The Housing Wealth Effect: The Crucial Roles of Demographics, Wealth Distribution and Wealth Shares

Supplemental Appendix C
IV Regressions using Alternate Homeowner Definitions

Charles W. Calomiris, Stanley D. Longhofer and William Miles[†]

This supplemental appendix contains tables and figures based on IV regression models run using data in which the raw number of owner-occupied households is used rather than the three-year moving averages. Only those tables and figures that differ from the versions appearing in the text are presented here.

[†] Calomiris is Henry Kaufman Professor of Financial Institutions at Columbia Business School and Research Associate, National Bureau of Economic Research. Longhofer is Stephen L. Clark Chair of Real Estate and Finance, and Director, Center for Real Estate, Barton School of Business, Wichita State University. Miles is Professor of Economics and a Barton Fellow in the Barton School of Business, Wichita State University.

Table 1 – Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Consumption	1,275	11,997	2,186	6,887	20,973
Income	1,275	29,550	6,544	15,877	63,053
Housing Wealth	1,275	45,357	21,844	16,789	173,191
Stock Wealth	1,275	56,169	24,989	7,496	120,102
Total Wealth	1,275	101,525	41,609	28,093	263,773
Housing Wealth Percent	1,275	0.457	0.103	0.244	0.734
Stock Wealth Percent	1,275	0.543	0.103	0.266	0.756
Percent Young (Ages 20-34)	1,275	0.312	0.041	0.229	0.478
Percent Middle Age (Ages 35-54)	1,275	0.384	0.034	0.292	0.499
Percent Old (Ages 55+)	1,275	0.304	0.033	0.135	0.386
Poverty Rate	1,275	0.127	0.038	0.029	0.272
Log Difference of					
Consumption	1,275	0.012	0.033	-0.122	0.156
Income	1,275	0.019	0.022	-0.108	0.096
Housing Wealth	1,275	0.029	0.061	-0.372	0.259
Stock Wealth	1,275	0.056	0.152	-0.423	0.429
Total Wealth	1,275	0.041	0.094	-0.364	0.265

Notes: Consumption, income and wealth variables are expressed in real, per-capita terms. Data are presented for the years 1985-2009 for all U.S. states and the District of Columbia; the years 1981-1984 are excluded from the analysis because of lags used for instrumenting.

Table 3 – Panel Data Wealth Effect Regressions

	Model 1	Model 2	Model 3	Model 4	Model 5
Income	0.936 ***	1.049 ***	0.767 ***	0.628 ***	0.636 ***
	(0.077)	(0.085)	(0.091)	(0.085)	(0.088)
Housing Wealth	0.132 ***	-0.040	0.970	-6.595 **	-7.442 ***
	(0.034)	(0.103)	(0.630)	(2.774)	(2.561)
Stock Wealth	0.066 ***	-0.101	1.150 ***	-8.273 ***	-8.157 ***
	(0.018)	(0.129)	(0.280)	(2.146)	(2.061)
Total Wealth		0.326		15.655 ***	15.927 ***
		(0.228)		(4.231)	(3.871)
Young Percent			0.076	0.024	0.034
			(0.082)	(0.079)	(0.107)
Old Percent			-0.123	-0.447 ***	-0.396 ***
			(0.106)	(0.129)	(0.153)
Poverty Rate			0.206 **		0.196 ***
			(0.100)		(0.072)
Young × Housing Wealth			-1.627	8.620 *	12.199 ***
			(1.130)	(4.968)	(4.652)
Old × Housing Wealth			-0.150	12.117 ***	13.978 ***
			(1.175)	(4.390)	(4.089)
Poverty × Housing Wealth			-1.548		-5.684 *
			(1.156)		(3.190)
Young × Stock Wealth			-0.755	11.623 ***	13.520 ***
			(0.594)	(3.371)	(3.353)
Old × Stock Wealth			-2.976 ***	13.598 ***	14.109 ***
			(0.657)	(3.767)	(3.448)
Poverty × Stock Wealth			0.177		-6.303 *
			(0.955)		(3.456)
Young × Total Wealth				-21.322 ***	-26.273 ***
				(7.423)	(7.157)
Old × Total Wealth				-26.496 ***	-28.055 ***
				(6.936)	(5.999)
Poverty × Total Wealth					12.569 *
					(7.340)
Constant	-0.012 ***	-0.012 ***	-0.059	0.070	0.038
	(0.001)	(0.002)	(0.049)	(0.056)	(0.071)
Observations	1,275	1,275	1,275	1,275	1,275
Wald Chi-square	379.47 ***	373.22 ***	735.92 ***	621.61 ***	1,111.71 ***
Degrees of freedom	53	54	62	62	66

Notes: The dependent variable is log difference of real, per capita consumption (where consumption is proxied by state-level retail sales). Wealth variables are expressed in log differences of real, per capita values. Young Percent is the percent of the adult population ages 20-34; Old Percent is the percentage of the adult population ages 55 and up; Poverty is the poverty rate. All wealth and interaction variables are instrumented using the 2^{nd}-4^{th} lags of these variables. Standard errors (clustered by state) are shown in parentheses below the estimates. The Wald Chi-square statistic tests for the joint significance of all of the coefficients except the constant term.

*** Coefficient significant at the 1% level.

** Coefficient significant at the 5% level.

* Coefficient significant at the 10% level.

Table 4 – Estimated Wealth Effects, Elasticities and Derivatives

	Model 1	Model 2	Model 3	Model 4	Model 5
Housing Wealth Effect (HWE)	0.040 ***	0.033 ***	0.066 ***	0.063 ***	0.077 ***
Stock Wealth Effect (SWE)	0.017 ***	0.020 ***	0.009 *	0.001	-0.005
Difference	0.022 *	0.013	0.057 ***	0.063 ***	0.082 ***
Housing Wealth Elasticity	0.132 ***	0.109 ***	0.219 ***	0.210 ***	0.256 ***
Stock Wealth Elasticity	0.066 ***	0.076 ***	0.033 *	0.002	-0.017
Difference	0.067	0.033	0.186 ***	0.208 ***	0.273 ***
Wealth Effect Derivatives					
d HWE / d Young Percent			-0.490	-0.338	0.059
d HWE / d Old Percent			-0.045	0.003	0.349
d HWE / d Poverty Rate			-0.467		0.018
d SWE / d Young Percent			-0.201	0.011	-0.199
d SWE / d Old Percent			-0.793	-0.211	-0.300
d SWE / d Poverty Rate			0.047		0.139

Notes: Standard errors (clustered by state) are shown in parentheses below the estimates.
*** Estimated value significant at the 1% level.
** Estimated value significant at the 5% level.
* Estimated value significant at the 10% level.

