

Internet Appendix For “What Drove the 2003–2006 House Price Boom and Subsequent Collapse? Disentangling Competing Explanations”

This appendix is divided into six sections. The first section describes the processing of the Home Mortgage Disclosure Act (HMDA) Loan Application Register (LAR) data. The second section describes the sample selection process. The third section provides additional detail regarding the credit supply and speculation variables. The fourth section describes the propensity score weighting methodology. The fifth section describes the methodology used to assess nonlinearities. The sixth section provides supplementary figures and tables.

A. HMDA LAR data processing

Variables affected: (1) Subprime share; (2) Non-core-deposit liabilities; (3) Worse originator share; (4) Private securitization; (5) Income growth difference (HMDA – IRS); (6) Non-owner occupancy.

The HMDA LAR dataset records information related to mortgage loan applications, originations, and sales. Banks, credit unions, and savings associations with offices in a Metropolitan Statistical Area (MSA) which are in the business of originating residential mortgage loans must report under the HMDA.

We use HMDA LAR files from 2002 through 2006. We keep observations associated with originations and drop applications that were denied or were not originated for another reason. We keep loans whose purpose was a home purchase or the refinancing of an existing mortgage, as well as loans and applications associated with one- to four-family dwellings (other than manufactured housing).¹ Finally, we require occupancy information to be non-missing, since this information is necessary to compute non-owner occupancy rates.²

HMDA reports the census tract associated with each mortgage origination and application. Because our analysis is at the zip code level, we match census tracts to zip codes using

¹Note, the property type is unavailable from 2001 to 2003 so we do not restrict by property type in those years.

²Occupancy status is missing for 0.64% of observations.

the 2010Q1 HUD-USPS Crosswalk file. We match tracts to zip codes based on residential population weights with the requirement that zip codes must match at least 80% of their population weights to HMDA.

B. Sample selection

We start with 11,444 zip codes with Zillow coverage that are located in a metropolitan statistical area (MSA)³ We drop 300 zip codes due to lack of Census and IRS data coverage, which are the source for the control variables used in regression analyses. Additionally, we require all the variables for credit supply and speculation to be non-missing, which translates into a loss of 7,227 zip codes. We drop an additional 50 zip codes with less than 1,000 habitants according to the 2000 Decennial Census. Finally, to limit noise in the variables, we drop zip codes with less than 10 purchase transactions (in DataQuick) or less than 10 loan originations (in HMDA) during the sample period. The final sample consists of 3,725 zip codes. An equivalent process for the 2003–2006 variables results in 5,622 zip codes.⁴

C. Credit supply and speculation variables

Credit supply variables

As a variable for subprime areas, we follow [Adelino, Schoar, and Severino \(2016\)](#) and [Gao, Sockin, and Xiong \(2019\)](#) and calculate the combined market share of subprime lenders identified by the U.S. Department of Housing and Urban Development (HUD). The variable is based on HMDA data. Specifically, we compute the fraction of mortgages originated by subprime lenders by zip code during the period of interest.⁵ Our primary variable is based on both purchase and refinance loans. In the Internet Appendix we consider alternatives based on only purchase loans and weighted by dollar lending volume as opposed to number

³A detailed description of the Zillow methodology is available at <https://www.zillow.com/research/zhvi-methodology-6032/>.

⁴The larger size of the 2003–2006 sample is mostly driven by a greater availability of the 2003–2006 credit supply and speculation variables.

⁵HMDA reports the census tract associated with each mortgage application. We match census tracts to zip codes using the 2010Q1 HUD-USPS Crosswalk file. The crosswalk allows matching tracts to zip codes based on population weights. We rely on this process for all variables that depend on HMDA data.

of loans for subprime share and all other credit supply variables. As reported in Tables 1 and IA.1, average zip code subprime share in is 9.4% in 2002 and 13.4% in 2003–2006.

For lender sensitivity to securitization expansion, we use Mian and Sufi’s (2019) non-core-deposit liability (NCL) ratio, which is calculated as $1 - \frac{\text{core deposits}}{\text{total liabilities}}$ using call report data on banks and thrifts. NCL calculations are at the bank holding company level. Because they do not have deposits, non-bank mortgage finance companies are assigned a NCL of one. Due to data availability, credit unions are excluded from the analysis. Zip code level NCL is the weighted average (by market share) of lender NCL in the zip code. Average zip code NCL for 2002, which is based on lender NCL as of the end of 2002 and 2002 market share, is 72.6%. Average zip code NCL in 2003–2006, which is calculated using annual lender NCL and market share in 2003–2006, is 76.6%.

To capture the prevalence of dubious mortgage origination practices in a zip code, we develop a variable based on market share that is similar to the variable used by Griffin and Maturana (2016a). First, we rank the 25 largest non-agency mortgage originators in ABSNet based on their propensity to misreport second liens during the period of interest.⁶ Then, in each zip code, we compute the fraction of mortgages originated by originators in the highest misreporting tercile. As reported in Table 1, average zip code worse originator market share in 2002 is 1.7%. Subsequently, worse originator market share increased, averaging 3.8% across zip codes during the 2003–2006 period.

Finally, to calculate private label securitization rates, we use HMDA data to calculate loans sold for private securitization as a fraction of all loans originated in a zip code. Following Mian and Sufi (2009), we consider loan sales to be for private securitization if they are sold directly to a private securitization trust or to a financial institution, an affiliated company, or an unspecified purchaser type because these purchasers are likely to securitize the purchased mortgage. The average zip code private label securitization rate is 29.1% in 2002 and 42.0% in 2003–2006, which reflects the large increase in this type of securitization.

⁶Second-lien misreporting is based on comparing what is reported by RMBS underwriters to second liens actually present in county deed data. See Griffin and Maturana (2016b) for additional details.

Speculation variables

Our first variable for speculation is [Gao et al.’s \(2019\)](#) non-owner occupancy variable, which is based on HMDA data. We compute the fraction of mortgages for purchase associated with non-owner occupied properties (i.e., investment properties or second homes) by zip code during the period of interest. As reported in [Tables 1](#) and [IA.1](#), the average zip code non-owner occupancy rate was 10.2% in 2002 and 12.9% in 2003–2006.

To calculate [Chinco and Mayer’s \(2016\)](#) out-of-town purchaser variable at the zip code level, we use transaction data from DataQuick property deeds data. Specifically, we calculate the out-of-town purchaser rate as the fraction of house purchase transactions in a zip code in which the buyer has a mailing address for tax purposes that is outside the combined statistical area where the property is located. The average zip code out-of-town purchaser rate in was 6.1% in 2002 and 6.4% during 2003–2006.

The final speculation variable we consider is house price growth during 2002, which is related to optimism about future house price growth if homebuyers use extrapolative expectations to form their beliefs. Based on Zillow data, zip code house price growth was 9.9% on average.

D. Propensity score weighting

Regression weights for each observation are $w_i = Pr(T_i = t)/Pr(T_i = t|X_i = x)$, where T_i is the treatment level of the credit supply and speculation variables. The denominator of the weight equation is $Pr(T_i = t|X_i = x)$, the generalized propensity score for the treatment levels conditional on the covariates. The unconditional treatment probability, $Pr(T_i = t)$, is included in the numerator to stabilize the weights following [Schuler et al. \(2016\)](#).

We estimate the propensity scores with flexible polynomial models for the relation between house price pre-trends and the credit supply and speculation variables. The 2002 credit supply and speculation variables are first standardized and demeaned by MSA. We then model the demeaned variables as normally distributed around a conditional mean given by a 10th order polynomial of 2000–2002 house price growth. Coefficients and residual standard

deviations are estimated based on OLS regressions. Observed and predicted credit supply and speculation variables are plotted in Fig.IA.2. Propensity scores, $Pr(T_i = t|X_i = x)$, are then calculated using the normal probability distribution. Similarly, $Pr(T_i = t)$ is calculated based on the normal distribution and a regression model using a constant and no covariates. Because $Pr(T_i = t|X_i = x)$ is not reliably estimated in the tails of the house price distribution, we drop observations with demeaned house prices below the 2.5 and above the 97.5 percentiles.

E. Nonlinearities

For the fractional polynomial regressions, we estimate the two-term fractional polynomial model that best explains the relationship between each variable and house price growth. The regression equations being estimated are of the form:

$$Y_i = \gamma_1 T_i^{(p1)} + \gamma_2 T_i^{(p2)} + X_i \beta + \delta_m + \epsilon_i, \quad (\text{IA.1})$$

where fractional polynomial powers $p1$ and $p2$ are selected to achieve the best model fit and treatment variables T_i are generated by adding 1 to the credit supply and speculation variables to prevent the treatment variables from being negative or zero, which is a requirement for fractional polynomial models. The rest of the equation is the same as equation (2).

In Internet Appendix Table IA.14, we test the linear model restriction compared to the fractional polynomial model. In the boom, the linear model is rejected except for the subprime share, private securitization, and 2002 house price growth variables. In the bust, nonlinearities are less important, and the linear model is only rejected for subprime share, non-core-deposit liability, and out-of-town purchaser.

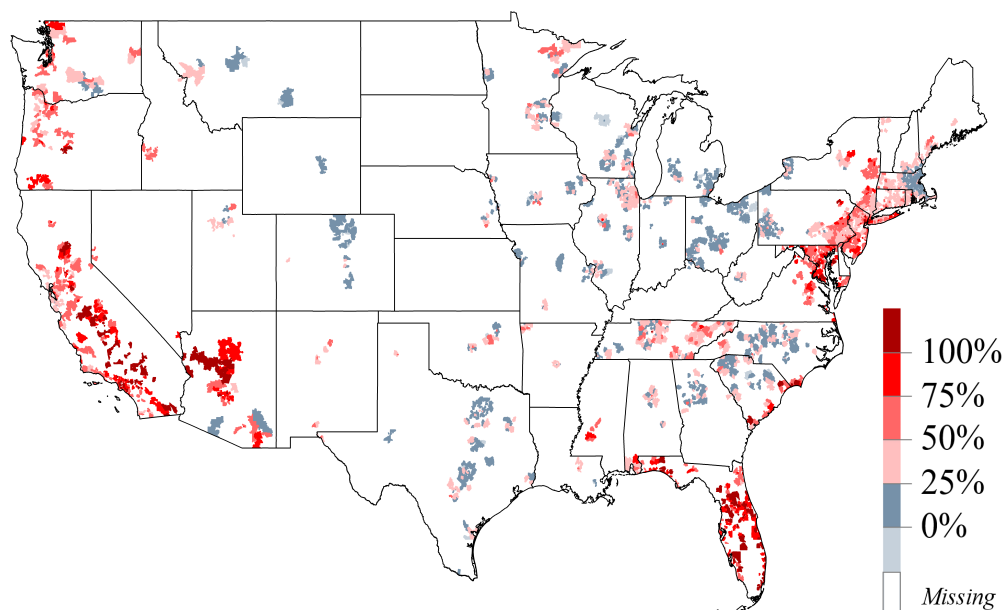
The estimating equation including interactions with the covariates is:

$$Y_i = \gamma T_i + X_i \beta + T_i X_i \lambda + \delta_m + \epsilon_i, \quad (\text{IA.2})$$

where $T_i X_i$ are interactions between the variable of interest and the covariates, and the rest of the equation is the same as equation (2).

