Economics of Behavioral Finance

Lecture 7

Analyst Recommendations

- Trading recommendation
- Usually categorical: strong buy, buy, hold, sell, strong sell
  - Specific price targets are sometimes provided
- Popular analyst's recommendations can have considerable market-moving power

Three Categories of Analysts

- Sell-side analysts
  - Work for service brokers, particularly investment banks
  - Probably the most frequently-quoted category
- Buy-side analysts
  - Work for funds
  - Analysis not public
- Independent analysts
  - No affiliation. Sell recommendations directly or indirectly

Should We Expect Accuracy?

- On one hand, analyst have better access to information about the firms they cover

- On the other hand, incentive matters
  - Investment-bank relationship with firms they cover
  - Hired gun—paid research
  - Commission from generating trade

A Model of Analyst Recommendations

- Consider a simple model where analysts know the true value of a stock

- There are two types of analysts
  - The first type cares wants stock price to be the true value
    - We say this type of analysts have *aligned* incentives
  - The second type wants inflated stock price
    - This is the type with I-Bank relationship, etc. This type of analysts have *misaligned* incentives

- When will we see truth telling?

A Model of Analyst Recommendations

- If the fraction of analysts with aligned incentive is 1?
- If the fraction of analysts with misaligned incentive is 1?
- If there is a mixture, and investors cannot tell the two types apart?

A Model of Analyst Recommendations

- Suppose there are fraction *p* incentive-aligned analysts and *1 – p* misaligned ones. Assume misaligned analysts inflate their reports by *b*
  - As an investor, what's the expected price you will form from a report?
- By an argument similar to the market for lemons—i.e. asymmetric information—it is impossible for analysts to *always* report truthfully
  - Even if their incentive is aligned with the investors
- One possible equilibrium: investors discount very rosy recommendations, but pay attention to discouraging recommendations
  - Consistent with the market reaction to analyst reports

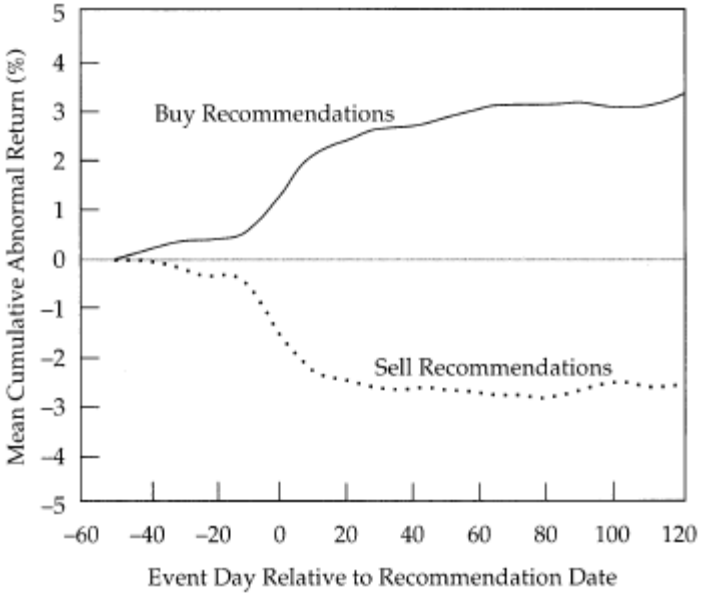
A Model of Analyst Recommendations

- One possible equilibrium: investors discount very rosy recommendations, but pay attention to discouraging recommendations
  - Assume b is very large
  - Investors
    - Believe in the report if and only if the reported value is below a certain number ϑ^*
    - Believe the truth value is ϑ^* otherwise
  - Analysts
    - Aligned: Report truth value if it is below ϑ^*, report ϑ^* if it is above
    - Misaligned: Report ϑ^* always

Source: Morgan and Stocken. 2003. "Analysis of Stock Recommendations", RAND Journal of Economics.

