The Housing Crisis and the Rise in Student Debt

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QUESTIONS

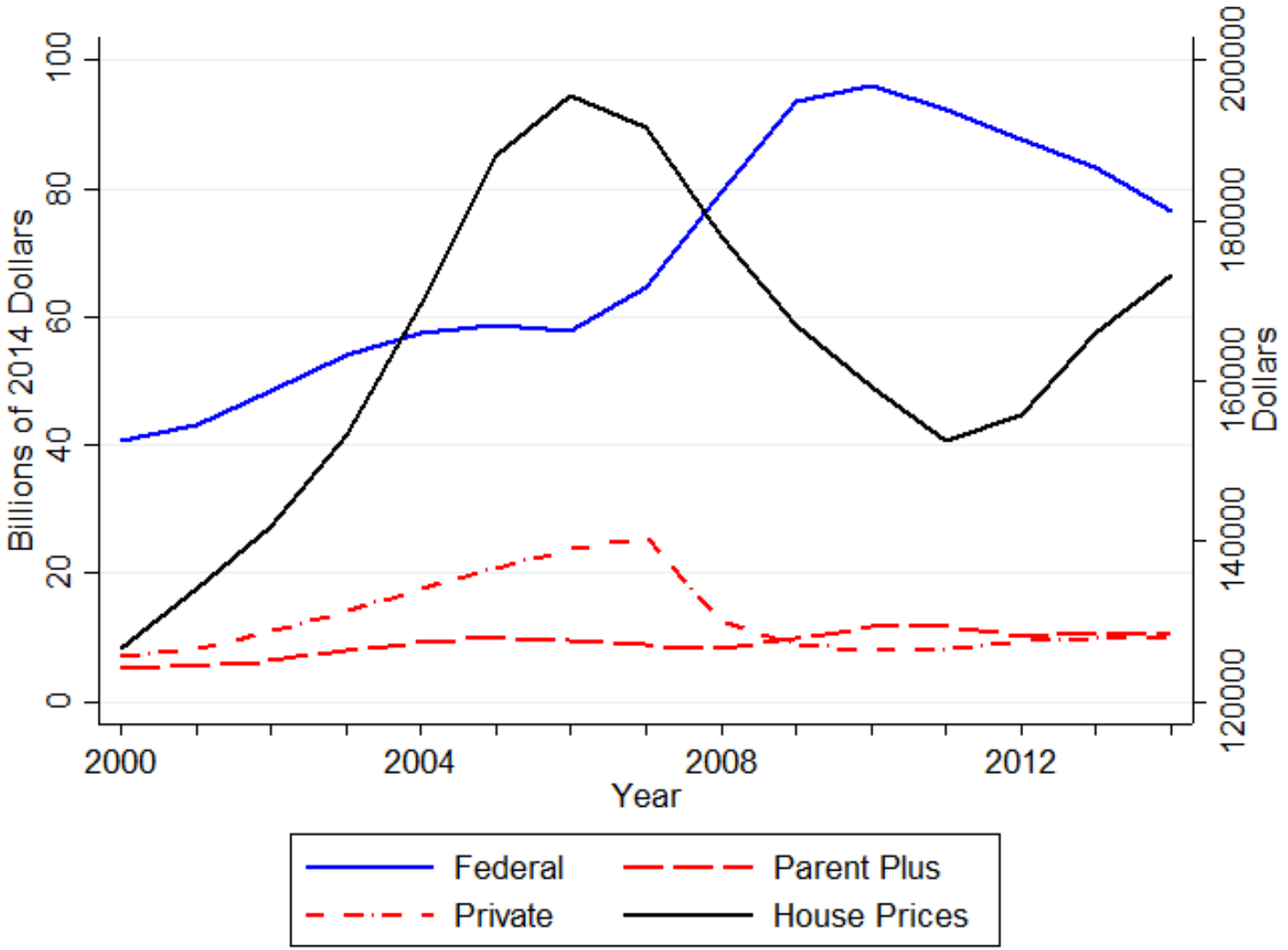
Did the changes in parent access to home equity credit over the 2000s affect how much students borrowed to finance college?

If so, did the changes in student leverage affect other student outcomes like home purchases and labor mobility?