F. Supplemental figures and tables

Panel A: National ZIP code level house price growth 2003–2006



Panel B: National ZIP code level house price growth 2007–2010

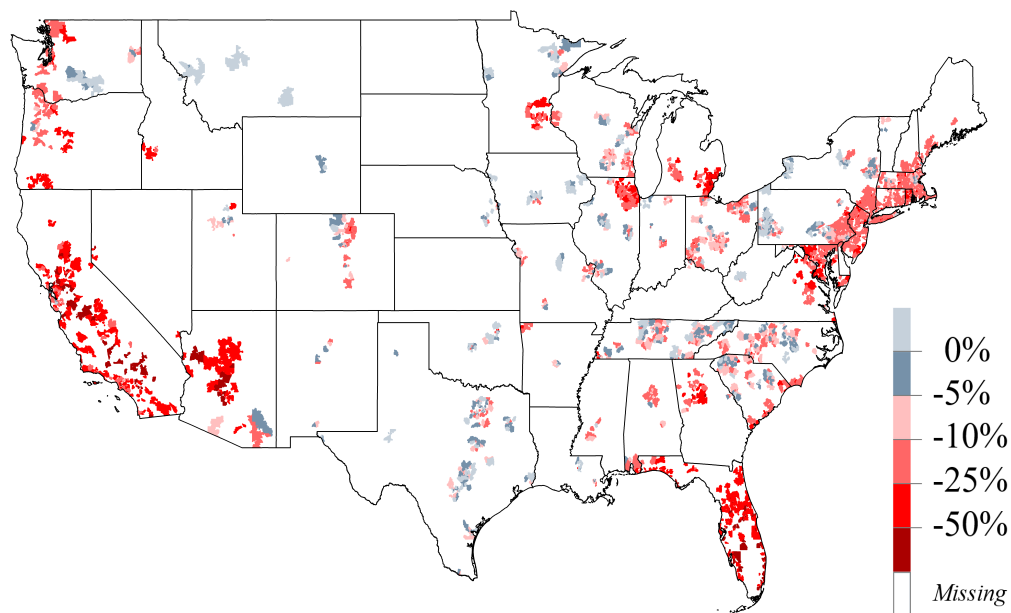


Fig. IA.1. House price growth in the U.S. This figure plots house price growth by zip code. House price growth represents changes to median home values from December of 2002 to December of 2006 (Panel A) and December of 2006 to December of 2010 (Panel B) as reflected in Zillow house price indices. To increase coverage, the sample contemporaneous to the 2003–2006 boom of 5,622 zip codes is considered. The sample is described in Table IA.1.

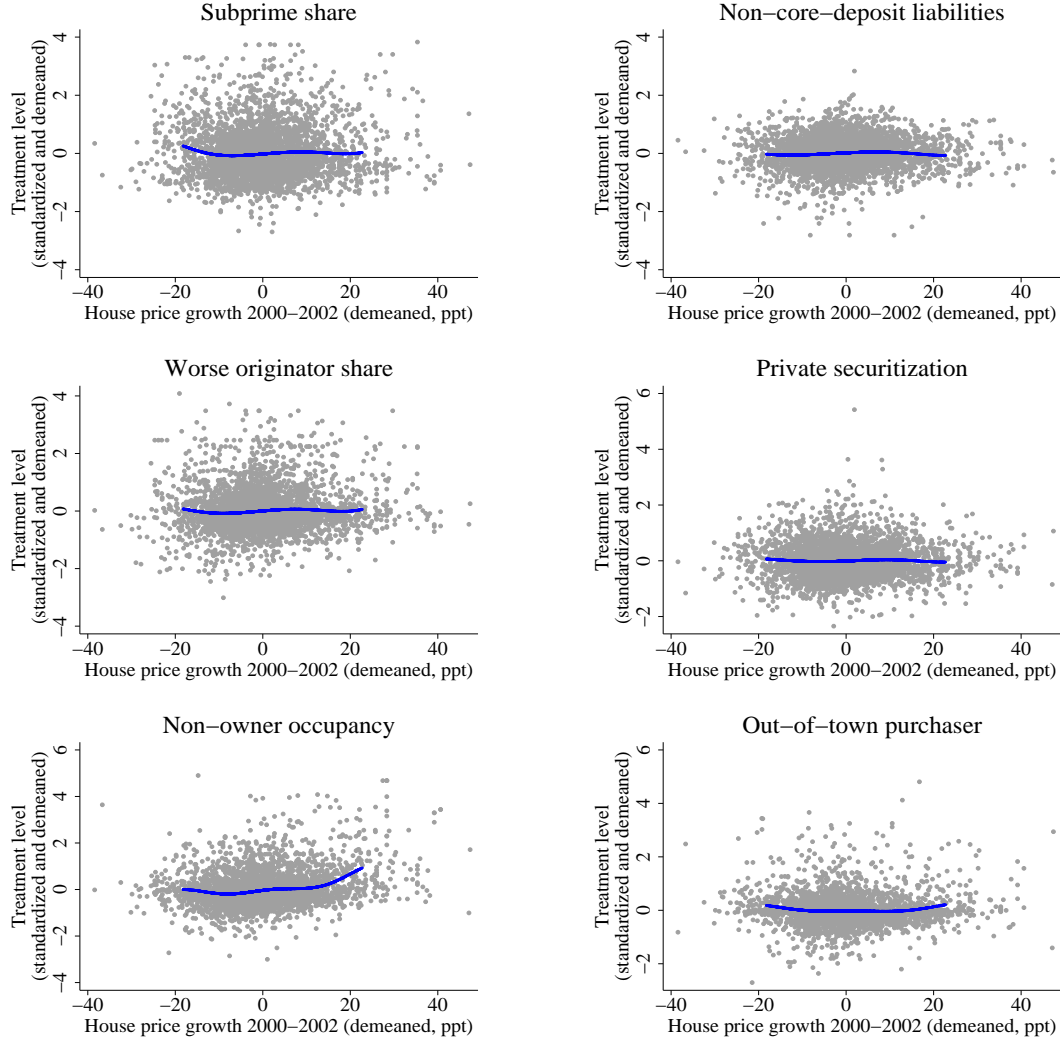


Fig. IA.2. Polynomial models for propensity scores. This figure shows the polynomial models for the relation between house price pre-trends and the credit supply and speculation variables used to estimate propensity scores. The 2002 credit supply and speculation variables are first standardized and demeaned by MSA. The demeaned variables are modelled as normally distributed around a conditional mean given by a 10th order polynomial of 2000–2002 house price growth. Coefficients and residual standard deviations are estimated based on OLS regressions. The solid line represents the predicted credit supply and speculation variables whereas the observed values of the variables are denoted by dots.

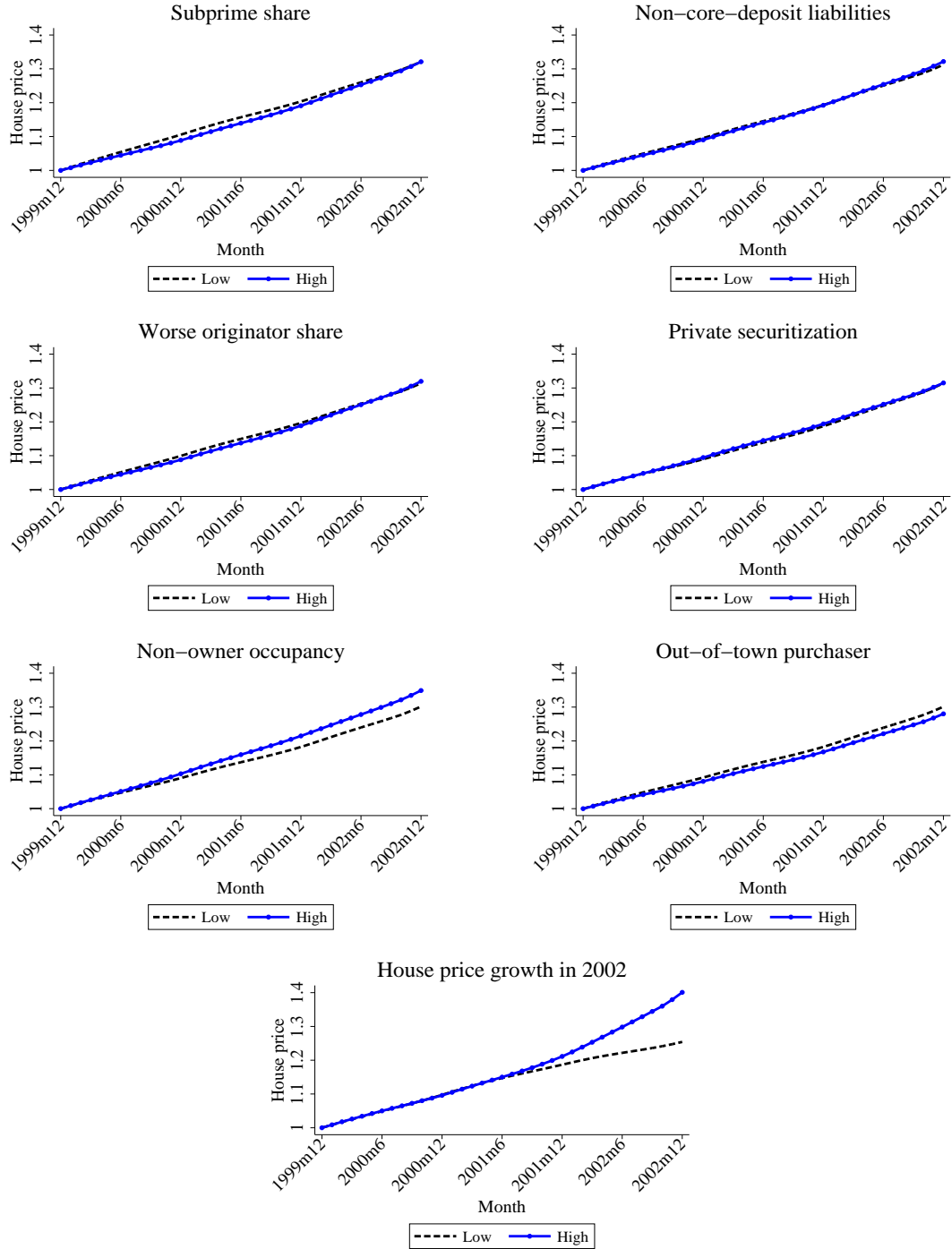


Fig. IA.3. House price growth from 2000 to 2003 and 2002 variables for credit supply and speculation. This figure shows the relation between house prices during the 2000–2002 period and variables for credit supply and speculation exposure based zip code level characteristics as of 2002. The panels sort zip codes within an MSA into quartiles based on the corresponding variable. The blue circles represent the average house price growth of the highest quartile whereas the solid black line represents the average house price growth of the lowest quartile.

