

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

Supplemental Appendix B IV Regressions using Unemployment Rate

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

This supplemental appendix contains tables and figures based on IV regression models run using the unemployment rate instead of the poverty rate as a measure of wealth distribution. 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	45,348	21,778	17,173	170,507
Stock Wealth	1,275	56,169	24,989	7,496	120,102
Total Wealth	1,275	101,517	41,570	28,317	260,588
Housing Wealth Percent	1,275	0.457	0.103	0.242	0.735
Stock Wealth Percent	1,275	0.543	0.103	0.265	0.758
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
Unemployment Rate	1,275	0.055	0.017	0.023	0.134
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 2 – Average Demographic Characteristics by State

State	Percent Ages 20-34	Percent Ages 35-54	Percent Ages 55+	Unemp Rate	State	Percent Ages 20-34	Percent Ages 35-54	Percent Ages 55+	Unemp Rate	State	Percent Ages 20-34	Percent Ages 35-54	Percent Ages 55+	Unemp Rate
AK	0.361	0.452	0.187	0.075	KY	0.310	0.382	0.308	0.066	NY	0.308	0.382	0.310	0.061
AL	0.308	0.375	0.317	0.059	LA	0.326	0.380	0.293	0.069	OH	0.301	0.383	0.316	0.062
AR	0.296	0.365	0.339	0.061	MA	0.313	0.379	0.308	0.052	OK	0.307	0.371	0.322	0.053
AZ	0.324	0.366	0.310	0.058	MD	0.314	0.405	0.281	0.048	OR	0.294	0.392	0.314	0.066
CA	0.347	0.386	0.267	0.070	ME	0.280	0.394	0.326	0.053	PA	0.282	0.373	0.345	0.058
CO	0.328	0.412	0.260	0.052	MI	0.308	0.390	0.302	0.072	RI	0.305	0.369	0.325	0.059
CT	0.290	0.393	0.317	0.049	MN	0.313	0.391	0.296	0.046	SC	0.320	0.381	0.300	0.060
DC	0.362	0.355	0.283	0.072	MO	0.301	0.376	0.323	0.056	SD	0.300	0.364	0.336	0.036
DE	0.315	0.379	0.306	0.044	MS	0.322	0.369	0.309	0.076	TN	0.308	0.384	0.307	0.060
FL	0.276	0.351	0.373	0.059	MT	0.280	0.394	0.327	0.055	TX	0.347	0.388	0.265	0.063
GA	0.341	0.399	0.260	0.054	NC	0.320	0.381	0.299	0.053	UT	0.394	0.359	0.246	0.046
HI	0.320	0.380	0.300	0.042	ND	0.313	0.359	0.328	0.038	VA	0.327	0.395	0.277	0.043
IA	0.291	0.368	0.341	0.044	NE	0.305	0.373	0.322	0.033	VT	0.295	0.403	0.302	0.043
ID	0.314	0.386	0.300	0.056	NH	0.301	0.410	0.289	0.042	WA	0.315	0.400	0.285	0.064
IL	0.319	0.383	0.298	0.065	NJ	0.293	0.394	0.313	0.056	WI	0.304	0.384	0.312	0.050
IN	0.312	0.383	0.305	0.053	NM	0.317	0.388	0.296	0.065	WV	0.276	0.374	0.350	0.078
KS	0.310	0.375	0.315	0.048	NV	0.322	0.391	0.286	0.061	WY	0.303	0.403	0.294	0.052

