Expectations of Returns and Expected Returns

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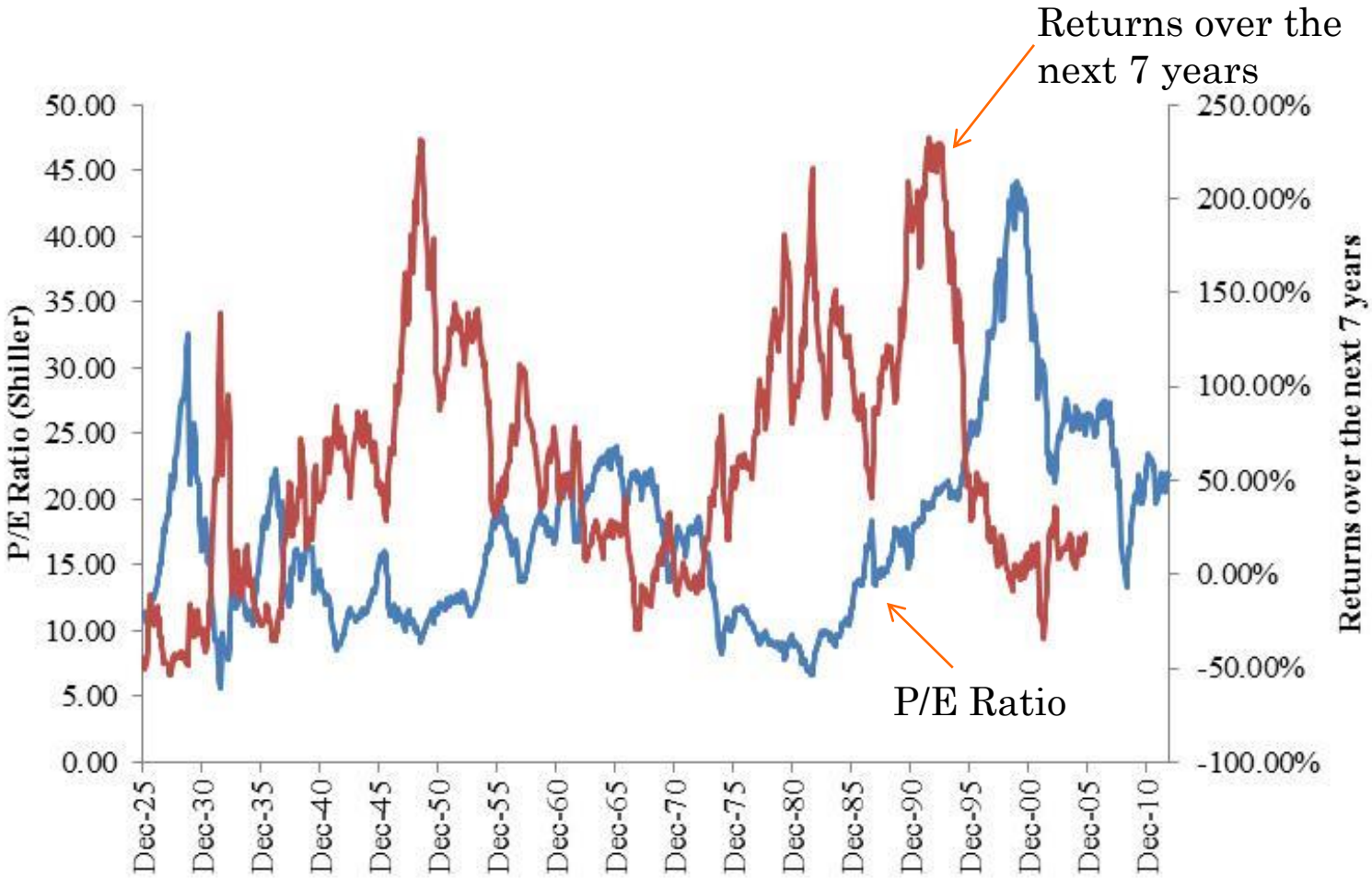
Modern Asset Pricing

- Stock returns are highly predictable
  - Prices vary considerably, while dividend and earnings growth very stable



Modern Asset Pricing

- Usual interpretation: Variation in dividend-price ratio reflects changes in investors' *required* returns
- One of the main objectives of modern AP is to explain how and why investors' required returns vary over time
- In these models, because everyone is rational, required returns = expected returns
- Expected returns, ER, are usually measured indirectly from data on dividends, consumption, and stock market wealth
- But we actually have lots of direct measures of investor expectations of stock market returns from investor surveys
- What do these survey answers look like, and how do they compare to indirect measures of ER?

Financial economists usually spurn expectations data

- Owen Lamont: "*To me, survey data about expectations and beliefs is the weakest form data, just one rung up in the quality ladder above anecdotes. I think we should be always suspicious of survey data on beliefs, especially involving abstract and intangible concepts (such as expected stock returns) that are unfamiliar to the respondents.*"

- John Cochrane: "*Some behavioral research uses survey evidence, and survey reports of people's expectations are certainly unsettling. However, surveys are sensitive to language and interpretation. People report astounding discount rates in surveys and experiments, yet still own long-lived assets, houses, and durable goods.*"

- Slavic Proverb: "When two people say you're drunk, you better lie down."

Expectations of Returns

- We analyze surveys of expected stock market returns from 6 sources
  - Gallup, Graham-Harvey, American Association of Individual Investors, Investor Intelligence, Robert Shiller's survey, Michigan Survey
  - We compare these measures with expected returns (ER)
- Main findings
  - Expectations are highly correlated across data sources
  - Expectations are positively correlated with flows into equity mutual funds
  - Expectations are highly extrapolative
  - Expectations are negatively correlated with model-based ER
  - Expectations are weakly negatively predict the stock market
- Interpretation
  - Surveys are not noise– they actually capture expectations of many investors
  - Data rules out representative agent-based models of time-varying required returns
  - What do the expectations data measure?
    - We propose a simple behavioral alternative that matches many of the facts

