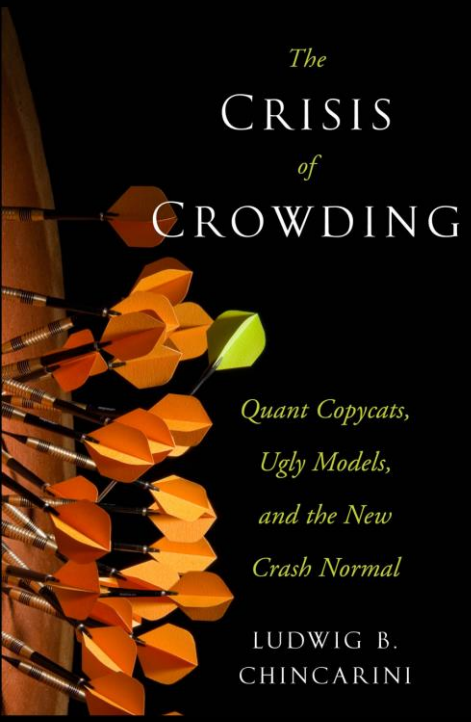
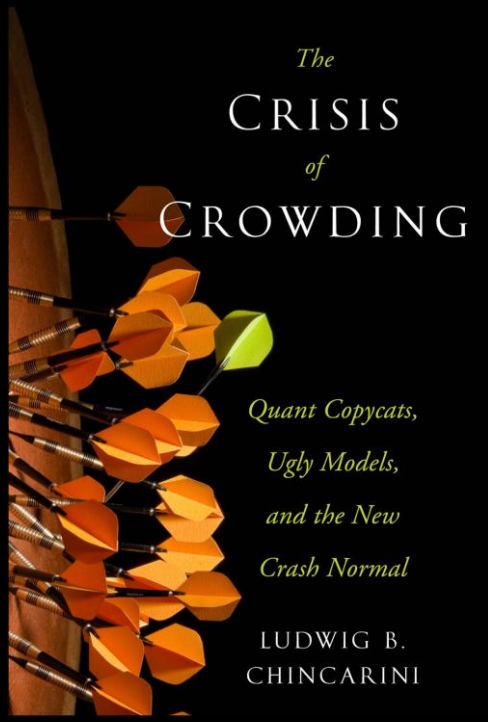


The Crisis of Crowding
A Story & New Ideas

May 2, 2017



Ludwig B. Chincarini, Ph.D., CFA
University of San Francisco
United States Commodity Fund Investments

PATHWAY SAN FRANCISCO AND SILICON VALLEY STUDY TOUR
MAY 2, 2017

- Thank you for coming.

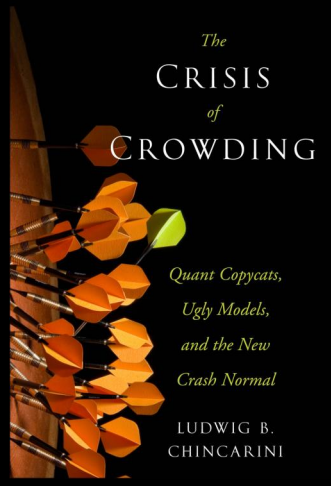
Outline

The Crisis of Crowding (2012)

This discussion is based on my book and other research on the issue of crowding.

Crowding is a new risk that must be considered by market participants.

1. New Idea of Crowding



- *The Crisis of Crowding* by Ludwig Chincarini.
- The book tells the real stories of the financial crisis of 2008 and beyond how they are all connected by elements of crowding.
- The book is easy to read and informative with lots of interviews with insiders, including Goldman Sachs executives, Jimmy Cayne, Myron Scholes, John Meriwether, Vice Chairman of Citibank, government regulators, and others.

2. Intro to Crowding

Crowding takes place when multiple market participants begin to follow the same trade in such a concentration that liquidity becomes fragile and it alters the risk and return dynamics of the trade.

- Not always east to detect – holders matter
- Risk will be incorrectly measured if not accounted for, both market and liquidity risk.
- Can lead to levered firms failing rapidly.

2. Intro to Crowding

How does crowding differ from herding?

They are similar. However, herding represents many similar investors following the same strategy and liquidity may not be fragile.

Crowding represents similar and/or different investors following the same or different, but correlated strategies to an extent that the opportunity or trading space is crowded/saturated. When the saturation is severe, the return and risk of the space is no longer determined by fundamentals, but determined by the behavior of the participants in the space. Exit is difficult. This makes all historical return and risk calculations less useful.

2. Intro to Crowding

Concepts Important to How Crowding Will Affect Markets:

1. Leverage – affects investor choices.
2. Liquidity – how much is on the other side in short period
3. Interdependence – investor 1's actions affect investor 2's actions
4. Types of Investors – how they will react to catalyst (depends on investor type)
5. Type of Catalyst

2. Intro to Crowding

Measuring Crowding Empirically

Return-Based Measures

- Can statistical characteristics of returns within an investment universe signal potential crowding?
- Timely and usually easy to get access to. Not clear its crowding.

Example 1: Take a factor (e.g. momentum), divide into deciles, compute cross-sectional residual return to each stock (i.e. Fama-French decoupled), then compute pair-wise correlation between stocks in each decile. If pair-wise correlation grows, maybe a signal that large portion of return movement is due to crowding by some group of investors following momentum.

Example 2: Recent large returns to a trade not explained by fundamentals.

2. Intro to Crowding

Measuring Crowding Empirically

Holding-Based Measures

- Can we detect crowding by measuring the holdings of an actual group of investors relative to the available liquidity in the market?
- Not as timely (delays in reporting) and difficult to gather.

Example 1: Take the individual holdings of all hedge fund managers of type A, the compute a similarity matrix and measure average similarity over time. Increased average similarity indicates crowding (with or without adjustment for correlation).

Example 2: Take the percentage of each stock owned by a group of hedge funds of type A and divide that by average share turnover. High values of this variable indicates stocks that might be crowded.

2. Intro to Crowding

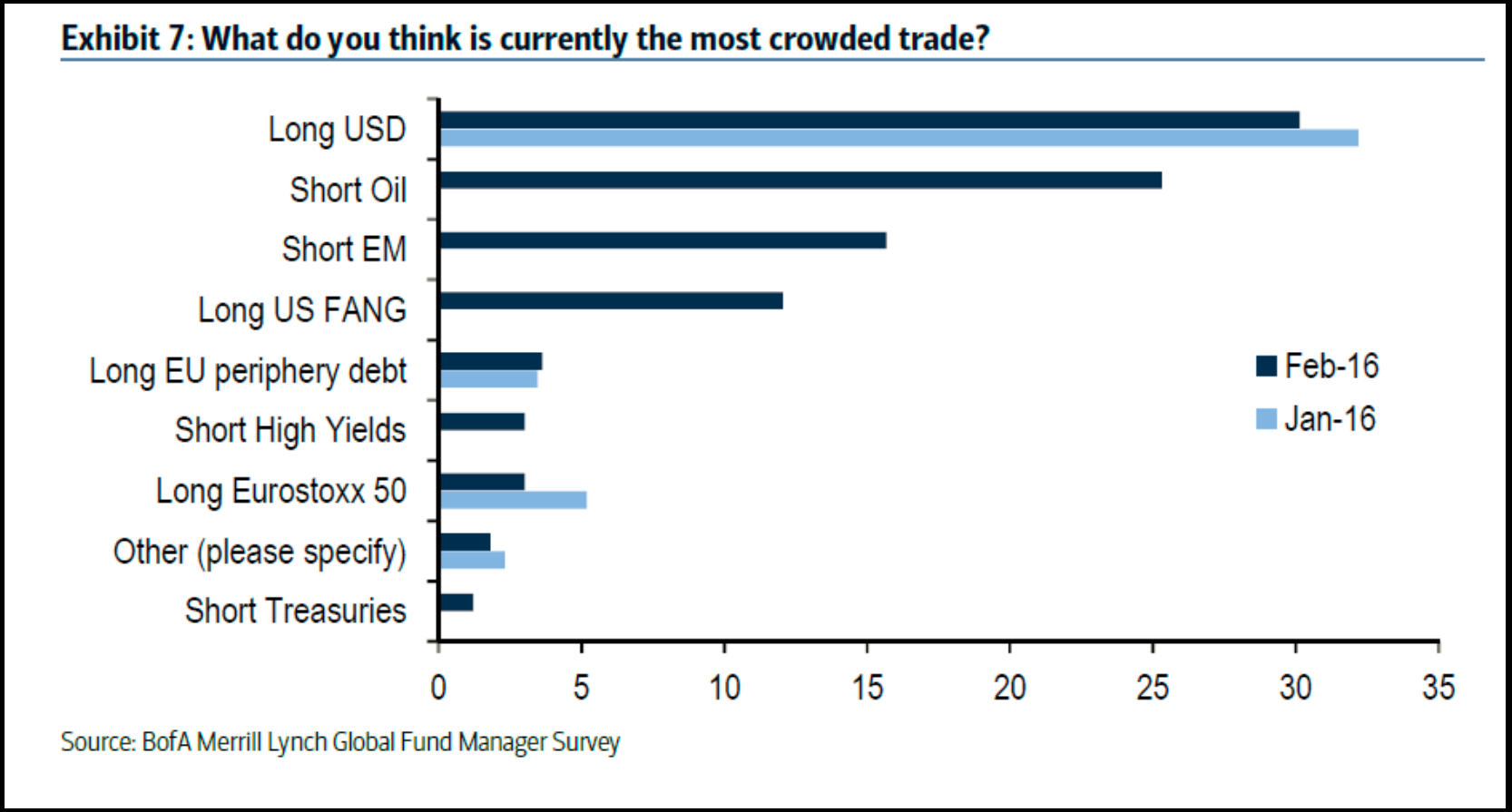
How Crowding Typically Happens

1. Attractive Trading Opportunity Develops
2. Copycats rush to follow the leader (even if it's not their core business)
3. Herding occurs, but sometimes very hidden (not obvious)
4. The trading space becomes crowded
5. Not all crowded spaces are similar.
   a. 1 type of holder (all traders similar)
   b. N types of holders (different motivations and behaviors to risk)
   c. Holders can have exactly same position or slightly different positions, still leading to crowded behavior.
   d. Inadvertent Crowding (see Bruno, Chincarini & Davis (2016)).
   e. Transaction costs and crowding (Chincarini (2016)).


Market is
Acknowledging
this New Risk

3. Market Acknowledges Crowding

A. Examples bank reports from BofA (March 2016)



3. Market Acknowledges Crowding

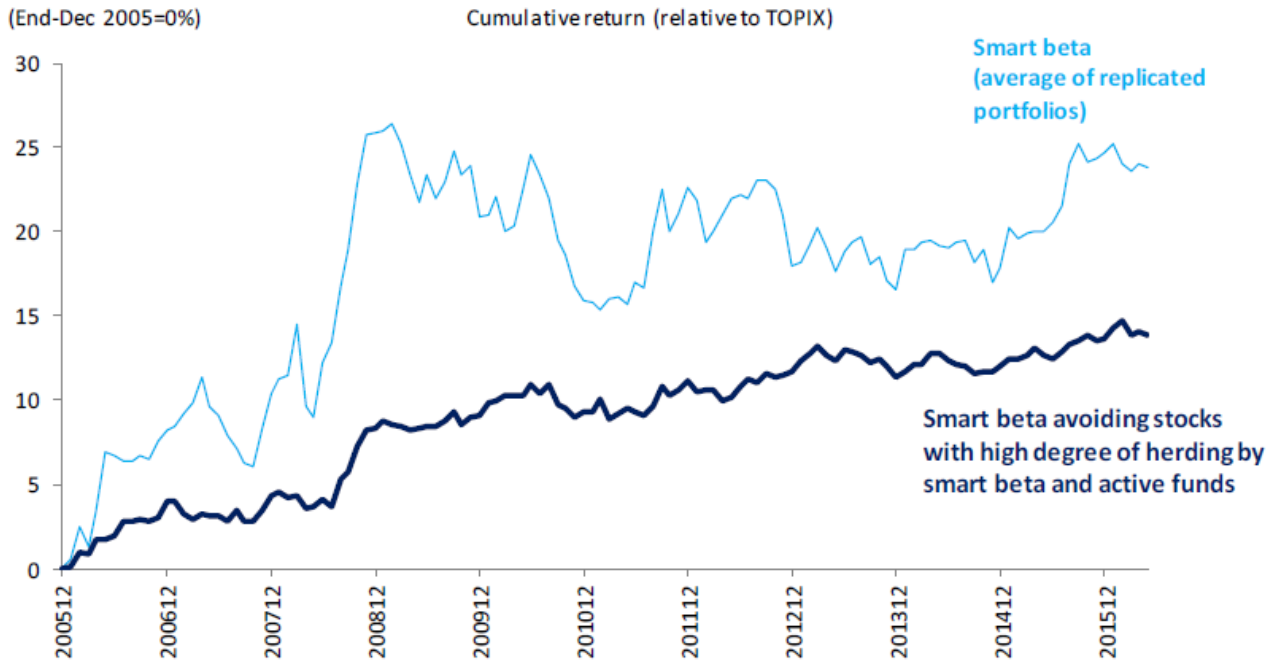
A. Examples Nomura Securities (June 2016).

