APPENDIX 1. Milestones in China's policies on the housing market, 2005–2014

Date	Milestone Policies	Dummy variable D=1
March 2005	State Council issues eight directives to stabilize housing prices.	From January 2005 to June 2005
May 2006	State Council issues six directives on healthy development of housing market.	From March 2006 to August 2006
March 2007	Property Law enacted.	From January 2007 to June 2007
December 2008	State Council issues 13 directives to promote the healthy development of the housing market.	From October 2008 to March 2009
December 2009	State Council issues four directives to curb excessive increase in housing prices.	From October 2009 to March 2010
April 2010	State Council issues 11 new directives to stabilize housing prices.	From February 2010 to July 2010
January 2011	State Council issues eight new directives on healthy development of the housing market.	From November 2010 to April 2011
May 2012	The expansion of a property tax trial on more cities launched.	From March 2012 to August 2012
February 2013	State Council issues five directives to regulate the housing market.	From December 2012 to May 2013
May 2014	People's Bank of China issues five directives to stabilize housing prices.	From March 2014 to August 2014

Source: Various announcements from the Central People's Government of the People's Republic of China (http://english.gov.cn/).

APPENDIX 2. Basic characteristics of 10 large cities (2014)

Region	Location	Population (ten thousand)	Area (square km)	GDP (RMB billions)
Beijing	North	2151.60	16800	2133.1
Tianjin	North	1516.81	11920	1572.3
Shanghai	East	2425.68	6219	2356.1
Nanjing	East	821.61	6582	882.1
Hangzhou	East	889.20	16596	920.1
Wuhan	South	1033.8	8494	1006.9
Guangzhou	South	1308.05	7434	1670.7
Shenzhen	South	1077.89	1953	1600.2
Chongqing	West	2991.40	82400	1426.5
Chengdu	West	1442.8	12121	1005.7

Source: National Bureau of Statistics (NBS).

APPENDIX 3. Results of DSP–GJR–GARCH (1, 1) model based on different geographic distance weight matrix specifications

Parameter	Specification 3_1		Specification 3_2		Specification 3_3		Specification 3_4		Specification 3_5		Specification 3_6	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
β_{pop}	0.170**	0.085	0.171**	0.082	0.185*	0.096	0.165**	0.072	0.166**	0.085	0.171**	0.082
$\beta_{income,t-1}$	0.162***	0.029	0.148***	0.026	0.176***	0.034	0.143***	0.024	0.150***	0.027	0.152***	0.028
$\beta_{unemp,t-1}$	-0.025	0.034	-0.013	0.032	-0.029	0.037	-0.010	0.028	-0.013	0.033	-0.025	0.032
$\beta_{rate,t-1}$	-0.016	0.010	-0.016*	0.009	-0.018	0.012	-0.015*	0.008	-0.015*	0.009	-0.015	0.010
β_{SZ}	0.004	0.003	0.004	0.003	0.005	0.003	0.004*	0.002	0.004	0.003	0.004	0.003

(Continued)

Parameter	Specification 3_1		Specification 3_2		Specification 3_3		Specification 3_4		Specification 3_5		Specification 3_6	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
(Continued)												
β_{policy}	0.790*	0.478	0.758*	0.430	0.891	0.547	0.737***	0.391	0.714*	0.431	0.725	0.458
ρ	0.701***	0.026	0.718***	0.016	0.670***	0.025	0.730***	0.052	0.718***	0.026	0.703***	0.071
δ	−0.475***	0.090	−0.550***	0.028	−0.366***	0.040	−0.571***	0.115	−0.568***	0.050	−0.479***	0.047
φ	0.369***	0.131	0.352***	0.023	0.370***	0.019	0.346***	0.057	0.351***	0.077	0.365***	0.011
λ	−0.231	0.148	−0.213***	0.030	−0.212***	0.021	−0.213***	0.036	−0.213**	0.092	−0.225***	0.035
ω_0	0.210***	0.046	0.223***	0.027	0.247***	0.027	0.210***	0.059	0.232***	0.038	0.198***	0.047
ω_1	0.081***	0.014	0.082***	0.026	0.078***	0.019	0.078***	0.028	0.089***	0.027	0.072***	0.024
ω_2	0.296***	0.022	0.152***	0.032	0.189***	0.037	0.148***	0.054	0.159**	0.064	0.289***	0.073
γ	0.443***	0.066	0.486***	0.044	0.474***	0.032	0.486***	0.076	0.485***	0.074	0.449***	0.028
ψ_G	0.010	0.011	0.024***	0.009	0.019***	0.006	0.030**	0.015	0.010	0.007	1.511***	0.016
ψ_E	0.195***	0.014	0.238***	0.036	0.220***	0.028	0.221***	0.066	0.273***	0.036	0.224***	0.021
a	0.150***	0.023	0.743***	0.056	0.796***	0.088	0.507***	0.071	0.808***	0.092	0.990***	0.010
b	0.077***	0.017	0.510***	0.046	0.396***	0.093	0.459	0.404	0.289***	0.092	0.981***	0.030
c	0.105***	0.018	0.748***	0.037	1.000***	0.108	0.515***	0.162	0.861***	0.068	0.991***	0.006
ξ	5.862***	0.348	5.794***	1.044	5.825***	0.835	5.508***	1.423	5.785***	0.846	5.497***	0.640
R^2	0.337		0.378		0.279		0.430		0.362		0.360	
LL	−1749.9		−1745.0		−1749.4		−1745.2		−1746.6		−1748.1	
$RMSE$	1.439		1.395		1.501		1.335		1.413		1.415	