Notes: Data are averaged over 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	0.878 *** (0.077)	0.954 *** (0.074)	0.906 *** (0.106)	0.548 *** (0.068)	0.837 *** (0.107)
Housing Wealth	0.183 *** (0.026)	-0.019 (0.087)	-0.157 (0.707)	-6.456 *** (1.635)	-6.993 *** (2.054)
Stock Wealth	0.058 *** (0.017)	-0.150 (0.095)	1.095 *** (0.285)	-7.381 *** (1.513)	-6.405 *** (1.971)
Total Wealth		0.398 ** (0.175)		13.872 *** (3.001)	13.357 *** (3.644)
Young Percent			-0.045 (0.075)	-0.016 (0.073)	-0.047 (0.073)
Old Percent			-0.171 * (0.097)	-0.516 *** (0.073)	-0.425 *** (0.099)
Unemployment Rate			1.081 *** (0.165)		0.601 *** (0.184)
Young × Housing Wealth			0.159 (1.001)	8.457 *** (2.984)	9.577 ** (4.595)
Old × Housing Wealth			0.593 (1.241)	11.962 *** (2.653)	11.756 *** (2.881)
Unemp. × Housing Wealth			3.526 (2.967)		8.087 (5.760)
Young × Stock Wealth			-0.200 (0.610)	10.217 *** (2.512)	9.086 ** (4.037)
Old × Stock Wealth			-2.088 *** (0.571)	12.224 *** (2.559)	10.171 *** (2.935)
Unemp. × Stock Wealth			-7.270 *** (1.341)		2.232 (4.780)
Young × Total Wealth				-18.790 *** (5.489)	-18.449 ** (8.303)
Old × Total Wealth				-23.442 *** (4.800)	-21.273 *** (5.134)
Unemp. × Total Wealth					-10.483 (11.244)
Constant	-0.011 *** (0.001)	-0.010 *** (0.001)	-0.045 (0.046)	0.102 *** (0.038)	0.051 (0.043)
Observations	1,275	1,275	1,275	1,275	1,275
Wald Chi-square	388.74 ***	345.77 ***	678.47 ***	808.27 ***	1,016.37 ***
Degrees of freedom	53	54	62	62	66

Notes: 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.

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; Unemp. is the unemployment rate.

Table 4 – Estimated Wealth Effects, Elasticities and Derivatives

	Model 1	Model 2	Model 3	Model 4	Model 5
Housing Wealth Effect (HWE)	0.055 ***	0.049 ***	0.080 ***	0.067 ***	0.081 ***
Stock Wealth Effect (SWE)	0.016 ***	0.018 ***	0.000	0.000	-0.014 **
Difference	0.039 ***	0.031 ***	0.080 ***	0.066 ***	0.094 ***
Housing Wealth Elasticity	0.183 ***	0.163 ***	0.266 ***	0.222 ***	0.268 ***
Stock Wealth Elasticity	0.058 ***	0.066 ***	0.001	0.002	-0.052 **
Difference	0.124 ***	0.097 ***	0.265 ***	0.220 ***	0.319 ***
Wealth Effect Derivatives					
d HWE / d Young Percent			0.048	-0.039	0.345
d HWE / d Old Percent			0.179	0.376	0.613
d HWE / d Unemp. Rate			1.062		0.993
d SWE / d Young Percent			-0.053	0.003	-0.248
d SWE / d Old Percent			-0.556	-0.135	-0.368
d SWE / d Unemp. Rate			-1.937		-0.922