Empirical Evidence on Performance

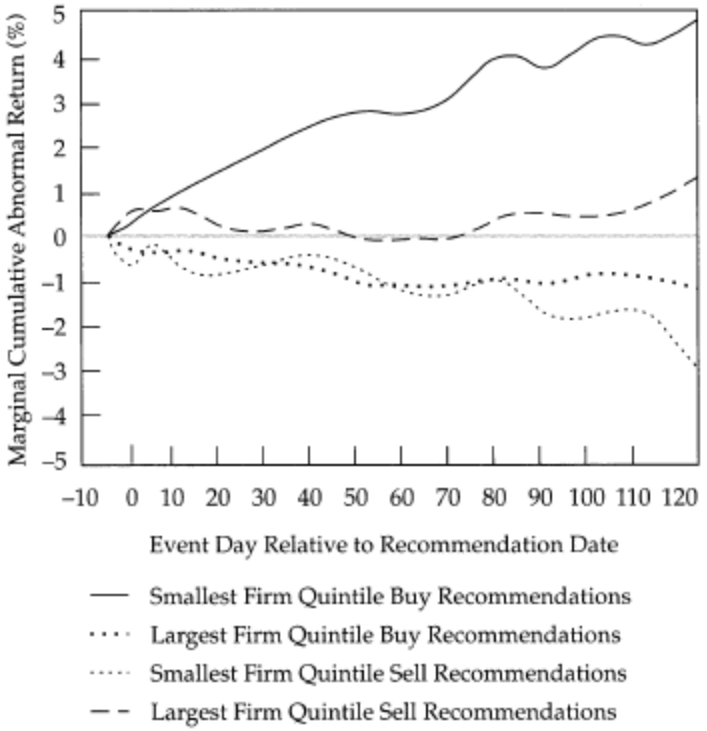
- Stickel 1995
  - 8790 buy and 8167 sell recommendations made by 1510 analysts between 1988-1991, covering 1179 stocks.
  - Downgrade to strong sell and sell have greater negative price impact than downgrades to hold (-0.66% difference over 10 days)
  - No similar effect for upgrades
  - Skipping a rank result in a stronger effect on price



Source: Stickel, Scott E. 1995. "The Anatomy of the Performance of Buy and Sell Recommendations", *Financial Analysts Journal*.

Empirical Evidence on Performance

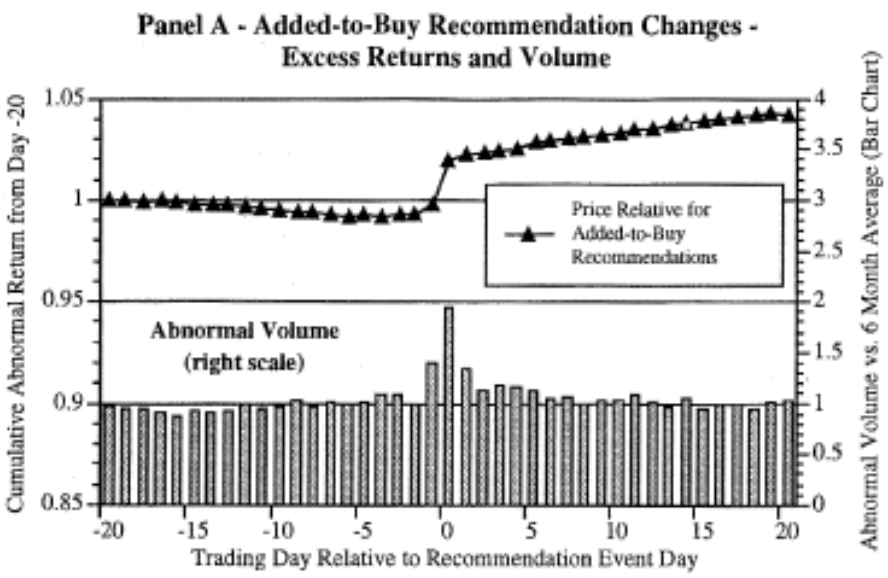
- Stickel 1995
  - Price of small firms react much stronger than price of large firms
  - Consistent with the lack of information on small firms

