

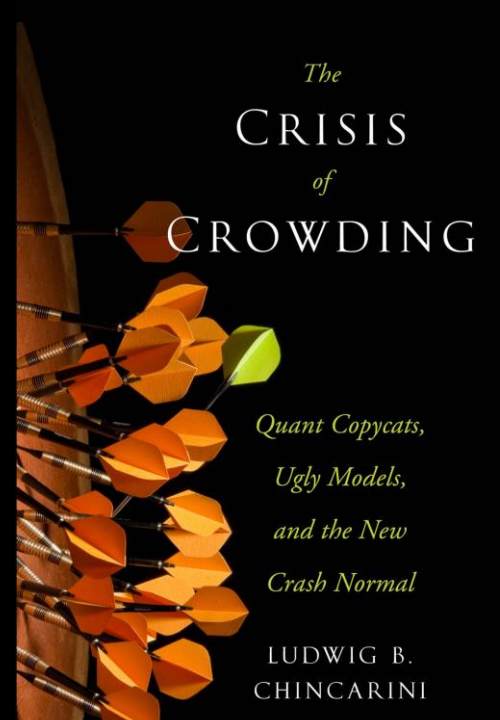
The
CRISIS
of
CROWDING

*Quant Copycats,
Ugly Models,
and the New
Crash Normal*

LUDWIG B.
CHINCARINI

The Crisis of Crowding *Stories and New Findings*

June 29, 2016



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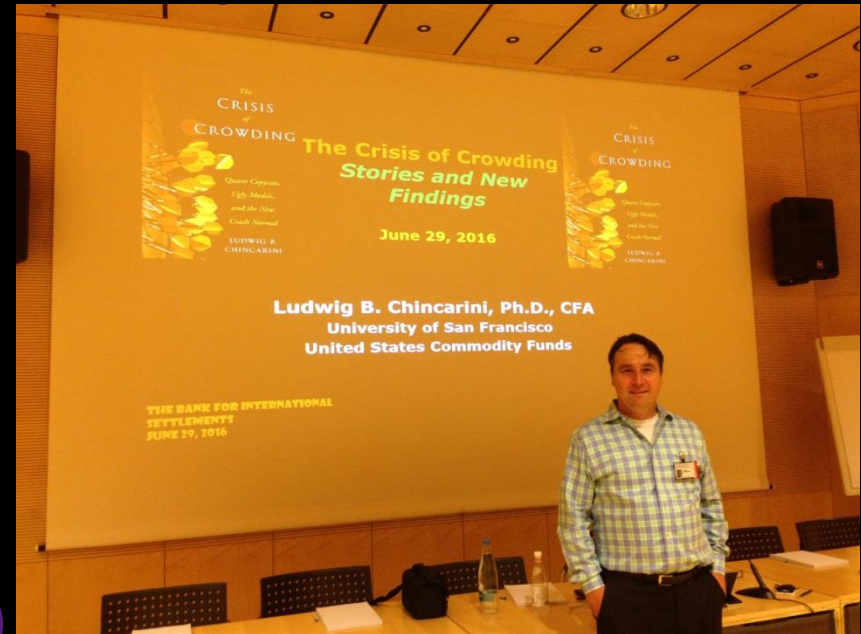
Ludwig B. Chincarini, Ph.D., CFA
University of San Francisco
United States Commodity Funds

**THE BANK FOR INTERNATIONAL
SETTLEMENTS
JUNE 29, 2016**

▪ Thank you for coming.



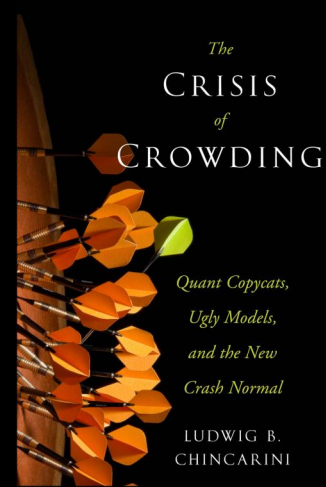
- Thanks to Angus Butler and Andrew Crockett.
 - 2 stores: Las Vegas and San Francisco



Outline

1. *The Crisis of Crowding* (2012)
2. Intro to Crowding
3. Market Acknowledging New Risk
4. Academics Acknowledging Crowding
5. Crowded Spaces and Portfolio Construction
 - **Risk management** might ironically create crowding
6. Did transaction costs contribute to the Quant Crisis and what role do they play?
7. Open Discussion or **Fun Stories**

Bottom Line: Crowding is a new risk that must be considered.



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 to such an extent the space that liquidity is fragile and it alters the risk and return dynamics of the trade.

- Not always easy 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

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, then 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 indicate stocks that might be crowded.

2. Intro to Crowding

How Crowding Typically Happens

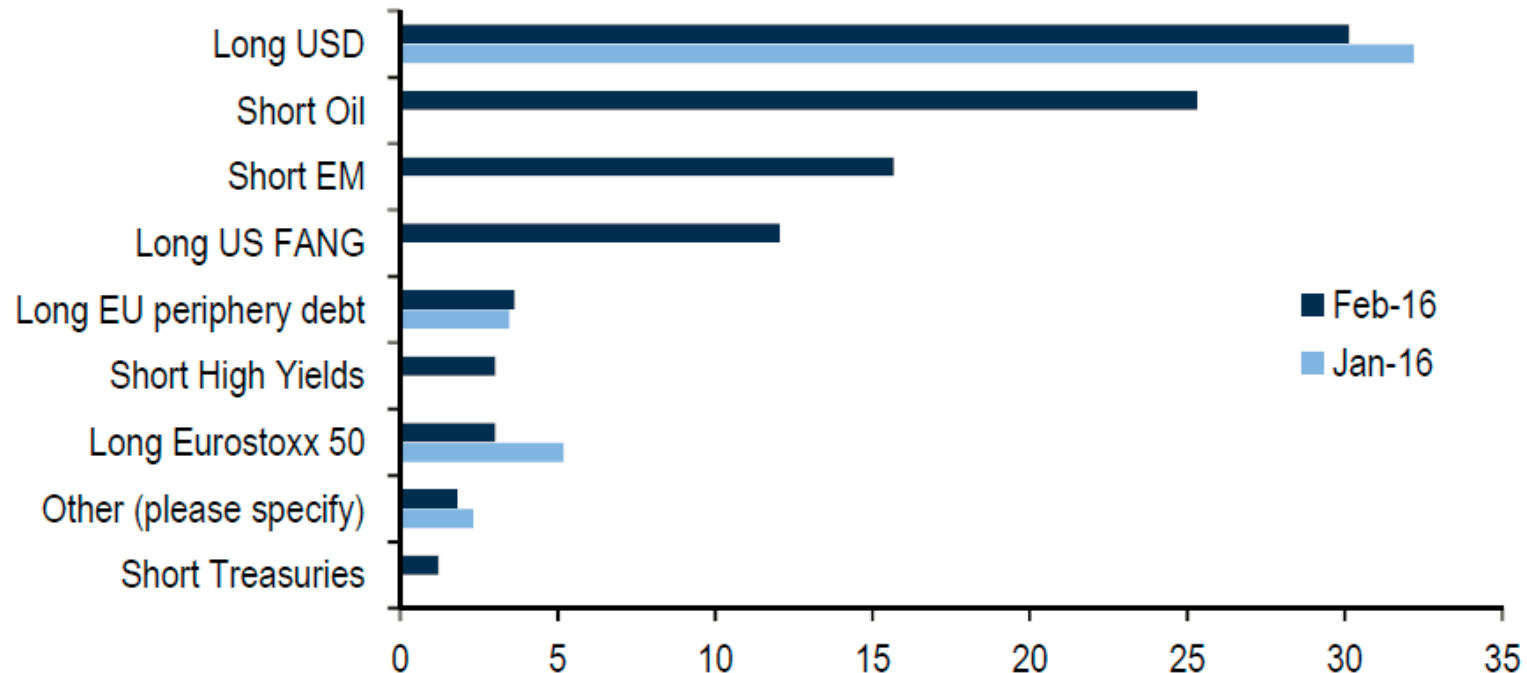
1. Attractive Trading Opportunity Develops
2. Copycats rush to follow the leader (even if it's not their core business)
3. Herding occurs, but sometimes very hidden (not obvious)
4. The trading space becomes crowded
5. Not all crowded spaces are similar.
 - a. 1 type of holder (all traders similar)
 - 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)).



3. Market Acknowledges Crowding

A. Examples bank reports from BofA (March 2016)

Exhibit 7: What do you think is currently the most crowded trade?



