Lecture 3

Behavioral Finance:

Investment decisions when the market is irrational

1

Behavioral Finance - Introduction

- **Behavioral finance** and **behavioral economics** are closely related fields which apply scientific research on human and social cognitive and emotional biases to better understand economic decisions and how they affect market prices, returns and the allocation of resources.
- Behavioral models typically integrate insights from psychology with neo-classical economic theory.
- Daniel Kahneman is one of the most important contributors to behavioral economics and was awarded the Nobel prize in 2002 "for having integrated insights from psychological research into economic science, especially concerning human judgment and decision-making under uncertainty". Dick Thaler's contribution.

2

Behavioral Finance – the beginning

Behavioral finance included the research that drops the traditional assumptions of expected utility maximization a la Von Neumann-Morgenstern with:

i) rational investors / managers
ii) efficient markets.

Rationality:

Agents are not fully rational (but– what is the definition of rationality? Von Neumann Morgenstern– really?) either because of preferences or because of mistaken beliefs (for example:

i) *Preferences*: gaining $2 makes people feel better by as much as a $1 loss makes them feel worse → People are loss averse
ii) *Mistakes*: people make mistakes!)

3

At a deeper level is hard to define Behavioral Economics (and Behavioral Finance)

- Which level of rigor do you need to keep in your model to be satisfactory (examples to reflect on: "Prospect Theory and Asset Prices" (Nick Barberis Ming Huang and Tano Santos), **Quarterly Journal of Economics** 116, 1-53, February 2001.)?
- At the theoretical level, what is the difference between decision theory and behavioral economics?
  - Methodological/realistic assumptions
  - Political implications

4

The divide between methodology and the need of realistic assumptions. An example from the micro-debate

- David Kreps on Harsanyi doctrine

"Individual consumers are allowed to have individual preferences. Seemingly then, one would allow subjective probabilities, as another part of the expression of personal preferences, to vary across individuals. If this seems so to you and, and it certainly does it to me, you are forewarned that, among many microeconomists, it is dogma (philosophy) that two individuals having access to *the same information* will necessary come up with the same subjective probability assessments. .. I leave it to others to defend this assumption, …, as I cannot do so. But the reader should be alerted to this modeling assumption, which plays an important role in parts of modern microeconomic theory." Compare to Roger Myerson's view.

5

My take on this

- Behavioral economics (and finance) should be commended for being the first to acknowledge that we should write our models using results from psychological evidence (and they did this while taking a lot of insults from the profession). Decision theorists are doing the same lately. No longer a big divide
- Welfare analysis. This remains a fundamental difference between the two camps: behavioral economists postulates that people make mistakes, while more traditional economist are willing to accept that people have "bizarre preferences" but they will stick to the revealed preferences concept in making welfare analysis.
- Measurement issues.

6

Rational vs Irrational Agents a (very questionable classification)

The rational agent	The irrational agent
●… is only concerned with his own well being, really?	●…is also driven by fairness considerations, really?
●…is planning ahead	●…reacts to regret
●… execute his actions as planned	●…may have problems of self control
●…does not need heuristic to simplify her choices	●…uses many heuristics to simplify his choices
●…bases her choices on calculus and statistics	●…has only limited knowledge of calculus and statistics
●…has a good judgment of her abilities	●…can be overconfident
●…re-optimizes	●… exhibits inertia

7

- "In a not-too-distant future, the term "behavior finance" will be correctly viewed as a redundant phrase…In their enlightenment, economists will routinely incorporate as much "behavior" into their model as they observe in the real world."

(Richard Thaler)

8

A much better classification of the differences which is likely not to go away

In mainstream economics:	In behavioral economics:
The agent	The agent
●Does not make mistakes	●Makes mistakes
●You can use revealed preferences to do welfare analysis and generate policy recommendation	●You cannot use revealed preferences for figuring out welfare analysis
●Very limited role for paternalistic policy	●Likely to generate paternalistic policy

⇒ Empirical work does not help us in figuring out the difference between a decision theory (mainstream) model or a behavioral model.

⇒ May be fMRI scan one day will (look at Cami Kuhnen web site)

9

A very good starting point if you are interested in this topic

- Andrei Shleifer, *Clarendon Lectures: Inefficient Markets*, Oxford University Press, 2000.
- In Corporate Finance: Baker, Malcolm, and Jeffrey Wurgler. "Behavioral Corporate Finance: A Current Survey" In Handbook of the Economics of Finance. Vol. 2, edited by George M. Constantinides, Milton Harris, and Rene M. Stulz. Handbooks in Economics. New York, 2012.

10

The Efficient Market Hypothesis

- The Efficient Market Hypothesis (EMH) argues that competition between investors seeking abnormal returns drives prices to their 'correct' value.
- The EMH does not assume that all investors are rational, but it does assume that the market is rational.
- The EMH does not assume that markets can foresee the future, but it does assume that markets can make unbiased forecasts of the future.

→ Behavioral finance assumes that, in some circumstances, financial markets are informationally inefficient.

11

Potential and Problems

- Behavioral finance attempts to:
  - Come up with a well-founded alternative theory about behavior
  - Use experimental techniques and micro-data to test theories

  →potentially very big gains
- But...
  - Too many irrational models –any deviation from (what we think is) rational behavior can be interpreted as behavioral
  - Need "strong" psychological foundations, but hard to agree upon what this is.
  - Empirically very hard to find measures of sentiments.

12

Two building blocks

- Behavioral finance stands on two building blocks:
  - The limits of arbitrage:
    which refers to predicting in what circumstances arbitrage forces will be effective or not. Shleifer and Vishny, in their paper "The Limits of Arbitrage" (1995) argue that arbitrage becomes ineffective in some extreme circumstances.
  - Cognitive psychology:
    which refers to how people think (overconfidence, recent experiences…).

13

Cognitive Psychology

We will distinguish two main cases:

1. **Investors are irrational while managers are rational**
2. **Managers are irrational while investors are rational**

→ In what follows we will see academic work that studies the two cases and their implications for:
- → Firm investment decisions
- → Capital structure decisions

14

Part I

Investors are irrational while managers are rational

Implications for Investment

15

Irrational Investors – Rational Managers

→ **Investor sentiment** is referred to as the beliefs held by some investors that cannot be rationally justified.

→ These investors are also sometimes referred to as **noise traders**.

→ As a consequence of investor sentiment **mispricing** can occur due to the myopic behavior of the participants in the market (Stein 1989, we will see in more detail)

→ Recent literature shows that stock market mispricing has **real consequences** for example for corporate investment and capital structure.

-- We will discuss several papers.

16

Irrational Investors – Rational Managers

- Irrational investors must influence securities prices
  → this requires limits to arbitrage or specific assumptions on the information structure that prevent arbitrageurs to correct prices
  → thus prices are too high or too low
- Managers are smart
  → they are able to distinguish between market prices and fundamental value
  → they make decisions that may encourage or respond to mispricing
  - Superior information
  - They manage earnings
  - They have fewer constraints than money managers
  - What did you learn from Stein paper?

17

Irrational Investors and Investment: Model

Stylized model (from Stein 1996):

- At time t=0 the firm invests *K* in a project that yields a gross return of *f(K)* at time t=1
- Equity may be mispriced by a percentage δ relative to the efficient-market value, either overpriced (δ > 0) or underpriced (δ < 0). NOTE MISPRICING IS ASSUMED, not DERIVED!
- The manager may have an incentive to exploit the current mispricing for the benefit of existing long term investors.
- Stein (1996) distinguishes among two hypothesis:
  - A long term horizon
  - A short term horizon
- The manager chooses investment and financing to maximize her objective function:

$$\underset{K,e}{Max}\ \lambda\left[f(K,\cdot)-K+e\delta(\cdot)\right]+(1-\lambda)\delta(\cdot)$$

→ Assumptions:
- f is increasing and concave in K
- discount rate is 0
- λ is between 0 and 1, specifies manager's horizon

18

Irrational Investors and Investment: Model

- When λ equals one, the manager cares only about creating value for existing, long-run shareholders, the last term drops out, and there is no distinct impact of catering. However, even an extreme long-horizon manager cares about short-term mispricing for the purposes of market timing, and thus may cater to short term mispricing to further this objective.
- When λ is less than one --a shorter horizon-- maximizing the stock price becomes an objective in its own right, even without any concomitant equity issues.
  - "Cater" to short-term investor demands to boost share prices above fundamental value
  - Market timing: exploit the current mispricing for the benefit of existing, long-run investors

19

Irrational Investors and Investment: Model

Optimal Investment Policy:

$$f_K(K,\cdot) = 1 - \left(e + \frac{1-\lambda}{\lambda}\right)\delta_K(\cdot)$$

→ The marginal value created from investment is weighed against the standard cost of capital (normalized to 1) net of the investment's impact on mispricing (through catering and market timing games).

Special cases:

- $f_e(\cdot)$ is not equal to zero (Baker, Stein, and Wurgler, 2002) →capital structure
- e=0 and $\delta_K(\cdot)$>0, and$(1-\lambda)$>0 (Polk and Sapienza, 2005) →catering
- e=0 and$\delta_K(\cdot)$>0, and $(1-\lambda)$=0 (Gilchrist et al, 2005)) →the user cost of capital is lower (assume short selling constraints) during a bubble →optimally increase investments. lambda=1

20

Irrational Investors and Investment: Evidence

Evidence on Investment:

- Confusing evidence in the 1990s (aggregate)
- Recent wave more conclusive, but problematic
  - Proxy for mispricing: hard!
    - Fama's critique: If the mispricing proxy is reflecting fundamentals, you can provide an alternative rational-based story.
  - Validity of the paper entirely based on
    - Quality of the proxy (DA, analyst opinion dispersion, etc…)

21

Irrational Investors and Investment: Evidence

Evidence on Investment (cont.):

- Smart cross sectional differences,
  - proxy for lambda → more likely to "cater" when $(1-\lambda)>0$
  - Analyze whether more equity dependent firms are more likely to issue equity in bubble times (Baker, Stein and Wurgler, 2004)
- Still big limitations in quantifying the phenomena.

We will see:

- Baker, Stein and Wurgler (2003)
- Polk and Sapienza (2009)

22

Baker, Stein and Wurgler (2003)

"When does the market matter? Stock prices and the investment of equity-dependent firms" (Baker, Stein and Wurgler, QJE 2003)

This paper analyzes the conditions under which corporate investment is sensitive to non-fundamental movements in stock prices through a financing channel.

Stein 1996 paper implies that firms that are in need of external equity finance will have investment that is especially sensitive to the non-fundamental component of stock prices.

Intuition:

- A firm with no debt and a stockpile of cash can insulate its investment decisions from irrational gyrations in its stock price
- But an 'equity-dependent' firm will be less likely to issue equity to finance new investment if it has to issue undervalued shares.

