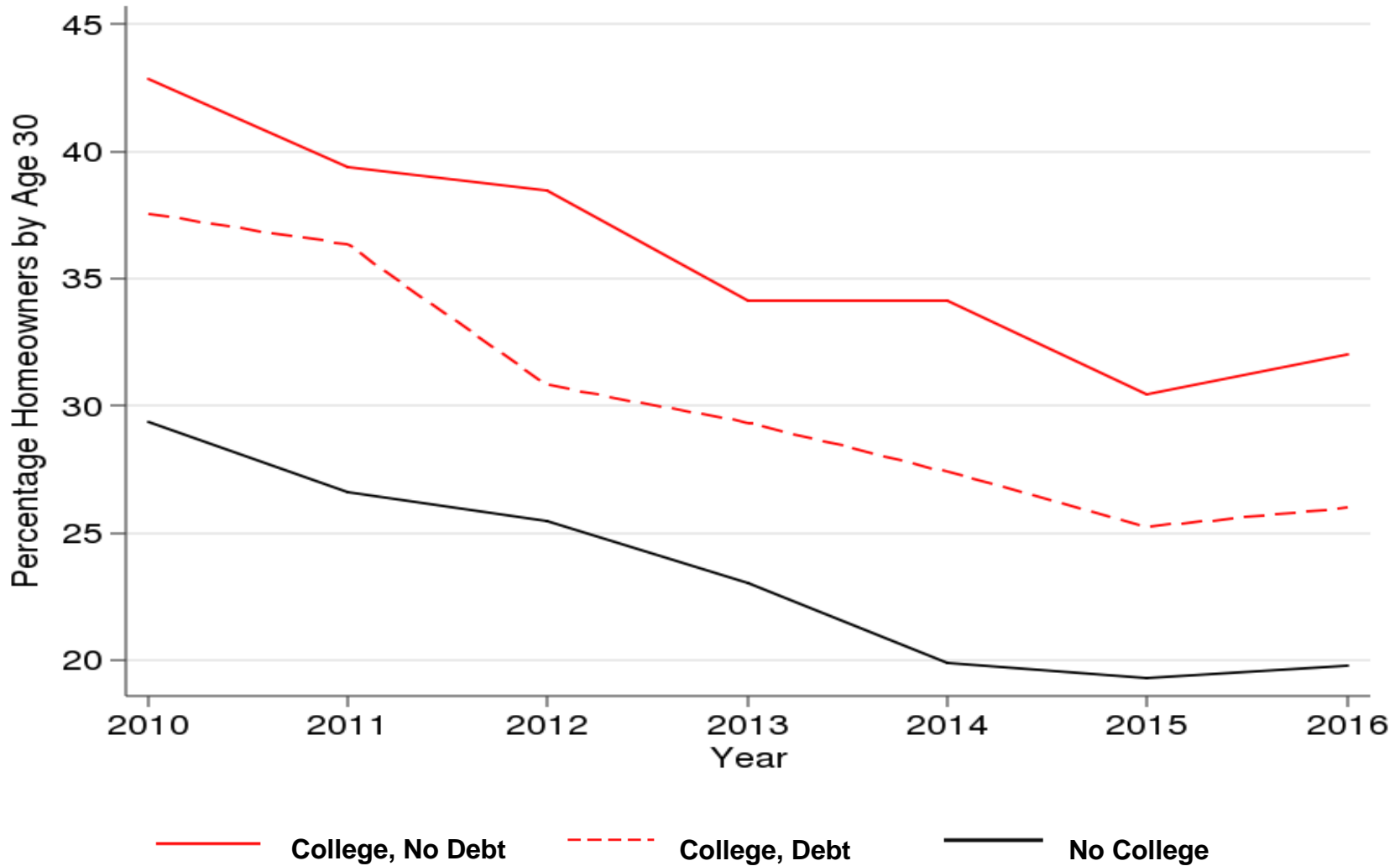


Student debt balance is based on maximum student debt amount observed between ages 27 and 30.

Sources: *New York Fed Consumer Credit Panel/Equifax and National Student Clearinghouse*

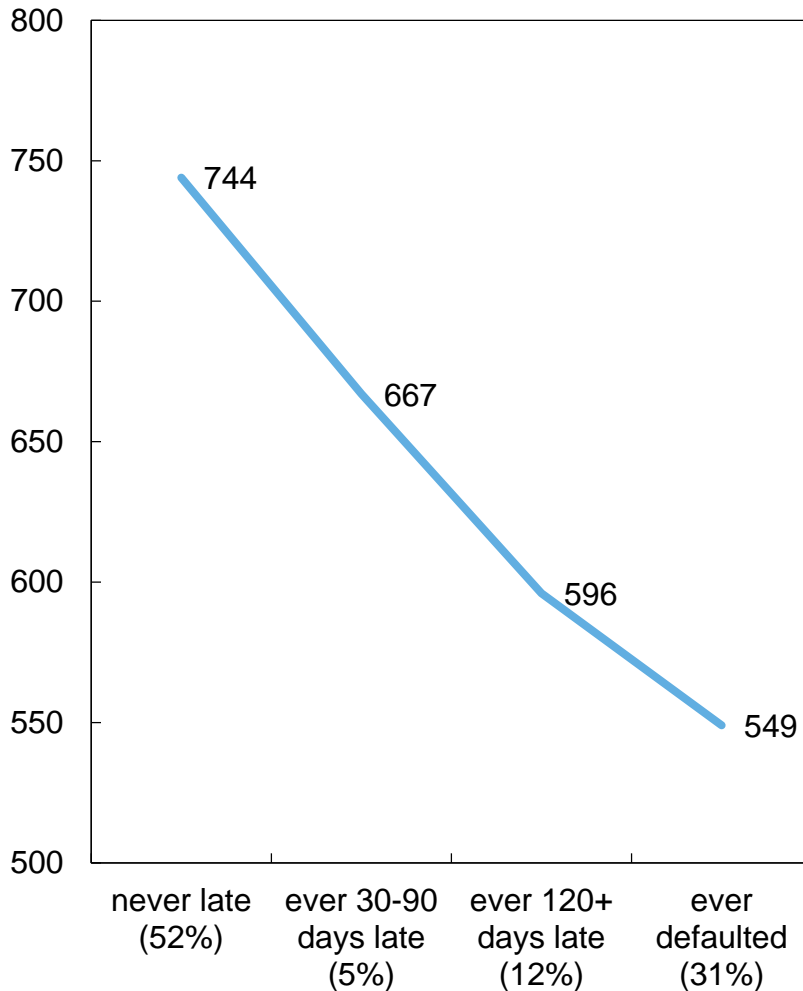


Age 30 Homeownership Gap Between Students With & Without Student Debt Widens Slightly Over Time

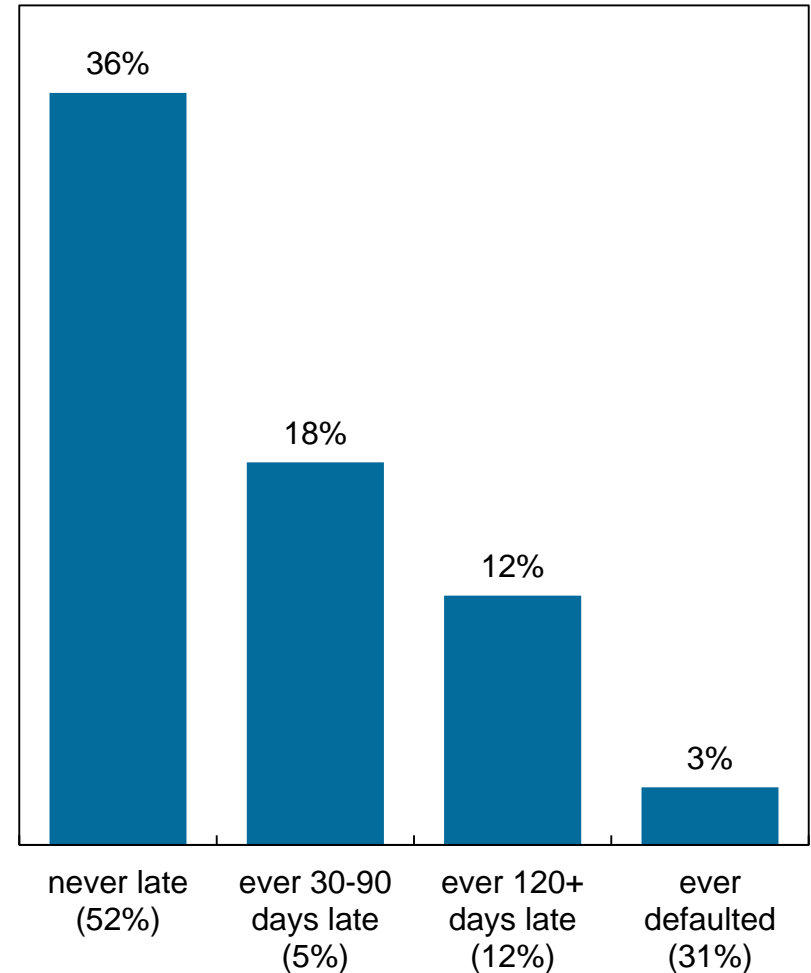


Student Loan Delinquency and Default Associated with Lower Credit Scores and Homeownership Rates

Median credit score at age 30



Homeownership at age 30



Is Association Causal? Potential Channels

- Decline in demand
 - Student debt repayment competes with consumption opportunities post-college, including buying a home
- Decline in supply - decreased access to credit
 - Exposure to the student loan system: exposure to delinquency and collections risk
 - Increased SL delinquency lowers apparent creditworthiness
 - See declining relative credit scores of student borrowers
 - Back-end DTI ratio calculations: uses monthly payment amount on credit report (assuming loan is current). For deferred loans, calculate 1% of student loan balance.



Why is Impact of Student Debt so Difficult to Measure?

Observed student debt levels reflect

- consumer demand for education (quantity as well as quality)
- application behavior and admission policies
- available family resources, financing options, needs and costs

Many determinants unobserved

- Incomplete information on educational attainment
- Debt repayment ability and ambition, risk attitudes
- Parent generosity

Limited loan policy variation to exploit: Inconveniently fair policy!

- > 90% of student loan market consists of federal loans: homogenous, caps move intermittently



We Focus on Variation in Student Debt due to Differential State-Cohort Tuition Changes

- How have students responded to the rising cost of education: by dropping out, or by borrowing more?
 - *Tuition* → *Educational attainment*
 - *Tuition* → *Student debt*
- To what extent is the sharp decline in homeownership among younger Americans attributable to .. the rise in college costs?
 - *Tuition* → *Homeownership*
 - Estimates causal impact of policy-induced shifts in education financing away from government to students and their families
- and to the tuition-induced increase in student debt
 - *Student Debt* → *Homeownership* (using IV)



Empirical Specification

Relate outcomes Y (homeownership at ages 28-30, student debt and educational attainment at age 24) to college cost E as in:

$$Y_{iclt} = X_{iclt}\beta + E_{cs(l)}\gamma + \delta_{s(l)} + \tau_t + \varepsilon_{iclt}$$

Individual i , cohort c , county l , state $s(l)$, time t , with

- X_{iclt} time-varying regressors: county employment share (QCEW), state youth unemployment (CPS) and wages (QCEW), at current age (and age 18), fileholder age
- $E_{cs(l)}$ time-fixed state-cohort college cost: average (enrollment-weighted) public tuition at age 22
- Year FEs, age-22 state FEs, current state FEs



Identification

- Based on (exogenous policy-induced) variation in timing and magnitude of tuition increases across states
- Focus on state-cohort's enrollment-weighted mean sticker price at 4yr public institutions (per school year)
 - *Variation also exploited by Mezza et al (2016)*
- Control for state and cohort fixed effects as well as for current local conditions (as well as at age 18) faced by cohorts



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IV approach: use tuition as instrument for student debt
attributes entire tuition effect on home ownership to its impact on student loan debt

- Likely biased downward (more negative) as it rules out channels other than student debt that may lower homeownership
 - Possible decline in quality of acquired college education
 - Declining parental support in making home down payments

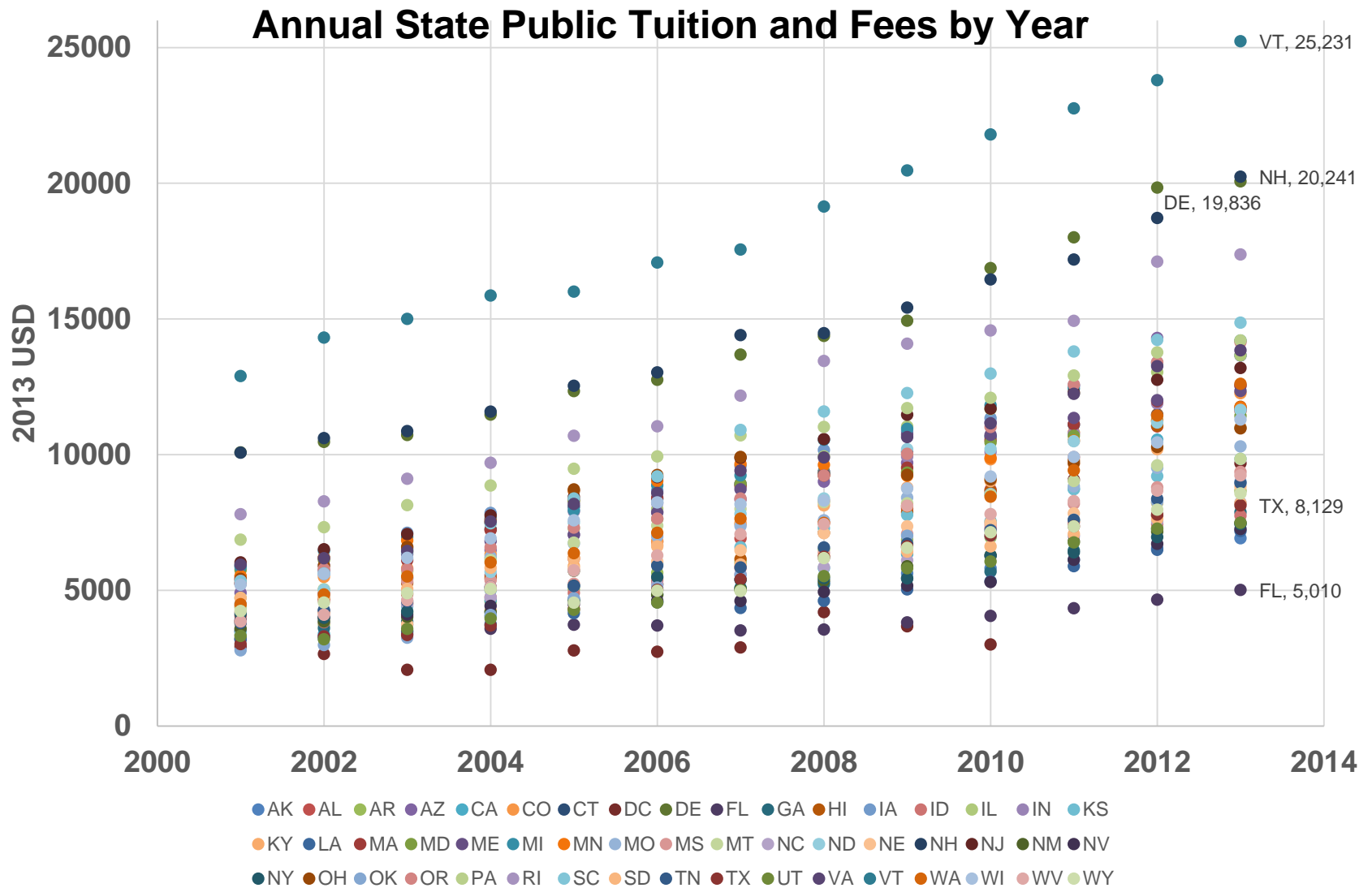


Sample Construction

- For homeownership and student debt regressions: CCP fileholders
 - Individuals belonging to 1979-1987 birth cohorts
 - Homeownership at ages 28-30; maximum individual student debt observed by age 24
 - Public tuition & fees observed at age 22 for state-cohort (IPEDS)
 - 1% sample of Q4 in each year from 2003-2015
 - $N=774,794$ person-year observations
- For educational attainment regressions: using IPUMS data
 - Years of post-secondary education, college enrollment, Bachelors degree awarded; all individual-level data
- Other outside sources of data on local economic conditions
 - BLS' Quarterly Census of Earnings and Wages (QCEW), county
 - CPS age 18-30 unemployment, state



