



EUROPEAN CENTRAL BANK
EUROSYSTEM

Working Paper Series

Alexander Popov
and Luc Laeven

A lost generation? Education
decisions and employment
outcomes during the U.S. housing
boom-bust cycle of the 2000s

No 1892 / April 2016



Note: This Working Paper should not be reported as representing the views of the European Central Bank (ECB). The views expressed are those of the authors and do not necessarily reflect those of the ECB

Abstract

We exploit regional variation in US house price fluctuations during the boom-bust cycle of the 2000s to study the impact of the housing cycle on young Americans' choices related to education and employment. We find that in MSAs which experienced large increases in house prices between 2001 and 2006, young adults were substantially more likely to forego a higher education and join the workforce, lowering skill formation. During the bust years, the young, especially those without higher education, were more likely to be unemployed in areas which experienced higher declines in house prices.

JEL classification: E32, G21, J10, R21.

Keywords: House prices, booms, education, unemployment.

Non-technical summary

Housing boom-bust episodes, such as those in Ireland, Spain, and the United States during the 2000s, can affect the skill composition of the local economy. For example, rapidly rising house prices tend to be accompanied by an expansion of low-skilled industries such as construction, as well as by an increased demand for local low-skilled services, such as retail sales. The resulting increase in the return to less skilled labor can depress the youngs' incentives to acquire more formal education. On the other hand, higher housing wealth reduces the effective cost of schooling for home owners, increasing the probability of investing in a higher education degree in the presence of intergenerational transfers between parents that own houses and their children. Similarly, a housing bust can boost schooling by reducing the return to unskilled labor if low-skill industries decline relatively more, but it can also increase the effective cost of schooling in the presence of substantial housing debt overhang.

We use a large household-level dataset derived from the U.S. Census. We find that in 2006, the young (age 22–30) were more likely to have at most a high school degree, and less likely to have acquired a higher degree (college or more) in regions where house prices *increased* by more between 2001 and 2006. Furthermore we find that in 2011, the same cohort of young individuals were less likely to have a college or higher degree in MSAs where house prices *declined* by more between 2006 and 2011. The less educated young were also more likely to be unemployed following the bust. The evidence thus suggests that changes in house prices have an asymmetric effect on skill formation, whereby investment in schooling is reduced during the boom as the return to unskilled labor goes up, and it is further reduced during down markets due to the decline in housing wealth. Moreover, housing boom-bust cycles can have a lasting negative impact on employment through the channel of reduced skill formation.

Foregoing higher education can reduce employability and returns to labor in the long run. The reduced skill formation for the young in boom areas that we document points to a misallocation of talent during the housing boom-bust cycle, and suggests that—beyond posing clear risks for financial stability—episodes of large swings in the price of residential property can have significant negative distributional consequences which policy makers may wish to take into account when deciding when and how forcefully to "lean against the wind" coming from housing markets.

1 Introduction

The concept of home ownership is an unalienable component of "the American Dream". However, the rapid increases in property prices that sometimes result from a rising demand for housing can have different effects on economic activity across generations. On the one hand, by boosting housing wealth, rising house prices can stimulate consumption and entrepreneurship for home owners who tend to be older (Campbell and Cocco 2007; Corradin and Popov 2015; Loutskina and Strahan 2015). On the other hand, and even in the presence of falling lending standards (Dell’Ariccia, Igan, and Laeven 2014), a housing boom can have a negative wealth effect on the young who are the marginal first-time buyers. Laeven and Popov (2015) show that the life cycle of home ownership and of family formation was distorted in those regions in the United States where house prices increased substantially in the early to mid-2000s. Acolin, Bricker, Calem, and Wachter (2016) show that tightening credit constraints were responsible for the decline in home ownership rates during the ensuing housing bust.

It is still not well understood how housing boom-bust episodes affect the skill composition of the local economy. Rapidly rising house prices tend to be accompanied by an expansion of low-skilled industries such as construction, as well as by an increased demand for local low-skilled services, such as retail sales. The resulting increase in the return to less skilled labor can depress the incentives to acquire more formal education, or result in an influx of low-skilled labor. Similarly, a housing boom may pull talent away from higher education into the mortgage brokerage or real estate brokerage industries, attracted by the prospect of "easy money". At the same time, higher housing wealth reduces the effective cost of schooling for home owners, increasing the probability of investing in a higher education degree (including from intergenerational transfers between parents that own houses and their children). The expected effect of a housing bust is equally ambiguous: it can reduce the return to unskilled labor by increasing unemployment marginally more in low-skill industries, but it can also increase the effective cost of schooling in the presence of substantial housing debt overhang.