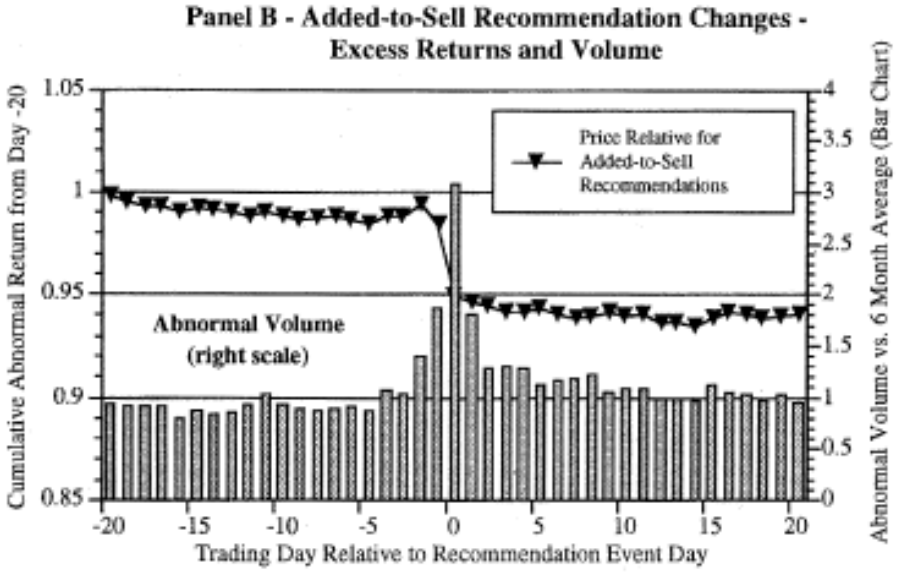


Source: Stickel, Scott E. 1995. "The Anatomy of the Performance of Buy and Sell Recommendations", *Financial Analysts Journa*l.

Empirical Evidence on Performance

- Womack 1996
  - Analyzed only the most extreme change in recommendation
    - Added to buy, removed from buy, added to sell, removed from sell
  - 1573 recommendations on 822 different companies

