

# EXPECTATIONS AND INVESTMENT

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# Expectations in Macroeconomic Analysis

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- Expectations are central to economic decisions.
- 1940s—1960s: Extensive effort to measure and understand actual expectations. NBER publications: e.g. *The Quality and Economic Significance of Anticipations Data* (1960)
- Rational Expectations Revolution:
  - Models dictate what expectations rational agents should hold, so anticipations data are redundant.
  - Prescott (1977): “***Like utility, expectations are not observed, and surveys cannot be used to test the rational expectations hypothesis.***”

# Our View

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- Expectations data provide economists with valuable information for understanding decisions and for distinguishing alternative models. See Manski (2004).
- Whether survey expectations predict behavior is an empirical question.
- Whether actual expectations are rational is testable and informative about models people use.
- We make these points using data on investor expectations and stock returns, and data on CFO expectations and corporate investment.

# The Usefulness of Expectations Data: Greenwood & Shleifer (2014)

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- Fact 1: Expectations of future stock returns are highly correlated across different surveys, and with equity mutual fund flows.

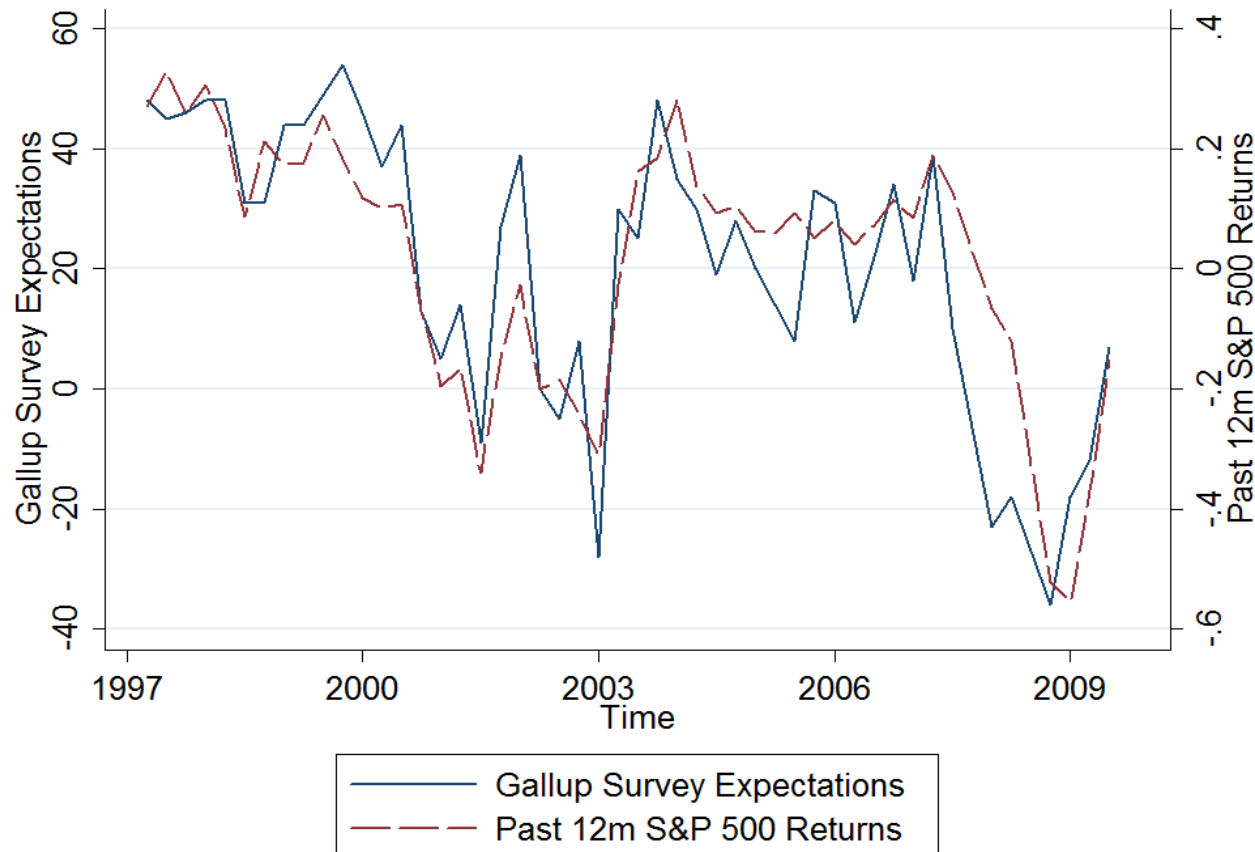
	Gallup	CFO Survey	AAll	Investor Intelligence	Shiller	Michigan
<b>CFO Survey</b>	0.77					
	[0.000]					
<b>AAll</b>	0.64	0.56				
	[0.000]	[0.000]				
<b>Investor Intelligence</b>	0.60	0.64	0.55			
	[0.000]	[0.000]	[0.000]			
<b>Shiller</b>	0.39	0.66	0.51	0.43		
	[0.000]	[0.000]	[0.000]	[0.000]		
<b>Michigan</b>	0.61	-0.12	0.60	0.19	-0.56	
	[0.003]	[0.922]	[0.003]	[0.395]	[0.020]	
<b>Equity Fund Flows</b>	0.70	0.71	0.41	0.20	0.33	0.40
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.068]

$p$ -value in brackets.