We use a large household-level dataset derived from the U.S. Census, for 2006 (the peak) and for 2011 (the bottom of the housing market). In doing so, we exploit the enormous spatial heterogeneity in housing price growth during the housing boom. For example, while nationally real home prices

rose by more than 50% between 2001 and 2006 (Shiller 2007), they only increased by 8% in Kokomo, IN, but almost doubled in Miami-Hialeah, FL. We find that in 2006, the young (age 22–30) were more likely to have at most a high school degree, and less likely to have acquired a higher degree (college or more) in MSAs where house prices *increased* by more between 2001 and 2006. The same individuals were less likely to have moved in from another MSA, suggesting that the skill composition effect we document is due to a reduced local schooling rather than to the influx of low-skilled labor. Furthermore we find that in 2011, the same cohort of young individuals were less likely to have a college or higher degree in MSAs where house prices *declined* by more between 2006 and 2011. The less educated young were also more likely to be unemployed following the bust. The evidence thus suggests that changes in house prices have an asymmetric effect on skill formation, whereby investment in schooling is reduced during the boom as the return to unskilled labor goes up, and it is further reduced during down markets due to the decline in housing wealth. Moreover, foregoing formal education further reduces one’s employability in the long run, suggesting that housing boom-bust cycles can have a lasting negative impact on employment through the channel of reduced skill formation.

This paper contributes to the emerging literature on the microeconomic consequences of changes in house prices. Recent research has provided compelling evidence that positive shocks to the value of the residential property raise home-owners’ fertility (Lovenheim and Mumford 2013; Dettling and Kearney 2014). Milosch (2014) provides evidence that positive shocks to house prices tend to increase marital stability. Farnham, Schmidt, and Sevak (2011) qualify this result by arguing that the effect is asymmetric across age categories, which they argue is a proxy for home ownership.

The paper proceeds as follows. Section 2 presents the data and methodology. Section 3 reports our findings. Section 4 concludes.

2 Data and Methodology

We use individual-level data for 2006 and for 2011, from the American Community Survey (ACS) individual-level and household-level extracts from the Integrated Public Use Microsamples (IPUMS) database. We restrict our attention to households residing in MSAs which can also be uniquely matched to MSA-level data on house prices. This yields a total of 2,884,658 households in 255 MSAs.

We compute local house prices using data from the Federal Housing Finance Agency (FHFA), which is a repeat-sales housing price index with data for most metropolitan areas, computing house prices at the MSA level. We map the FHFA metro areas to the Census/ACS metro areas by hand. To mirror the Census and the ACS data, we construct house price growth as the change in average MSA-level house prices between the first quarter of 2001 and the first quarter of 2006.

In order to estimate the effect of changes in MSA-level house prices on various individual outcomes, across different age groups, we estimate the following baseline model:

$$\begin{aligned} \text{Pr ob}(Y_{im} = 1) = & \Phi(\beta_1 \text{Young}_{im} + \beta_2 \text{Young}_{im} \times \Delta \text{Home prices}_m^{2001-2006} \\ & + \beta_3 X_{im} + \beta_4 \Psi_m + \varepsilon_{im}) \end{aligned} \quad (1)$$

where Y_{im} is, in turn, a proxy for educational attainment, employment status, or geographic mobility, for the 2006 sample (the peak of the housing market). Young_{im} is a dummy variable equal to 1 if the head of household i in MSA m is between 22 and 30 years old, and to 0 if she is 30+ years old. We focus on the young aged 22+ because this is the group of individuals for which the full range of education choices has already been made. $\Delta \text{Home prices}_m^{2001-2006}$ denotes the change in average MSA-level house prices between 2001 and 2006, for each individual MSA m . X_{im} is an exhaustive vector of individual control variables which includes proxies for gender, marital status, education, and race. We also include proxies for both current and expected income, such as total labor income and employment status; Ψ_m is a matrix of MSA-level fixed effects; and ε_{im} is an idiosyncratic error term. We do not include the variable $\Delta \text{Home prices}_m^{2001-2006}$ on its own in the regression because its effect is subsumed in Ψ_m . Our main coefficient of interest is β_2 . For example, a negative coefficient β_2 in the regression where the dependent variable is a dummy equal to 1 if the individual has at least a college degree implies that households in age category 22-30 are less likely to have acquired higher education if they reside in an MSA that experienced a larger increase in house prices between 2001 and 2006.