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	Unemp. Rate	HW / TW	SW / TW	Total Wealth
SD	0.111	0.005	0.548	0.288	0.300	0.336	0.036	0.347	0.653	82,818
WV	0.110	-0.043	0.337	0.360	0.276	0.350	0.077	0.479	0.521	70,626
AR	0.104	-0.021	0.371	0.368	0.296	0.339	0.060	0.466	0.534	66,822
ND	0.104	0.000	0.505	0.266	0.313	0.328	0.038	0.339	0.661	81,647
FL	0.099	-0.024	0.279	0.253	0.276	0.373	0.056	0.473	0.527	109,229
IA	0.095	-0.004	0.405	0.215	0.291	0.341	0.043	0.340	0.660	90,098
MS	0.094	-0.024	0.340	0.404	0.322	0.309	0.074	0.495	0.505	64,275
KY	0.092	-0.026	0.350	0.351	0.310	0.308	0.064	0.470	0.530	73,702
MI	0.090	-0.019	0.320	0.226	0.308	0.302	0.070	0.407	0.593	97,727
MO	0.085	-0.007	0.348	0.196	0.301	0.323	0.054	0.358	0.642	100,264
OK	0.085	-0.009	0.375	0.310	0.307	0.322	0.053	0.426	0.574	70,442
OR	0.082	-0.022	0.275	0.246	0.294	0.314	0.065	0.474	0.526	110,717
TN	0.082	-0.021	0.327	0.365	0.308	0.307	0.058	0.494	0.506	80,978
AL	0.081	-0.020	0.322	0.383	0.308	0.317	0.057	0.499	0.501	76,693
OH	0.081	-0.012	0.320	0.238	0.301	0.316	0.060	0.415	0.585	92,230
LA	0.080	-0.019	0.346	0.362	0.326	0.293	0.069	0.474	0.526	70,930
PA	0.080	-0.015	0.276	0.209	0.282	0.345	0.057	0.428	0.572	102,995
SC	0.080	-0.030	0.292	0.402	0.320	0.300	0.058	0.532	0.468	83,130
NV	0.078	-0.028	0.288	0.349	0.322	0.286	0.057	0.526	0.474	101,637
IN	0.077	-0.007	0.364	0.307	0.312	0.305	0.051	0.436	0.564	83,972
ID	0.076	-0.015	0.299	0.277	0.314	0.300	0.055	0.474	0.526	88,820
NM	0.076	-0.025	0.278	0.302	0.317	0.296	0.064	0.501	0.499	85,708
AZ	0.075	-0.017	0.269	0.272	0.324	0.310	0.056	0.499	0.501	96,209
MT	0.074	-0.008	0.308	0.237	0.280	0.327	0.054	0.433	0.567	96,315
KS	0.073	0.002	0.372	0.188	0.310	0.315	0.047	0.333	0.667	91,326
ME	0.073	-0.014	0.295	0.308	0.280	0.326	0.052	0.496	0.504	99,727
NC	0.069	-0.011	0.296	0.325	0.320	0.299	0.051	0.496	0.504	87,872
TX	0.069	-0.005	0.421	0.336	0.347	0.265	0.062	0.420	0.580	73,066
IL	0.067	-0.015	0.257	0.214	0.319	0.298	0.063	0.445	0.555	108,790
NE	0.063	0.015	0.432	0.222	0.305	0.322	0.033	0.337	0.663	87,016
WA	0.063	-0.022	0.220	0.236	0.315	0.285	0.063	0.509	0.491	121,400
DE	0.061	-0.002	0.290	0.221	0.315	0.306	0.042	0.441	0.559	124,287
WI	0.061	0.002	0.328	0.221	0.304	0.312	0.048	0.393	0.607	101,515
GA	0.060	-0.013	0.311	0.346	0.341	0.260	0.052	0.490	0.510	86,760
UT	0.057	-0.005	0.275	0.303	0.394	0.246	0.045	0.505	0.495	88,639
DC	0.056	-0.016	0.153	0.105	0.362	0.283	0.071	0.425	0.575	150,173
NY	0.056	-0.010	0.216	0.172	0.308	0.310	0.059	0.439	0.561	114,358
RI	0.056	-0.008	0.216	0.225	0.305	0.325	0.056	0.498	0.502	109,141

Table 5 – Factors Affecting Estimated Housing and Stock Wealth Effects

State	HWE	SWE	Cons. / HW	Cons. / SW	Young Percent	Old Percent	Unemp. Rate	HW / TW	SW / TW	Total Wealth
WY	0.052	0.003	0.306	0.233	0.303	0.294	0.051	0.428	0.572	102,442
NJ	0.051	-0.011	0.193	0.173	0.293	0.313	0.055	0.472	0.528	148,834
CA	0.050	-0.028	0.161	0.240	0.347	0.267	0.067	0.589	0.411	132,668
HI	0.048	-0.022	0.165	0.278	0.320	0.300	0.041	0.620	0.380	149,082
MA	0.047	-0.007	0.197	0.180	0.313	0.308	0.051	0.469	0.531	146,918
MD	0.047	-0.009	0.207	0.215	0.314	0.281	0.047	0.506	0.494	129,027
VA	0.047	-0.007	0.232	0.258	0.327	0.277	0.042	0.508	0.492	112,649
VT	0.046	0.003	0.268	0.238	0.295	0.302	0.043	0.464	0.536	114,618
CT	0.044	-0.009	0.171	0.197	0.290	0.317	0.047	0.528	0.472	156,059
NH	0.041	0.012	0.338	0.311	0.301	0.289	0.041	0.471	0.529	115,250
MN	0.039	0.010	0.307	0.169	0.313	0.296	0.045	0.355	0.645	124,178
CO	0.032	0.007	0.253	0.198	0.328	0.260	0.051	0.435	0.565	125,780
AK	0.031	-0.007	0.329	0.288	0.361	0.187	0.075	0.448	0.552	97,818
Total	0.070	-0.011	0.301	0.266	0.312	0.304	0.055	0.457	0.543	101,517