# The Usefulness of Expectations Data: Greenwood & Shleifer (2014)

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- Fact 2: Expectations of future stock returns are highly correlated with past returns.

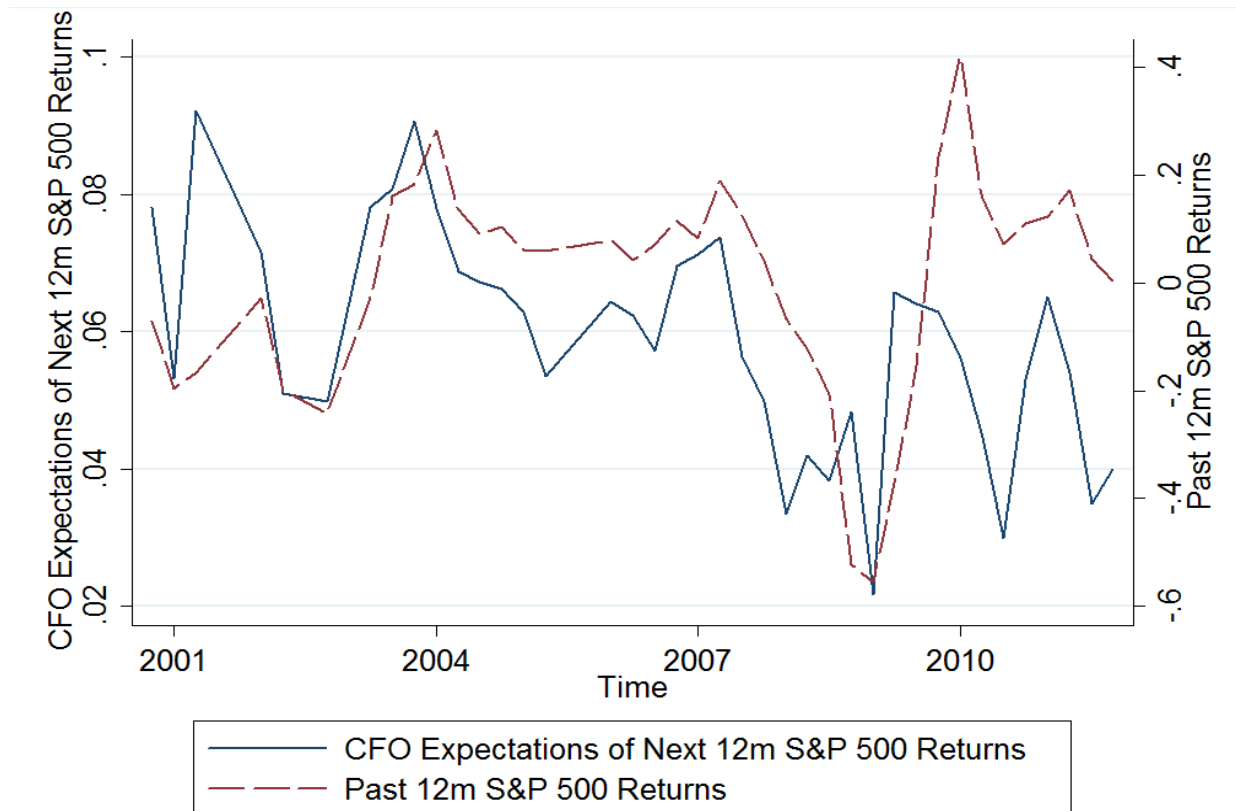


Gallup: % optimistic - % pessimistic about next 12m aggregate stock market performance.

# The Usefulness of Expectations Data: Greenwood & Shleifer (2014)

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- Fact 2: Expectations of future stock returns are highly correlated with past returns.



CFO survey: “Over the next year, I expect the average annual S&P 500 return will be: \_\_\_\_.”

# The Usefulness of Expectations Data: Greenwood & Shleifer (2014)

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- Fact 3: Expectations of future stock returns are strongly negatively correlated with model-based measures of expected returns (ER).

