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Published online: 10 Apr 2017.

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Asymmetric effects of housing wealth on college enrolment

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ABSTRACT

We investigate the impact of housing wealth, credit availability and financial distress on college enrolment decisions. We find that housing wealth is negatively related to enrolment in public schools and positively related to enrolment in private schools. This evidence suggests that, on average, students substituted away from private schools towards public institutions during the recent financial crisis.

1. Introduction

The effects of the Great Recession included dramatic changes to both the liquidity and net worth of many American households. Specifically, the diminished value of housing collateral had an impact on the borrowing capacity of these homeowners through the channel of reduced ability to acquire relatively low interest home equity lines of credit (HELOCs). Through this channel, changes in housing wealth have been shown to impact personal consumption (Slacalek 2009; Gan 2010), smooth consumption over time (Hurst and Stafford 2004), entrepreneurial activities (Hurst and Lusardi 2004) and retirement decisions (Lusardi and Mitchell 2007). We investigate how housing wealth impacts another important financial decision, college enrolment choices.

Recently, Long (2014) found a net positive impact of the 2008 recession on college enrolment, corroborating past research that found college enrolment to be countercyclical. However, procyclical housing wealth is a potential source of credit for homeowners who are attempting to finance their children's educations, as families can borrow against their home's value to obtain a loan (Bennet, Peach, and Peristianai 2001; Deep and Domanski 2002; Greenspan and Kennedy 2005; Doms and Krainer, 2007). This story is plausible as 85% of college attendees come from families who own a home (Lovenheim 2011) and housing wealth makes up over two-thirds of the median household's wealth

(Iacoviello 2010). In particular, Lovenheim (2011) and Lovenheim and Reynolds (2013) tested the impact of housing wealth on college choices and found that increases in housing wealth can lead to an increase in college enrolment in total and in addition allow students to substitute away from 2-year schools towards flagship 4-year public universities. Stolper (2015) exploits a policy change that reversed a previous ban on home equity lending in Texas and provides evidence that this change induced families in Texas to spend more on tuition (net of financial aid). Additionally, Johnson (2014) has found that decreases in parental wealth induced by housing price shocks can negatively impact students' college enrolment decisions.

We extend the existing literature in three ways. First, Lovenheim (2011) and Lovenheim and Reynolds (2013) examine a period of rising house prices, extending their analysis to only 2005. We examine both the bubble and subsequent collapse by utilizing data from 2001 to 2010. Additionally, we estimate the effects of housing wealth on college enrolment at private and public schools separately and find asymmetric effects. We find that the housing crisis led to an increase in enrolment at relatively less expensive public institutions, but led to a decrease in enrolment at relatively more expensive private institutions. Finally, we examine the effects of financial distress on enrolment by testing if increases in mortgage delinquencies and foreclosures

are associated with declines in enrolment. We find that increases in severe forms of delinquency are positively associated with public school enrolment and negatively associated with private school enrolment.

2. Empirical strategy

2.1. Data

We use the logged value of annual first-year first-time full-time student enrolment by school from the Integrated Post-Secondary Education Data System as the sole dependent variable of interest.

Metropolitan Statistical Area (MSA)-level measures of housing wealth and mortgage delinquency, the independent variables of interest, are created from two sources. First, individual monthly loan payment records of first-lien, single-family, owner-occupied properties are from BlackBox Logic, LLC (BBx). BBx provides information on over 90% of the privately securitized mortgages in the United States and includes about 23 million unique loans and over one billion monthly payment records. Second, seasonally adjusted Federal Housing Finance Agency house price indices (FHFA-HPI) that cover 75 metro areas are used.

Data on MSA-level wages and employment by education level from Quarterly Workforce Indicators are used as covariates. In all specifications, we only include schools with at least 90% of enrolment from in-state students as this allows us to test the hypothesis that changes in *local* housing wealth have an impact on enrolment in *local* institutions.[1]

2.2. Measures of housing wealth

We define several housing wealth indicators (HWIs) calculated from individual loan-level BBx data in conjunction with MSA housing price indices (FHFA-HPI). First, we calculate the percentage of loans in each MSA with no equity, that is, the percentage of borrowers who have a current loan to value ratio (CLTV) of 1 or higher. Our estimate of CLTV for loan i at time t is given by

$$\text{CLTV}_{it} = \left(\frac{(\text{MB}_{t=0} + \Delta \text{MB})}{(V_{t=0} \times (1 + \Delta \text{HPI}^m))} \right) \quad (1)$$

where ΔMB equals the change in mortgage balance from $t = 0$ to $t = t^*$, V_0 is the value of the property at $t = 0$ and ΔHPI^c is the percentage change in the FHFA-HPI index for MSA m from $t = 0$ to $t = t^*$.