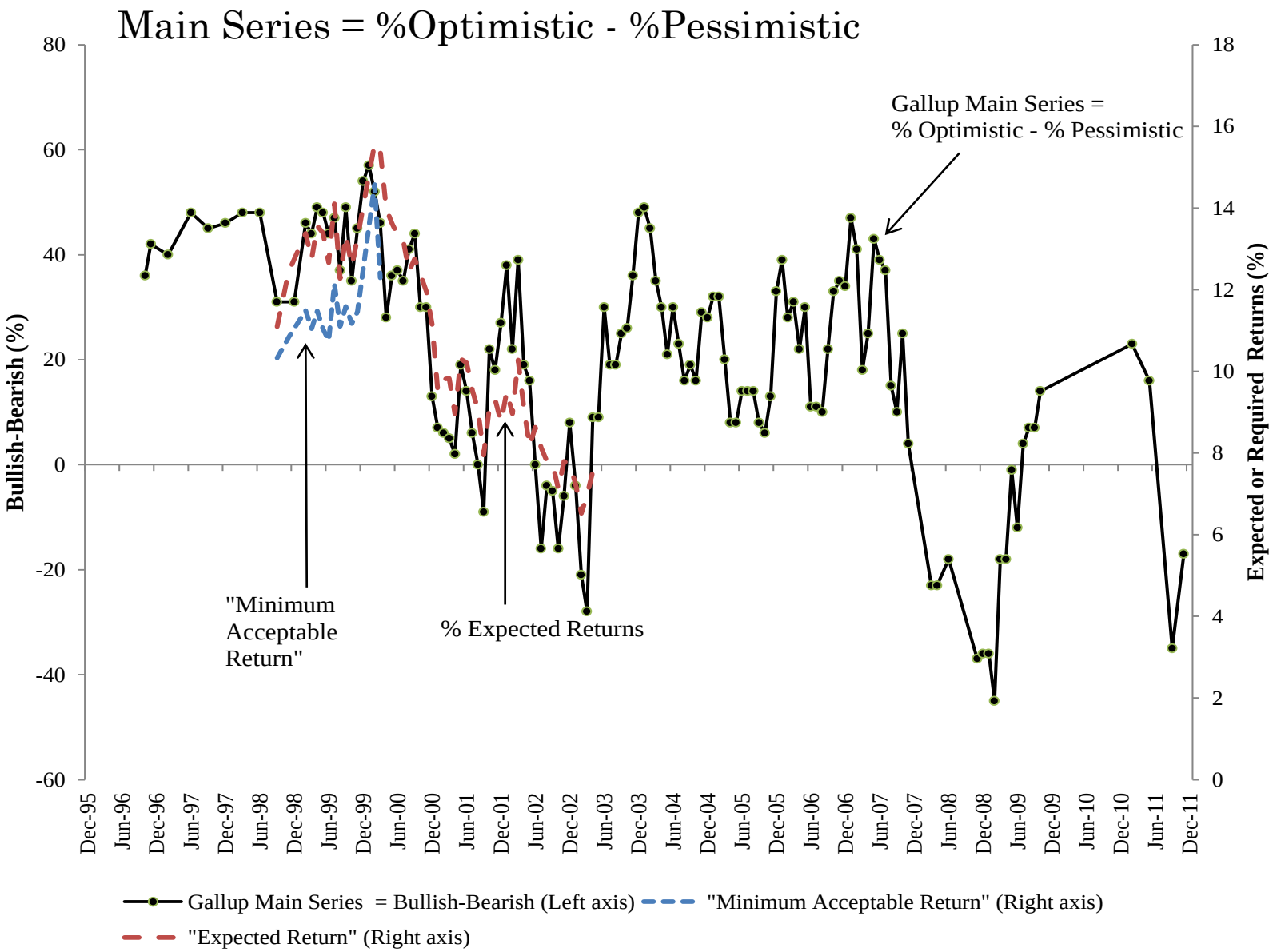
Data

- Measures of Investor Expectations
  - Mix of qualitative and quantitative measures
    - Gallup 1996-2011
    - Graham-Harvey 2000-2011
    - American Association of Individual Investors 1987-2011
    - Investor Intelligence 1963-2011
    - Shiller 1999-2011
    - Michigan Survey Research Center 2000-2005
- Mutual fund flows from Investment Company Institute
- Measures of ER
- Future Returns
  - CRSP VW over next 1-3 years

Gallup

- Main series:
  - **Gallup** = % Optimistic or Very Optimistic minus % Pessimistic or Very pessimistic about stock market in the next year
  - We compute this series from aggregate data provided to us by Gallup
- Two additional time-series
  - "**Expected Returns**" over the next year
  - "**Minimum Acceptable Returns**" on the investor's portfolio
  - We compute both of these series as the mean value from the individual response data, which we have in selected years
- Qualitative and Quantitative measures highly correlated