Source: BofA Merrill Lynch Global Fund Manager Survey

3. Market Acknowledges Crowding

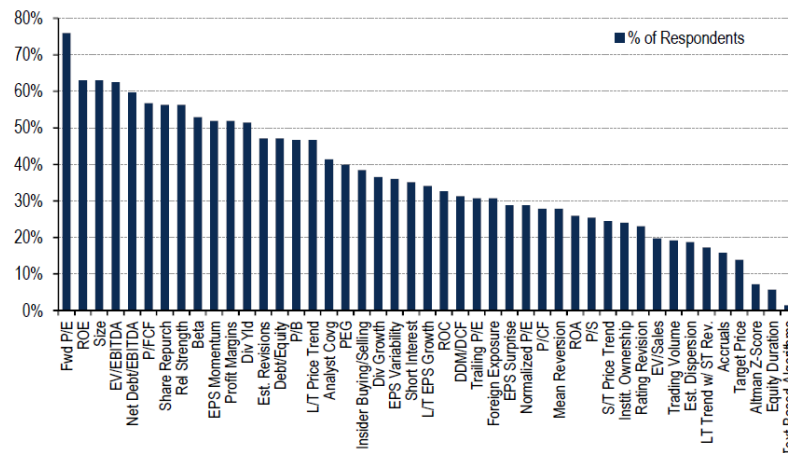
A. Examples bank reports from BofA/Merrill Lynch (May 10, 2016)

What are quants doing?

Each year, we survey institutional investors to monitor which factors, characteristics, attributes and models they use in their stock selection processes. These include valuation factors, quality and growth factors, risk factors, technical and price factors, risk factors and other factors.

The results of our most recent survey, published May 3, 2016, are below. Survey respondents indicated that Forward P/E was most frequently used factor to make investment decisions (for the 10th year running), while ROE and Size (Market Capitalization) were the next most popular. Forward P/E has topped the list every year since the crisis, while prior to the crisis, cash flow-based valuation measures were more popular. Despite more discussion about off-the-beat-path signals like text analysis (i.e. combing through press releases or sell side research for indications of incrementally more positive or negative tone), few investors have cited using text-based algorithms.

Chart 75: Percentage of 2016 survey respondents using various factors

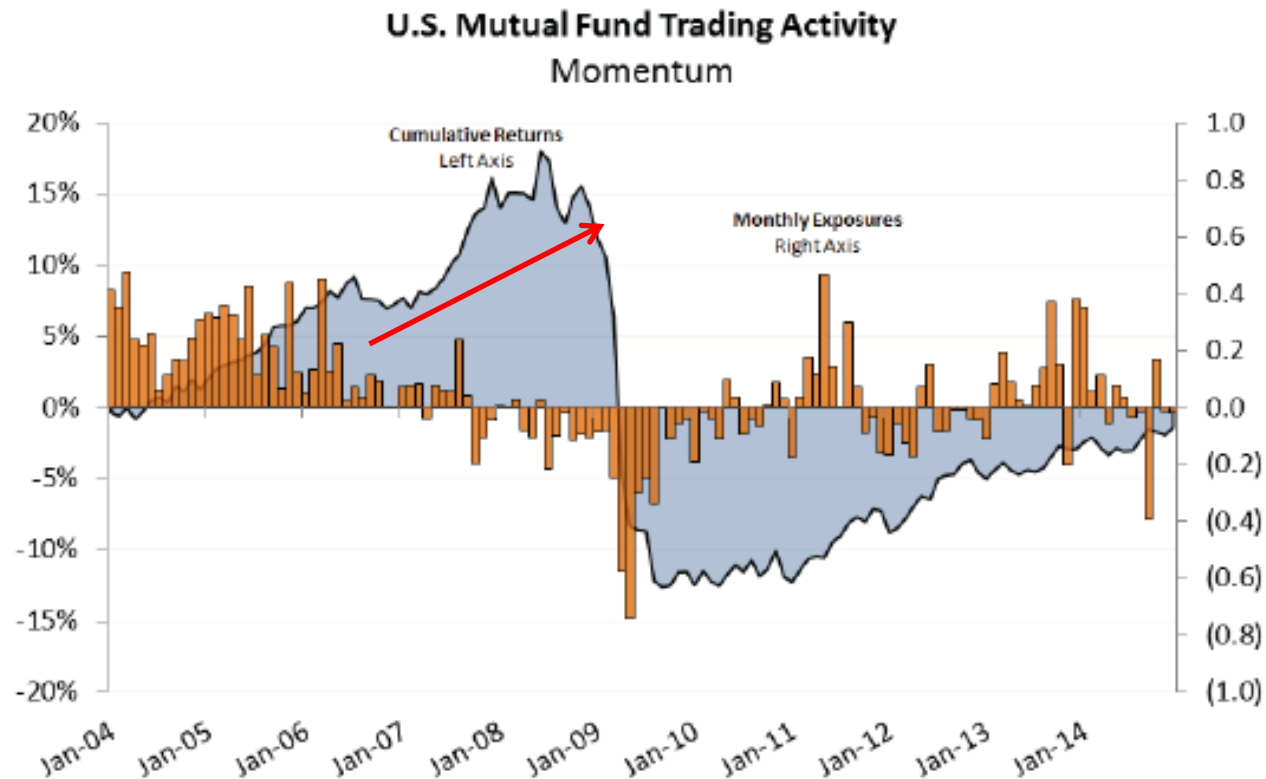


Source: BofA Merrill Lynch US Equity & US Quant Strategy

3. Market Acknowledges Crowding

A. Examples bank reports from MSCI Barra

Exhibit 1: U.S. Mutual Fund Trading Activity for the Momentum Factor



Source: Barra US Total Market Model, Barra Peer Analytics

3. Market Acknowledges Crowding

A. Examples bank reports from Bank of America/Merrill Lynch

Buying neglect and selling the crowds has worked YTD

Buying the ten most underweight stocks and selling the ten most overweight stocks by large cap active fund list as of 12/2014 has produced a spread of 10ppt YTD, outperforming the average long-short equity hedge fund performance of -2bp. This strategy has delivered consistent positive spreads over the last several years given outflows from active to passive which look likely to continue. Why? Passive funds still only make up about one-third of the US large cap space, far from critical mass. So what's the analogous trade for 2016? We believe U/W stocks will continue to outperform O/W stocks. For reference, we include a list of the current most O/W and U/W stocks held by managers (Table 4).

Table 4: Current 10 most O/W and U/W stock list

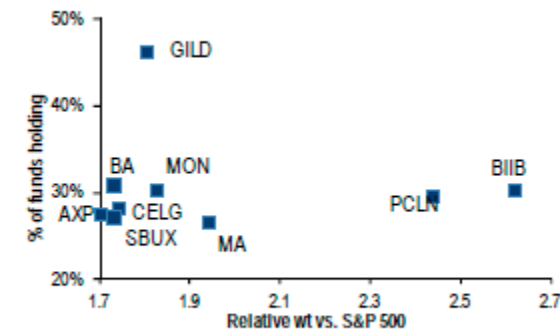
Top 10			Bottom 10		
Ticker	Name	Rel. Weight	Ticker	Name	Rel. Weight
NTAP	NetApp, Inc.	2.99	VNO	Vornado Realty Trust	0.04
TXN	Texas Instruments Incorporated	2.88	HPE	Hewlett Packard Enterprise Co.	0.02
KLAC	KLA-Tencor Corporation	2.49	MAC	Macerich Company	0.02
ALXN	Alexion Pharmaceuticals, Inc.	2.47	LEG	Leggett & Platt, Incorporated	0.02
SCHW	Charles Schwab Corporation	2.46	OKE	ONEOK, Inc.	0.01
STT	State Street Corporation	2.39	TE	TECO Energy, Inc.	0.01
ADBE	Adobe Systems Incorporated	2.39	CINF	Cincinnati Financial Corporation	0.01
NDAQ	Nasdaq, Inc.	2.36	O	Realty Income Corporation	0.01
TYC	Tyco International PLC	2.35	NWS	News Corporation Class B	0.01
DHR	Danaher Corporation	2.33	CSRA	CSRA, Inc.	0.00

Source: Lionshares, BofA Merrill Lynch US Equity & US Quant Strategy. The screen is not a recommended list either individually or as a group of stocks. Investors should consider the fundamentals of the companies and their own individual circumstances/objectives before making any investment decision. The

3. Market Acknowledges Crowding

A. Examples bank reports from **Goldman Sachs**, **Bank of America**, **Bernstein**, JP Morgan Chase, and many others.

Chart 15: Overowned - most overweighted stocks, broadest ownership



Source: BofA Merrill Lynch US Equity & US Quant Strategy, Lionshares

Exhibit 9: The 20 most concentrated stocks in the S&P 500 <Bloomberg: GSTHFFHI> Holdings as of September 30, 2012; Pricing as of November 15, 2012