Housing and stock wealth effects are expressed in dollar terms and calculated at the sample mean values for all variables. Housing and stock wealth elasticities and wealth effect derivatives are calculated at sample means for all variables as well.

Table 5 – Factors Affecting Estimated Housing and Stock Wealth Effects

State	HWE	SWE	Cons. / HW	Cons. / SW	Young Percent	Old Percent	Poverty Rate	HW / TW	SW / TW	Total Wealth
SD	0.132	-0.001	0.548	0.288	0.300	0.336	0.130	0.347	0.653	82,818
ND	0.121	-0.007	0.505	0.266	0.313	0.328	0.120	0.339	0.661	81,660
IA	0.113	-0.011	0.406	0.215	0.291	0.341	0.104	0.340	0.660	90,079
WV	0.103	-0.026	0.337	0.360	0.276	0.350	0.176	0.479	0.521	70,646
MS	0.101	-0.041	0.340	0.404	0.322	0.309	0.212	0.495	0.505	64,271
NE	0.101	-0.003	0.433	0.222	0.305	0.322	0.106	0.337	0.663	86,999
AR	0.100	-0.011	0.371	0.368	0.296	0.339	0.177	0.466	0.534	66,846
AL	0.094	-0.030	0.322	0.383	0.308	0.317	0.170	0.499	0.501	76,696
KY	0.087	-0.012	0.350	0.351	0.310	0.308	0.164	0.470	0.530	73,713
SC	0.087	-0.033	0.292	0.402	0.320	0.300	0.149	0.532	0.468	83,142
TN	0.087	-0.018	0.327	0.365	0.308	0.307	0.157	0.494	0.506	80,980
NM	0.083	-0.017	0.279	0.302	0.317	0.296	0.198	0.501	0.499	85,691
FL	0.080	-0.006	0.279	0.253	0.276	0.373	0.134	0.473	0.527	109,268
LA	0.079	-0.011	0.346	0.362	0.326	0.293	0.198	0.474	0.526	70,932
OK	0.079	0.007	0.376	0.310	0.307	0.322	0.152	0.425	0.575	70,423
KS	0.077	0.001	0.373	0.188	0.310	0.315	0.113	0.333	0.667	91,321
IN	0.075	0.002	0.365	0.307	0.312	0.305	0.112	0.435	0.565	83,976
ID	0.074	-0.005	0.299	0.277	0.314	0.300	0.129	0.473	0.527	88,832
ME	0.074	-0.005	0.295	0.308	0.280	0.326	0.116	0.496	0.504	99,717
MO	0.074	0.003	0.348	0.196	0.301	0.323	0.125	0.358	0.642	100,263
DE	0.072	-0.011	0.289	0.221	0.315	0.306	0.092	0.441	0.559	124,354
OR	0.071	-0.007	0.275	0.246	0.294	0.314	0.119	0.474	0.526	110,730
PA	0.071	-0.005	0.276	0.209	0.282	0.345	0.109	0.428	0.572	103,016
NV	0.068	-0.009	0.289	0.349	0.322	0.286	0.105	0.526	0.474	101,629
NC	0.067	-0.001	0.296	0.325	0.320	0.299	0.138	0.496	0.504	87,886
AZ	0.066	-0.001	0.270	0.272	0.324	0.310	0.150	0.499	0.501	96,179
GA	0.066	-0.011	0.312	0.346	0.341	0.260	0.143	0.490	0.510	86,746
MT	0.065	0.009	0.309	0.237	0.280	0.327	0.148	0.433	0.567	96,286
OH	0.065	0.005	0.320	0.238	0.301	0.316	0.120	0.415	0.585	92,244
WI	0.064	0.002	0.328	0.221	0.304	0.312	0.097	0.393	0.607	101,535
MI	0.062	0.008	0.320	0.226	0.308	0.302	0.124	0.407	0.593	97,734
WA	0.057	-0.011	0.221	0.236	0.315	0.285	0.106	0.509	0.491	121,401
IL	0.055	0.001	0.257	0.214	0.319	0.298	0.124	0.445	0.555	108,797
VT	0.054	0.002	0.268	0.238	0.295	0.302	0.095	0.464	0.536	114,649
WY	0.053	0.009	0.306	0.233	0.303	0.294	0.108	0.428	0.572	102,463
VA	0.051	-0.006	0.232	0.258	0.327	0.277	0.099	0.508	0.492	112,669
MD	0.050	-0.010	0.207	0.215	0.314	0.281	0.090	0.506	0.494	129,051
MN	0.050	0.006	0.307	0.169	0.313	0.296	0.099	0.355	0.645	124,163

Table 5 – Factors Affecting Estimated Housing and Stock Wealth Effects

State	HWE	SWE	Cons. / HW	Cons. / SW	Young Percent	Old Percent	Poverty Rate	HW / TW	SW / TW	Total Wealth
NH	0.050	0.016	0.338	0.311	0.301	0.289	0.067	0.471	0.529	115,287
CA	0.048	-0.019	0.161	0.240	0.347	0.267	0.144	0.589	0.411	132,699
NJ	0.048	-0.008	0.193	0.173	0.293	0.313	0.086	0.472	0.528	148,872
UT	0.046	0.006	0.276	0.303	0.394	0.246	0.093	0.505	0.495	88,613
HI	0.042	-0.007	0.166	0.278	0.320	0.300	0.102	0.620	0.380	149,084
MA	0.042	-0.001	0.198	0.180	0.313	0.308	0.102	0.469	0.531	146,917
NY	0.042	0.004	0.216	0.172	0.308	0.310	0.149	0.439	0.561	114,369
RI	0.042	0.012	0.216	0.225	0.305	0.325	0.105	0.498	0.502	109,164
TX	0.040	0.027	0.421	0.336	0.347	0.265	0.167	0.420	0.580	73,089
CT	0.039	0.001	0.171	0.197	0.290	0.317	0.081	0.528	0.472	156,060
CO	0.036	0.010	0.253	0.198	0.328	0.260	0.105	0.435	0.565	125,803
DC	0.031	0.001	0.153	0.105	0.362	0.283	0.188	0.424	0.576	150,156
AK	0.022	0.015	0.329	0.288	0.361	0.187	0.095	0.448	0.552	97,872
Total	0.068	-0.004	0.301	0.266	0.312	0.304	0.127	0.457	0.543	101,525