GALLUP


Main Series = %Optimistic - %Pessimistic
Gallup Main Series =
% Optimistic - % Pessimistic
"Minimum
Acceptable
Return"
% Expected Returns
Bullish-Bearish (%)
Expected or Required Returns (%)
80
60
40
20
0
-20
-40
-60
18
16
14
12
10
8
6
4
2
0
Dec-95
Jun-96
Dec-96
Jun-97
Dec-97
Jun-98
Dec-98
Jun-99
Dec-99
Jun-00
Dec-00
Jun-01
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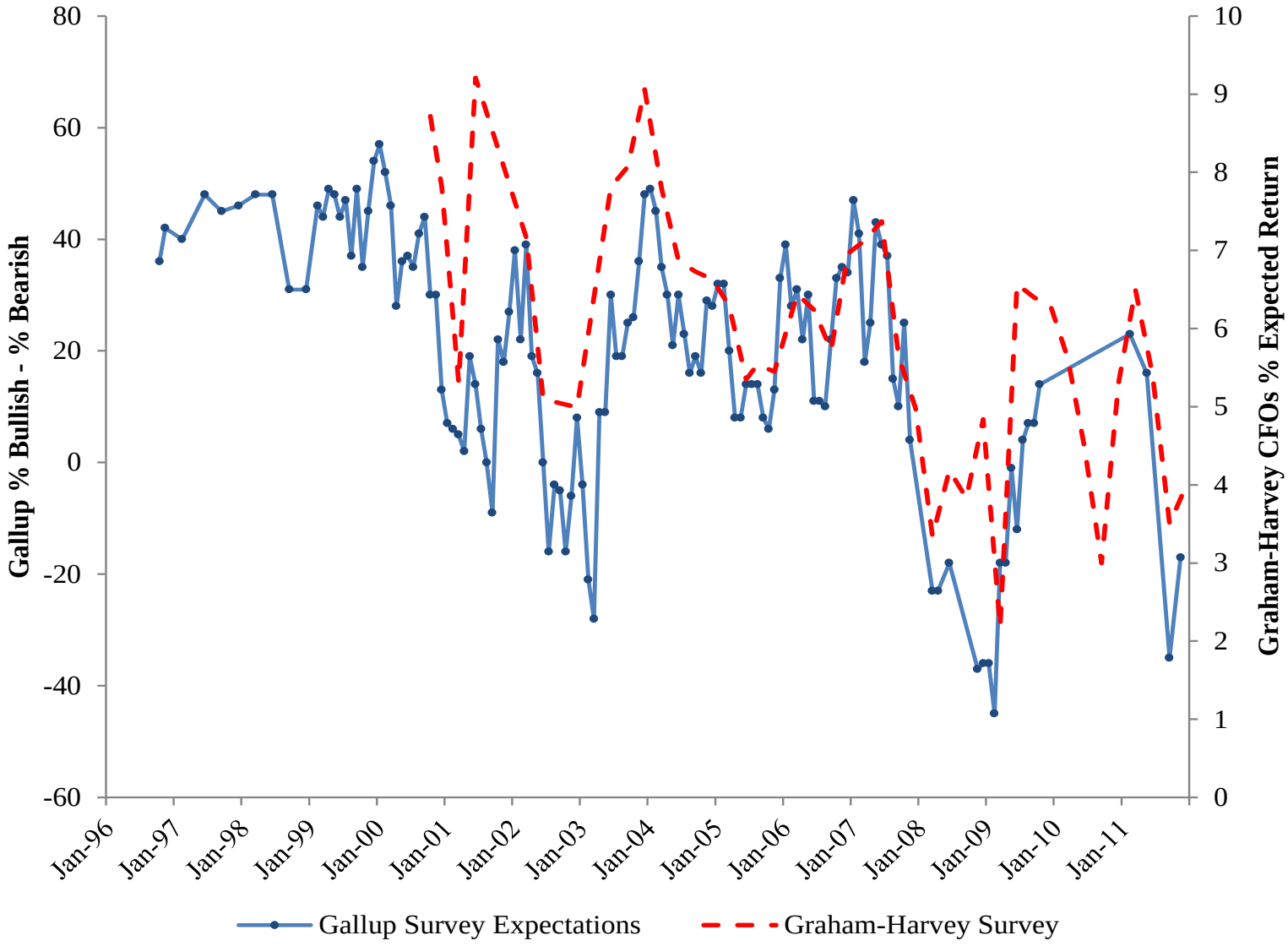
Jun-11
Dec-11
Gallup Main Series = Bullish-Bearish (Left axis)
"Minimum Acceptable Return" (Right axis)
"Expected Return" (Right axis)

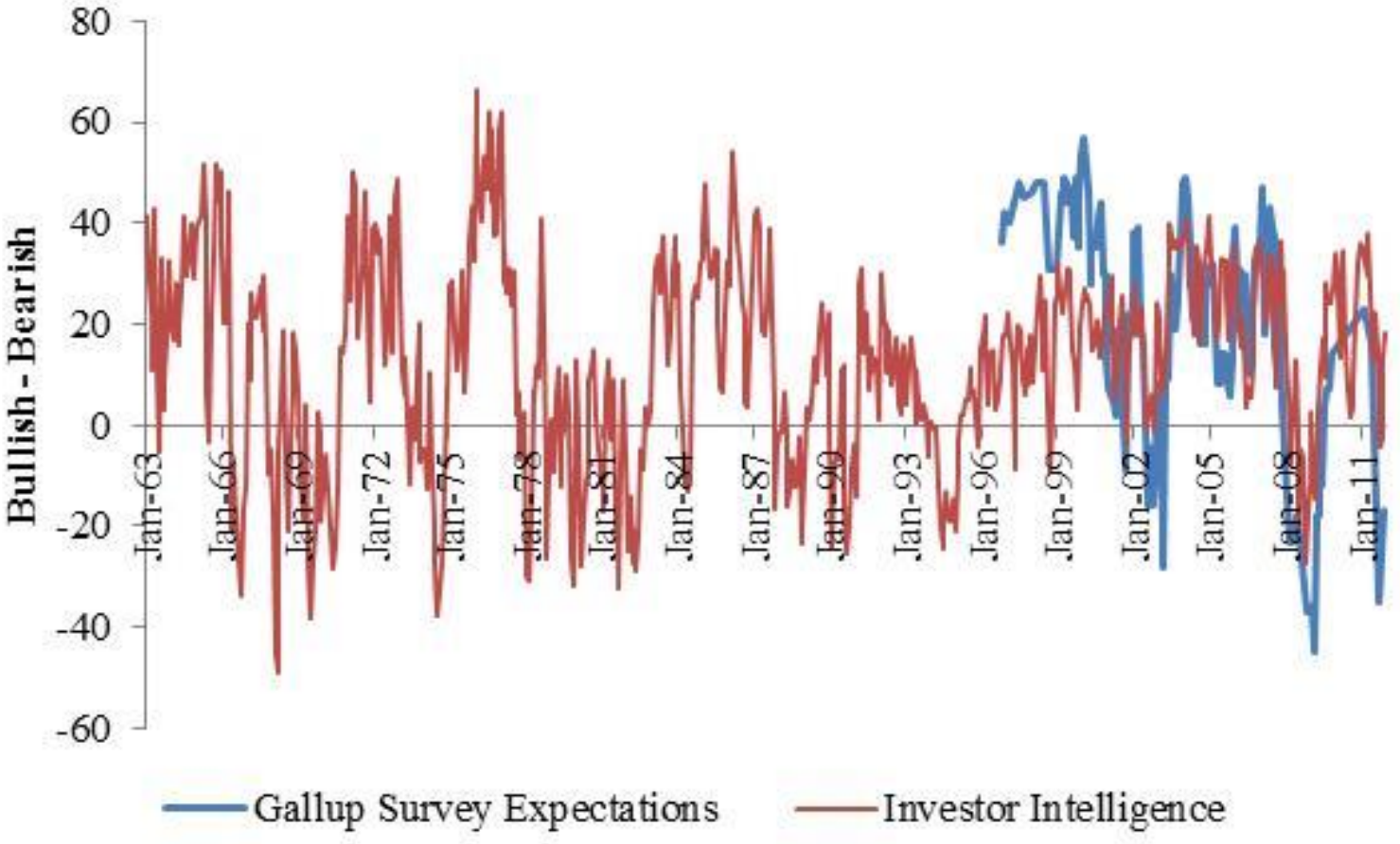
Graham-Harvey (CFOs)