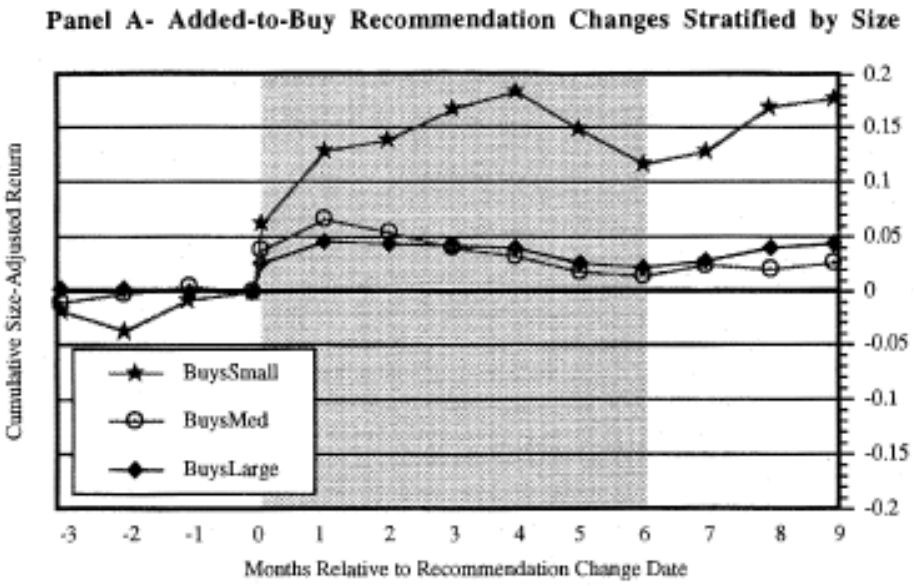


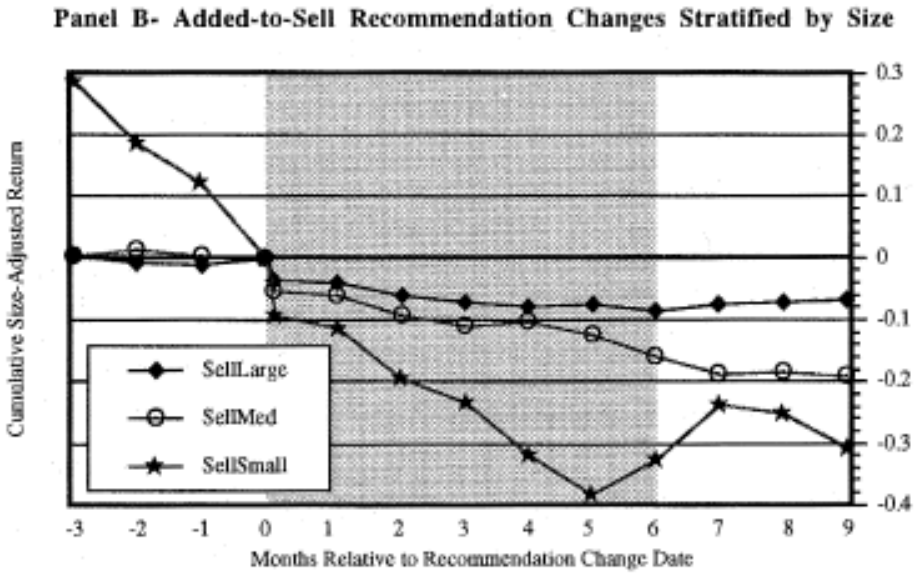


Source: Womack, Kent L. 1996. "Do Brokerage Analysts' Recommendations Have Investment Value?", *Journal of Finance*.

Empirical Evidence on Performance

- Womack 1996
  - Stronger effect for downgrades (-9.1%) than upgrades (+2.4%)
  - Again, price of small firms responded much stronger





Source: Womack, Kent L. 1996. "Do Brokerage Analysts' Recommendations Have Investment Value?", *Journal of Finance*.

Empirical Evidence on Performance

- Barber et al 2001
  - 361,620 recommendations from 1985 to 1996 (same source as Stickel 1995)
  - Unlike Stickel 1995 and Womack 1996, which use an event-study approach, Barber et al take a portfolio formation approach
    - Form portfolio every period, buying the most-recommended stocks and selling the least-recommended ones

Source: Barber et al. 2001. "Can Investors Profit from the Prophets? Security Analyst Recommendations and Stock Returns", *Journal of Finance*.