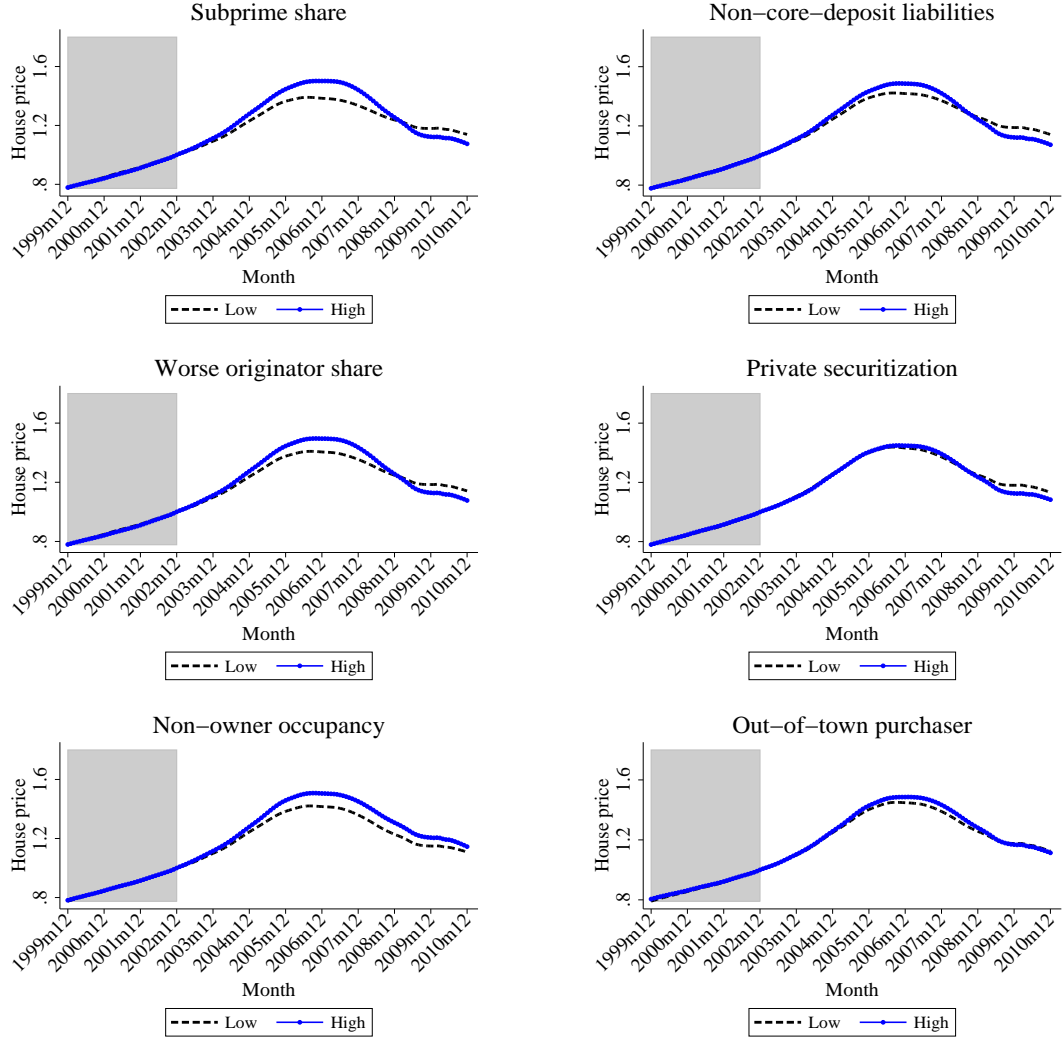


Fig. IA.4. House price growth from 2000 to 2010 and 2002 variables for credit supply and speculation using propensity score weighting. This figure shows the relation between house prices and variables for credit supply and speculation exposure based on zip code level characteristics as of 2002. The plots sort zip codes within an MSA into quartiles based on the corresponding variable, and zip codes are weighted by inverse propensity scores to compute average house price growth for the highest and lowest quartile. Weights are the same as in Tables 3 and 4. The blue circles represent the average house price growth of the highest quartile whereas the solid black line represents the average house price growth of the lowest quartile.

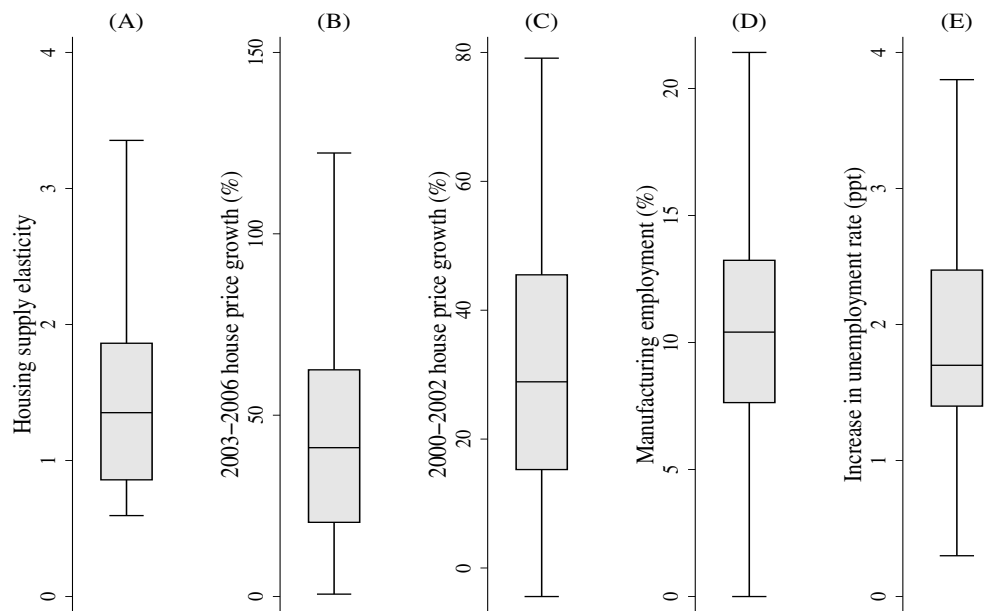


Fig. IA.5. Box plots. This figure summarizes the variables used to sort zip codes in many of the tests. Specifically, plots A, B, C, D, and E summarize housing supply elasticity, 2003–2006 house price growth, 2000–2002 house price growth, manufacturing employment exposure as of 2002, and 2000–2002 increase in unemployment rate, respectively.

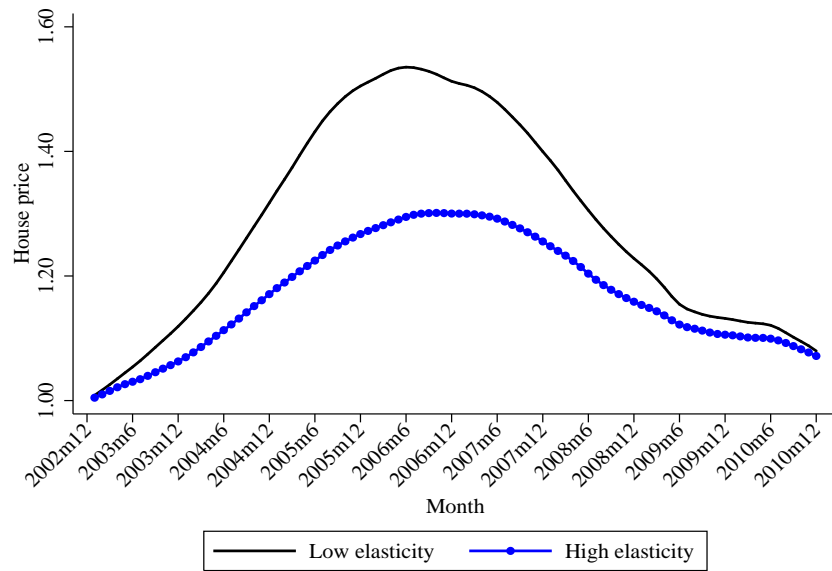
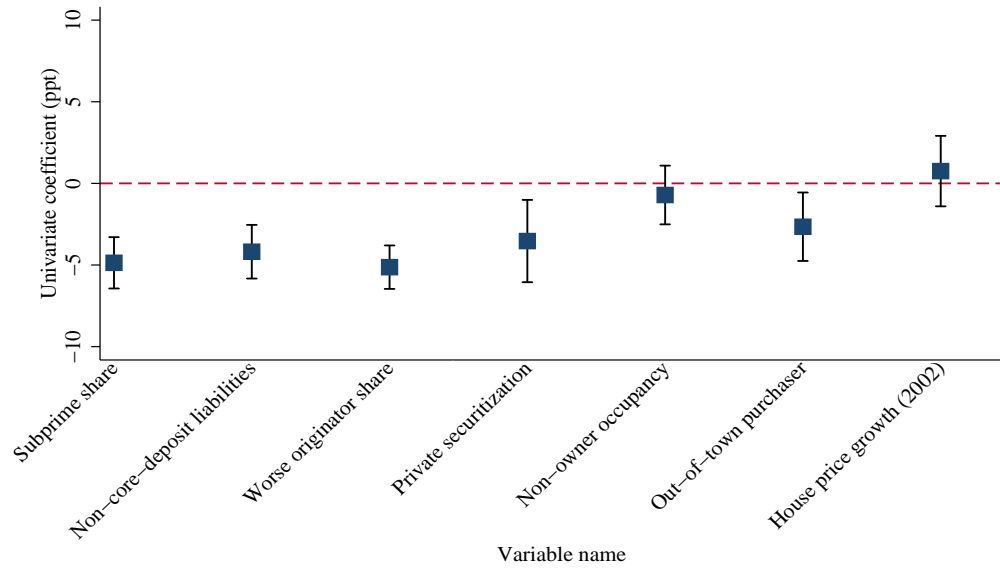


Fig. IA.6. House price growth and housing supply elasticity. This figure shows the relation between house prices and housing supply elasticity. The blue circles represent the average house price growth of those zip codes in high housing supply elasticity areas whereas the solid black line represents the average house price growth of those zip codes in low housing supply elasticity areas.