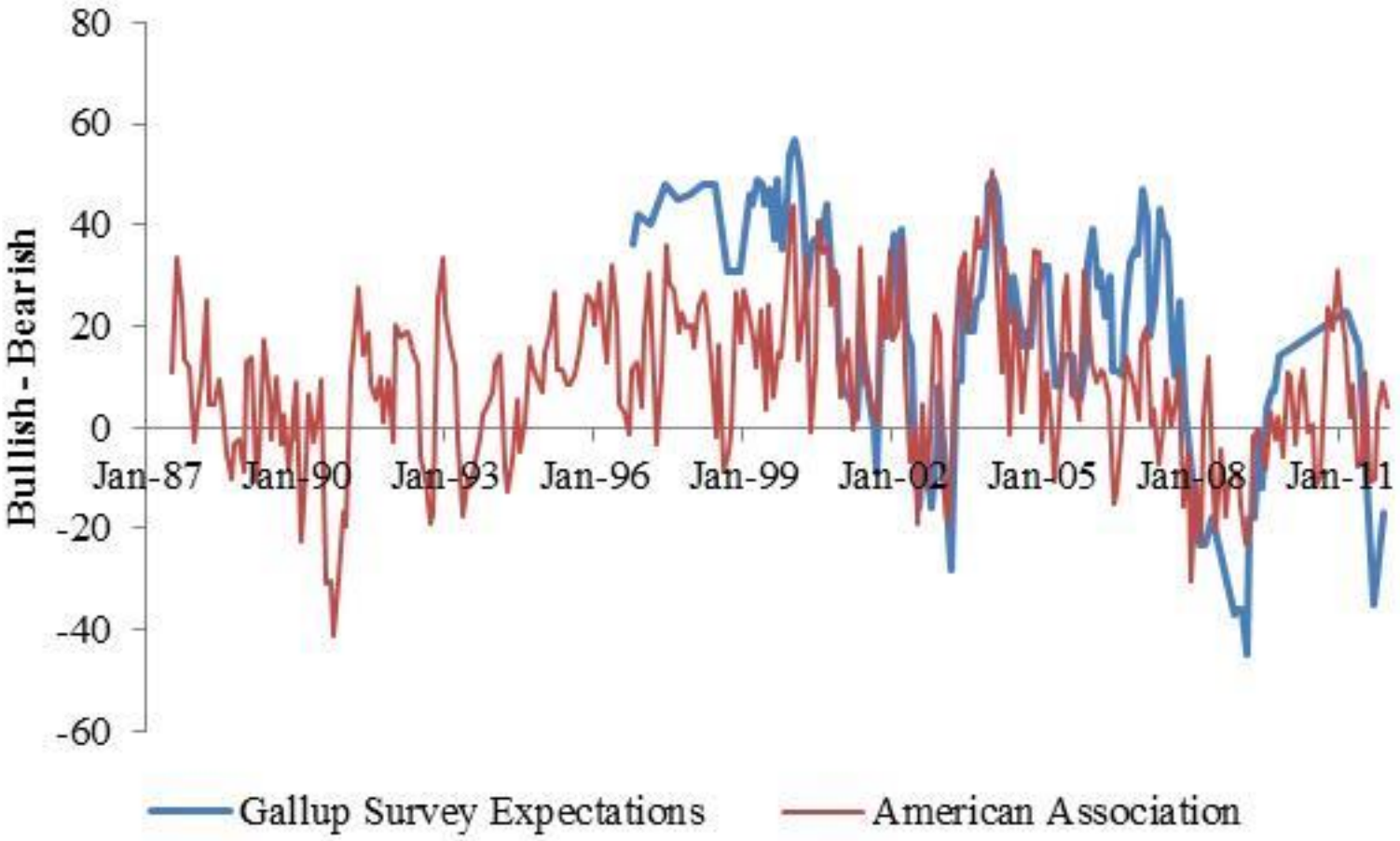
Other Surveys

- American Association of Individual Investors
  - Bullish minus Bearish
  - Recorded since 1986
- Investor Intelligence
  - Set of professional newsletters coded as “bullish” “neutral” or “bearish”
  - Consistent coding from 1963!
- Robert Shiller
  - Surveyed high net worth individuals
  - Yale University provides time series of percentage of investors who have a positive expected market return

