

Does Stock Market Performance Influence Retirement Expectations?

Gopi Shah Goda
John Shoven
Sita Nataraj Slavov

12th Annual Conference of the
Retirement Research Consortium
August 5-6, 2010

Economic crisis *likely* to cause delayed retirement

- Participation in defined contribution pensions has risen.
- S&P 500 fell by more than 50% from October 2007-March 2009.
- *Wall Street Journal* (4/09): “Investment advisers and retirement planners ... are seeing large numbers of older workers put off retirement as the housing and stock-market troubles have deepened.”
- *Time* magazine (7/02) cover story: “Will You Ever Be Able to Retire?”

Economic crisis *unlikely* to cause delayed retirement

- Near retirees rely primarily on defined benefit pensions and Social Security (Gustman et al. 2009a, 2009b).
- Stocks held primarily by wealthier individuals (Engen et al. 2005).
- Mixed evidence from late 1990s/early 2000s.
- Labor market conditions push in opposite direction (Gustman et al. 2009a, 2009b; Coile and Levine 2010).
- Individuals may reduce consumption instead (Kezdi and Sevak 2004)

Key Research Questions

- Are retirement plans sensitive to short-run stock market fluctuations?
- More generally, what impact do wealth shocks have on the timing of retirement?
- Additionally:
 - Do individuals respond asymmetrically to positive and negative shocks?
 - Can we identify groups that are more sensitive to stock market fluctuations?

Contributions

- Among the first evidence on impact of most recent financial and economic crisis.
 - Additional variation from new 2008 data.
 - Exploit variation based on exact interview date.
- More detailed controls for labor and housing market conditions.
- Detailed investigation of differential responses:
 - Positive versus negative changes.
 - More sensitive versus less sensitive groups.

Overview of Findings

- Little evidence that retirement plans respond to level or growth of S&P 500.
 - Weak evidence of correlation between S&P 500 and retirement plans in recent data (2006-2008).
 - BUT: No evidence when all years combined (1998-2008).
- Little evidence of differential responses for positive versus negative changes, or across groups.
 - Weak evidence of correlation between S&P 500 and retirement plans for those 58 and over.
 - BUT: More specific tests fail to validate causal relationship for older group.

Previous Literature

	Evidence of relationship?	
	Yes	No
Late 1990s boom	Coronado and Perozek (2003) Sevak (2002) Khitatrakun (2003) Gustman and Steinmeier (2002)	Hurd and Reti (2001)
2000-2001 bust	Kezdi and Sevak (2004) [for CPS cross-section data]	Hurd et al. (2005) Coile and Levine (2006) Kezdi and Sevak (2004) [for HRS panel data]
Recent bust	Coile and Levine (2009)	
Non-stock market variation	Holtz-Eakin et al. (1993) Imbens et al. (2001) Brown et al. (2010) Farnham and Sevak (2007)	Krueger and Pischke (1992) Joulfaian and Wilhelm (1994)

Data

- Health and Retirement Study (HRS) panel data from 1998-2008.
- Restricted data contains exact interview date and county of residence, match to:
 - Daily S&P 500.
 - Monthly county-level unemployment rate.
 - Quarterly state-level house price (FHFA) index.
- Use Gustman et al. (2010) calculations of defined contribution pension wealth.

Retirement Plans

- Retirement expectations questions:
 - Probability of working full time after age 62 (P62) and age 65 (P65).
 - Expected retirement age ($E(R)$).
- Advantage: Can observe changes in retirement behavior for an individual under different regimes.
- Correlated with actual retirement behavior (Hurd et al. 2005; Khitatrakun 2003).
- Correlated with each other, but sometimes inconsistent.

Figure 2: Distribution of growth rates in S&P 500 index for 12 months preceding interview date by wave