Approach:

- household-level panel data to observe student enrollment and borrowing decisions by parents and students
- Use movements in home values as shocks to parents' access to home equity credit
- Use house-price driven variation in student loans to study outcomes

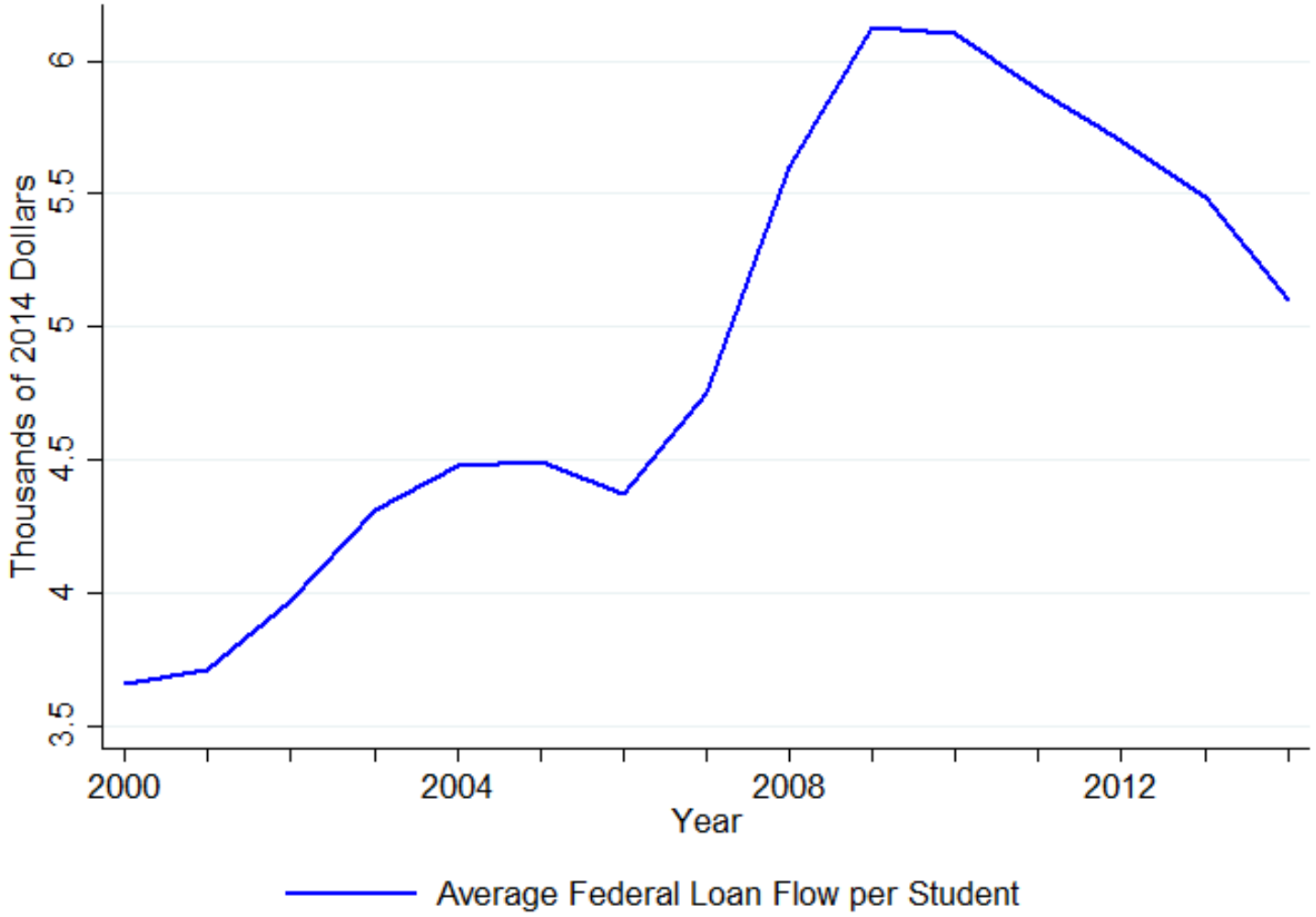
AGGREGATE STUDENT LOAN FLOW AND HOUSE PRICES



From 2006-2011 enrollment of college-age children (18-24) also increased from 37% to 42%