Strategies to avoid herding by "smart beta" and "active funds" in Japan equities

NOMURA

- Smart beta avoiding overcrowded stocks might be effective when concentrated positions unwind

Performance of smart beta including and avoiding stocks with high degree of herding by smart beta and active funds



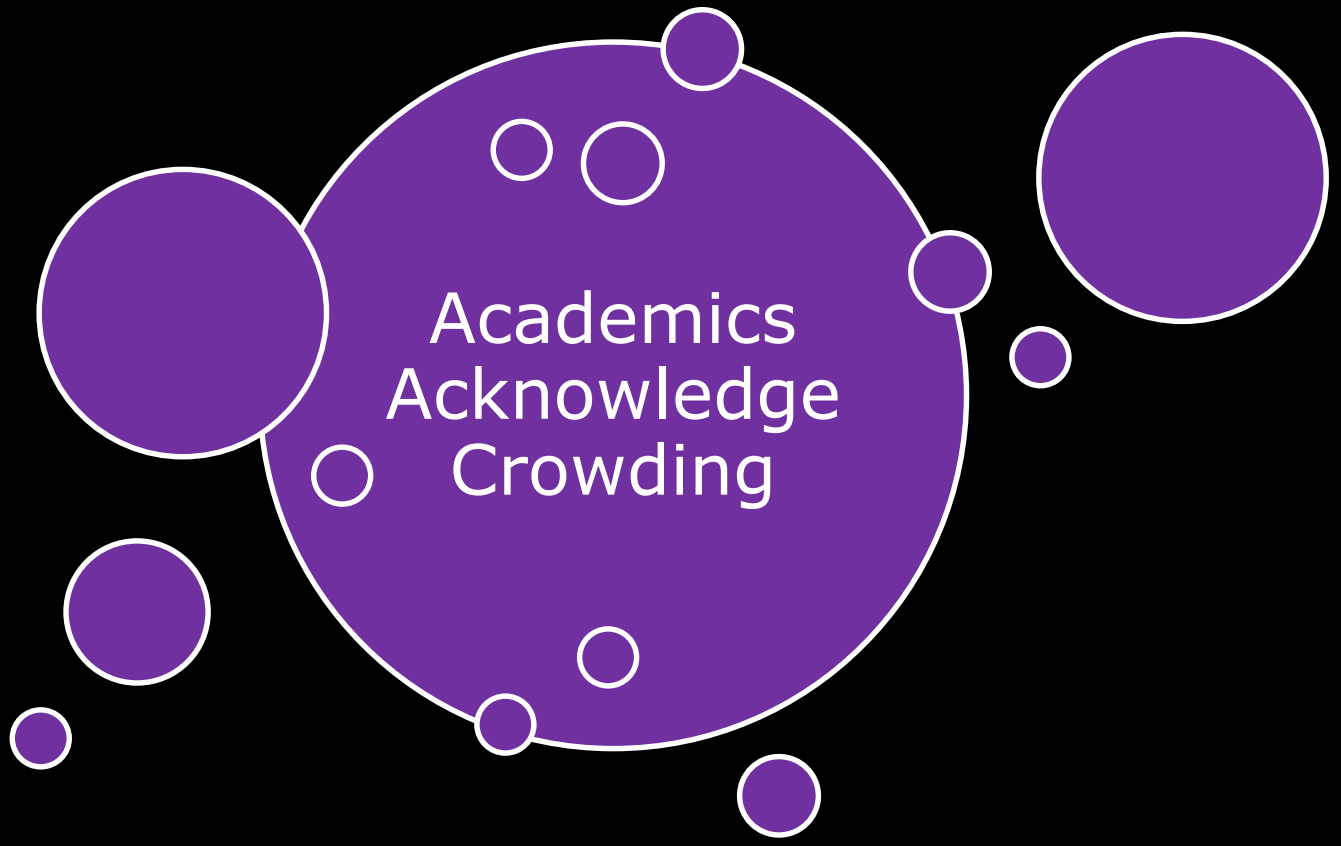
3. Market Acknowledges Crowding

B. Investment banks are regularly producing crowding measures and crowding investments in their investment reports

C. For more information, please see:

http://ludwigbc.com/presentations/slides/

(Just check other presentations)


Academics
Acknowledge
Crowding

4. Academic Studies on Crowding

- Three areas of contribution:

A. Portfolio Construction
   - Copycat Techniques
   - Copycat Alpha
B. Impact of Crowding
C. Implications

4. Academic Studies on Crowding

A. "The Failure of LTCM," Chincarini (1998)
B. "Sophisticated Investors and Market Strategy," Stein (2009)
C. *The Crisis of Crowding*, Chincarini (2012)
D. "The Externalities of Crowded Trades," Blocher (2013)
E. "Standing out from the Crowd. Measuring Crowding in Quantitative Strategies," Cahan and Luo (2013)
F. "Stock portfolio structure of individual investors infers future trading behavior," Bohlin and Rosvall (2014)

4. Academic Studies on Crowding

G. "Dimensions of Popularity," Ibbotson and Idsorek (2014)).

H. "Crowded Trades: An Overlooked Systemic Risk for Central Clearing Counterparties," Menkveld (2014)

I. "The Effects of Short Sales and Leverage Constraints on Market Efficiency," Yan (2014).

J. "Omitted Risks or Crowded Strategies: Why Mutual Fund Comovement Predicts Future Performance," Chue (2015).

K. "Fire, Fire. Is Low Volatility a Crowded Trade," Marmar (2015)

L. "Days to Cover and Short Interest," Hong et al. (2015)

4. Academic Studies on Crowding

M. "Portfolio Construction and Crowding" Bruno, Chincarini, Davis, and Ohara (2016).

N. "Transaction Costs and Crowding" Chincarini (2016)

O. "Mutual Fund Crowding and Stock Returns," Tay et al. (2016)

P. "Hedge fund crowds and mispricing," Sias et al. (2016)

R. "Individual stock Crowded Trades, Individual Stock Investor Sentiment, and Excess Returns," Yang and Zhou (2016)

4. Academic Studies on Crowding

Some recent work by Macquarie Research (August 5, 2016)

A. Crowding measured as: Short Interest Ratio (short interest/shares outstanding) divided by liquidity.

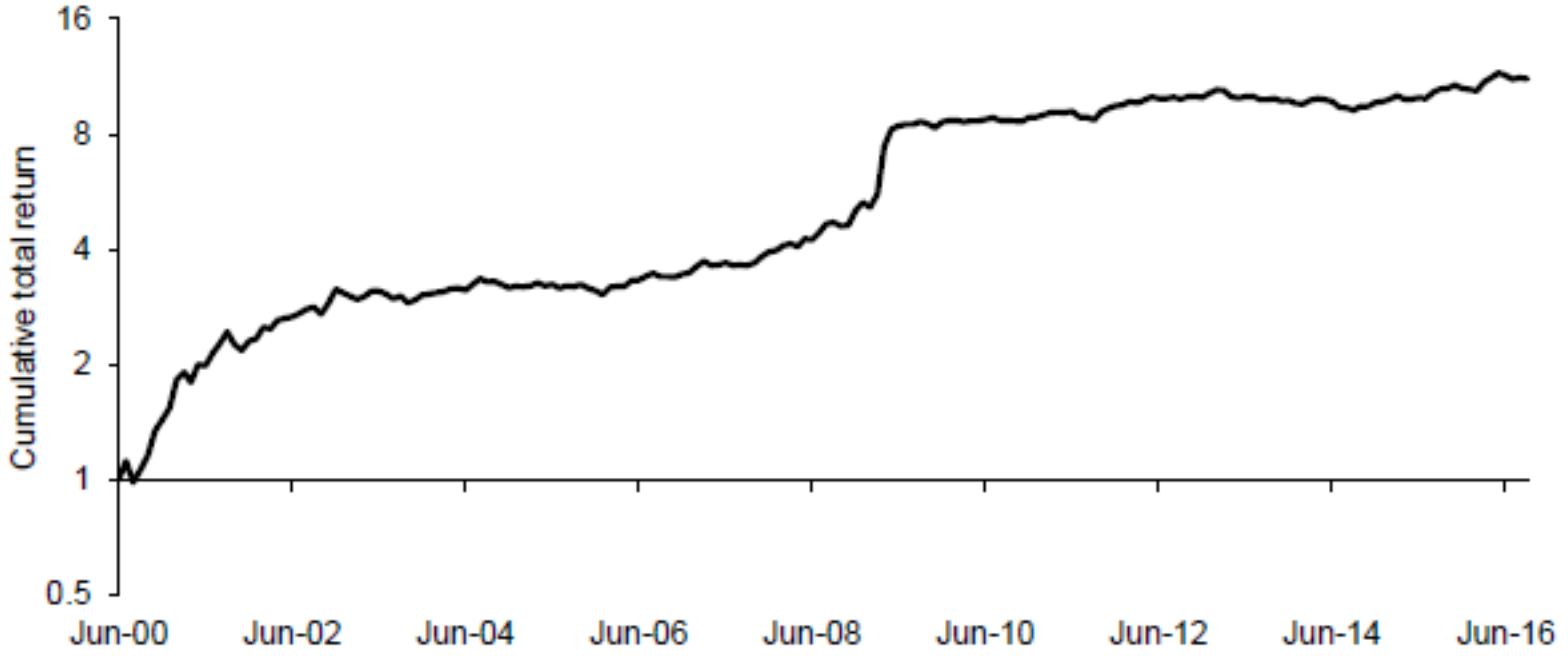
B. Go long non-crowded companies and short crowded companies produces excess returns.

C. Produces alpha even after accounting for Fama-French factors.

4. Academic Studies on Crowding

Strategy of Long-Short Crowding

Fig 21 Cumulative returns to a long/short crowding factor

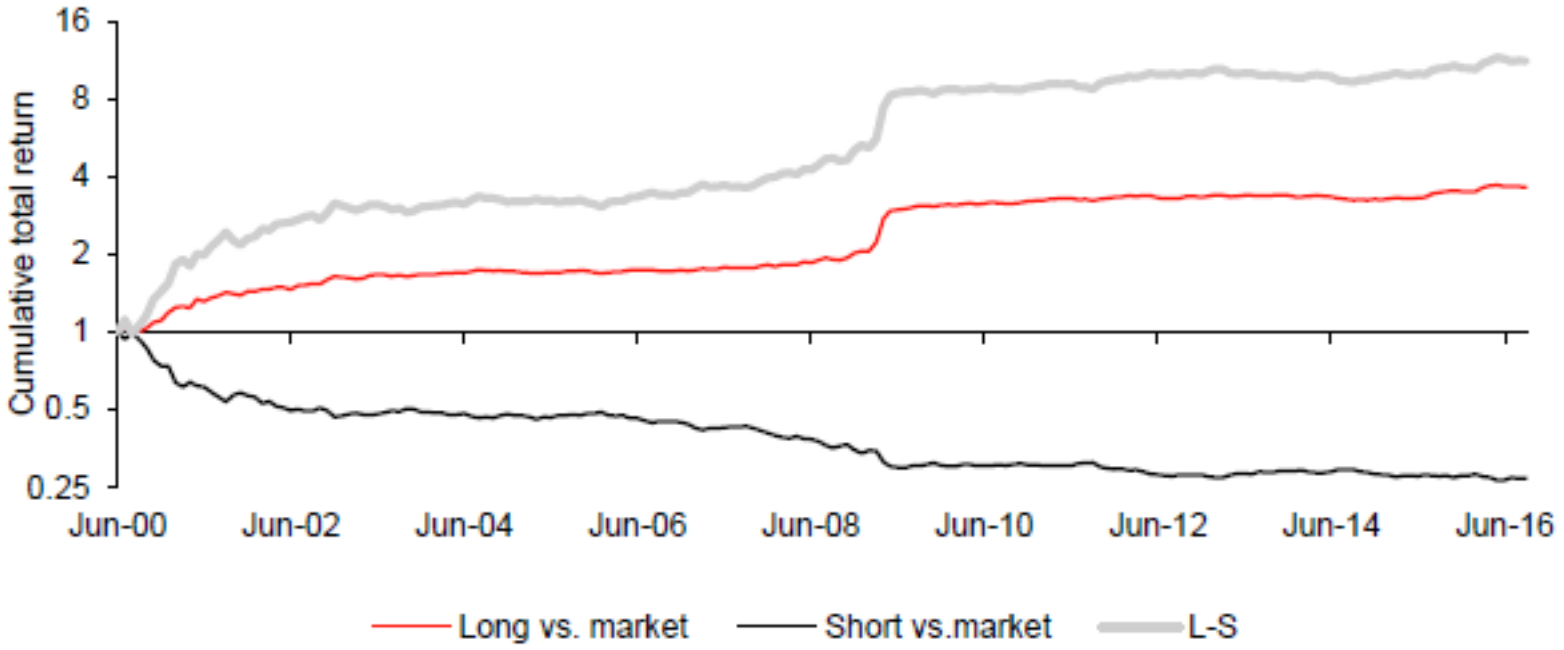


Source: Factset, Macquarie Research, January 2017. The plot is on a logarithmic scale.

4. Academic Studies on Crowding

Strategy of Long-Short Crowding

Fig 22 Cumulative returns to the long and short legs, crowding factor



Source: Factset, Macquarie Research, January 2017. The market is an equally weighted version of the Russell 1000 index. The plot is on a logarithmic scale.