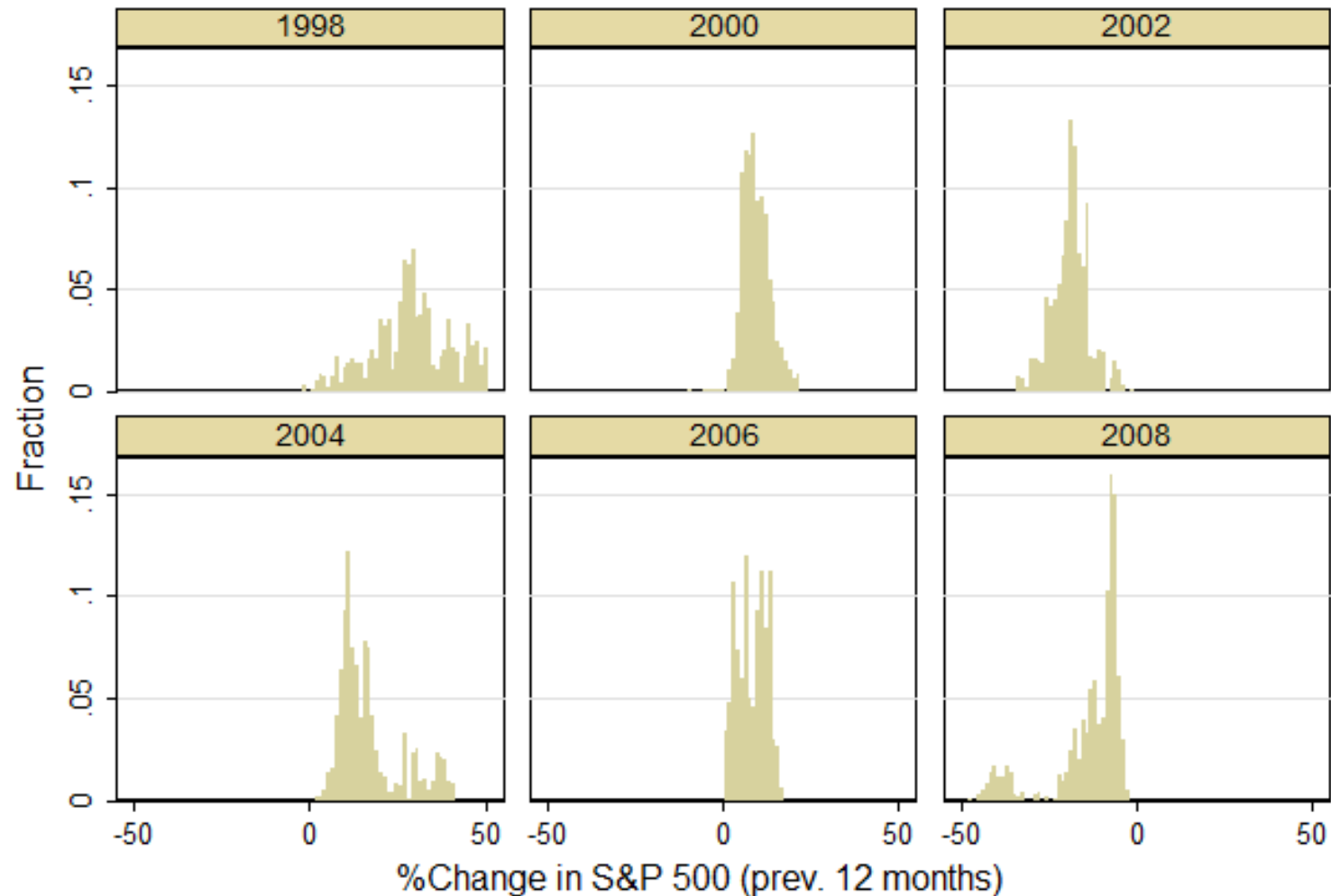
