

Benefiting from the Principles of Behavioral Finance While Avoiding Their Pitfalls

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The Role of Behavioral Finance in Consistent and Predictable Investor Errors

Cognitive Heuristics

- We use heuristics or mental rules of thumb countless times in making many decisions.
 - ie: It's faster to fly than to go by car
- When we drive down a busy thoroughfare we concentrate on the road and screen out thousands of inconsequential pieces of information such as advertising, what pedestrians are wearing, and the architecture of numerous buildings.
- Human beings are poor information processors. The very same heuristics that prove indispensable in making thousands of useful decisions daily also lead to systematic mistakes when people use statistics in making their investment decisions.

Cognitive Heuristics Contribute to Predictable and Consistent Investment Errors

Major Heuristical Biases

- All can cause a disconnect between fundamentals and price

- Representativeness

- Labeling two companies or market environments the same when the actual resemblance is superficial.

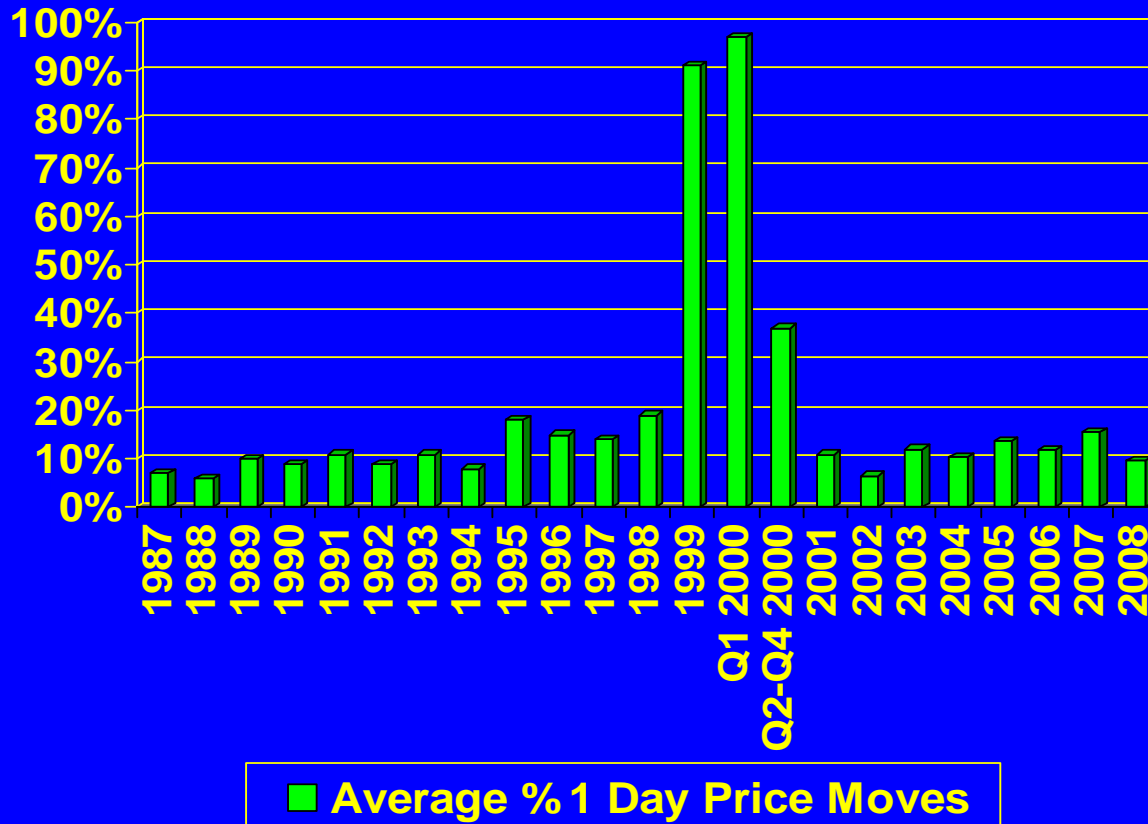
- The 1987 Crash would be followed by a Depression because this was the case in 1929.

- The enormous drop in prices from 2008 through early March indicated that the market was discounting another Great Depression.