Notes: Specifications C1-C6 are under different kernel functions: (Specification C1) $w_{ij}^G = \begin{cases} [1-(d_{ij}/1125)^2]^2 & if\ d_{ij} \leq 1125, \\ 0 & if\ d_{ij} > 1125, \end{cases}$, (Specification C2) $w_{ij}^G = \begin{cases} [1-(d_{ij}/2020)^2]^2 & if\ d_{ij} \leq 2020, \\ 0 & if\ d_{ij} > 2020, \end{cases}$, (Specification C3) $w_{ij}^G = \begin{cases} [1-(d_{ij}/2842)^2]^2 & if\ d_{ij} \leq 2842, \\ 0 & if\ d_{ij} > 2842, \end{cases}$, (Specification C4) $w_{ij}^G = \begin{cases} [1-(d_{ij}/1591)^3]^3 & if\ d_{ij} \leq 1591, \\ 0 & if\ d_{ij} > 1591, \end{cases}$, (Specification C5) $w_{ij}^G = \begin{cases} \exp\{-\frac{1}{2}(d_{ij}/1591)^2\} & if\ d_{ij} \leq 1591, \\ 0 & if\ d_{ij} > 1591, \end{cases}$, (Specification C6) $w_{ij}^G = \begin{cases} (1/d_{ij}) & if\ d_{ij} \leq 1591, \\ 0 & if\ d_{ij} > 1591, \end{cases}$. The first and third quartile cutoff distances are 1125 km and 2020 km, respectively. The maximum distance in our sample is 2842 km between Hangzhou and Chengdu. $\beta_{pop}, \beta_{income,t-1}, \beta_{unemp,t-1},$ and $\beta_{rate,t-1}$ represent the coefficients of the contemporaneous growth rate of the urban total population, one-period lagged growth rate of the per-capita disposable income of urban households, one-period lagged registered urban unemployment rate, and one-period lagged fixed mortgage rate, respectively. $\beta_{SZ,t-1}$ is the coefficient of the one-period lagged monthly returns of the Shanghai Composite Index. β_{policy} is the coefficient for the dummy variable D which is used to reflect the effects of the national macro-control policy issued by the State Council in May 2006 on the regional housing returns and the dummy variable D takes a value of 1 covering the period from March 2006 to August 2006 and takes a value of 0 otherwise. R^2 is the goodness-of-fit. LL stands for the maximum log-likelihood function value. $RMSE$ represents the root-mean-square error. The signs ***, **, and *denote significance at the 0.01, 0.05, and 0.1 levels, respectively.