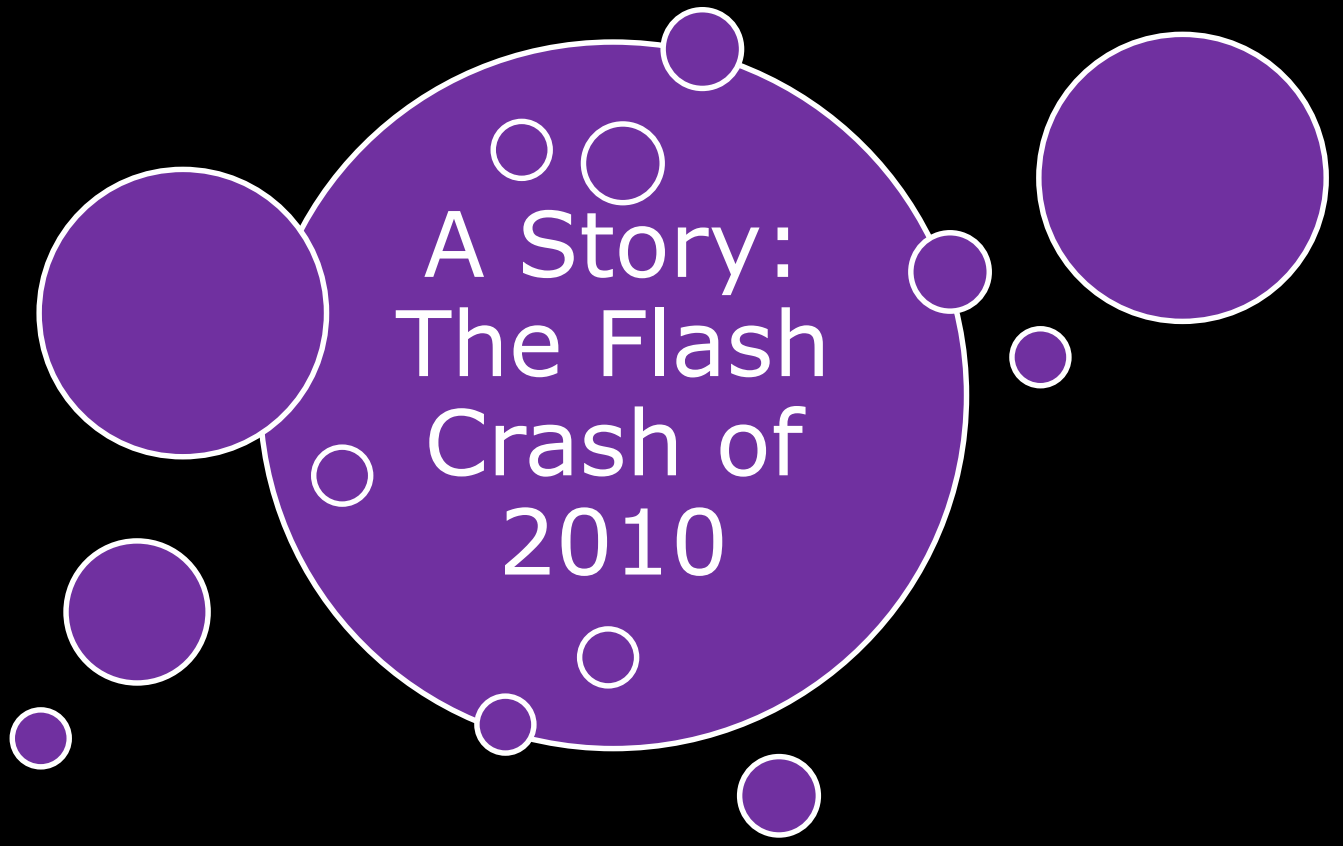
3. Market Acknowledges Crowding

Strategy of Long-Short Crowding

Fig 24 Our crowding signal generates alpha beyond well-known anomalies

	FF-3		FF-3 plus MOM		FF-5	
	Estimate	*t value*	Estimate	*t value*	Estimate	*t value*
α	1.05	*3.94*	1.16	*4.67*	0.75	*2.75*
Market - Riskfree	-0.14	*-2.20*	-0.29	*-4.64*	0.02	*0.33*
SMB	0.24	*2.19*	0.25	*2.41*	0.33	*3.02*
HML	0.65	*7.15*	0.63	*7.49*	0.47	*3.97*
WML			-0.30	*-5.87*		
RMW					0.48	*3.57*
CMA					0.09	*0.56*

Source: Factset, Macquarie Research, January 2017.


A Story:
The Flash
Crash of
2010

A Story from *The Crisis of Crowding*:

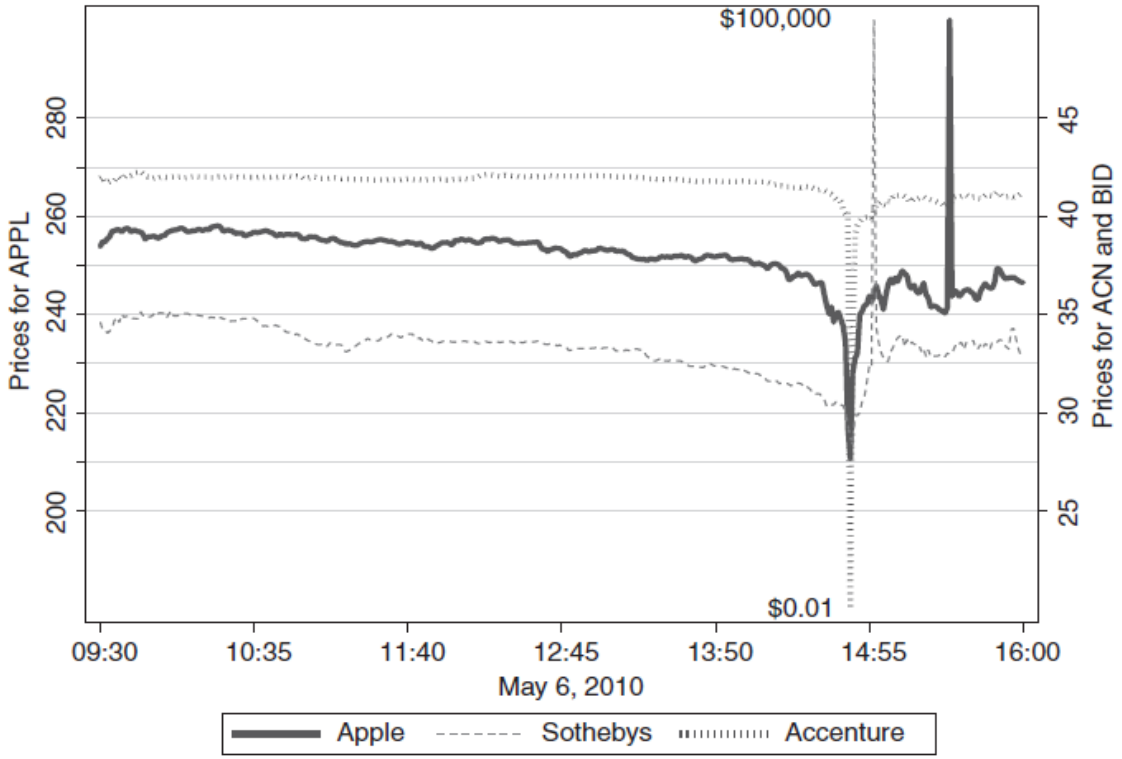
- The Flash Crash

- How does AAPL trade at $100,000 per share?
- How does Accenture trade at 1 cent per share?

A Story from *The Crisis of Crowding*:

- The Flash Crash

FIGURE 17.1 Apple, Accenture, and Sotheby's Stock Prices



Source: Chapter 17 The Crisis of Crowding

A Story from *The Crisis of Crowding*:

- The Flash Crash

- What happened?
- SEC said it was Waddell-Reed…riiiiight.
- 75,000 e-mini futures sell order.
- Too small, happened before, and liquidity dried up later.

A Story from *The Crisis of Crowding*:

- The Flash Crash

- What happened?

- NYSE Arca had old computers on many of the stocks.

- Fast trading caused a glut and delayed quotes appeared on orders.

- Market makers saw inconsistencies in ticker tape and got scared.

A Story from *The Crisis of Crowding*:

- The Flash Crash
  - What happened? Odds bumps in price quotes.

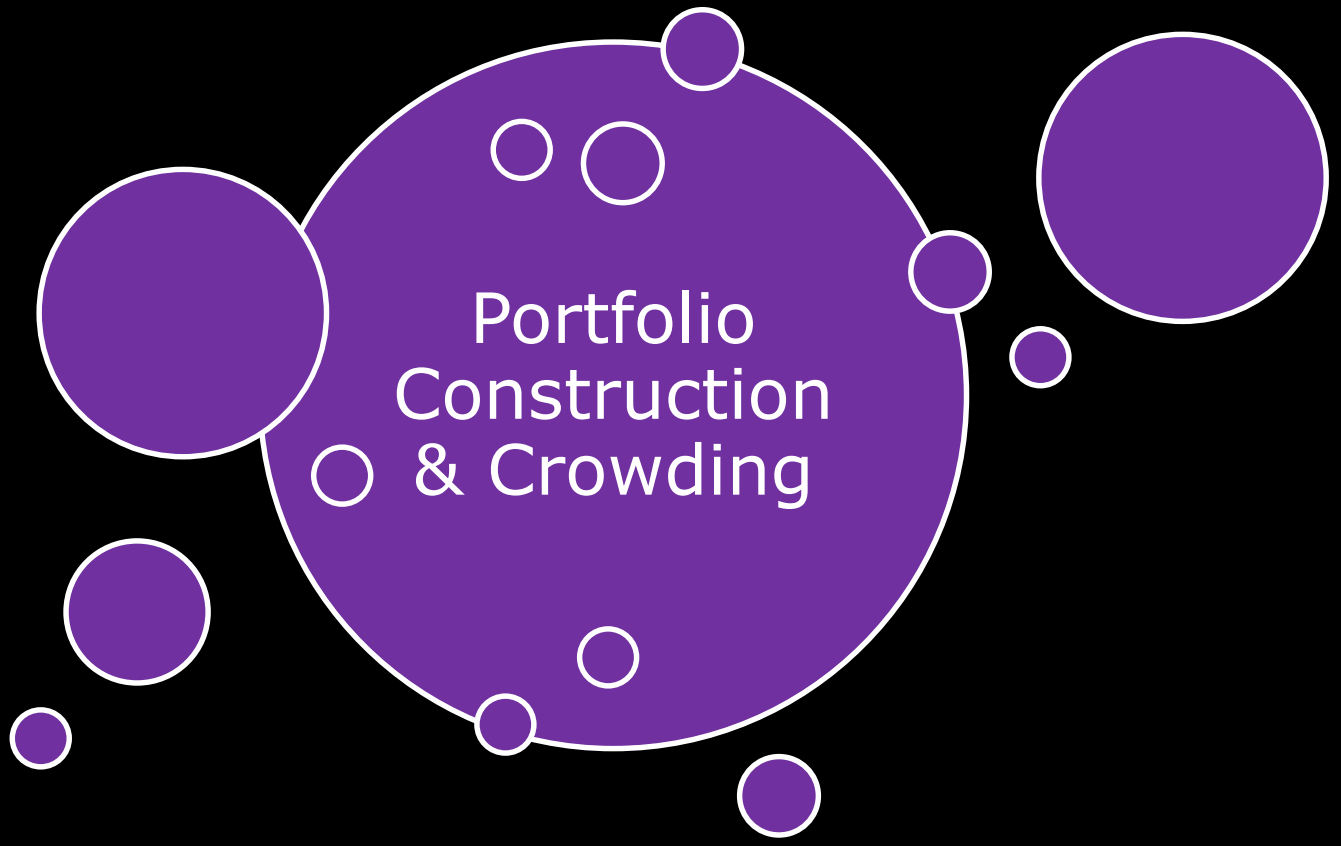
TABLE 17.1 Consolidated Tape for Accenture on May 6, 2010

Time	Shares	Price	Exchange
2:47:25 P.M.	100	38.66	ISE
2:47:25 P.M.	100	40.22	FINRA
2:47:25 P.M.	100	40.22	FINRA
2:47:25 P.M.	100	39.06	NYSE Arca

A Story from *The Crisis of Crowding*:

- The Flash Crash

- What happened?
- The market maker crowd ran for the exits.
- Left stub quotes (due to regulation)
- One major broker kept sending orders through system…catching stub quotes.
- Eventually, liquidity came back.


Portfolio
Construction
& Crowding

5. Crowded Spaces and Copycat Risk Management

A. Risk Management and Crowding

- If portfolio managers use similar risk models, these risk models might cause positions to become crowded.

- Could occur if models are similar or even slightly different.

5. Crowded Spaces and Copycat Risk Management

B. A Simple Demonstration

- This portfolio is indistinguishable from random noise.

- Conjecture 1 (Convergence to Noise): In the limit, not only do expected returns of managers not matter for portfolio formation, and not only does just a small slice of the covariance matrix govern the portfolio that all managers will converge to, but that small slice of the covariance matrix is governed by something that is indistinguishable from random.

5. Crowded Spaces and Copycat Risk Management

B. A Simple Demonstration

- Conjecture 2 (Simple Risk Variation and Crowding): Even if managers use different simple empirical covariance matrices, the risk model induced crowding problem seems unavoidable.

5. Crowded Spaces and Copycat Risk Management

E. Empirical Results

Summary:

1. Crowding occurs from the use of standard risk models in the industry – even when crowding is absent in alpha models.
2. Crowding seems to be more severe for long-only equity managers.
3. The Marchenko-Pasteur procedure we suggest reduces crowding amongst portfolio managers.
4. Crowding would be less in a financial system where there is a diversification of risk model usage.

5. Crowded Spaces and Copycat Risk Management

E. Empirical Results

Table 2: Summary of Crowding of Random Alpha Models from 2006 to 2009

	Risk Model 1			Risk Model 2			Risk Model 3		
	C	Ω	S.D.R.	C	Ω	S.R.	C	Ω	S.D.R.
Alpha	0.00		0.14			0.14			0.14
Long Only									
Regular	0.85†	1251.17	0.438	0.86†	1140.19	0.407	0.86†	1250.08	0.434
MPA	0.73††	1123.99	0.881	0.73††	872.10	0.892	0.72††	976.13	0.891
Market Neutral									
Regular	0.00	1.65	1.016	0.00	1.76	1.020	0.00	1.10	1.029
MPA	0.00	1.24	1.000	0.00	1.23	1.000	0.00	1.05	1.000
Market Neutral Liq.									
Regular	0.00	2.02	1.038	0.00	4.23	1.056	0.00	1.20	1.070
MPA	0.00	0.78	1.008	0.00	0.73	1.009	0.00	0.84	1.008