Panel A: Zip codes in the bottom 25% of 2003–2006 house price growth



Panel B: Zip codes in the bottom 5% of 2003–2006 house price growth

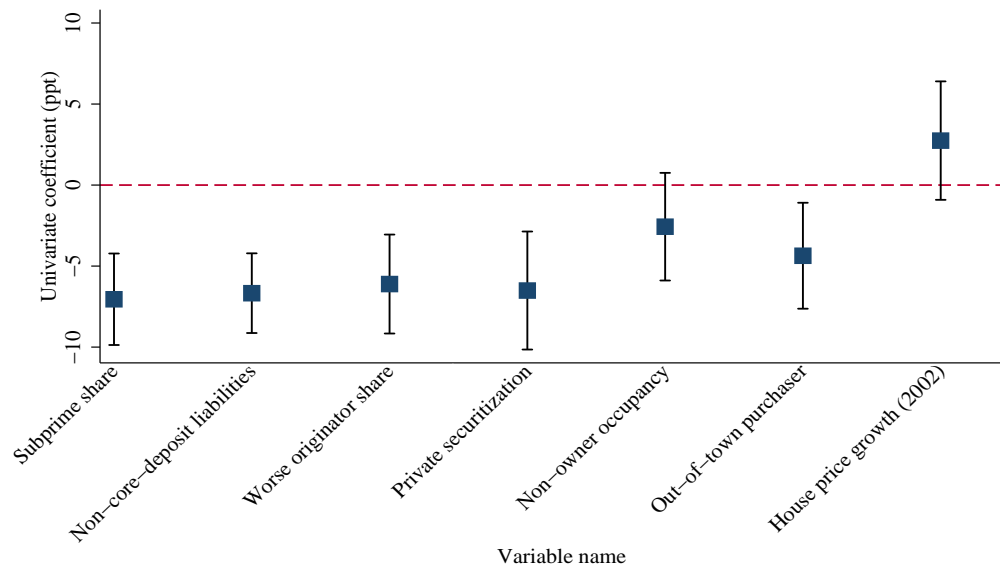


Fig. IA.7. Coefficient estimates of 2007–2010 house price growth regressions in extremely low 2003–2006 house price growth subsample. This figure shows coefficients (with corresponding 95% confidence intervals based on standard errors clustered by MSA) for regressions estimating equation (2) in the subsample of zip codes in the lowest 25-percent (Panel A) and lowest 5-percent (Panel B) of 2003–2006 house price growth. Credit supply and speculation variables are standardized so that coefficients reflect the impact of changing the variable by one standard deviation. All regressions include zip code level controls for population, housing units, and vacancy rates from 2000 census data, 2002 average IRS income, as well as MSA fixed effects.

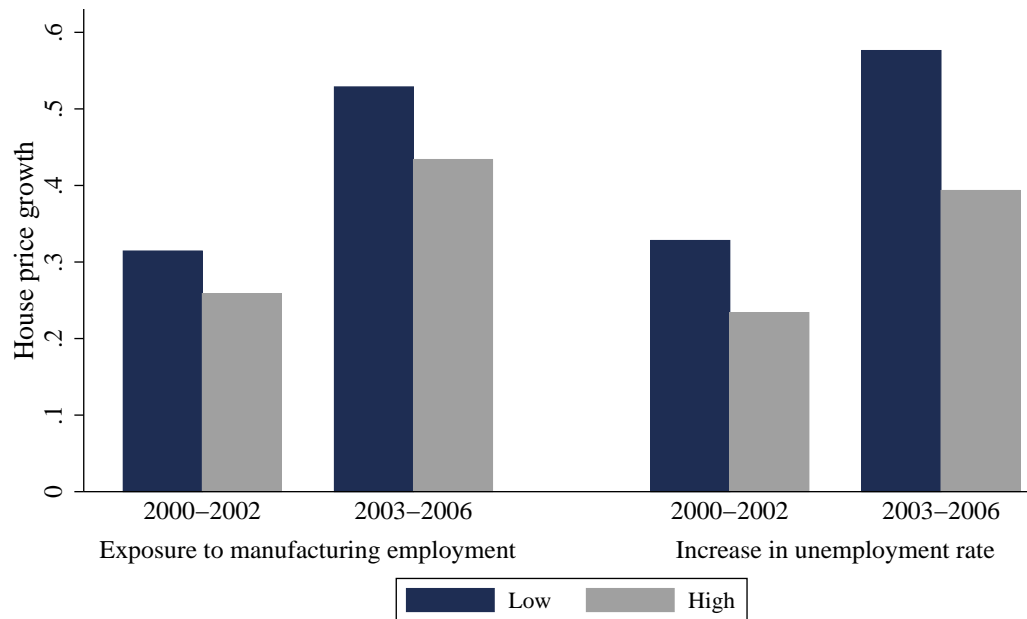
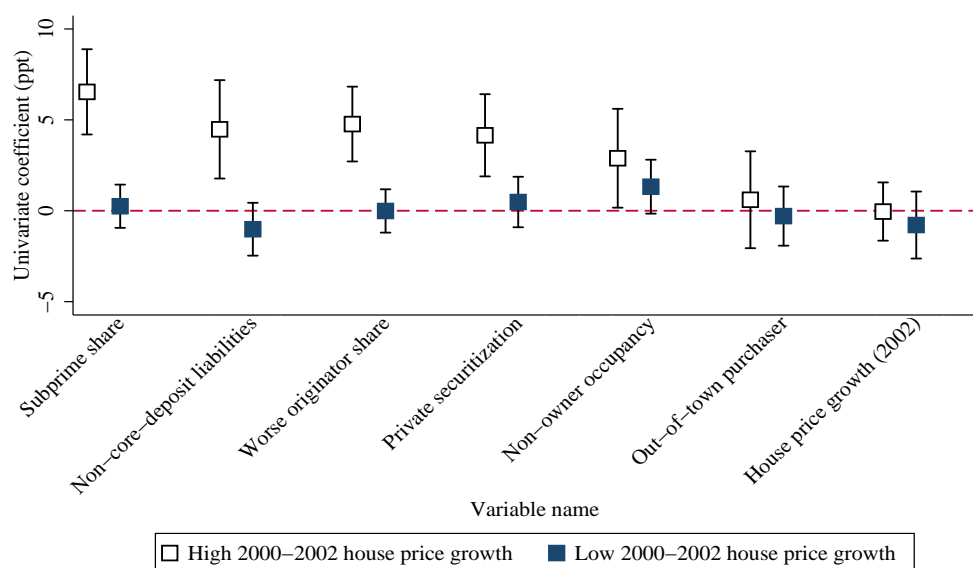


Fig. IA.8. House price growth in subsamples based on measures of employment. This figure shows the average house price growth from 2000 to 2002 and from 2003 to 2006 for subsamples of zip codes split by exposure to MSA level manufacturing employment and by MSA level increases in unemployment rates from 2000 to 2002. The main sample of zip codes is split into two groups based on the median value of these MSA level measures across zip codes.

Panel A: 2003–2006 house price growth



Panel B: 2007–2010 house price growth

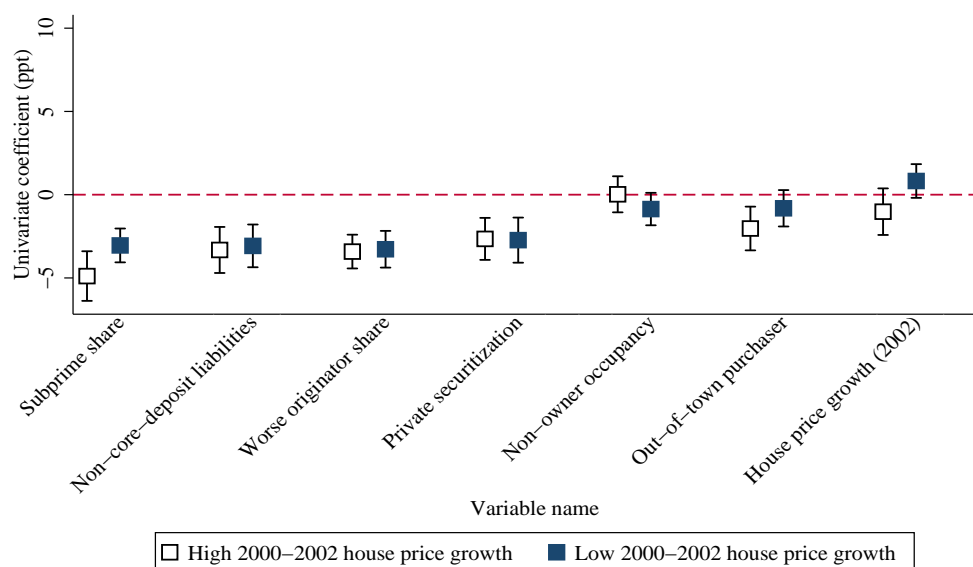


Fig. IA.9. Coefficient estimates in 2000–2002 house price growth subsamples. This figure shows coefficients (with corresponding 95% confidence intervals with standard errors clustered by MSA) for regressions estimating equation (2) in subsamples based on 2000–2002 house price growth at the zip code level. Panel A considers house price growth from 2003 to 2006 and Panel B considers house price growth from 2007 to 2010. Credit supply and speculation variables are standardized so that coefficients reflect the impact of changing the variable by one standard deviation. All regressions include zip code level controls for population, housing units, and vacancy rates from 2000 census data, 2002 average IRS income, as well as MSA fixed effects. Hollow squares represent coefficients of regressions where the sample consists of those zip codes in low (below median) 2000–2002 house price growth areas whereas solid squares represent coefficients of regressions where the sample consists of those zip codes in high 2000–2002 house price growth areas.