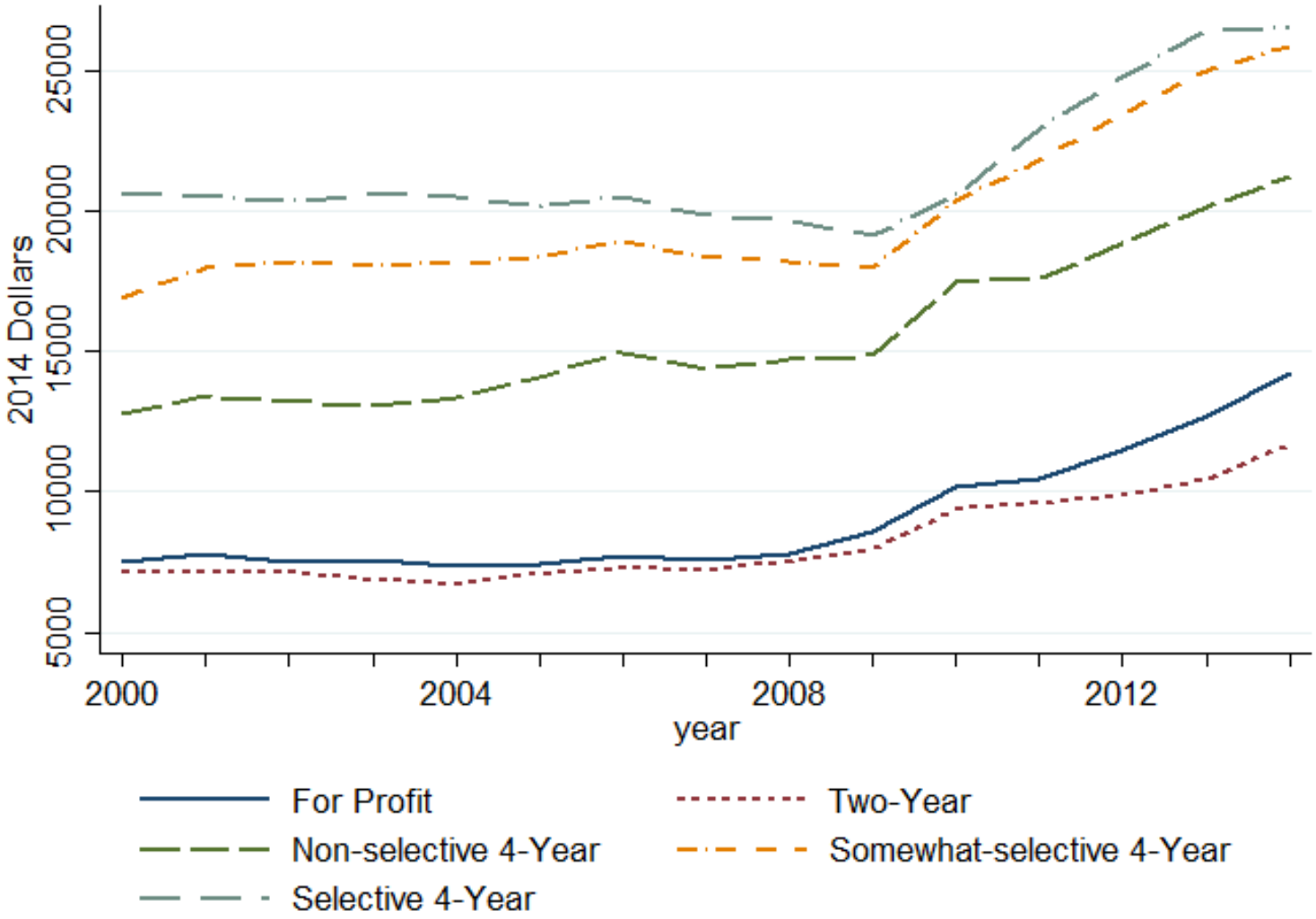
Sources: College Board, Department of Education, and Zillow