Growth and Increased Dispersion in State Tuition

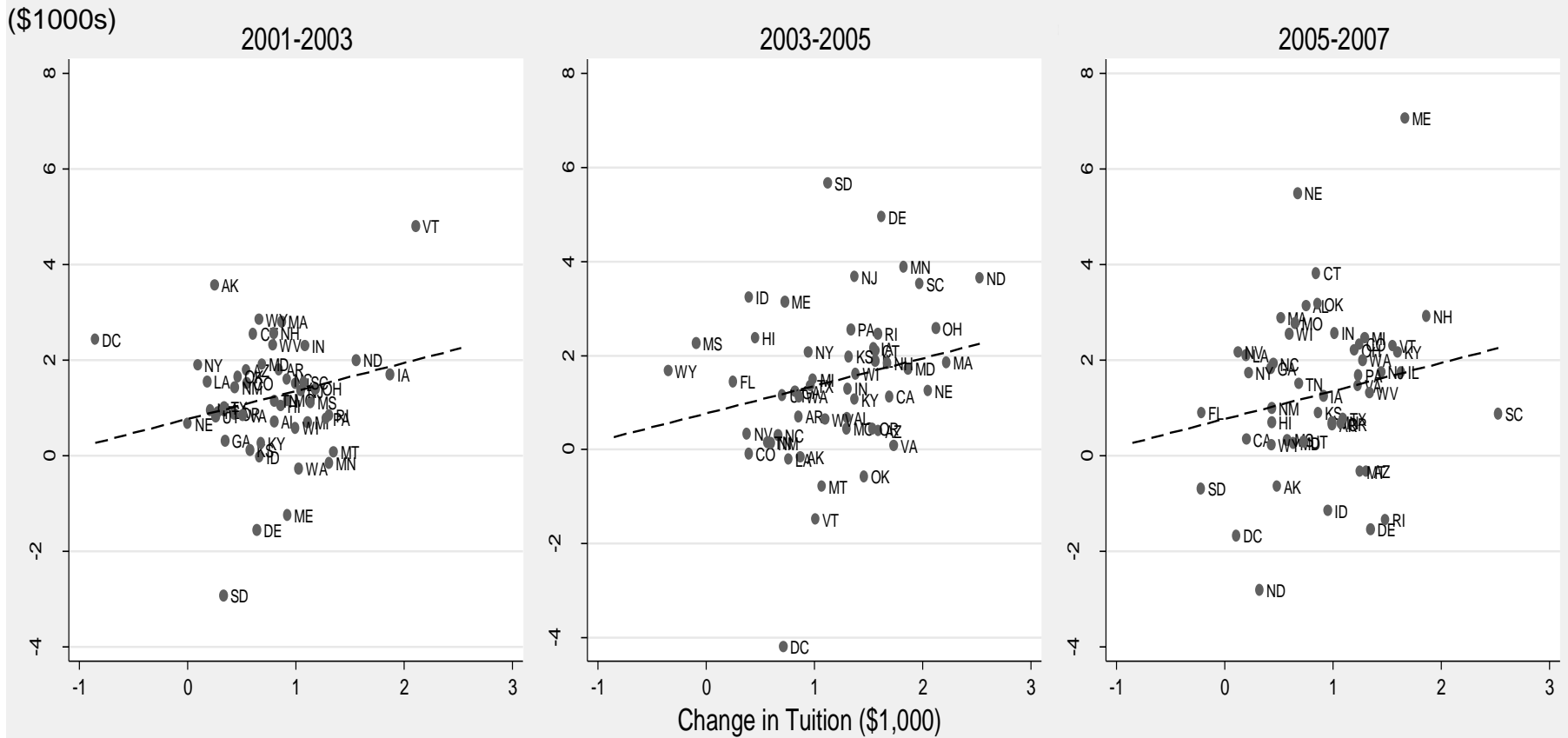


Source: IPEDS. Enrollment-weighted mean tuition and fees at four-year public colleges and universities by state, year



Simple Cross-State & Cohort Relationship Between Tuition and Student Debt Changes

Change in average student debt per person and tuition across states and cohorts

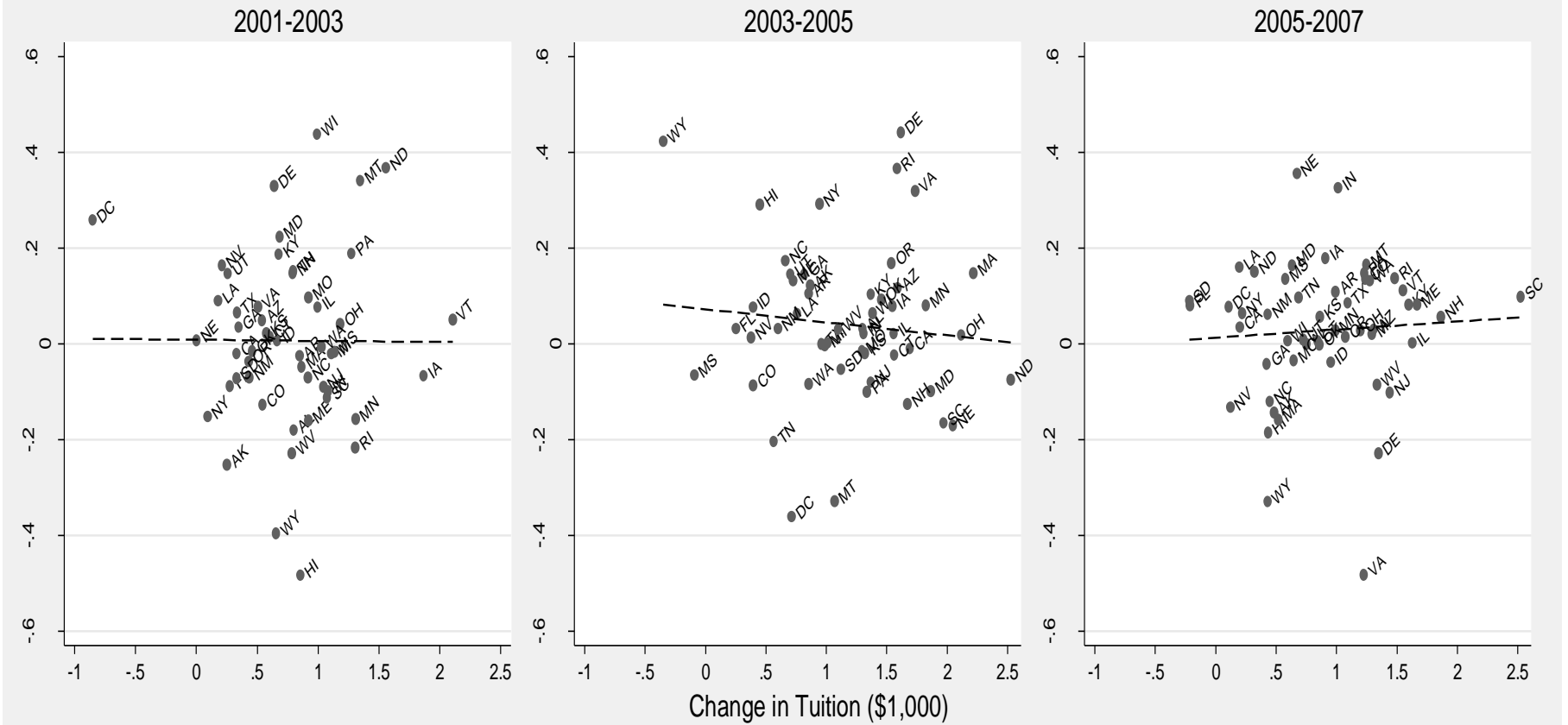


Slope 0.586** (pooled data)



Simple Cross-State & Cohort Relationship Between Tuition and Educational Attainment Changes

Change in years of education per person and tuition across states and cohorts

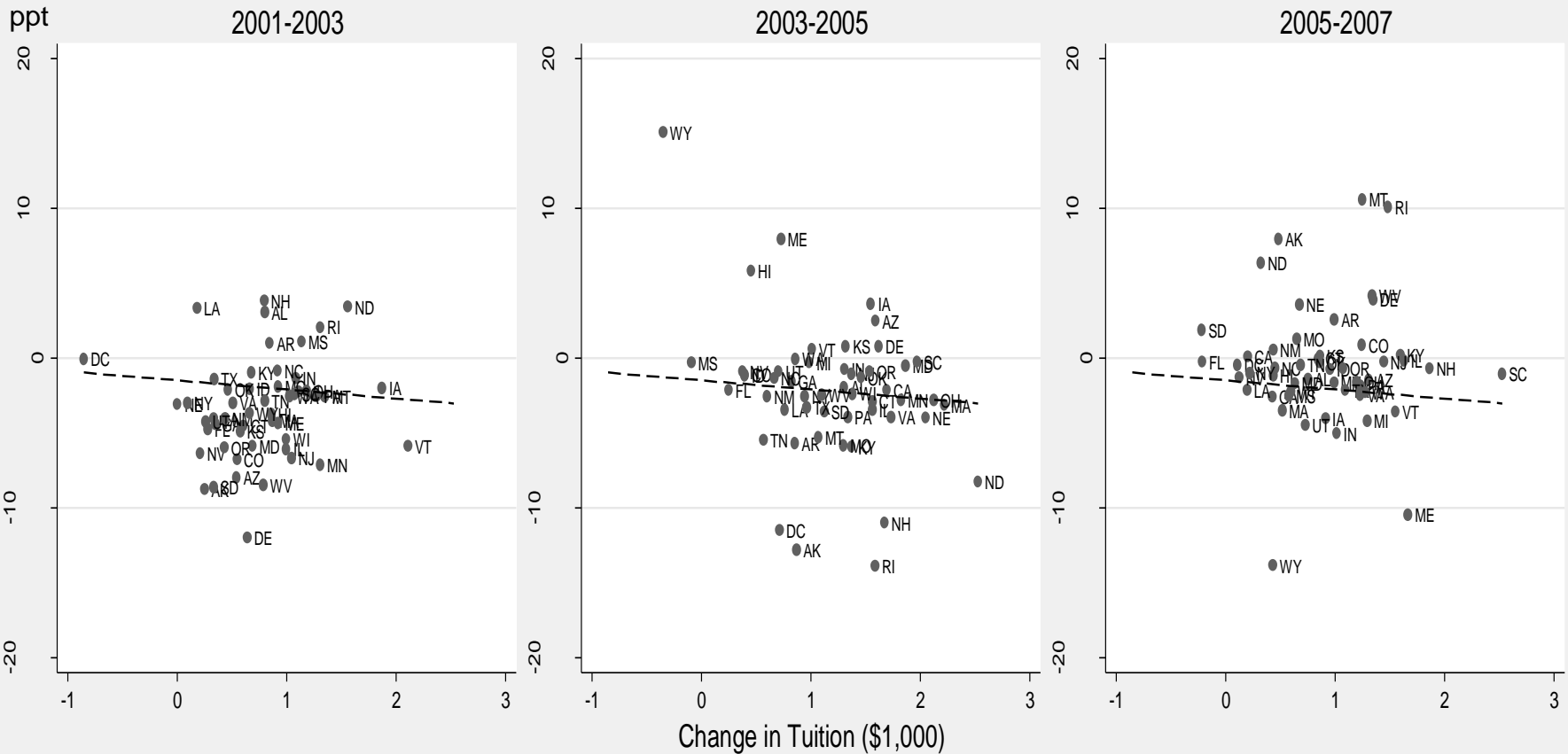


Slope -0.002 (pooled data)



Simple Cross-State & Cohort Relationship Between Tuition and Age-28 Homeownership Rate Changes

Change in homeownership and tuition across states and cohorts



Slope -0.607 (pooled data)



From Cohort-State Level Correlations to Causal Estimates

We next consider regression estimates of these relationships, using individual-level data, and

- extending the estimation sample to include all 2001-2009 cohorts
- incorporating home ownership at ages 29 and 30
- controlling for state and cohort fixed effects
- controlling for time-varying local economic conditions facing different cohorts in the different states and counties



Estimated Tuition Effects

	Student Debt (\$1,000)	College Attendance (100=Yes,0=no)	Years of College Education	BA Graduate 100=Yes,0=no	Home Ownership (100=Yes,0=no)
Public Tuition (\$1,000)	0.455*** (0.051)	-0.116 (0.101)	-0.006* (0.003)	-0.121 (0.091)	-0.237** (0.089)
Clustered SEs					
State	(0.051)	(0.115)	(0.004)	(0.106)	(0.137)
Driscoll-Kraay	(0.073)	(0.060)	(0.002)	(0.069)	(0.089)
Age 22 State FEs	Yes	Yes	Yes	Yes	Yes
Current State FEs					Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Current Labor market conditions	Yes	Yes	Yes	Yes	Yes
Number Obs	293,915	261,181	261,181	261,181	774,794
Source	CCP	IPUMS	IPUMS	IPUMS	CCP

Source: New York Fed Consumer Credit Panel/Equifax

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Estimated Tuition Effects on Homeownership

	<i>Baseline Specification</i>	<i>Added age 24 LM controls</i>	<i>Added age 18 LM controls</i>	<i>IV estimate effect of debt on homeownership</i>
<i>Public Tuition (\$1,000)</i>	-0.237** (0.089)	-0.192** (0.090)	-0.222** (0.091)	-0.480** (0.184)

Source: New York Fed Consumer Credit Panel/Equifax

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Source: New York Fed Consumer Credit Panel/Equifax

Each \$1000 increase in annual public tuition leads to:

- increase of \$455 in student debt per capita at age 24
- precisely estimated zero effects on educational attainment
- decrease of 24 basis points in likelihood of owning home

Extra \$1000 student debt reduces likelihood of owning home by 0.48 ppt

Implications

- Observed \$3578 mean tuition climb can explain
 - Approximately \$1628 (**30%**) of the increase in age 24 student debt between 2003-2011
 - About **0.84 (11%)** of the observed 7.7 ppt decline in age 28-30 homeownership over 2007-2015
- Observed \$5707 increase in per-capita student debt can explain **2.7 ppt (35%)** of observed homeownership decline
- As tuition measure is a proxy for college cost, estimates likely attenuated



Tuition Effects Increase in Magnitude with State College Enrollment Rate

	<i>Student Debt</i>	<i>Home Ownership</i>
<i>Tuition (\$1,000)</i>	0.375*** (0.051)	-0.156 (0.097)
<i>Tuition * Above Median College Going Rate</i>	0.140*** (0.015)	-0.128** (0.062)
<i>Tuition * College Going Rate (Effective Tuition)</i>	1.237*** (0.073)	-0.435*** (0.148)

- Similar findings distinguishing by BA receipt and years of college education
- Tuition ownership effect 1.8 times larger for college-goers (45% of cohorts do not attend college, never pay tuition), even larger for BA students

Survey findings – Why not just ask whether student debt delayed home purchase?