APPENDIX 4. Results of DSP–GJR–GARCH (1, 1) model based on different specifications of the explanatory variables

Parameter	Specification 4_1		Specification 4_2		Specification 4_3		Specification 4_4		Specification 4_5		Specification 4_6		Specification 4_7	
	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.	Estimate	S.E.
β_{pop}	0.193**	0.081	0.181**	0.082	—	—	0.179**	0.082	0.171**	0.072	0.168**	0.073	—	—
$\beta_{income,t-1}$	0.150***	0.027	0.138***	0.027	0.157***	0.026	0.139***	0.027	0.152***	0.024	0.144***	0.024	0.163***	0.023
$\beta_{unemp,t-1}$	-0.009	0.031	-0.008	0.032	0.002	0.032	-0.008	0.032	-0.011	0.028	-0.011	0.029	-0.002	0.029
$\beta_{rate,t-1}$	-0.015	0.009	-0.015	0.010	-0.016*	0.010	-0.016*	0.010	-0.015*	0.008	-0.014*	0.008	-0.015*	0.009
$\beta_{SZ,t-1}$	0.004	0.003	—	—	0.004	0.003	0.004	0.003	0.004*	0.002	—	—	0.004*	0.002
β_{policy}	—	—	1.318***	0.264	1.309***	0.263	1.301***	0.262	—	—	0.756*	0.402	0.747*	0.404
ρ	0.708***	0.035	0.710***	0.019	0.709***	0.034	0.709***	0.024	0.725***	0.023	0.728***	0.027	0.724***	0.027
δ	-0.512***	0.072	-0.521***	0.044	-0.523***	0.074	-0.525***	0.036	-0.556***	0.054	-0.555***	0.078	-0.551***	0.105
φ	0.384***	0.033	0.376*	0.198	0.376***	0.049	0.374***	0.069	0.344***	0.026	0.349***	0.030	0.349***	0.065
λ	-0.240***	0.048	-0.233	0.152	-0.230***	0.043	-0.234**	0.108	-0.213***	0.027	-0.213***	0.036	-0.209***	0.072
ω_0	0.149**	0.072	0.160**	0.063	0.165***	0.060	0.162***	0.058	0.209***	0.032	0.206***	0.046	0.216***	0.045
ω_1	0.083**	0.042	0.080***	0.023	0.085***	0.025	0.083***	0.024	0.075***	0.027	0.073***	0.026	0.082***	0.028
ω_2	0.214***	0.045	0.200***	0.063	0.199***	0.073	0.202**	0.087	0.150***	0.047	0.156***	0.055	0.158***	0.042
γ	0.449*	0.248	0.452*	0.240	0.449***	0.048	0.450***	0.093	0.489***	0.053	0.486***	0.200	0.481***	0.062
ψ_G	0.021	0.013	0.022	0.015	0.018	0.012	0.021	0.013	0.030**	0.015	0.033**	0.015	0.026**	0.012
ψ_E	0.498***	0.122	0.484**	0.221	0.496***	0.067	0.477***	0.040	0.222***	0.052	0.232***	0.060	0.239***	0.042
a	0.464*	0.258	0.490**	0.240	0.501***	0.060	0.490***	0.099	0.513***	0.056	0.505***	0.081	0.499***	0.063
b	0.503***	0.165	0.558***	0.079	0.563***	0.158	0.535***	0.078	0.473***	0.108	0.439*	0.231	0.424***	0.062
c	0.480	0.339	0.518***	0.100	0.524***	0.116	0.510***	0.051	0.532***	0.042	0.527***	0.163	0.517***	0.040
ξ	—	—	—	—	—	—	—	—	6.244***	1.240	5.546***	1.472	5.520***	1.181
R^2	0.388		0.400		0.401		0.401		0.420		0.421		0.416	
LL	-1788.3		-1785.9		-1788.2		-1785.1		-1740.9		-1746.7		-1748.9	
$RMSE$	1.383		1.369		1.368		1.368		1.346		1.345		1.351	

Notes: The table presents the regression results based on different specifications of the explanatory variables. β_{pop}, $\beta_{income,t-1}$, $\beta_{unemp,t-1}$, and $\beta_{rate,t-1}$ represent the coefficients of the contemporaneous growth rate of the urban total population, one-period lagged growth rate of the per-capita disposable income of urban households, one-period lagged registered urban unemployment rate, and one-period lagged fixed mortgage rate, respectively. $\beta_{SZ,t-1}$ is the coefficient of the one-period lagged monthly returns of the Shanghai Composite Index. β_{policy} is the coefficient for the dummy variable D, which is used to reflect the effects of the national macro-control policy issued by the State Council in May 2006 on the regional housing returns and the dummy variable D takes a value of 1 covering the period from March 2006 to August 2006 and takes a value of 0 otherwise. R^2 is the goodness-of-fit. LL stands for the maximum log-likelihood function value. $RMSE$ represents the root-mean-square error. The signs ***, **, and *denote significance at the 0.01, 0.05, and 0.1 levels, respectively.