- Base Rate vs. Case Rate

- IPO's

“Underpricing” of IPOs Average 1 Day Price Moves



Source: FactSet Initial Public Offering Data

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Cognitive Heuristics Contribute to Predictable and Consistent Investment Errors

- Availability (Kahneman and Tversky)
 - A major heuristical error in which people assess the frequency of an event by the ease the event can be brought to mind. However, factors such as recency and saliency can distort our recall of actual frequency:
 - Shark Attacks
 - Oil drops from a high of \$147 a barrel to \$33, investors believe these low prices will last indefinitely.
 - Sharply lower than average returns for a few years become the new norm. (Dreman & Slovic 2001)

27 years of Over Optimism

Analyst and Economist Earnings Growth Estimates for the S&P 500, 1982-2008

Year*	Analysts	Economists	Actual
1982	26.16%	5.27%	-17.84%
1983	32.17%	24.72%	11.41%
1984	34.18%	27.67%	18.35%
1985	10.76%	12.86%	-12.20%
1986	22.77%	22.86%	-0.89%
1987	32.62%	18.78%	20.86%
1988	29.76%	14.51%	35.77%
1989	10.46%	4.42%	-3.75%
1990	13.79%	12.02%	-6.69%
1991	1.88%	6.70%	-25.16%
1992	37.98%	48.65%	19.54%
1993	22.77%	36.35%	14.98%
1994	38.90%	28.61%	39.45%
1995	10.91%	4.77%	10.91%
1996	18.19%	11.69%	14.08%
1997	13.68%	5.16%	2.56%
1998	14.68%	13.75%	-5.06%
1999	28.50%	14.77%	27.98%
2000	8.07%	7.34%	3.61%
2001	16.91%	19.26%	-50.62%
2002	56.81%	49.86%	14.70%
2003	44.02%	39.48%	72.25%
2004	19.16%	10.46%	20.03%
2005	8.23%	11.10%	19.44%
2006	-1.96%	-0.40%	16.56%
2007	-5.88%	12.87%	-18.81%
2008	7.22%	45.06%	-77.52%

Average annual percentage error

1982-2008 284% 253%

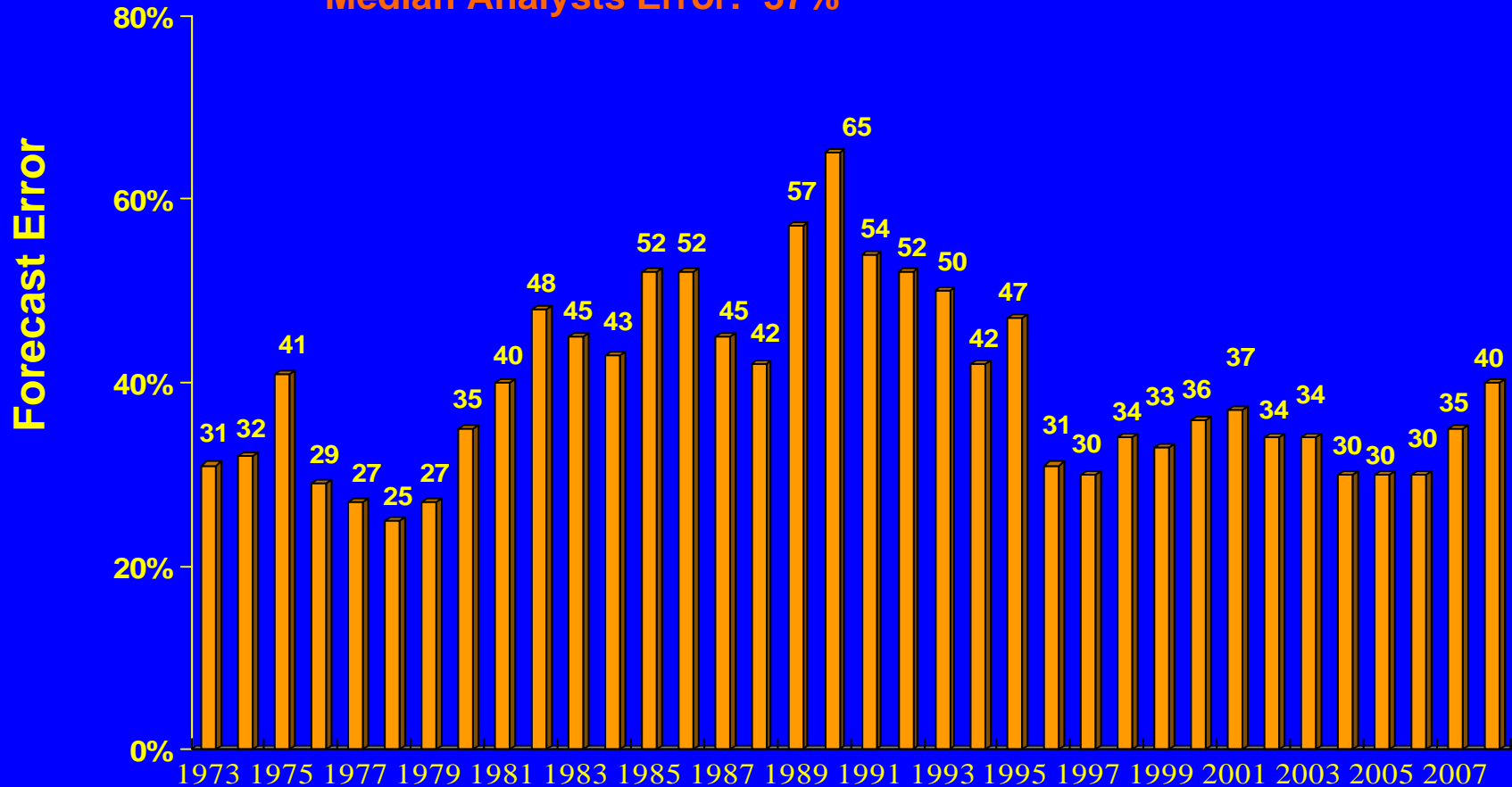
*Estimates made in January each year.