- Pew Research Center US representative survey
 - 48% of SL borrowers “Student debt makes it harder to pay other bills.”
 - 25% of SL borrowers: “Student debt has made it harder to buy a home
- NAR national survey of homebuyers
 - Among 18-35: 44% had student debt at time of homebuyer survey, median \$25,000.
 - 53% of 18-35 buyers report having been delayed by student debt in purchasing home
- American Student Assistance survey of young professionals
 - 60%: confusion with student loan repayment paperwork
 - 69%: confusion with student loan repayment options
 - 75%: student debt had affected their ability to purchase a home
- NeighborWorks America national phone survey
 - 57%: Student debt “at least somewhat of an obstacle to buying a home”



Thank You !



Conclusions

- Estimates indicate that rise in tuition contributed to increase in student debt (but not educational attainment), a decline in homeownership and increase in parental co-residence
- Signals active role for U.S. student loan system in shielding young Americans' human capital investments against shocks to education costs
- Results imply that states that increase college costs for current student cohorts can expect a response not through decline in workforce skills, but through weaker spending among young in future
- Implications for policy
 - State (re-)funding of higher education
 - Improving effectiveness of repayment plan options
 - Student loan treatment in mortgage underwriting



Reference Slides



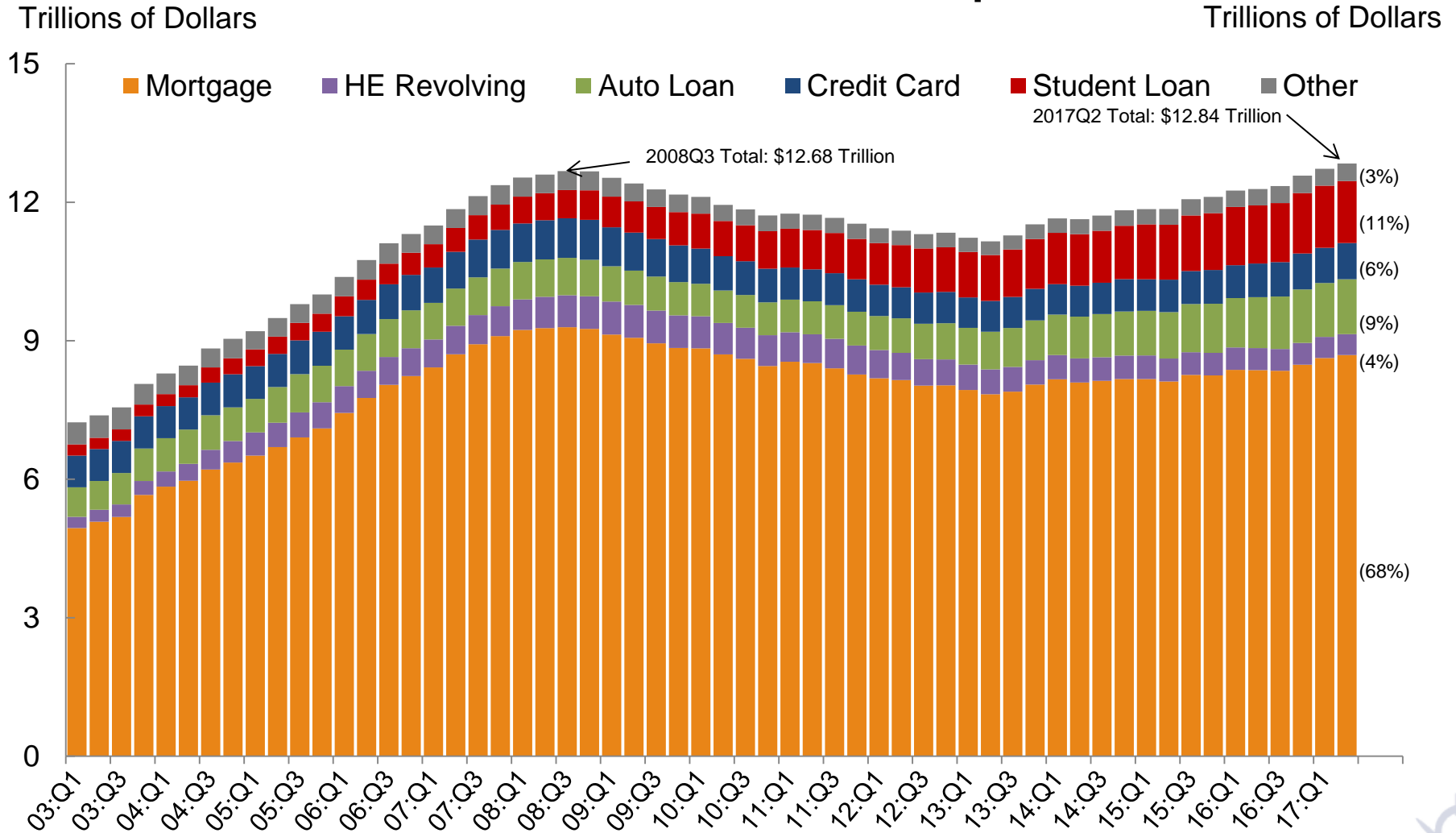
New York Fed Consumer Credit Panel (CCP)

- Features of credit report data
 - 5% representative sample of US credit report holders in any given quarter. 1999Q1-2016Q4
 - Panel tracking
 - Representative entry, as consumers age in or immigrate, and exit, as consumers die or emigrate
 - Standard consumer debts, delinquency, collections, bankruptcy
 - Age, location to Census block group, mobility, household
- Importantly, the CCP contains borrower-level information on student loan balances and payment status



Total Household Debt Passed 2008Q3 Peak but Composition Has Changed

Total Debt Balance and its Composition



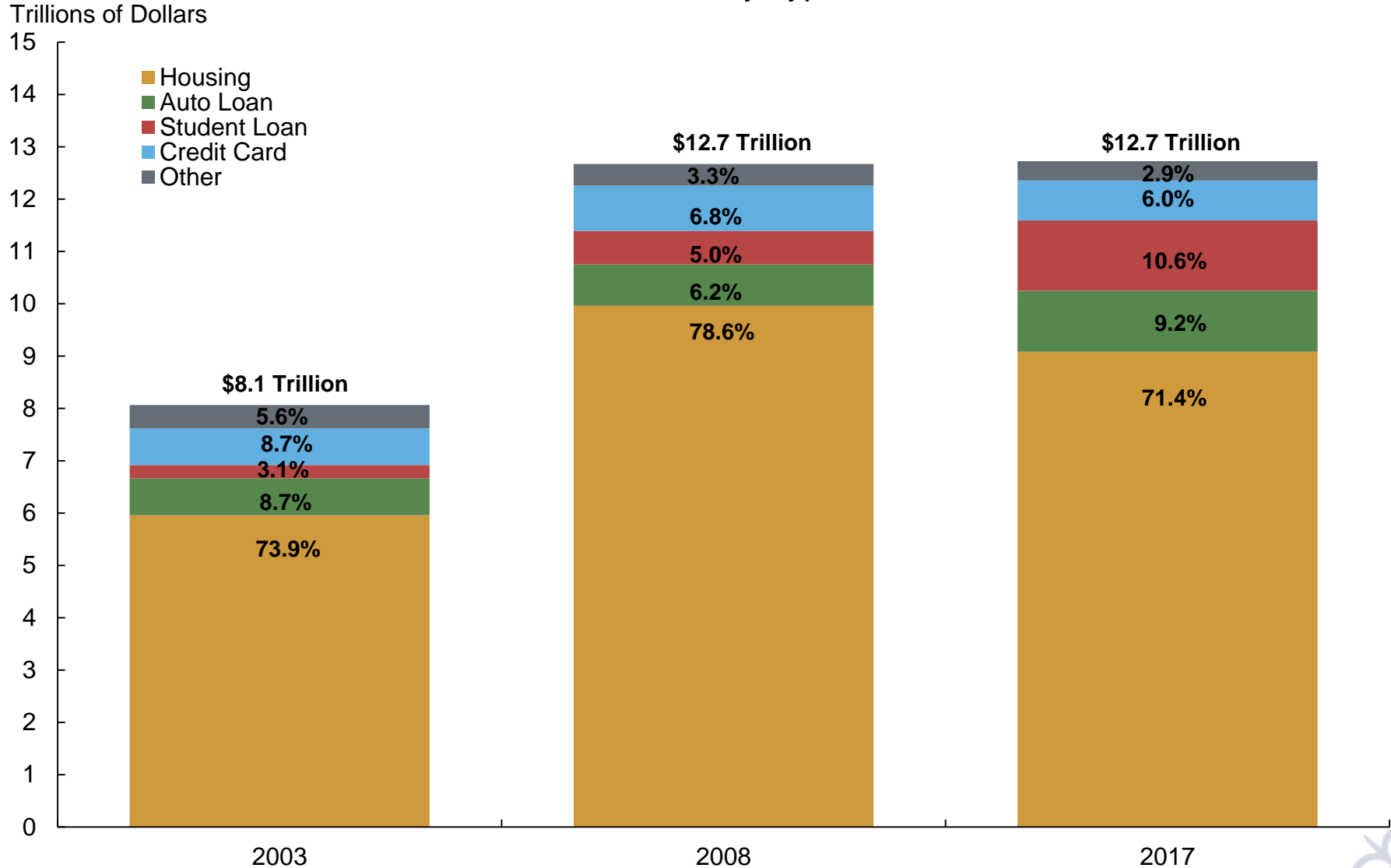
Popular Discussion

- National Association of Realtors: drop from steady-state 40% to 30% share of existing home purchases by first-time buyers
- NAR 2014: NAR President Steve Brown cites student loans as primary factor holding back first-time buyers
- General Motors (2015), cited student debt as a major reason why millennials are not purchasing cars
- CFPB 2013: hypothesizes links between student debt, delayed household formation, delayed homeownership



Housing Debt is \$900B Below Previous Peak; Student and Auto Debt up \$700B and \$375B

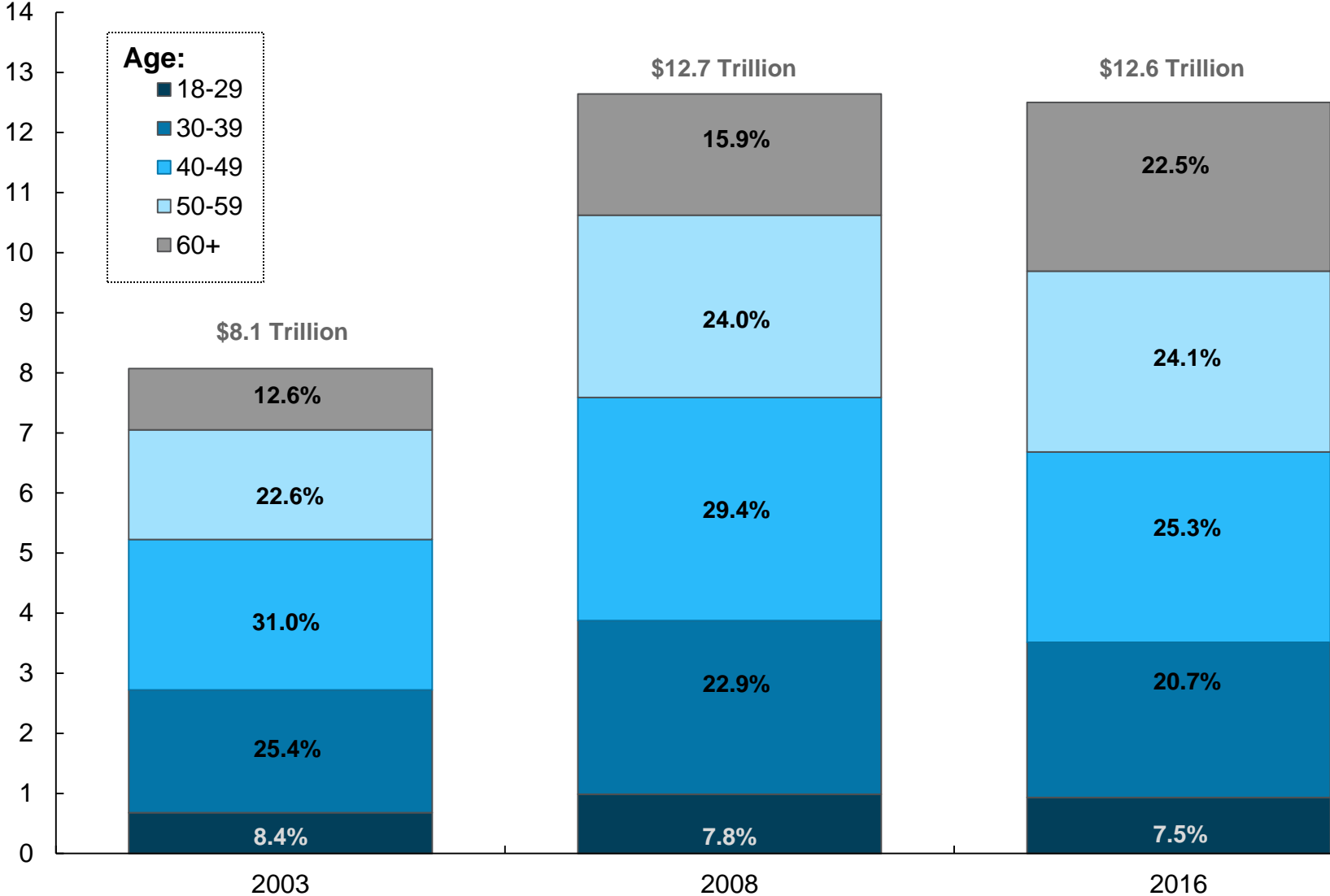
Total Debt by Type



Older Borrowers (Age 60+) Take Greater Share of Debt

Trillions of Dollars

Total Debt by Age of Borrower

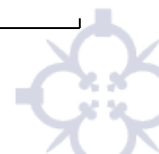
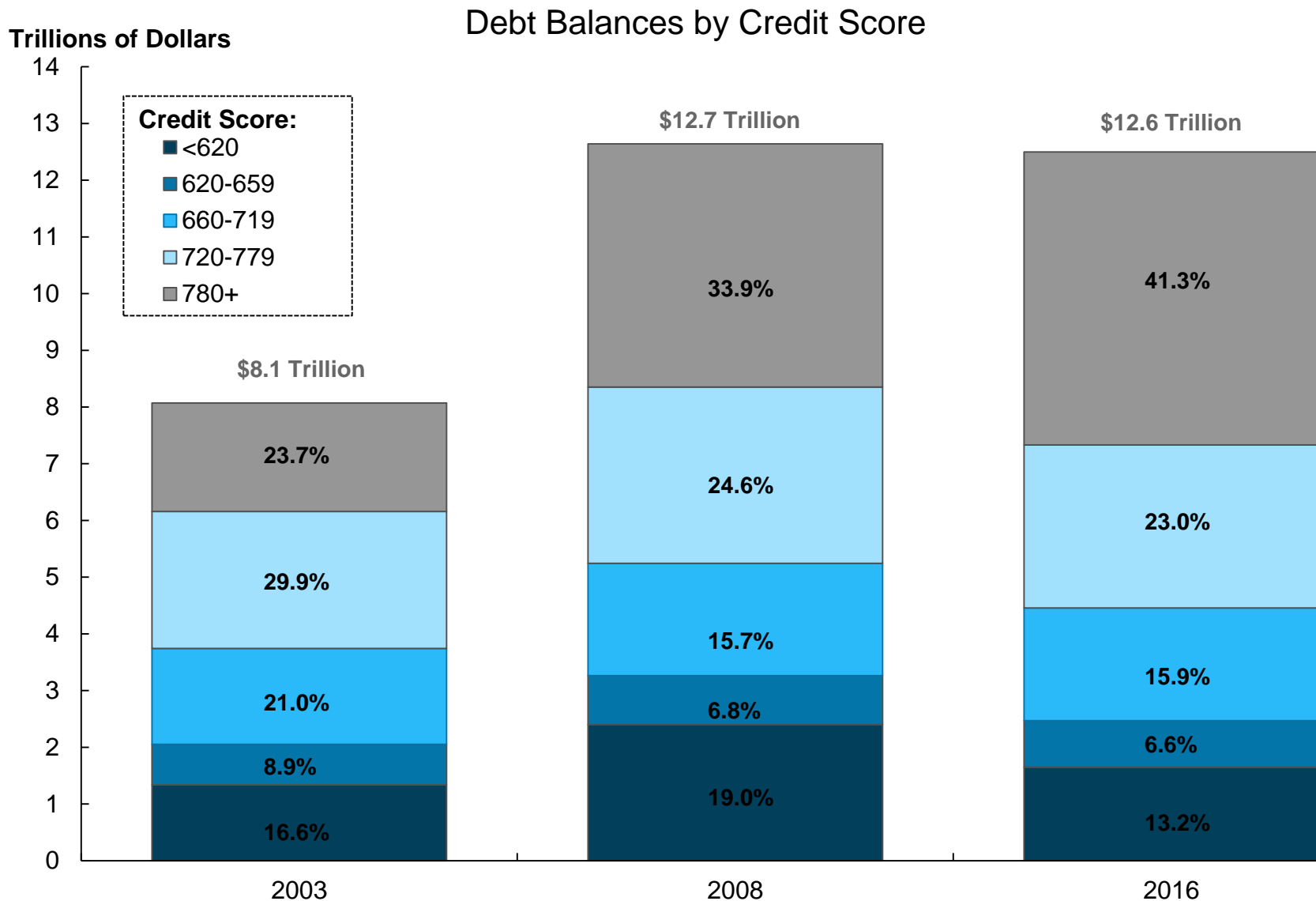