5. Crowded Spaces and Copycat Risk Management

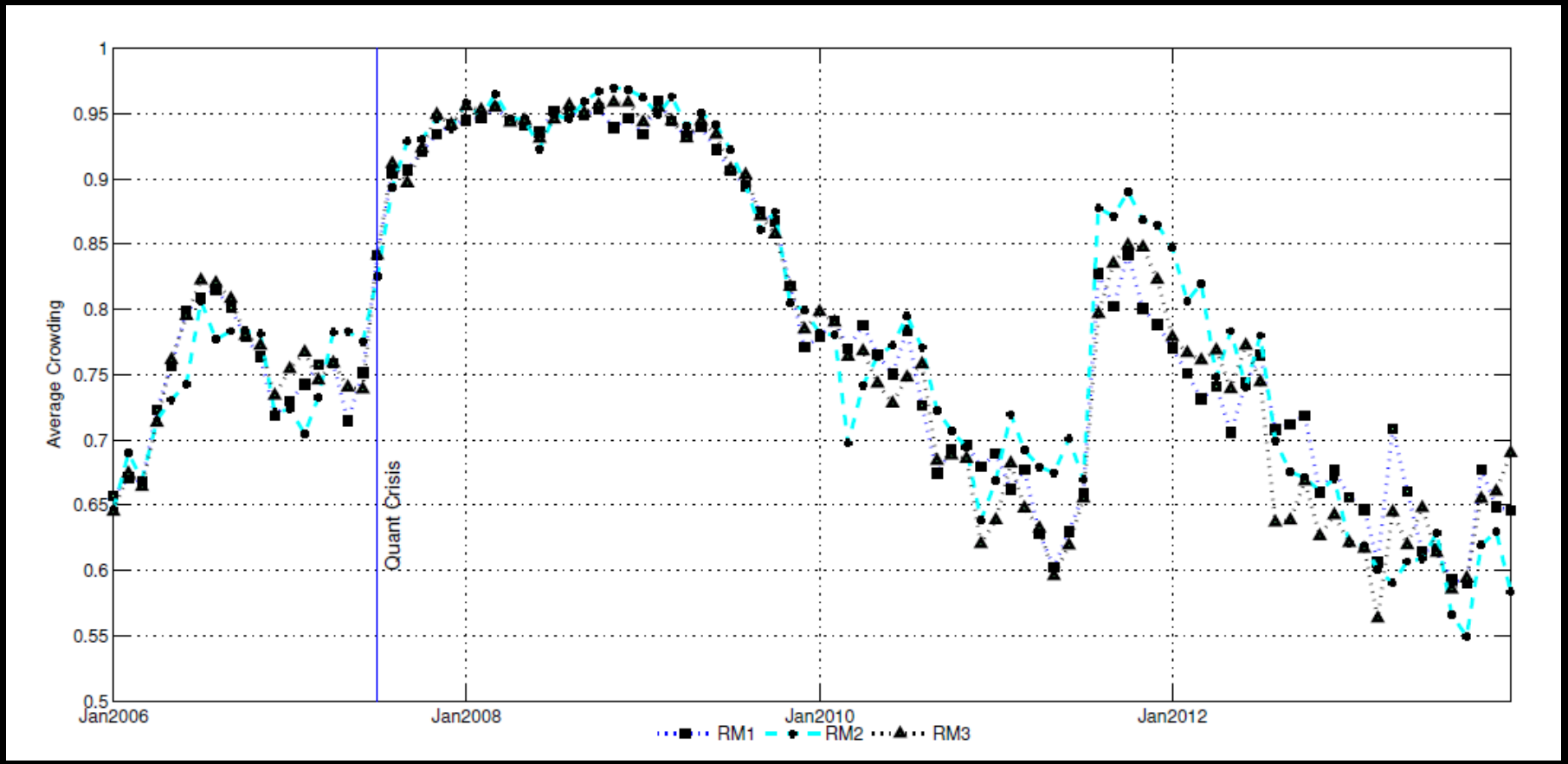
E. Empirical Results

- Risk models all seem to have similar amounts of crowding (see next slide).

- Does it make any difference whether the universe uses one risk model versus another?

5. Crowded Spaces and Copycat Risk Management

E. Empirical Results



5. Crowded Spaces and Copycat Risk Management

E. Empirical Results

-

Percentage of Models Used	Long Only			Market Neutral		
	C	Ω	S.R.	C	Ω	S.R.
100 - 0 - 0	**0.85**	1251.17	0.01	0.00	1.65	-0.02
0 - 100 - 0	**0.86**	1140.19	-0.00	0.00	1.76	-0.01
0 - 0 - 100	**0.86**	1250.08	0.00	0.00	1.10	-0.00
80 - 20 - 0	0.65	869.71	0.01	0.00	2.96	-0.02
80 - 0 - 20	0.76	1176.42	0.01	0.00	1.38	-0.02
20 - 80 - 0	0.65	799.36	0.00	0.00	2.37	-0.02
0 - 80 - 20	0.66	788.17	0.00	0.00	2.33	-0.02
20 - 0 - 80	0.76	1181.01	0.01	0.00	1.29	-0.02
0 - 20 - 80	0.66	859.13	0.00	0.00	2.29	-0.02
45 - 45 - 10	0.52	623.48	0.00	0.00	3.02	-0.02
10 - 45 - 45	0.52	620.27	0.00	0.00	3.03	-0.02
45 - 10 - 45	0.63	939.13	0.00	0.00	2.28	-0.01
60 - 40 - 0	0.55	672.34	0.00	0.00	3.54	-0.01
60 - 20 - 20	0.58	802.99	0.00	0.00	3.05	-0.00
40 - 60 - 0	0.55	644.00	0.00	0.00	2.74	-0.00
0 - 60 - 40	0.56	633.06	0.00	0.00	3.00	0.01
40 - 0 - 60	0.72	1152.52	0.00	0.00	1.79	-0.00
0 - 40 - 60	0.56	660.20	0.00	0.00	2.73	-0.01
33 - 67 - 0	0.58	673.88	-0.00	0.00	2.31	-0.00
67 - 0 - 33	0.58	710.80	0.00	0.00	3.12	-0.01
0 - 67 - 33	0.58	661.92	0.00	0.00	3.02	-0.00
33 - 33 - 34	**0.51**	681.27	0.00	0.00	1.92	-0.01
10 - 90 - 0	0.74	961.72	0.00	0.00	1.77	-0.01
10 - 0 - 90	0.80	1200.84	0.00	0.00	0.78	0.00
90 - 10 - 0	0.74	1028.33	0.01	0.00	2.35	-0.01
0 - 10 - 90	0.75	1029.26	0.00	0.00	1.67	-0.00
90 - 0 - 10	0.74	1032.74	0.01	0.00	2.37	-0.01

5. Crowded Spaces and Copycat Risk Management

E. Empirical Results

- Conjecture 3 (Distribution of Risk Models and Systemic Risk): Crowding in the financial system will be less when there is a diversification of risk models used in the system.

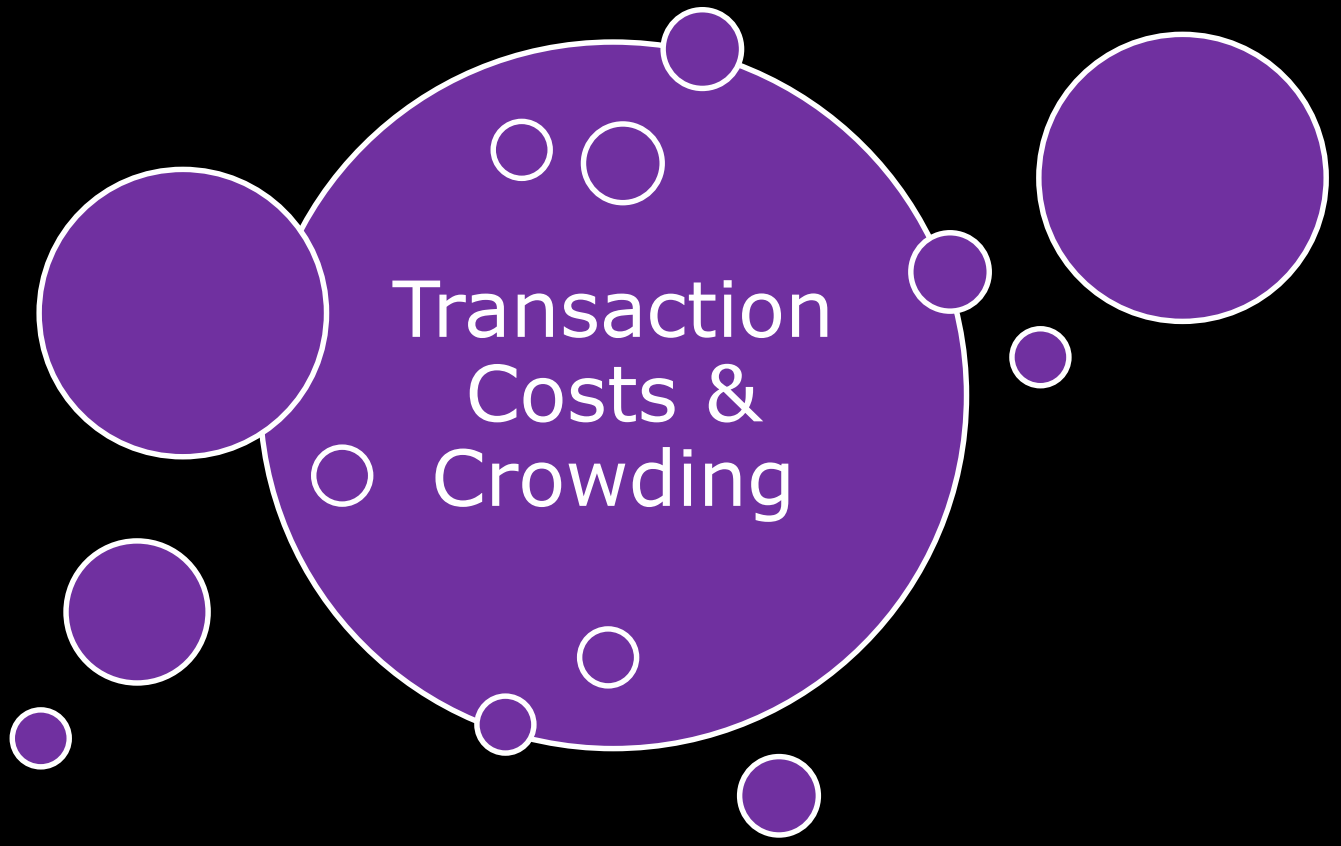
5. Crowded Spaces and Copycat Risk Management: Summary

A. Crowding is a real and important phenomena that needs to be studied more.

B. Crowding is typically thought of to be generated from similar alpha models (Chincarini (2012)).

C. Crowding can also occur due to the portfolio construction process itself.

D. Some suggestions from our research: (a) Use a MP or OGARCH implementation to reduce crowding; (b) The financial system might have less crowding when there is a diversification of risk models.


Transaction
Costs &
Crowding

6. Transaction Costs and Crowding

A. How do transaction costs and crowding interact?

B. Was the quant crisis influenced by transaction cost considerations?

C. Do portfolio managers really consider transaction costs when building portfolios?

D. How is size of a portfolio and investment horizon related?

6. Transaction Costs and Crowding

Methods

- Take typical data for portfolio construction and two reasonable transaction cost models.
- Simulate the creation of many portfolios based on a universe of 2000 stocks.
- Change the asset level of portfolios (since market impact depends on this)
- Examine how transaction costs influence the crowding of portfolios.

6. Transaction Costs and Crowding

Brief Answers

- This evidence doesn't seem to link transaction costs to crowding in quant crisis (unless managers did not explicitly consider them or ignored some constraints)

- Do portfolio managers (not just quants) really consider them explicitly and accurately?

- As a portfolio becomes larger, i.e. $20 million to $5 billion, the portfolio manager must gradually transform to a longer term investment horizon, otherwise violating reasonable constraints.

6. Transaction Costs and Crowding

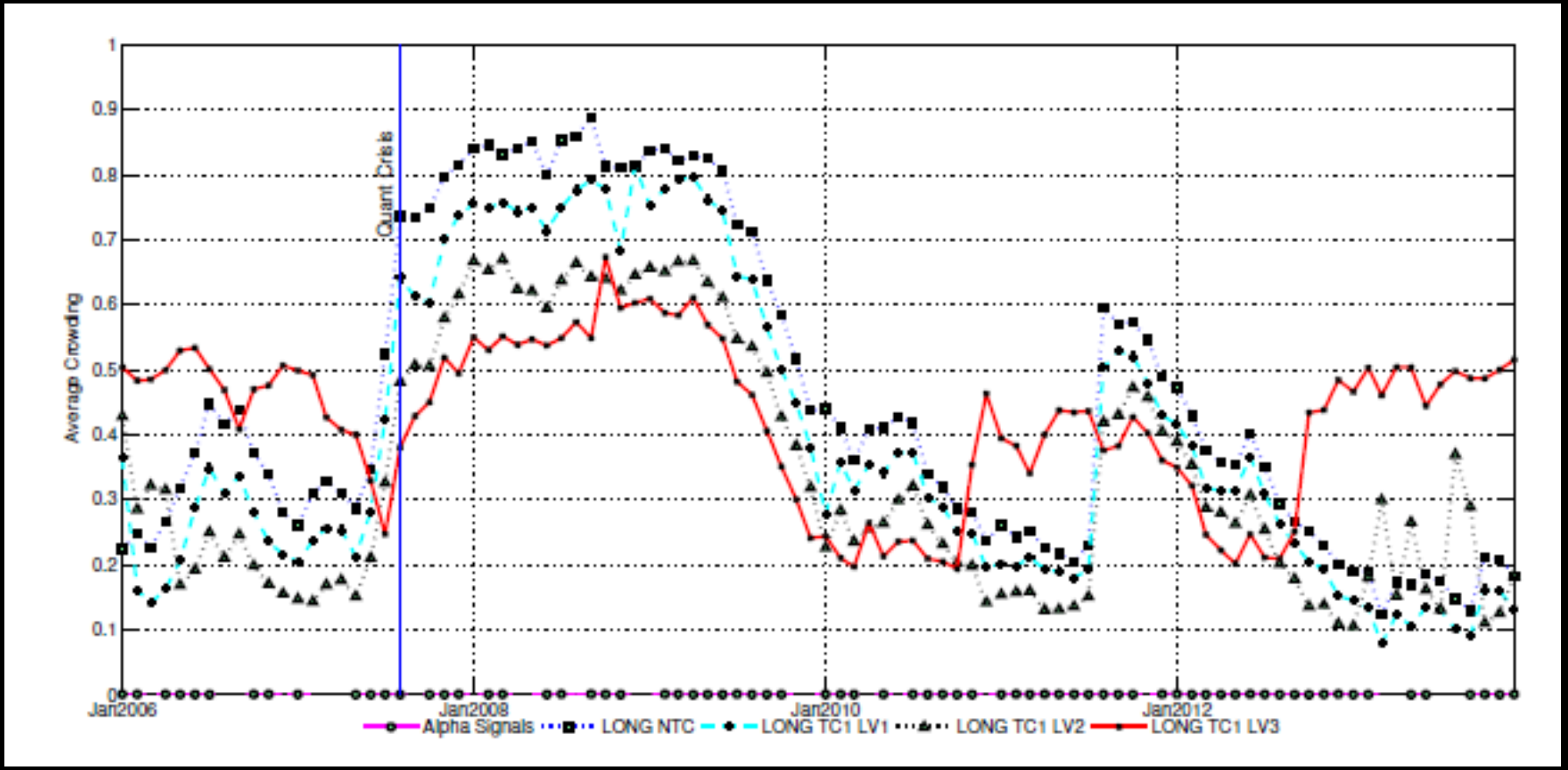
Results

Table 1: Summary of Crowding from Random Alpha Models and Transaction Costs from 2006 to February 2009