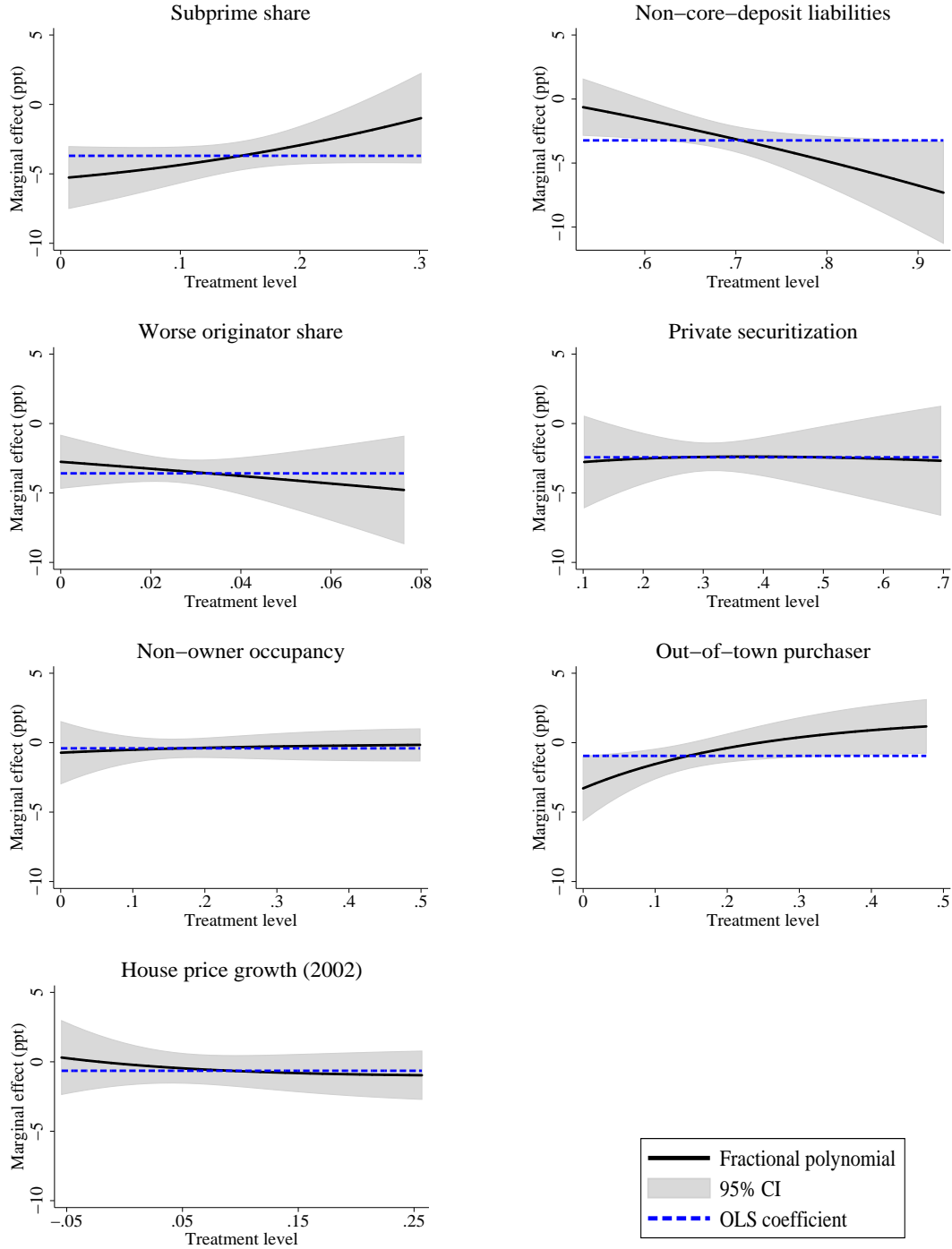


Fig. IA.10. Nonlinear effects for the 2007–2010 period. This figure shows marginal effects (with corresponding 95% confidence intervals with standard errors clustered by MSA) of the variables for credit supply and speculation on 2007–2010 house price growth, for different levels of each variable. For each credit supply and speculation variable, the two-term fractional polynomial that best explains the relation between each variable and house price growth is estimated and then used to compute the marginal effect (the solid line). The dashed line represents the corresponding OLS coefficient from Table 2.

Panel A: 2003–2006 house price growth

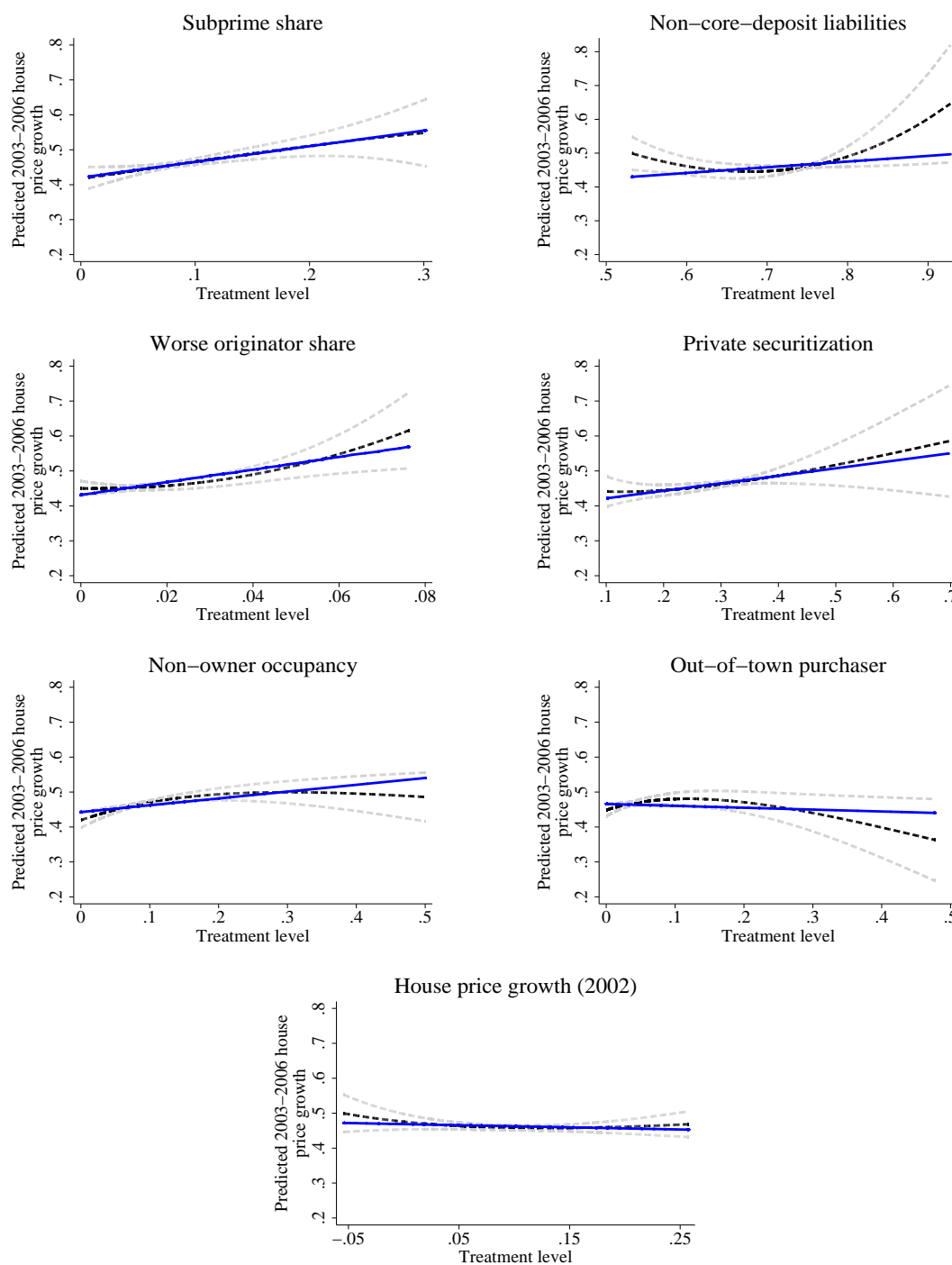


Fig. IA.11. Dose-response functions. This figure shows predicted house price growth (with corresponding 95% confidence intervals with standard errors clustered by MSA) when using two-term fractional polynomials. Panel A considers house price growth from 2003 to 2006 and Panel B considers house price growth from 2007 to 2010. For each credit supply and speculation variable, the two-term fractional polynomial that best explains the relationship between each variable and house price growth is estimated and then used to compute predicted house price growth values (the dark dashed line). The light dashed line denotes the 95% confidence interval for each estimation. The solid line represents the corresponding predicted value based on the estimations from Table 2.