In our second set of regression we focus on the sample of households observed in 2011 (the trough of the housing market). In these regressions, $\text{Young}_{im} = 1$ if the head of household i in MSA m is between 27 and 35 years old, and 0 if she is less than 27 or more than 35 years old. This allows us to study the long-term implications of the housing boom for the same cohort of individuals which we first observe in 2006.

3 Findings

Table 1 provides estimates of the effects of past changes in house prices on educational attainment. We report marginal effects estimates from a probit regression. In Panel A, we do so for 2006 when house prices peaked. We find that in 2006, and relative to the control group of individuals aged 30+, the youngest (age 22–30) living in booming MSAs are significantly more likely to have lower educational attainment than similar individuals living in non-booming areas. In particular, they are more likely to have a high school degree only (column (1)), and less likely to have a college or graduate degree (column (2)). In the latter case, the estimated coefficient of -0.0850 (significant at the 1% level) implies that a young individual living in an MSA at the 75th percentile of changes in house prices between 2001 and 2006 (corresponding to a 71.5% increase) is 0.038 percentage points less likely to have a college degree or more than a similar individual living in an MSA at the 25th percentile of such changes (corresponding to a 26.4% increase). Given an average share of the young with a college degree or more of 0.264, this corresponds to a 14.5% lower probability of acquiring higher education in booming MSAs. Column (3) demonstrates that the same young individuals are less likely to be unemployed, and column (4) shows that they are also less likely to have moved in from another MSA in the last year. Taken together, the evidence suggests that the effect of changes in house prices on the share of educated young individuals works through a decline in local skill formation, whereby the young choose to forego more formal education in order to join the labor force earlier, and not through an influx of less-educated young workers from other regions. The data thus confirm that rising house prices reduce the incentives to acquire higher education, possibly by increasing the demand for low-skilled labor.

In column (5), we repeat the same exercise for 2011, where we define *Young* as those who belong to the same cohort as in 2006 (now aged 27–35). The estimates suggest that changes in house prices have an asymmetric effect on skill formation. In particular, the young living in MSAs where house prices *declined* by more between 2006 and 2011 were once again significantly less likely to have a college degree or higher. Consistent with the arguments discussed above, we interpret this as evidence that declining house prices depress investment in schooling by increasing housing debt overhang. To give a sense of magnitudes, the percentage of the young with a college or graduate degree in 2011 was 0.8 higher than in 2006 in areas that were *not* booming between 2001 and 2006

while it was only 0.2 percentage points higher in booming areas.

In Table 2, we look at the effect in 2011 of educational attainment and of changes in house prices on employment. Not surprisingly, we find that higher educational attainment implies higher employability: those with college degree or more were significantly less likely, and those with at most a high school degree were significantly more likely, to be unemployed than college drop-outs (the left-out category; see column (1)). The young (aged 27–35) are on average more likely to be unemployed than younger or older individuals, but less so in areas that boomed between 2001 and 2006, suggesting that such areas tend to have more dynamic economies. However, they are also more likely (albeit statistically insignificantly so) to be unemployed in areas where house prices *decreased* more between 2006 and 2011, consistent with models in which local economic activity is sensitive to liquidity shocks coming from declining housing wealth (Midrigan and Philippon 2011). Importantly, the young are relatively more likely to be unemployed if they have at most a high school degree, and relatively less likely to be unemployed if they have at least a college degree (column (2)). This latter effect survives the horse race regression in column (3) where we simultaneously control for house prices and educational attainment. The evidence suggests that changes in house prices have a symmetric effect on unemployment. During the boom phase, unemployment probability for the young declines—at the expense of foregone schooling—as increasing housing wealth stimulates local demand and job creation. During the bust phase, unemployment probability for the young increases, both through a direct channel whereby declining housing wealth depresses local demand, and through an indirect one whereby lower educational attainment during the boom phase makes the young less employable in the long run.

4 Discussion

Our findings suggest that changes in house prices have a significant effect on the skill formation and on the employability of young Americans. We find an asymmetry in the response of educational attainment to house prices. House price increases reduce the share of the young with higher education, presumably by raising the current return to unskilled labor, thereby discouraging skill formation. Price decreases further reduce the share of the educated young, possibly because increasing debt overhang raises the effective cost of schooling. We also find that at the trough

of the housing cycle, the young are more likely to be unemployed in areas which experienced a higher decline in house prices during the bust years. The effect is more pronounced for the less educated young. This evidence is consistent with housing busts depressing local demand, and with the negative long-term consequences of foregoing formal education during the boom.