Next, we calculate the potential amount that each homeowner could reasonably take out in a HELOC loan given the current mortgage balance and MSA-level house price changes. We do this by subtracting the current balance outstanding on the mortgage from the estimated current property value:

$$EquityAmount_{it} = (V_{t=0} \times (1 + \Delta \text{HPI}^m)) - \text{MB}_{it} \quad (2)$$

Then, we average these over all mortgages in each MSA each year. The maximum amount that a homeowner might borrow is a function of the amount of equity they currently have in the property. While the percentage of equity individuals are allowed to borrow varies across lenders, time and unobservable borrower risk factors, the maximum HELOC amount allowed typically ranges between 70% and 85% of equity. Using the conservative lower bound of 70%, we create a variable that represents the potential HELOC eligibility of a given household.[2] The average HELOC eligibility amount over all MSAs over our sample period is $40,390 (SD $21,900).

$$HELOCamount_{it} = EquityAmount_{it} \times 0.70 \quad (3)$$

Finally, we construct three measures of mortgage delinquency and foreclosure. First, we define the most serious measure of financial distress as a loan that is 90+ days delinquent. Next, as an additional measure of financial distress, we calculate the percentage of loans that have missed one or more payments in the past 12 months. Finally, we calculate the percentage of loans that currently have mild delinquencies, defined as a borrower being 30–60 days behind in payments at time of observation. Delinquency is a measure of mild financial distress; some noncurrent borrowers recover while others continue down the path of missed payments, eventually facing foreclosure. All else equal, we would expect a rise in financial distress to negatively impact enrolment decisions.

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[1]We repeat the analysis using only schools with less than 90% of enrolment from in-state students and find no significant results.
[2]Amounts for individual loans are considered as zero if the borrower has negative equity or if the borrower is currently delinquent on payments.

We estimate the impact of changes in housing wealth in the period $t - 1$ on college enrolment of 4-year public and private schools with at least 90% in-state enrolment in period t. Equation 4 describes the main empirical relationship that is being analysed where $Enrollment_{i,t}$ is first-year first-time enrolment in college i in year t, $HWI_{m,t-1}$ is a HWI in metropolitan area m in year $t - 1$. $H.S. wage_{mt}$ is the average wage of a worker with only a high school diploma in metro area m and $X_{m,t}'$ includes controls for per cent of workers with college degrees and percentage of workers who are white at the MSA level. A yearly time trend T and school-level fixed effects D_m are included in all regressions.

$$\ln(Enrolment_{i,t}) = \alpha + \beta_1 \ln(HWI_{m,t-1})$$
$$+ \beta_2 H.S.wage_{mt} + \gamma X_{i,t}'$$
$$+ \theta T + \rho D_m + \varepsilon \quad (4)$$

All HWIs are compiled by "school year" (August–July) instead of a traditional calendar year. Our specification identifies the relationship bewteen the log HWI in the previous school year ($t - 1$) and log enrolment the current school year (t).

Other sources of wealth outside of changes in local housing wealth and wages, such as changes in retirement or investment accounts, could plausibly impact college enrolment decisions. However, we do not believe that other sources of wealth pose an endogeneity concern in our model; two-thirds of the median household's net worth is in housing wealth (Iacoviello 2010), leaving a limited role for changes in other types of wealth in average local college enrolment decisions. To the extent that changes in the value of these nonhousing assets could impact enrolment choices, these changes, on average, equally impact households across all geographic areas. As evidence of this claim, between 2000 and 2011, Census figures show that median household net worth was both volatile and showed considerable regional variability, but when housing wealth was excluded from net worth, changes in net worth were both relatively small and did not exhibit significant geographic variability.[3]

3. Results and discussion

The impact of housing wealth on enrolment is presented in Table 1. First, we examine the impact of being underwater (e.g. current leverage is greater than 1), and therefore ineligible to borrow against housing wealth, on college enrolment. We find evidence that the share of borrowers in a metro area who have no home equity at the end of a given school year negatively impacts private school enrolment, but positively impacts public school enrolment in the following academic year. For a 10% increase in the percentage of underwater borrowers (borrowers with no equity), we estimate a 3.34% increase in 4-year public school enrolment. We do not find a statistically significant effect on private school enrolment.

We also consider how average HELOC eligibility (in dollars) impacts enrolment choices. There are two mechanisms through which home equity can increase: the borrower makes regular monthly payments[4] or the property value increases (Bennet, Peach, and Peristianai). A 10% increase (on average, corresponds to $4,039 increase in HELOC eligibility) in this measure of accessible housing wealth is associated with a 0.37% increase in private enrolment and a 0.24% decrease in public enrolment. This is intuitive as the tuition and fees are more expensive at private schools as compared to public institutions. Therefore, it is plausible that increases in accessible housing wealth may influence some substitution away from public to private schools as households are better able to afford

Table 1. The impact of HELOC potential on full-time enrolment.