	Gallup	CFO Survey	AAll	Investor Intelligence	Shiller	Michigan
<b>Log(D/P)</b>	-0.33	-0.44	-0.31	-0.19	-0.55	-0.57
<b>Campbell-Shiller (1988)</b>	[0.000]	[0.003]	[0.000]	[0.000]	[0.000]	[0.006]
<b>cay</b>	0.02	0.14	-0.02	-0.19	0.37	0.00
<b>Lettau-Ludvigson (2001)</b>	[0.776]	[0.380]	[0.788]	[0.000]	[0.000]	[0.988]
<b>-Surplus Consumption</b>	-0.48	-0.53	-0.28	-0.05	-0.67	-0.74
<b>Campbell-Cochrane (1999)</b>	[0.000]	[0.000]	[0.000]	[0.191]	[0.000]	[0.000]

$p$ -value in brackets.





# The Usefulness of Expectations Data: Greenwood & Shleifer (2014)

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- Survey expectations are informative:
  - Consistent across different surveys of different types of investors
  - Predict investor behavior
  - Have a clear extrapolative structure
- Survey expectations reject rational expectations models of asset prices. The trouble seems to be with the models, not with expectations data.



# Expectations and Corporate Investment

# Data on Expectations and Investment

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- CFO Expectations: Duke/CFO Magazine Business Outlook Survey
  - Quarterly survey since July 1996; covers mostly large corporations.
  - Aggregate data: Aggregate results published on survey website [www.cfosurvey.org](http://www.cfosurvey.org).
  - Firm-level data: CFOs are not required to identify themselves, and individual responses are not released. But some respondents voluntarily disclose their identity, which makes it possible to match a subset of firm-level responses with CRSP and Compustat data.
  - Ben-David, Graham, and Harvey (2013) use firm-level data to study managerial miscalibration.
  - We use a subsample of Ben-David, Graham, and Harvey (2013) , with 1,133 firm-year observations, from 2005Q1 to 2013Q4.

# Data on Expectations and Investment

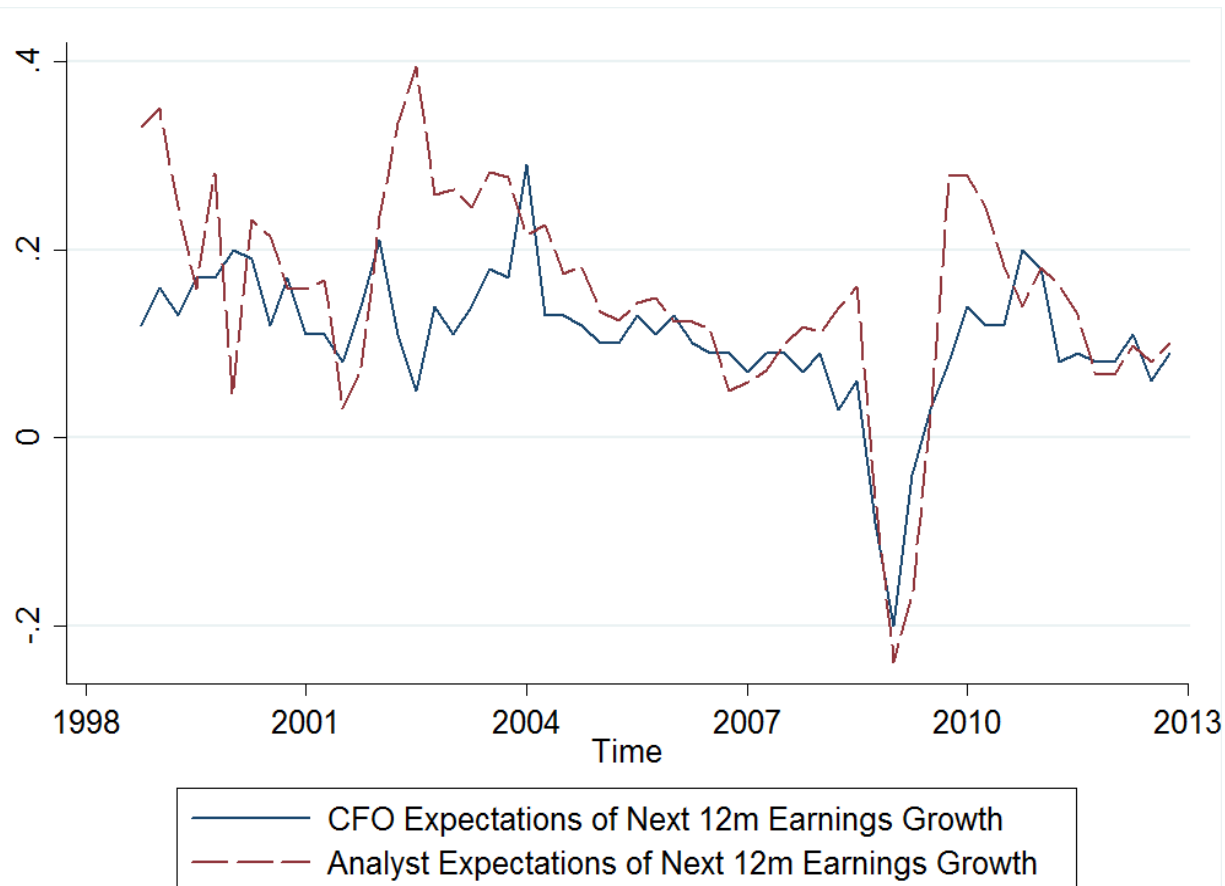
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- ❑ CFO Expectations: Duke/CFO Magazine Business Outlook Survey
  - Since 1998, in every quarter's CFO survey, respondents are asked about, among other things:
    - Expectations of next 12 month earnings growth
    - Planned next 12 month investment growth
  - Answers are numerical
- ❑ Analyst Expectations: IBES
  - Supplement CFO expectations of future earnings with analyst forecasts of future earnings.
  - Since early 1980s, IBES provides analyst forecasts of quarterly earnings for up to 12 quarters in the future. Longer time span and larger sample.