Forecast Error as a Percent of Reported Earnings

1973 – 2008

Average Analysts Error: 39%

Median Analysts Error: 37%



Source: First Call Consensus Estimates, IBES International Data, and A-N Research Corp; Date of Data: Quarter 1, 1973 – Quarter 4, 2008.

The Probability Game

1973 – 2008

The Chances of a Stock Surviving Without a 5% Earnings Surprise

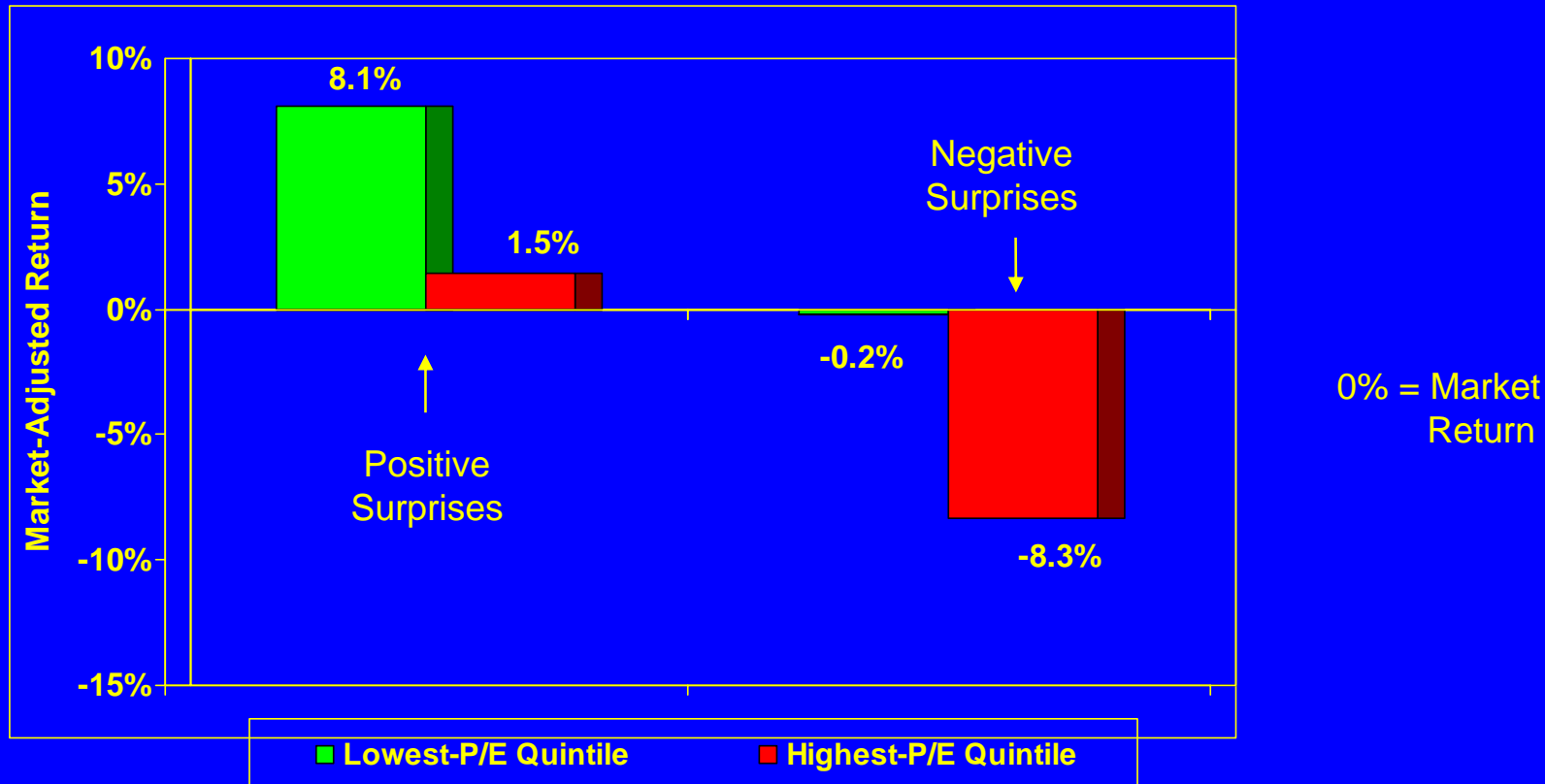
		Any Surprise	Negative Surprise	Positive Surprise
1 Quarter	<input type="radio"/>	30%	66%	63%
4 Quarters	<input type="radio"/>	1/125	1/5	1/6
10 Quarters	<input type="radio"/>	1/170,000	1/70	1/100
20 Quarters	<input type="radio"/>	1/30 Billion	1/4,500	1/9,500