Notes: Cell entries are averages of the variable over the years 1985-2009; the years 1981-1984 are excluded from the analysis because of lags used for instrumenting. Note that the average housing and stock wealth effects over the entire sample are not the same as the housing and stock wealth effects calculated at the sample means of the variables, and thus the totals presented in this table correctly differ from the values shown in Table 4.

Variables are defined as follows:

HWE = Average housing wealth effect
SWE = Average stock wealth effect
Cons. / HW = Average consumption-to-housing wealth ratio
Cons. / SW = Average consumption-to-stock wealth ratio
Young Percent = Average percent of the adult population ages 20-34
Old Percent = Average percent of the adult population ages 55 and up
Poverty Rate = Average poverty rate
HW / TW = Average housing wealth-to-total wealth ratio
SW / TW = Average stock wealth-to-total wealth ratio
Total Wealth = Average real, per capita total wealth

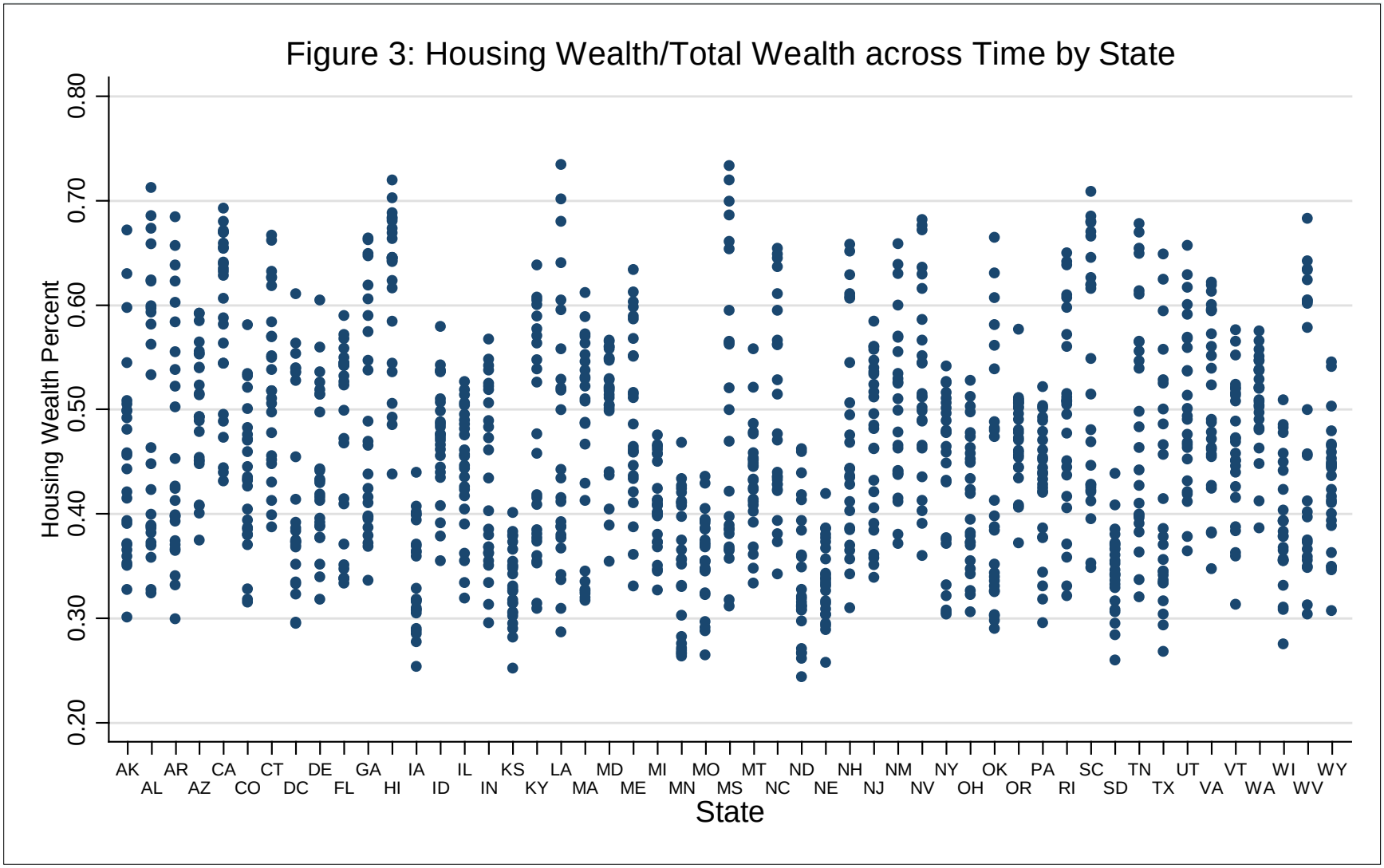
Table 9 – Wealth Variability over Time by State