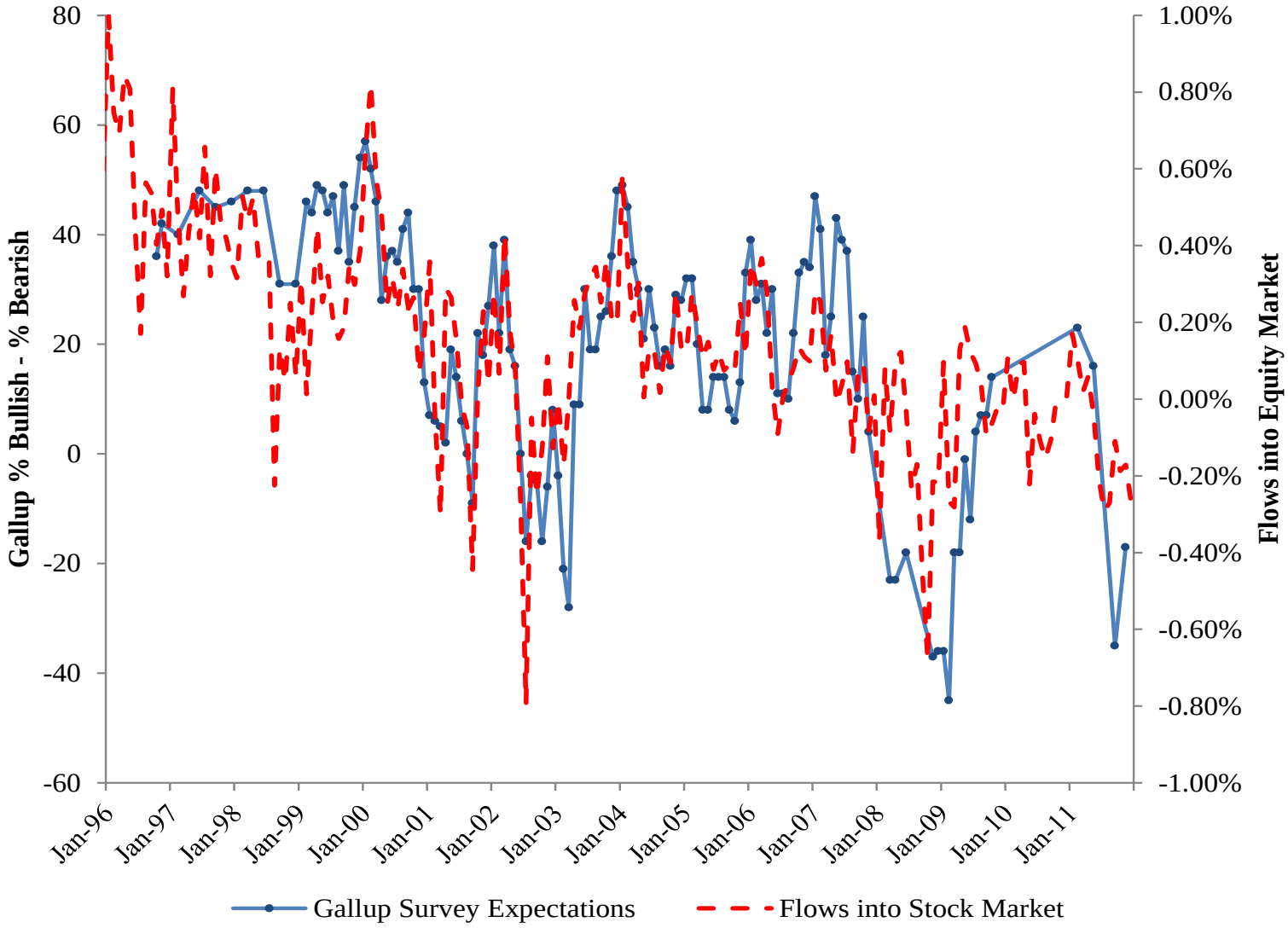
Investor Intelligence = The Professionals?



American Association of Individual Investors



Flows into equity mutual funds



Summary of Correlations

- Table 2

	Gallup (N=135)	Graham-Harvey (N=42)	American Association (N=294)	Investor Intelligence (N=588)	Shiller (N=132)	Michigan (N=22)
Graham-Harvey	0.77					
	[0.000]					
American Association	0.64	0.56				
	[0.000]	[0.000]				
Investor Intelligence	0.60	0.64	0.55			
	[0.000]	[0.000]	[0.000]			
Shiller	0.39	0.66	0.51	0.43		
	[0.000]	[0.000]	[0.000]	[0.000]		
Michigan	0.61	-0.12	0.60	0.19	-0.55	
	[0.003]	[0.922]	[0.003]	[0.395]	[0.020]	
Fund Flow	0.69	0.71	0.42	0.20	0.51	0.40
	[0.000]	[0.000]	[0.000]	[0.002]	[0.001]	[0.068]

- Minimum pairwise correlation is 0.42. Average is 0.54
- Most are also highly correlated with flows

Determinants of Expectations

- Several studies suggest that expectations are extrapolative
  - Empirical: Barsky and DeLong 1993, Cutler, Poterba, and Summers 1991, Lakonishok, Shleifer, and Vishny 1994.
  - Theoretical: Barberis, Shleifer, and Vishny 1998, Campbell and Kyle 1993, Cutler, Poterba, and Summers 1990, DeLong et al. 1990, Fuster, Laibson, and Mendel 2010
  - Prior work: Frankel and Froot 1987, 1988, Hurd et al. 2009, Shiller 2000, Case et al. 2012, Yagan 2012.