AVERAGE FLOW OF STUDENT LOANS



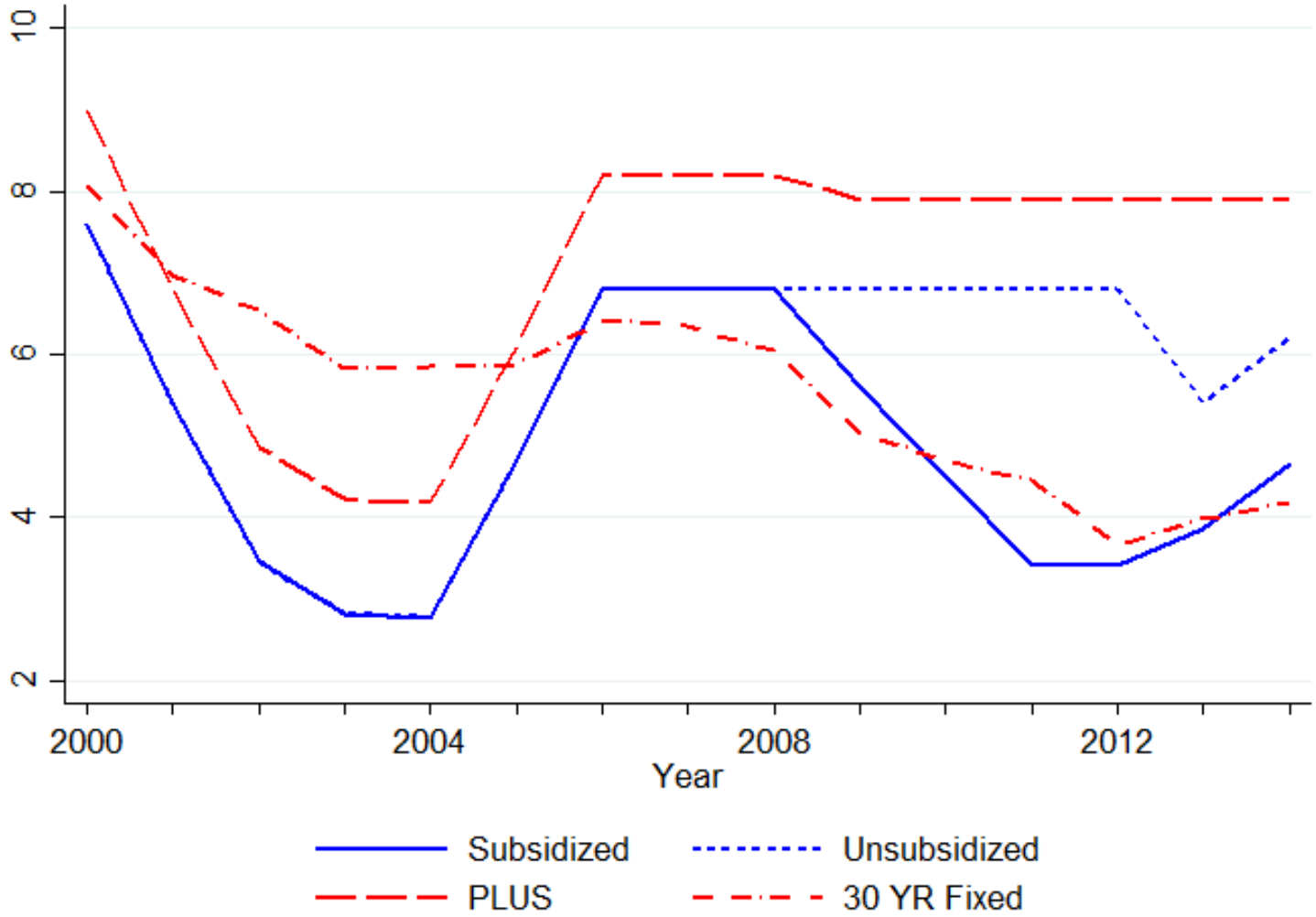
Source: College Board

MEDIAN BALANCE OF STUDENT LOANS



Source: Looney and Yannelis (BPEA 2015)

INTEREST RATES ON TYPES OF FINANCING



Source: Department of Education and FRED

RESULTS

For every additional dollar of parents' equity extracted, students borrow about between 40 and 60 cents less

- Instead of parents borrowing $40K in equity student has ~$20K in student loan debt
- 30% decline in house prices induced $1,200 more student loan debt on average in our sample
- Liquidity-constrained households appear to drive substitution

House price growth reduces enrollment in our sample

- Conditional on enrollment, employment conditions do not seem to affect results

Preliminary results suggest some real, long-run effects on students

- Students work more as support falls
- Student loans reduce probability of mortgage and auto debt in early adulthood

LITERATURE

Not clear that there is large substitution between home equity and student loans

- Brown, Stein, and Zafar (2015)