Source: New York Fed Consumer Credit Panel/Equifax

*data for 4th quarter of each year



Super-Prime Borrowers Increase Share as Subprime Tally Eases



Institutional Background

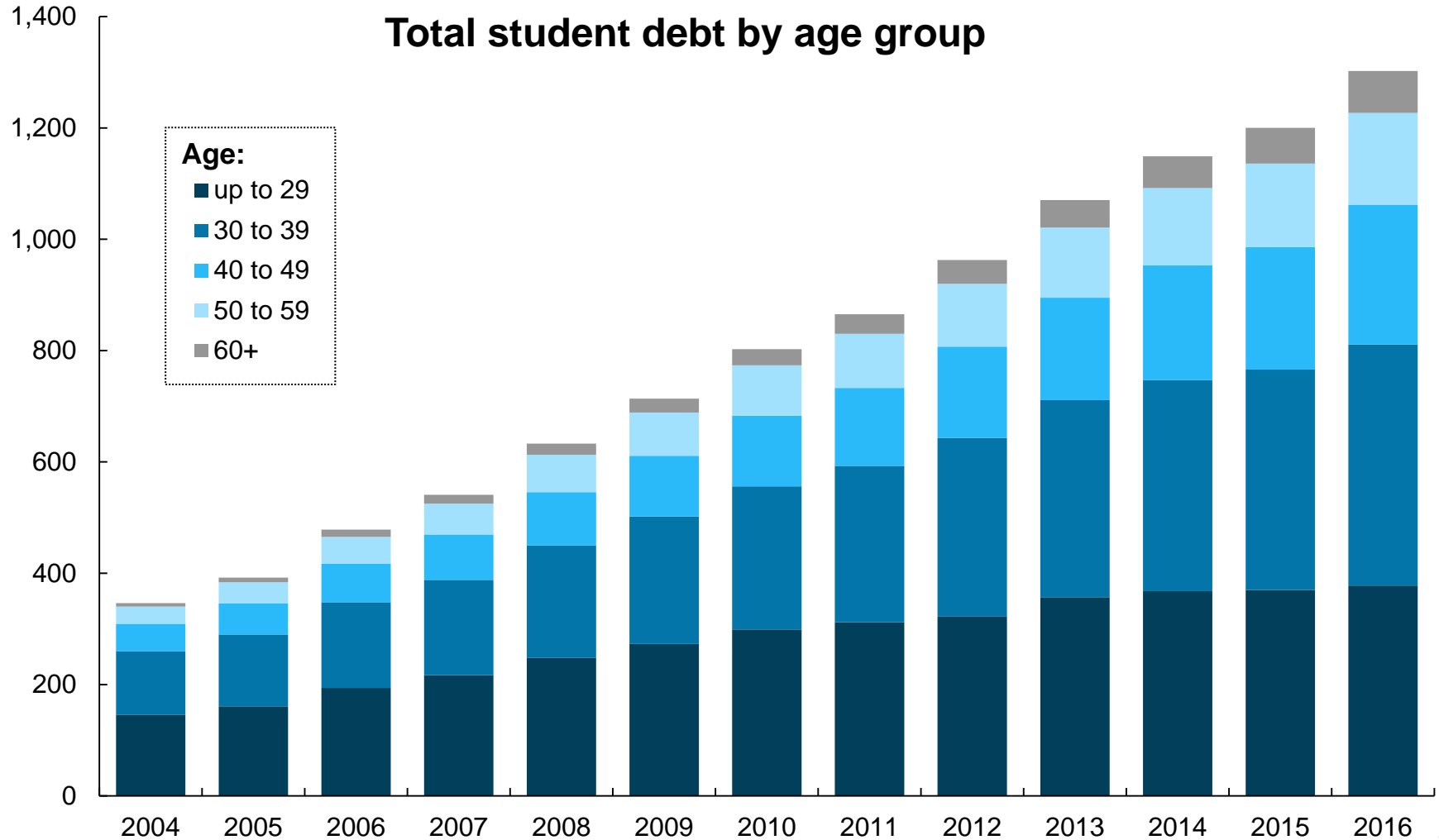
- Over 90% of debt is federal student loan debt:
 - Undergraduate loans. Current variable interest rate 4.5%, up to annual and cumulative loan limits
 - Graduate and professional student loans at 6.0% up to annual and cumulative loan limits
 - Parent Plus and Graduate Plus loans at 7% up to full cost of attendance
 - Typical term is 10 years; options to consolidate/extend terms to 20, 25 or 30yrs if large debt
- Student debt generally not dischargeable in bankruptcy
- Growing number of repayment plan options for those w high DTI:
 - Income Based Repayment (IBR), PAYE/RE-PAYE, ICR, ISR, Public Service Loan Forgiveness (PSLF), Teacher Loan Forgiveness (TLF)



Student Debt Totaled \$1.3 Trillion in 2016, Up 170% from 2006

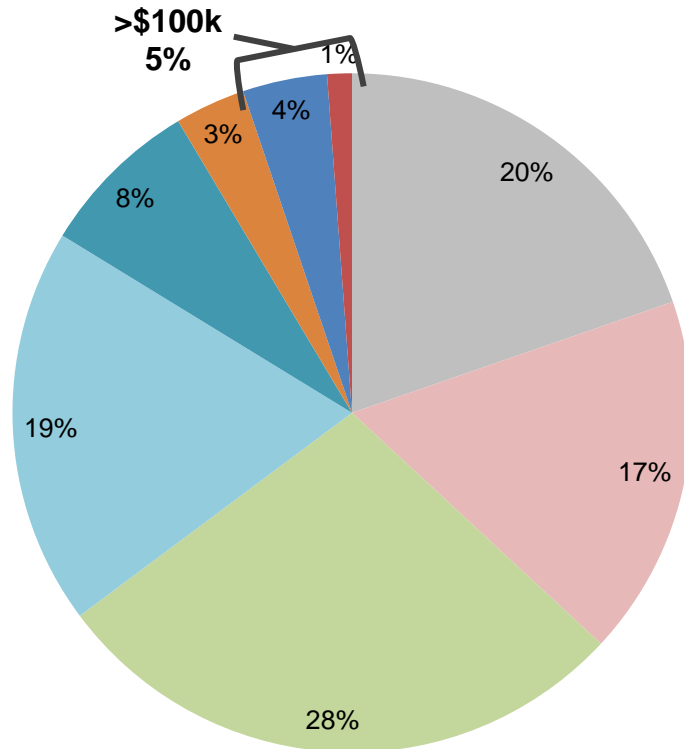
Billions of Dollars

Total student debt by age group

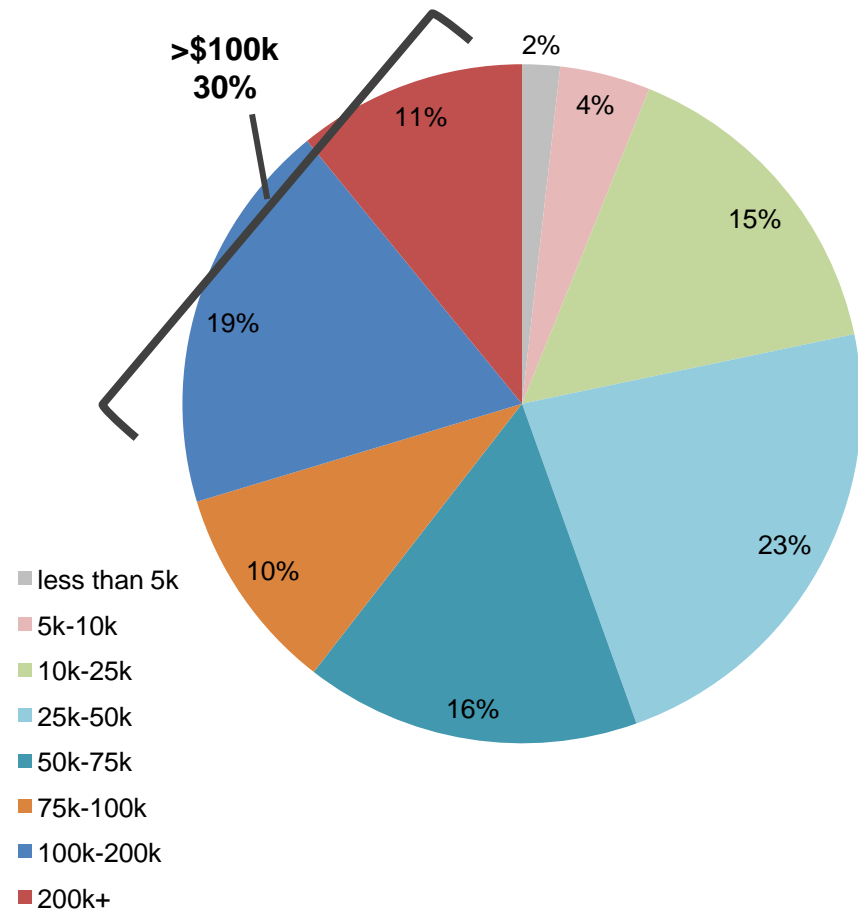


5% of Borrowers Have More Than \$100,000 Debt in 2016, But Account For About 30% of Total Debt

Borrower Distribution by Outstanding Balance
(out of 44 million borrowers in 2016)



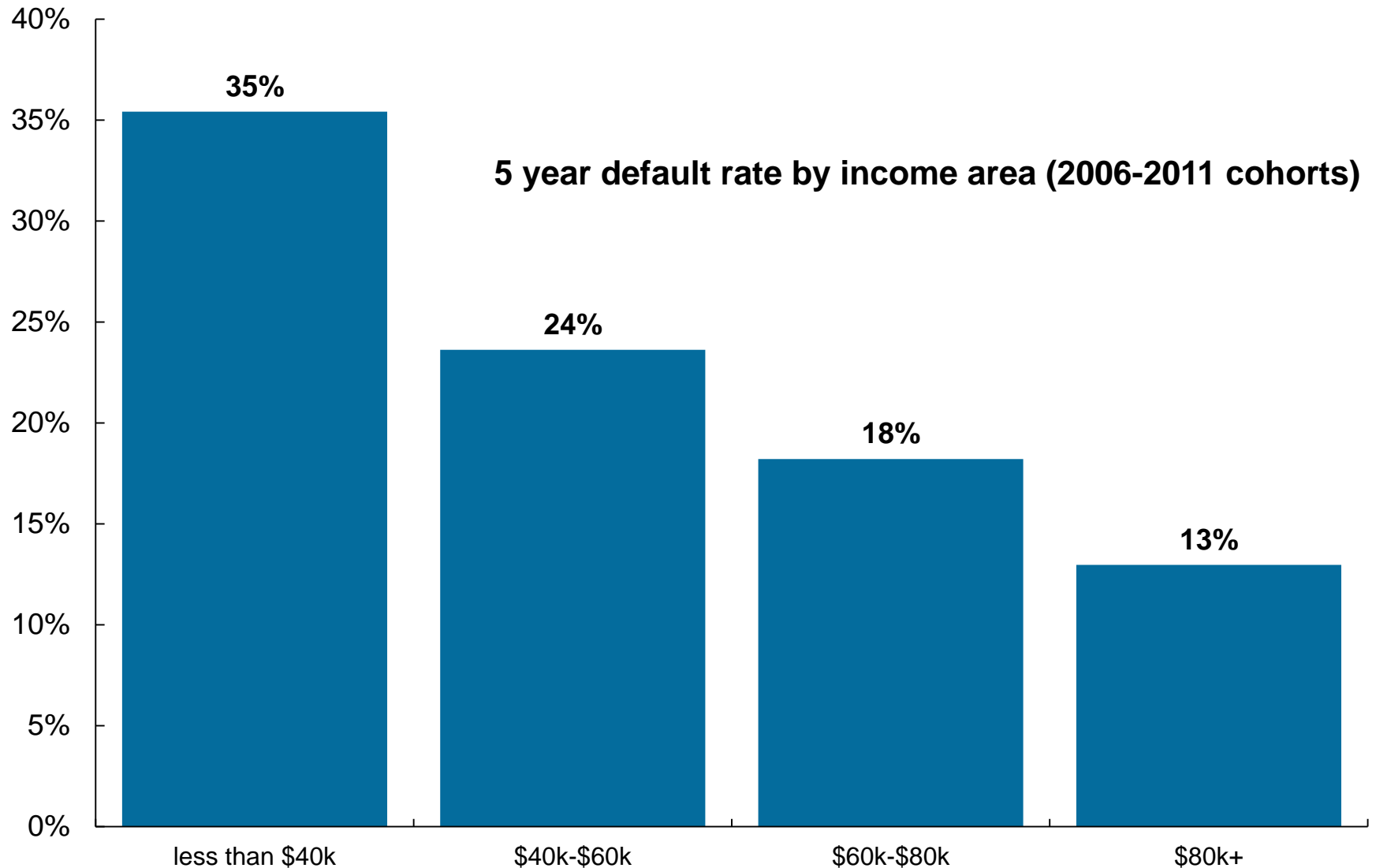
Debt Distribution by Outstanding Balance
(out of \$1.3 trillion in 2016)