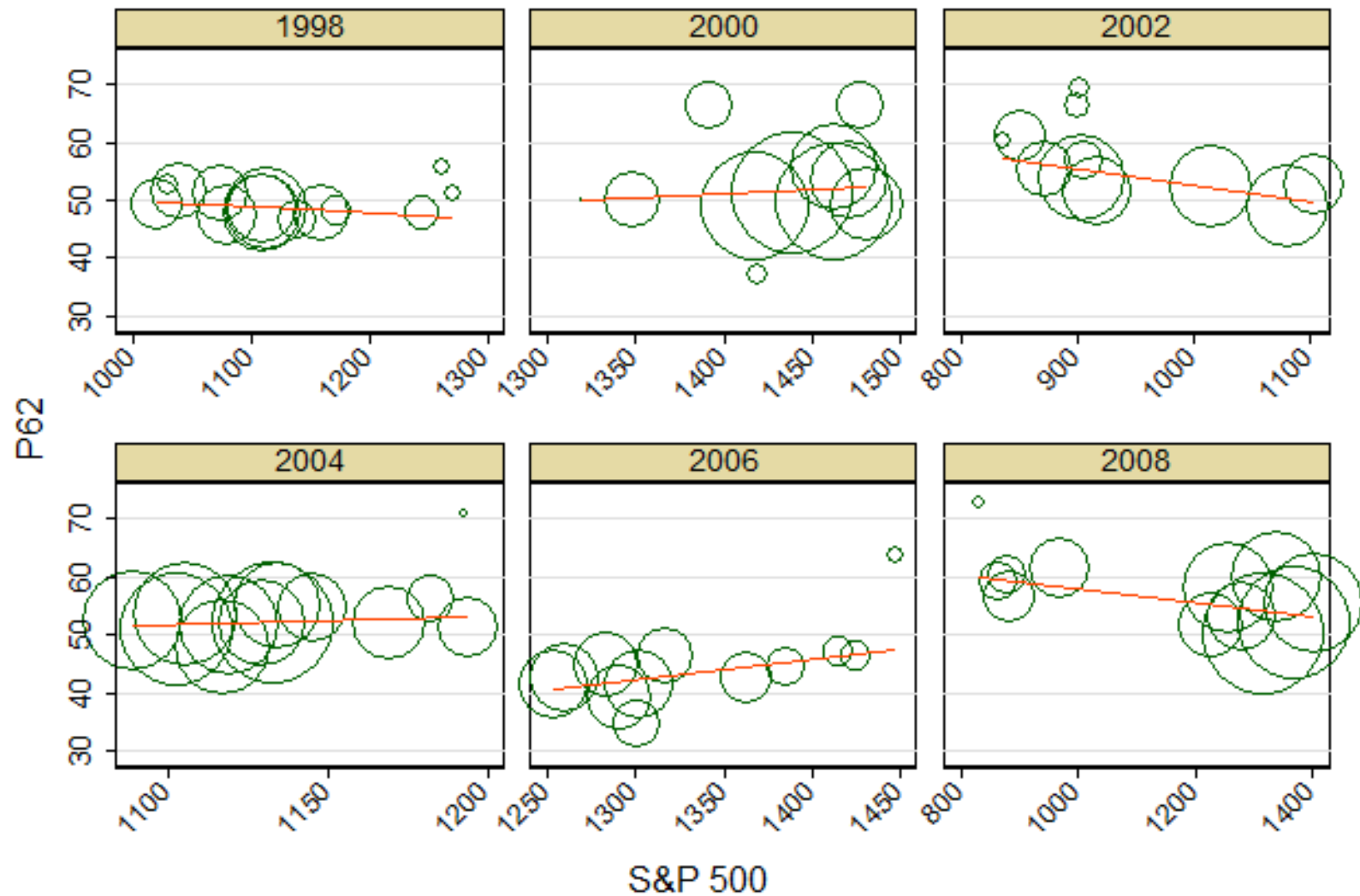