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

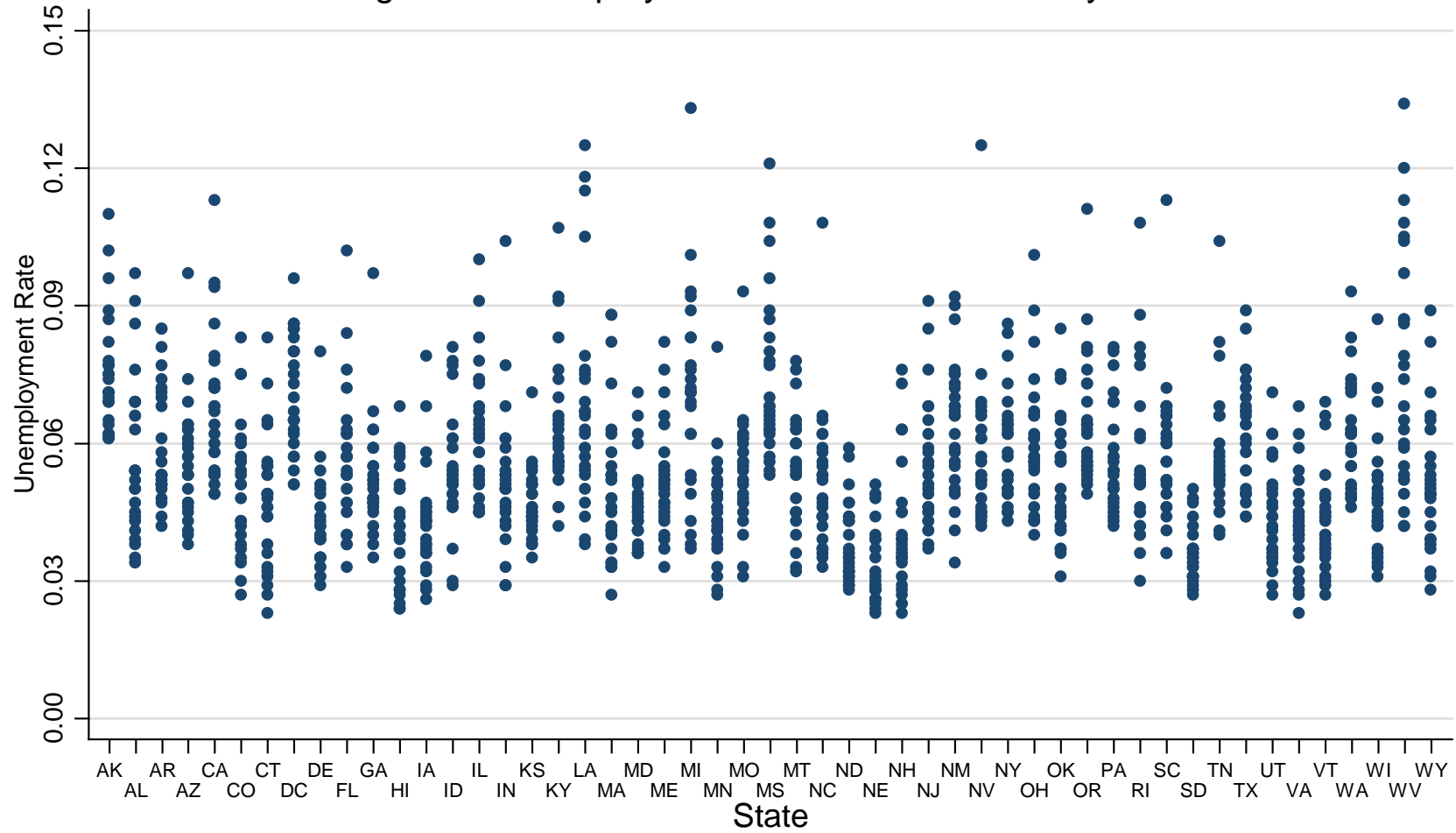
Unemp. Rate = Average unemployment rate

HW / TW = Average housing wealth-to-total wealth ratio

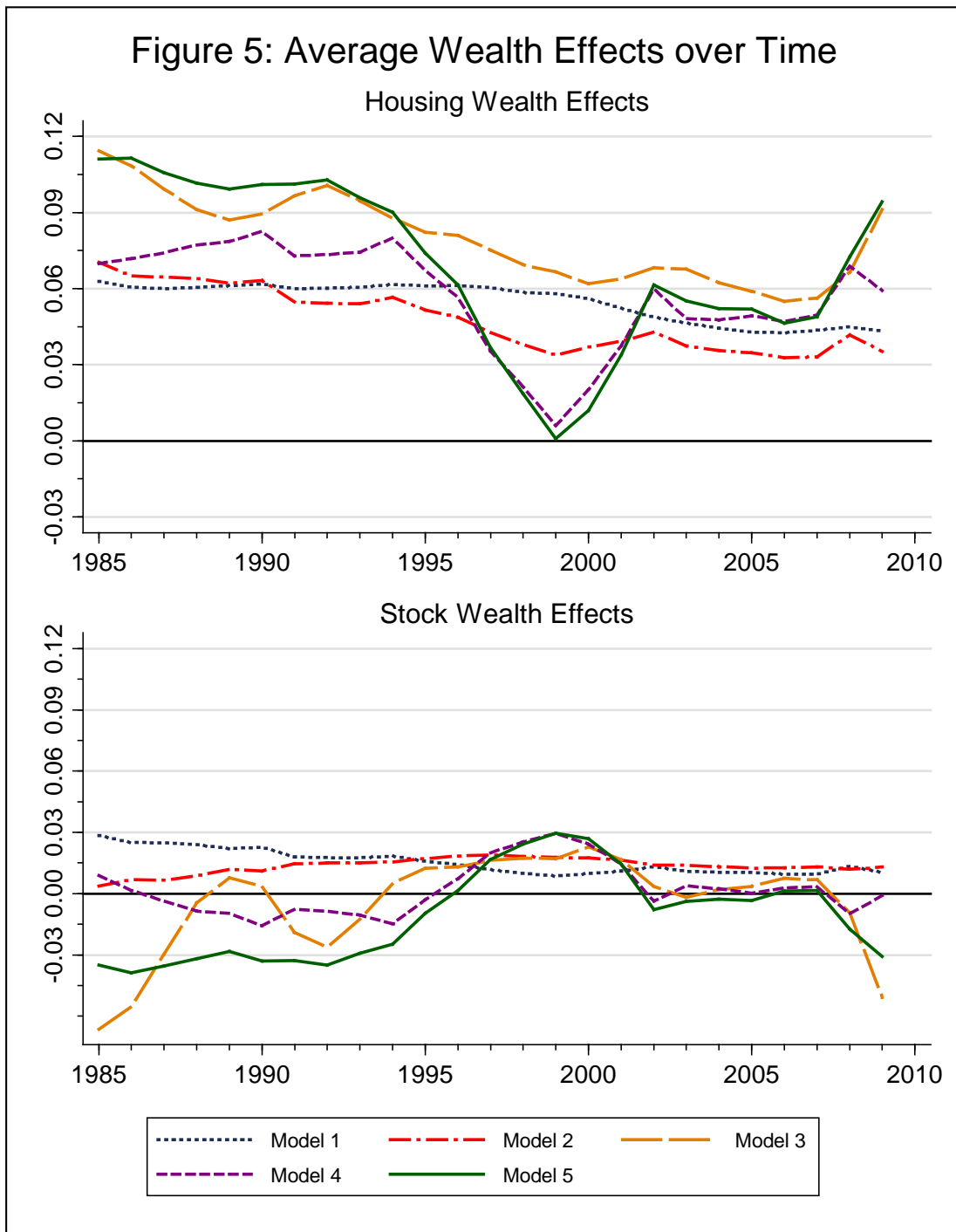
SW / TW = Average stock wealth-to-total wealth ratio

Total Wealth = Average real, per capita total wealth