Empirical Evidence on Performance

- Recommendations correlates with return

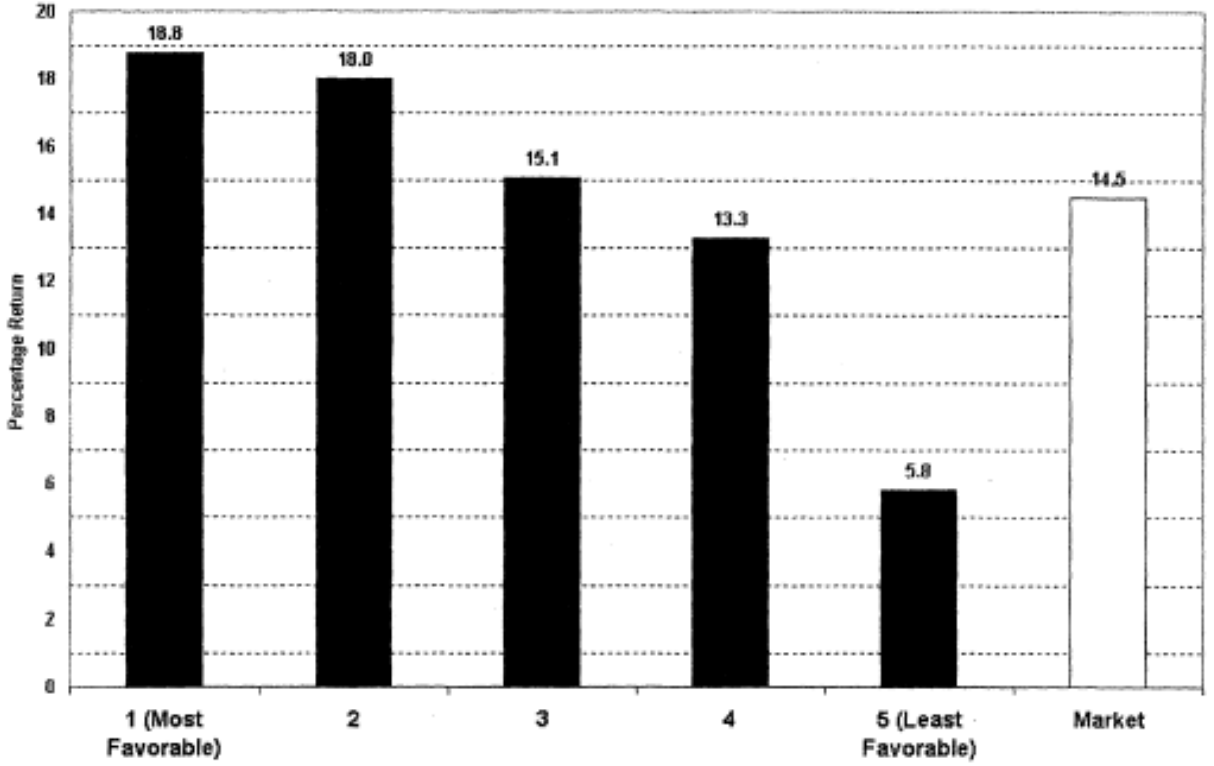


Figure 1. Annualized geometric mean percentage gross return earned by portfolios formed on the basis of consensus analyst recommendations, 1986 to 1996.

Source: Barber et al. 2001. "Can Investors Profit from the Prophets? Security Analyst Recommendations and Stock Returns", *Journal of Finance*.

Empirical Evidence on Performance

- Speed of portfolio rebalancing is crucial

Portfolio (1)	Mean Raw Return (2)	Mean Market-adjusted Return (3)	Intercept from CAPM (4)	Intercept from Fama-French (5)	Intercept from Four-characteristic (6)
Panel A: One-week Delay					
P1 (most favorable)	1.422	0.198	0.025	0.174	0.158
		1.267	0.170	1.394	1.198
P5 (least favorable)	0.699	−0.526	−0.467	−0.518	−0.335
		−3.118	**−2.750**	**−3.767**	**−2.468**
P1–P5	0.723	0.723	0.492	0.692	0.493
	2.838	**2.838**	**2.073**	**3.450**	**2.412**
Panel B: Semimonthly Delay					
P1 (most favorable)	1.408	0.181	0.034	0.177	0.181
		1.273	0.249	1.524	1.478
P5 (least favorable)	0.809	−0.418	−0.359	−0.403	−0.223
		−2.541	**−2.170**	**−3.008**	−1.693
P1–P5	0.599	0.599	0.393	0.580	0.404
	2.467	**2.467**	1.716	**3.015**	**2.054**
Panel C: One-month Delay					
P1 (most favorable)	1.283	0.056	−0.081	0.077	0.084
		0.386	−0.566	0.659	0.681
P5 (least favorable)	0.854	−0.373	−0.331	−0.388	−0.229
		−2.329	**−2.032**	**−3.234**	−1.940
P1–P5	0.429	0.429	0.251	0.465	0.313
	1.797	1.797	1.090	**2.539**	1.662

Source: Barber et al. 2001. "Can Investors Profit from the Prophets? Security Analyst Recommendations and Stock Returns", *Journal of Finance*.