Source: First Call Consensus Estimates, IBES International Data, and A-N Research Corp; Date of Data: Quarter 1, 1973 – Quarter 4, 2008.
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Impact of All Positive and Negative Surprises

Stock Universe: Compustat Largest 1500 Companies 1973 – 2008

1 Year



Source: First Call Consensus Estimates, IBES International Data, Compustat North America, and IDC; Date of Data: Quarter 1, 1973 – Quarter 3, 2008.
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Other Psychological Influences on Decisions

- Cognitive Heuristics by themselves seem incapable of explaining market phenomena where the disconnect between prices and value is enormous

Another Major Psychological Influence on Investor Decision Making

- Another heuristic called affect working either alone or in tandem with cognitive heuristics seems to far better explain extreme mispricing
- Strong likes, dislikes, opinions, or feelings can influence judgment about:
 - Ideas
 - Personality Types
 - Stocks
 - Markets

Extreme Overreaction Results in Bubbles and Panics

Performance Of the Nasdaq 100 vs. the S&P 500
1/1/96 – 12/31/02



The Disconnect in Prices 1998-2000

(Originally presented at the Kennedy School of Government conference in November 1999)

<u>Company</u>	<u>10/31/99 Price</u>	<u>10/31/99 P/E</u>	<u>PV of discounted future EPS: 15%</u>	<u>Price 8/31/02</u>
eBay	\$67.57	1930	\$ 4.75	\$56.52
Realnetworks	54.85	1219	5.31	4.58
Yahoo!	89.53	1194	10.18	10.29
Doubleclick	70.00	933	6.70	5.63
Priceline.com	60.25	603	8.92	2.35
Amazon.com	70.63	353	17.87	14.94
Lycos ³	53.38	334	18.87	11.19
Qwest	36.00	327	13.00	3.28
Mindspring ³	25.69	257	11.80	6.10
E*Trade	23.81	238	10.27	4.34