S&P 500: Twenty MOST CONCENTRATED Hedge Fund Holdings (Bloomberg Ticker: GSTHFFHI)						
Company	Ticker	Sector	Sub-sector	Equity Cap (\$ bil)	Total Return During 3Q 2012	% of equity cap owned by Hedge Funds 30-Sep-12
TripAdvisor	TRIP	Consumer Discretionary	Internet Retail	5	(26)	45
AutoNation	AN	Consumer Discretionary	Automotive Retail	5	24	9
LyondellBasell Industries N.V.	LYB	Materials	Specialty Chemicals	26	29	53
E*TRADE Financial	ETFC	Financials	Investment Banking & Brokerage	2	9	(1)
J.C. Penney	JCP	Consumer Discretionary	Department Stores	4	4	(53)
Tenet Healthcare	THC	Health Care	Health Care Facilities	3	20	23
Yahoo! Inc.	YHOO	Information Technology	Internet Software & Services	21	1	11
VeriSign Inc.	VRSN	Information Technology	Internet Software & Services	7	12	16
Beam Inc	BEAM	Consumer Staples	Distillers & Vintners	8	(8)	6
MetroPCS Communications	PCS	Telecommunication Serv	Wireless Telecommunication Services	4	94	20
Ralph Lauren Corp.	RL	Consumer Discretionary	Apparel Accessories & Luxury Goods	14	8	9
Life Technologies	LIFE	Health Care	Life Sciences Tools & Services	8	9	20
American Intl Group	AIG	Financials	Multi-line Insurance	46	2	35
CBRE Group Inc	CBG	Financials	Real Estate Services	6	13	14
WPX Energy	WPX	Energy	Oil & Gas Exploration & Production	3	3	(17)
Family Dollar Stores	FD	Consumer Discretionary	General Merchandise Stores	8	0	15
priceless.com	PCLN	Consumer Discretionary	Internet Retail	31	(7)	32
Coca-Cola Enterprises	CCE	Consumer Staples	Soft Drinks	9	12	17
BMC Software	BMC	Information Technology	Systems Software	6	(3)	19
Motorola Solutions	MSI	Information Technology	Communications Equipment	15	6	16

Top 50 Holdings: Top 50 Hedge Funds

Market value is in millions of dollars and represents the market value held by the top 50 hedge funds at the end of the quarter. The market value change measures the total position change of each security multiplied by its quarter-end price. "% Port" indicates the weight of the stock in an aggregated equity portfolio of the top 50 hedge funds. "% Shares Out" indicates the proportion of the shares outstanding of the stock owned by the aggregated portfolio of the top 50 hedge funds and the "Total" and "50 Highest" lines show the average for this item*. "# of companies" indicates the number of funds (out of the top 50) holding the stock.

High/Low - %Portfolio	GICS Sector	Qtr End Market Value	Mkt Val Chg - 3 mo (\$millions)	Mkt Val Chg 3mth % Port	%Shrs Out*	# Of Co's
Total						
55 Highest						
LyondellBasell Industries N.V. C.I.A						
Google Inc. C.I.A						
Realty Holdings Corp.						

Highlights

In this report we extend the definition of crowding to include breadth of high conviction overweights by active managers, as well as persistence of accumulation by active managers. We also demonstrate that crowding is an important risk factor at the stock level (with neutral performance profile), but tends to be a useful contrarian performance indicator at the aggregate sector, region level.

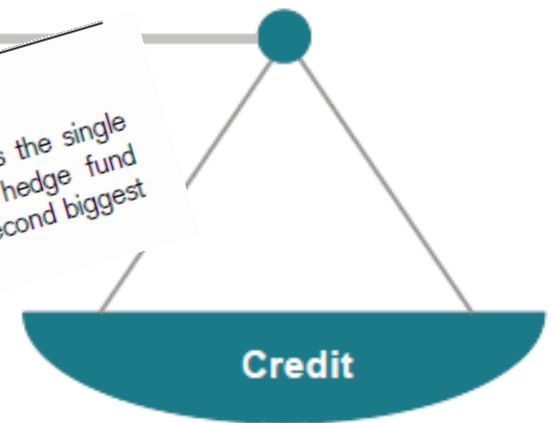
3. Market Acknowledges Crowding

- A. Examples bank reports from **Goldman Sachs**, **Bank of America**, **Bernstein**, **Credit Suisse**, JP Morgan Chase, and many others.

Crowded Trades: The Bank Loan Story

1. Sources of Risk to the Hedge Fund Industry in 2014

As with the last three surveys, investors have continued to express crowded trades and herd mentality as the single biggest threat to the industry in 2014, given the increasing challenge they pose in differentiating hedge fund performance. Given the low market volatility over the past year, risk complacency was highlighted as the second biggest threat.



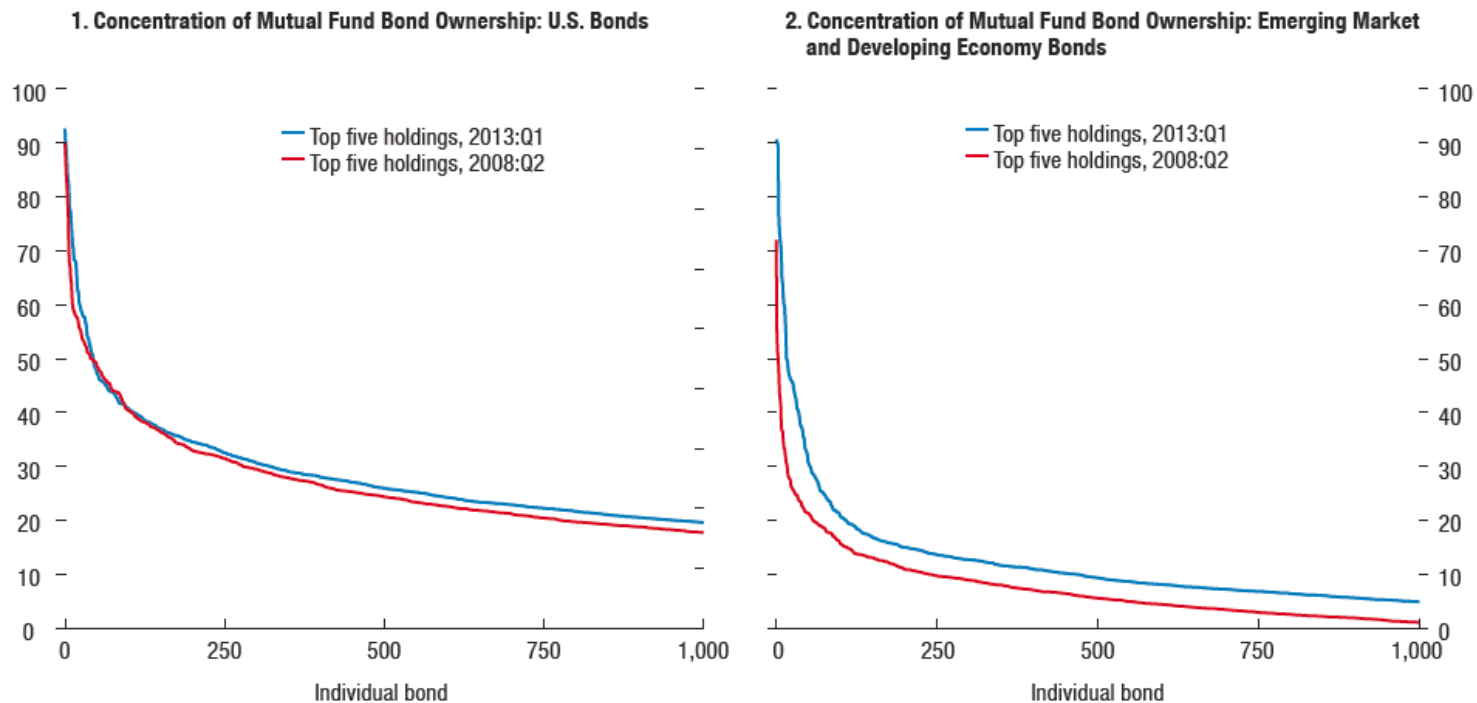
- Avoid crowded trades
 - Loans
 - CCC-rated bonds
- Alternative strategies: understand your exposure
- Consider municipal credit

3. Market Acknowledges Crowding

A. Examples IMF Report “The Asset Management Industry and Financial Stability” April 2015.

Figure 3.7. Bond Ownership Concentration and Its Effects on Credit Spreads

Mutual fund concentration in bond markets has increased somewhat since the global financial crisis.
(Share of individual bonds held by the five largest mutual funds in 2008 and 2013, percentage points)