Panel B: 2007–2010 house price growth

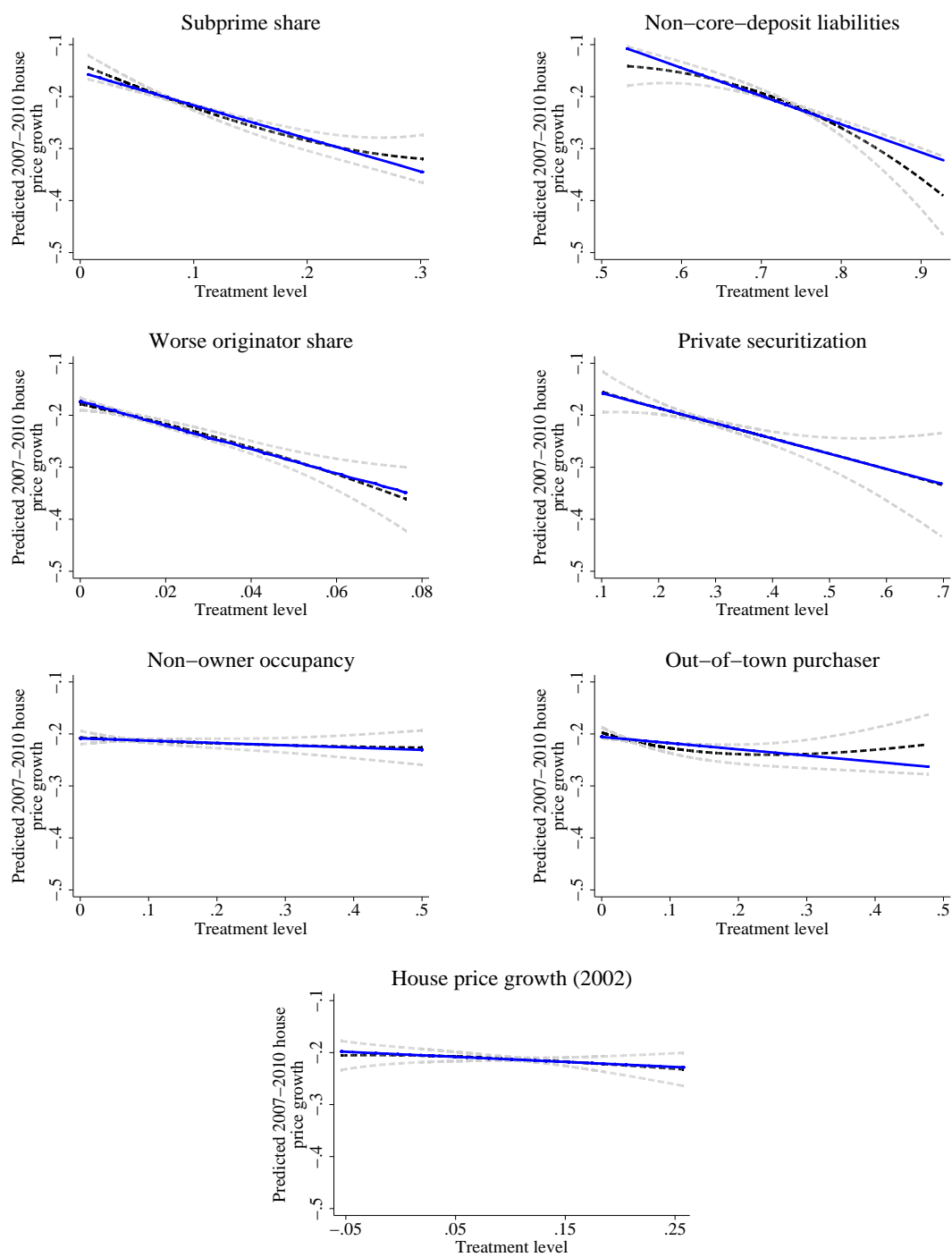


Table IA.1

Data Summary for the 2003–2006 sample.

This table reports summary statistics for the sample of zip codes that is contemporaneous with the 2003–2006 house price expansion. Variable definitions are the same as in Table 1.

	Observations	Mean	Standard deviation		
			Overall	Between MSA	Within MSA
<i>House price growth</i>					
2003–2006	5,622	0.435	0.295	0.303	0.139
2007–2010	5,622	-0.189	0.156	0.168	0.078
<i>2003–2006 credit supply variables</i>					
Subprime share	5,622	0.134	0.070	0.042	0.062
Non-core-deposit liabilities	5,622	0.766	0.053	0.052	0.029
Worse originator share	5,622	0.038	0.026	0.019	0.019
Private securitization	5,622	0.420	0.087	0.078	0.054
<i>2003–2006 speculation variables</i>					
Non-owner occupancy	5,622	0.129	0.100	0.085	0.074
Out-of-town purchaser	5,622	0.064	0.070	0.076	0.042

Table IA.2

Correlation matrix of variables for credit supply and speculation.

This table reports the correlation matrix of the variables for credit supply and speculation exposure. Panel A considers variables based on zip code level characteristics as of 2002 and Panel B considers variables based on zip code level characteristics from 2003 to 2006. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

Panel A 2002 measures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Subprime share	1						
(2) Non-core-deposit liabilities	0.404***	1					
(3) Worse originator share	0.571***	0.410***	1				
(4) Private securitization	0.258***	0.632***	0.414***	1			
(5) Non-owner occupancy	0.0835***	-0.0347*	0.0391*	-0.0486**	1		
(6) Out-of-town purchaser	0.149***	0.0866***	0.0475**	-0.0312	0.440***	1	
(7) House price growth (2002)	-0.0395*	0.0560***	0.113***	0.00134	0.0798***	-0.174***	1

Panel B: 2003-2006 measures

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Subprime share	1					
(2) Non-core-deposit liabilities	0.456***	1				
(3) Worse originator share	0.706***	0.610***	1			
(4) Private securitization	0.486***	0.756***	0.710***	1		
(5) Non-owner occupancy	0.0682***	0.0584***	0.0392**	0.0690***	1	
(6) Out-of-town purchaser	0.0387**	0.0285*	-0.106***	-0.0584***	0.491***	1

Table IA.3

Wald tests for coefficient equality.

This table reports pairwise p -values for Wald tests of equality for the coefficients reported in Table 2. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

Panel A: 2003–2006 house price growth

2002 zip code characteristics	Credit supply				Speculation		
	Subprime share	Non-core-deposit liabilities	Worse originator share	Private securitization	Non-owner occupancy	Out-of-town purchaser	House price growth (2002)
<i>Credit supply</i>							
Subprime share							
Non-core-deposit liabilities	0.007***						
Worse originator share	0.693	0.014**					
Private securitization	0.295	0.290	0.273				
<i>Speculation</i>							
Non-owner occupancy	0.486	0.441	0.414	0.998			
Out-of-town purchaser	0.004***	0.150	0.003***	0.045**	0.054*		
House price growth (2002)	0.006***	0.206	0.007***	0.056*	0.037**	0.988	

Panel B: 2007–2010 house price growth

2002 zip code characteristics	Credit supply				Speculation		
	Subprime share	Non-core-deposit liabilities	Worse originator share	Private securitization	Non-owner occupancy	Out-of-town purchaser	House price growth (2002)
<i>Credit supply</i>							
Subprime share							
Non-core-deposit liabilities	0.255						
Worse originator share	0.724	0.427					
Private securitization	0.014**	0.075*	0.024**				
<i>Speculation</i>							
Non-owner occupancy	0.000***	0.000***	0.000***	0.000***			
Out-of-town purchaser	0.000***	0.000***	0.000***	0.009***	0.230		
House price growth (2002)	0.000***	0.001***	0.000***	0.045**	0.736	0.717	

Table IA.4

House price growth regressions on 2002 variables for credit supply and speculation variables based on zip codes within a five-mile radius.

Regressions reported in this table are identical to Table 2 except that the credit supply and speculation variables calculated based on all zip codes within a five-mile radius of the zip code being analyzed. Credit supply and speculation variables are based on 2002 data. Panel A considers house price growth from 2003 to 2006 (i.e., price appreciation from December of 2002 to December of 2006). Panel B considers house price growth from 2007 to 2010 (i.e., price appreciation from December of 2006 to December of 2010). Standard errors clustered by MSA are reported in parentheses. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

Panel A: 2003–2006 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u><i>Credit supply</i></u>							
Subprime share	0.025*** (0.008)						
Non-core-deposit liabilities		0.012 (0.009)					
Worse originator share			0.030*** (0.010)				
Private securitization				0.014* (0.008)			
<u><i>Speculation</i></u>							
Non-owner occupancy					0.012 (0.009)		
Out-of-town purchaser						-0.008 (0.010)	
House price growth (2002)							0.001 (0.007)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725	3,725	3,725	3,725
R^2	0.849	0.847	0.844	0.847	0.844	0.844	0.844
Mean house price growth	0.463	0.463	0.463	0.463	0.463	0.463	0.463

Panel B: 2007–2010 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Credit supply</u>							
Subprime share	-0.027*** (0.005)						
Non-core-deposit liabilities		-0.031*** (0.006)					
Worse originator share			-0.034*** (0.006)				
Private securitization				-0.019*** (0.006)			
<u>Speculation</u>							
Non-owner occupancy					-0.001 (0.003)		
Out-of-town purchaser						-0.005 (0.005)	
House price growth (2002)							-0.008 (0.006)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725	3,725	3,725	3,725
R^2	0.822	0.815	0.81	0.818	0.805	0.802	0.802
Mean house price growth	-0.213	-0.213	-0.213	-0.213	-0.213	-0.213	-0.213

Table IA.5

House price growth regressions on 2002 variables for credit supply and speculation without control variables. Regressions reported in this table are identical to Table 2 except that the regressions do not include control variables. Credit supply and speculation variables are based on 2002 data. Panel A considers house price growth from 2003 to 2006 (i.e., price appreciation from December of 2002 to December of 2006). Panel B considers house price growth from 2007 to 2010 (i.e., price appreciation from December of 2006 to December of 2010). Standard errors clustered by MSA are reported in parentheses. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

Panel A: 2003–2006 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u><i>Credit supply</i></u>							
Subprime share	0.055*** (0.012)						
Non-core-deposit liabilities		0.037** (0.016)					
Worse originator share			0.054*** (0.013)				
Private securitization				0.013 (0.010)			
<u><i>Speculation</i></u>							
Non-owner occupancy					0.030*** (0.010)		
Out-of-town purchaser						0.019* (0.010)	
House price growth (2002)							0.009 (0.009)
Control variables	No	No	No	No	No	No	No
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725	3,725	3,725	3,725
R^2	0.833	0.813	0.826	0.809	0.814	0.810	0.809
Mean house price growth	0.463	0.463	0.463	0.463	0.463	0.463	0.463

Panel B: 2007–2010 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Credit supply</u>							
Subprime share	-0.047*** (0.006)						
Non-core-deposit liabilities		-0.049*** (0.008)					
Worse originator share			-0.049*** (0.006)				
Private securitization				-0.023*** (0.007)			
<u>Speculation</u>							
Non-owner occupancy					-0.005 (0.003)		
Out-of-town purchaser						-0.012** (0.005)	
House price growth (2002)							-0.014* (0.007)
Control variables	No	No	No	No	No	No	No
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725	3,725	3,725	3,725
R^2	0.820	0.782	0.807	0.762	0.755	0.756	0.757
Mean house price growth	-0.213	-0.213	-0.213	-0.213	-0.213	-0.213	-0.213

Table IA.6

House price growth regressions on 2002 variables for credit supply and speculation without MSA fixed effects. Regressions reported in this table are identical to Table 2 except that the regressions do not include MSA fixed effects. Credit supply and speculation variables are based on 2002 data. Panel A considers house price growth from 2003 to 2006 (i.e., price appreciation from December of 2002 to December of 2006). Panel B considers house price growth from 2007 to 2010 (i.e., price appreciation from December of 2006 to December of 2010). Standard errors clustered by MSA are reported in parentheses. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

Panel A: 2003–2006 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Credit supply</u>							
Subprime share	0.014 (0.022)						
Non-core-deposit liabilities		0.089*** (0.022)					
Worse originator share			0.083*** (0.025)				
Private securitization				0.061*** (0.023)			
<u>Speculation</u>							
Non-owner occupancy					0.055*** (0.016)		
Out-of-town purchaser						0.035 (0.026)	
House price growth (2002)							0.100*** (0.022)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	No	No	No	No	No	No	No
Observations	3,725	3,725	3,725	3,725	3,725	3,725	3,725
R^2	0.120	0.199	0.179	0.156	0.134	0.129	0.223
Mean house price growth	0.463	0.463	0.463	0.463	0.463	0.463	0.463

Panel B: 2007–2010 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Credit supply</u>							
Subprime share	-0.027** (0.011)						
Non-core-deposit liabilities		-0.053*** (0.010)					
Worse originator share			-0.063*** (0.007)				
Private securitization				-0.032*** (0.010)			
<u>Speculation</u>							
Non-owner occupancy					-0.030*** (0.009)		
Out-of-town purchaser						-0.018* (0.010)	
House price growth (2002)							-0.052*** (0.008)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	No	No	No	No	No	No	No
Observations	3,725	3,725	3,725	3,725	3,725	3,725	3,725
R^2	0.098	0.180	0.208	0.117	0.095	0.090	0.182
Mean house price growth	-0.213	-0.213	-0.213	-0.213	-0.213	-0.213	-0.213

Table IA.7

House price growth regressions on 2002 variables for credit supply and speculation with an additional control for income growth.