Figure 2: Unemployment Rates across Time by State



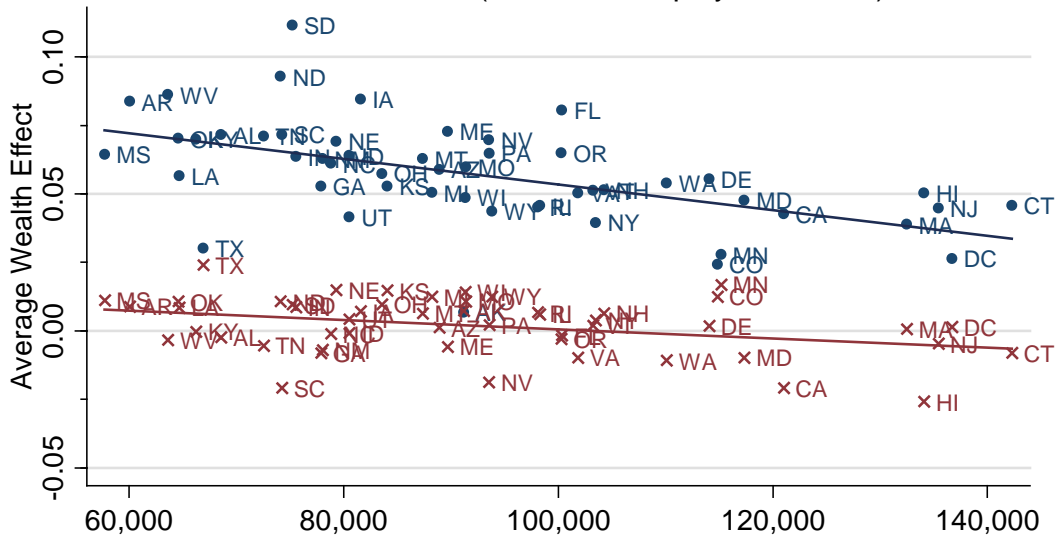
Notes: Figure shows the poverty rate in each year of the analysis for each state. Data are presented for the years 1985-2009; the years 1981-1984 are excluded from the analysis because of lags used for instrumenting.