# Data on Expectations and Investment

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- CFO and analyst expectations of future earnings growth are highly correlated.



# Expectations and Investment: Adapting Q Equations

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- Basic Q model (CRS, quadratic adjustment costs):

$$\frac{I_t}{K_t} = \left( a - \frac{1}{b} \right) + \frac{1}{b} \frac{\mathbb{E}_t[\sum_{s \geq t+1} \beta^{s-t} \Pi_s]}{K_{t+1}}$$

- Approximate by:

$$\frac{I_t^p}{K_t} \approx \theta_0 + \theta_1 \frac{\mathbb{E}_t(\Pi_t)}{K_t}$$

- Log linearized approximation:

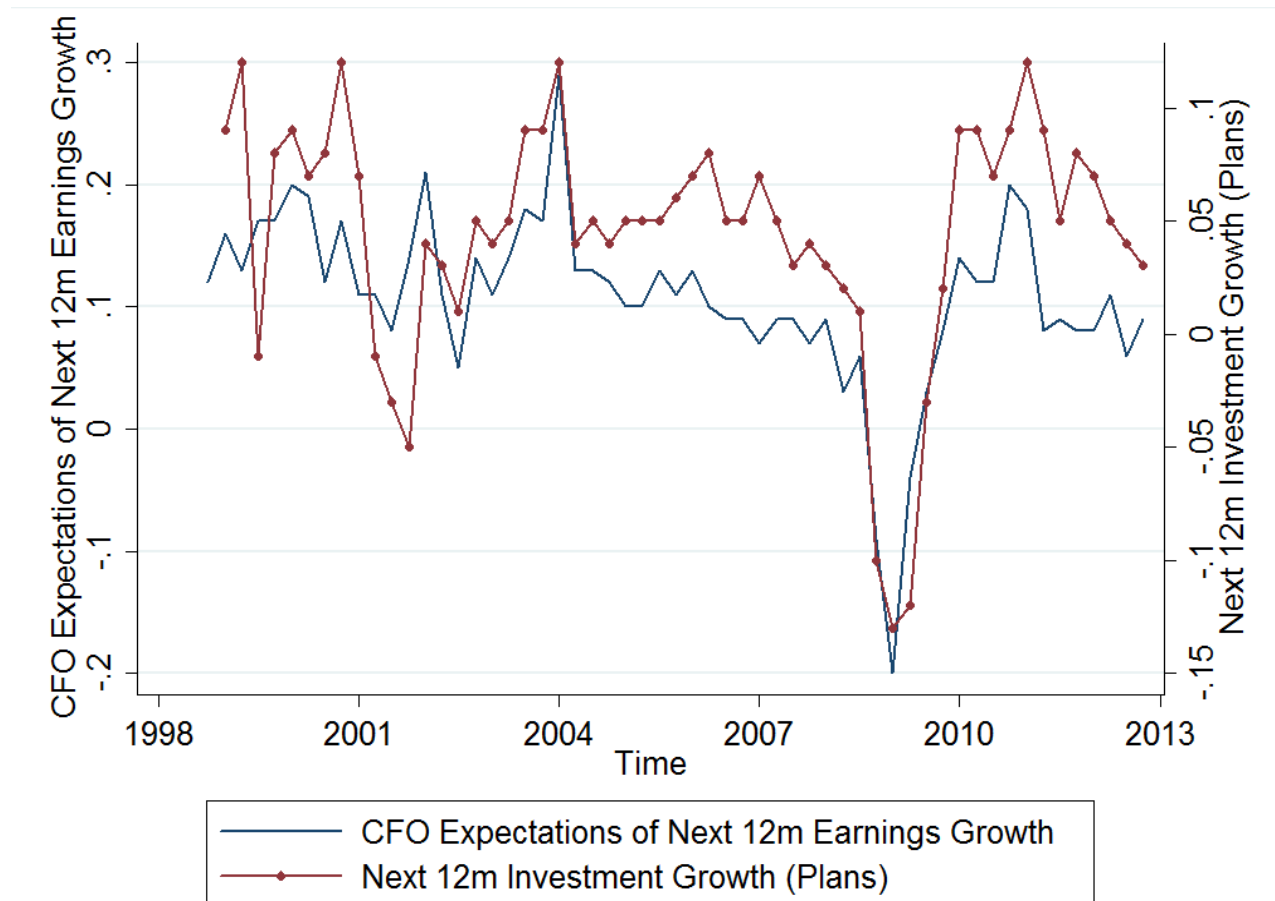
$$\underbrace{\frac{i_t^p - i_{t-1}}{\text{planned investment growth in the next 12m}}}_{\text{planned investment growth in the next 12m}} \approx \mu_1 \underbrace{\frac{[\mathbb{E}_t(\pi_t) - \pi_{t-1}]}{\text{expectations of earnings growth in the next 12m}}}_{\text{expectations of earnings growth in the next 12m}} + (1 - \mu_1)(k_t - k_{t-1})$$