Effect of financing and financial constraints on college enrollment unclear

- Carneiro and Heckman (2002), Cameron and Taber (2004) Field (2009), Lovenheim (2011) and Lovenheim and Reynolds (2013), Stinebrickner and Stinebrickner (2008)

Housing booms reduce college enrollment through labor market effects

- Charles, Hurst, and Notowidigdo (2015)

Effects of student loans on job choice, household formation, home purchases, savings

- Bleemer, Brown, Lee, and van der Klaauw (2014), Cooper and Wang (2014), Field (2009), Mezza et al (2015), Rothstein and Rouse (2011),
- Dynarski (2016), Looney and Yannelis (2015): effect of debt depends on type of student
- Amromin and Eberly (2016) suggest potential aggregate effects on savings

DATA

PSID and Transition to Adulthood Survey (TAS)

- Household-level panel survey, biennual
- Covers household expenditures, income, demographics, wealth, debts
- TAS (2005-2013) bridges gap between childhood and new household formation, allows us to observe student loans and college enrollment
- We restrict sample to stable homeowners not moving: ~1,600 households

New York Fed/Equifax Consumer Credit Panel

- Individual-level panel: 5% sample of the population, quarterly
- Covers debts, delinquencies, location
- Almost no demographic information, use Census information

APPROACH

Difference-in-differences:

Compare two households enrolling members in college, one where house prices have been increasing and one where they have been declining

$$\boldsymbol{y_{it} = \alpha_i + \beta_1 Enrolled_{it} + \beta_2 \widehat{HP}_{it} + \beta_3 Enrolled_{it} * \widehat{HP}_{it}} + \gamma X_{it} + \boldsymbol{e_{it}}$$

APPROACH

Difference-in-differences:

Compare two households enrolling members in college, one where house prices have been increasing and one where they have been declining

$$\boldsymbol{y_{it} = \alpha_i + \beta_1 Enrolled_{it} + \beta_2 \widehat{HP}_{it} + \beta_3 Enrolled_{it} * \widehat{HP}_{it} + \gamma X_{it} + e_{it}}$$

IV specification where the interaction term above is the instrument

$$\boldsymbol{\$StudentLoans_{it} = \alpha_i + \beta \$EquityExtracted_{it} + \gamma X_{it} + e_{it}}$$

Here β gives the dollar for dollar substitution rate between home equity and student loans

FINANCING ENROLLMENT

$$y_{it} = \alpha_i + \beta CollegeAge/Enrolled_{it} + \gamma X_{it} + e_{it}$$

	P(Enroll)	P(Student Loan)	Student Loans ($)
College Age	0.510***		
	(0.022)		
Enrolled		0.399***	9.018***
		(0.024)	(0.837)
N	6386	6386	6386
FE	State	State	State
Clusters	51	51	51
R^2	0.456	0.373	0.179

All regressions include lagged income, wealth, LTV, year FE, age, household size, and state-clustered SEs.

FINANCING ENROLLMENT

$$y_{it} = \alpha_i + \beta Enrolled_{it} + \gamma X_{it} + e_{it}$$

	P(Extract Equity)	P(Extract Equity)	Equity Extracted ($)	Equity Extracted ($)
Enrolled	0.034**	0.039**	3.157***	3.417**
	(0.014)	(0.018)	(1.157)	(1.311)
College age		-0.007		-0.406
		(0.016)		(1.055)
N	6386	6386	6386	6386
FE	State	State	State	State
Clusters	51	51	51	51
R^2	0.062	0.063	0.064	0.557

Enrollment strongly correlated with equity extraction

FINANCING ENROLLMENT

$$y_{it} = \alpha_i + \beta_1 Enrolled_{it} + \beta_2 Extract\ Equity + \beta_3 ExtractEquity * Enrolled + \gamma X_{it} + e_{it}$$

	P(Extract Equity)	P(Extract Equity)	Equity Extracted ($)	Equity Extracted ($)	Equity Extracted ($)
Enrolled	0.040***	0.044**	3.124***	3.362**	-1.074**
	(0.014)	(0.018)	(1.160)	(1.311)	(0.455)
College age		-0.006		-0.374	-0.109
		(0.017)		(1.059)	(0.714)
Extract Equity					40.413***
					(2.775)
*Extract Equity * Enrolled*					14.427***
					(4.163)
N	6386	6386	6386	6386	6386
FE	State	State	State	State	State
Clusters	51	51	51	51	51
R^2	0.066	0.066	0.373	0.180	0.180

HOME IMPROVEMENT ?