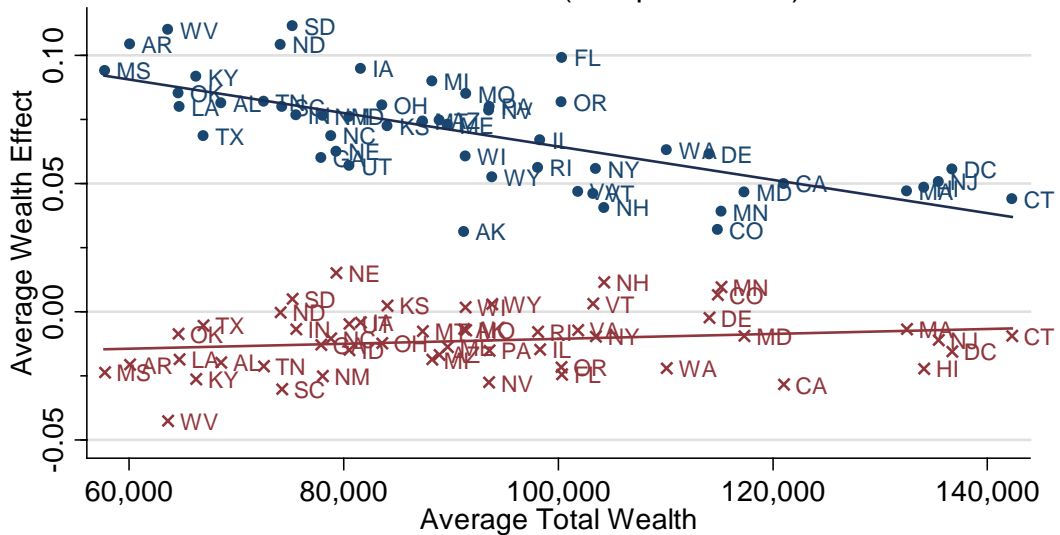
Notes: The time path of the average housing and stock wealth effects are shown for each of the five models presented in Table 3 (each year's value is the average across states). Model 1 is a traditional constant elasticity framework. Model 2 allows housing and stock wealth elasticities to vary based 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.

Figure 6: Relationship between Wealth Effects and Total Wealth

Panel A: Model 4 (without unemployment rates)