Figure 4: Relationship between P62 and S&P 500 index on interview date by wave



Graphs by wave

Econometric Model

- Specification 1:

$$Y_{it} = \alpha_0 + \alpha_1 \ln(S \& P500_{it}) + \alpha_2 \ln(FHFA_{it}) + \alpha_3 \ln(unemp_{it}) \\ + \alpha_4 X_{it} + \theta s_{it} + \rho w_t + \pi_i + \varepsilon_{it}$$

- Specification 2:

$$Y_{it} = \beta_0 + \beta_1 \% \Delta S \& P500_{it} + \beta_2 \ln(FHFA_{it}) + \beta_3 \ln(unemp_{it}) \\ + \beta_4 X_{it} + \gamma s_{it} + \delta w_t + \lambda_i + u_{it}$$

Table 2: Effect of S&P 500 on Expected Labor Supply

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-12.09** (5.550)	-1.489 (4.825)	0.180 (0.796)	-4.086 (3.806)	-0.558 (3.440)	-0.107 (0.513)
Observations	2,450	3,135	1,451	12,375	14,507	8,016
R-squared	0.073	0.060	0.170	0.027	0.027	0.170
Waves	2006-2008	2006-2008	2006-2008	All	All	All

VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-18.58*** (7.184)	-6.110 (6.100)	-0.0837 (0.981)	-4.732 (3.586)	-6.720** (3.252)	-0.217 (0.503)
Observations	2,450	3,135	1,451	12,375	14,507	8,016
R-squared	0.074	0.061	0.170	0.027	0.027	0.170
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Percent Change Above and Below 0 Percent, All Waves

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	8.517 (6.702)	6.894 (5.807)	-0.133 (0.864)	-9.160** (4.496)	-2.292 (4.062)	-0.178 (0.623)
Observations	7,691	9,099	4,989	4,684	5,408	3,027
R-squared	0.022	0.026	0.175	0.052	0.045	0.184
Relationship	Above	Above	Above	Below	Below	Below
VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-0.466 (4.353)	-5.063 (3.910)	0.116 (0.626)	-14.59** (6.053)	-7.488 (5.279)	-0.596 (0.841)
Observations	7,691	9,099	4,989	4,684	5,408	3,027
R-squared	0.021	0.026	0.175	0.052	0.045	0.185
Relationship	Above	Above	Above	Below	Below	Below

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Differential Responses Across Groups

- Above age 58 (57% of sample).
- With household financial assets between 1 and 20 times annual income (47% of sample).
- With retiree health insurance (36% of sample):
 - Loss of health insurance may discourage early retirement (Khitatrakun 2003).
- Not covered by defined benefit pension (75% of sample):
 - More exposed to stock market (Sevak 2002).
 - No penalties for early retirement (Khitatrakun 2003).

Table 4: Effect of S&P 500 on expected labor supply, individuals age 58+

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-21.48*** (7.968)	-5.854 (5.885)	0.562 (0.904)	-10.40* (5.552)	-2.134 (4.420)	-0.172 (0.588)
Observations	1,279	1,974	1,138	6,099	8,268	5,844
R-squared	0.089	0.075	0.190	0.040	0.039	0.176
Waves	2006-2008	2006-2008	2006-2008	All	All	All

VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-32.70*** (10.07)	-12.87* (7.429)	0.313 (1.126)	-13.66** (5.507)	-9.334** (4.516)	-0.618 (0.600)
Observations	1,279	1,974	1,138	6,099	8,268	5,844
R-squared	0.092	0.076	0.189	0.040	0.040	0.176
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Effect of S&P 500 on Expected Labor Supply, Financial Wealth between 1 and 20X Income

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-1.607 (10.22)	7.871 (8.620)	0.413 (1.486)	1.268 (6.072)	4.045 (5.531)	-0.588 (0.860)
Observations	738	956	515	4,508	5,273	3,107
R-squared	0.093	0.107	0.191	0.038	0.047	0.188
Waves	2006-2008	2006-2008	2006-2008	All	All	All
VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-7.844 (12.65)	3.069 (10.63)	0.242 (1.573)	0.595 (5.770)	-4.148 (4.993)	-0.0590 (0.740)
Observations	738	956	515	4,508	5,273	3,107
R-squared	0.094	0.106	0.191	0.038	0.047	0.188
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Effect of S&P 500 on Expected Labor Supply, Individuals with Retiree Health Insurance

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-17.53 (10.85)	3.115 (8.682)	1.123 (1.525)	-4.580 (6.597)	4.955 (5.744)	0.757 (0.882)
Observations	691	932	411	4,144	4,995	2,840
R-squared	0.108	0.059	0.205	0.035	0.029	0.190
Waves	2006-2008	2006-2008	2006-2008	All	All	All
VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-28.33** (13.82)	2.190 (10.59)	1.687 (1.714)	-6.451 (5.981)	-6.506 (5.012)	0.534 (0.778)
Observations	691	932	411	4,144	4,995	2,840
R-squared	0.111	0.059	0.206	0.035	0.029	0.190
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Effect of S&P 500 on Expected Labor Supply, Individuals with no DB plans

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-8.677 (6.501)	-0.708 (5.437)	0.385 (1.082)	-1.181 (4.542)	-0.104 (3.993)	-0.137 (0.682)
Observations	1,896	2,475	1,025	8,788	10,464	5,357
R-squared	0.070	0.064	0.192	0.028	0.031	0.194
Waves	2006-2008	2006-2008	2006-2008	All	All	All
VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-13.86* (8.378)	-6.890 (6.997)	0.0429 (1.361)	-2.088 (4.511)	-6.740* (4.064)	-0.0925 (0.668)
Observations	1,896	2,475	1,025	8,788	10,464	5,357
R-squared	0.071	0.065	0.192	0.028	0.031	0.194
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