	Housing Wealth			Stock Wealth		
State	Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
AK	41,348	8,932	0.22	57,802	27,055	0.47
AL	34,113	9,062	0.27	43,743	27,256	0.62
AR	28,565	7,185	0.25	38,998	20,480	0.53
AZ	47,663	17,515	0.37	49,355	17,412	0.35
CA	78,033	32,184	0.41	55,395	20,867	0.38
CO	54,158	17,284	0.32	72,435	22,571	0.31
CT	81,526	18,500	0.23	75,325	22,580	0.30
DC	67,867	39,841	0.59	83,348	20,341	0.24
DE	56,389	23,874	0.42	68,283	15,104	0.22
FL	51,593	20,735	0.40	58,066	18,230	0.31
GA	39,072	8,990	0.23	48,587	26,109	0.54
HI	92,625	39,690	0.43	57,310	21,994	0.38
IA	29,443	8,010	0.27	61,677	24,487	0.40
ID	41,110	15,873	0.39	48,624	21,496	0.44
IL	47,117	13,100	0.28	62,439	23,564	0.38
IN	33,860	8,950	0.26	51,010	26,480	0.52
KS	29,804	6,685	0.22	62,152	19,061	0.31
KY	31,497	8,166	0.26	43,044	24,383	0.57
LA	30,547	7,064	0.23	41,101	22,351	0.54
MA	67,687	17,008	0.25	79,744	24,474	0.31
MD	64,673	24,377	0.38	65,346	25,679	0.39
ME	47,244	12,766	0.27	53,610	25,019	0.47
MI	38,877	11,483	0.30	59,656	22,247	0.37
MN	43,834	13,407	0.31	80,936	21,859	0.27
MO	35,324	9,356	0.26	65,389	20,434	0.31
MS	28,149	7,005	0.25	37,059	23,007	0.62
MT	41,701	16,167	0.39	55,510	19,166	0.35
NC	40,947	10,738	0.26	47,779	23,246	0.49
ND	26,557	8,195	0.31	56,133	22,544	0.40
NE	28,660	6,815	0.24	59,200	18,955	0.32
NH	52,065	11,534	0.22	64,550	27,369	0.42
NJ	70,675	20,347	0.29	78,525	16,485	0.21
NM	40,901	11,190	0.27	45,414	21,210	0.47
NV	51,689	20,340	0.39	50,756	23,337	0.46
NY	49,618	12,390	0.25	65,296	17,931	0.27
OH	36,389	7,674	0.21	56,758	23,858	0.42
OK	27,180	4,572	0.17	44,370	22,918	0.52
OR	52,870	23,730	0.45	58,849	23,191	0.39

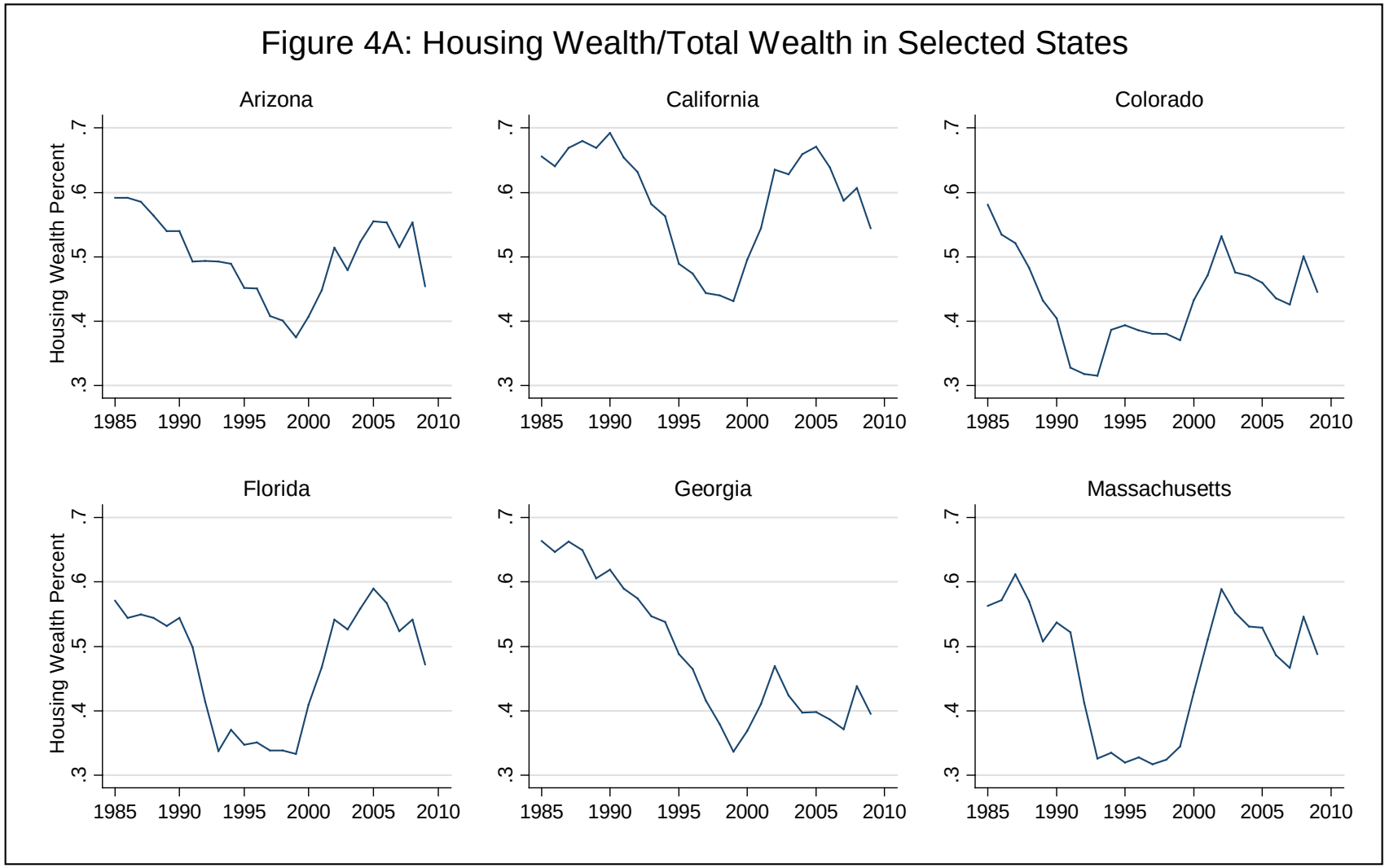
Table 9 – Wealth Variability over Time by State