Average Decline from November 1999 to 8/31/02 = -79.1%

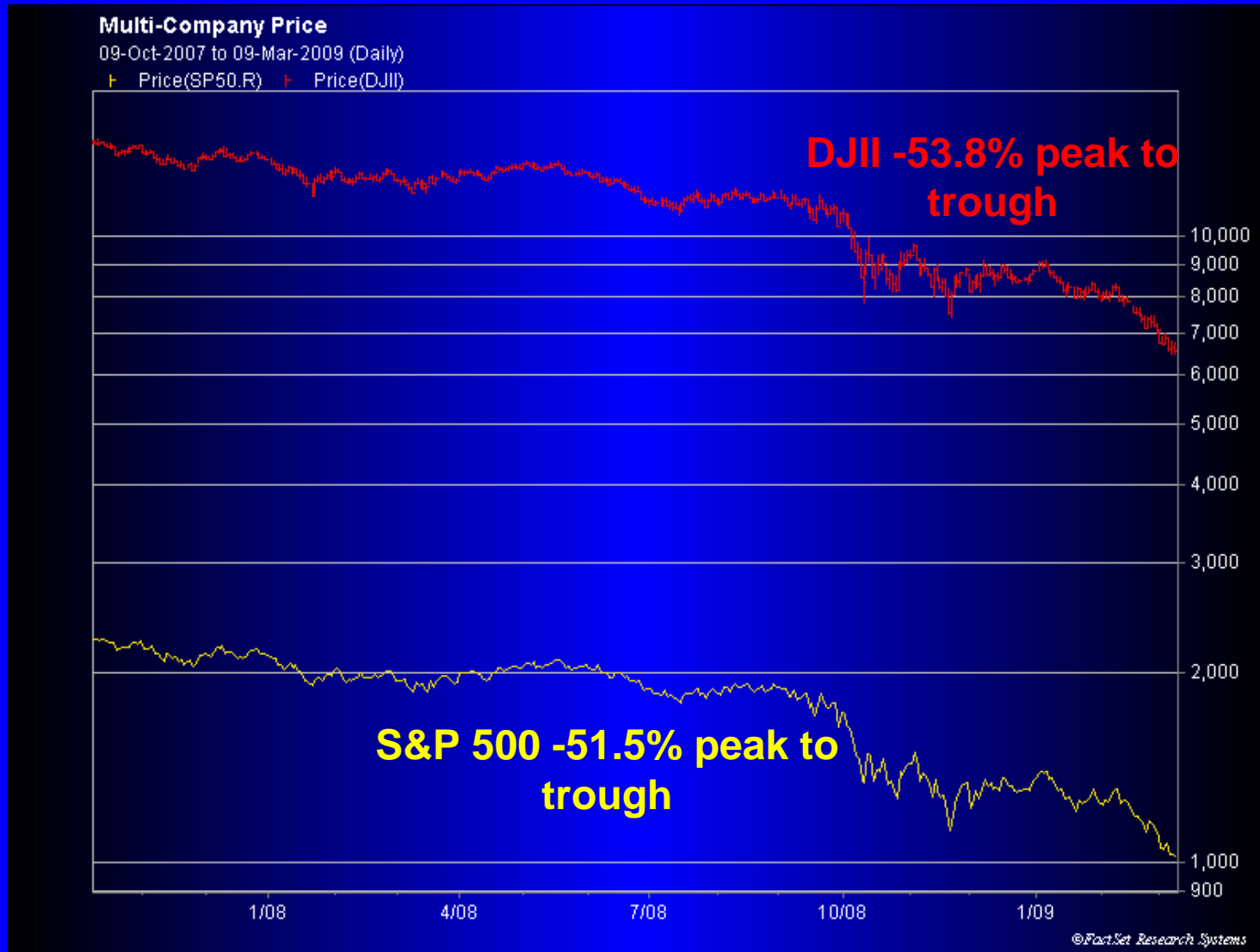
1. Earnings are assumed to grow at 50% for the first 3 years, 25% for the next 5 years, 20% for the next 6 years, 15% for another 7 years, and 7.5% thereafter.
2. Discount rates are calculated as follows: The 15% rate includes 5.9% on long government bonds plus a 9.1% risk premium.
3. Lycos was purchased on 10/30/00 by Terra Networks SA for 2.15 shares per Lycos share. Mindspring is now Earthlink.

Important Variations of Affect

- Insensitivity to Probability
- When consequences have sharp affective meaning, insensitivity to probability can result in small probabilities carrying disproportionately large weights.
- Research shows that a person's feelings toward winning or losing are similar if the odds are 1 in 10 thousand or 1 in 10 million.
- If emotions toward a stock are very powerful, research shows insensitivity to probability can lead to over or under-valuations up to a hundredfold.
 - A possible reason for the enormous disconnect between prices and fundamentals of tech stocks during the Bubble and also the declines of up to 80-90% in financials, resource, and manufacturing stocks during the recent panic.