Figure 5: Extrapolative Expectations

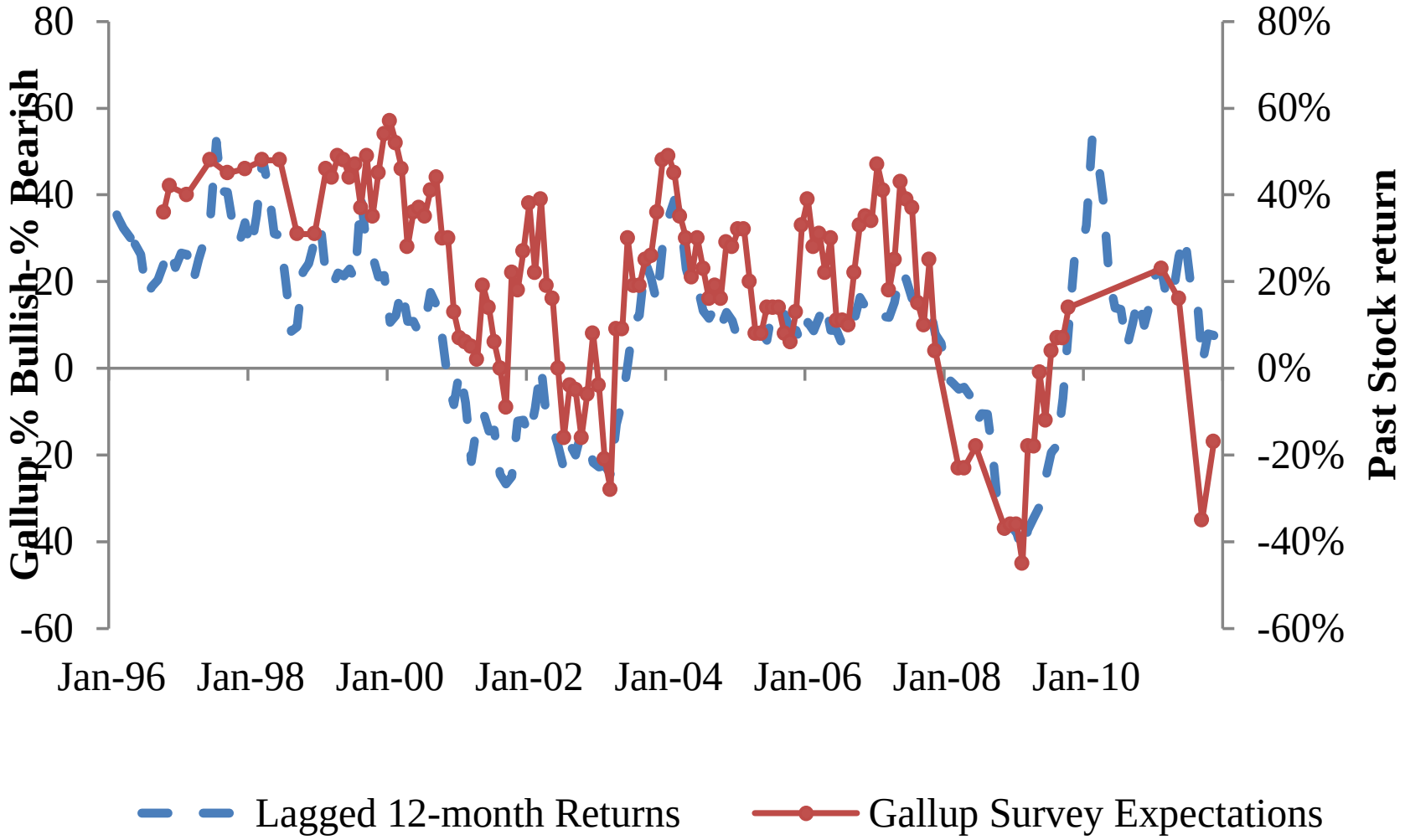


Figure 5: Extrapolative Expectations

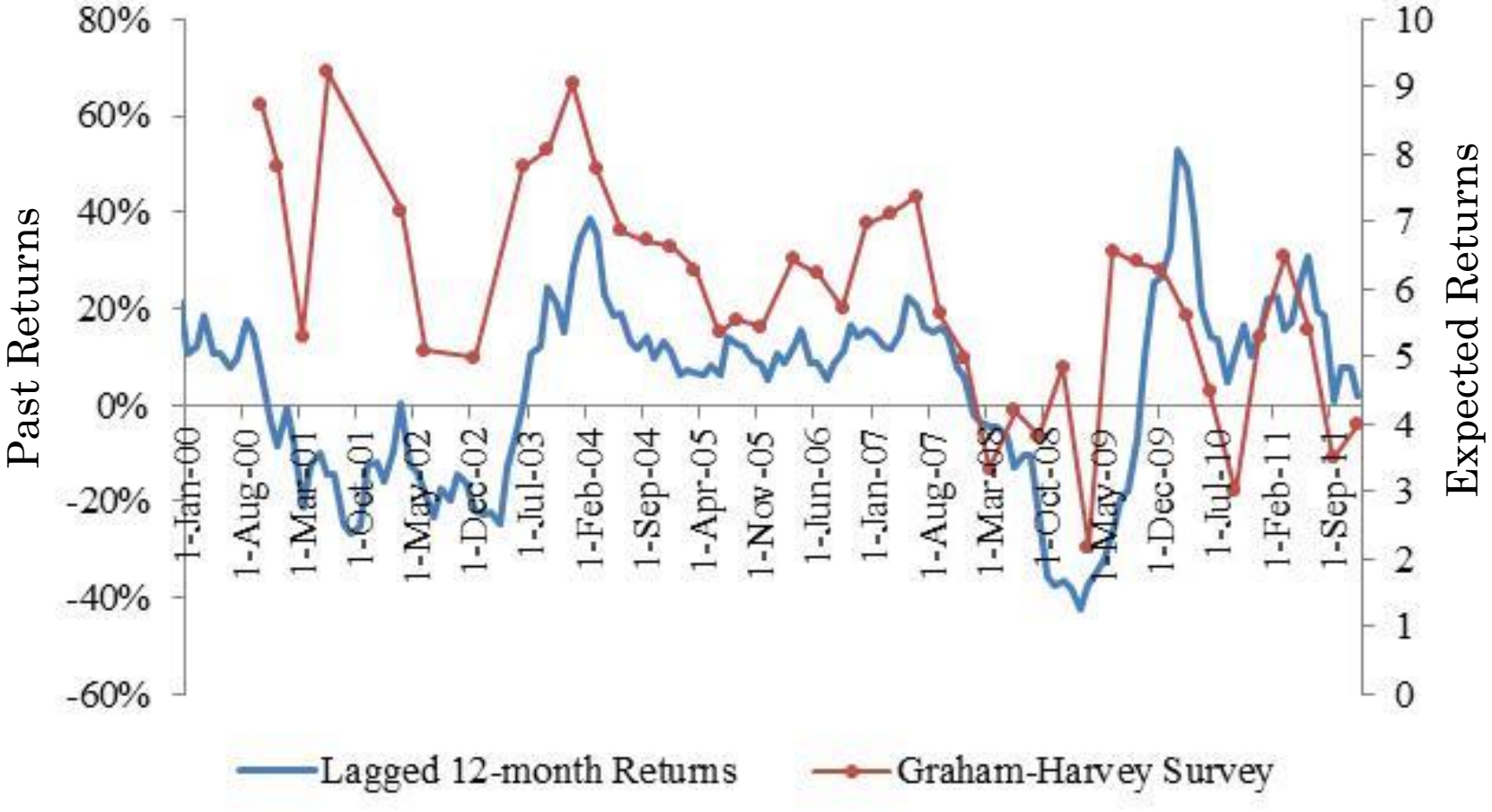


TABLE 3

$$Exp_t = a + bR_{t-k} + cP_t + dZ_t + u_t,$$

	(1) Gallup	(2) GH	(8) Gallup	(9) GH
R_{t-12}	33.71	1.882	41.84	3.354
	[5.790]	[1.377]	[11.72]	[2.460]
Log(SP500)	16.88	4.140		
	[3.170]	[2.200]		
Log(P/D)			12.99	3.404
			[3.446]	[3.264]
Constant	-109.7	-25.92	-49.38	-11.33
	[-3.267]	[-2.065]	[-2.952]	[-2.188]
N	135	42	135	42
R^2	0.616	0.285	0.632	0.348