23

Baker, Stein and Wurgler (2003)

Proxy for equity dependence:

→ The Kaplan and Zingales (1997) index: young firms with high leverage, low cash balances and cash flows, high cash-flow volatility and strong investment opportunities.

Empirical question:

→ Are those firms classified as most likely to be equity dependent the ones that have the strongest correlation between stock prices (Q) and investment?

Results:

→ yes! The firms that rank in the top quintile of the sample in terms of KZ index have a sensitivity of investment to Q almost three times as large as firms that rank in the bottom quintile.

24

Baker, Stein and Wurgler (2003)

Caveat:

The finding also admits other interpretations!

Q contains more than just a non-fundamental component, such as information about future profitability and measurement error in q

→ Use future realized returns are a noisy estimate of the future returns expected by managers and include their views of over- and undervaluation

→ if investment-Q sensitivity is increasing in equity dependence, then investment-future returns sensitivity should be negative and increasingly negative in equity dependence.

This prediction is confirmed in the data

25

Baker, Stein and Wurgler (2003)

Simple model (a variation of Stein 1996):

The firm's optimization problem is:

$$\underset{e,K}{Max} \quad \frac{f(K)}{(1+r)} - K + \delta e$$

$$s.t.$$

$$e + W - K(1-\overline{D}) \geq 0$$

$$0 \leq e \leq e^{\max}$$

- The first constraint is a leverage constraint, with W the firm's preexisting wealth and D the fractional debt capacity of the new assets → the firm's debt ratio cannot exceed D bar.
- The second constraint means that the firm cannot repurchase equity and that it can issue equity up to a maximum amount

26

Baker, Stein and Wurgler (2003)

Proposition 1:

Assume that $e^{\max} > K^{fb}(1-\overline{D})$ (i.e. the firm can invest at the first best without exceeding the upper bound on how much it can issue). Then the possible outcomes are:

1. **Overvaluation.** If $\delta > 0$, then $K = K^{fb}$ and $e = e^{\max}$: an overvalued firm invests at the first-best level and issues as much equity as possible
2. **Undervaluation and sufficient wealth.** If $\delta < 0$ and $W - K^{fb}(1-\overline{D}) \geq 0$ then $K = K^{fb}$ and e=0: an undervalued firm with sufficient wealth W invests at the first-best level and avoids issuing equity.
3. **Undervaluation and insufficient wealth.** If $\delta < 0$ and $W - K^{ec}(1-\overline{D}) < 0$ then $K < K^{fb}$: an undervalued firm with insufficient wealth W underinvests.

   → This case admits two subcases which will provide the testable hypothesis of the paper.

27

Baker, Stein and Wurgler (2003)

Proposition 1 (cont.):

a) Insufficient wealth for investing at the second best. First define K^{SB} by $f(K^{SB})/(1+r) = 1-\delta(1-D)$ (as the solution to the maximization problem with the leverage constraint).

If the firm has insufficient funds also for investing at the second best: $W - K^{SB}(1-D) < 0$ it follows that $e = K^{SB}(1-D) - W > 0$ and $K = K^{SB}$

- The firm issues equity, and both investment and size of the equity issue are functions of the degree of undervaluation and debt capacity.
- Investment depends on the non-fundamental component of stock prices in case iii) a), when the stock is undervalued, and available wealth is so low that the firm would have to issue undervalued equity to invest at the first-best level.
- Thus, for equity-dependent firms, market inefficiency can act like a financial constraint, discouraging investment when stock prices are too low.

28

Baker, Stein and Wurgler (2003)

Proposition 1 (cont.):

b) Sufficient wealth for investing at the Second Best.

If $W - K^{SB}(1-D) \geq 0$, then $K = W/(1-D)$, and e=0.

→ The firm does not issue equity and invests as much as it can subject to its wealth W and the leverage constraint.

Three testable hypothesis are generated by proposition 1.

Hypothesis 1: Equity-dependent firms display a more positive sensitivity of investment to Q than do non-equity-dependent firms.

- uses Q as the nonfundamental component of the stock price
- For a firm facing a binding leverage constraint, the lower is the debt capacity, the more equity must be issued for each marginal dollar of investment.

29

Baker, Stein and Wurgler (2003)

Hypothesis 2: Equity-dependent firms display a more negative sensitivity of investment to future stock returns than do non-equity-dependent firms

→ this hypothesis uses future stock returns (instead of Q) as a proxy for mispricing of stock prices. The intuition is that overpriced stocks have lower expected returns going forward, as mispricing is corrected, while undervalued stocks have higher expected returns.

→ this hypothesis is useful to rule out other alternative explanations of the findings with respect to hypothesis 1.

Hypothesis 3: Equity-dependent firms have equity issuance that is positively related to Q and negatively related to future stock returns.

30

Baker, Stein and Wurgler (2003)

Data:

- Data consists of an unbalanced panel of Compustat firms that covers 1980 through 1999 and excludes financial firms and firm-years with a book value under $10 million.

Empirical specification:

Following Lamont, Polk and Saa-Requejo (2001) and based on the KZ index, they construct a five-variable KZ index for each firm-year. Baker and Wurgler use a four-variable index version of their linear combination:

$$KZ_{it}(four-variable) = -1.002\frac{CF_{it}}{A_{it-1}} - 39.368\frac{DIV_{it}}{A_{it-1}} - 1.315\frac{C_{it}}{A_{it-1}} + 3.139LEV_{it}$$

Q is not included to avoid ambiguities since both low dividends and high Q can be thought of as proxies for strong investment prospects.

31

Baker, Stein and Wurgler (2003)

Empirical specification (cont.):

The authors assign each firm to a quintile according to its median value of KZ over the full sample period.

Then, the following investment and financing equations are estimated, for each quintile, to test hypothesis 1, 2 and 3 respectively:

$$\frac{CAPX_{it}}{A_{it-1}} = a_i + a_t + bQ_{it-1} + c\frac{CF_{it}}{A_{it-1}} + u_{it}$$

$$\frac{CAPX_{it}}{A_{it-1}} = a_t + bR_{it,t+3} + c\frac{CF_{it}}{A_{it-1}} + u_{it}$$

$$\frac{e_{it}}{A_{it-1}} = a_i + a_t + bQ_{it-1} + c\frac{CF_{it}}{A_{it-1}} + u_{it}$$

32

Baker, Stein and Wurgler (2003)

Results: hypthesis one is confirmed

TABLE III

EQUITY DEPENDENCE AND THE LINK BETWEEN INVESTMENT AND STOCK PRICES

		Q_{t-1}			CF_t/A_{t-1}			
KZ index	N	b	(se)	[t-stat]	c	(se)	[t-stat]	R^2
Quintile 1	10,427	0.012	(0.0013)	—	0.110	(0.0146)	—	0.62
2	10,415	0.018	(0.0015)	[2.86]	0.124	(0.0133)	[0.74]	0.61
3	10,421	0.024	(0.0024)	[4.45]	0.117	(0.0140)	[0.38]	0.58
4	10,418	0.032	(0.0030)	[6.17]	0.137	(0.0130)	[1.42]	0.62
5	10,420	0.033	(0.0042)	[4.80]	0.145	(0.0134)	[1.80]	0.62

Baker, Stein and Wurgler (2003)

Results: hypthesis two is supported.

TABLE VII

EQUITY DEPENDENCE AND THE LINK BETWEEN INVESTMENT AND FUTURE RETURNS

		$R_{it,t+3}$			CF_t/A_{t-1}			
KZ index	N	b	(se)	[t-stat]	c	(se)	[t-stat]	R^2
Quintile 1	8307	−0.004	(0.0009)	—	0.228	(0.0169)	—	0.14
2	8292	−0.004	(0.0011)	[−0.33]	0.215	(0.0165)	[−0.57]	0.07
3	8449	−0.006	(0.0010)	[−1.66]	0.250	(0.0207)	[0.82]	0.07
4	8407	−0.008	(0.0009)	[−3.08]	0.311	(0.0204)	[3.11]	0.08
5	8364	−0.007	(0.0009)	[−2.40]	0.290	(0.0186)	[2.44]	0.08

Baker, Stein and Wurgler (2003)

Results: hypthesis three is supported.

TABLE VIII

EQUITY DEPENDENCE AND THE LINK BETWEEN EXTERNAL FINANCE, STOCK PRICES, AND RETURNS

	Bottom quintile		2		3		4		Top quintile		Top − bottom	
	b	(se)	b	(se)	b	(se)	b	(se)	b	(se)	Δb	[t-stat]
Panel A: Financing and Q												
External equity—all firms	0.021	(0.0040)	0.051	(0.0050)	0.040	(0.0056)	0.095	(0.0069)	0.064	(0.0085)	0.043	[4.29]
External equity plus debt—all	0.036	(0.0065)	0.077	(0.0080)	0.087	(0.0090)	0.104	(0.0115)	0.136	(0.0161)	0.100	[5.78]
Panel B: Financing and future returns												
External equity—all firms	−0.007	(0.0018)	−0.013	(0.0021)	−0.012	(0.0020)	−0.012	(0.0012)	−0.008	(0.0010)	−0.001	[−0.71]
External equity plus debt—all	−0.008	(0.0030)	−0.019	(0.0031)	−0.020	(0.0033)	−0.026	(0.0025)	−0.020	(0.0026)	−0.012	[−2.94]

35

Baker, Stein and Wurgler (2003)

Conclusion:

- Equity-dependent firms have equity issuance that is positively related to Q and negatively related to future stock returns.
- Equity channel. Long horizon managers discount project cash flow at the true cost of capital. If firms are constrained, market inefficiencies enable +NPV investment through an equity-issuance channel. Irrational fluctuation in the stock market are a determinant of investment for firms that are equity dependent. (Baker, Stein, and Wurgler, 2004). But are a sideshow for firms that are not.

36

Polk and Sapienza (2009)

"The Stock Market and Corporate Investment: a Test of Catering Theory " (Polk and Sapienza).

This paper tests the hypothesis whether deviation from fundamentals affects investment decisions directly through a *catering channel*. Shut down the equity channel.

Catering channel. Short term rational managers may invest in an unprofitable projects to temporary boost their company's stock price.