Regressions reported in this table are identical to Table 2 except that the regressions also control for zip code level income growth from 2002 to 2006. Credit supply and speculation variables are based on 2002 data. Panel A considers house price growth from 2003 to 2006 (i.e., price appreciation from December of 2002 to December of 2006). Panel B considers house price growth from 2007 to 2010 (i.e., price appreciation from December of 2006 to December of 2010). Standard errors clustered by MSA are reported in parentheses. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

Panel A: 2003–2006 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u><i>Credit supply</i></u>							
Subprime share	0.029*** (0.009)						
Non-core-deposit liabilities		0.013 (0.008)					
Worse originator share			0.030*** (0.010)				
Private securitization				0.019** (0.008)			
<u><i>Speculation</i></u>							
Non-owner occupancy					0.017** (0.008)		
Out-of-town purchaser						-0.003 (0.008)	
House price growth (2002)							-0.005 (0.006)
Standard control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income growth control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725	3,725	3,725	3,725
R^2	0.849	0.845	0.849	0.846	0.846	0.845	0.845
Mean house price growth	0.463	0.463	0.463	0.463	0.463	0.463	0.463

Panel B: 2007–2010 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Credit supply</u>							
Subprime share	-0.036*** (0.005)						
Non-core-deposit liabilities		-0.030*** (0.005)					
Worse originator share			-0.035*** (0.005)				
Private securitization				-0.023*** (0.005)			
<u>Speculation</u>							
Non-owner occupancy					-0.005 (0.003)		
Out-of-town purchaser						-0.009* (0.005)	
House price growth (2002)							-0.007 (0.005)
Standard control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Income growth control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725	3,725	3,725	3,725
R^2	0.827	0.814	0.826	0.813	0.806	0.806	0.806
Mean house price growth	-0.213	-0.213	-0.213	-0.213	-0.213	-0.213	-0.213

Table IA.8

House price growth regressions on 2002 variables for credit supply and speculation using weighted least squares.

Regressions reported in this table are identical to Table 2 except that the regressions are estimated using weighted least squares. Specifically, observations are weighted by the number of occupied housing units at the zip code (from the 2000 decennial census). Credit supply and speculation variables are based on 2002 data. Panel A considers house price growth from 2003 to 2006 (i.e., price appreciation from December of 2002 to December of 2006). Panel B considers house price growth from 2007 to 2010 (i.e., price appreciation from December of 2006 to December of 2010). Standard errors clustered by MSA are reported in parentheses. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

Panel A: 2003–2006 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u><i>Credit supply</i></u>							
Subprime share	0.030*** (0.011)						
Non-core-deposit liabilities		0.010 (0.012)					
Worse originator share			0.031** (0.012)				
Private securitization				0.020** (0.009)			
<u><i>Speculation</i></u>							
Non-owner occupancy					0.018** (0.009)		
Out-of-town purchaser						-0.005 (0.009)	
House price growth (2002)							-0.000 (0.008)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725	3,725	3,725	3,725
R^2	0.874	0.870	0.874	0.871	0.870	0.870	0.870
Mean house price growth	0.463	0.463	0.463	0.463	0.463	0.463	0.463

Panel B: 2007–2010 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Credit supply</u>							
Subprime share	-0.039*** (0.008)						
Non-core-deposit liabilities		-0.037*** (0.009)					
Worse originator share			-0.038*** (0.008)				
Private securitization				-0.028*** (0.007)			
<u>Speculation</u>							
Non-owner occupancy					-0.006 (0.005)		
Out-of-town purchaser						-0.015** (0.007)	
House price growth (2002)							-0.009 (0.008)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725	3,725	3,725	3,725
R^2	0.834	0.816	0.830	0.815	0.807	0.808	0.808
Mean house price growth	-0.213	-0.213	-0.213	-0.213	-0.213	-0.213	-0.213

Table IA.9

House price growth regressions on 2002 variables for credit supply calculated based only on purchase loans. Regressions reported in this table are identical to Table 2 except that the variables for credit supply are calculated based only on purchase loans. Credit supply variables are based on 2002 data. Panel A considers house price growth from 2003 to 2006 (i.e., price appreciation from December of 2002 to December of 2006). Panel B considers house price growth from 2007 to 2010 (i.e., price appreciation from December of 2006 to December of 2010). Standard errors clustered by MSA are reported in parentheses. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

Panel A: 2003–2006 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)
<i>Credit supply</i>				
Subprime share	0.018*** (0.007)			
Non-core-deposit liabilities		0.005 (0.007)		
Worse originator share			0.017** (0.008)	
Private securitization				0.009 (0.006)
Control variables	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725
R^2	0.845	0.844	0.845	0.844
Mean house price growth	0.463	0.463	0.463	0.463

Panel B: 2007–2010 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)
<i>Credit supply</i>				
Subprime share	-0.029*** (0.005)			
Non-core-deposit liabilities		-0.026*** (0.005)		
Worse originator share			-0.028*** (0.005)	
Private securitization				-0.018*** (0.004)
Control variables	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725
R^2	0.817	0.809	0.815	0.807
Mean house price growth	-0.213	-0.213	-0.213	-0.213

Table IA.10

House price growth regressions on 2002 variables for credit supply weighted by loan size.

Regressions reported in this table are identical to Table 2 except that the variables for credit supply are value weighted by loan amount. Credit supply variables are based on 2002 data. Panel A considers house price growth from 2003 to 2006 (i.e., price appreciation from December of 2002 to December of 2006). Panel B considers house price growth from 2007 to 2010 (i.e., price appreciation from December of 2006 to December of 2010). Standard errors clustered by MSA are reported in parentheses. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

Panel A: 2003–2006 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)
<i>Credit supply</i>				
Subprime share	0.025*** (0.009)			
Non-core-deposit liabilities		0.008 (0.007)		
Worse originator share			0.028*** (0.009)	
Private securitization				0.016** (0.007)
Control variables	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725
R^2	0.847	0.844	0.848	0.845
Mean house price growth	0.463	0.463	0.463	0.463

Panel B: 2007–2010 house price growth

2002 zip code characteristics	(1)	(2)	(3)	(4)
<i>Credit supply</i>				
Subprime share	-0.039*** (0.005)			
Non-core-deposit liabilities		-0.028*** (0.007)		
Worse originator share			-0.035*** (0.005)	
Private securitization				-0.021*** (0.005)
Control variables	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725
R^2	0.829	0.811	0.823	0.808
Mean house price growth	-0.213	-0.213	-0.213	-0.213

Table IA.11

House price growth regressions on 2003–2006 variables for credit supply and speculation.

Regressions reported in this table are identical to Table 2 except that the variables for exposure to credit supply and speculation are based on zip code level characteristics from 2003 to 2006. Panel A considers house price growth from 2003 to 2006 (i.e., price appreciation from December of 2002 to December of 2006). Panel B considers house price growth from 2007 to 2010 (i.e., price appreciation from December of 2006 to December of 2010). Standard errors clustered by MSA are reported in parentheses. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

Panel A: 2003–2006 house price growth

2003–2006 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)
<u><i>Credit supply</i></u>						
Subprime share	0.031*** (0.010)					
Non-core-deposit liabilities		0.021** (0.009)				
Worse originator share			0.059*** (0.009)			
Private securitization				0.040*** (0.011)		
<u><i>Speculation</i></u>						
Non-owner occupancy					0.017** (0.007)	
Out-of-town purchaser						-0.015*** (0.005)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,622	5,622	5,622	5,622	5,622	5,622
R^2	0.822	0.819	0.830	0.824	0.819	0.819
Mean house price growth	0.435	0.435	0.435	0.435	0.435	0.435

Panel B: 2007–2010 house price growth

2003–2006 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)
<u>Credit supply</u>						
Subprime share	-0.050*** (0.005)					
Non-core-deposit liabilities		-0.043*** (0.005)				
Worse originator share			-0.052*** (0.009)			
Private securitization				-0.040*** (0.004)		
<u>Speculation</u>						
Non-owner occupancy					-0.012*** (0.004)	
Out-of-town purchaser						-0.005 (0.004)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,622	5,622	5,622	5,622	5,622	5,622
R^2	0.826	0.802	0.819	0.806	0.785	0.784
Mean house price growth	-0.189	-0.189	-0.189	-0.189	-0.189	-0.189

Table IA.12

House price growth regressions on lagged house price growth.