Empirical Evidence on Performance

- The strategy works better on small firms as expected
- Notice the high turnover. After subtracting the assumed 0.7-4% transaction cost, net returns are negative

	Mean Raw Return			Mean Market-Adjusted Return			Gross Monthly Return from Four-Characteristic Model			% Annual Turnover			Net Annual Return from Four-Characteristic Model		
Portfolio	S (1)	M (2)	B (3)	S (4)	M (5)	B (6)	S (7)	M (8)	B (9)	S (10)	M (11)	B (12)	S (13)	M (14)	B (15)
1 (most favorable)	1.800	1.654	1.468	0.575	0.430	0.244	0.575	0.387	0.251	265	409	618	−4.014	−3.285	−1.479
	560	114	17	**2.283**	**2.253**	1.213	**5.615**	**2.715**	1.293						
2	1.478	1.589	1.482	0.253	0.365	0.257	0.327	0.226	0.212	384	450	462	−11.895	−6.021	−0.819
	475	216	95	1.155	**2.557**	**2.843**	**3.602**	**2.314**	**2.730**						
3	1.253	1.309	1.270	0.029	0.084	0.045	−0.004	−0.027	−0.022	497	458	487	−20.425	−8.558	−3.272
	261	238	141	0.142	0.837	0.561	−0.041	−0.347	−0.366						
4	0.796	1.061	1.200	−0.429	−0.164	−0.025	−0.275	−0.169	−0.032	309	406	575	−9.426	−5.843	−3.792
	523	200	72	**−2.363**	**−1.585**	−0.193	**−3.717**	**−1.932**	−0.305						
5 (least favorable)	0.040	0.675	0.716	−1.184	−0.550	−0.508	−0.926	−0.596	−0.017	357	403	638	−3.594	−0.661	−4.434
	139	59	12	**−4.234**	**−2.960**	**−1.818**	**−5.057**	**−3.695**	−0.066						
P1–P5	1.759	0.979	0.752	1.759	0.979	0.752	1.502	0.984	0.268	622	812	1256	−7.608	−3.946	−5.913
	6.893	**4.025**	**2.040**	**6.893**	**4.025**	**2.040**	**7.302**	**4.516**	0.799						

Source: Barber et al. 2001. "Can Investors Profit from the Prophets? Security Analyst Recommendations and Stock Returns", *Journal of Finance*.

Empirical Evidence on Performance

- Jegadeesh et al 2004
  - Same data source as Stickel 1995 and Barber et al 2001
  - 1985-1998, averaging 971 observations per year