Foregoing higher education can drastically reduce one's employability and returns to labor in the long run. Our findings transcend the US experience to countries such as Spain which also experienced a large property bubble during the 2000s, coupled with increased high school and university drop out rates. The reduced skill formation for the young in boom areas that we document points to a misallocation of talent during the housing boom-bust cycle, and raises an important policy concern that has not received much attention. It also suggests that—beyond posing clear risks for financial stability—episodes of large swings in the price of residential property can have significant negative distributional consequences which policy makers may wish to take into account when deciding when and how forcefully to "lean against the wind" coming from housing markets.

References

- [1] **Acolin, Arthur, Jesse Bricker, Paul Calem, and Susan Wachter.** 2016. "Borrowing Constraints and Home Ownership over the Recent Cycle." *American Economic Review*, this issue.
- [2] **Campbell, John Y., and Joao F. Cocco.** 2007. "How Do House Prices Affect Consumption? Evidence from Micro Data." *Journal of Monetary Economics*, 54(3): 591–621.
- [3] **Corradin, Stefano, and Alexander Popov.** 2015. "House Prices, Home Equity Borrowing, and Entrepreneurship." *Review of Financial Studies*, 28(8): 2399–428.
- [4] **Dell’Ariccia, Giovanni, Deniz Igan, and Luc Laeven.** 2012. "Credit Booms and Lending Standards: Evidence from the Subprime Mortgage Market." *Journal of Money, Credit and Banking*, 44(2–3): 367–84.
- [5] **Detting, Lisa J., and Melissa S. Kearney.** 2014. "House Prices and Birth Rates: The Impact of the Real Estate Market on the Decision to Have a Baby." *Journal of Public Economics*, 110: 82–100.
- [6] **Farnham, Martin, Lucie Schmidt, and Purvi Sevak.** 2011. "House Prices and Marital Stability." *American Economic Review*, 101(3), 615–9.
- [7] **Laeven, Luc, and Alexander Popov.** 2016. Waking Up from the American Dream: On the Experience of Young Americans during the U.S. Housing Boom of the 2000s. Unpublished.
- [8] **Loutskina, Elena, and Philip E. Strahan.** 2015. "Financial Integration, Housing, and Economic Volatility." *Journal of Financial Economics*, 115(1): 25–41.
- [9] **Lovenheim, Michael F., and Kevin J. Mumford.** 2013. "Do Family Wealth Shocks Affect Fertility Choices? Evidence from the Housing Market." *Review of Economics and Statistics*, 95(2): 464–75.
- [10] **Midrigan, Virgiliu, and Thomas Philippon.** 2011. "Household Leverage and the Recession." NBER Working Paper 16965.

- [11] **Milosch, Jennifer L.** 2014. "House Price Shocks and Individual Divorce Risk in the US." University of California at Santa Barbara mimeo.
- [12] **Shiller, Robert J.** 2007. "Understanding Recent Trends in House Prices and Home Ownership." Proceedings Economic Policy Symposium Jackson Hole, Federal Reserve Bank of Kansas City, 89-123.

Table 1—Effect of Changes in House Prices during the Housing Boom

	High school degree	College or graduate degree	Unemployed	Moved in from another MSA	College or graduate degree 2011
	2006				
	(1)	(2)	(3)	(4)	(5)
Age 22–30 × Δ5-year house prices 01–06	0.0837*** (0.0236)	–0.0850*** (0.0210)	–0.0052*** (0.0018)	–0.0247*** (0.0081)	
Age 22–30	–0.0600*** (0.0131)	0.0526*** (0.0117)	0.0198*** (0.0016)	0.1959*** (0.0077)	
Age 27–35 × Δ5-year house prices 01–06					–0.0224 (0.0219)
Age 27–35 × Δ5-year house prices 06–11					0.0585** (0.0228)
Age 27–35					0.0933*** (0.0100)
Demographic controls	Yes	Yes	Yes	Yes	Yes
Observations	1,366,580	1,366,580	1,366,580	1,366,580	1,402,605
R-squared	0.10	0.11	0.06	0.08	0.12