"If new investment projects are evaluated by managers at the current stock market price, for example by using 'multiples', and if there is enough asymmetry of information regarding project quality, a rational manager may find it optimal to waste resources when the stock price is overvalued and to forgo positive investment opportunities when the stock price is undervalued"

37

Catering channel

- At time 0, a firm uses homogeneous capital, *K*, with price *c* to produce output
- The true value of the firm is *V(K)*
- The market value of the firm is $V^{mkt}(K)=(1+\alpha_t)V(K)$
- α_t measures the extent the firm is mispriced.
- Mispricing disappears over time at the rate *p:* $\alpha_t=\alpha e^{-pt}$

the real effects of investor sentiment

Catering channel

- Each shareholder requires liquidity at some point in time, t+u, where u is distributed according to a Poisson process with mean arrival rate *qj*.
  - A small qj represents a long-term shareholder
  - A short-term investor has a large qj
- After the liquidity shock, the investor j sells his stocks at the market price, consumes, and dies.
- Managers maximize the wealth of the average old shareholder. The mean arrival rate of that shareholder is q.

$$Y_j = \int_0^\infty (1+\alpha e^{-pt}) q_j e^{-q_j t} V(K) dt - (K - K_0)c$$

the real effects of investor sentiment

Catering channel

- Assume the firm's manager maximizes the income of the average existing shareholder. Denote her q_j with q
- Manager's FOC is

$$V'(K) = \frac{c}{\gamma}$$

$$\text{where } \gamma \equiv 1 + \frac{\alpha q}{q + p}$$

Empirical challenge

- We need to show that investment responds to mispricing.
  - Find mispricing proxies
  - Show that proxies are not simply picking up information related to investment opportunities.
  - We will use several mispricing proxy.

Empirical strategy

$$\frac{I_{i,t}}{K_{i,t-1}} = f_i + \gamma_t + b_1\alpha_{i,t} + b_2 Q_{i,t-1} + b_3 \frac{CF_{i,t-1}}{K_{i,t-2}} + \varepsilon_{i,t}$$

- Mispricing proxies:
  - Discretionary accruals
  - Equity issuance/repurchase activity
  - Price momentum
  - Mispricing metric
- Controls:
  - Actual investment of december fiscal year-end firms: firm investment capital ratios ($I_{i,t}/K_{i,t-1}$)
  - Investment opportunities ($Q_{i,t-1}$)
  - Financial slack: cash flow ($CF_{i,t-1}/K_{i,t-2}$)

Data

	Mean	Std. Dev.	Min	Max	Obs.
$I_{i,t}/K_{i,t-1}$	.31543318	.40981705	.000055	9.8948135	53585
$DACCR_{i,t}$	0.0037146	0.1735791	-1.901459	1.466965	48340
$EQISSUE_{i,t}$	.34047265	1.2368979	-8.5319862	16.595188	37761
$MOM_{i,t-1}$	.02231656	.8655887	-3.3779354	19.338051	53585
$IMOM_{i,t-1}$	.03217884	.89540824	-3.5319417	4.8756251	53585
$Q_{i,t-1}$	1.5613214	1.5692514	.074246	82.470253	53585
$CF_{i,t-1}/K_{i,t-2}$	.46286134	1.1810156	-9.9966278	9.9881659	53585
$S_{i,t-1}$	1017.1091	3938.6659	10.002	160883	53585
$A_{i,t-1}$	1277799.8	5897335.8	1878	3.281e+08	53585
$E_{t-1}[EARN_{i,t}]/A_{i,t-1}$	.04385347	.13160954	-6.1592259	13.147612	25249
$E_{t-1}[EARN_{i,t+1}]/A_{i,t-1}$	.07059737	.08605749	-3.8495162	2.0628276	24278
$E_{t-1}[EARN_{i,t+4}]/A_{i,t-1}$	1.746586	3.7817765	-2.403513	120.72811	20628
$R\&D_{i,t-1}/A_{i,t-1}$	.04555467	.07023887	0	2.051975	24153
$TURN_{i,t-1}$	1.4973921	2.3476327	0	252.16142	27834
$BE/ME_{i,t-1}$	0.975	0.992	0.100	47.287	106,960
KZ	-0.118	2.239	-4.999	46.843	90132

Discretionary accruals

- Accruals represent the difference between reported earnings and underlying cash flow.
- Current discretionary accruals:
  - Advanced recognition of revenues with credit sales (before cash is received);
  - Delayed recognition of expenses after cash is advanced to suppliers
  - Assumed low provision for bad debts.
- Long-term accruals:
  - Decelerated depreciation
  - Decreased deferred taxes (the difference between tax expense recognized for financial reporting and actual taxes paid)

Discretionary accruals

$ACCR_{(i,t)}$=Δ[current assets –cash]- Δ[current liabilities - current maturity of long-term debt]- Depreciation and amortization

$$NORMALACCR_{jt} = \beta_0(\frac{1}{TA_{j,t-1}}) + \beta_1(\frac{\Delta SALES_{jt}}{TA_{j,t-1}}) + \beta_2(\frac{PPE_{jt}}{TA_{j,t-1}}) + \varepsilon_{j,t}$$

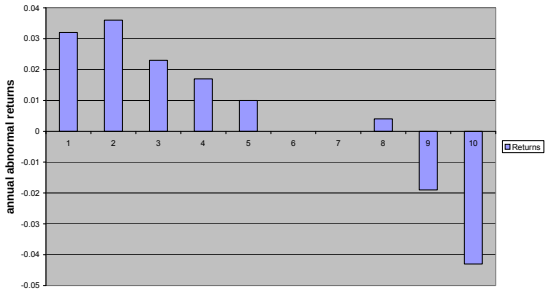
- We use the cross-sectional adaptation of the modified Jones (1991) model (Teoh, Welch, and Wong (1998a, 1998b). Estimate the following cross-sectional regression for the firm's two-digit SIC code peers (i.e. excluding the firm under consideration)
- We then apply these estimates to the firm under consideration.
- We then compute discretionary accruals by subtracting normal accruals from total accruals.

Why discretionary accruals?

- Previous literature:
  - Subsequent stock returns are abnormally low (Sloan, 1996; Chan, Jegadeesh, and Lakonishok, 2001)
  - But also: firms with high discretionary accruals have poor growth opportunities, a subsequent deterioration of CF, and relatively low post-issue net income.
  - Underperformance is concentrated in the top 20% of firms (Chan, Jegadeesh, and Lakonishok, 2001)
  - Manipulation has been increasing over time (D'Avolio, Gilder, and Shleifer, 2001)

Discretionary accruals

Abnormal returns on discretionary accruals portfolios
data source: Chan, Chan, Jegadeesh, and Lakonishok (2001)



Discretionary accruals

Panel A

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$DACCR_{i,t}$	0.1266***	0.1586***	0.1555***	0.1678***	0.1303***	0.1200***	0.0762***	0.0705***
	(0.0173)	(0.0200)	(0.0224)	(0.0251)	(0.0249)	(0.0180)	(0.0153)	(0.0170)
$Q_{i,t-1}$	0.0576***	0.0532***	0.0493***	0.0449***	0.1404***	0.0661***	0.0564***	0.0571***
	(0.0077)	(0.0097)	(0.0091)	(0.0091)	(0.0233)	(0.0054)	(0.0055)	(0.0056)
$CF_{i,t-1}/K_{i,t-1}$	0.0725***	0.0659***	0.0680***	0.0706***	0.0454***	0.0754***	0.0695***	0.0703***
	(0.0079)	(0.0081)	(0.0087)	(0.0086)	(0.0154)	(0.0085)	(0.0103)	(0.0099)
$E_{t-1}[EARN_{i,t}]/A_{i,t-1}$		0.1082***	0.1147	0.6140***				
		(0.0288)	(0.1662)	(0.2348)				
$E_{t-1}[EARN_{i,t+1}]/A_{i,t-1}$			0.1670	-0.5106				
			(0.2781)	(0.3976)				
$E_{t-1}[EARN_{i,t+4}]/A_{i,t-1}$				0.0136***				
				(0.0035)				
$Q_{i,t}$						0.0089	0.0079	0.0040
						(0.0064)	(0.0055)	(0.0058)
$Q_{i,t-2}$							-0.0105**	-0.0076
							(0.0042)	(0.0058)
$Q_{i,t-3}$								-0.0043
								(0.0040)
Observations	48340	23229	22354	18678	18982	46099	39010	35669
R-squared	0.5054	0.5974	0.6063	0.6232	0.0296	0.4420	0.4393	0.4393

Discretionary accruals

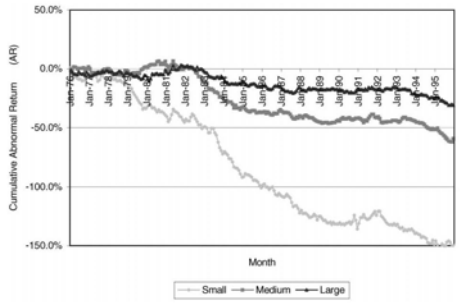
Panel B

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$DACCR_{i,t}$	0.1127***	0.0874***	0.1071	0.1507***	0.1390***	0.0655*	0.2428***	0.0317	0.0413*
	(0.0187)	(0.0173)	(0.7567)	(0.0242)	(0.0534)	(0.0389)	(0.0335)	(0.0261)	(0.0246)
$Q_{i,t-1}$	0.0574***	0.0576***	0.0116	0.0490***	0.0352***	0.1122***	0.0456***	0.0324***	0.0590***
	(0.0077)	(0.0077)	(0.0173)	(0.0119)	(0.0095)	(0.0125)	(0.0084)	(0.0049)	(0.0071)
$CF_{i,t-1}/K_{i,t-1}$	0.0725***	0.0724***	0.0879	0.0473***	0.0238	0.0910***	0.0575***	0.0635***	0.1299***
	(0.0079)	(0.0079)	(0.1098)	(0.0074)	(0.0148)	(0.0173)	(0.0122)	(0.0147)	(0.0219)
$HIGHDACCR_{i,t}$	0.0100**								
	(0.0049)								
$DACCR_{i,t} * HIGHEQISSUE_{i,t}$		0.0605***							
		(0.0213)							
Observations	48340	48340	113	12933	6534	11473	11455	12288	12216
R-squared	0.5054	0.5055	0.6439	0.6103	0.7446	0.5649	0.5755	0.3853	0.4531

Equity issuance / repurchase

- Firms with high
  $EQISSUE_{i,t} = log(ME_{i,t}/ME_{i,t-5}) - log(1+r_{i,t-5,t})$
  do poorly the next year (Daniel and Titman, 2001)
- Measure captures three long-run stylized facts
  - Public firms issuing equity underperform benchmarks over the next five years. Accompanying that poor performance are announcements of disappointing earnings (Loughran and Ritter, 1997)
  - Firms repurchasing equity outperform benchmarks over the next five years (Ikenberry, Lakonishok, and Vermaleon, 1995).
  - Firms initiating (cutting) dividends outperform (underperform) benchmarks over the next five years (Michaely, Thaler, and Womack, 1995)

Why Equity issuance / repurchase?