	Risk Model 1						Risk Model 2						Risk Model 3					
	C	Omega	SR	Max	Min	*N*	C	Omega	SR	Max	Min	*N*	C	Omega	SR	Max	Min	*N*
Alpha	-0.00																	
Long Only																		
MN NTC	-0.00	0.75	-3708.352	0.004	-0.004	645	-0.00	0.84	-2437.77	0.005	-0.005	611	0.00	0.50	-3296.92	0.006	-0.01	632
LONG NTC	0.58	-141.26	-140.911	0.076	0.000	63	0.60	-181.90	-175.48	0.072	0.000	75	0.59	-156.62	-184.22	0.079	0.00	64
Port. Size ($500M																		
MN TC1	-0.00	0.27	-8.171	0.007	-0.006	567	0.00	-0.04	-7.84	0.006	-0.006	543	0.00	0.11	-7.49	0.009	-0.01	556
LONG TC1	0.49	-127.77	-0.512	0.079	0.000	67	0.45**	-123.77	-1.00	0.071	0.000	89	0.46**	-116.86	-0.84	0.080	0.00	71
Port. Size ($5B)																		
MN TC1	0.00	0.63	-15.027	0.007	-0.007	527	0.00	0.10	-13.88	0.010	-0.011	514	0.00	0.47	-13.98	0.009	-0.01	519
LONG TC1	0.42***	-91.04	-1.427	0.077	0.000	102	0.38***	-113.74	-1.59	0.072	0.000	138	0.38***	-111.11	-1.71	0.077	0.00	114
Port. Size ($20B)																		
MN TC1	0.00	1.42	-21.240	0.013	-0.013	157	0.00	0.09	-20.03	0.014	-0.014	456	0.00	1.13	-20.05	0.014	-0.01	460
LONG TC1	0.50	294.63	-2.152	0.072	0.000	157	0.43***	151.19	-2.26	0.064	0.000	217	0.46***	241.19	-2.33	0.072	0.00	176

6. Transaction Costs and Crowding

Results



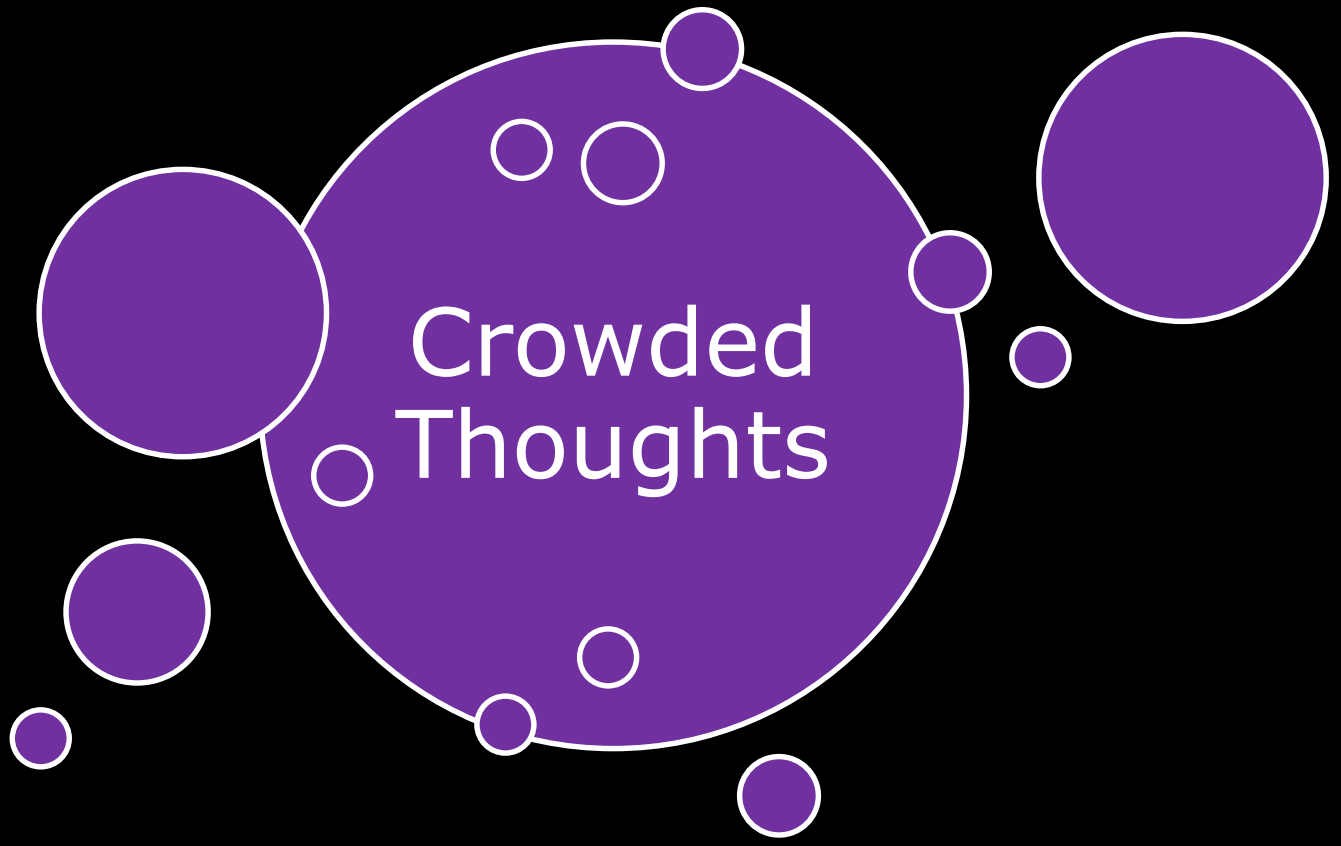
6. Transaction Costs and Crowding

Summary

- If you would like further information on my latest research (submitted for publication), I can send a draft. **Please give me your card after the talk**.

- Chincarini, Ludwig B. "Transaction Costs and Crowding".

- Bruno, Salvatore, Chincarini, Ludwig B., Davis, Jesse, and Frank Ohara. "Portfolio Construction and Crowding."


Crowded
Thoughts

7. Crowded Thoughts

A. The Growth of Indexed Funds

i. Passive funds grown by 73% (2009 – 2015) and represent about 19% of global AUM (compared to 11%). Some estimates have 24% of GAUM (Morningstar).

ii. Smart Beta funds have grown by 40% from 2010-2015 (versus 19% for market cap indices). Smart Beta funds gathered $54B in first 10 months of 2015. As of 03/2015, $282Billion (expected $1Trillion by 2020).

iii. There could be danger that markets become inefficient combined with crowding of positions in smart beta space. That is, if everyone is chasing similar signals, then liquidity may suffer as copycats chase each other in and out of positions.

Note: Some numbers may not add up because they are from different sources and estimation techniques on number of funds varies.

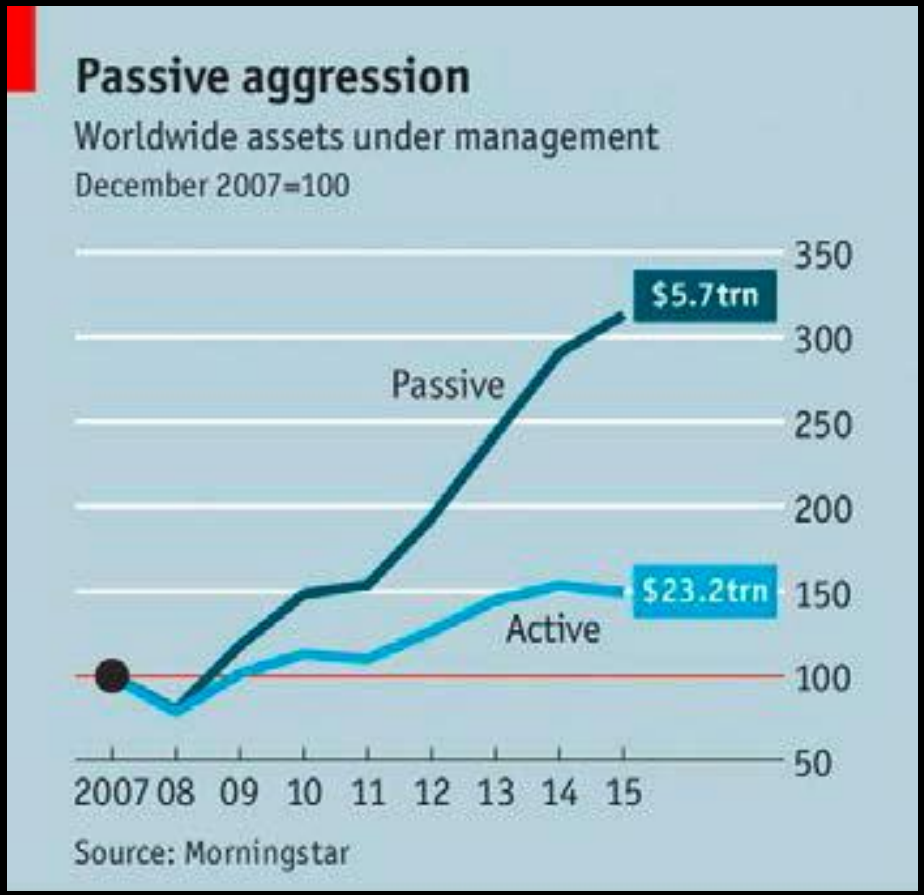
7. Crowded Thoughts

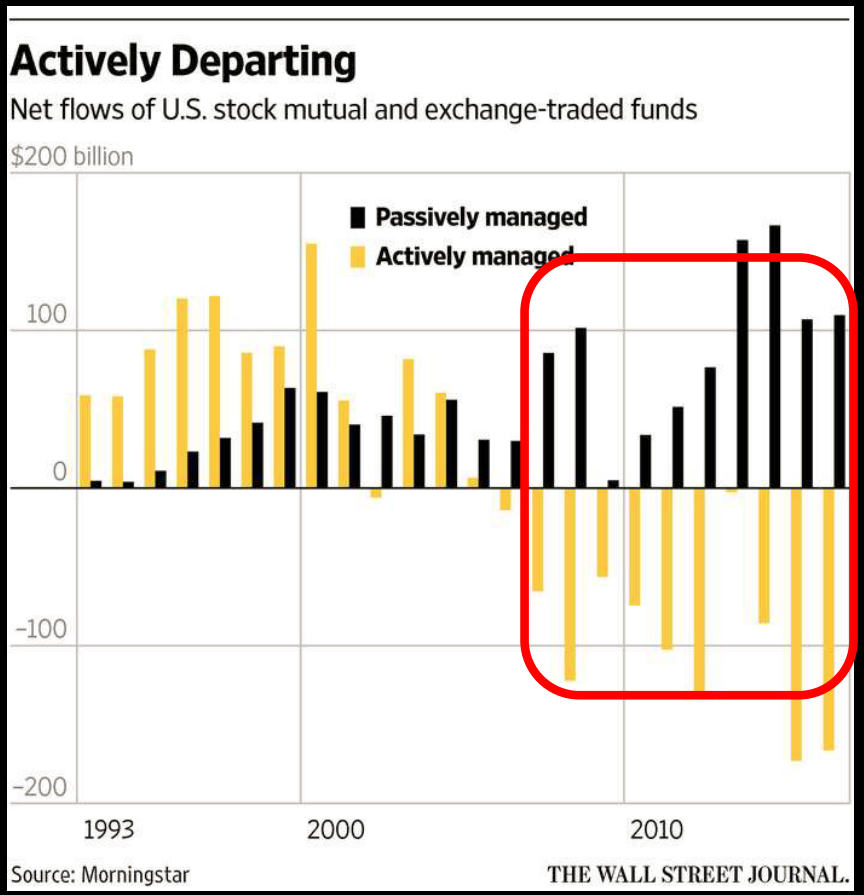
A. The Growth of Indexed Funds

i. Passive funds grown by 73% (2009 – 2015) and represent about 19% of global AUM (compared to 11%). Some estimates have 24% of GAUM (Morningstar).