3. Market Acknowledges Crowding

A. Bloomberg Story on June 23, 2015.

BloombergBusiness

How to Spot Crowded Trades That the Shoeshine Boy Missed

by Michael P Regan
June 23, 2015 — 8:56 AM PDT

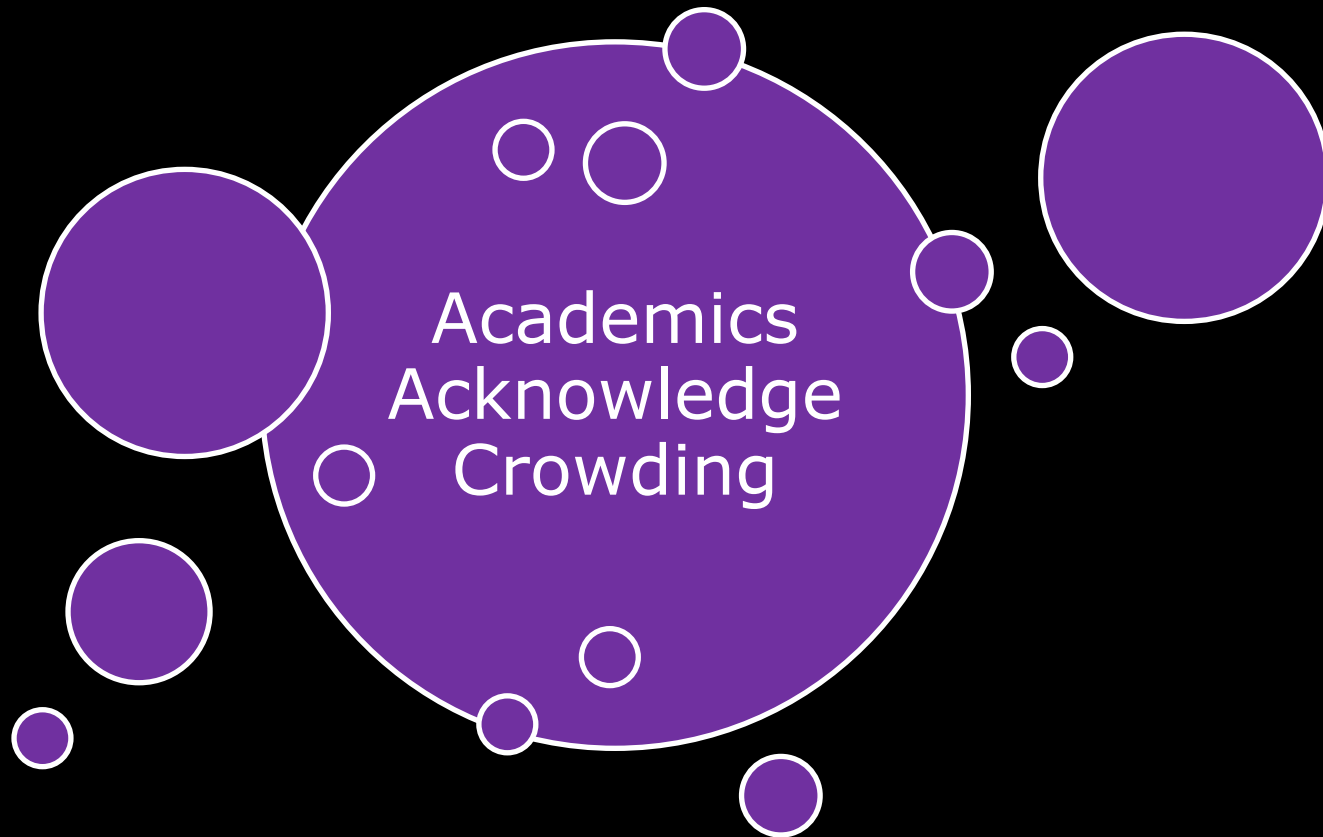
The way that [the famous yarn](#) is usually told, Joe Kennedy got out of the market before the 1929 crash because a shoe-shine boy was offering him stock tips, and that just didn't seem right.

Almost nine decades later, markets seem to be no less vulnerable to the proverbial "crowded trade" that lures investors like lemmings over the edge of a cliff. Exhibit A could be the crowds that bid the yield on German 10-year bunds down to almost zero a few months ago, only to later flee like a flock of scared birds.

BASEBALL HALL OF FAMER "Wee Willie" Keeler once said he was successful because he "hit 'em where they ain't." Going where the crowd isn't could be a recipe for investment success as well.

October 3, 2015

Big pharmaceutical stocks don't seem to have many friends, despite our prior assertion that the health-care sector is too crowded. But while mutual fund managers were busy buying biotechs, they generally shunned major pharma companies such as Eli Lilly (LLY), Merck (MRK), and Pfizer (PFE), notes Bank of America Merrill Lynch analyst Colin Bristow.



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. Portfolio Construction: Copycat Techniques

- A. Starting points matter – similar portfolios lead to similar trading (Bohlin and Rosvall (2014), Chincarini (2012)).
- B. Portfolio construction due to risk models can cause crowding (Bruno, Chincarini, Davis, and Ohara (2016)).
- C. Transaction costs and crowding have a non-intuitive relationship for certain asset levels (Chincarini (2016)).

4. Academic Studies on Crowding

A. Portfolio Construction: Copycat Alpha

- D. Investors following similar strategies (Chincarini (1998), Chincarini (2012), and Lo and Khandani (2008)).
- E. Many others, but no detailed study of when and how it happens.

4. Academic Studies on Crowding

B. Impact of Crowding

- F. Peer or copycat flows of mutual funds influence returns due to crowded holdings (Blocher (2013), Chincarini (2012)).
- G. Quant Crisis of 2007 may have been associated with crowded factors (Cahan and Luo (2013), Chincarini (2012)).
- H. Stocks with relatively more trading versus market capitalization tend to have worse risk-adjusted returns (Ibbotson and Idsorek (2014)).
- I. Momentum strategy that is exposed to crowded losers is more crash prone than non-crowded losers. Refining momentum strategies to non-crowded losers improves the performance of momentum strategies (Yan (2014)).

4. Academic Studies on Crowding

B. Impact of Crowding

- J. Among mutual funds with similar past alphas, those that had co-moved with past losers have future alphas that exceed those that had co-moved with past winners (Chue (2015)).

4. Academic Studies on Crowding

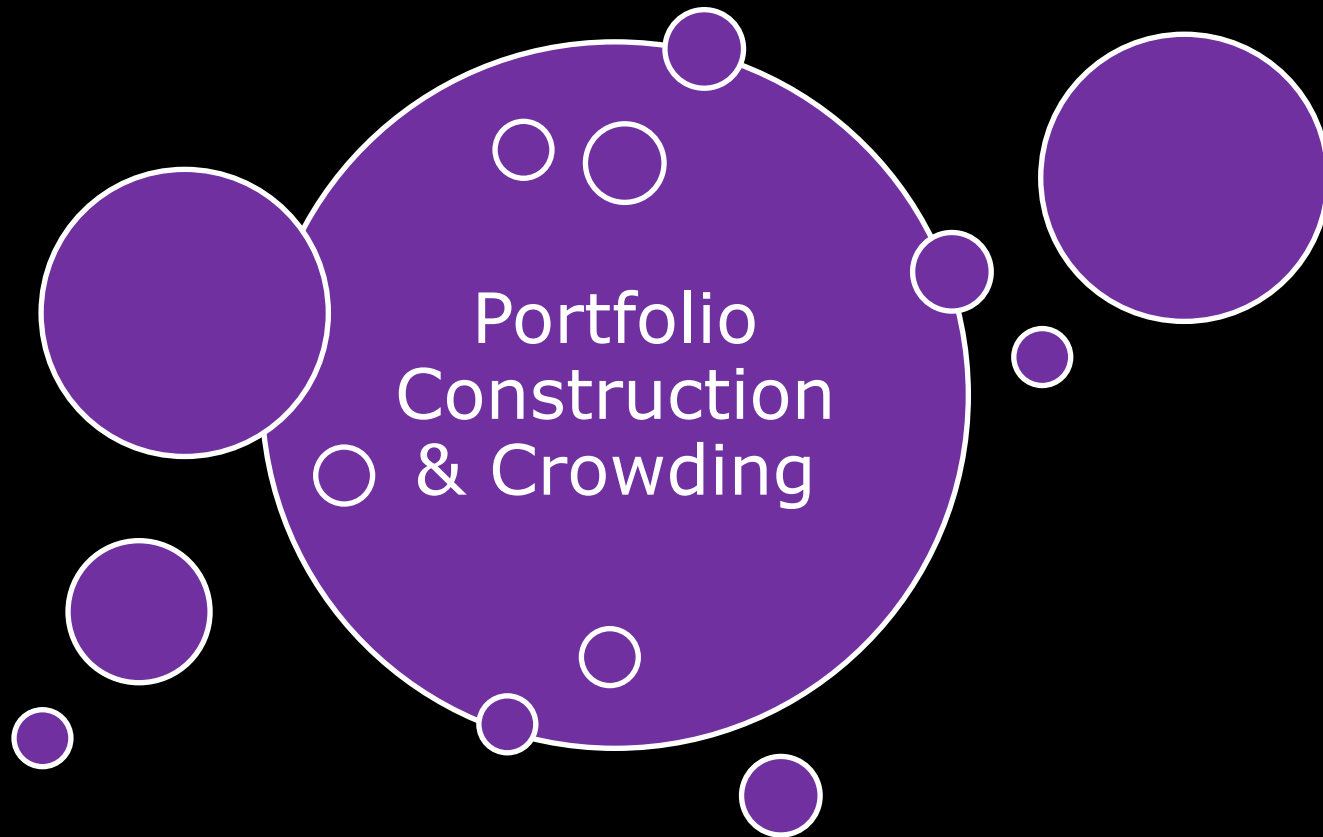
C. Implications

- K. Exchanges or central clearing parties (CCPs) may underestimate margin requirements because they fail to account for crowding. Could cause systemic risk. (Menkveld (2014)).
- L. Days-to-cover, the ratio of short interest to trading volume, could be a measure of the costliness of exiting crowded trades. Shorting high DTC stocks and buying low DTC stocks generates excess returns of 1.2% per month (Hong et al (2015)).