Similar results for other measures of expectations shown in table

Table 3: Add measures of current fundamentals

- No effect

$$Exp_t = a + bR_{t-k} + cP_t + dZ_t + u_t,$$

	(1) Gallup	(2) GH	(8) Gallup	(9) GH
R_{t-12}			54.95	7.337
			[8.761]	[8.084]
Log(P/D)			17.70	4.360
			[3.298]	[3.599]
Earnings Gr.	9.615	0.272	-7.572	-1.215
	[2.572]	[1.154]	[-1.966]	[-5.603]
Unemployment	0.367	-0.410	-1.353	-0.0481
	[0.202]	[-2.390]	[-0.765]	[-0.307]
Risk-free R	190.4	-8.287	-103.4	-8.103
	[1.517]	[-0.486]	[-1.374]	[-0.687]
Constant	-149.1	17.01	30.62	-10.72
	[-1.090]	[0.932]	[0.352]	[-0.957]
N	135	42	135	42
R^2	0.333	0.190	0.667	0.509

Critiques of Survey Data

- Surveys are just noise
  - But, high correlation across surveys, correlation with past returns and price levels
  - High correlation with past returns and current price levels
  - High correlation with investor flows
- We don't know what question people *think* they are answering
  - Perhaps they mean "high" when they say "low" ?
    - Cochrane (2011) discusses equivalence between distorted probability assessments and time-varying required returns. He calls this "risk neutral equivalent"
    - E.g., when people say "high expected return" they mean "high cash flow growth" which is equivalent to "low required returns"
    - But our surveys are about investors expected *returns* not cash flows
      - Risk neutral equivalent of expected returns is just the risk-free rate

Expected Returns ER

- Variation in dividend price ratios driven not by expected dividend growth, but by changing expected returns
  - Campbell and Shiller 1988, Cochrane 1992, many others
- Since Campbell and Shiller, one of the objectives in asset pricing has been to develop theories of ER
- In rational expectations models, ER = Required Returns
- Three types of popular models
  - Habit formation models (ER varies because of variation in risk aversion)
  - Long run risk models (ER varies because of reassessments of future risk)
  - Rare disaster models (ER varies because of reassessments of rare disasters)

In principle, the dividend price ratio is a good summary statistic that subsumes all of these models

Permanent income hypothesis

- Lettau and Ludvigson (2001)
  - Under rational expectations, if ER vary predictably, then households with wealth invested in the stock market will adjust their consumption accordingly
  - *cay* ≈ Log consumption wealth ratio
    - When consumption is high relative to wealth, it is because expected returns are low
  - Lettau and Ludvigson show in regressions of future returns on cay that cay is an excellent forecaster of stock market returns
  - Keep in mind that this is just another scaled price variable

Null hypothesis

- If ER is measured without noise, then in a representative agent rational expectations model, the null hypothesis is
  - Expectations = 1xER with R^2 =1

CORRELATIONS

	Gallup	Graham-Harvey	AA	II	Shiller	Michigan
Log(D/P)	-0.328	-0.443	-0.305	-0.193	-0.554	-0.567
[*p*-val]	[0.000]	[0.003]	[0.000]	[0.000]	[0.000]	[0.000]
N	135	42	294	588	132	22
-Surplus C	-0.481	-0.529	-0.283	-0.054	-0.670	-0.736
[*p*-val]	[0.000]	[0.000]	[0.000]	[0.191]	[0.000]	[0.000]
N	135	42	294	588	132	22
cay	0.025	0.139	-0.016	-0.185	0.366	-0.003
[*p*-val]	[0.776]	[0.380]	[0.788]	[0.000]	[0.000]	[0.988]
N	135	42	294	588	132	22

Remember null hypothesis of perfect *positive* correlation

Future Returns

- Table 5
- Run time-series regressions of the form $R^{x}_{t+k} = a + bX_t + u_{t+k}$
- X=
  - Expectations of Returns (Gallup, Graham-Harvey, etc)
  - Measures of ER
- Rational Expectations null hypothesis:
  - b=1
  - R^2=1
  - No other variables measured at t should contribute to realized returns beyond
- Findings
  - Expectations of returns weakly negatively forecast returns
  - In large part this is explained by the negative correlation between d/p and expectations
  - ER positively forecast returns
    - Higher explanatory power than expectations variables

TABLE 5

Gallup*	-1.99								
	[-1.371]								
Graham-Harvey*		-0.021							
		[0.684]							
American Association*			-1.654						
			[0.888]						
Investor Intelligence*				-1.542					
				[2.326]					
Shiller*					-0.625				
					[0.231]				
Michigan*						-0.081			
						[-3.964]			
Log(D/P)							0.074		
							[1.475]		
-Surplus Consumption								0.891	
								[3.988]	
cay									3.235
									[3.153]
Constant	0.235	0.144	0.24	0.214	0.099	0.695	0.327	0.188	0.057
	[1.460]	[0.683]	[1.219]	[2.897]	[0.371]	[2.845	[1.842]	[5.644]	[3.101]
[*p*-val, *b*=1]	[0.040]	[0.000]	[0.154]	[0.000]	[0.550]	[0.000]			
N	131	38	282	576	120	22	612	612	610
R^2	0.057	0.031	0.015	0.036	0.004	0.342	0.031	0.111	0.111

What can reconcile the evidence?

- For expectations of returns to be *negatively* related to ER, it must be that there are multiple classes of investors in the economy
- We draw on Cutler Poterba Summers (1990) to outline how this might work
- Risky asset in fixed supply q
- News about liquidating dividend f released each period. f is a random walk:

$$f_t = f_{t-1} + z_t$$

- Two classes of traders
  - Fundamental traders

$$s_{f,t} = \underbrace{\beta}_{<0}(p_t - \underbrace{\alpha_1 f_t - \alpha_2 f_{t-1}}_{\alpha_1 + \alpha_2 = 1})$$

  - Extrapolative (positive-feedback) traders

$$s_{p,t} = \underbrace{\gamma}_{>0} p_t + \underbrace{\delta}_{>0}(p_t - p_{t-1})$$

Equilibrium

- Impose market clearing

$$p_t = \theta + \frac{1}{\beta+\gamma+\delta}\left[\delta p_{t-1} + \beta(f_{t-1} + (1-\alpha_2)z_t)\right], \text{ where } \theta = q/(\beta+\gamma+\delta)$$

- Derive price to fundamental ratios

$$p_t - f_t = \frac{\delta}{\beta+\gamma+\delta} p_{t-1} - \frac{\gamma+\delta}{\beta+\gamma+\delta} f_{t-1} - \frac{\alpha_2\beta+\gamma+\delta}{\beta+\gamma+\delta} z_t + \theta.$$