	P(Home Improve)	P(Home Improve)	$Home Improve	$Home Improve
Enrolled	-0.022	-0.025	0.107	-0.262
	(0.022)	(0.022)	(1.571)	(1.492)
Extract Equity		0.066***		2.312***
		(0.021)		(0.705)
*Extract Equity * Enrolled*		0.002		1.453
		(0.047)		(1.806)
N	6386	6386	6386	6386
FE	State	State	State	State
Clusters	51	51	51	51
R^2	0.354	0.357	0.401	0.402

Enrollment **not** strongly correlated with home improvement

HOUSE PRICES AND STUDENT LOANS

$$y_{it} = \alpha_i + \beta_1 Enrolled_{it} + \beta_2 \widehat{HP}_{it} + \beta_3 Enrolled_{it} * \widehat{HP}_{it} + \gamma X_{it} + e_{it}$$

	P(Student Loan)
Enrollment	0.320***
	(0.032)
*Enrollment *HP Growth*	-0.150***
	(0.048)
HP Growth	0.002
	(0.006)
N	6386
FE	Household
Clusters	51
R^2	0.621

HOUSE PRICES AND STUDENT LOANS

$$y_{it} = \alpha_i + \beta_1 Enrolled_{it} + \beta_2 \widehat{HP}_{it} + \beta_3 Enrolled_{it} * \widehat{HP}_{it} + \gamma X_{it} + e_{it}$$

	P(Student Loan)	P(Student Loan)
Enrollment	0.320***	0.309***
	(0.032)	(0.032)
*Enrollment *HP Growth*	-0.150***	-0.125**
	(0.048)	(0.047)
HP Growth	0.002	-0.000
	(0.006)	(0.006)
*Enrollment * Change UR*		0.031***
		(0.011)
Change UR		-0.001
		(0.002)
N	6386	6386
FE	Household	Household
Clusters	51	51
R^2	0.621	0.627

HOUSE PRICES AND STUDENT LOANS

$$y_{it} = \alpha_i + \beta_1 Enrolled_{it} + \beta_2 \widehat{HP}_{it} + \beta_3 Enrolled_{it} * \widehat{HP}_{it} + \gamma X_{it} + e_{it}$$

	P(Student Loan)	P(Student Loan)	Student Loans ($)	Student Loans ($)
Enrollment	0.320***	0.309***	5.740***	5.438***
	(0.032)	(0.032)	(0.914)	(0.901)
*Enrollment *HP Growth*	-0.150***	-0.125**	-4.776***	-5.265***
	(0.048)	(0.047)	(1.513)	(1.748)
HP Growth	0.002	-0.000	0.319*	0.290
	(0.006)	(0.006)	(0.179)	(0.231)
*Enrollment * Change UR*		0.031***		0.954**
		(0.011)		(0.434)
Change UR		-0.001		-0.046
		(0.002)		(0.099)
N	6386	6386	6386	6386
FE	Household	Household	Household	Household
Clusters	51	51	51	51
R^2	0.621	0.627	0.527	0.533

HOUSE PRICES AND EQUITY EXTRACTION

	P(Extract Equity)	P(Extract Equity)	Equity Extracted ($)	Equity Extracted ($)
Enrollment	0.030**	0.038	2.792**	2.535
	(0.014)	(0.028)	(1.175)	(2.545)
*Enrollment *HP Growth*	0.113**	0.138***	9.122***	10.860***
	(0.042)	(0.050)	(2.626)	(2.878)
HP Growth	0.049***	0.061***	4.380***	3.726***
	(0.012)	(0.013)	(0.926)	(1.042)
*Enrollment * Change UR*		0.002		0.245
		(0.006)		(0.453)
Change UR		0.002		0.054
		(0.004)		(0.261)
N	6386	6386	6386	6386
FE	Household	Household	Household	Household
Clusters	51	51	51	51
R^2	0.349	0.350	0.362	0.362

HOME EQUITY AND STUDENT LOAN SUBSTITUTION

$$\$StudentLoans_{it} = \alpha_i + \beta\$HomeEquity_{it} + \gamma X_{it} + e_{it}$$