- Specification similar to Barro (1990), Lamont (2000)
- Plans are useful for detecting the impact of expectations given lags in investment implementation (Lamont, 2000). We start with plans, and then connect to actual capital spending over the planned period.

# Expectations and Investment: Aggregate Evidence

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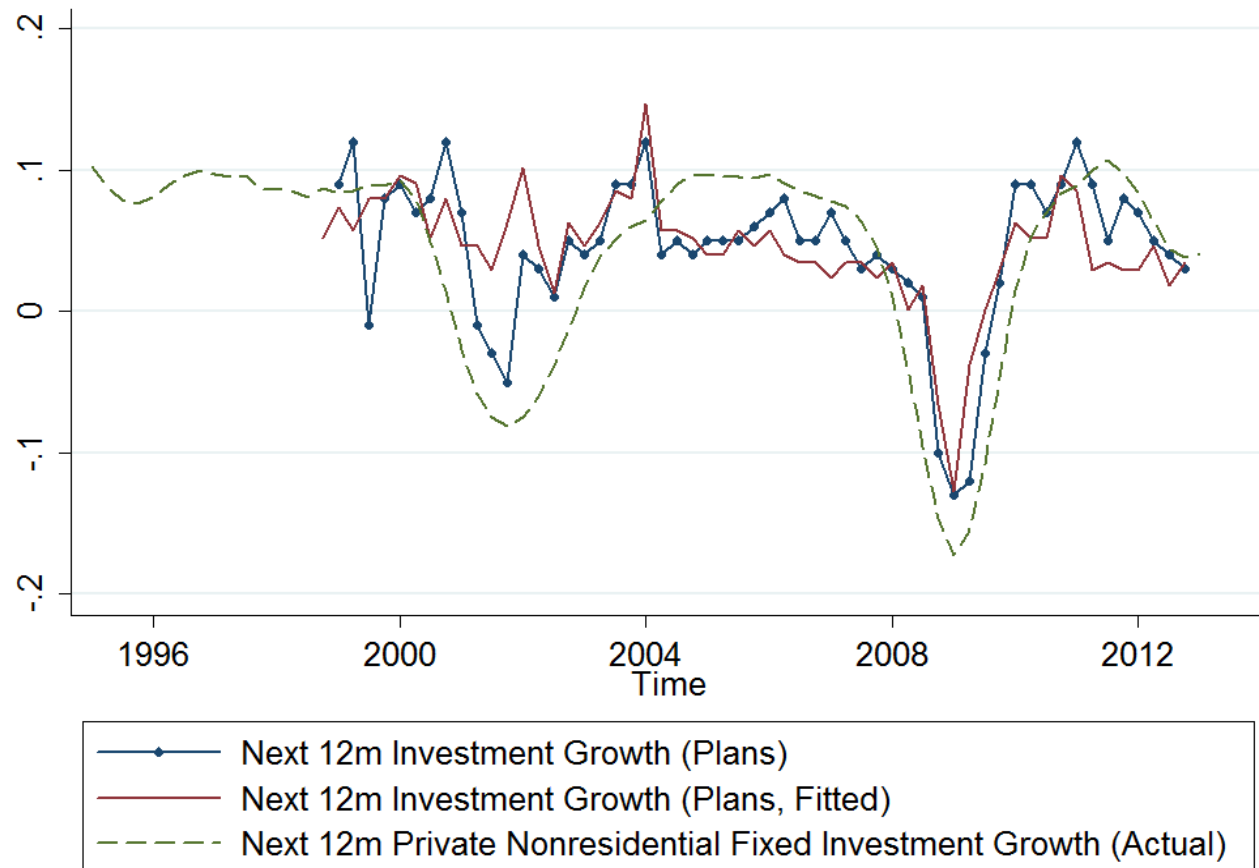
- CFO earnings growth expectations and investment plans