7. Crowded Thoughts

A. The Growth of Indexed Funds

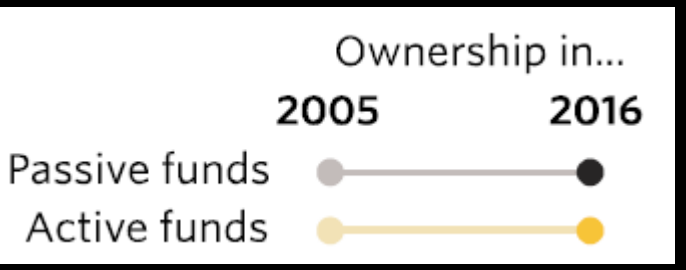


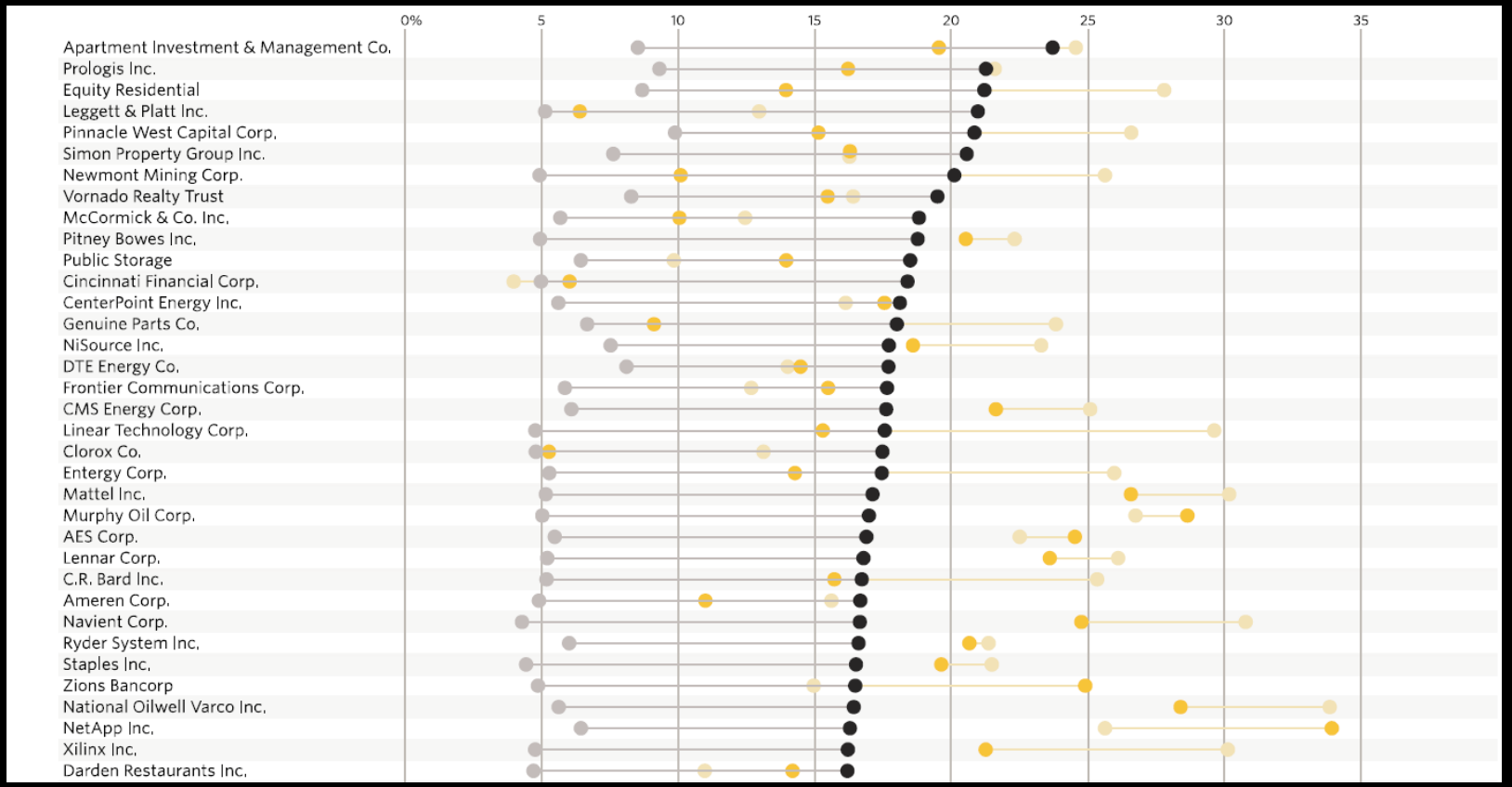


7. Crowded Thoughts

A. The Growth of Indexed Funds

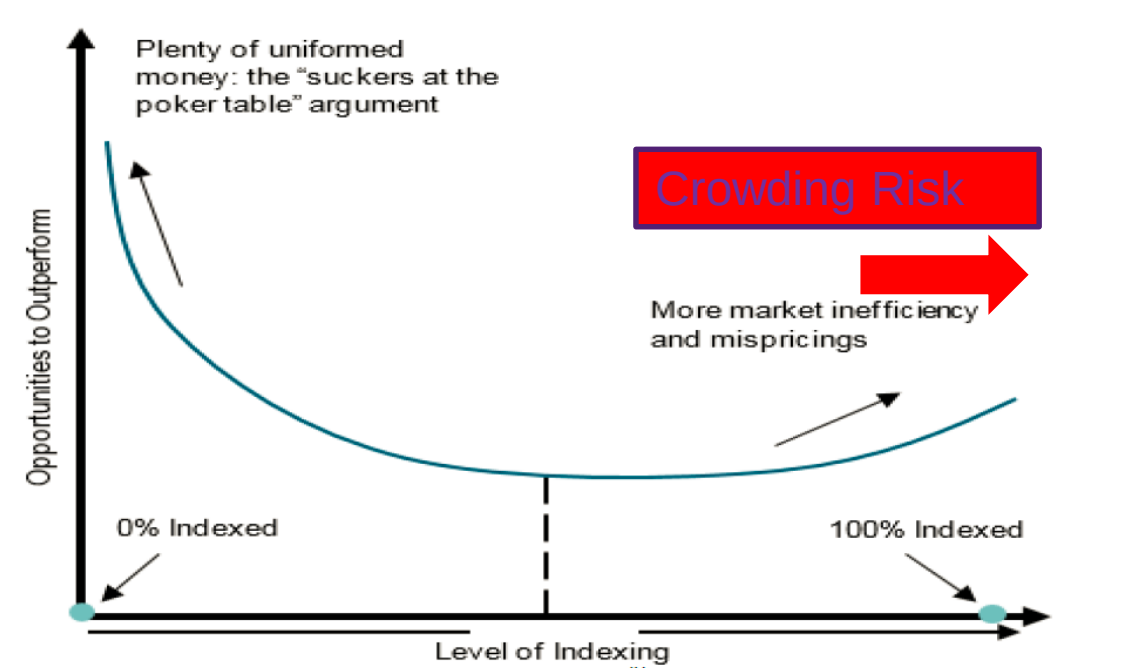
ETF/Passive MF majority of holdings in many S&P stocks (2005-2015)





7. Crowded Thoughts

A. The Growth of Indexed Funds



Source: S&P Dow Jones Indices LLC, abormalreturns.com.[27] Charts are provided for illustrative purposes.

Sources: Bloomberg and "The Rise of Indices is Changing the Face of Investing." Jacob Angana, S&P

7. Crowded Thoughts

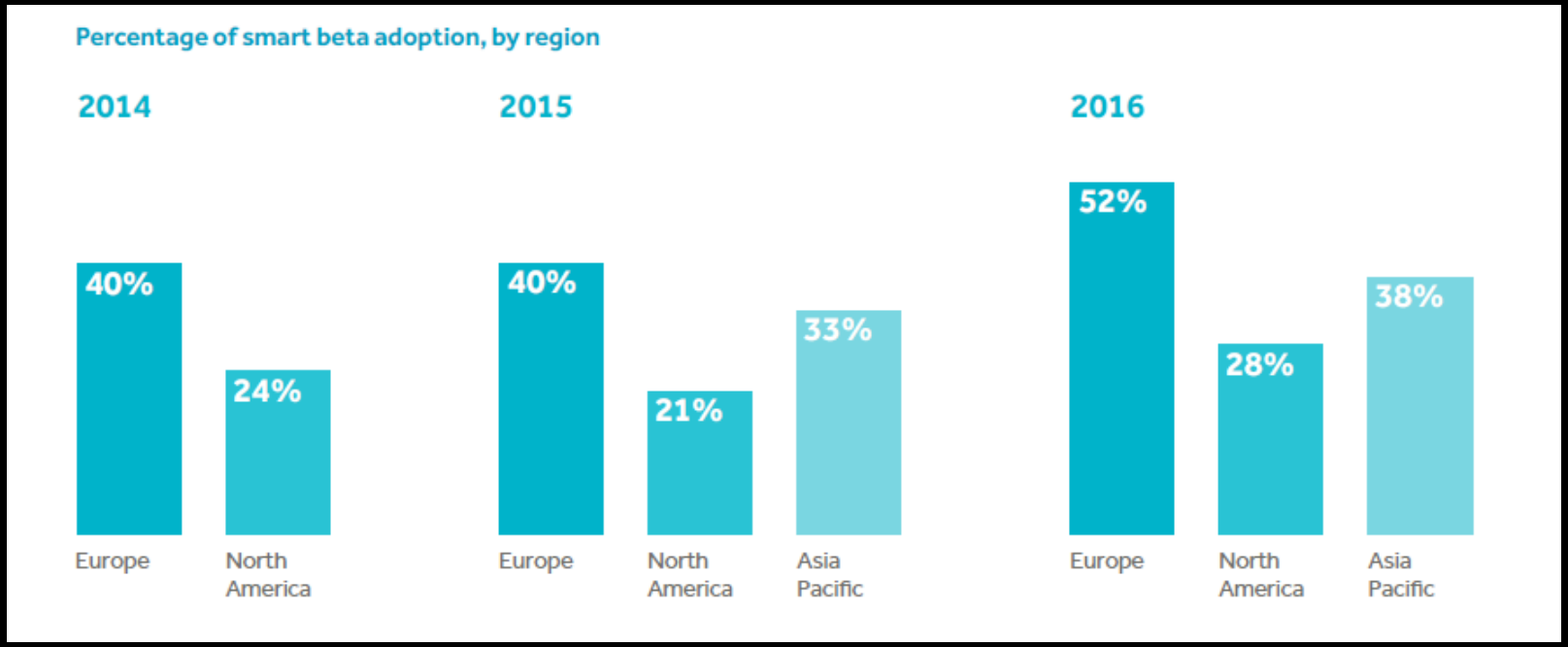
A. The Growth of Indexed Funds

ii. Smart Beta funds have grown by 40% from 2010-2015 (versus 19% for market cap indices). Smart Beta funds gathered $54B in first 10 months of 2015. As of 03/2015, $282Billion (expected $1Trillion by 2020).

7. Crowded Thoughts

A. The Growth of Indexed Funds: "Smart Beta"

- Higher growth of adoption worldwide.