	OLS	IV	IV	IV
Equity Extracted ($)	0.008	-0.568***	-0.486**	-0.506**
	(0.007)	(0.202)	(0.193)	(0.202)
UR Interaction	No	No	Yes	Yes
Household Interactions	No	No	No	Yes
N	6386	6386	6386	6386
Clusters	51	51	51	51
Weak ID P		0.018	0.018	0.013

Substitution strongest in households that appear to be liquidity-constrained

HOUSE PRICES AND OTHER OUTCOMES: PSID

	P(Enrolls)	P(Student Working)	P(Tuition)	P(Student Credit Cards)
College age	0.387***			
	(0.022)			
*College Age *HP Growth*	-0.049*			
	(0.025)			
Enrolled		0.449***	0.473***	0.308***
		(0.031)	(0.039)	(0.030)
*Enrolled * HP Growth*		-0.154***	0.109**	-0.068
		(0.052)	(0.052)	(0.045)
HP Growth	0.019	0.017*	0.007	0.008
	(0.011)	(0.009)	(0.007)	(0.010)
N	6386	6386	6386	6386
FE	Household	Household	Household	Household
Clusters	51	51	51	51
R^2	0.777	0.637	0.777	0.585

FORMER-STUDENTS AND OUTCOMES BY 2014:

CCP 2005 COHORT

$$y_i = \alpha_{county} + \beta(\widehat{StudentLoans\$})_\iota + \gamma X_{it} + e_{it}$$

	P(Mortgage Debt)	P(Auto Debt)
Student Loans		
(Thousands$)	-0.001***	-0.002***
	(0.0003)	(0.0003)
N	70,942	70,942
FE	County	County
Clusters	2,758	2,758
R^2	0.097	0.085

Controls for household debt portfolio while individual was likely to be a student.

36% of cohort has a mortgage by this point

CONCLUSION (IN PROGRESS)

Movements in house prices caused some shifting of burden of financing college to student loans through effects of access to home equity

- Substitution rate of -0.4 and -0.5 between parents' mortgage debt and students loans
- Substitution driven by liquidity-constrained households

Effect of house prices on financing is not dominant effect on enrollment, at least at extensive margins

Effect of additional leverage on student outcomes in progress, but preliminary results suggest it reduces the likelihood of purchasing a home or car

HETEROGENEITY: STUDENT LOANS

Split sample by liquid-wealth to income ratio: e.g. Zeldes (1989), Cooper (2010)

	P(Student Loan)		Student Loans ($)	
	Constrained	Unconstrained	Constrained	Unconstrained
Enrollment	0.363***	0.255***	6.730***	4.198***
	(0.044)	(0.040)	(1.273)	(1.088)
*Enrollment *HP Growth*	-0.108**	-0.232***	-5.382**	-6.976**
	(0.050)	(0.081)	(2.399)	(3.163)
HP Growth	-0.003	0.003	0.238	0.336
	(0.012)	(0.008)	(0.264)	(0.306)
N	3198	3188	3198	3188
Clusters	46	47	46	47
R^2	0.630	0.615	0.558	0.472

BACK

HETEROGENEITY: MORTGAGE DEBT

	P(Equity Extraction)		Equity Extracted ($)	
	Constrained	Unconstrained	Constrained	Unconstrained
Enrollment	0.045	0.031	1.015	4.954
	(0.042)	(0.045)	(2.761)	(3.969)
*Enrollment *HP Growth*	0.165**	0.072	13.053***	5.261
	(0.074)	(0.085)	(4.250)	(6.035)
HP Growth	0.057***	0.056***	4.248***	3.045**
	(0.018)	(0.017)	(1.435)	(1.362)
N	3198	3188	3198	3188
Clusters	46	47	46	47
R^2	0.328	0.340	0.367	0.354

Consumer Credit Panel Construction

Evidence from PSID suggests movements in house prices can induce variation in student loans.

We can use this variation to study student outcomes like household formation, home purchase, and mobility, but need more precision.

First need to convert panel based on credit records into a "household" panel.

Challenges:

- Only observed if you have a credit record
- Only observe student loans if a "primary" sample member

Our construction:

- Grab a 20% random sample of 18-22 year olds from "primary" sample
- Identify likely parents and follow both as long as we can