	Housing Wealth			Stock Wealth		
State	Mean	Standard Deviation	Coefficient of Variation	Mean	Standard Deviation	Coefficient of Variation
PA	43,299	11,678	0.27	60,388	20,190	0.33
RI	52,762	15,469	0.29	57,505	23,592	0.41
SC	39,909	12,240	0.31	44,109	27,964	0.63
SD	28,467	10,005	0.35	55,394	19,743	0.36
TN	36,733	8,969	0.24	44,895	24,705	0.55
TX	28,246	5,067	0.18	45,571	21,832	0.48
UT	42,524	14,898	0.35	47,040	23,752	0.50
VA	54,773	15,875	0.29	59,035	28,125	0.48
VT	52,196	13,757	0.26	63,436	21,284	0.34
WA	60,789	21,953	0.36	61,798	25,995	0.42
WI	38,441	11,573	0.30	63,882	25,674	0.40
WV	30,240	7,440	0.25	41,342	24,449	0.59
WY	43,434	15,743	0.36	59,910	21,275	0.36

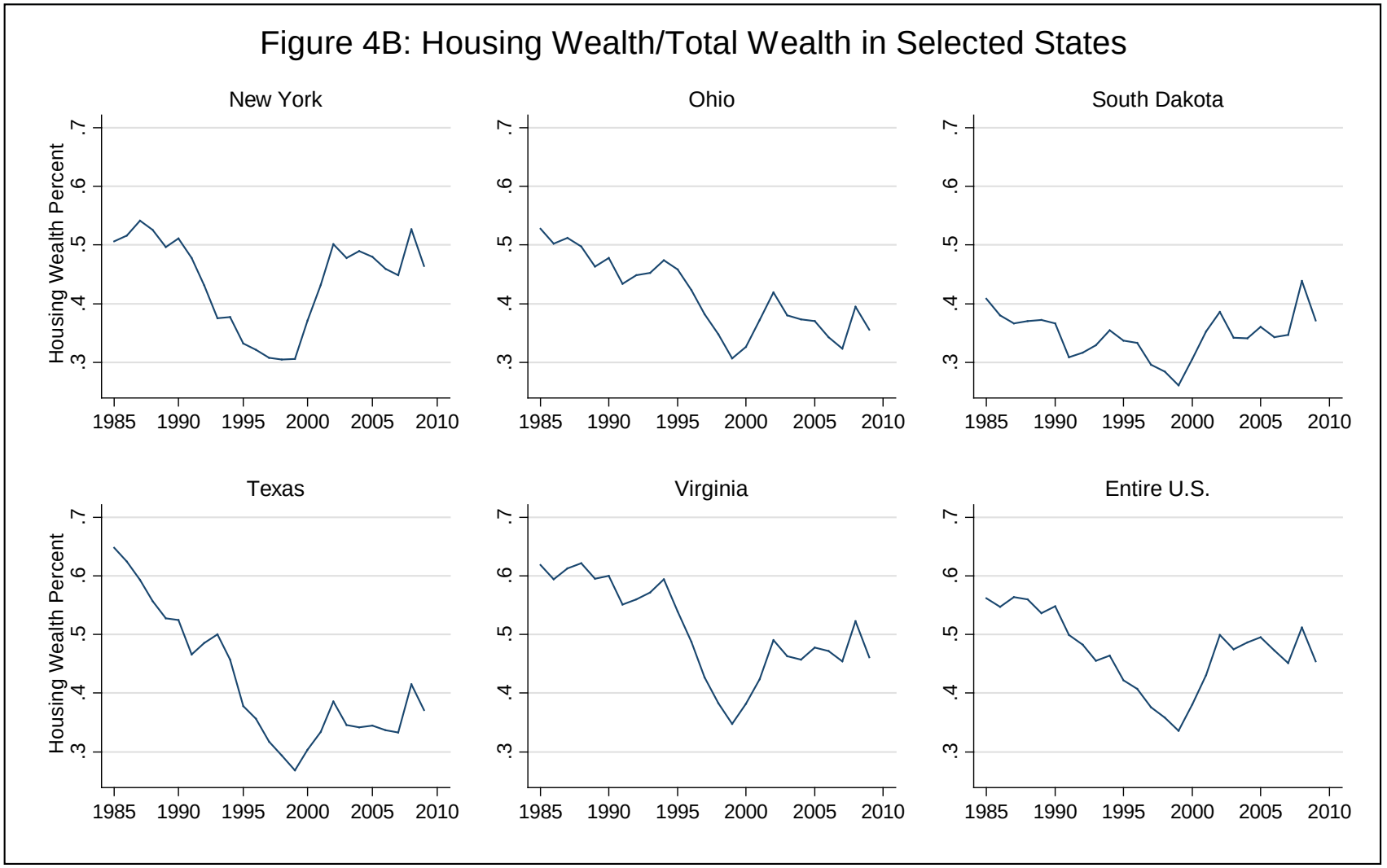
Notes: Cell entries show the mean, standard deviation, and coefficient of variation for housing and stock wealth across time for each state. In general, stock wealth is more variable than housing wealth.