Equity issuance / repurchase

Panel A

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$EQISSUE_{i,t}$	0.0259***	0.0166***	0.0162***	0.0164***	0.0183***	0.0287***	0.0264***	0.0266***
	(0.0030)	(0.0033)	(0.0032)	(0.0043)	(0.0043)	(0.0032)	(0.0032)	(0.0033)
$Q_{i,t-1}$	0.0454***	0.0491***	0.0452***	0.0453***	0.0461***	0.0540***	0.0593***	0.0603***
	(0.0040)	(0.0055)	(0.0046)	(0.0064)	(0.0125)	(0.0059)	(0.0054)	(0.0055)
$CF_{i,t-1}/K_{i,t-1}$	0.0789***	0.0493***	0.0526***	0.0639***	0.0727***	0.0789***	0.0805***	0.0795***
	(0.0119)	(0.0098)	(0.0114)	(0.0146)	(0.0106)	(0.0121)	(0.0122)	(0.0120)
$E_{t-1}[EARN_{i,t}]/A_{i,t-1}$		0.3281***	0.4055***	0.4920***				
		(0.0831)	(0.0840)	(0.0921)				
$E_{t-1}[EARN_{i,t+1}]/A_{i,t-1}$			-0.0374	-0.1021				
			(0.1597)	(0.1993)				
$E_{t-1}[EARN_{i,t+4}]/A_{i,t-1}$				0.0021				
				(0.0038)				
$Q_{i,t}$						-0.0126**	-0.0113**	-0.0119***
						(0.0050)	(0.0047)	(0.0048)
$Q_{i,t-2}$							-0.0165***	-0.0162***
							(0.0039)	(0.0048)
$Q_{i,t-3}$								0.0004
								(0.0036)
Observations	37761	17283	19631	14220	14451	36212	35366	34867
R-squared	0.409	0.571	0.578	0.548	0.100	0.415	0.419	0.424

Equity issuance / repurchase

Panel B

	(1)	(2)	(3)	(4)	(5)	(6)
$EQISSUE_{i,t}$	0.0187***	0.0026	0.0210***	0.0279***	0.0224***	0.0493***
	(0.0055)	(0.0062)	(0.0039)	(0.0057)	(0.0039)	(0.0092)
$Q_{i,t-1}$	0.0566***	0.0517***	0.0534***	0.0432***	0.0177***	0.0283***
	(0.0063)	(0.0032)	(0.0104)	(0.0066)	(0.0056)	(0.0047)
$CF_{i,t-1}/K_{i,t-2}$	0.0403***	0.0245	0.0974***	0.0646***	0.0874***	0.1572***
	(0.0138)	(0.0245)	(0.0135)	(0.0158)	(0.0228)	(0.0257)
Observations	8346	4327	8631	8558	11784	11301
R-squared	0.563	0.668	0.454	0.543	0.328	0.406

Price momentum

- MOMLAGi,t-1 is the cross-sectionally demeaned stock return in the year prior to investment (excluding December). IMOMLAGi,t-1 is the cross-sectionally demeaned two-digit SIC code industry return

$$MOMLAG_{i,t-1} = R_{i,t-1} - R_{m,t-1}$$

$$IMOMLAG_{i,t-1} = R_{i,t-1} - R_{m,t-1}$$

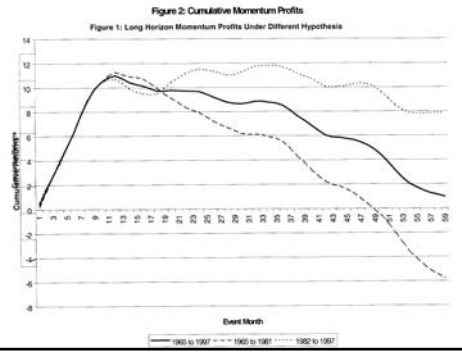
- Advantage: The measure is uncorrelated with managerial decision (Frazzini, 2004)
- Problem: is serial correlation of returns consistent with underreaction or overreaction? Conflicting theories (Daniel et al, 1998), Barberis et al. (1998), and Hong and Stein (1998).

Why Price momentum?

- Firms with high excess returns do well the next year (Jegadeesh and Titman, 1993)
- Industries with high excess returns do well the next year (Moskowitz and Grinblatt, 1999)
- Both firm (Jegadeesh and Titman, 2001) and industry momentum profits revert after three to five years
- High turnover winner firms and low turnover loser firms experience stronger reversal (Lee and Swaminathan, 2001).

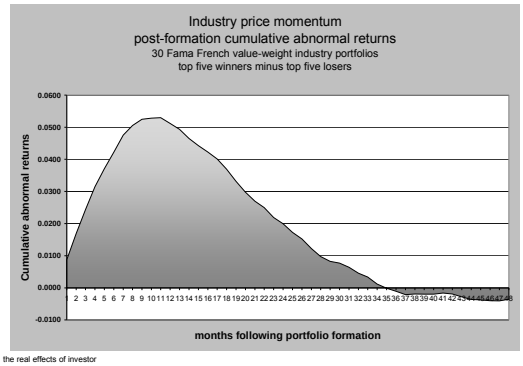
the real effects of investor sentiment

Price momentum



the real e
sentimen

Price momentum



the real effects of investor sentiment

Price momentum

Panel A

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$MOM_{i,t-1}$	0.0282***	0.0356***	0.0381***	0.0461***	0.0709***	0.0263***	0.0282***	0.0276***
	(0.0032)	(0.0050)	(0.0052)	(0.0065)	(0.0106)	(0.0030)	(0.0034)	(0.0034)
$IMOM_{i,t-1}$	0.0126***	0.0057**	0.0042*	0.0023**	0.0113***	0.0137***	0.0147***	0.0135***
	(0.0025)	(0.0024)	(0.0024)	(0.0030)	(0.0404)	(0.0026)	(0.0022)	(0.0023)
$Q_{i,t-1}$	0.0532***	0.0508***	0.0490***	0.0419***	0.1345***	0.0606***	0.0467***	0.0476***
	(0.0068)	(0.0084)	(0.0069)	(0.0063)	(0.0241)	(0.0055)	(0.0041)	(0.0054)
$CF_{i,t-1}/K_{i,t-2}$	0.0732***	0.0642***	0.0662***	0.0696***	0.0561***	0.0755***	0.0675***	0.0678***
	(0.0081)	(0.0083)	(0.0089)	(0.0092)	(0.0144)	(0.0087)	(0.0097)	(0.0093)
$E_{t-1}[EARN_{i,t}]/A_{i,t-1}$		0.1071***	0.0805	0.5430**				
		(0.0275)	(0.1603)	(0.2216)				
$E_{t-1}[EARN_{i,t+1}]/A_{i,t-1}$			0.2221	-0.4319				
			(0.2669)	(0.3733)				
$E_{t-1}[EARN_{i,t+4}]/A_{i,t-1}$				0.0132***				
				(0.0035)				
$Q_{i,t}$						0.0060	0.0055	0.0020
						(0.0056)	(0.0048)	(0.0050)
$Q_{i,t-2}$							-0.0061	-0.0026
							(0.0040)	(0.0054)
$Q_{i,t-3}$								-0.0052
								(0.0036)
Observations	53585	25249	24278	20290	20628	51045	43008	39255
R-squared	0.495	0.603	0.611	0.630	0.070	0.495	0.442	0.444

Price momentum

Panel B

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
$MOM_{i,t-1}$	0.0564***	0.0366***	0.0188***	0.0176**	0.2358*	0.0340***	0.0348**	0.0157***	0.0339***	0.0215***	0.0204***
	(0.0094)	(0.0074)	(0.0048)	(0.0086)	(0.1228)	(0.0065)	(0.0147)	(0.0056)	(0.0057)	(0.0049)	(0.0037)
$IMOM_{i,t-1}$	0.0111***	0.0112***	0.0105***	0.0136***		0.0060	0.0024	0.0046**	0.0170***	0.0094***	0.0115***
	(0.0032)	(0.0029)	(0.0033)	(0.0029)		(0.0051)	(0.0137)	(0.0027)	(0.0049)	(0.0022)	(0.0032)
$Q_{i,t-1}$	0.0733***	0.0336***	0.0302***	0.0342***	0.0271	0.0489***	0.0364***	0.1153***	0.0443***	0.0250***	0.0531***
	(0.0086)	(0.0046)	(0.0050)	(0.0060)	(0.0173)	(0.0111)	(0.0064)	(0.0143)	(0.0066)	(0.0038)	(0.0078)
$CF_{i,t-1}/K_{i,t-2}$	0.0950***	0.0890***	0.0863***	0.1144***	0.0536	0.0434***	0.0206	0.0918***	0.0554***	0.0672	0.1259***
	(0.0093)	(0.0126)	(0.0121)	(0.0241)	(0.0830)	(0.0075)	(0.0169)	(0.0190)	(0.0119)	(0.0124)	(0.0195)

Mispricing metric

- We construct $MISPRICING_{i,t}$ from a firm-level vector autoregression (VAR) of firm risk and return as well as other characteristics that predict future risks and returns. These characteristics include our three previous mispricing proxies.

$$z_{i,t} = \Gamma z_{i,t-1} + u_{i,t}$$

$$e1' \equiv [10...0], e2' \equiv [01...0]$$

$$e1'\Gamma z_{i,t} = a + be2'\Gamma z_{i,t} + e_{i,t+j},\ j = 1:J$$

$$MISPRICING_{i,t} = \prod_{j=1}^{J}(1 + e_{i,t+j})$$

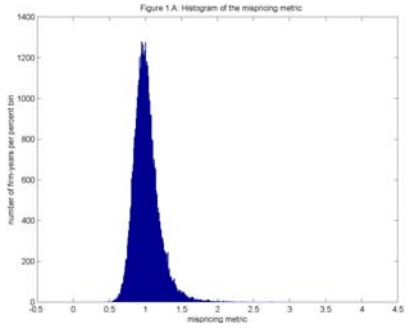
Mispricing metric – motivation

- Why use a VAR?
  - We can use our three variables simultaneously
  - The VAR lets us control for risk so that mispricing is explicitly dependent on a model of market equilibrium
  - We can measure the price-level impact of return predictability which takes into account the persistence of the characteristics predicting risk and return
- What is in our VAR?
  - stock return, $r_{i,t}$
  - 12-month market return beta, $\beta^{short}_{i,t}$
  - 36-60 month market return beta, $\beta^{long}_{i,t}$
  - log book-to-market equity, $BE/ME_{i,t}$
  - our previous mispricing proxies: $DACCR_{i,t}$, $EQISSUE_{i,t}$, and lagged returns