4. Academic Studies on Crowding

C. Implications

M. To capture crowding, measure as the percentage of shares held by equity mutual funds divided by the average share turnover for the stock. A high (low) percentage of mutual fund holdings in low-(high)-turnover stocks is associated with a high (low) degree of crowding. A long-short trading strategy based on this crowding measure (long least crowded stocks and short most crowded stocks) can generate an annualized alpha of 13% after controlling for the four standard risk factors—beta, size, book-to-market and momentum (Tay et al (2016)).



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

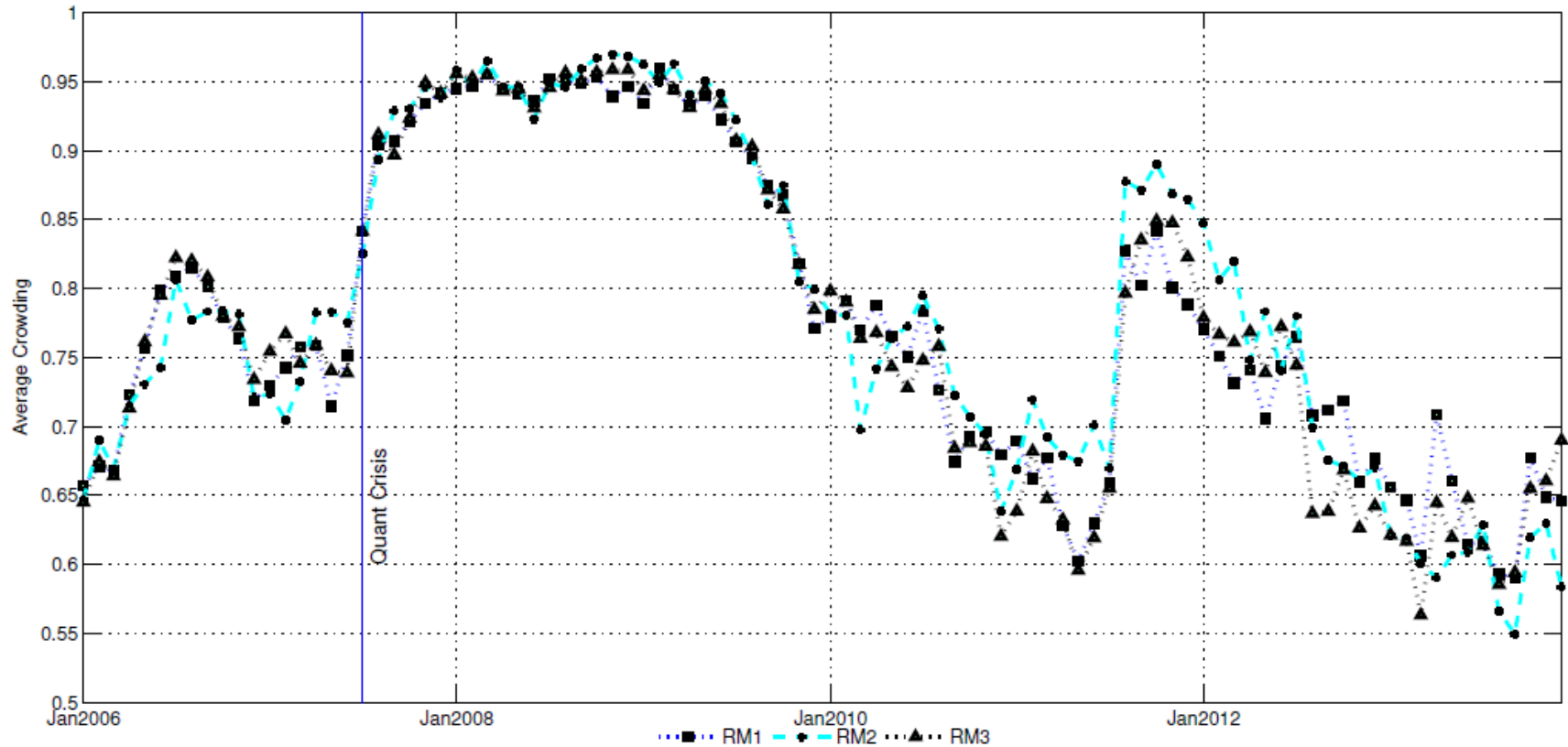
E. Empirical Results

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

	Risk Model 1			Risk Model 2			Risk Model 3		
	C	Ω	S.R.	C	Ω	S.R.	C	Ω	S.R.
Alpha Long Only	0.00								
Regular	0.85	1251.17	0.007	0.86	1140.19	-0.001	0.86	1250.08	0.005
MPA	0.73	1123.99	0.006	0.73	872.10	-0.003	0.72	976.13	0.002
Market Neutral									
Regular	0.00	1.65	-0.017	0.00	1.76	-0.006	0.00	1.10	-0.002
MPA	0.00	1.24	-0.011	0.00	1.23	0.020	0.00	1.05	0.006
Market Neutral Liq.									
Regular	0.00	2.02	-0.023	0.00	4.23	0.029	0.00	1.20	-0.004
MPA	0.00	0.78	-0.007	0.00	0.73	0.034	0.00	0.84	0.011

5. Crowded Spaces and Copycat Risk Management

E. Empirical Results



5. Crowded Spaces and Copycat Risk Management

E. Empirical Results

- Risk models all seem to have similar amounts of crowding.
- Does it make any difference whether the universe uses one risk model versus another?

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

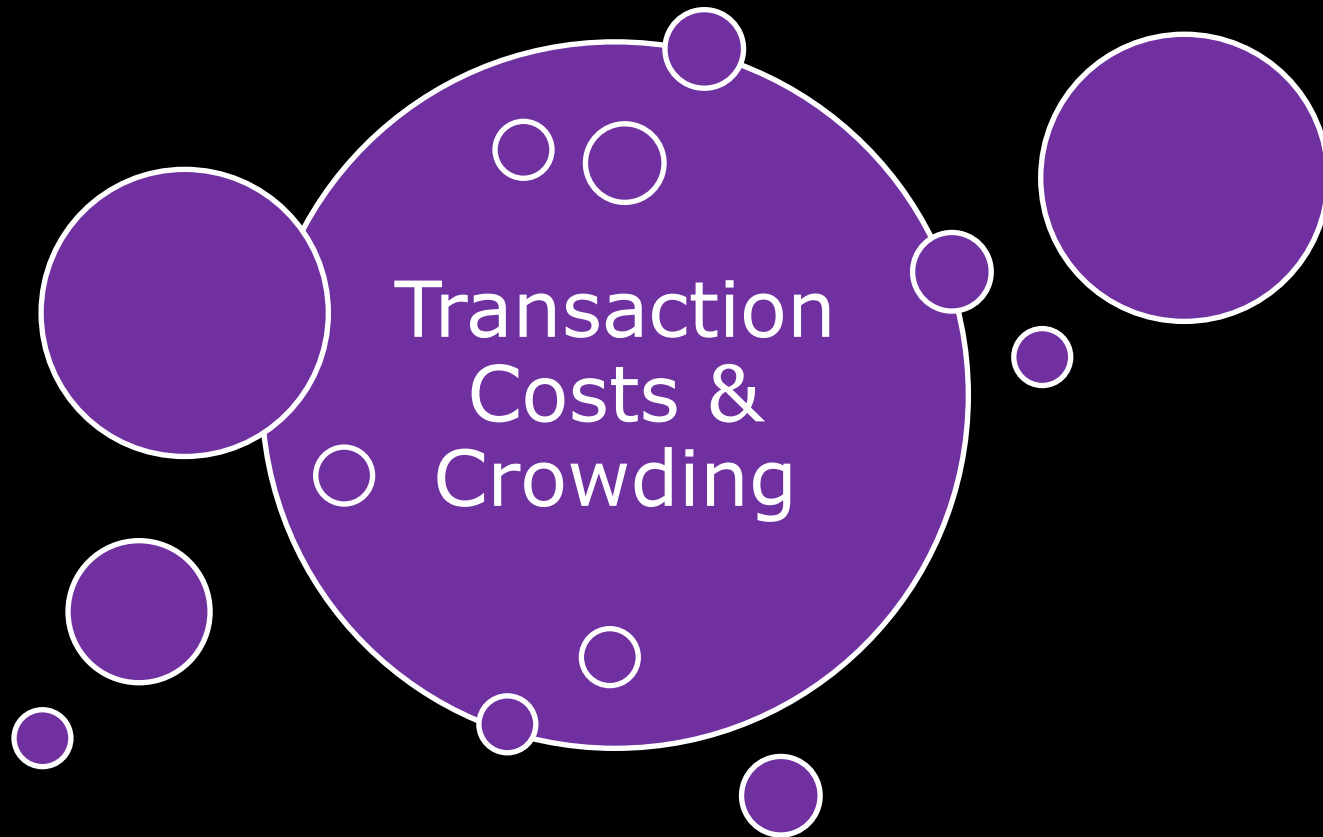
5. Crowded Spaces and Copycat Risk Management

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 risk model process itself.
- D. Our research shows that crowding does occur from risk models.
- E. 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.