# Expectations and Investment: Aggregate Evidence

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- CFO earnings growth expectations, investment plans, and realized investment





# Expectations and Investment: Aggregate Evidence

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- Regression results: Baseline and comparison with market-based Q proxies

$$\Delta \widehat{\text{CAPX}}_{q_t} = \alpha + \beta E_{q_t}^* [\Delta \text{Earnings}] + \lambda X_{q_t} + \epsilon_{q_t}$$

	Planned Next 12m Investment Growth			
CFO Expectations of Next 12m Earnings Growth	0.5959	0.5869	0.4235	0.4853
	(11.65)	(11.40)	(7.21)	(12.83)
Q		0.0532		
		(1.68)		
Past 12m Agg. Stock Returns			0.1082	
			(3.64)	
Past 12m Credit Spread Change				-0.0352
				(-2.26)
Past 12m Asset Growth	0.2181	0.1461	0.0784	0.2643
	(3.97)	(2.39)	(1.89)	(5.88)
Observations	56	56	56	56
R-squared	0.660	0.672	0.741	0.685

*t*-statistics in parentheses. Standard errors are Newey-West with twelve lags.

# Expectations and Investment: Aggregate Evidence

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## Regression results: Alternative theories of investment

	Planned Next 12m Investment Growth				
CFO Expectations of Next 12m Earnings Growth	0.5997 (11.79)	0.5435 (9.78)	0.5969 (11.37)	0.5429 (8.20)	0.5301 (14.03)
Log(D/P)	0.0271 (0.62)				
<i>cay</i>		-0.9700 (-1.86)			
Surplus Consumption			0.0154 (0.30)		
Past 12m Change of Net Income/Asset				0.0433 (1.70)	
Past 12m Agg. Stock Vol Change					-0.0044 (-0.37)
Bloom Policy Uncertainty Index (Past 12m Change)					-0.0328 (-2.11)
Past 12m Asset Growth	0.2481 (2.97)	0.2536 (3.92)	0.2114 (3.40)	0.1716 (3.25)	0.2376 (4.22)
Observations	56	56	56	56	56
R-squared	0.663	0.674	0.660	0.672	0.694

*t*-statistics in parentheses. Standard errors are Newey-West with twelve lags.

# Expectations and Investment: Concerns

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- Reverse Causality Concerns: If a firm plans to invest a lot in the next twelve months, might expect earnings to increase as investment leads to more output and sales.
- Investment in the next twelve months generally does not translate into output and sales immediately.
- Even if it does, unlikely that a one percent increase in investment--which increases capital stock by much less than one percent--can instantly lead to a one percent or more increase in firm earnings, as would be required to match the magnitude of coefficients in the data.
- Robustness checks: In every quarter's survey, CFOs are asked to rate their optimism about the US economy on a scale from 0 to 100.
- Results are similar. Hard to argue that firms' investment plans will mechanically cause CFOs to be more optimistic about the *US economy*.

# Expectations and Investment: Aggregate Evidence

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- Forecasting next 12m realized investment

$$\Delta\text{CAPX}_{q_t} = \alpha + \beta E_{q_t}^*[\Delta\text{Earnings}] + \lambda X_{q_t} + \epsilon_{q_t}$$

	Realized Next 12m Investment Growth			
CFO Expectations of Next 12m Earnings Growth	0.5903 (8.14)	0.5853 (8.41)	0.2799 (3.52)	0.2611 (3.20)
Q		0.0278 (0.37)		
Past 12m Agg. Stock Returns			0.1975 (4.20)	
Past 12m Credit Spread Change				-0.1035 (-3.82)
Past 12m Asset Growth	0.7021 (6.48)	0.6645 (3.53)	0.4473 (3.43)	0.8382 (11.72)
Observations	57	57	57	57
R-squared	0.610	0.611	0.748	0.719

*t*-statistics in parentheses. Standard errors are Newey-West with twelve lags.

# Expectations and Investment: Firm-level Evidence

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	Planned Next 12m Invest. Growth				Actual Next 12m Invest. Growth			
CFO Expectations of Next 12m Earnings Growth	0.4259	0.3887	0.4172	0.3420	0.5930	0.3787	0.6137	0.3243
	(4.50)	(3.94)	(4.25)	(3.16)	(5.04)	(3.08)	(4.99)	(2.53)
Past 12m Firm Stock Ret		0.0833				0.3047		
		(3.49)				(4.32)		
Past 12m Change of Net Income/Asset			0.0025				-0.0003	
			(2.23)				(-0.08)	
Past 12m Firm Stock Vol Change				-0.0905				-0.4806
				(-2.87)				(-5.76)
Bloom Policy Uncertainty (Past 12m Change)				-0.0764				-0.0844
				(-2.35)				(-0.96)
Past 12m Asset Growth	0.1163	0.0626	0.0929	0.0393	0.3565	0.1914	0.3371	0.1248
	(1.37)	(0.69)	(0.97)	(0.40)	(1.83)	(1.00)	(1.69)	(0.65)
Observations	834	764	809	719	845	788	819	741
R-squared	0.104	0.132	0.114	0.115	0.054	0.103	0.057	0.175