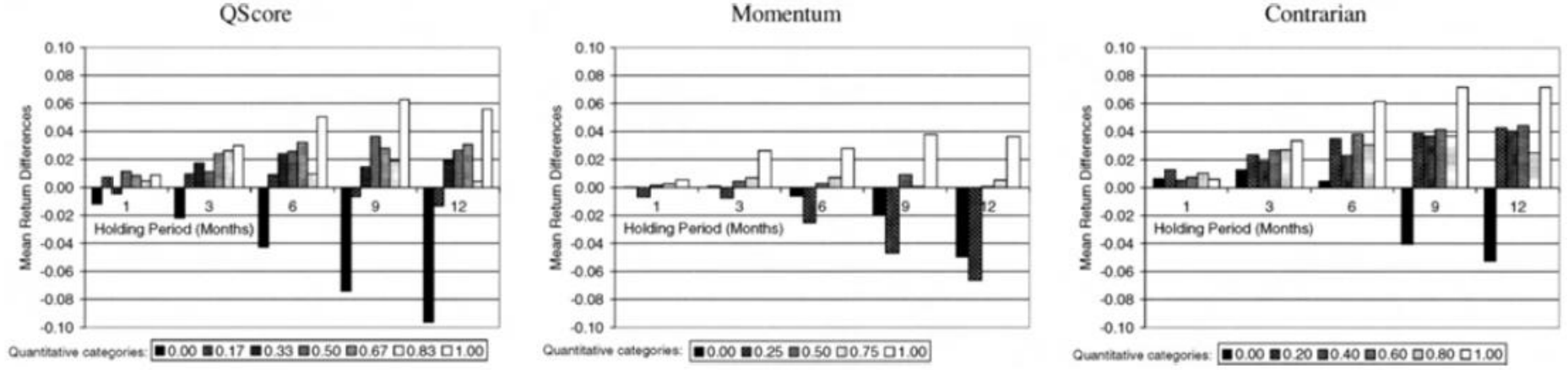
- Focus: does recommendations provide additional value beyond the underlying characteristics of stock they recommend?
  - For example if analysts tend to recommend small-caps, average portfolio return will beat market return even without any useful insight on the analysts' part

Source: Jegadeesh et al. 2004. "Analyzing the Analysts: When Do Recommendations Add Value?", *Journal of Finance*.

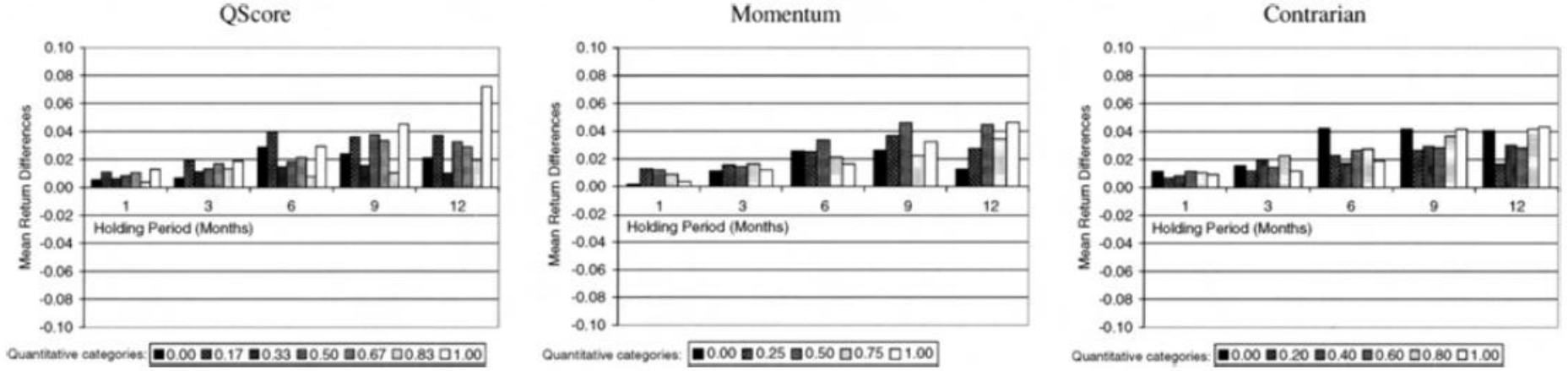
Empirical Evidence on Performance

- Jegadeesh et al 2004

Panel A: Hedge Portfolio Returns for Recommendation *Levels* (QCON) across Quantitative Signal Categories



Panel B: Hedge Portfolio Returns for Recommendation *Changes* (QCHGCON) across Quantitative Signal categories



Source: Jegadeesh et al. 2004. "Analyzing the Analysts: When Do Recommendations Add Value?", *Journal of Finance*.