VAR estimates

	(1) r_t	(2) β^{12}_{t-1}	(3) β^{36-60}_{t-1}	(4) B/M_{t-1}	(5) $DACCR_{t-1}$	(6) $EQISSUE_{t-1}$
r_{t-1}	0.0241	-0.2905***	0.0019	0.0872***	-0.0031	-0.1542*
	(0.0243)	(0.0100)	(0.0059)	(0.0283)	(0.0023)	(0.0264)
β^{12}_{t-1}	0.0056	0.0328**	0.0418***	-0.0057	0.0004	0.0051
	(0.0050)	(0.0141)	(0.0065)	(0.0040)	(0.0016)	(0.0117)
β^{36-60}_{t-1}	-0.0119	0.4110***	0.8006***	0.0161	-0.0067**	-0.0715*
	(0.0220)	(0.0447)	(0.0206)	(0.0198)	(0.0025)	(0.0411)
$lnBE/ME_{t-1}$	0.0365	-0.0347	-0.0213**	0.8746***	-0.0082***	-0.0556
	(0.0223)	(0.0322)	(0.0100)	(0.0217)	(0.0017)	(0.0347)
$DACCR_{t-1}$	-0.1021**	0.0042	-0.0016	-0.0081	0.0202***	0.6140***
	(0.0423)	(0.0637)	(0.0196)	(0.0267)	(0.0293)	(0.0872)
$EQISSUE_{t-1}$	-0.0021	0.0290	-0.0736***	0.1248***	-0.0064	0.5458***
	(0.0081)	(0.0822)	(0.0260)	(0.0084)	(0.0021)	(0.0691)
r_{t-2}	-0.0030	0.0369	0.0127	0.0729***	0.0225***	0.2398***
	(0.0221)	(0.0379)	(0.0153)	(0.0171)	(0.0052)	(0.0404)
r_{t-3}	-0.0166	0.0642	0.0255	0.0547**	0.0002	0.1722***
	(0.0171)	(0.0494)	(0.0167)	(0.0203)	(0.0019)	(0.0152)
r_{t-4}	-0.0160	0.0053	0.0098	0.0296**	-0.0039	0.2392***
	(0.0147)	(0.0240)	(0.0123)	(0.0106)	(0.0025)	(0.0293)
r_{t-5}	-0.0178	0.0571**	0.0025	0.0216*	-0.0100**	-0.2303***
	(0.0153)	(0.0270)	(0.0123)	(0.0118)	(0.0036)	(0.0325)
Observations	45440	45440	45440	45440	45440	45440
R-squared	0.005	0.057	0.749	0.704	0.028	0.552

Mispricing metric



Mispricing metric

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$MISPRICING_{i,t}$	0.2124***	0.1535***	0.1464***	0.1542***	0.0936	0.2102***	0.2229***	0.2231***
	(0.0288)	(0.0312)	(0.0275)	(0.0278)	(0.0620)	(0.0296)	(0.0294)	(0.0296)
Q_{t-1}	0.0390***	0.0394***	0.0398***	0.0383***	0.0703***	0.0376***	0.0437***	0.0449***
	(0.0048)	(0.0043)	(0.0047)	(0.0075)	(0.0216)	(0.0062)	(0.0060)	(0.0059)
CF_{t-1}/K_{t-2}	0.0909***	0.0652***	0.0611***	0.0641***	0.0667***	0.0910***	0.0914***	0.0914***
	(0.0146)	(0.0083)	(0.0080)	(0.0108)	(0.0175)	(0.0146)	(0.0146)	(0.0146)
$E_{t-1}[EARN_{t,t}]/A_{t,t-1}$		0.3145***	0.4774***	0.4610***				
		(0.0955)	(0.1344)	(0.1626)				
$E_{t-1}[EARN_{t,t+1}]/A_{t,t-1}$			-0.0984	-0.1310				
			(0.1814)	(0.2105)				
$E_{t-1}[EARN_{t,t+k}]/A_{t,t-1}$				0.0060				
				(0.0062)				
Q_t						0.0026	-0.0009	-0.0004
						(0.0051)	(0.0058)	(0.0057)
Q_{t-2}							-0.0209***	-0.0169**
							(0.0052)	(0.0068)
Q_{t-3}								-0.0084
								(0.0071)
Observations	23347	12914	12520	10787	10923	23347	23347	23347
R-squared	0.460	0.587	0.608	0.576	0.108	0.460	0.461	0.461

Efficient or inefficient investments?

- Open question: Does market inefficiencies encourage the undertaking of wasteful projects or help finance good investment projects that would be otherwise be forgone?
- What is the relation between returns and ("abnormal") investment?

Framework

$$R_{i,t} = a_t + b_{1,t} \ln \frac{I_{i,t-1}}{K_{i,t-2}} + b_{2,t} \ln Q_{i,t-1} + b_{3,t} \frac{CF_{i,t-1}}{K_{i,t-2}} + \varepsilon_{i,t}$$

- Fama-MacBeth (1976) estimates of monthly cross-sectional regressions of stock returns on abnormal investment
- Control for characteristics related to returns

Return predictability

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
intercept	1.1561***	3.2108***	2.7542***	3.9667***	1.9802***	3.0249***	2.7679***	3.7459***	3.7119***
	(0.3109)	(0.6949)	(0.7680)	(0.8771)	(0.6625)	(0.7845)	(0.6639)	(0.7248)	(0.7449)
$\ln I_{i,t-1}/K_{i,t-2}$	-0.1579***	-0.1372***	-0.1058	-0.2489***	-0.0670	-0.1151***	-0.1182***	-0.1624***	-0.0702*
	(0.0399)	(0.0342)	(0.0794)	(0.0887)	(0.0417)	(0.0491)	(0.0451)	(0.0417)	(0.0385)
$\ln Q_{i,t-1}$	-0.4161***	0.3061***	0.2219	0.1909	0.3818**	-0.0970	0.2946	-0.0307	0.1055
	(0.1067)	(0.1131)	(0.2723)	(0.2355)	(0.1882)	(0.1664)	(0.2008)	(0.1663)	(0.1355)
$\ln CF_{i,t-1}/K_{i,t-2}$	0.0714*	0.0179	0.0310	-0.1420	-0.0266	0.0193	-0.0089	0.0413	-0.0089
	(0.0389)	(0.0318)	(0.1315)	(0.1737)	(0.0640)	(0.0512)	(0.0733)	(0.1030)	(0.0404)
$\ln ME_{i,t-1}$		-0.1900***	-0.1447***	-0.2351***	-0.0901**	-0.1755***	-0.1400***	-0.2483***	-0.2044***
		(0.0474)	(0.0514)	(0.0588)	(0.0451)	(0.0518)	(0.0440)	(0.0518)	(0.0525)
$\ln BE/ME_{i,t-1}$		0.3541***	0.5003***	0.2643	0.2888***	0.1681	0.3443**	0.2199**	0.1625*
		(0.0762)	(0.1815)	(0.1893)	(0.1183)	(0.1033)	(0.1518)	(0.0995)	(0.0867)
$\ln MOM_{i,t-1}$		0.9665***	0.8603***	0.7332***	0.7992***	1.2381***	0.9160***	0.9153***	0.7033***
		(0.1840)	(0.2472)	(0.2457)	(0.2115)	(0.2066)	(0.1977)	(0.1939)	(0.2036)
$DACCR_{i,t-1}$									-0.6917***
									(0.2678)
$EQISSUE_{i,t-1}$									-0.1814
									(0.1490)

sentiment

Summary

- Managers may have a rational incentive to overinvest when prices are above fundamental value.
- This incentive is stronger for firms which are held by short-term investors and have projects whose quality is slowly revealed

Summary

- Controlling for investment opportunities and financial slack, firm business investment is higher for firms with
  - Higher discretionary accruals
  - Higher equity issuance activity over the last five years
  - Postive price momentum at the firm or industry level
  - Higher mispricing metric
- Consistent with our model, this relation exists primarily in opaque firms with short-term investors.

Summary

- Controlling for characteristics related to returns (risk), firms with higher abnormal investment have lower subsequent returns
- Consistent with our model, this relation exists primarily in opaque firms with short-term investors.
- The relation between abnormal investment and future returns does not vary significantly with a firm's degree of financial constraint.

How big is the effect?

- In the average firm-year, our three variables together predict a level of investment that is nine percent (or 14 million dollars per firm-year) different from the typical benchmark.
- The average CAPEX per firm-year is 100M.

Unsolved questions

- Do managers act rationally and take advantage of mispricing or are managers as overconfident about the quality of their firm as their investors?

Next topic

- Do managers overinvest because their firm is overpriced or does the market become irrationally exuberant about firms that are overinvesting?

Part II

Investors are rational while managers are irrational

73

Before behavioral economics…

- Biases were created by incentives…
- Agents is rational
- Constraints, or inefficient contracts generate myopia

74

Efficient Capital Markets, Inefficient Firms

"Efficient Capital Markets, Inefficient Firms: A Model of Myopic Corporate Behavior" (Stein, 1989)

This paper shows that even a fully efficient market can lead managers who care about stock prices to behave myopically. In this paper, however, the myopia is generated by the high powered incentives (i.e. the fraction of stock that the manager wants to sell in the short period – interpret it as takeover pressure).

Intuition:

The market uses earnings to make a rational forecast of firm value. Manager has some incentive for the firm value to be higher in the short run even at the cost of losing money later (high powered short term incentives). Knowing this, managers will pump up earnings to raise forecasted value. In equilibrium the market correctly conjectures earnings inflation but managers continue to behave myopically.

Similar to a prisoner's dilemma: the preferred cooperative equilibrium would involve no myopia but if the market conjectures myopia managers have an incentive to fool it by boosting earnings.

How about an optimal contract that solves this bias?

75

After behavioral economics became popular…

- Psychological phenomena came into the picture:
- Three categories:
  - Biases
  - Heuristic
  - Framing effects

76

Biases

- A bias is a predisposition toward error
- Excessive optimism
  - Overestimate how frequently you will have favorable outcomes and underestimate how frequently you will have unfavorable outcomes
- Overconfidence
  - A bias that pertains to how well people understand their own abilities and the limits of their knowledge (illusion of knowledge)
- Differences: overconfidence and excessive optimism often go hand in hand, but are not the same. Managers may be pessimistic, yet overconfidently so.

77

Biases

- Confirmation bias
  - People overlook information that disconfirms their views in favor of information that confirms their view.
- Illusion of Control
  - People believe they have an influence on random outcomes. Psychological studies have found that an increase in perceived control leads to an increase in excessive pessimism.

78

Heuristics

- Representativeness
  - Heuristics that makes use of analogues or stereotypes.
- Availability
  - People use information that is more readily available rather than information that is less readily available.
- Anchoring and adjusting
  - When forming judgment, people have a tendency to become anchored on numbers on their heads and not make sufficient adjustment.
- Affect Heuristic
  - A behavior that places heavy reliance on intuition and gut feeling

79

Optimism, overconfidence and corporate finance – the beginning

A disconnect between:

- The psychological literature on optimism
- The economic literature on the consequences of being optimistic.

80

Starting point

- People display overoptimism
- Managers are likely to have this bias (really?)
- What are the consequences on managerial decisions
- Empirically!