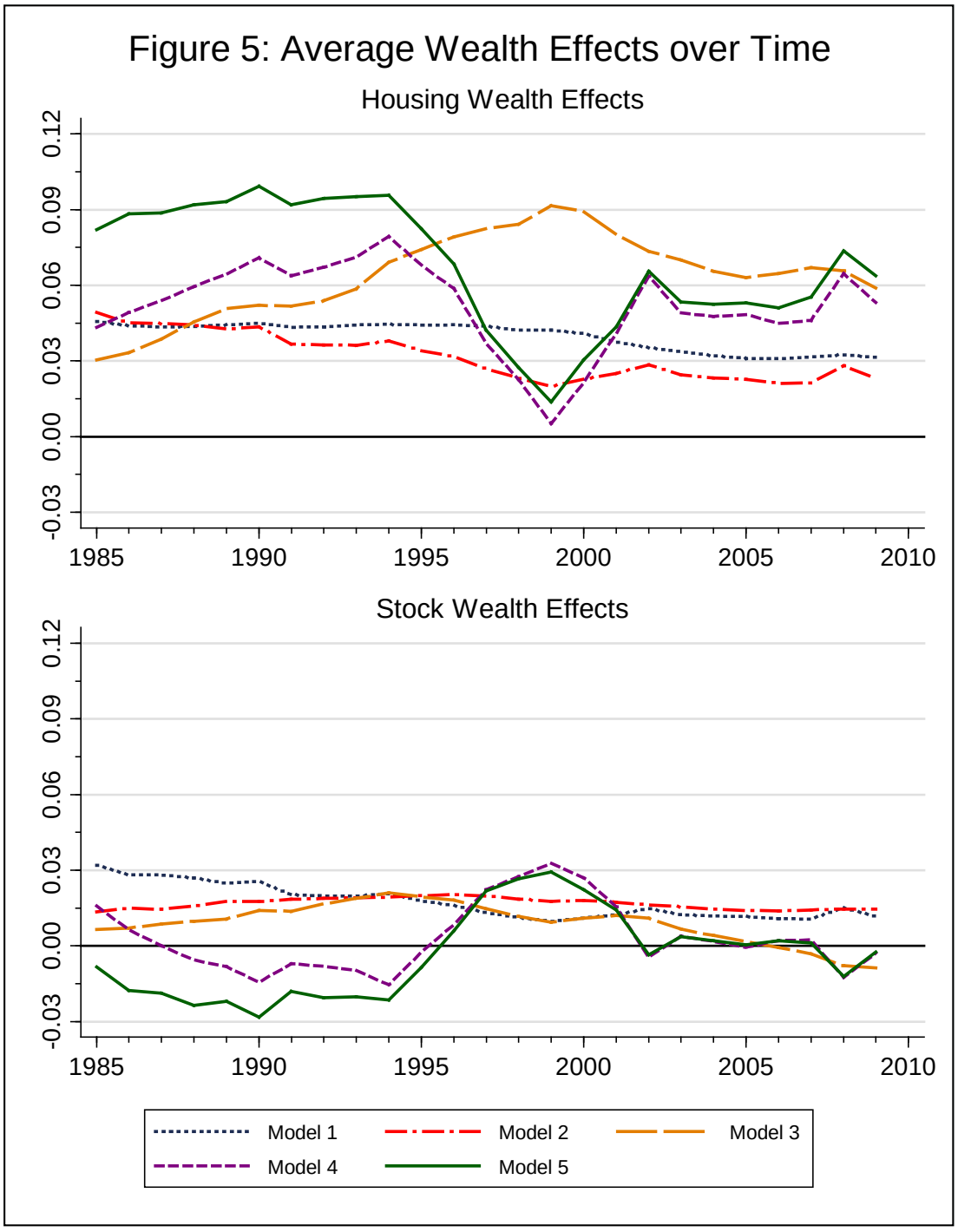
Notes: Figure shows fraction of total wealth comprised by housing wealth in each year of the analysis for each state. Data are presented for the years 1985-2009; the years 1981-1984 are excluded from the analysis because of lags used for instrumenting.



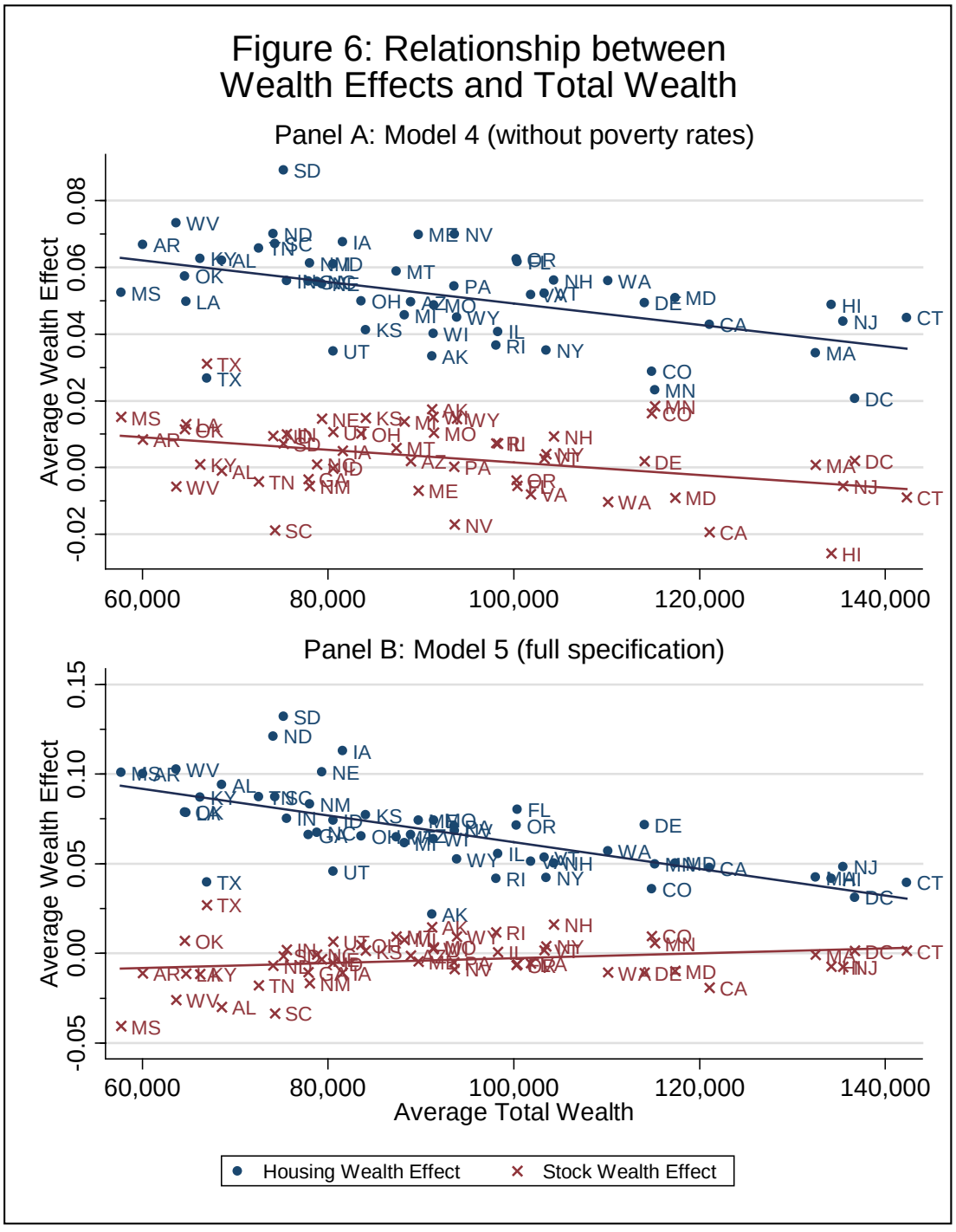
Notes: Figure shows fraction of total wealth comprised by housing wealth over time for selected states and the United States as a whole.