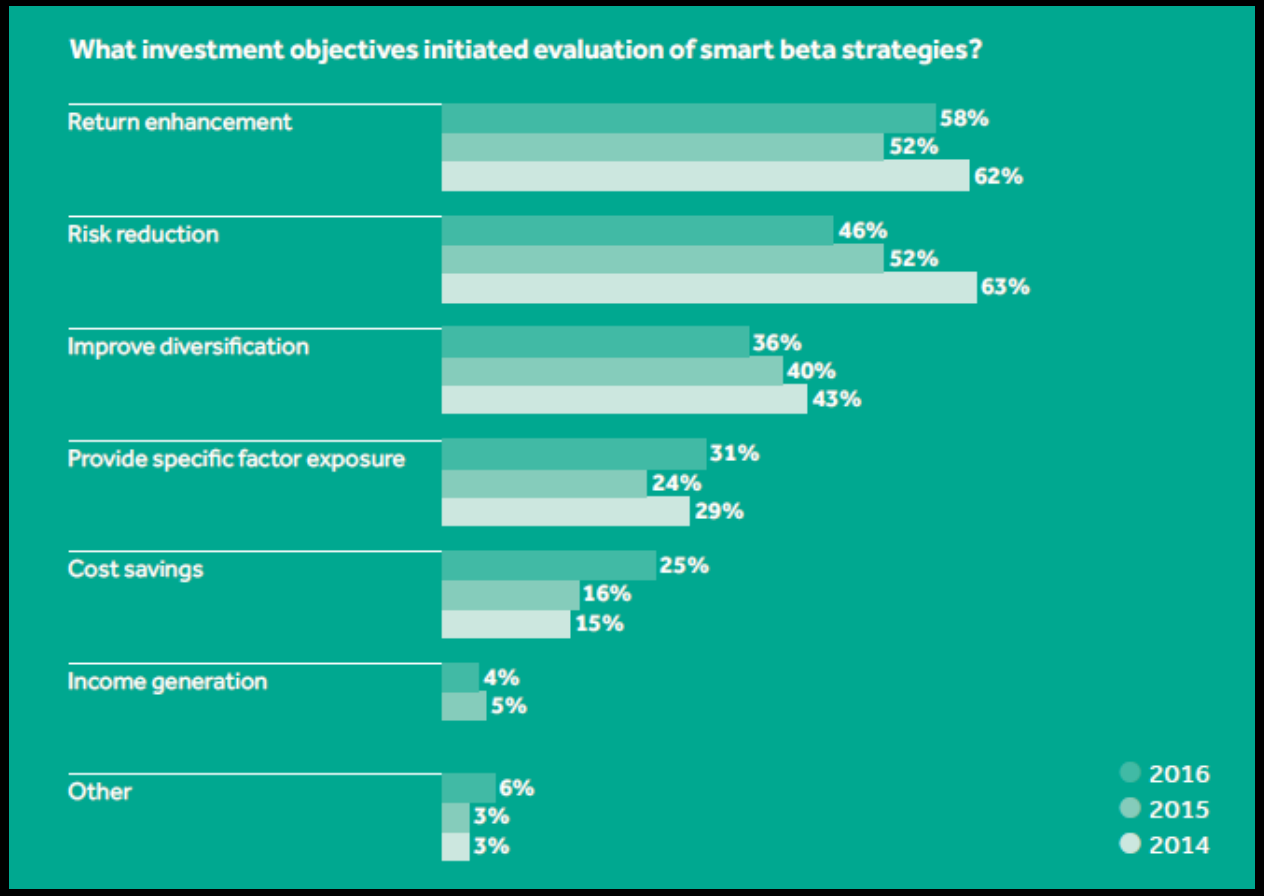


Source: FTSE Russell Survey of Asset Managers in 2016

7. Crowded Thoughts

A. The Growth of Indexed Funds: "Smart Beta"

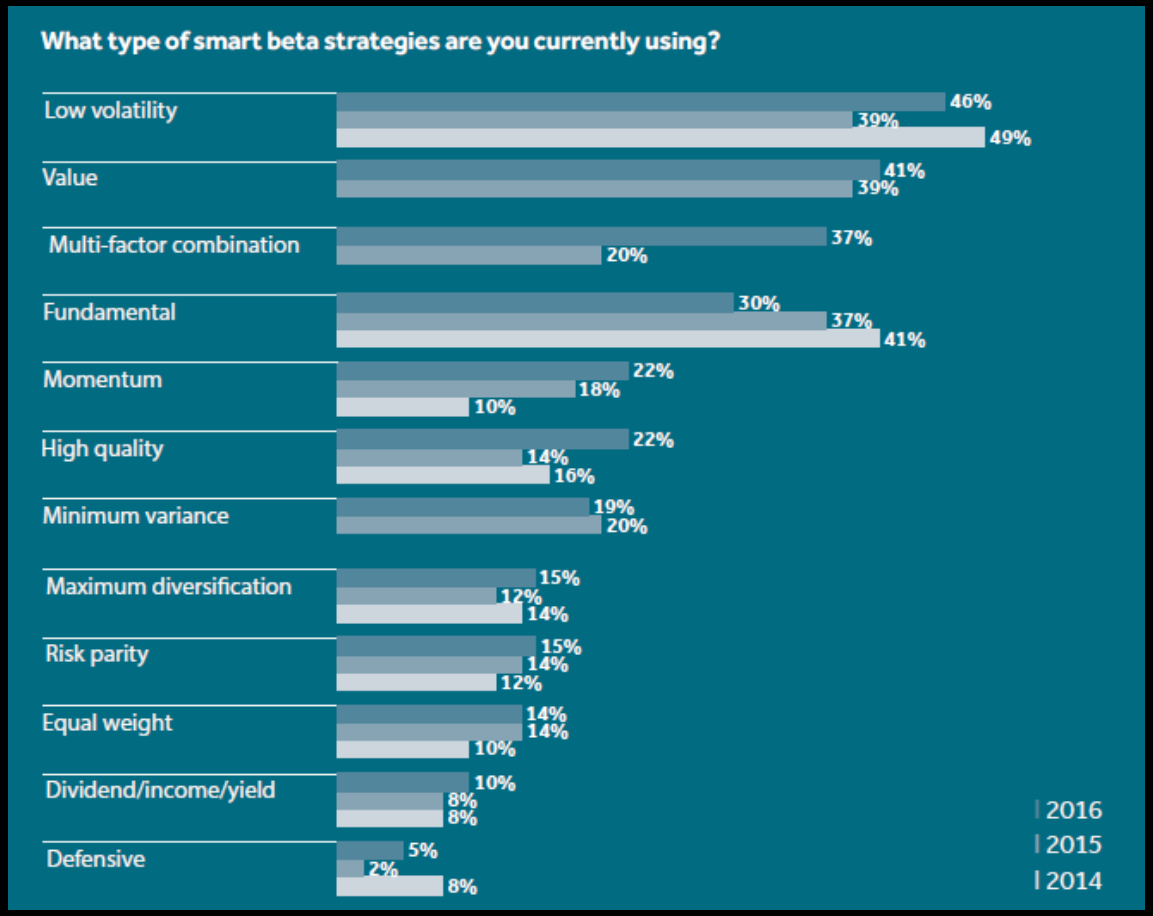
- Reasons for "Smart Beta" Adoption



7. Crowded Thoughts

A. The Growth of Indexed Funds: "Smart Beta"

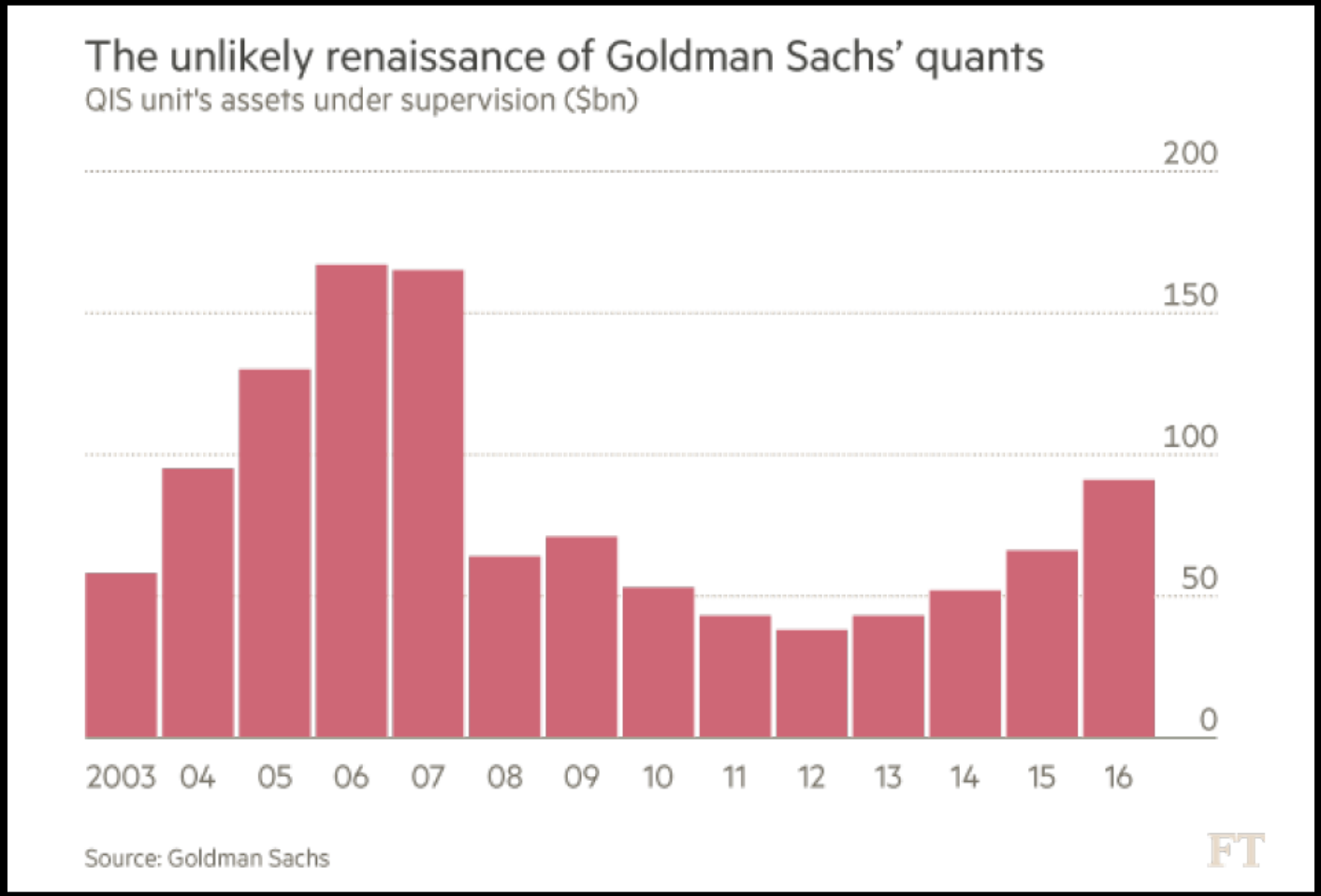
- Usage of "Smart Beta" products



7. Crowded Thoughts

A. The Growth of Indexed Funds: "Smart Beta"

- Quant Funds growing in size again



7. Crowded Thoughts

A. The Growth of Indexed Funds: "Smart Beta"

iv. *Quantitative Equity Portfolio Management* (Chincarini and Kim (2006)) and *The Crisis of Crowding* (2012) mentioned that price movement or returns might be an indirect measure of crowding. That is, if a strategy is making amazing returns, it might be partly because many copycats are crowding into the position.

Table. Performance of "Anomalies" for Different Periods								
	Mkt-RF	SMB	HML	MOM	Mkt-RF	SMB	HML	MOM
1964-2000	6.72%	3.47%	5.47%	12.05%	5.80%	2.38%	3.33%	11.38%
2000-2014	4.77%	5.13%	5.66%	0.20%	2.62%	4.70%	5.00%	-6.65%
2010-2014	16.20%	1.65%	-1.00%	4.75%	15.66%	1.33%	-1.12%	4.72%
1990-2014	8.41%	2.27%	3.07%	6.39%	6.64%	1.60%	2.02%	1.58%

7. Crowded Thoughts

A. The Growth of Indexed Funds: "Smart Beta"

Factor Crowding Before and After "Discovery"

Panel B. *Factors: Before and After Publication*

Annualized Results	Value (Blend)	Value (B/P)	Momentum	Size	Illiquidity	Low Beta	Profitability	Investment	Average
Year Published	1977	1977	1993	1981	2002	1975	2013	2004	
Before Publication	9.8%	9.1%	5.4%	7.0%	2.5%	7.4%	1.2%	3.5%	5.8%
After Publication	2.3%	1.4%	3.7%	0.8%	5.0%	2.1%	5.0%	-1.0%	2.4%
Difference	-7.5%	-7.8%	-1.8%	-6.2%	2.5%	-5.4%	3.8%	-4.5%	-3.3%

Source: Research Affiliates, LLC, using CRSP/Compustat and Worldscope/Datastream data.

Panel A. *Smart Beta Strategies: Before and After Index Launch*

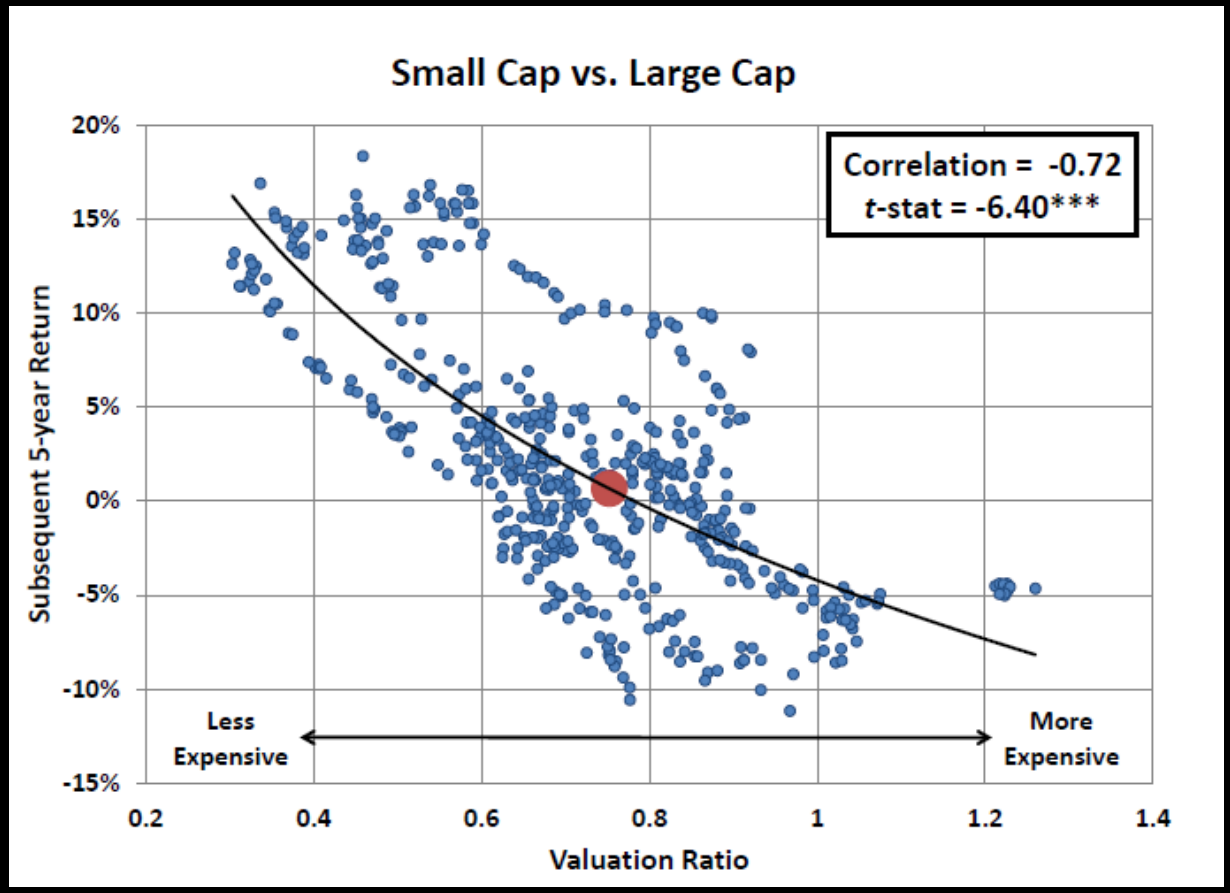
Annualized Results	Fundamental Index	Equal Weight	Low-Vol Index	FTSE RAFI Low Vol	Quality Index	Dividend Index	Risk Efficient	Maximum Diversification	Average
Year Launched	Nov-05	Jan-03	Feb-11	Apr-13	Dec-12	Nov-03	Jan-10	Nov-11	
Before Launch	2.0%	1.3%	1.2%	2.2%	0.4%	2.9%	2.7%	1.6%	1.8%
After Launch	0.4%	2.3%	2.1%	0.1%	0.1%	1.3%	0.9%	4.1%	1.4%
Difference	-1.6%	1.0%	0.9%	-2.1%	-0.4%	-1.6%	-1.9%	2.5%	-0.4%

7. Crowded Thoughts

B. Measuring "Smart Beta" Crowding

Indirect Measure of Factor Crowding

(Measure: Relative P/B of high and low factors as ratio)



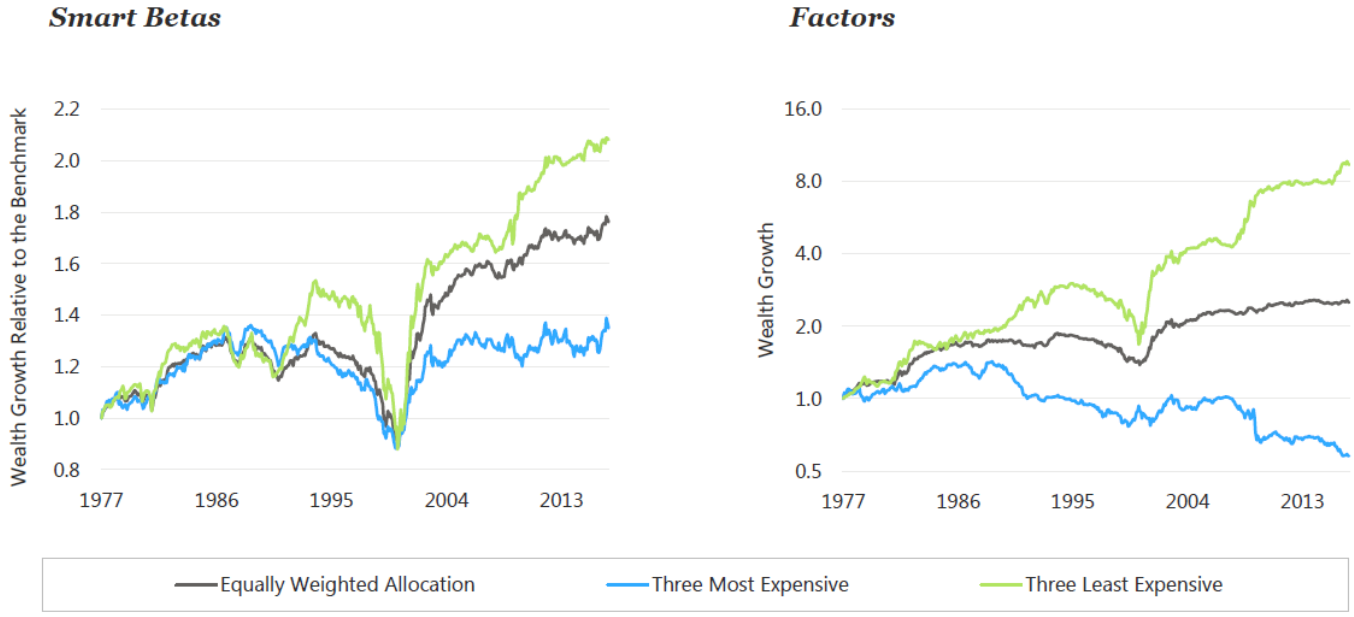
7. Crowded Thoughts

B. Measuring "Smart Beta" Crowding

Indirectly Measuring Factor Crowding

(Sorting Factors by Z-Score of relative expensiveness to their history. Yearly rebalance.)