81

Problems

- How do we measure overoptimism?
- What decisions do we want to investigate?
- In which framework we will investigate them

82

Overconfident managers and corporate decision-making

- Overconfident managers win takeovers (Roll 1986)
- Overconfident managers and investment (Malmendier and Tate, 2005)*
- Overconfident managers and acquisitions (Malmendier and Tate, 2005)
- Overconfident managers and financial contracting (Landier and Thesmar, 2005)
- Overconfident managers and managing style (Bertrand and Schoar, 2003)*

(We will see the ones marked with *)

83

Overconfident managers: empirical evidence

- **Behavioral Explanation of the Pecking Order Rule:** (*Malmendier and Tate, 2005)*
  - Managers overestimate the probability of a good future performance of their firm.
  - Since managers are optimistic relative to the capital markets, they believe their equity is undervalued
  - They first use internally generated funds or the debt market
  - True and perceived default risk coincide and managers agree with creditors on the value of debt
- **Observation:** Markets are more pessimistic than managers
- **Explanations:**
  - The market is wrong (asymmetric information)
  - The managers are wrong (e.g. overconfidence)
- **The Idea:** Managerial confidence affects corporate investment decisions, i.e. the sensitivity of investments to cash flows.

84

Overconfident managers: stylized model

Stylized model:

- Suppose the firm invests I at t=1, which yields a gross return R(I) at t=2.
- I is raised partly with external finance (s) and partly from internal cash-flows (C).
- There are financing frictions (n).
- The manager has a misperception Δ of the value of the firm (or in the agency models, a manager derives private benefits from investing).

The manager chooses to invest an amount I so as to solve the following maximization problem:

$$Max[(1 + \Delta)R(I) - I] + \eta s \qquad \text{s.t. } I = s + C$$

85

Overconfident managers: stylized model

Predictions of the model:

- With Δ=0, as C goes to infinity there is overinvestment $I^*: R'(I)(1+\Delta)=1$
- Overinvestment occurs or not (depending on the specification) for $C<I^*$

Conclusion:

- If Δ>0, investment is more sensitive to CF than if Δ=0.
- Equity-dependent firms display a higher sensitivity of investment to internal cash than non-equity-dependent firms.

86

Malmendier and Tate (2005)

As a result,

- If CEO's have sufficient internal funds, they overinvest
- If they do not have sufficient internal funds, they underinvest since they are reluctant to issue new equity because they perceive it is undervalued by the market.

Overconfidence of CEO's is attributed to three main factors:

1. The illusion of control
2. A high degree of commitment to good outcomes
3. Abstract reference points that make it hard to compare to performance across individuals.

87

Malmendier and Tate (2005)

Measure of overconfidence:

with respect to a benchmark for the minimum percentage in the money at which CEOs should exercise their options following the vesting period.

According to that, CEOs are classified as overconfident if:

1. They persistently exercise their options later than suggested by the benchmark
2. They hold options all the way to their expiration (typically ten years) meaning that they are confident about their firm's future performance
3. They increase their holdings of the company's stock by acquiring additional equity

88

Malmendier and Tate (2005)

Usually CEOs suffer from underdiversification of their porfolios for three reasons (at least):

1. Their options cannot be traded and the sale of their stock may be restricted
2. Firms prohibit CEOs from perfectly hedging against risk by short-selling the company stock
3. CEOs human capital is also invested in the firm.

Intuition:

While risk aversion and underdiversification should lead CEOs to minimize their stock holdings, overconfidence may lead them to overestimate future returns and induce them to postpone option exercise or even to buy additional company stock.

89

Malmendier and Tate (2005)

The main objective of the paper is to compare the behavior of 'overconfident' versus 'non-overconfident' CEOs.

Two main predictions are made:

1. The investment of CEOs who are overconfident is more sensitive to cash flow than the investment of CEOs who are not overconfident.
2. The investment-cash flow sensitivity of overconfident CEOs is more pronounced in equity-dependent firms.

90

Malmendier and Tate (2005)

Data consists in a sample of 477 large US firms for the years 1980 to 1994.

The data set contains information about stock ownership and the set of option packages including:

- exercise price
- remaining duration
- number of underlying shares

for the CEO of each company, year-by-year.

91

Malmendier and Tate (2005)

Three overconfidence measures are used:

- Holder 67: considers the status of each individual option package at the end of the vesting period. A CEO is classified overconfident if he/she fails at least twice to exercise an option valued above a threshold of 67% in the money during the 5th year.
- Longholder: focuses on the expiration date of option packages. A CEO is classified overconfident if he/she holds an option until the last year of its duration.
- Net buyer: exploits the tendency of some CEOs to purchase additional company stock despite their already high exposure to company risk.

92

Malmendier and Tate (2005)

Empirical specification:

Test:

Prediction 1- the sensitivity of investment to cash flow increases with overconfidence,

Model:

$$I_{it} = \beta_1 + \beta_2 Q_{it-1} + \beta_3 C_{it} + X_{it}' \beta_4 + \beta_5 \Delta_{it} + \beta_6 C_{it} Q_{it-1} + C_{it} X_{it}' \beta_7 + \beta_8 C_{it} \Delta_{it} + \varepsilon_{it}$$

Where,

C is cash flow, Q is market value over book value of the assets, X is a vector of controls (corporate governance, stock ownership, number of vested periods), and Δ the overconfidence measure.

The parameter of interest is β_8

93

Malmendier and Tate (2005)

Results for Holder 67:

	Baseline Regressions			Late Exercise of 67%-in-the-money Options (in year 5)			
	no fixed effects, no controls	fixed effects, no controls	fixed effects, controls	over-confidence with fixed effects, no controls	over-confidence with fixed effects, controls	standard errors clustered by firm	industry - CF interactions, clustered by firm
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cash flow	0.2052	0.6419	1.8579	0.6729	1.7044	1.7044	1.3911
	(9.73)***	(7.19)***	(9.85)***	(7.56)***	(10.20)***	(2.99)***	(3.32)***
Q	0.0250	0.0635	-0.0049	0.0656	-0.0088	-0.0088	-0.0113
	(3.04)***	(4.54)***	(0.34)	(6.79)***	(0.44)	(0.18)	(0.35)
Stock ownership (%)			-0.1077		-0.1834	-0.1834	0.1892
			(0.19)		(0.33)	(0.26)	(0.34)
Vested options			0.1946		0.1398	0.1398	0.1989
			(1.61)		(1.17)	(1.04)	(1.55)
Size			0.0466		0.0543	0.0543	0.0429
			(2.45)**		(2.88)***	(1.47)	(1.44)
Corporate governance			-0.0042		-0.0071	-0.0071	-0.0131
			(0.54)		(0.92)	(0.75)	(1.40)
(Q)*(Cash flow)			0.0521		0.0648	0.0648	0.0645
			(2.64)***		(3.28)***	(0.83)	(1.28)
(Stock ownership)*(Cash flow)			-0.5749		-0.6907	-0.6907	-1.1138
			(1.38)		(1.67)*	(0.45)	(0.97)
(Vested options)*(Cash flow)			-0.4612		-0.2981	-0.2981	-0.5015
			(4.15)***		(2.62)***	(1.32)	(2.62)***
(Size)*(Cash flow)			-0.1713		-0.1754	-0.1754	-0.1433
			(8.47)***		(8.77)***	(2.51)**	(2.64)***
(Corporate governance)*(Cash flow)			0.0265		0.0441	0.0441	0.0597
			(2.16)**		(2.65)***	(1.69)*	(2.61)**
Holder 67				-0.0351	-0.0495	-0.0495	-0.0362
				(1.35)	(1.96)*	(1.67)*	(1.27)
(Holder 67)*(Cash flow)				0.1648	0.2339	0.2339	0.1718
				(3.30)***	(4.70)***	(2.59)**	(2.20)**
Year fixed effects	no	yes	yes	yes	yes	yes	yes
Firm fixed effects	no	yes	yes	yes	yes	yes	yes
(Year fixed effects)*(Cash flow)	no	yes	yes	yes	yes	yes	yes
(Industry fixed effects)*(Cash flow)	no	no	no	no	no	no	yes
Observations	1058	1058	1058	1058	1058	1058	1056
Adjusted R-squared	0.13	0.56	0.61	0.56	0.62	0.62	0.67

Constant included. Absolute value of t statistics in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

94

Malmendier and Tate (2005)

Results for Holder 67:

- Cash flow has a large amount of explanatory power beyond Q for investment.
- CEOs who have a higher percentage of ownership display a smaller investment to cash flow sensitivity: ownership acts as a corporate governance mechanism
- Prediction 1 holds: CEOs who demonstrate a higher level of overconfidence than their peers also exhibit higher sensitivity of investment to cash flow.

95

Malmendier and Tate (2005)

Results for Longholder and Net Buyer:

	Longholder Regressions				Net Buyer Regressions			
	fixed effects, controls	over-confidence with fixed effects, controls	standard errors clustered by firm	firm - CF interactions, clustered by firm	fixed effects, controls	over-confidence with fixed effects, controls	standard errors clustered by firm	industry - CF interactions, clustered by firm
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cash flow	0.7249	0.656	0.656	1.1093	1.6262	1.555	1.555	1.382
	(8.33)***	(7.50)***	(2.53)**	(2.58)**	(7.24)***	(6.99)***	(4.19)***	(2.46)**
Q	0.0814	0.0851	0.0851	0.1009	0.0752	0.0770	0.0770	0.0677
	(7.53)***	(7.89)***	(1.99)**	(1.45)	(3.45)***	(3.57)***	(3.33)***	(2.96)***
Stock ownership (%)	0.1936	0.196	0.196	0.1138	0.3543	-0.0864	-0.0864	-0.1138
	(2.37)**	(2.41)**	(1.01)	(0.54)	(0.91)	(0.24)	(0.24)	(0.27)
Vested options	-0.0231	0.003	0.003	0.0098	0.1104	0.0839	0.0839	0.0934
	(0.24)	(0.03)	(0.01)	(0.07)	(0.72)	(0.42)	(0.43)	(0.64)
Size	-0.0455	-0.0494	-0.0494	-0.0213	-0.0850	-0.0790	-0.0790	-0.0827
	(4.81)***	(5.12)***	(2.34)**	(0.53)	(3.36)***	(3.12)***	(1.48)	(1.53)
Corporate governance	0.0012	0.0023	0.0023	0.0058	0.0025	0.0071	0.0071	-0.0025
	(0.31)	(0.59)	(0.43)	(1.22)	(0.26)	(0.74)	(0.42)	(0.16)
(Q)*(Cash flow)	-0.0082	-0.0099	-0.0099	-0.0234	-0.0555	-0.0721	-0.0721	-0.0502
	(0.63)	(1.02)	(0.23)	(0.04)	(2.44)**	(3.17)***	(1.80)*	(1.53)
(Stock ownership)*(Cash flow)	0.0186	0.002	0.002	0.2694	-0.8325	0.3991	0.3991	0.5724
	(0.12)	(0.01)	(0.00)	(1.91)*	(1.25)	(0.56)	(0.34)	(0.44)
(Vested options)*(Cash flow)	0.3198	0.2847	0.2847	-0.0427	-0.1131	-0.0012	-0.0012	0.0221
	(4.46)***	(3.97)***	(1.19)	(0.61)	(0.85)	(0.01)	(0.01)	(0.11)
(Size)*(Cash flow)	-0.0595	-0.053	-0.053	-0.0202	-0.1517	-0.1653	-0.1653	-0.1123
	(5.67)***	(5.04)***	(1.55)	(1.18)	(5.49)***	(6.02)***	(3.43)***	(2.31)**
(Corporate governance)*(Cash flow)	-0.0074	-0.0096	-0.0096	-0.0242	0.022	0.0006	0.0006	0.0357
	(0.82)	(1.07)	(0.49)	(0.34)	(0.92)	(0.03)	(0.01)	(0.55)
Longholder		-0.0504	-0.0504	-0.0306				
		(2.65)***	(1.00)	(1.05)				
(Longholder)*(Cash flow)		0.1778	0.1778	0.1126				
		(5.51)***	(1.33)	(1.32)				
Net Buyer						1.0615	1.0615	0.1053
						(2.83)***	(1.84)*	(0.11)
(Net Buyer)*(Cash flow)						0.4226	0.4226	0.449
						(4.33)***	(1.57)	(1.92)*
Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
(Year fixed effects)*(Cash flow)	yes	yes	yes	yes	yes	yes	yes	yes
(Industry fixed effects)*(Cash flow)	no	no	no	no	no	no	no	yes
(Firm fixed effects)*(Cash flow)	no	no	no	yes	no	no	no	no
Observations	3742	3742	3742	3742	842	842	842	842
Adjusted R-squared	0.54	0.54	0.54	0.63	0.53	0.54	0.54	0.56