This table reports coefficients for regressions of zip code level house price growth on lagged house price growth. In columns (1) and (2) the dependent variable is house price growth from 2003 to 2006 (i.e., price appreciation from December of 2002 to December of 2006). The independent variables of interest in columns (1) and (2) are house price growth from 2000 to 2002 and an alternative version of house price growth from 2000 to 2002 based on all zip codes within a 5 mile radius of the zip code being analyzed. In columns (3) to (6), yearly house price growth is regressed on house price growth lagged by one year. Independent variables are standardized so that coefficients reflect the impact of changing the independent variable by one standard deviation. All regressions include zip code level controls for population, housing units, and vacancy rates from 2000 census data, 2002 average IRS income, as well as MSA fixed effects. Standard errors clustered by MSA are reported in parentheses. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

	2003–2006 HPG		2003 HPG	2004 HPG	2005 HPG	2006 HPG
Lagged house price growth	(1)	(2)	(3)	(4)	(5)	(6)
2000–2002 HPG	-0.023*					
	(0.012)					
2000–2002 HPG (5 mile radius)		-0.019				
		(0.014)				
2002 HPG			0.006**			
			(0.003)			
2003 HPG				-0.005**		
				(0.002)		
2004 HPG					0.002	
					(0.004)	
2005 HPG						0.002
						(0.005)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,725	3,725	3,725	3,725	3,725	3,725
R^2	0.845	0.845	0.670	0.785	0.760	0.598
Mean house price growth	0.463	0.463	0.105	0.140	0.122	0.0266

Table IA.13

House price growth regressions: Sand states vs. non-sand states.

Regressions reported in this table are identical to Table 2 except that the sample of zip codes is split based on whether the zip code is in a sand state (i.e., Arizona, California, Florida, and Nevada) or not. Credit supply and speculation variables are based on 2002 data. Panel A considers house price growth from 2003 to 2006 (i.e., price appreciation from December of 2002 to December of 2006) in sand states. Panel B considers house price growth from 2003 to 2006 in non-sand states. Panel C considers house price growth from 2007 to 2010 (i.e., price appreciation from December of 2006 to December of 2010) in sand states. Panel D considers house price growth from 2007 to 2010 in non-sand states. Standard errors clustered by MSA are reported in parentheses. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

Panel A: 2003–2006 house price growth, sand states

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Credit supply</u>							
Subprime share	0.077*** (0.019)						
Non-core-deposit liabilities		0.059* (0.032)					
Worse originator share			0.046*** (0.017)				
Private securitization				0.068*** (0.022)			
<u>Speculation</u>							
Non-owner occupancy					0.011 (0.014)		
Out-of-town purchaser						0.003 (0.015)	
House price growth (2002)							-0.009 (0.013)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	876	876	876	876	876	876	876
R^2	0.759	0.731	0.742	0.743	0.725	0.725	0.725
Mean house price growth	0.785	0.785	0.785	0.785	0.785	0.785	0.785

Panel B: 2003–2006 house price growth, non-sand states

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Credit supply</u>							
Subprime share	0.010 (0.007)						
Non-core-deposit liabilities		0.001 (0.008)					
Worse originator share			0.011 (0.009)				
Private securitization				0.002 (0.008)			
<u>Speculation</u>							
Non-owner occupancy					0.024*** (0.008)		
Out-of-town purchaser						0.001 (0.008)	
House price growth (2002)							-0.006 (0.007)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,849	2,849	2,849	2,849	2,849	2,849	2,849
R^2	0.787	0.787	0.787	0.787	0.790	0.787	0.787
Mean house price growth	0.363	0.363	0.363	0.363	0.363	0.363	0.363

Panel C: 2007–2010 house price growth, sand states

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Credit supply</u>							
Subprime share	-0.056*** (0.011)						
Non-core-deposit liabilities		-0.058*** (0.018)					
Worse originator share			-0.048*** (0.006)				
Private securitization				-0.053*** (0.009)			
<u>Speculation</u>							
Non-owner occupancy					-0.004 (0.006)		
Out-of-town purchaser						0.004 (0.006)	
House price growth (2002)							-0.012 (0.011)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	876	876	876	876	876	876	876
R^2	0.751	0.707	0.751	0.724	0.684	0.683	0.686
Mean house price growth	-0.388	-0.388	-0.388	-0.388	-0.388	-0.388	-0.388

Panel D: 2007–2010 house price growth, non-sand states

2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<u>Credit supply</u>							
Subprime share	-0.032*** (0.005)						
Non-core-deposit liabilities		-0.028*** (0.005)					
Worse originator share			-0.028*** (0.005)				
Private securitization				-0.017*** (0.005)			
<u>Speculation</u>							
Non-owner occupancy					-0.005 (0.004)		
Out-of-town purchaser						-0.018*** (0.005)	
House price growth (2002)							-0.003 (0.006)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,849	2,849	2,849	2,849	2,849	2,849	2,849
R^2	0.721	0.706	0.710	0.698	0.691	0.695	0.691
Mean house price growth	-0.159	-0.159	-0.159	-0.159	-0.159	-0.159	-0.159

Table IA.14Fractional polynomial model F -tests.This table reports F -test results (with p -values in parentheses) for a restriction of the model to a linear (OLS) model relative to the best-fitting two-term fractional polynomial model.

2002 zip code characteristics	Fractional polynomial F tests (Two dimensional model versus OLS)	
	2003–2006	2007–2010
<u><i>Credit supply</i></u>		
Subprime share	0.22 (0.8818)	6.81*** (0.0001)
Non-core-deposit liabilities	10.31*** (0.0000)	6.93*** (0.0001)
Worse originator share	8.96*** (0.0000)	1.91 (0.1258)
Private securitization	0.77 (0.5128)	0.17 (0.9156)
<u><i>Speculation</i></u>		
Non-owner occupancy	7.97*** (0.0000)	0.12 (0.9497)
Out-of-town purchaser	9.33*** (0.0000)	6.99*** (0.0001)
House price growth (2002)	1.75 (0.1550)	0.35 (0.7879)

Table IA.15

Variance inflation factors.

This table reports the variance inflation factor (VIF) of the variables for credit supply and speculation exposure. Credit supply and speculation variables are standardized and demeaned based on MSA-level averages, and the same control variables used in the baseline specifications are also included when computing VIFs.

2002 zip code characteristics	VIF
Subprime share	2.42
Non-core-deposit liabilities	1.66
Worse originator share	2.07
Private securitization	1.26
Non-owner occupancy	1.76
Out-of-town purchaser	1.28
House price growth (2002)	1.04

Table IA.16

Propensity score weighted multivariate house price growth regressions.

This table reports coefficients for regressions estimating equation (3) where zip codes are weighted by inverse propensity scores. The variable on which propensity scores are based is reported at the top of the table. Panel A considers house price growth from 2003 to 2006 (i.e., price appreciation from December of 2002 to December of 2006). Panel B considers house price growth from 2007 to 2010 (i.e., price appreciation from December of 2006 to December of 2010). Credit supply and speculation variables are standardized so that coefficients reflect the impact of changing the variable by one standard deviation. All regressions include zip code level controls for population, housing units, and vacancy rates from 2000 census data, 2002 average IRS income, as well as MSA fixed effects. Standard errors clustered by MSA are reported in parentheses. * indicates 10% significance, ** indicates 5% significance, and *** indicates 1% significance.

Panel A: 2003–2006 house price growth

GPS treatment variable	Subprime	Non-core	Worse orig.	Private sec.	Non-owner	Out-of-town
2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)
<i>Credit supply</i>						
Subprime share	0.016** (0.007)	0.018** (0.007)	0.017** (0.007)	0.017** (0.007)	0.037*** (0.013)	0.017** (0.007)
Non-core-deposit liabilities	-0.012 (0.008)	-0.012 (0.009)	-0.012 (0.009)	-0.012 (0.009)	-0.010 (0.012)	-0.014 (0.009)
Worse originator share	0.017* (0.010)	0.016* (0.010)	0.016* (0.010)	0.017* (0.009)	0.004 (0.011)	0.017* (0.009)
Private securitization	0.005 (0.010)	0.005 (0.011)	0.005 (0.011)	0.004 (0.011)	0.001 (0.014)	0.006 (0.010)
<i>Speculation</i>						
Non-owner occupancy	0.013* (0.007)	0.014* (0.007)	0.014* (0.007)	0.014* (0.007)	0.026 (0.016)	0.012* (0.007)
Out-of-town purchaser	-0.007 (0.008)	-0.007 (0.008)	-0.007 (0.008)	-0.007 (0.008)	-0.009 (0.008)	-0.008 (0.008)
House price growth (2002)	-0.001 (0.006)	-0.002 (0.006)	-0.001 (0.006)	-0.002 (0.005)	-0.005 (0.006)	-0.004 (0.005)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,539	3,539	3,539	3,539	3,539	3,539
R^2	0.857	0.857	0.857	0.857	0.852	0.859
Mean house price growth	0.454	0.454	0.454	0.454	0.454	0.454
Credit supply F -test (p -value)	0.018**	0.009***	0.015**	0.011**	0.001***	0.006***
Speculation F -test (p -value)	0.264	0.242	0.247	0.249	0.214	0.292

Panel B: 2007–2010 house price growth

GPS treatment variable	Subprime	Non-core	Worse orig.	Private sec.	Non-owner	Out-of-town
2002 zip code characteristics	(1)	(2)	(3)	(4)	(5)	(6)
<i>Credit supply</i>						
Subprime share	-0.022*** (0.005)	-0.022*** (0.005)	-0.022*** (0.005)	-0.022*** (0.005)	-0.024*** (0.006)	-0.022*** (0.005)
Non-core-deposit liabilities	-0.010** (0.004)	-0.009** (0.004)	-0.010*** (0.004)	-0.010** (0.004)	-0.011** (0.005)	-0.009** (0.004)
Worse originator share	-0.016*** (0.005)	-0.017*** (0.005)	-0.016*** (0.005)	-0.017*** (0.005)	-0.016*** (0.005)	-0.017*** (0.005)
Private securitization	-0.001 (0.005)	-0.001 (0.005)	-0.001 (0.005)	-0.001 (0.005)	-0.001 (0.006)	-0.001 (0.005)
<i>Speculation</i>						
Non-owner occupancy	0.000 (0.003)	0.000 (0.003)	-0.000 (0.003)	0.000 (0.003)	-0.003 (0.004)	0.000 (0.003)
Out-of-town purchaser	-0.004 (0.004)	-0.005 (0.004)	-0.004 (0.004)	-0.004 (0.004)	-0.006 (0.004)	-0.006 (0.004)
House price growth (2002)	-0.004 (0.004)	-0.004 (0.004)	-0.004 (0.004)	-0.004 (0.004)	-0.002 (0.004)	-0.003 (0.004)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
MSA fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,539	3,539	3,539	3,539	3,539	3,539
R^2	0.839	0.840	0.839	0.839	0.837	0.840
Mean house price growth	-0.209	-0.209	-0.209	-0.209	-0.209	-0.209
Credit supply F -test (p -value)	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
Speculation F -test (p -value)	0.378	0.350	0.316	0.378	0.173	0.346