Notes: The table reports marginal effects estimates from a probit regression where the dependent variable is a dummy equal to 1 if the individual has at most a high school degree (column (1)), a dummy equal to 1 if the individual has a college or higher degree (columns (2) and (5)), a dummy equal to 1 if the individual is unemployed (column (3)), and a dummy equal to 1 if the individual moved to his current residence from in-state or from out-of-state in the past year (column (4)). The sample period is 2006 (columns (1)–(4)) and 2011 (column (5)), and it includes all individuals aged 21+. ‘Age 22–30’ is a dummy variable equal to 1 if the individual is between 22 and 30 years of age. ‘Age 27–35’ is a dummy variable equal to 1 if the individual is between 27 and 35 years of age. ‘Δ5-year house prices 01–06’ is the MSA-level change in average house prices between 2001:Q1 and 2006:Q1. ‘Δ5-year house prices 06–11’ is the MSA-level change in average house prices between 2006:Q1 and 2011:Q1. Each regression controls for gender, marital status, race, and income, as well as for employment status (columns (1)–(2) and (4)–(5)) and for education (column (3)). Robust standard errors are reported in brackets, with standard errors clustered at the MSA level.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table 2—Effect of Educational Attainment and of Changes in House Prices on Unemployment during the Housing Bust

	Unemployed in 2011		
	(1)	(2)	(3)
Age 27–35	0.0208*** (0.0017)	0.0053** (0.0017)	0.0104** (0.0027)
High school degree	0.0027*** (0.0008)	–0.0002 (0.0009)	–0.0002 (0.0009)
College or graduate degree	–0.0122*** (0.0010)	–0.0105*** (0.0011)	–0.0105*** (0.0011)
Age 27–35 × Δ5-year house prices 01–06	–0.0118*** (0.0027)		–0.0096*** (0.0030)
Age 27–35 × Δ5-year house prices 06–11	–0.0040 (0.0030)		–0.0015 (0.0032)
Age 27–35 × High school degree		0.0180*** (0.0029)	0.0180*** (0.0028)
Age 27–35 × College or graduate degree		–0.0080*** (0.0016)	–0.0080*** (0.0016)
Demographic controls	Yes	Yes	Yes
Observations	1,402,605	1,402,605	1,402,605
R-squared	0.06	0.06	0.06

Notes: The table reports marginal effects estimates from a probit regression where the dependent variable is a dummy equal to 1 if the individual is unemployed. The sample period is 2011, and it includes all individuals aged 21+. ‘Age 27–35’ is a dummy variable equal to 1 if the individual is between 27 and 35 years of age. ‘High school degree’ is a dummy variable equal to 1 if the individual has at most a high school degree. ‘College or graduate degree’ is a dummy equal to 1 if the individual has a college or higher degree. ‘Δ5-year house prices 01–06’ is the MSA-level change in average house prices between 2001:Q1 and 2006:Q1. ‘Δ5-year house prices 06–11’ is the MSA-level change in average house prices between 2006:Q1 and 2011:Q1. Each regression controls for gender, marital status, race, and income. Robust standard errors are reported in brackets, with standard errors clustered at the MSA level.

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Acknowledgements

We are grateful to Geert Bekaert, Raphael Bostic, Pedro Gesteira, John Muellbauer, Mitchell Petersen, Jeremy Stein, Suresh Sundaresan, David Thesmar, Susan Wachter, seminar participants at the ECB, and conference participants at the 2016 American Economic Association meeting for valuable comments. The opinions expressed herein are those of the authors and do not necessarily reflect those of the ECB or the Eurosystem.

Luc Laeven

European Central Bank, Directorate General Research; email: Luc.Laeven@ecb.europa.eu

Alexander Popov

European Central Bank, Financial Research Division; email: Alexander.Popov@ecb.europa.eu

© European Central Bank, 2016

Postal address 60640 Frankfurt am Main, Germany
Telephone +49 69 1344 0
Website www.ecb.europa.eu

All rights reserved. Any reproduction, publication and reprint in the form of a different publication, whether printed or produced electronically, in whole or in part, is permitted only with the explicit written authorisation of the ECB or the authors.

This paper can be downloaded without charge from www.ecb.europa.eu, from the [Social Science Research Network](#) electronic library at or from [RePEc: Research Papers in Economics](#).

Information on all of the papers published in the ECB Working Paper Series can be found on the [ECB's website](#).

ISSN 1725-2806 (online)
ISBN 978-92-899-2021-6
DOI 10.2866/073145
EU catalogue No QB-AR-16-009-EN-N