- Forecast future returns

$$p_t - p_{t-1} = \frac{1}{\beta+\gamma+\delta}\left[\delta(p_{t-1} - p_{t-2}) + \beta(\alpha_1 z_t + \alpha_2 z_{t-1})\right].$$

- We assume $\beta+\gamma+\delta<0$
- Key point: Under reasonable parameters, positive feedback traders *increase* the impact of good fundamental news, creating predictability in returns
  - Basic idea in Cutler, Poterba, Summers (1990,1991) and DeLong et al (1990)
- Fundamental investors are the "marginal investors" and have time-series variation in required returns, but this is driven solely by their accommodation of the feedback traders
  - Prices are far from rational

Calibration Exercise

- Draw extrapolative trader demand directly from our data (Table 3)

$$s_{p,t} = 0.17\, p_t + 0.34(p_t - p_{t-1}).$$

- For fundamental traders, use specification in CPS

$$s_{f,t} = -1(p_t - 0.75\, f_t - 0.25\, f_{t-1}).$$

- Simulate 5000 paths of 100 years of stock returns.
- We simulate the random walk in f and start $p_1 = 0$, and then use equations in previous slide to track price process
- We throw out first 50 observations to remove impact of initial conditions
  - Left with 5000 paths of 50 year samples, roughly the same as in our empirical specification
- In each sample, run regressions of the form

$$p_{t+k} - p_t = a + bX_t + u_{t+k}.$$

- where X = Price fundamental ratio *p-f*, fundamental *f*, innovation in fundamental *z*, or "surplus consumption" *f* – moving average(*f*)

TABLE 6: REGRESSIONS USING SIMULATED DATA

$$R_{t+k} = p_{t+k} - p_t = a + bX_t + u_{t+k}$$

Approximate "surplus" consumption

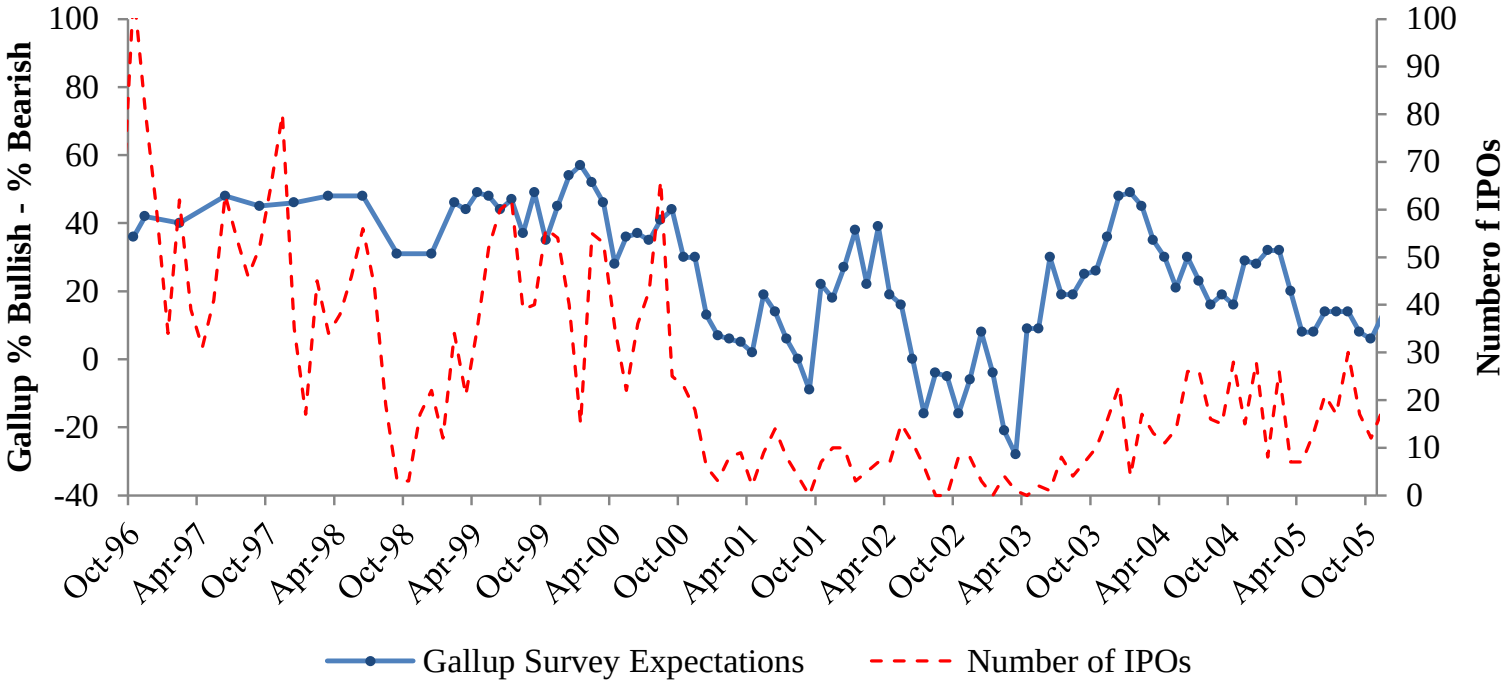
	R_{t+3}	R_{t+3}	R_{t+3}	R_{t+3}
	$X=f-p$	$X=z$	$X=f$	$X=f$-mav(f,10)
b-mean	0.77	-0.40	-0.73	-0.13
t-mean	2.65	-2.66	-1.91	-1.86
p-val	(0.05)	(0.05)	(0.06)	(0.11)
Avg R^2	0.10	0.10	0.06	0.07

Definitions:
b-mean = Average regression coefficient across all simulations
t-mean = Average in-sample t-statistic across all simulations
p-val = Percentage of simulation in which b greater than or less than zero
Avg R^2 = Average R^2 across all simulations

Who is on the other side?

- Who plays the role of fundamental trader?
- Corporate finance research suggests that firms play a role
  - Baker and Wurgler (2000)
  - Frazzini and Lamont (2008)

FIGURE 6: SURVEY EXPECTATIONS AND IPOS



Conclusion

- Asset pricing has made great strides in developing models of ER
- An important test of these models is how well they match expectations data
- They do not
- A simple behavioral model may be able to account for many of the facts