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

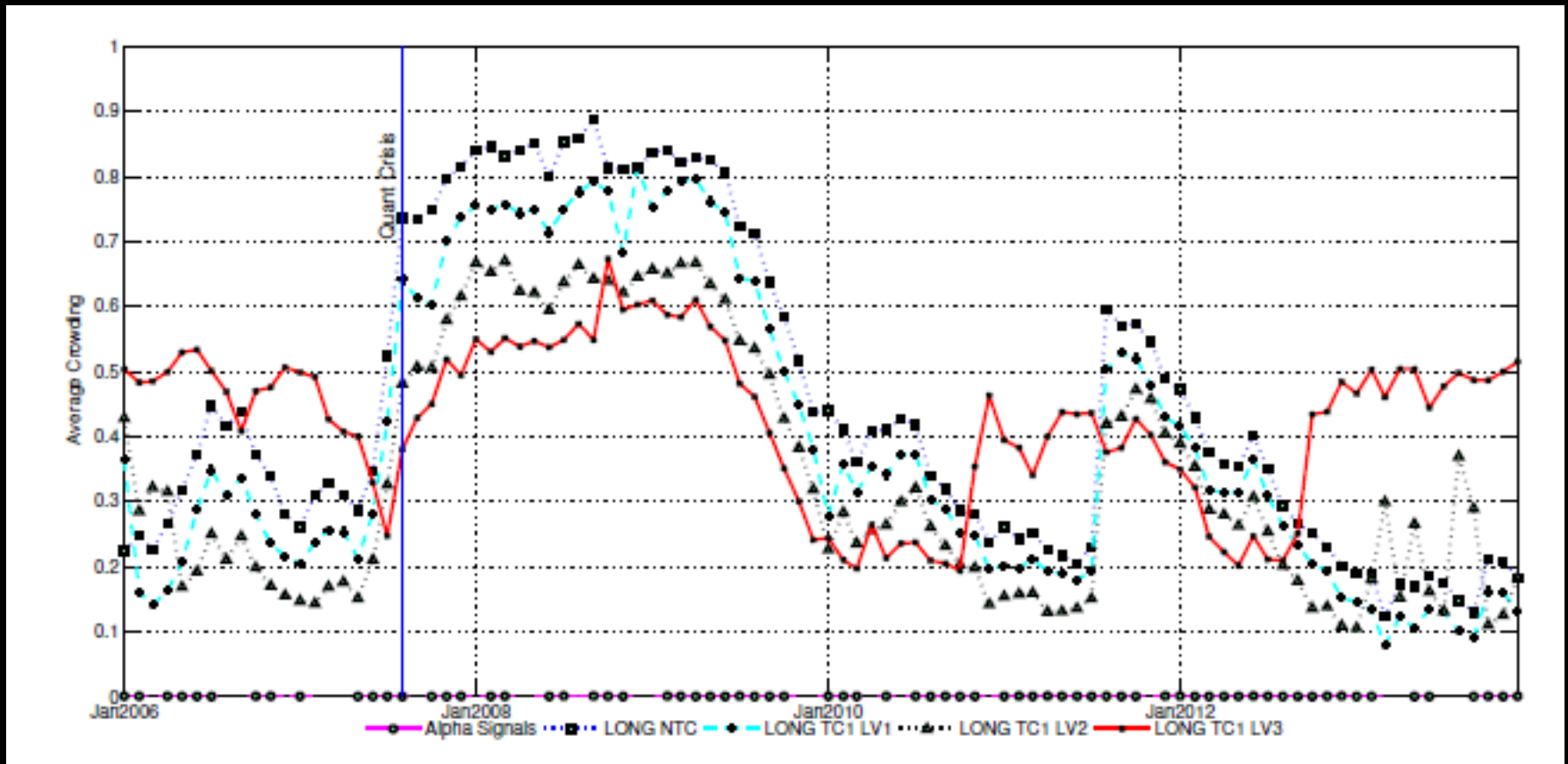
Results

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 Long Only	-0.00																	
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.”

Thank you

- Dr. Ludwig Chincarini , CFA
- University of San Francisco
- United States Commodity Funds

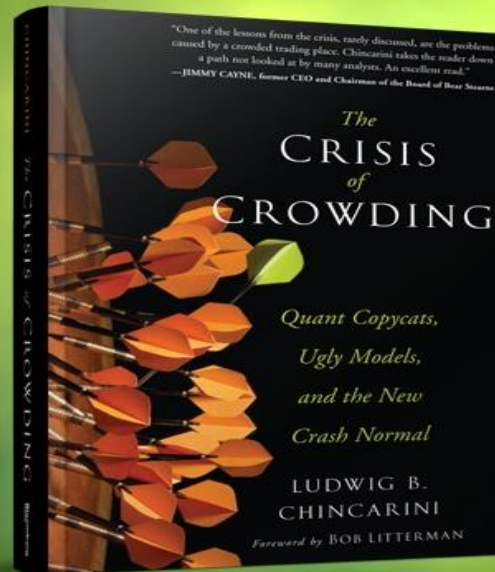
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A unique blend of storytelling and sound quantitative analysis, *The Crisis of Crowding* explores the circle of greed from homeowners to real estate agents to politicians to Wall Street.

Linking the 2008 financial crisis back to the 1998 crisis of LTCM, *The Crisis of Crowding* shows how banks, hedge funds, and other market participants repeated the sins of the past and how the collapse of Lehman Brothers led to market insanity thanks to the irrational behaviors of buyers and sellers in the crowded space.

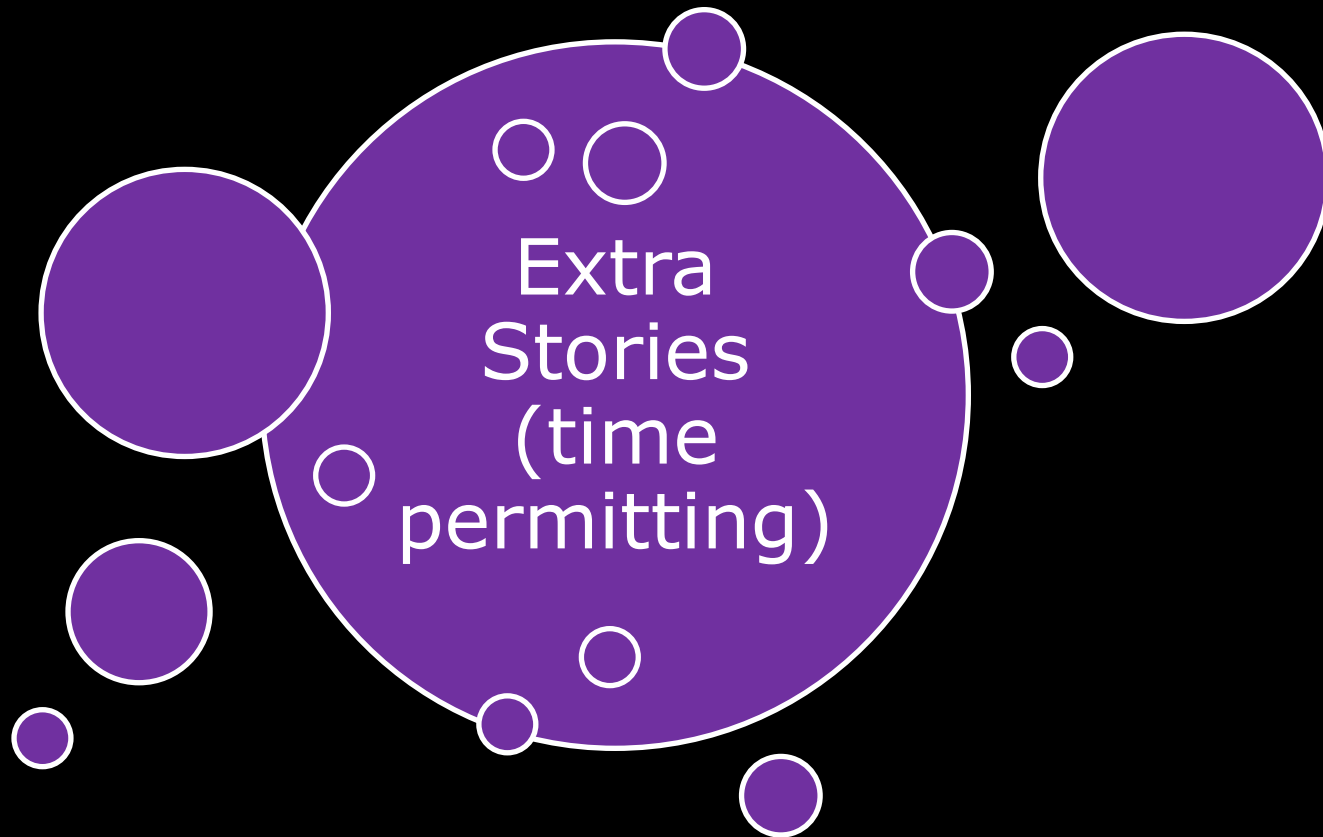
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Open Discussion

1. Have you formalized the discussion about size of a portfolio and investment horizon?
2. Could some of the crowding during the quant crisis been due to portfolio managers cutting risk?