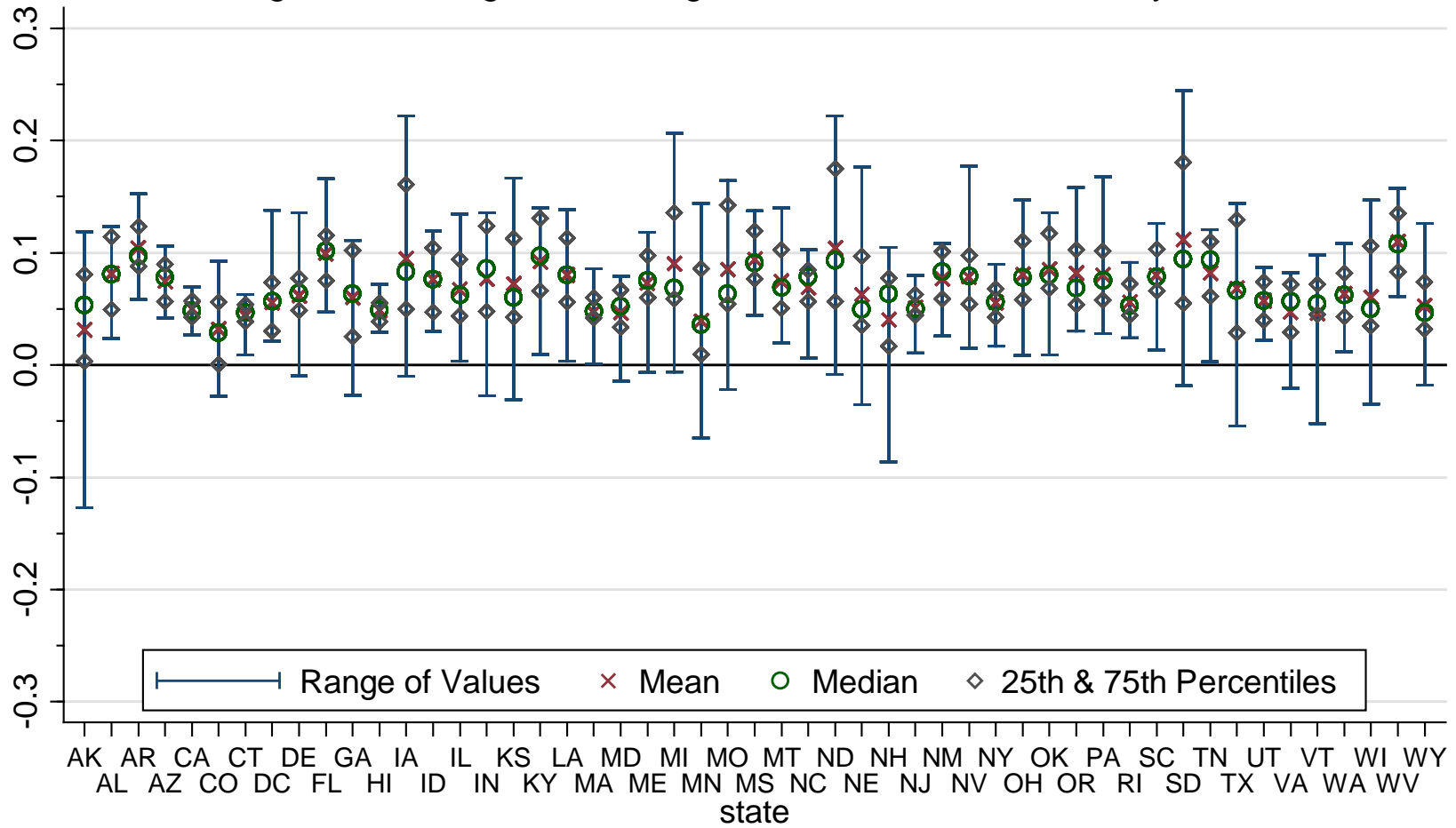
Panel B: Model 5 (full specification)