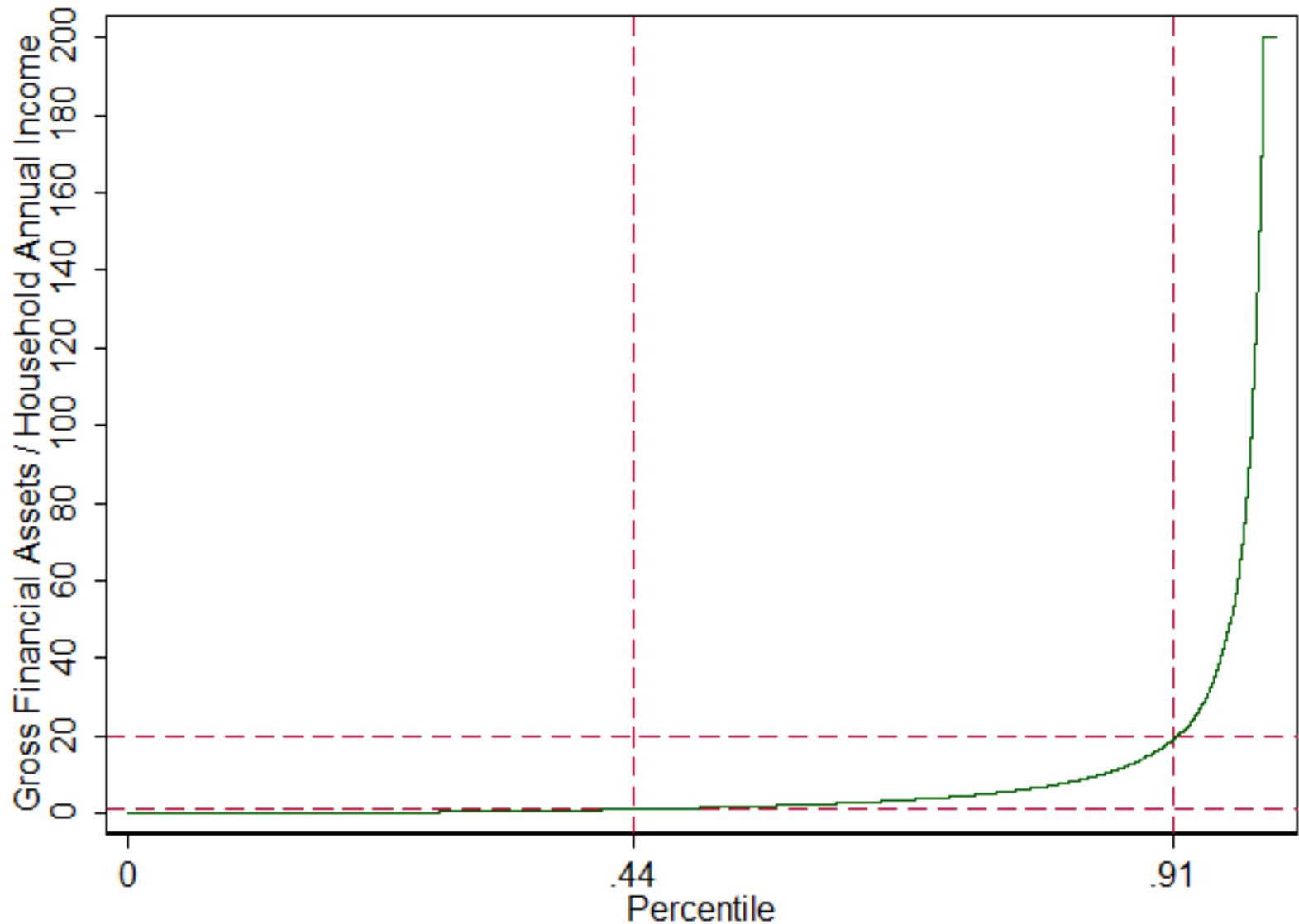
Sensitivity Analysis

- Overall, results are robust to:
 - Replacing $\% \Delta \text{S\&P}$ with 6-month and 5-year growth rate of S\&P 500.
 - Using an alternate threshold for positive/negative changes (average S\&P return = 7.1%).
 - Using non-selected sample (those who did not retire before age 62/65).
 - Look at stockholders and DC plan participants aged 58 and older.