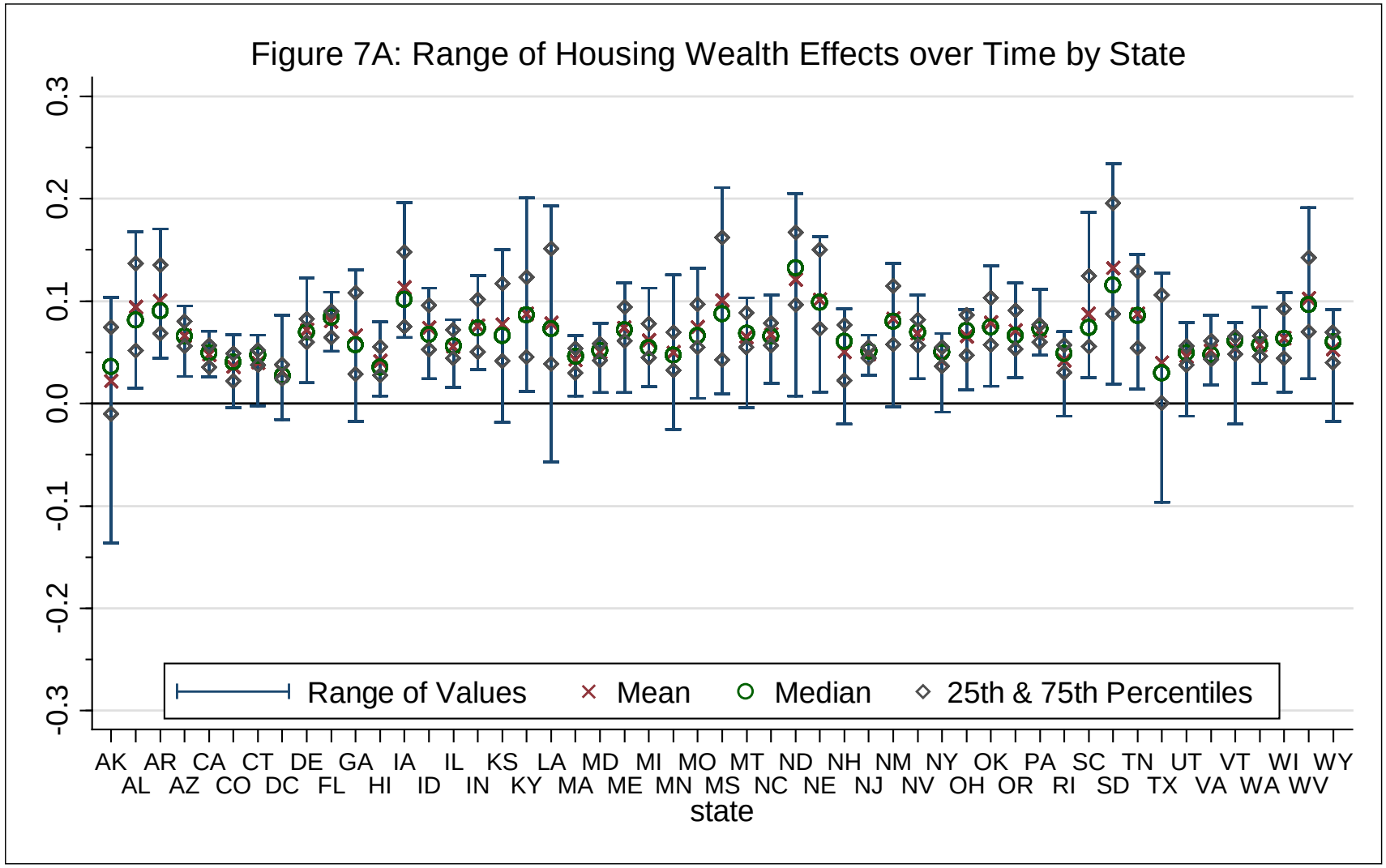
Notes: Figure shows fraction of total wealth comprised by housing wealth over time for selected states and the United States as a whole.