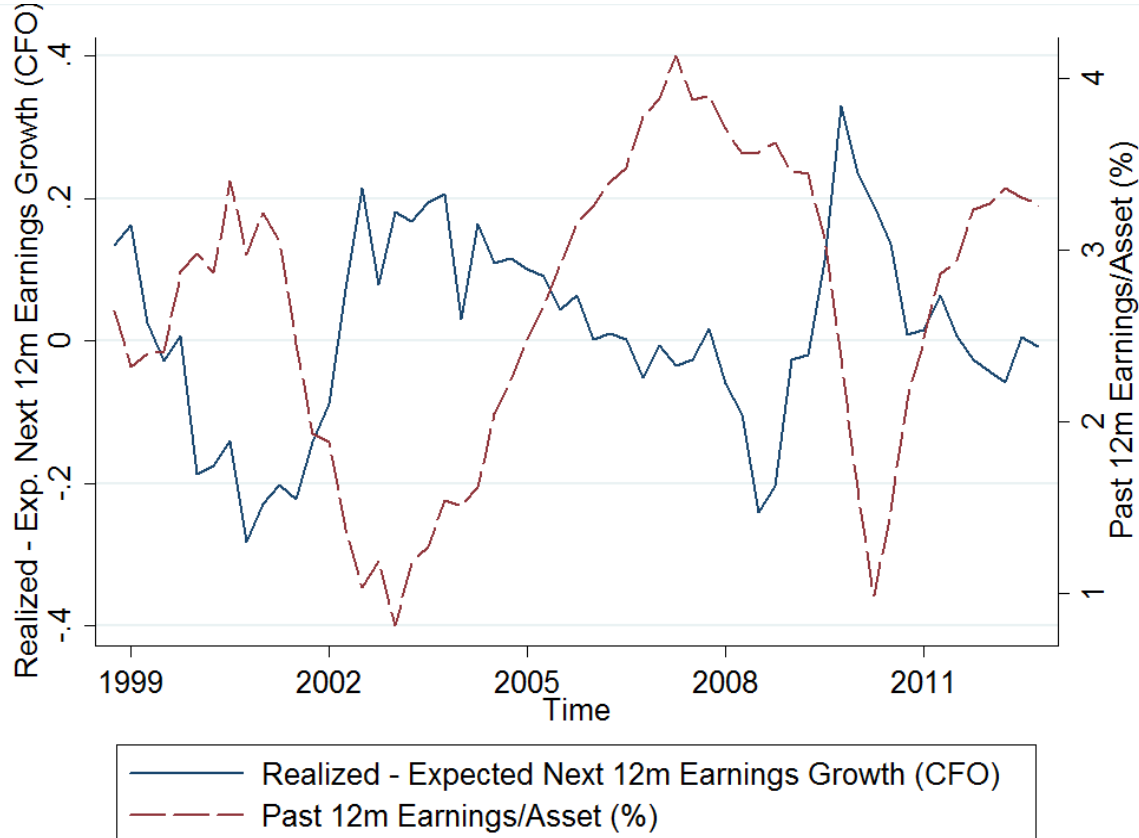
*t*-statistics in parentheses. Standard errors are clustered by firm.