The Worst Market Drop in Both Relative and Absolute Terms Since the 1930s

October 9, 2007– March 9, 2009



Financial Indexes: KBE and XLF

February 20, 2007 – March 6, 2009

The Drop was almost as sharp as 1929-32, but condensed to 24 months



* - The peak for the XLF Index was June 1, 2007

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Panic and Crash: Aftermath of Freddie and Fannie

- **September 15:** Lehman files Chapter 11, Bank of America buys Merrill Lynch, and AIG seeks support from the Federal Reserve; the Dow drops over 500 points.
- **September 16:** The Federal Reserve authorizes the Federal Reserve Bank of New York to loan \$85 billion to AIG, the U.S. government takes a 79.9% stake in the company.
- **September 19:** The SEC restricts short selling in 799 financial companies for 10 days. The Treasury agrees to insure any publicly offered eligible money market fund
- **September 21:** Goldman Sachs and Morgan Stanley are permitted to convert to bank holding companies from investment banks.
- **September 25:** Bailout talks stall and cause an electronic run on some banks; Washington Mutual fails, the biggest bank failure in U.S. history. Most of WaMu's assets are sold to JPMorgan for \$1.9 billion.
- **September 29:** Citigroup agrees to acquire banking operations of Wachovia with FDIC sharing risks and receiving a stake in the company.

Panic in Financials 2007 – 2009:

		<u>High Price</u>	<u>Low Price</u>	<u>% Drop</u>
WM	WASHINGTON MUTUAL INC	\$ 46.15	\$ 0.01	-100%
FRE	FEDERAL HOME LOAN MORTG C CORP	68.55	0.25	-100%
FNM	FANNIE MAE	70.57	0.30	-100%
AIG	AMERICAN INTERNATIONAL GROUP	72.97	0.33	-100%
C	CITIGROUP INC	56.28	0.97	-98%
WB	WACHOVIA CORP	58.80	1.25	-98%
HIG	HARTFORD FINANCIAL SERVICES	106.23	3.33	-97%
BAC	BANK OF AMERICA CORP	54.21	2.53	-95%
MS	MORGAN STANLEY	75.50	6.71	-91%
COF	CAPITAL ONE FINANCIAL CORP	83.84	7.80	-91%
PRU	PRUDENTIAL FINANCIAL INC	103.27	10.63	-90%

Important Variations of Affect

- Judgment of Risk and Benefit Is Negatively Correlated
 - If large numbers of investors like a stock, the risk is perceived as low. If they dislike it, the risk is perceived as high.
 - This explains both the major overvaluation of favorites during the Tech Bubble, as well as the widespread belief that toxic mortgages had relatively low risk prior to the Financial Crisis. It might also call for a reassessment of the conventional methods of measuring risk.