A1. A Story from the Financial Crisis

- The Quant Crisis of 2007

- What are Quants?
- Some well known firms: Barclays Global Investors, GSAM, State Street, Morgan Stanley PDT, AQR, Panagora, Mellon Capital, etc.

A1. A Story from the Financial Crisis

- The Quant Crisis of 2007

- What are factors?
- Example: The Value Factor.

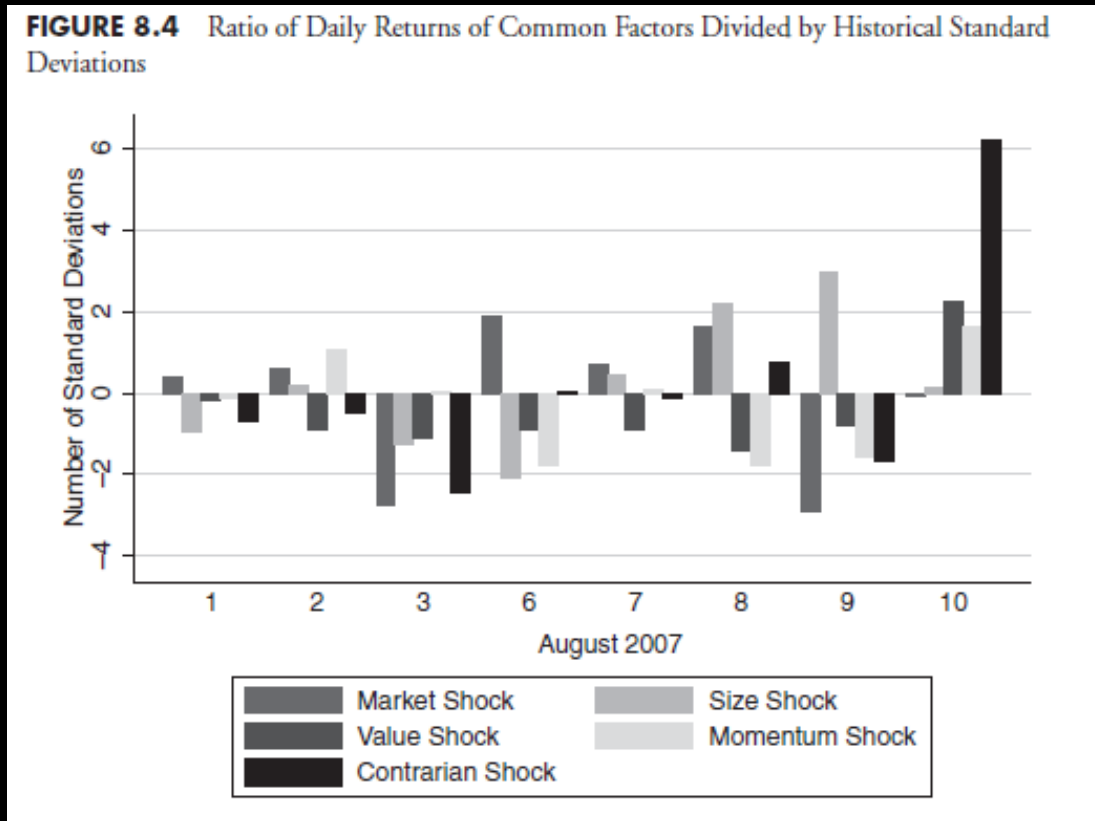
A1. A Story from the Financial Crisis

■ The Quant Crisis of 2007

- In August 2007, even standard factors behaved erratically.
- For example, value factor moved 0.75% in one day – unheard of – with 8x leverage moved 6%. August 2 – August 8, every day was within worst 5% moves in 20 years.

A1. A Story from the Financial Crisis

■ The Quant Crisis of 2007



Source: Chapter 8 The Crisis of Crowding

A1. A Story from the Financial Crisis

- The Quant Crisis of 2007
- Quant copycats everywhere...
- Factors different, but correlated...
- Transaction costs models similar
- Result→Similar small portfolios
- A seemingly liquid space became very illiquid...risk mis-measured. Exit path was crowded.

A1. A Story from the Financial Crisis

■ The Quant Crisis of 2007

We saw the growth of quant assets under management, but didn't see how far these strategies had extended into statistical arbitrage desks and hedge funds. We felt our proprietary factor specifications and weightings would provide differentiation, and this was supported by historical correlations plus low exposures of other quant managers to our factors. Our individual equity positions were small, liquid, and diversified—we didn't foresee a significant liquidation event focused on similar portfolios.

—Goldman Sachs analyst statement, December 13, 2007
(GSAM 2007)

Source: Chapter 8 **The Crisis of Crowding**

A1. A Story from the Financial Crisis

■ The Quant Crisis of 2007

Crowding among quants happens for several reasons, but the transaction costs model was of primary importance, as it caused us to trade similar securities at each point in time.

—Mark Carhart interview, former co-CIO of Quantitative Strategies at GSAM and Founder of Kepos Capital, October 11, 2011

Source: Chapter 8 The Crisis of Crowding

A1. A Story from the Financial Crisis

- The Quant Crisis of 2007
- Many hedge funds completely wiped out.

A2. A Story from the Financial Crisis

- JP Morgan and the Relative Value HF Community
 - J.P. Morgan had large losses in the 2nd quarter of 2012 due to bad hedges. \$5-7 billion.
 - Losses related to bets on corporate credit indices.
 - Bruno Iksil (aka London Whale) was involved.
 - Fudging marks, lying, and **misunderstanding real risk of instrument** partly due to **crowds** and **holders**

A2. A Story from the Financial Crisis

■ JP Morgan and the Relative Value HF Community

Excerpts from the internal JP Morgan Report

the priorities would be simultaneously addressed;¹¹ (2) the trading strategies that were designed in an effort to achieve the various priorities were poorly conceived and not fully understood by CIO management and other CIO personnel who might have been in a position to manage the risks of the Synthetic Credit Portfolio effectively; (3) CIO management (including CIO's