Panel B. *Cumulative Growth in Wealth of the Most and Least Expensive Strategies and Factors*



Source: Research Affiliates, LLC, using CRSP/Compustat and Worldscope/Datastream data.

7. Crowded Thoughts

B. Measuring "Smart Beta" Crowding

Measuring via Cross-Section Exposure to Factors

- Measure exposures to smart beta funds with rolling regressions and estimate net exposure at time points.
- Measure with holdings at different points in time using historical exposures of individual stocks (more timely).
- *Note*: They could be so diverse so as to have net zero effect.

7. Crowded Thoughts

B. Measuring "Smart Beta" Crowding

Measuring via Transaction Cost Capacity

- Measure the transaction cost impact of crowded smart beta.

  AUM*TO*TCOST = AUM*PREMIUM

  FIND AUM

  Capacity in 2017 of "Smart Beta" funds

  Momentum = $65B

  Size = $5T

  Volatility = $1T

  Many Combined Factors = $316B

Source: Ang, Miranda, Ratcliffe. "Capacity of Smart Beta Strategies, A Transaction Cost Perspective," Blackrock Working Paper (2017)

7. Crowded Thoughts

C. Potential Crowded Spaces (Nov. 5 and 7, 2017 Presentation)

i. Low interest rates have led to seeking yield in strange places. Interest rates and certain other areas (equities: consumer staples & utilities vs. industrials and energy) may be crowded.

Performance Interest Rate Products: 2YR: 0.12% 5YR: 0.07%

Performance Equity Sectors:

Staples: 8.84%, Utilities: 10.22%

Industrials: 18.69%, Energy: 1.83%

7. Crowded Thoughts

D. What’s Crowded Today?

7. Crowded Thoughts

E. The Trump Tax Cut and U.S. Equity Valuation

i. Simple Model of Equities and Corporate Tax Rates

$$P_j = \frac{E_{at}(1+g)}{\delta - g} = \frac{E_{bt}(1-\tau_b)(1+g)}{\delta - g}$$

ii. Stock Market Return from Tax Cut

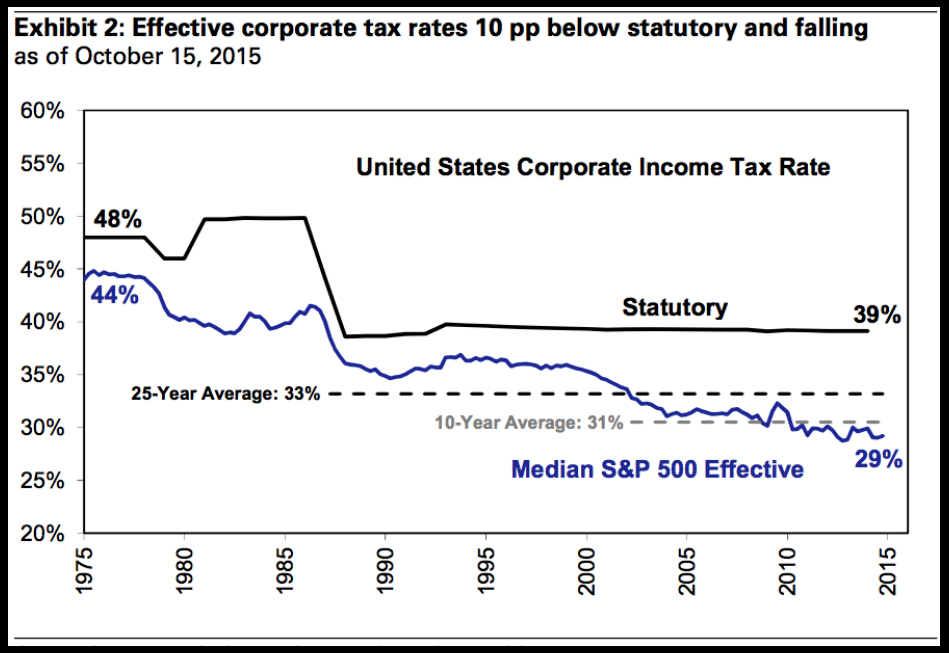
$$P_a / P_b - 1 = \frac{\dfrac{E_{bt}(1-\tau_a)(1+g)}{\delta - g}}{\dfrac{E_{bt}(1-\tau_b)(1+g)}{\delta - g}} = \frac{(1-\tau_a)}{(1-\tau_b)} - 1$$

7. Crowded Thoughts

E. The Trump Tax Cut and U.S. Equity Valuation

iii. Returns of S&P 500 from a tax cut of 35% to 15% could be 33%. Since Trump was elected, market moved 9.7%.

iv. Difference between effective and statutory Federal tax rates.



7. Crowded Thoughts

E. The Trump Tax Cut and U.S. Equity Valuation

v. Bottom Line: 20% decline = 39 – 19, but looking at Reagan's 1986 tax cut, statutory went down 10%, but effective only 5%.

Thus, 20% decline might mean 10% on S&P, which would be a 14% increase in S&P500. Since November 8, 2016, there has already been an 11% gain (up to 04/24/2017).\

However, if 39-24 [30-22.5] ~ 10.7%

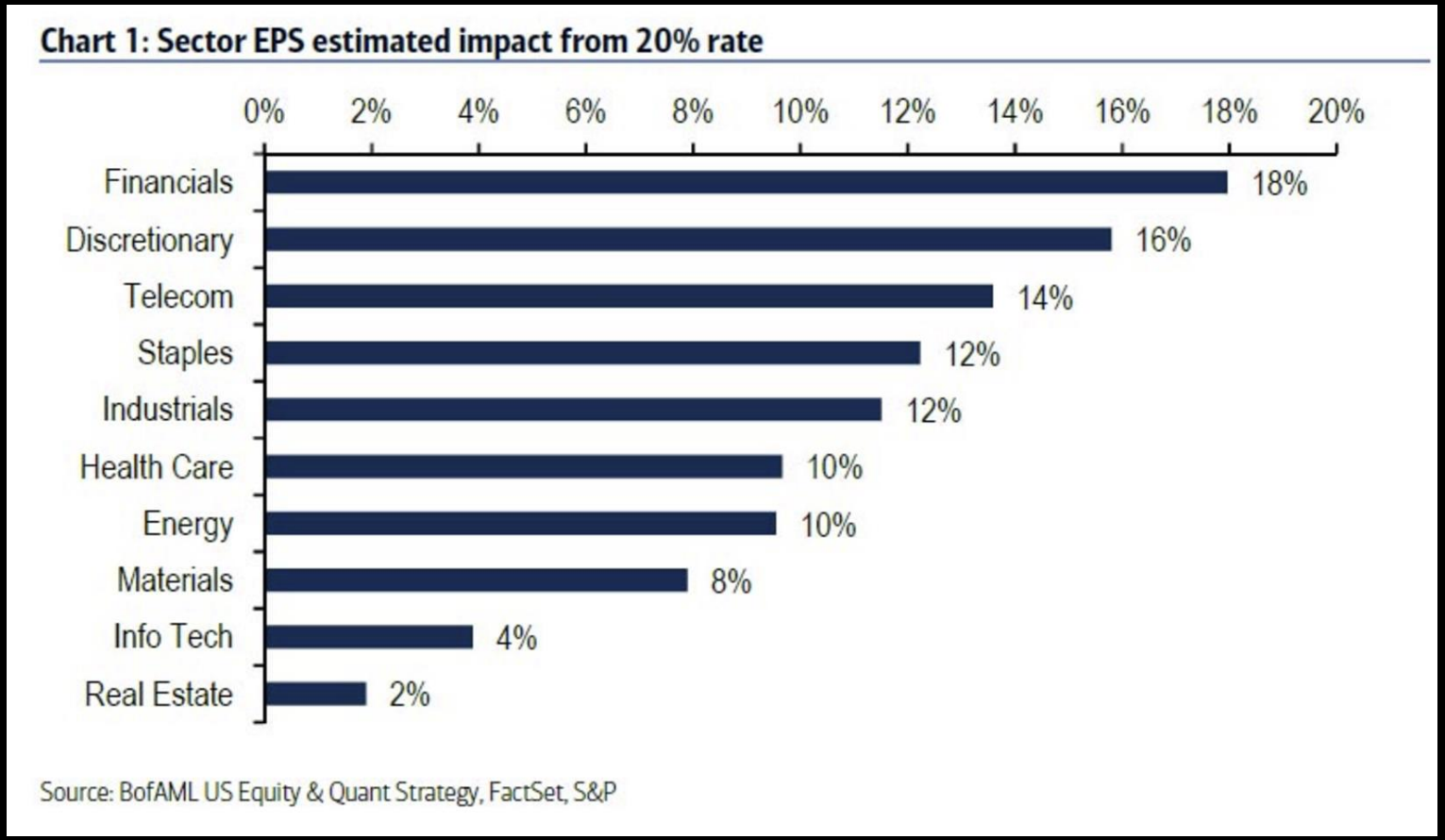
39-29 [30-25]~ 7.1%

Thus, absent extreme tax cut, most is priced in. And watch out for P/E ratios of S&P 500.

Note: Of course, the details of all tax cuts are much more complicated, including multiplier effects and personal tax cuts.

7. Crowded Thoughts

E. The Trump Tax Cut and U.S. Equity Valuation



Thank you

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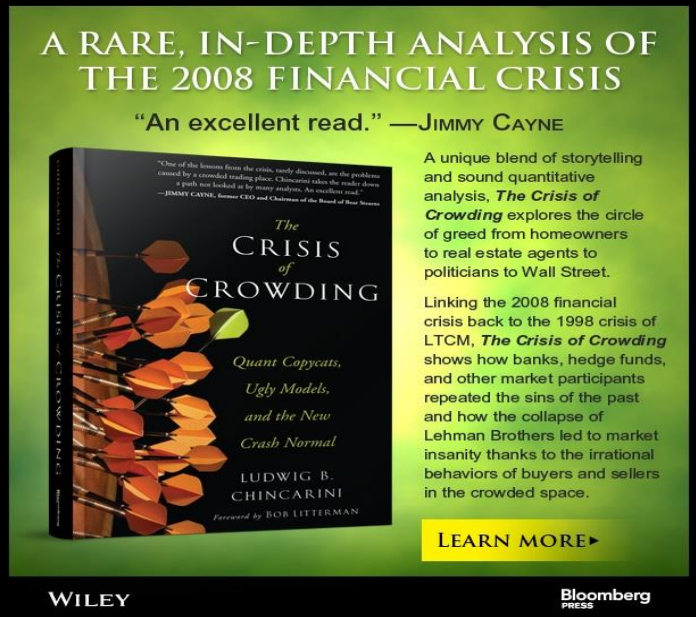
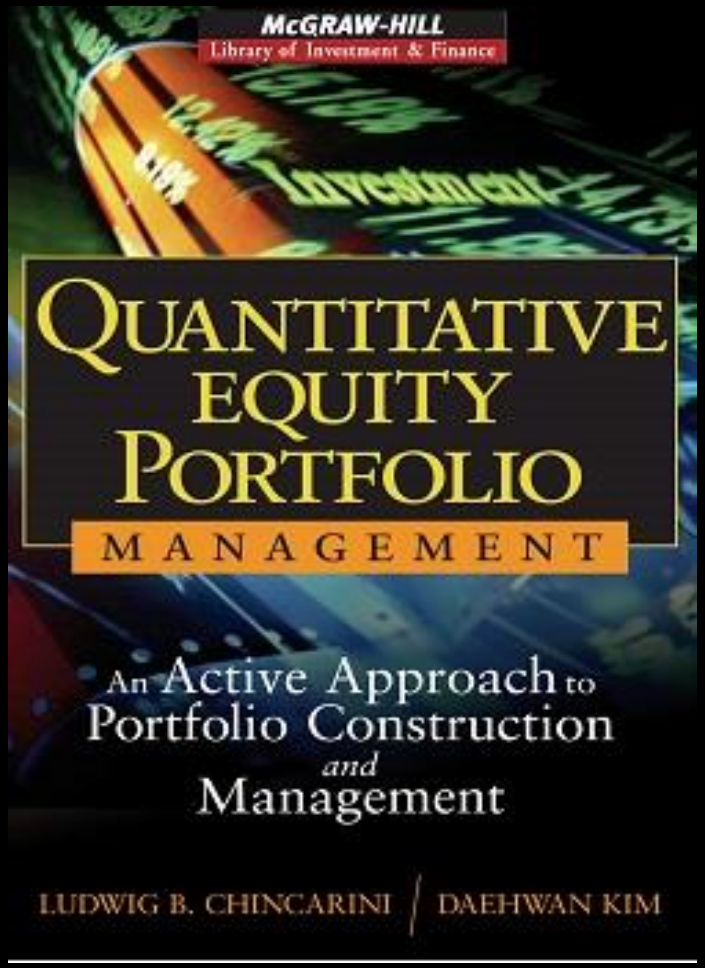
For more information: Buy the books! ;)





Thanks

1. I would like to thank Hao Sha, Pathway Study Tour, United States Commodity Funds, and all those who continue to understand crowding.

Open Discussion

1. TBA