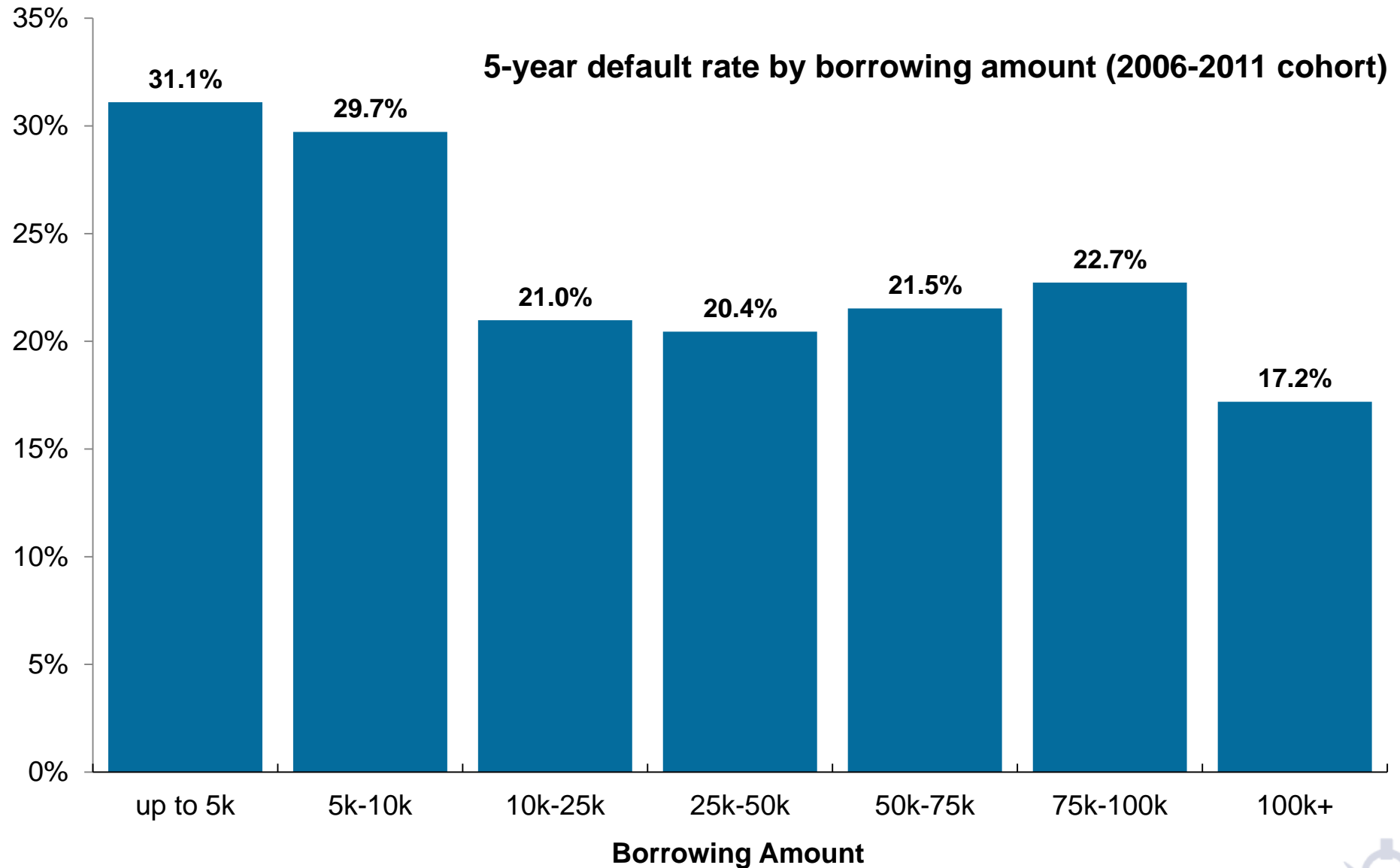
- less than 5k
- 5k-10k
- 10k-25k
- 25k-50k
- 50k-75k
- 75k-100k
- 100k-200k
- 200k+



Higher Default Rates Among Borrowers from Lower Income Areas

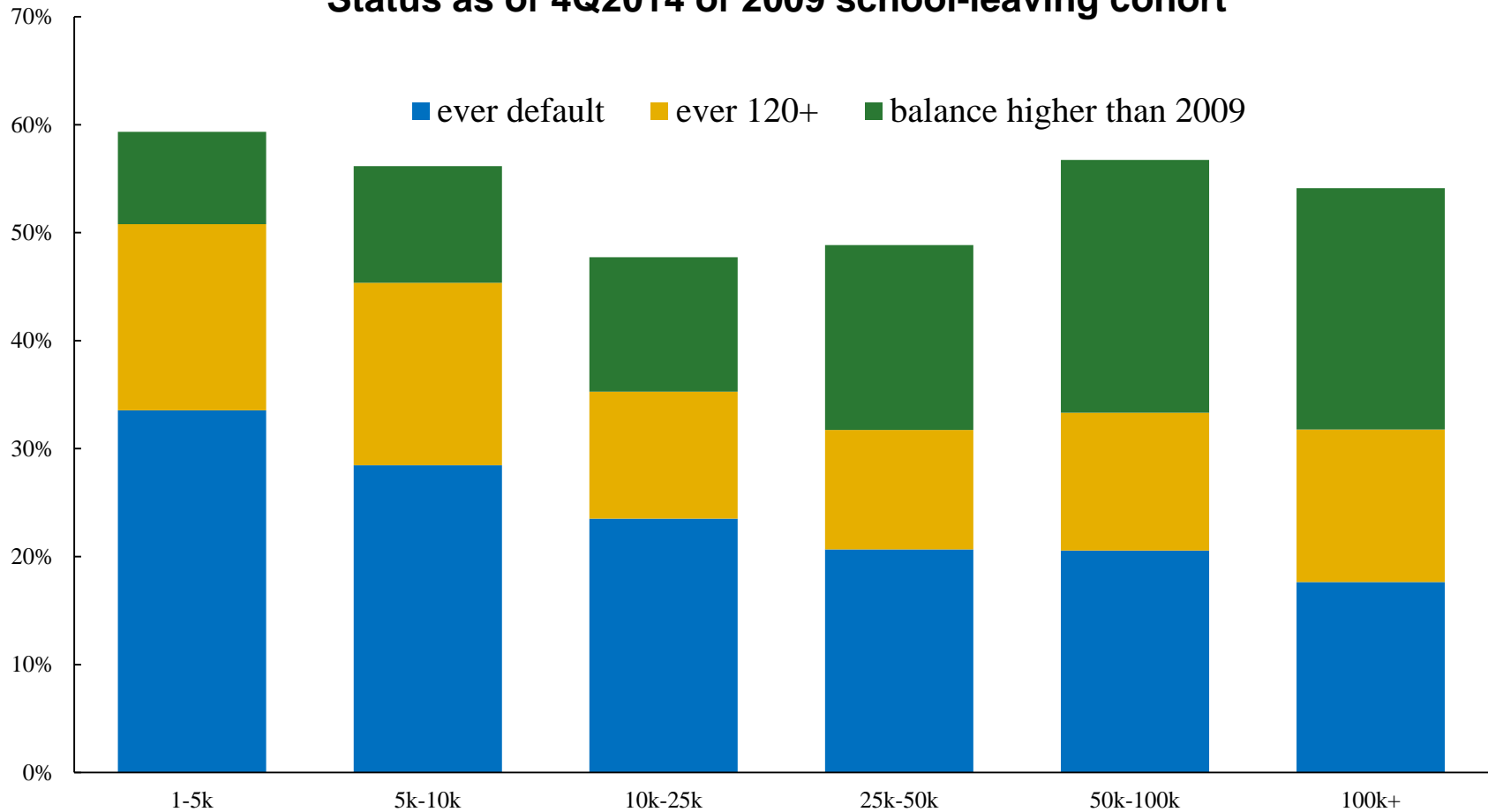


Higher Default Rates Among Lower-Balance Borrowers



But Repayment difficulties extend to High-Balance Borrowers

Status as of 4Q2014 of 2009 school-leaving cohort



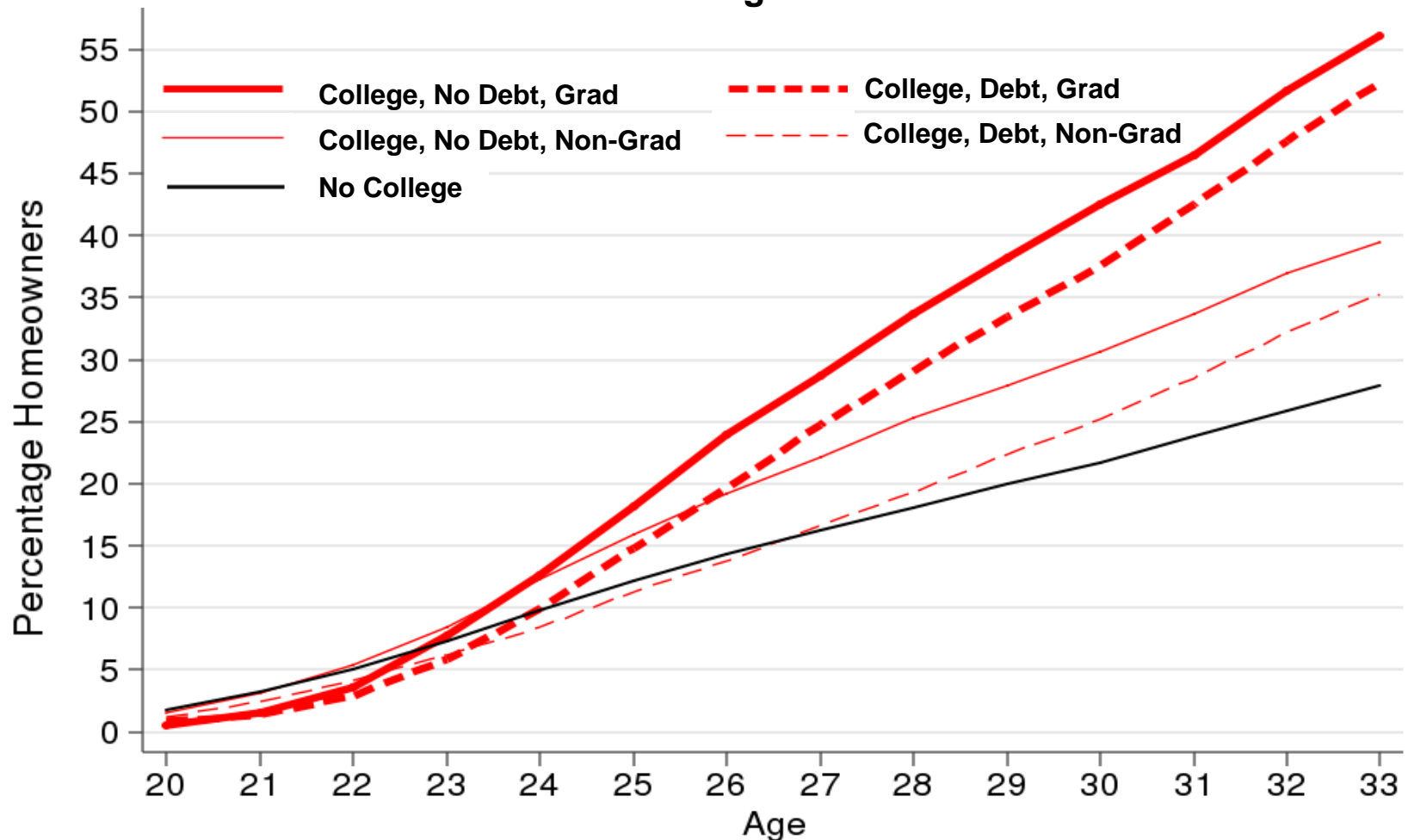
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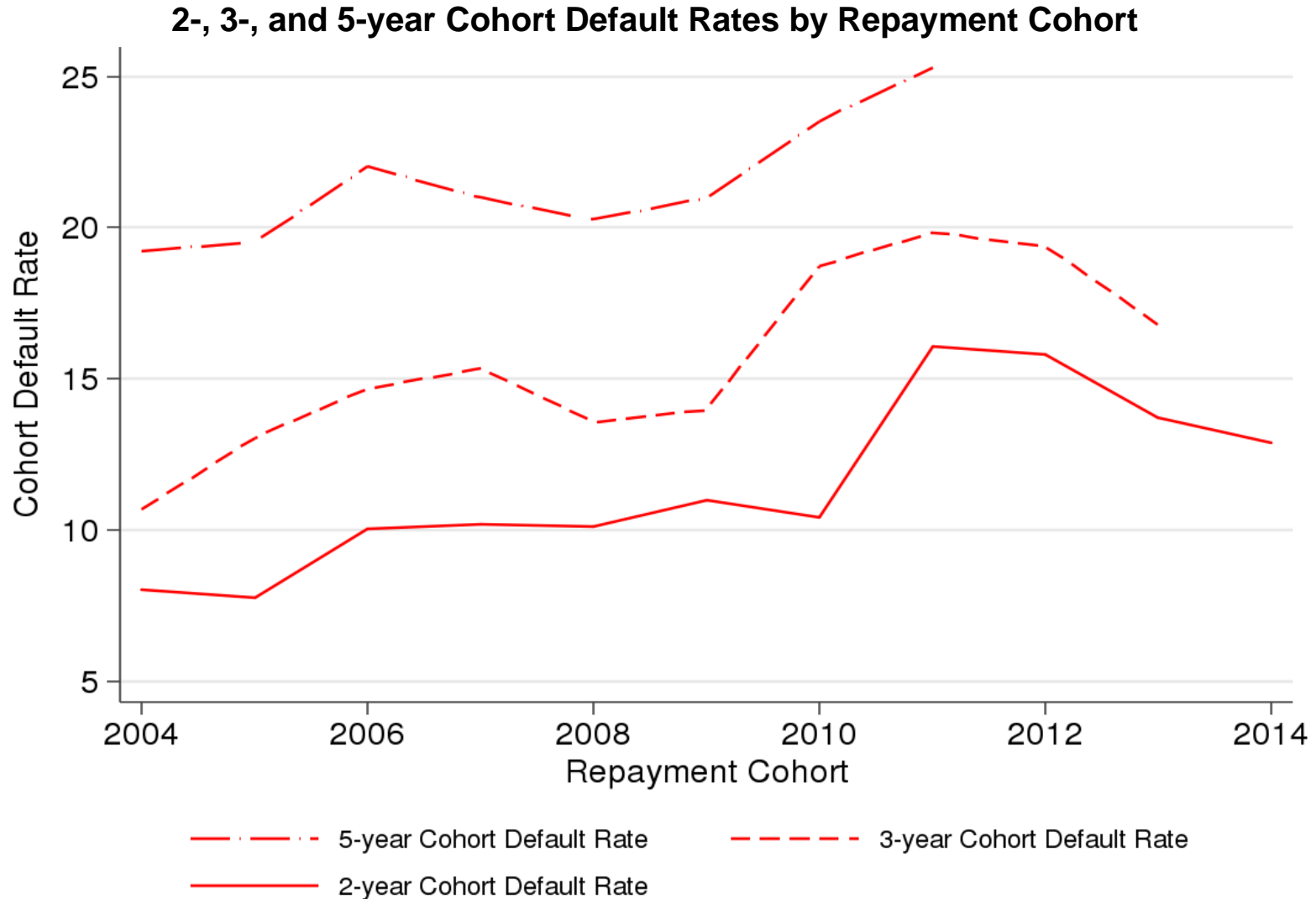


Graduates Have Higher Homeownership Rates, Regardless Of Debt Status

Homeownership Rate By College Attendance, Graduation Status, Student Debt Status And Age



Strong Cyclicalality in Default Rates: Increased for Recession Cohorts, Declined for Recovery Cohorts