● Housing Wealth Effect × Stock Wealth Effect

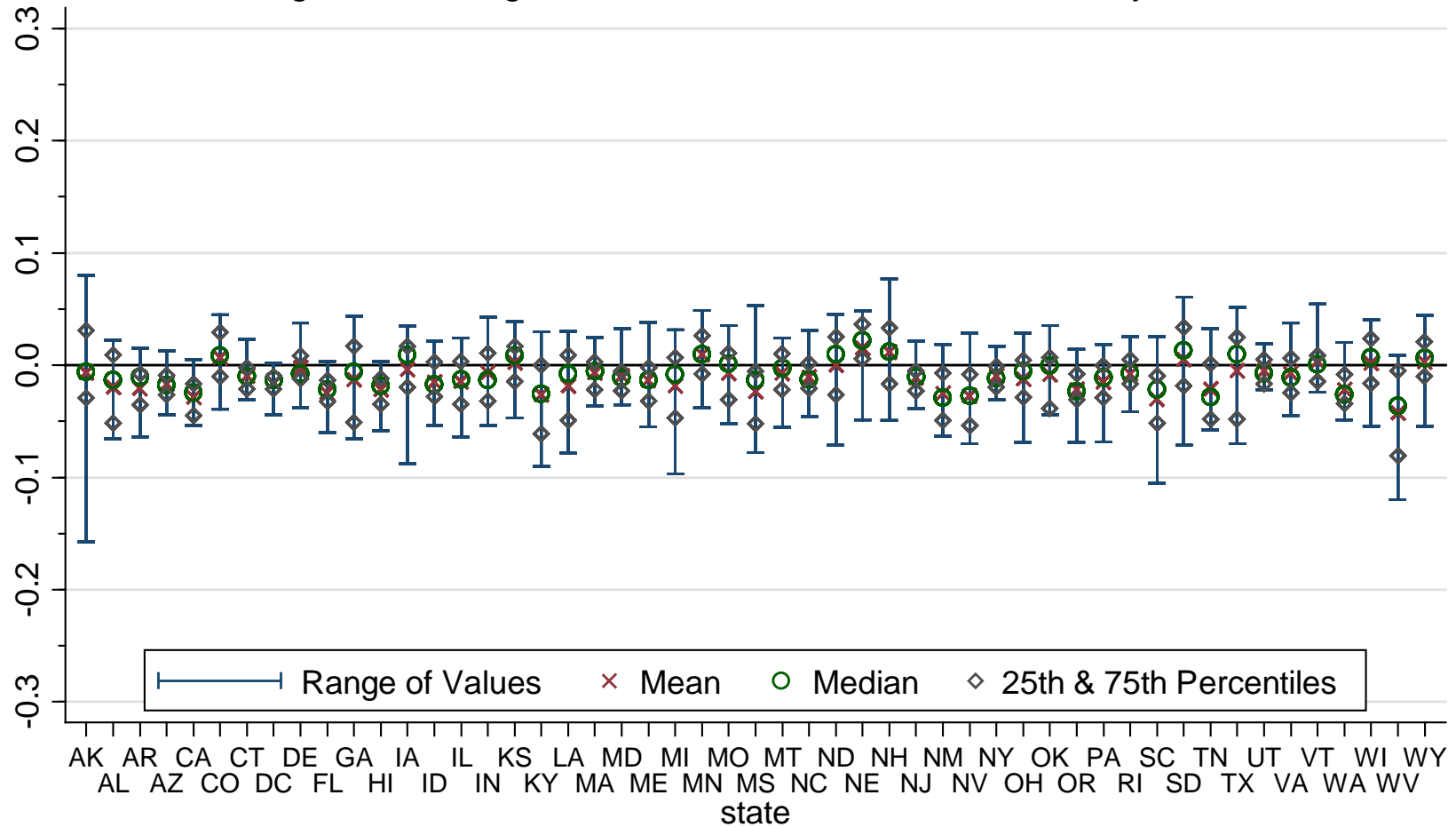
Notes: Figure shows the relationship between each state's average housing and stock wealth effects and average total wealth within that state (averaged across over the years of the analysis, 1985-2009, within each state). Panel A calculates the average housing and stock wealth effects using the parameter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

Figure 7A: Range of Housing Wealth Effects over Time by State



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.

Figure 7B: Range of Stock Wealth Effects over Time by State



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	0.053 *** (0.008)	NY	0.055 *** (0.008)
AL	0.060 (0.009)	LA	0.040 (0.008)	OH	0.061 *** (0.008)
AR	0.064 (0.010)	MA	0.058 *** (0.007)	OK	0.061 *** (0.009)
AZ	0.059 *** (0.008)	MD	0.040 *** (0.006)	OR	0.048 *** (0.009)
CA	0.036 *** (0.006)	ME	0.067 *** (0.009)	PA	0.066 *** (0.010)
CO	0.041 *** (0.005)	MI	0.052 *** (0.007)	RI	0.062 *** (0.009)
CT	0.060 *** (0.008)	MN	0.063 *** (0.007)	SC	0.049 *** (0.009)
DC	0.019 (0.008)	MO	0.067 *** (0.009)	SD	0.076 *** (0.010)
DE	0.059 *** (0.008)	MS	0.047 *** (0.009)	TN	0.053 *** (0.008)
FL	0.084 *** (0.012)	MT	0.063 *** (0.010)	TX	0.032 *** (0.006)
GA	0.037 *** (0.005)	NC	0.052 *** (0.008)	UT	0.043 *** (0.007)
HI	0.056 *** (0.007)	ND	0.074 *** (0.010)	VA	0.048 *** (0.006)
IA	0.076 *** (0.010)	NE	0.080 *** (0.009)	VT	0.054 *** (0.007)
ID	0.052 *** (0.008)	NH	0.061 *** (0.007)	WA	0.034 *** (0.007)
IL	0.049 *** (0.007)	NJ	0.052 *** (0.009)	WI	0.062 *** (0.008)
IN	0.056 *** (0.008)	NM	0.046 *** (0.007)	WV	0.065 *** (0.011)
KS	0.061 *** (0.009)	NV	0.059 *** (0.006)	WY	0.044 *** (0.007)

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.