# Structure of Expectations

# Errors in Earnings Growth Expectations: CFOs

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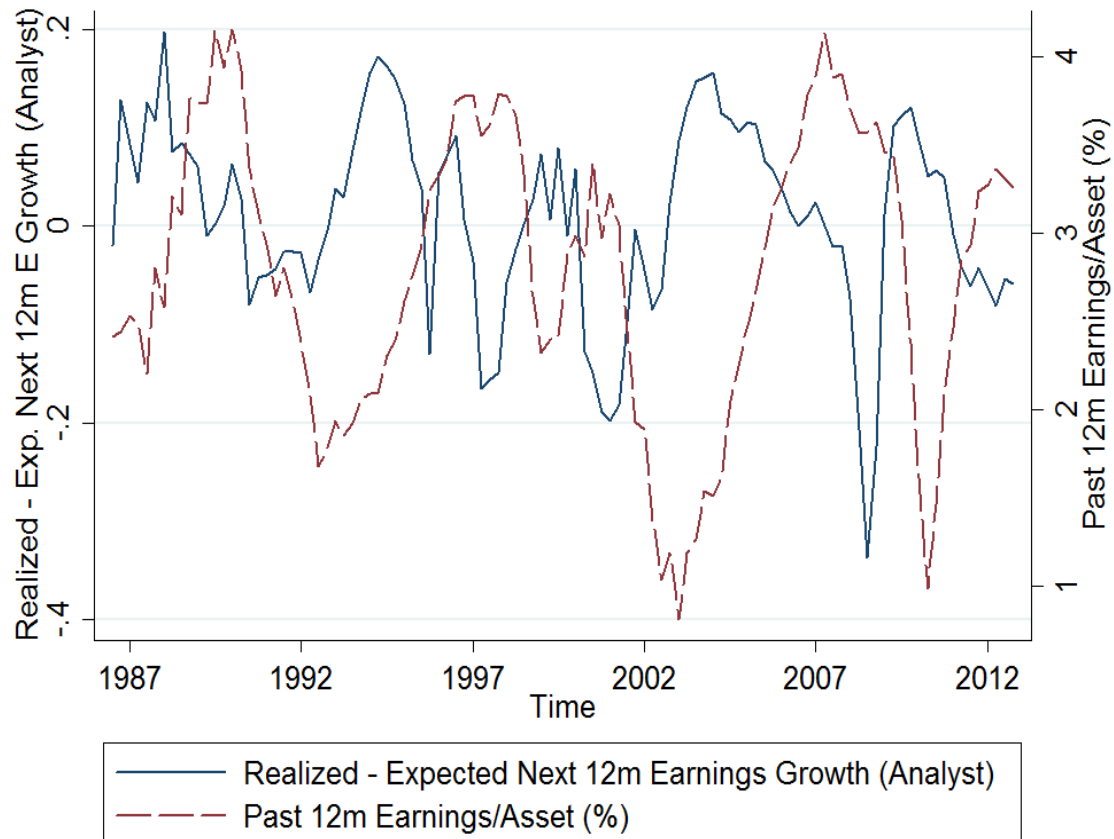
- Realized – CFO Expected Next 12m Earnings Growth.
- Errors appear systematic and recurring: over-optimism in good times and over-pessimism in bad times.



# Errors in Earnings Growth Expectations: Analysts

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- Realized – Analyst Expected Next 12m Earnings Growth.
- Errors appear systematic and recurring: over-optimism in good times and over-pessimism in bad times.





# Errors in Earnings Expectations: Predictive Regressions

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- Errors in aggregate CFO expectations:

	Realized – CFO Expected Next 12m Earnings Growth			
Past 12m Earnings/Asset (%)	-0.0881		-0.0915	
	(-6.48)		(-8.85)	
Past 12m GDP Growth		-3.2999		-3.6632
		(-3.06)		(-3.38)
VIX			-0.2552	-0.3288
			(-1.51)	(-1.46)
Observations	57	57	57	57
R-squared	0.335	0.225	0.361	0.266

*t*-statistics in parentheses. Standard errors are Newey-West with twelve lags.

- When past year earnings/asset increase by one percentage point, actual earnings growth in the next twelve months on average slows down by 0.12.
- However CFOs only expect it to slow down by 0.03.

# Errors in Earnings Expectations: Predictive Regressions

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## Errors in individual CFO expectations:

	Realized – CFO Expected Next 12m Earnings Growth					
Past 12m Firm Earnings/Asset (%)	-0.0511		-0.0500		-0.0324	-0.0353
	(-5.14)		(-5.22)		(-3.40)	(-3.56)
Past 12m GDP Growth		-4.1472		-2.811		
		(-2.44)		(-1.75)		
Firm Stock Vol			0.3959	0.2229		0.5299
			(1.74)	(0.94)		(1.13)
Firm Fixed Effects	Y	Y	Y	Y	Y	Y
Time Fixed Effects	No			Yes		
Observations	606	651	594	638	606	594
R-squared	0.082	0.032	0.103	0.033	0.037	0.050

*t*-statistics in parentheses. Standard errors are clustered by firm.

- When past year firm earnings/asset increase by one percentage point, actual earnings growth in the next twelve months on average slows down by 0.06.
- However CFOs only expect it to slow down by 0.01.

# Errors in Earnings Growth Expectations

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- Similar patterns in aggregate and firm-level analyst expectations: Analysts over-estimate future earnings growth when past year was favorable, and under-estimate when past year was rough.
- Past earnings are highly important, publicly available information that matter a lot to CFOs and analysts.
- Evidence appears consistent with extrapolative biases.
- Echoes accumulating evidence from finance that market participants have extrapolative expectations (Greenwood and Shleifer, 2014; Piazzesi, Salomao, Schneider, 2013; etc.)
- CFO expectations of future stock returns are also extrapolative.

# Summary and Implications

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- Expectations data appear to be extremely helpful in understanding corporate investment.
- Expectations appear to exhibit systematic extrapolative errors.
- What are plausible models of actual expectations that allow some awareness that the future may be different?
- Open question of how much errors in expectations can account for economic fluctuations; the role of over-optimism and over-pessimism in aggregate overbuilding and prolonged economic recessions.