Determinants of Student Loan Default by age 30

2yr Private for Profit	0.057* (0.023)	Above Mean ZIP Income	-0.035* (0.006)
2yr Public	0.060* (0.018)	Graduate	-0.076* (0.006)
4yr Private for Profit	0.109* (0.020)	Art	0.039* (0.008)
4yr Private non-profit	0.004 (0.018)	Stem	-0.001 (0.008)
4yr Public	0.003 (0.017)	Vocational	-0.003 (0.008)
Selective school	-0.025* (0.006)	Loan Amount (1000s)	0.000 (0.001)

N=12,908. Standard errors in parentheses. Outcome is a dummy for default between ages 27 and 30. Omitted major category is business; omitted school type is 2-year NFP. $p < 0:05$, $p < 0:01$, $p < 0:001$

Source: *New York Fed Consumer Credit Panel/Equifax, National Student Clearinghouse. 1980-1986 cohorts*



Estimated Tuition Effects

	Student Debt (\$1,000)	College Attendance (100=Yes,0=no)	Years of College Education	BA Graduate	Home Ownership (100=Yes,0=no)
Public Tuition (\$1,000)	0.455*** (0.051)	-0.116 (0.101)	-0.006* (0.003)	-0.121 (0.091)	-0.237** (0.089)
Clustered SEs					
State	(0.051)	(0.115)	(0.004)	(0.106)	(0.137)
Driscoll-Kraay	(0.073)	(0.060)	(0.002)	(0.069)	(0.089)
Age 22 State FEs	Yes	Yes	Yes	Yes	Yes
Current State FEs					Yes
Year FEs	Yes	Yes	Yes	Yes	Yes
Current Labor market conditions	Yes	Yes	Yes	Yes	Yes
Number Obs	293,915	261,181	261,181	261,181	774,794
Source	CCP	IPUMS	IPUMS	IPUMS	CCP

Source: New York Fed Consumer Credit Panel/Equifax



Estimated Tuition Effects on Co-residence

Tuition effect among top half of states with highest college graduation rates

	<i>Living with Parents</i>	<i>Living with Roommates</i>	<i>Living as a Couple</i>	<i>Living Alone</i>
<i>Average State Tuition (\$1,000)</i>	0.778*** (0.254)	-0.898*** (0.228)	0.058 (0.167)	-0.188 (0.136)

Source: New York Fed Consumer Credit Panel/Equifax

- Extra \$1000 tuition leads to .78 ppt increase in share living w parents (tuition rise can explain about 25% of increase in parental co-residence)
- Also find significant tuition effect on transitions into/out of parental residence



Estimated Tuition Effects on Homeownership

	<i>Baseline Specification</i>	<i>Added age 24 LM controls</i>	<i>Added age 18 LM controls</i>	<i>IV estimate effect of debt on homeownership</i>
<i>Public Tuition (\$1,000)</i>	-0.237*** (0.089)	-0.192** (0.090)	-0.222** (0.091)	-0.480** (0.184)

Source: *New York Fed Consumer Credit Panel/Equifax*

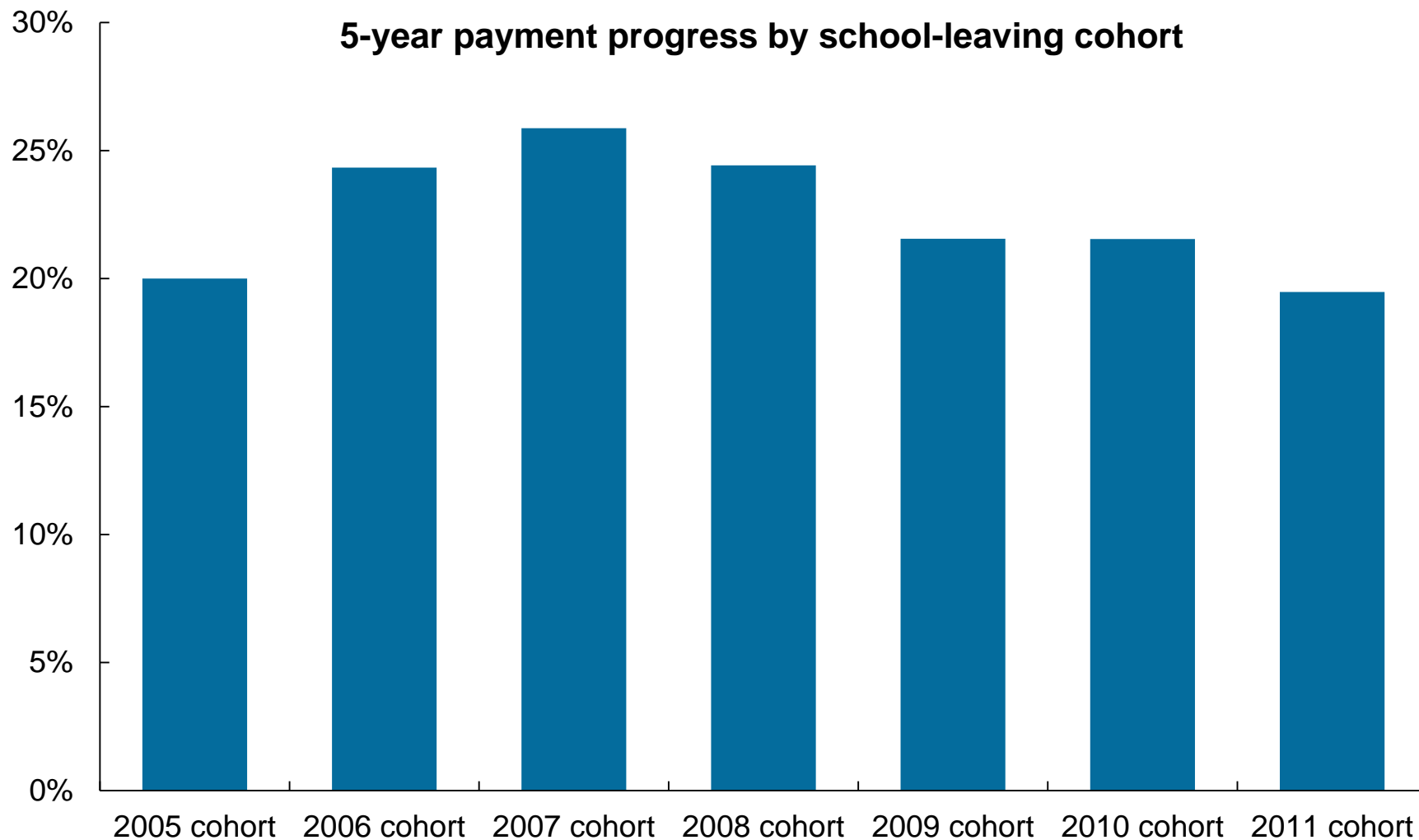
Each \$1000 increase in annual public tuition leads to:

- increase of \$455 in student debt per capita at age 24
- precisely estimated zero effects on educational attainment
- decrease of **24** basis points in likelihood of owning home

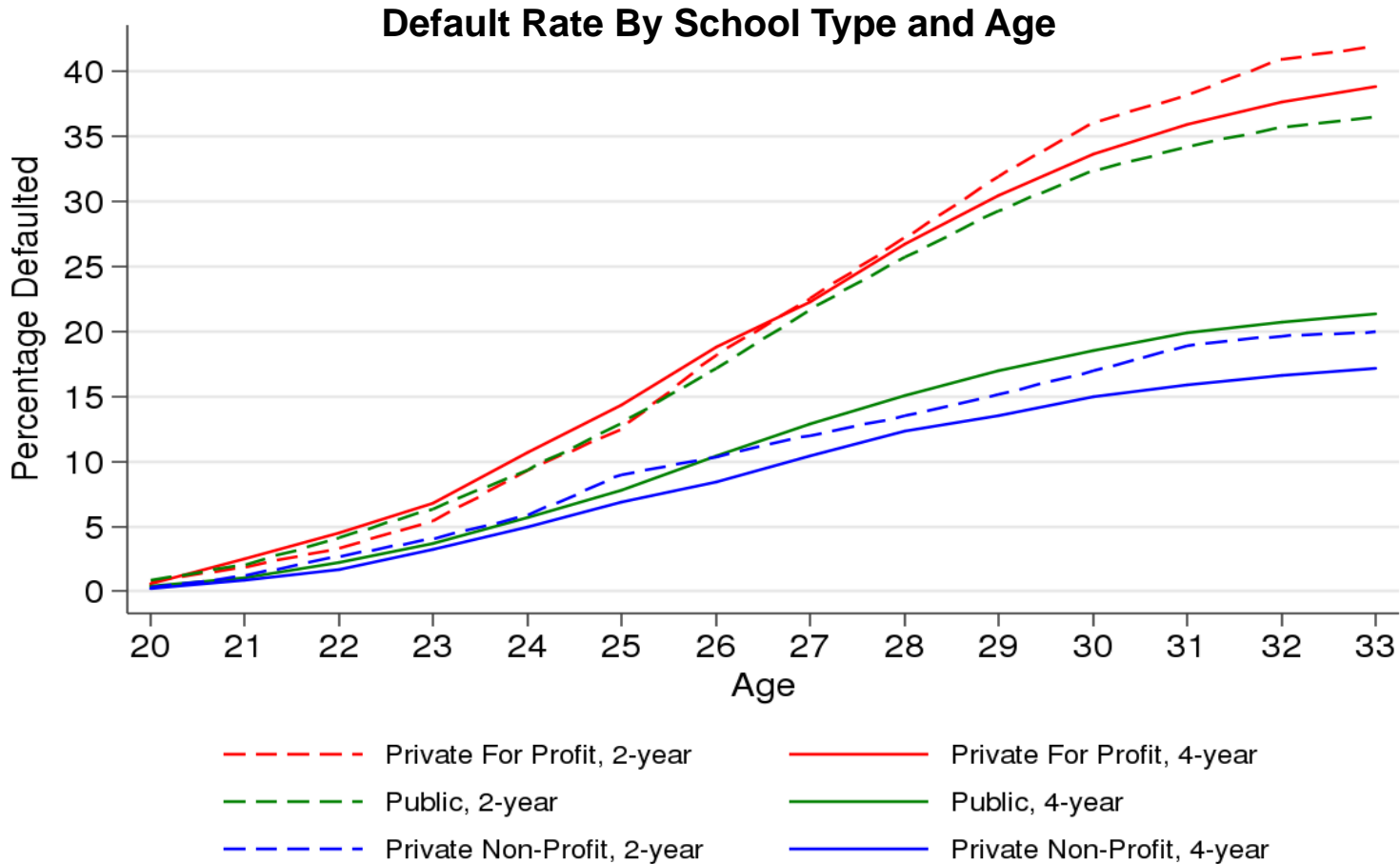
Extra \$1000 student debt reduces likelihood of owning home by **0.48** ppt



But Lower Repayment Rates for Recent Cohorts 5 Years After Leaving School



For-profit Students Have, By Far, Highest Default Rates but Community College Students Not Too Different



Percentage EVER defaulted by each age, out of college-goers with student loans.

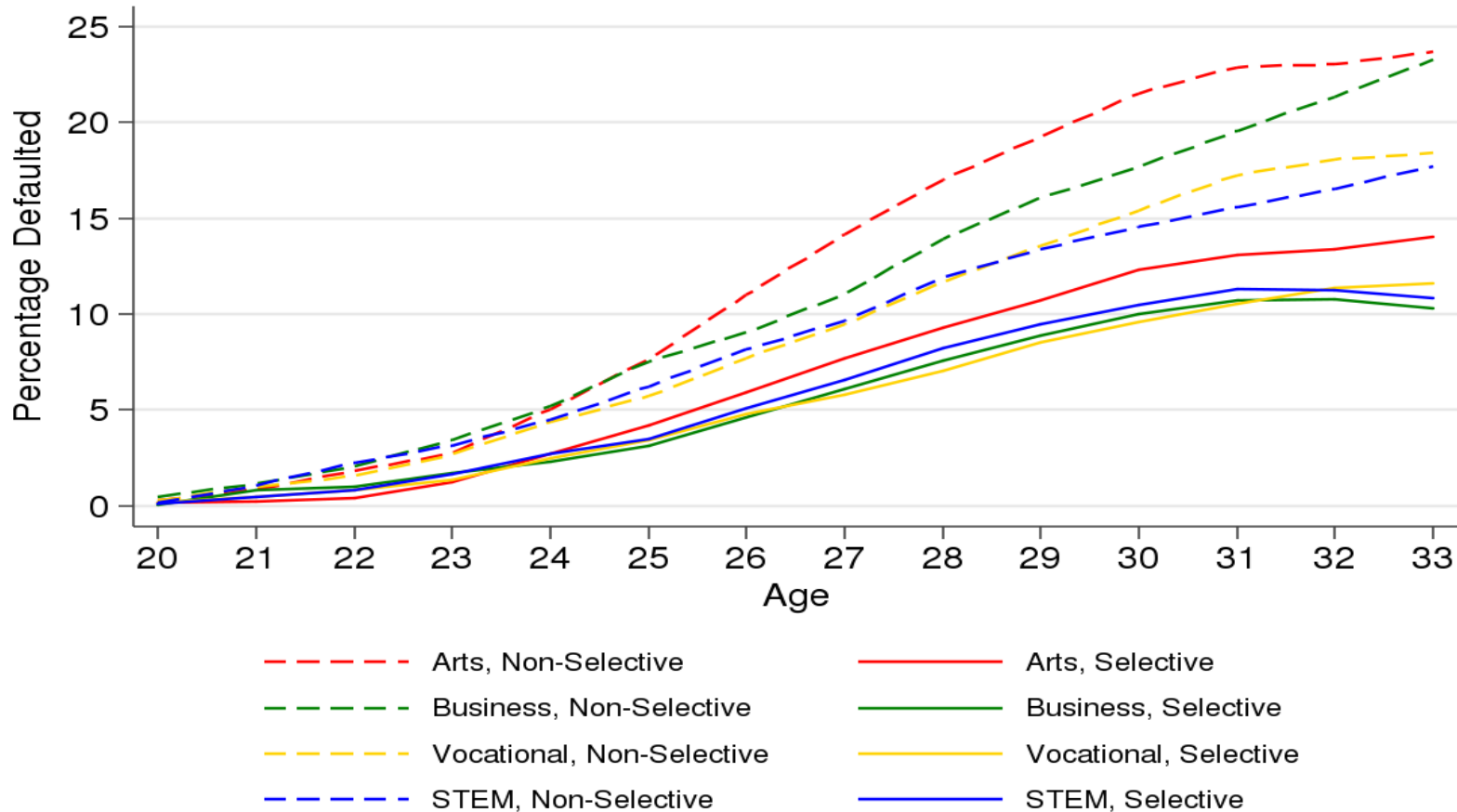
- Wide divergence (16 ppt at age 33) of default rates between 2 year and 4 year public college students, unlike for for-profits and not-for-profits.