Conclusions

- Despite media attention, no evidence that people change retirement plans consistently as the stock market fluctuates.
- Further research needed to clarify correlation in most recent waves (2006-08), and for older group.
- Factors other than stock market fluctuations are likely to be operating.

Figure 3: Ratio of Gross Financial Assets to Household Annual Income



Effect of S&P 500 on Expected Labor Supply (wave dummies, no controls)

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-9.082* (5.041)	-5.382 (4.423)	0.267 (0.727)	-3.309 (3.741)	-1.980 (3.369)	0.168 (0.521)
Observations	2,450	3,135	1,451	12,375	14,507	8,016
R-squared	0.046	0.028	0.003	0.012	0.012	0.001
Waves	2006-2008	2006-2008	2006-2008	All	All	All

VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-14.14** (6.254)	-10.72** (5.324)	0.251 (0.878)	-5.801* (3.298)	-9.128*** (3.007)	0.406 (0.481)
Observations	2,450	3,135	1,451	12,375	14,507	8,016
R-squared	0.047	0.029	0.003	0.013	0.012	0.002
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Effect of S&P 500 on Expected Labor Supply (wave dummies, demographic controls)

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-7.993 (5.208)	-4.434 (4.594)	-0.148 (0.756)	-3.323 (3.754)	-1.536 (3.399)	-0.185 (0.509)
Observations	2,450	3,135	1,451	12,375	14,507	8,016
R-squared	0.046	0.028	0.003	0.012	0.012	0.001
Waves	2006-2008	2006-2008	2006-2008	All	All	All

VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-12.30* (6.635)	-9.478* (5.684)	-0.504 (0.935)	-4.256 (3.542)	-7.453** (3.220)	-0.257 (0.500)
Observations	2,450	3,135	1,451	12,375	14,507	8,016
R-squared	0.047	0.029	0.003	0.013	0.012	0.002
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Effect of S&P 500 on Expected Labor Supply, long and short term

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
% Δ S&P 500 (5-year)	-7.793** (3.111)	-0.345 (2.655)	-0.111 (0.435)	-2.743 (1.907)	-0.0701 (1.744)	-0.0966 (0.254)
Observations	2,450	3,135	1,451	12,375	14,507	8,016
R-squared	0.073	0.060	0.170	0.027	0.027	0.170
Waves	2006-2008	2006-2008	2006-2008	All	All	All

VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
% Δ S&P 500 (1-month)	-17.71 (11.27)	-6.451 (9.392)	1.011 (1.401)	-3.338 (5.531)	-2.107 (4.953)	-0.315 (0.740)
Observations	2,450	3,135	1,451	12,375	14,507	8,016
R-squared	0.072	0.060	0.171	0.027	0.027	0.170
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Percent Change Above and Below 7.1 Percent, All Waves

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	13.29* (7.630)	14.25** (6.308)	-0.495 (0.925)	-8.599** (4.297)	-2.835 (3.885)	-0.0717 (0.603)
Observations	5,351	6,394	3,615	7,024	8,113	4,401
R-squared	0.025	0.036	0.186	0.038	0.033	0.182
Relationship	Above	Above	Above	Below	Below	Below
VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	0.272 (5.330)	-4.329 (4.651)	0.0850 (0.743)	-9.416* (4.896)	-5.786 (4.314)	-0.519 (0.690)
Observations	5,351	6,394	3,615	7,024	8,113	4,401
R-squared	0.025	0.035	0.186	0.038	0.034	0.182
Relationship	Above	Above	Above	Below	Below	Below

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Effect of S&P 500 on Expected Labor Supply, Nonselected Group

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-12.36** (5.558)	-1.875 (5.354)	0.128 (1.051)	-5.422 (4.340)	-0.856 (4.200)	0.492 (0.790)
Observations	2,427	2,426	685	8,095	8,079	3,010
R-squared	0.070	0.057	0.137	0.035	0.029	0.116
Waves	2006-2008	2006-2008	2006-2008	All	All	All

VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-19.27*** (7.206)	-5.755 (6.855)	-0.103 (1.291)	-7.346* (4.388)	-3.747 (4.186)	0.483 (0.703)
Observations	2,427	2,426	685	8,095	8,079	3,010
R-squared	0.071	0.057	0.137	0.036	0.029	0.116
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Effect of S&P 500 on Expected Labor Supply, Financial Wealth between 1 and 20X Income, Ages 58+

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-7.189 (14.94)	2.813 (10.58)	1.760 (1.371)	-0.150 (9.205)	6.126 (7.146)	-0.208 (1.027)
Observations	399	618	410	2,293	3,066	2,248
R-squared	0.147	0.163	0.214	0.054	0.061	0.181
Waves	2006-2008	2006-2008	2006-2008	All	All	All

VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-16.02 (17.38)	-3.515 (12.76)	1.429 (1.535)	0.953 (8.336)	-5.349 (6.880)	0.238 (0.912)
Observations	399	618	410	2,293	3,066	2,248
R-squared	0.149	0.163	0.212	0.054	0.061	0.181
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Effect of S&P 500 on Expected Labor Supply, Individuals with No DB Plans, Ages 58+

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-22.49** (9.157)	-5.305 (6.724)	0.721 (1.220)	-9.923 (6.548)	-1.683 (5.200)	0.00216 (0.821)
Observations	994	1,582	832	4,369	6,075	4,016
R-squared	0.086	0.077	0.216	0.039	0.045	0.191
Waves	2006-2008	2006-2008	2006-2008	All	All	All

VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-33.82*** (11.62)	-15.65* (8.551)	0.336 (1.530)	-12.89* (6.719)	-10.38* (5.537)	-0.463 (0.831)
Observations	994	1,582	832	4,369	6,075	4,016
R-squared	0.089	0.079	0.215	0.040	0.046	0.191
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Effect of S&P 500 on Expected Labor Supply, Individuals with Retiree Health Insurance, Ages 58+

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-14.50 (16.08)	7.410 (10.73)	3.173* (1.720)	-0.356 (10.06)	7.794 (7.476)	0.795 (1.089)
Observations	384	626	302	2,164	3,022	2,021
R-squared	0.101	0.074	0.218	0.050	0.047	0.197
Waves	2006-2008	2006-2008	2006-2008	All	All	All

VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-31.28 (20.19)	4.019 (13.12)	3.849* (1.979)	-4.743 (9.160)	-1.058 (6.886)	0.205 (0.970)
Observations	384	626	302	2,164	3,022	2,021
R-squared	0.107	0.074	0.218	0.050	0.046	0.197
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Effect of S&P 500 on Expected Labor Supply, Individuals Age 58+, DC participants

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-14.35 (13.29)	-12.29 (10.35)	0.245 (1.112)	-3.642 (9.267)	-2.244 (7.517)	-0.845 (0.815)
Observations	380	541	329	1,933	2,536	1,598
R-squared	0.165	0.123	0.217	0.069	0.060	0.191
Waves	2006-2008	2006-2008	2006-2008	All	All	All

VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-15.17 (16.74)	-17.01 (13.04)	0.263 (1.548)	-4.043 (8.776)	-7.800 (7.514)	-0.366 (0.794)
Observations	380	541	329	1,933	2,536	1,598
R-squared	0.164	0.123	0.217	0.069	0.061	0.191
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Effect of S&P 500 on Expected Labor Supply, Individuals Age 58+, Stockowners

VARIABLES	(1) P62	(2) P65	(3) E(R)	(4) P62	(5) P65	(6) E(R)
ln(S&P 500)	-24.71*** (8.396)	-11.33* (6.149)	0.316 (0.918)	-12.65** (5.929)	-6.394 (4.585)	-0.428 (0.600)
Observations	1,100	1,714	953	5,018	6,856	4,798
R-squared	0.098	0.092	0.192	0.044	0.046	0.179
Waves	2006-2008	2006-2008	2006-2008	All	All	All
VARIABLES	(7) P62	(8) P65	(9) E(R)	(10) P62	(11) P65	(12) E(R)
%ΔS&P 500	-34.63*** (10.52)	-17.60** (7.803)	0.378 (1.157)	-12.42** (5.768)	-11.66** (4.709)	-0.582 (0.642)
Observations	1,100	1,714	953	5,018	6,856	4,798
R-squared	0.101	0.093	0.192	0.044	0.046	0.179
Waves	2006-2008	2006-2008	2006-2008	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1