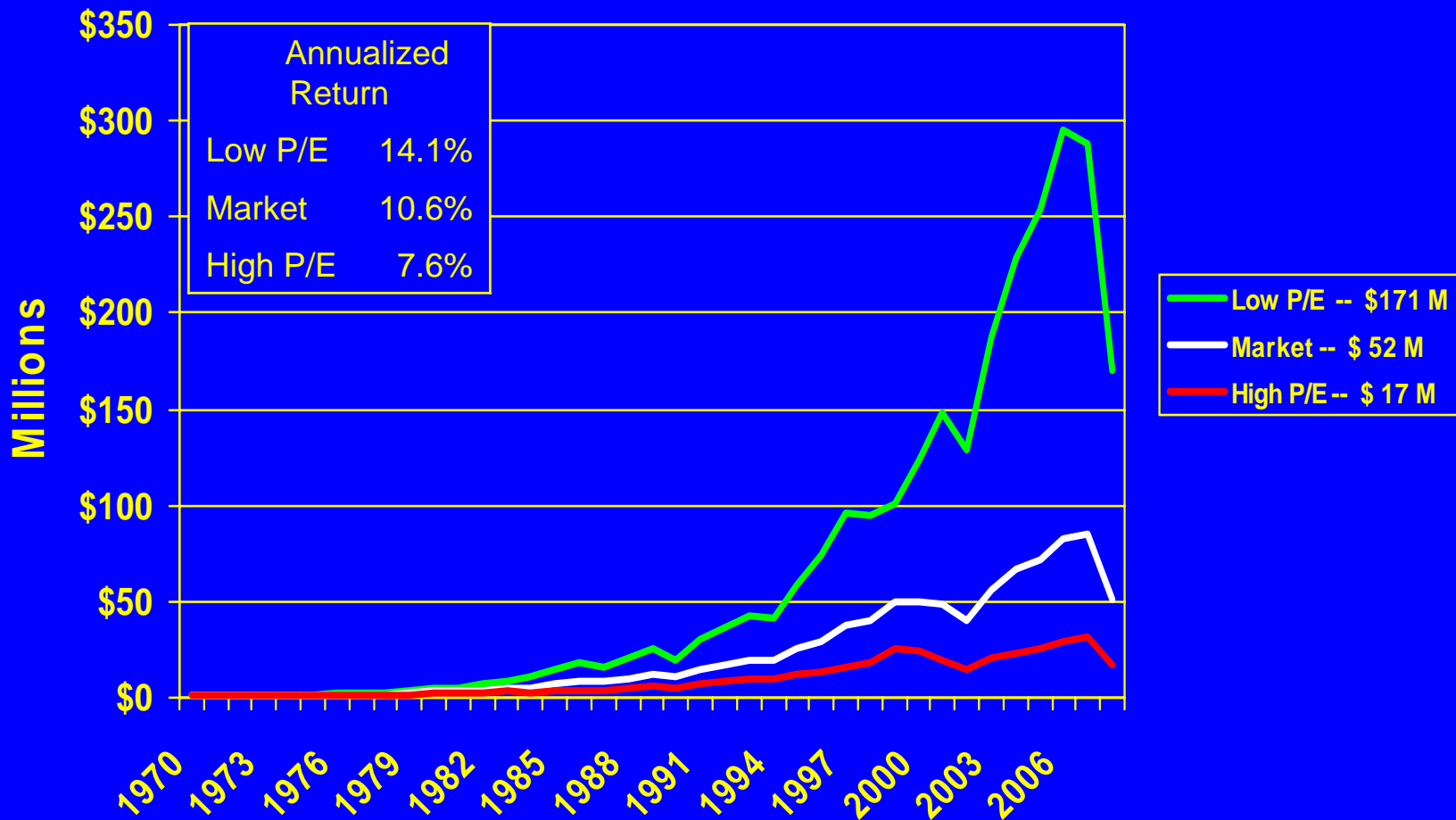
Important Variations of Affect

- Durability Bias

- Studies show that after experiencing a pleasant or unpleasant surprise, investors overestimate the length of time a positive or negative affect will last.
- This finding also helps to explain the panic which drove stocks to some of their relatively lowest levels in the post World War II period in recent months and the major euphoric overreaction to tech stocks in the late 1990's.

Cumulative Returns for Value and Growth Strategies

Stock Universe: Compustat Largest 1500 Companies 1970-2008



In addition to low P/E, strategies that employ low price-to-cash flow (P/CF), low price-to-book value (P/BV), or high yield (low price-to-dividend, or P/D) also outperform the market. This chart shows the results of investing \$1,000,000 at the beginning of 1970 and rebalancing annually for the following 39 years, reinvesting dividends. The initial investment would have grown to well over \$120 million in low P/E stocks compared to only \$52 million for the market and only \$17 million in high P/E stocks.

Source: Compustat North America; Date of Data: 1970 – 2008.

Important Variations of Affect

- Temporal Construal
 - The further investors look into the future, the more likely events are represented by a few abstract or general features that convey the perceived value of a company. Strong positive or negative affect can result in a stock being priced too high or too low.
 - In order to justify AOL's price in late 1999, for example, an earnings discount model indicated it needed 18 billion subscribers—approximately triple the population of the world.
 - Citibank's ATM fees of \$3 could have bought you 2 common shares of its stock.
 - A share of Bank of America was worth about the same price as a gallon a gasoline.

Summary

- **Affect**
 - Emotional rather than cognitive errors
 - Leads to very poor investment decision-making
- **Defenses**
 - Valuation discipline
 - Contrarian strategies

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