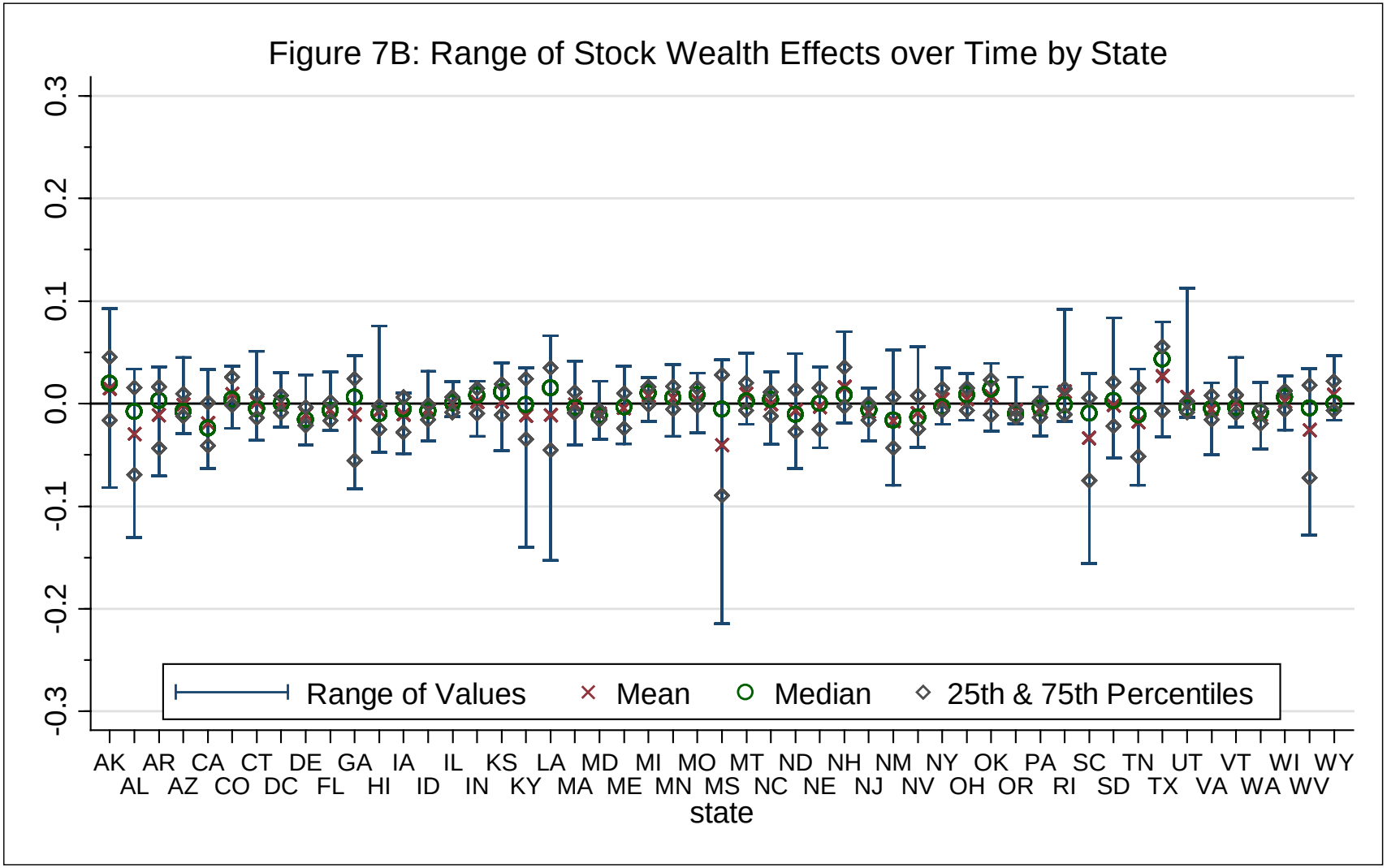
Notes: The time path of the average housing and stock wealth effects are shown for each of the five models presented in Table 3 (each year's value is the average across states). Model 1 is a traditional constant elasticity framework. Model 2 allows housing and stock wealth elasticities to vary based on the composition of total wealth. Model 3 includes demographic effects (age and unemployment rates) but not wealth compositions. Model 4 includes both age demographics and wealth compositions but not unemployment rates. Model 5 includes all demographic wealth composition effects.



Notes: Figure shows the relationship between each state's average housing and stock wealth effects and average total wealth within that state (averaged across over the years of the analysis, 1985-2009, within each state). Panel A calculates the average housing and stock wealth effects using the parameter estimates from Model 4, which does not include the poverty rate. Panel B calculates the wealth effects using the parameter estimates from Model 5 (the full specification).



Notes: For each state, figure shows the range of calculated housing wealth effects over the years of the analysis (1985-2009), as well as the mean, median, 25th percentile and 75th percentile of these values.



Notes: For each state, figure shows the range of calculated stock wealth effects over the years of the analysis (1985-2009), as well as the mean, median, 25th percentile and 75th percentile of these values.

Table A1 – State Fixed Effect Coefficients for Table 3 - Model 5

State		State		State	
AK	Omitted	KY	0.039 ***	NY	0.039 ***
			(0.013)		(0.013)
AL	0.044 ***	LA	0.023 *	OH	0.052 ***
	(0.013)		(0.012)		(0.011)
AR	0.047 ***	MA	0.044 ***	OK	0.040 ***
	(0.015)		(0.010)		(0.013)
AZ	0.040 ***	MD	0.032 ***	OR	0.043 ***
	(0.013)		(0.008)		(0.012)
CA	0.025 ***	ME	0.058 ***	PA	0.060 ***
	(0.008)		(0.011)		(0.013)
CO	0.027 ***	MI	0.044 ***	RI	0.055 ***
	(0.007)		(0.010)		(0.011)
CT	0.052 ***	MN	0.049 ***	SC	0.038 ***
	(0.010)		(0.010)		(0.012)
DC	0.002	MO	0.054 ***	SD	0.052 ***
	(0.018)		(0.013)		(0.016)
DE	0.045 ***	MS	0.034 **	TN	0.041 ***
	(0.010)		(0.014)		(0.012)
FL	0.066 ***	MT	0.045 ***	TX	0.011
	(0.017)		(0.014)		(0.010)
GA	0.022 ***	NC	0.036 ***	UT	0.026 ***
	(0.008)		(0.012)		(0.008)
HI	0.041 ***	ND	0.052 ***	VA	0.035 ***
	(0.010)		(0.015)		(0.008)
IA	0.063 ***	NE	0.062 ***	VT	0.044 ***
	(0.013)		(0.012)		(0.009)
ID	0.038 ***	NH	0.055 ***	WA	0.032 ***
	(0.011)		(0.007)		(0.009)
IL	0.041 ***	NJ	0.051 ***	WI	0.052 ***
	(0.010)		(0.009)		(0.010)
IN	0.046 ***	NM	0.026 *	WV	0.055 ***
	(0.010)		(0.014)		(0.016)
KS	0.048 ***	NV	0.047 ***	WY	0.032 ***
	(0.012)		(0.008)		(0.010)

Notes: Standard errors (clustered by state) are shown in parentheses below the estimates.
*** Coefficient significant at the 1% level.
** Coefficient significant at the 5% level.
* Coefficient significant at the 10% level.