Empirical Evidence on Performance

- Jegadeesh et al 2004
  - *Level* of consensus recommendations only adds value when the underlying characteristics are favorable
  - When the underlying characteristics are unfavorable, high consensus level is actually associated with worst return
  - *Change* in consensus is a much stronger return predictor, largely independently of underlying characteristics

Source: Jegadeesh et al. 2004. "Analyzing the Analysts: When Do Recommendations Add Value?", *Journal of Finance*.

Herding among Analysts

- Herding is the tendency of many agents, each making their own decisions, to take similar actions around the same time
- Do analysts show such a tendency?
- Estimate the probability of transiting from one recommendation to another
  - Higher ϑ means more likely to change

$$p_{i,j}(\theta, T) \equiv p_{i,j}(0) \left\{ \frac{[1 + (j - T)^2]^{-\theta}}{D_i} \right\},$$

$$D_i = \sum_{j=1}^{5} p_{i,j}(0)[1 + (j - T)^2]^{-\theta},$$

	Consensus (C)	Last Revision (R(-1))	2nd-To-Last Revision (R(-2))
Consensus is	θ_C	$\theta_{R(-1)}$	$\theta_{R(-2)}$
Ordinary Prevailing	0.045	0.087	0.054
Broker-Quality Weighted	0.066	0.081	0.045
Time-Decayed	0.079	0.064	0.041

All χ^2_1 significance levels for these estimates are $< 0.01\%$.

Source: Welch. 2000. "Herding Among Security Analysts", *Journal of Financial Economics*.

Who is More Likely to Herd?

Panel B: Long Horizon (1980–1992)

Explanatory variable	Expected Sign	Base Case 1b	Alternative Regression 2b	Alternative Regression 3b	Alternative Regression 4b	Alternative Regression 5	Alternative Regression 6	Alternative Regression 7
Intercept		−1.422	−0.828	−1.080	−0.941	−0.032	2.489	3.854
		(0.003)	(0.518)	(0.025)	(0.001)	(0.906)	(0.999)	(0.001)
Abs[$E_{t-1}(r_{mkt,t})$/Max($E_{t-1}(r_{mkt,t})$)]	+	1.400		1.492	2.804	1.371		1.740
Prior information (α)		(0.001)		(0.001)	(0.001)	(0.001)		(0.077)
Updated $\hat{\theta}(\cdot)$	+	0.696	0.707		0.616	0.721	0.354	0.610
Reputation (θ)		(0.001)	(0.001)		(0.001)	(0.001)	(0.004)	(0.001)
Ave. ex post accuracy	−	−7.463	−8.101	−7.771		−7.149		−7.401
Ability (p)		(0.001)	(0.001)	(0.001)		(0.001)		(0.001)
σ(T-bill forecast)	+	2.134	2.067	2.400	0.927			4.439
Signal correlation (ρ)		(0.001)	(0.002)	(0.001)	(0.067)			(0.001)
No shorting		−0.094	−0.083	−0.031	−0.058	−0.092	−0.133	−0.121
		(0.406)	(0.460)	(0.796)	(0.613)	(0.409)	(0.233)	(0.299)
I(sign(Δw_t) = sign($r_{mkt,t-1}$))	+	−0.108	−0.138	−0.110	−0.074	−0.127	−0.407	0.015
Momentum-following		(0.156)	(0.063)	(0.001)	(0.314)	(0.091)	(0.006)	(0.853)
$\sigma(r_{mkt,t})$								−0.132
Market uncertainty								(0.885)
Annual dummies		✔	✔	✔	✔	✔		✔
149 year-month dummies							✔	
Adjusted R^2		15.26%	14.92%	13.24%	10.77%	15.27%	27.87%	12.49%
Number of observations		5,293	5,293	5,293	5,293	5,293	5,422	5,076

Source: Graham. 1999. "Herding among Investment Newsletters: Theory and Evidence?", *Journal of Finance*.