Constant Included. Absolute value of t statistics in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%

96

Malmendier and Tate (2005)

Results for Longholder and Net Buyer:

- Q affects positively the sensitivity of investment to cash flow
- Equity ownership is also, as before, negatively related to the sensitivity of investment to cash flow
- Both Longholder CEO's and Net Buyer CEO's exhibit higher sensitivity of investment to cash flow than their less overconfident counterparts.

97

Malmendier and Tate (2005)

Debate:

- Classical objection: Q does not measure correctly marginal Q, then internal CF may be correlated with investment opportunities.
- Splitting the sample along the dimension used in the paper makes sense if the sorting criterion (managerial overoptimism) is correlated with the true unobservable variable (liquidity constraints) BUT uncorrelated with the error (the extent to which cashflow is a proxy for the mis-measurement of Q). Examples may be high sales growth.
  → Intuition: cash flow may convey more information for firms with more overoptimistic managers. Although investment is not truly affected by CF, investment will be correlated with it.

98

Malmendier and Tate (2005)

Overconfidence and financial constraints:

Prediction 2: overconfidence should matter most for firms that are equity dependent.

For that, the Kaplan-Zingales index of financial constraints is used and the empirical specification shown before is estimated five times: for each of the quintiles in which the sample is separated based on the KZ index.

The results show that prediction 2 holds: the effect of overconfidence on the sensitivity of investment to cash flow is significant only for the top quintile (most constrained) of the KZ index.

99

Malmendier and Tate (2005)

Overconfidence and financial constraints. Results:

	OLS with Fixed Effects				
	Most Constrained (1)	(2)	(3)	(4)	Least Constrained (5)
Cash flow	1.1538	0.1763	0.8952	0.5259	0.6969
	(2.21)**	(0.34)	(2.08)**	(1.01)	(2.50)**
Q	0.1844	0.0598	0.0700	0.0124	-0.0346
	(4.48)***	(1.41)	(1.99)**	(0.43)	(0.41)
Stock ownership (%)	-0.4103	0.5790	0.0266	-0.1723	0.3433
	(1.60)	(2.02)**	(0.15)	(1.16)	(0.79)
Vested options	0.1414	-0.3270	0.2748	0.2150	0.7829
	(0.59)	(1.02)	(1.43)	(0.53)	(1.09)
Size	-0.0428	-0.0175	-0.0223	-0.0664	-0.0425
	(1.04)	(0.73)	(0.94)	(1.54)	(0.81)
Corporate governance	0.0032	-0.0044	0.0034	-0.0073	0.0122
	(0.21)	(0.64)	(0.57)	(0.51)	(0.52)
(Q)*(Cash flow)	-0.1685	0.0364	-0.0420	0.0371	0.0420
	(3.12)**	(0.30)	(0.53)	(1.00)	(0.64)
(Stock ownership)*(Cash flow)	-0.3707	-1.2622	-1.0177	0.5432	0.0685
	(0.69)	(1.48)	(1.32)	(0.92)	(0.10)
(Vested options)*(Cash flow)	-0.4152	1.3804	0.0486	-0.1765	-0.6750
	(1.18)	(2.31)**	(0.08)	(0.55)	(1.22)
(Size)*(Cash flow)	-0.0446	-0.0144	-0.0482	0.0258	-0.0413
	(0.69)	(0.23)	(1.05)	(0.47)	(0.98)
(Corporate governance)*(Cash flow)	-0.0439	0.0954	-0.0318	0.0237	-0.0273
	(0.91)	(2.26)**	(1.24)	(0.57)	(0.80)
Longholder	-0.0832	0.0831	-0.0196	-0.0219	-0.1404
	(1.72)*	(1.74)*	(0.68)	(0.43)	(1.10)
(Longholder)*(Cash flow)	0.4990	-0.1440	0.0680	0.0025	0.3453
	(3.52)***	(1.10)	(0.67)	(0.02)	(1.28)
Year fixed effects	yes	yes	yes	yes	yes
Firm fixed effects	yes	yes	yes	yes	yes
(Year fixed effects)*(Cash flow)	yes	yes	yes	yes	yes
Observations	728	728	729	728	728
Adjusted R-squared	0.75	0.82	0.91	0.78	0.56

Constant included. Absolute value of t statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

100

Malmendier and Tate (2005)

Other personal CEO characteristics:

The authors also consider several CEO characteristics as a factor that may influence the sensitivity of investment to cash flow. The results show that:

- CEOs with technical education have more investment to cash flow sensitivity that cEOs with general education, while CEOs with financial education have less.
- CEOs who belong to the Great Depression birth cohort also have more investment to cash flow sensitivity
- CEOs who have accumulated additional titles (like President and Chairman of the Board) also have more investment to cash flow sensitivity.

101

Malmendier and Tate (2005)

Conclusion:

- Both predictions of the overconfidence of the model hold:
  - The relationship between the sensitivity of investment to cash flow and CEO overconfidence is positive, strong and significant
  - Overconfidence matters more in firms that are more equity dependent
- Other personal characteristics of CEOs also matter, suggesting that these might be important for determining investment policy
- Including overconfidence in the regression together with personal CEO characteristics does not alter the significance of overconfidence, suggesting that overconfidence is different from observable CEO characteristics.

102

Malmendier and Tate (2005)

Conclusion (continued):

- The results have important implications for contracting practices and organizational design.
- Alternative measures such us debt overhang may suffice to discipline overconfident CEOs.
- These results confirm the need for independent and vigilant directors.

103

Bertrand and Schoar (2003)

"Managing with style: the effect of managers on firm policies" (Bertrand and Schoar, 2003)

Empirical literature until now typically relies on firm, industry or market level characteristics to explain corporate behavior and performance.

However, this literature shows that a large amount of variation remains unexplained after controlling for firm-level characteristics or industry fixed effects.

→ This paper asks how much individual managers, i.e. their individual characteristics, matter for firm behavior and economic performance.

104

Bertrand and Schoar (2003)

- They quantify how much of the observed variation in firm policies (investment, financial policy, organizational strategy, performance) can be attributed to manager fixed effects.

- Results show that:
  - Manager fixed effects are empirically important determinants of a wide range of corporate variables
  - Manager effects matter much more for some decisions than others
  - Managers seem to differ in their approach towards company growth and in their financial aggressiveness
  - Managers also differ in the benchmark they use when making investment decisions.

105

Bertrand and Schoar (2003)

- Neoclassical view of the manager:
  - Top managers are homogeneous and selfless inputs into the production process
- Standard agency models view managers as:
  - Having discretion inside the firm
  - But such discretion varies according to the strength of the corporate governance mechanisms
- This paper:
  - Managers matter in the determination of firm policies
  - Some managerial traits or preferences may cause corporations to adopt sub-optimal strategies
  - What are the efficiency implications?

106

Bertrand and Schoar (2003)

Data:

- The objective is to understand whether there are manager fixed effects in corporate practices
- One needs to separate manager fixed effects from firm fixed effects

Thus, construct a manager-firm matched panel data set that allows to track the same top managers across different firms over time.

- Data comes from Forbes 800 files, period 1969-99
- And Execucomp data from 1992-99.
- And Compustat and SDC data to construct series of annual accounting variables.

107

Bertrand and Schoar (2003)

Empirical Strategy:

For each dependent variable of interest, they estimate:

$$y_{it} = \alpha_t + \gamma_i + \beta X_{it} + \lambda_{CEO} + \lambda_{CFO} + \lambda_{Others} + \varepsilon_{it}$$

Where:

- y_{it} is one of the corporate policy variables
- α_t are year fixed effects and γ_i are firm fixed effects
- X_{it} represents a vector of time varying controls
- $\lambda_{CEO}, \lambda_{CFO}, \lambda_{Others,}$ are fixed effects of CEOs, CFOs, and other managers that are not CEOs or CFOs respectively
- errors are clustered at firm-level to account for serial correlation.

108

Bertrand and Schoar (2003)

Results:

The following tables report F-tests and adjusted R-squares of the above regression.

First rows report the fit that includes only firm and year fixed effects, and time varying controls. The second row includes CEO fixed effects, the third incldues CFO and Others fixed effects.

- Results suggest that manager specific effects matter both economically and statistically for the policy decisions of firms
- Including CEO's as well as other managers' fixed effects increases the adjusted R-square
- F-tests are large and allow in most cases to reject the null hypothesis that all the manager fixed effects are zero.