Source: New York Fed Consumer Credit Panel/Equifax



Major Matters for Non-Selective Colleges, Not So Much for Selective Colleges

Default Rate By Field, School Selectivity, and Age



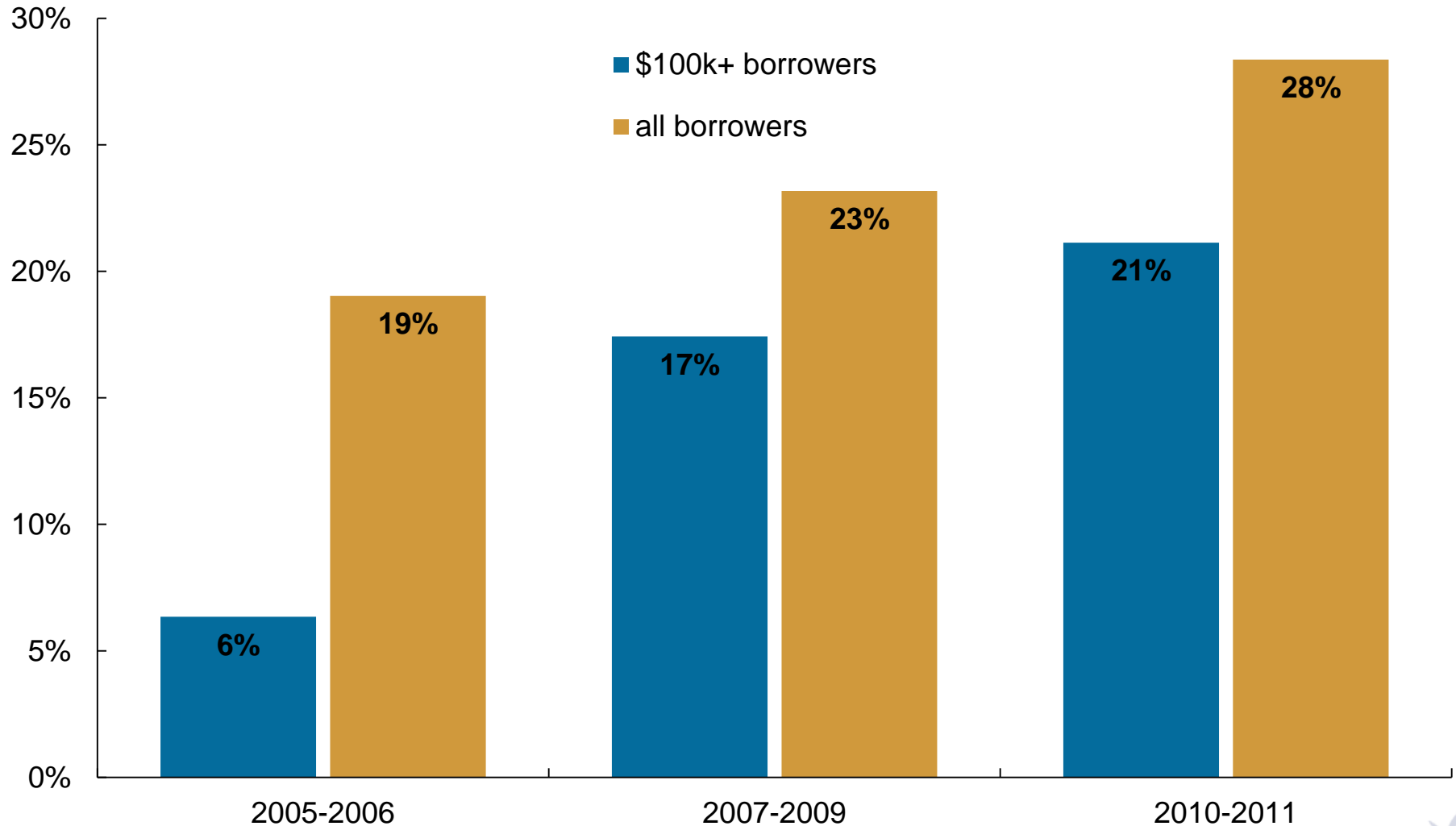
Percentage EVER defaulted by each age, out of college-goers with student loans.

- Gap Differences Vary: By Far Largest for Business and Arts
- Vocational has Close to Lowest Default Rates (also true among Associates and For-profit students)

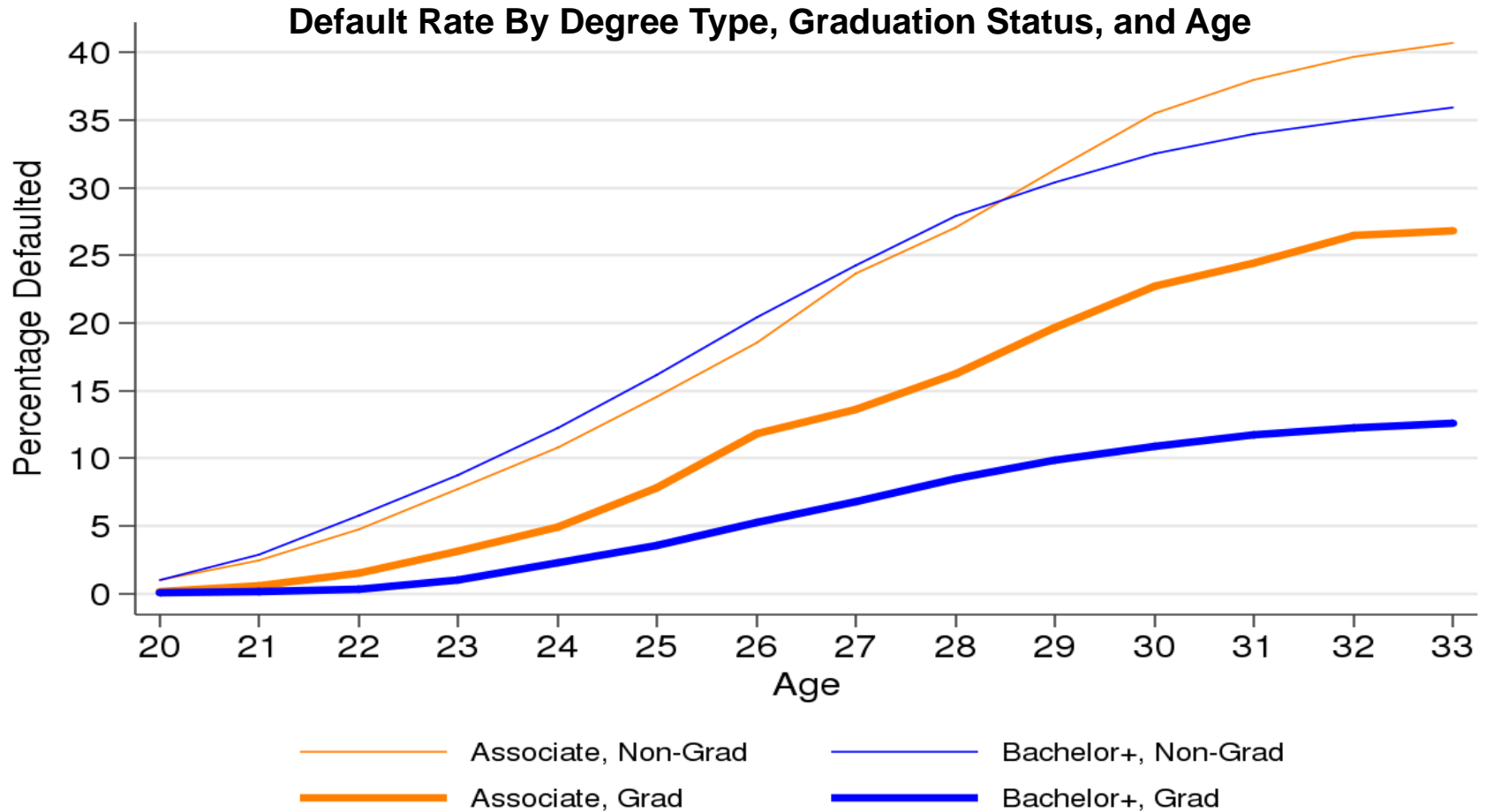


Increasing Default Rate for Higher Balance Borrowers in Recent Cohorts

5-year default rate of high-balance borrowers by school-leaving cohort



Non-Graduates, Associates Have Higher Default Rates

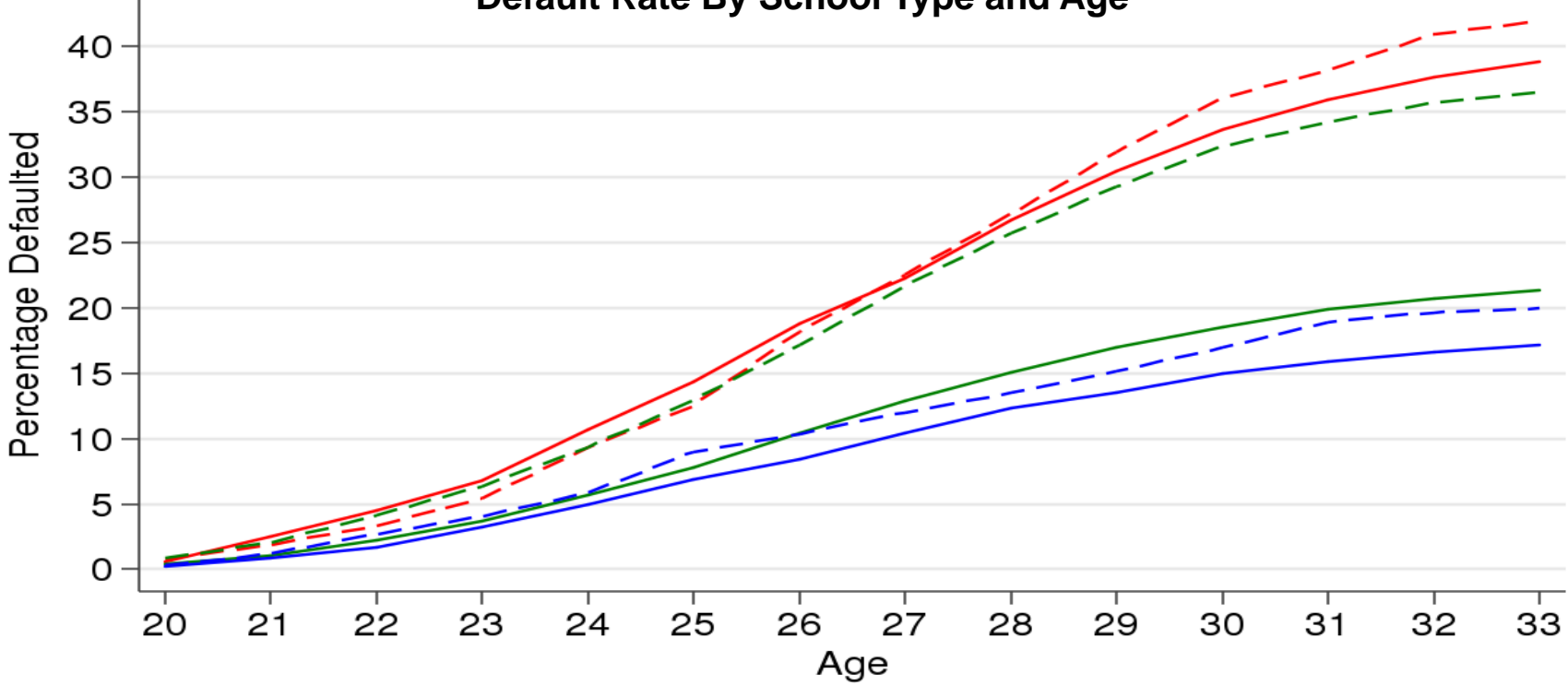


Percentage EVER defaulted by each age, out of college-goers with student loans.
Bachelor's and Bachelor's+ synonymously refer to Bachelors and post-Bachelors students



For-profit Students Have, By Far, Highest Default Rates but Community College Students Not Too Different

Default Rate By School Type and Age



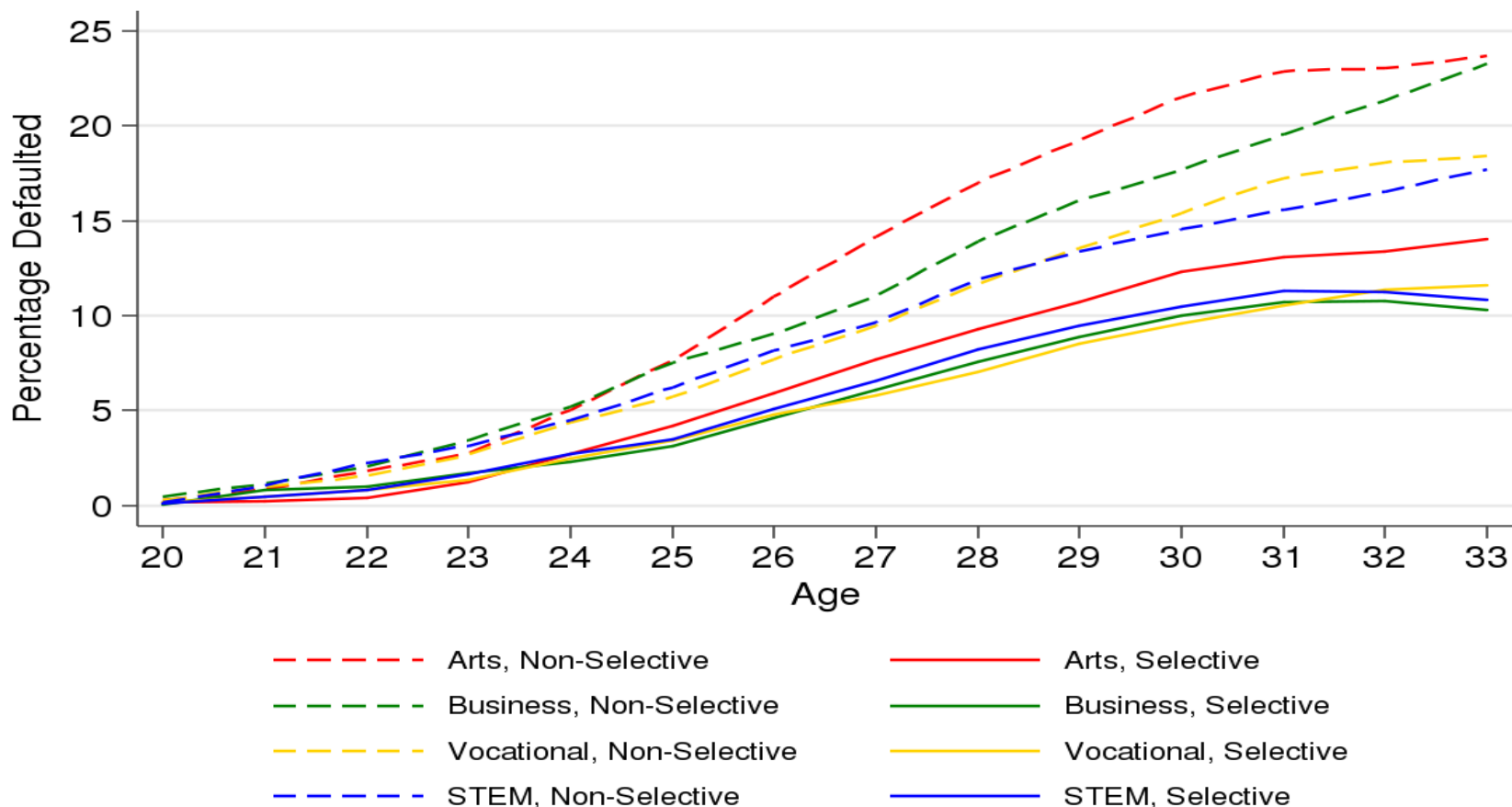
- Private For Profit, 2-year
- Public, 2-year
- Private Non-Profit, 2-year
- Private For Profit, 4-year
- Public, 4-year
- Private Non-Profit, 4-year

Percentage EVER defaulted by each age, out of college-goers with student loans.