	Public		Private	
	(1)	(2)	(3)	(4)
Ln per cent of borrowers with no equity$_{t-1}$	0.344*** (0.117)		−0.197 (0.152)	
Ln mean potential HELOC amount$_{t-1}$		−0.0240** (0.0101)		0.0373** (0.0139)
Ln average wage Unskilled workers	−0.145 (0.582)	−0.106 (0.707)	−0.265 (0.450)	−0.592 (0.428)
Year trend	0.00927 (0.0189)	0.0103 (0.0219)	0.0311** (0.0140)	0.0361*** (0.0130)
Observations	368	368	872	872

All SEs clustered at MSA level. School-level FE and metro-specific per cent of workers with college degree and per cent of workers who are white are used in all regressions. Coefficients are not shown. All schools that did not report enrolment for all years between 2001 and 2010 and schools with less than 50 first-year first-time students are excluded.
* is p=0.1, ** is p=0.05, and *** is p=0.01.

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[3]See the 2011 US Census Wealth Highlights Report: https://www.census.gov/people/wealth/files/Wealth%20Highlights%202011.pdf
[4]Borrower may also make larger than contractually required payments, leading to an even greater increase in equity, all else equal.

Table 2. The impact of foreclosure on full-time enrolment.

	Public			Private		
Ln per cent with current foreclosure activity$_{t-1}$	0.522** (0.227)			−0.396* (0.233)		
Ln per cent with delinquency in past 12 months$_{t-1}$		0.371** (0.173)			−0.273* (0.161)	
Ln per cent with delinquency less than 90 days$_{t-1}$			1.331 (1.054)			−1.194 (0.710)
Ln average wage Unskilled workers	−0.0917 (0.627)	−0.124 (0.595)	−0.314 (0.566)	−0.401 (0.457)	−0.368 (0.455)	−0.275 (0.454)
Year trend	0.00236 (0.0212)	−0.00151 (0.0210)	0.00656 (0.0211)	0.0396** (0.0161)	0.0413** (0.0173)	0.0365** (0.0159)
Observations	368	368	368	872	872	872

All SEs clustered at MSA level. School-level FE and metro-specific per cent of workers with college degree and per cent of workers who are white are used in all regressions. Coefficients are not shown. All schools that did not report enrolment for all years between 2001 and 2010 and schools with less than 50 first-year first-time students are excluded. * is p=0.1, ** is p=0.05, and *** is p=0.01.

the more expensive tuition and fees charged by a private school.

Next, the impact of financial distress on enrolment is presented in Table 2. For our most severe measure of financial distress, percentage of homeowners who are 90+ days delinquent, we find the strongest effect. A 10% increase in the severe delinquency or foreclosure rate in a local area is associated with a 5.22% increase in public school enrolment and a 3.96% decrease in private school enrolment. Relaxing our distress measure to include any delinquency over the past year, we find similar but smaller effects; a 10% increase in this measure of financial distress is associated with a 3.71% increase in public school enrolment but a 2.73% decrease in private school enrolment. We find no significant results for our measure of mild financial distress (percentage of local homeowners with current delinquencies of less than 90 days). These results are intuitive; we observe larger effects for more severe measures of financial distress and no effect for relatively mild measures.

We again see dichotomous results by school types. Increased levels of mortgage delinquency or foreclosure in a given metro area negatively impact private enrolment, but lead to an increase in public enrolment. As borrowers become unable to afford payments on their homes, they are likely unable to afford other major expenditures, including assisting their children in financing their college educations. Therefore, it is plausible that they substitute away from expensive private schools to relatively inexpensive public schools.

4. Conclusion

We find that housing wealth is negatively related to enrolment in public schools and positively related to enrolment in private schools. This evidence suggests that, on average, students substituted away from private schools towards public institutions during the recent financial crisis. These results are robust over multiple measures of housing wealth including percentage of borrowers with no equity, eligibility for HELOCs, as well as measures of financial distress such as mortgage delinquency and foreclosure and are consistent with micro-data evidence that parental home equity and wealth in years prior to college enrolment impact postsecondary education outcomes (Johnson 2014). During the mortgage crisis and Great Recession of 2009, while net college enrolment increased (Long 2014), we find evidence that the housing wealth channel had asymmetric effects on enrolment at public and private institutions.

Disclosure statement

No potential conflict of interest was reported by the authors.

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