109

Bertrand and Schoar (2003)

Table III
Executive Effects on Investment and Financial Policies[a]

Panel A: Investment policy

	F-tests on fixed effects for			*N*	*Adjusted R^2*
	CEOs	*CFOs*	*Other executives*		
Investment				6631	.91
Investment	16.74 (< .0001, 198)			6631	.94
Investment	19.39 (< .0001, 192)	53.48 (< .0001, 55)	8.45 (< .0001, 200)	6631	.96
Inv to Q sensitivity				6631	.95
Inv to Q sensitivity	17.87 (< .0001, 223)			6631	.97
Inv to Q sensitivity	5.33 (< .0001, 221)	9.40 (< .0001, 58)	20.29 (< .0001, 208)	6631	.98
Inv to CF sensitivity				6631	.97
Inv to CF sensitivity	2.00 (< .0001, 205)			6631	.98
Inv to CF sensitivity	0.94 (.7276, 194)	1.29 (.0760, 55)	1.28 (.0058, 199)	6631	.98
N of acquisitions				6593	.25
N of acquisitions	2.01 (< .0001, 204)			6593	.28
N of acquisitions	1.68 (< .0001, 199)	1.74 (.0006, 55)	4.08 (< .0001, 203)	6593	.30

Panel B: Financial policy

	F-tests on fixed effects for			*N*	*Adjusted R^2*
	CEOs	*CFOs*	*Other executives*		
Leverage				6563	.30
Leverage	0.99 (.5294, 203)			6563	.39
Leverage	0.86 (.9190, 199)	1.43 (.0225, 54)	1.21 (.0230, 203)	6563	.41
Interest coverage				6278	.31
Interest coverage	0.56 (.99, 193)			6278	.31
Interest coverage	0.35 (.99, 192)	13.85 (< .0001, 50)	2.61 (< .0001, 192)	6278	.41
Cash holdings				6592	.77
Cash holdings	2.52 (< .0001, 204)			6592	.78
Cash holdings	2.48 (< .0001, 201)	3.68 (< .0001, 54)	2.53 (< .0001, 202)	6592	.80
Dividends/earnings				6580	.65
Dividends/earnings	5.78 (< .0001, 203)			6580	.71
Dividends/earnings	4.95 (< .0001, 199)	1.07(.3368, 54)	1.74 (< .0001, 203)	6580	.72

110

Bertrand and Schoar (2003)

Table IV
Executive Effects on Organizational Strategy and Performance[a]

Panel A: Organizational strategy

	F-tests on fixed effects for			*N*	*Adjusted R^2*
	CEOs	*CFOs*	*Other Executives*		
N of diversifying acquis.				6593	.22
N of diversifying acquis.	2.06 (< .0001, 204)			6593	.25
N of diversifying acquis.	1.23 (.0163, 202)	1.74 (.0007, 53)	3.97 (< .0001, 202)	6593	.30
R&D				4283	.78
R&D	1.86 (< .0001, 145)			4283	.79
R&D	2.27 (< .0001, 143)	3.60 (< .0001, 45)	4.46 (< .0001, 143)	4283	.83
Advertising				2584	.79
Advertising	2.88 (< .0001, 95)			2584	.81
Advertising	4.03 (< .0001, 95)	0.84 (.6065, 21)	6.10 (< .0001, 80)	2584	.84
SG&A				2397	.46
SG&A	33.55 (< .0001, 123)			2397	.83
SG&A	13.80 (< .0001, 118)	0.82 (.7934, 42)	0.77 (.9777, 146)	2397	.83

Panel B: Performance

	F-tests on fixed effects for			*N*	*Adjusted R^2*
	CEOs	*CFOs*	*Other Executives*		
Return on assets				6593	.72
Return on assets	2.04 (< .0001, 217)			6593	.74
Return on assets	2.46 (< .0001, 201)	3.39 (< .0001, 54)	4.46 (< .0001, 202)	6593	.77
Operating return on assets				5135	.34
Operating return on assets	2.61 (< .0001, 217)			5135	.39
Operating return on assets	1.60 (< .0001, 216)	0.66 (.9788, 58)	1.01 (.4536, 217)	5135	.39

111

Bertrand and Schoar (2003)

Moreover, next table reports the size distribution of the manager fixed effects for each of the above regressions.

As it can be seen, variation in size of the manager fixed effects is economically large.

Table VI
Size Distribution of Manager Fixed Effects[a]

	Median	Standard deviation	25th percentile	75th percentile
Investment	0.00	2.80	-0.09	0.11
Inv to Q Sensitivity	-0.02	0.66	-0.16	0.12
Inv to CF Sensitivity	0.04	1.01	-0.17	0.28
N of acquisitions	-0.04	1.50	-0.54	0.41
Leverage	0.01	0.22	-0.05	0.09
Interest coverage	0.00	860.0	-56.0	51.7
Cash holdings	0.00	0.06	-0.03	0.02
Dividends/earnings	-0.01	0.59	-0.13	0.11
N of diversifying acquis.	-0.04	1.05	-0.28	0.21
R&D	0.00	0.04	-0.10	0.02
SG&A	0.00	0.06	-0.09	0.09
Advertising	0.00	0.04	-0.01	0.01
Return on assets	0.00	0.07	-0.03	0.03
Operating return on assets	0.00	0.08	-0.02	0.03

112

Bertrand and Schoar (2003)

Additional regressions are made to analyze the correlation structure between the manager specific fixed effects:

Table VII
Relationship Between the Manager Fixed Effects[a]

	Investment	Inv to Q	Inv to CF	Cash holdings	Leverage	R&D	Return on assets
Investment							0.00 (0.00)
Inv to Q sensitivity	6.8 (0.92)						0.03 (0.01)
Inv to CF sensitivity	0.02 (0.6)	-0.23 (0.11)					-0.01 (0.01)
Cash holdings	-1.10 (1.62)	-0.79 (1.71)	-0.46 (1.72)				-0.12 (0.05)
Leverage	-0.39 (0.55)	-0.28 (0.59)	-0.63 (0.60)	-0.40 (0.17)			-0.02 (0.02)
R&D	0.07 (0.00)	0.08 (0.02)	-0.03 (0.01)	-0.23 (0.04)	-0.02 (0.01)		0.11 (0.11)
Advertising	0.01 (0.01)	0.02 (0.01)	-0.01 (0.01)	-0.01 (0.04)	0.00 (0.01)	0.25 (0.15)	0.31 (0.15)
N of acquisitions	-0.27 (0.11)	0.08 (0.10)	0.23 (0.10)	0.01 (0.00)	0.02 (0.01)	-0.01 (0.00)	-0.01 (0.00)
N of divers. acquis.	-0.30 (0.13)	-0.14 (0.15)	0.14 (0.14)	0.01 (0.01)	0.01 (0.02)	-0.01 (0.00)	-0.01 (0.00)
SG&A	-0.22 (0.01)	-0.30 (0.04)	0.10 (0.03)	0.54 (0.56)	0.06 (0.21)	-4.32 (0.90)	-3.36 (0.62)

113

Bertrand and Schoar (2003)

Which specific managerial traits or characteristics influence their decision making?

- The authors analyze the role of two possible managerial characteristics: MBA graduation and birth cohort/age.
- With additional data from the 'S&P Directory of Corporate Executives' and the 'Who is Who of Corporate America' databases, they run the following regression:

$$I_{ijt} = \beta X_{it} + \delta_1 MBA_j + \delta_2 MBA_j * CF_{it} / K_{i(t-1)} + \delta_3 MBA_j * Q_{i(t-1)}$$
$$+ \eta_1 Cohort_j + \eta_2 Cohort_j * CF_{it} / K_{i(t-1)} + \eta_3 Cohort_j * Q_{i(t-1)}$$
$$+ \gamma_1 Tenure_j + \gamma_2 Tenure_j * CF_{it} / K_{i(t-1)} + \gamma_3 Tenure_j * Q_{i(t-1)}$$
$$+ \alpha_i + \alpha_{i2} * CF_{it} / K_{i(t-1)} + \alpha_{i3} * Q_{i(t-1)} + \lambda_t + \varepsilon_{ijt}$$

114

Bertrand and Schoar (2003)

- i indexes firms, j indexes CEOs, t indexes time
- X(i,t) is a vector of firm characteristics
- MBA is a dummy variable that equals 1 if the CEO j completed an MBA and 0 otherwise
- Cohort is the birth cohort of CEO j
- α_i are firm fixed effects, λ_t are year fixed effects
- Tenure is a control for the number of years the CEO has been in office
- ε_{ijt} is the error term
- The rest are interaction terms

115

Bertrand and Schoar (2003)

Results:

- CEOs from earlier birth cohorts are associated with lower investment levels
- MBA graduates appear to invest 1.6 percentage point more on average
- MBA graduates respond more to Tobin's Q and less to cash flow availability when deciding about capital structures
- Investment cash flow sensitivities are larger among younger cohorts
- Older CEOs choose lower leverage and higher interest coverage, not significant for MBAs
- There is a negative correlation between dividend payout and MBA graduation
- CEOs with MBAs and CEOs from earlier cohorts have a stronger tendency to engage in diversification moves.

116

Bertrand and Schoar (2003)

Table IX
CEOs' Birth Cohort and MBA Effects on Firm Policies[a]

	Dependent Variable:	Year of Birth (*10)	MBA
(1)	Investment	.017	.016
		(.005)	(.010)
(2)	Inv to Q sensitivity	-.013	.017
		(.003)	(.006)
(3)	Inv to CF sensitivity	.118	-.075
		(.014)	(.026)
(4)	N of acquisitions	.001	-.017
		(.027)	(.056)
(5)	Leverage	.024	.011
		(.007)	(.008)
(6)	Interest coverage	-6.50	.924
		(2.67)	(3.41)
(7)	Cash holdings	-.005	-.001
		(.002)	(.003)
(8)	Dividends/earnings	.000	-.009
		(.003)	(.004)
(9)	N of diversifying acquis.	-.036	.040
		(.015)	(.017)
(10)	R&D	-.003	-.002
		(.002)	(.002)
(11)	Advertising	-.001	.003
		(.002)	(.003)
(12)	SG&A	.002	-.004
		(.003)	(.003)
(13)	Return on assets	-.003	.012
		(.004)	(.005)
(14)	Operating return on assets	-.002	.008
		(.003)	(.003)

117

Bertrand and Schoar (2003)

Conclusions:

- Considerable heterogeneities are found across managers
- Some of the managerial differences in corporate practices are systematically related to differences in corporate performance
- Differences in behavior can be tight to observable managerial characteristics:
  - CEOs with MBAs appear to be on average more aggressive, choosing to engage in higher capital expenditures, hold more debt and pay less dividends
  - CEOs from older generations are less aggressive on average, choosing lower capital expenditures, lover leverage and higher cash holdings.

118

More biases

- More explanations of managerial behavior?
- Loss aversion
  - Psychologically people experience a loss more acutely than a gain of the same magnitude
  - (Loss aversion can cause debt aversion?)
- Aversion to a sure loss
  - Most people are willing to accept a risky alternative that otherwise would have not accepted to avoid a sure loss.

119

Limits with this literature

- Measures of heuristic biases are very imperfect in these exercises
- They often correlate with variable of interest
- Psychological papers have thought us more precise ways of estimating overconfidence
- They also have shown us very sophisticated way of looking at causality with experiment

120