Major Matters for Non-Selective Colleges, Not So Much for Selective Colleges

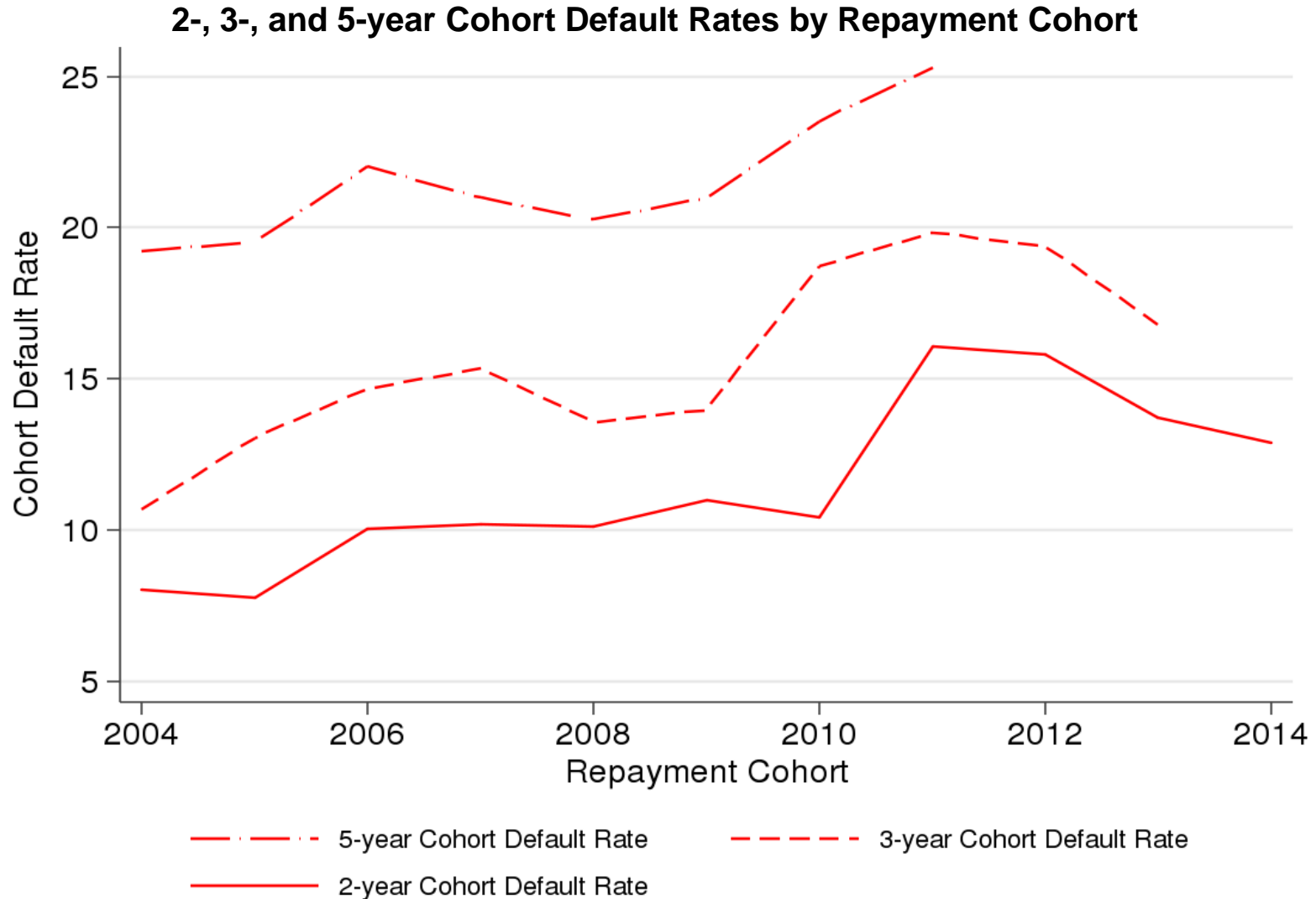
Default Rate by Field, School Selectivity, and Age



Percentage EVER defaulted by each age, out of college-goers with student loans.

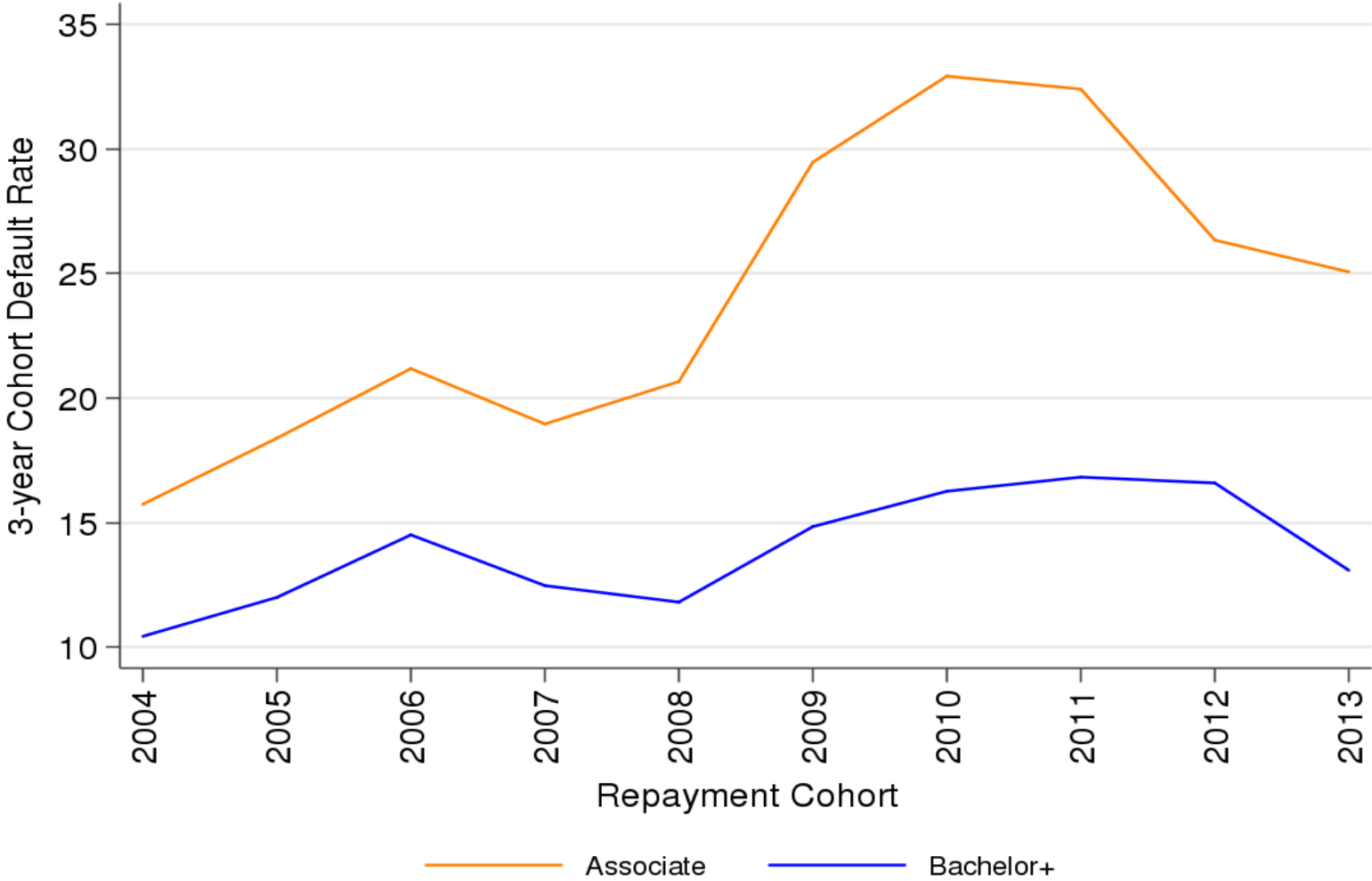


Strong Cyclicalality in Default Rates: Increased for Recession Cohorts, Declined for Recovery Cohorts



Associates' Default Rates Considerably More Affected By Recessionary Labor Market Than Bachelor's

3-year Cohort Default Rates by Repayment Cohort and Degree Type

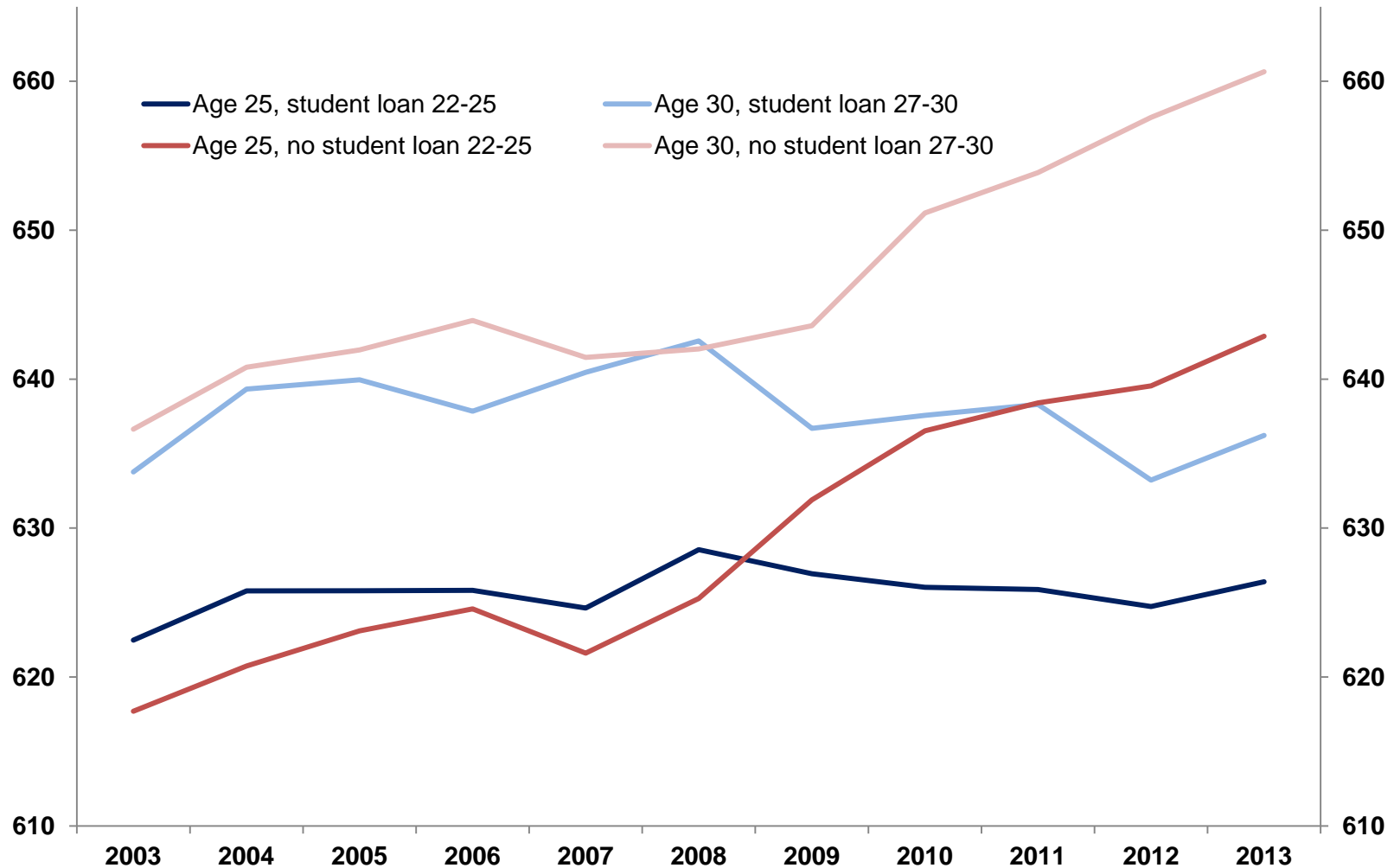


Source: New York Fed Consumer Credit Panel/Equifax and National Student Clearinghouse



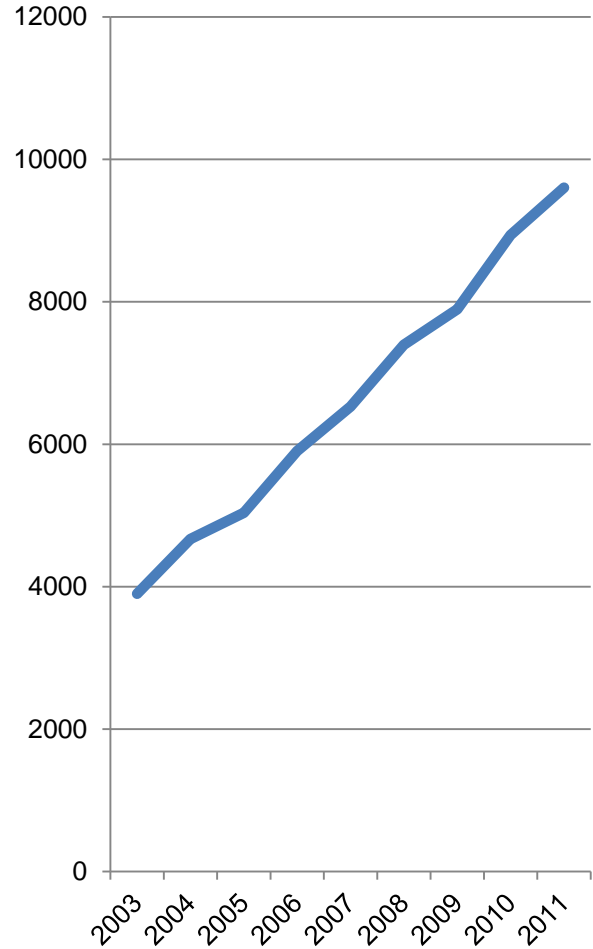
Declining relative credit scores of student borrowers

Average risk scores at 25 and 30

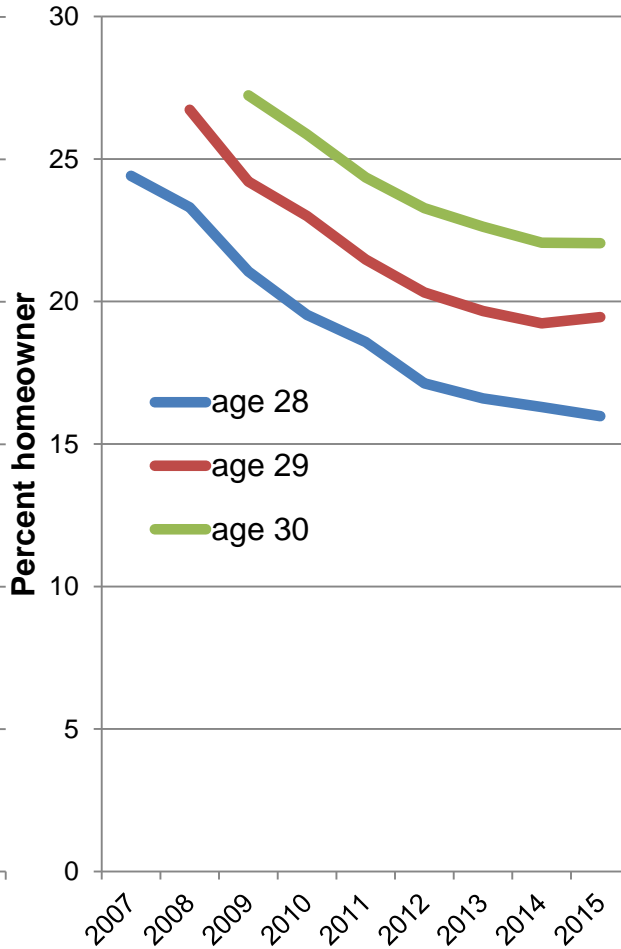


Trends in Student Debt, Homeownership and Living Arrangements

Student debt at age 24



Homeownership by age



Co-residence trends among 23-25 year olds