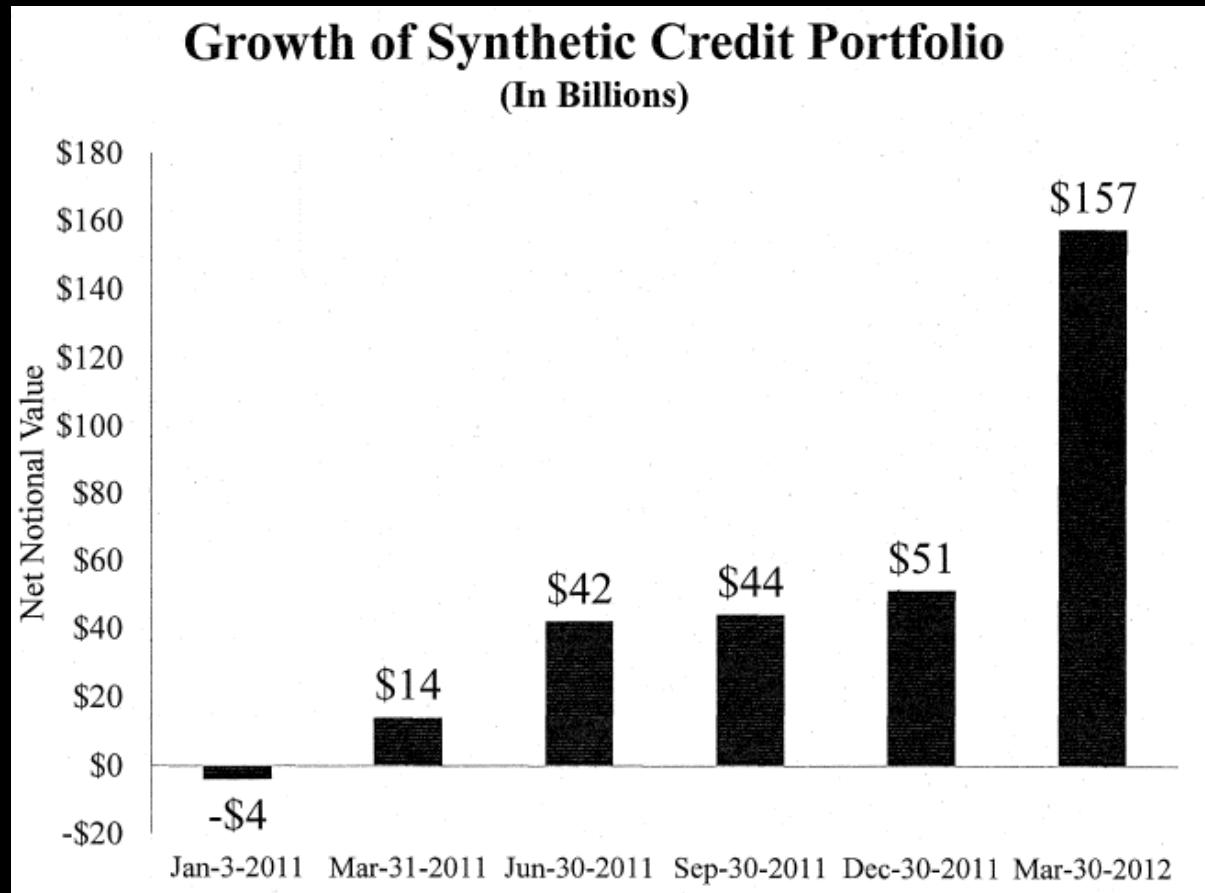
The positions in the Synthetic Credit Portfolio consisted of standardized indices (and related tranches²¹) based on baskets of credit default swaps ("CDS") tied to corporate debt issuers. CIO bought, among other things, credit protection on these instruments, which means

multiple maturities and tranche positions. In the fourth quarter of 2011, the Synthetic Credit Portfolio was in an overall short risk posture (as measured by CSW 10%), with a short risk position in high-yield offset to some extent by a long-risk investment-grade position.

A2. A Story from the Financial Crisis

- JP Morgan and the Relative Value HF Community

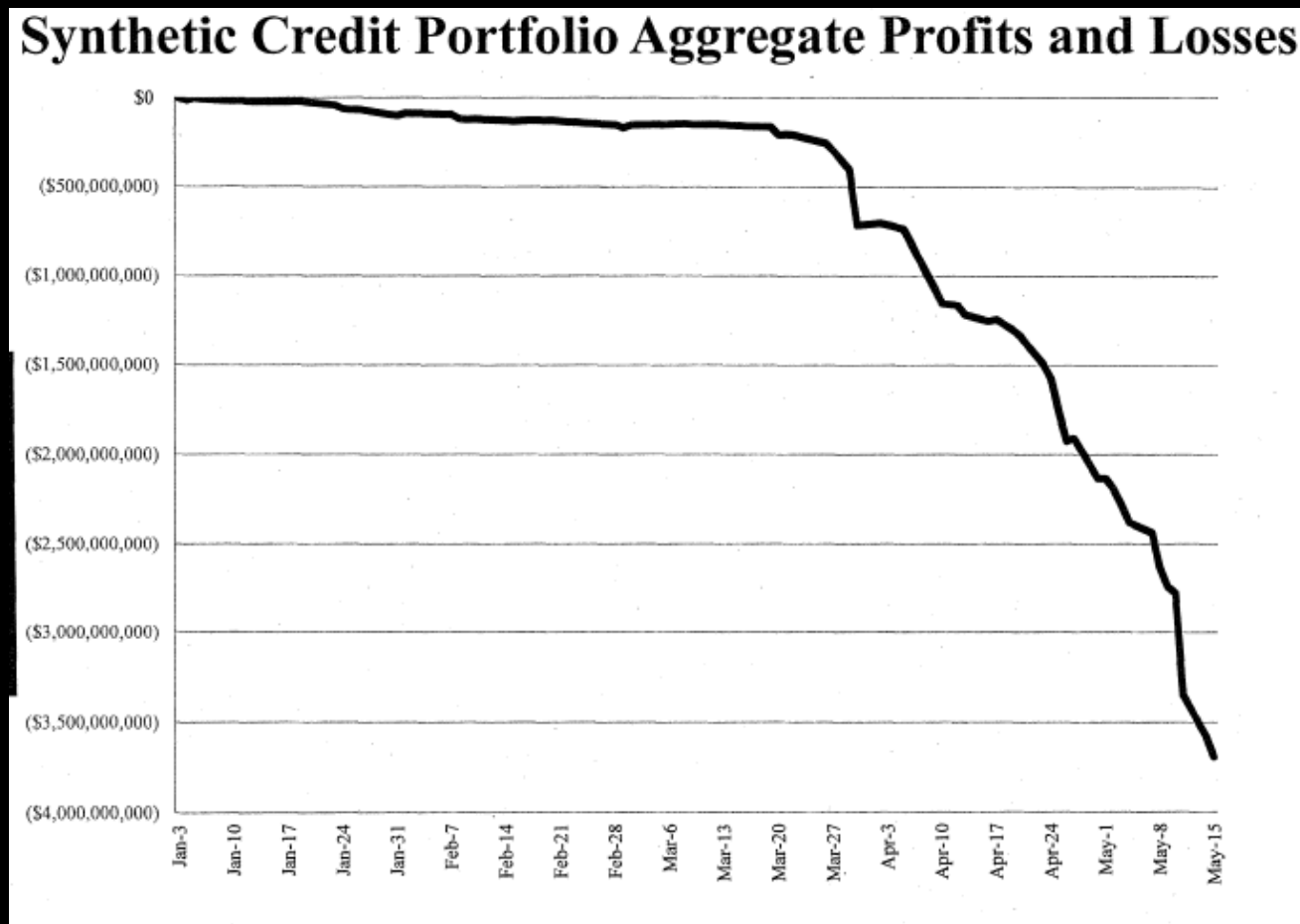
Excerpts from Senate Report



A2. A Story from the Financial Crisis

- JP Morgan and the Relative Value HF Community

Excerpts from Senate Report



A2. A Story from the Financial Crisis

- JP Morgan and the Relative Value HF Community

Excerpts from Senate Report

----- Original Message -----

From: macris@[REDACTED]

Sent: Tuesday, January 31, 2012 07:58 AM

To: Martin-Artajo, Javier X

Cc: Iksil, Bruno M; Stephan, Keith; Kalimtgis, Evan

Subject: FW: Core book p&l drawdown and main exposures

Hi Javier,

How is it going in NY?

Are you dialling into ISMG?

We need to discuss the synthetic book.

The current strategy doesn't seem to work-out.

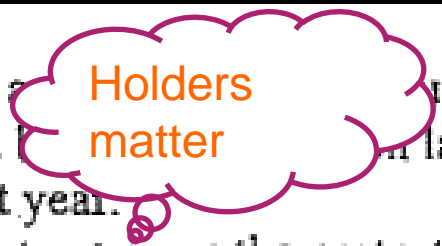
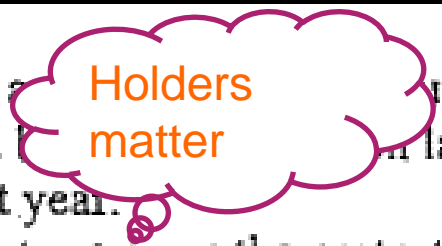
The intention was to be more bullish, but the book doesn't behave as intended.

A2. A Story from the Financial Crisis

■ JP Morgan and the Relative Value HF Community

Excerpts from Senate Report

Why does it impact the book ?

The book used the forward spreads () to buy protection on defaults short term and  a large spread widening. This worked very well last year.

Now January is very bullish and the street owns the protection we sold on the forwards. Towards month end the spread on series 9 remains sticky and tends to widen more than the rest especially the on-the-run indices where the book still has short risk overlay. So the book is squeezed on both ends and we saw this pattern from the first days of the year. It did not really correct since then. This explains why the ig part of the book does not perform as expected.

A2. A Story from the Financial Crisis

- JP Morgan and the Relative Value HF Community
 - It happened in 2008, but slightly differently.
 - Many relative-value hedge funds and banks were roasted, including Meriwether's new fund.

A2. A Story from the Financial Crisis

■ JP Morgan and the Relative Value HF Community

Background:

- CDX – new indices based on corporate bond CDS.
- IG index 125 largest, biggest U.S. companies equal-weighted.
- Tranches 0-3, 3-7, 7-10, ...30-100.
- If companies begin defaulting on debt, 0-3 takes first losses, then 3-7, and so on.
- For 30-100 to lose, about 63% of U.S. companies must default or fail

A2. A Story from the Financial Crisis

- JP Morgan and the Relative Value HF Community

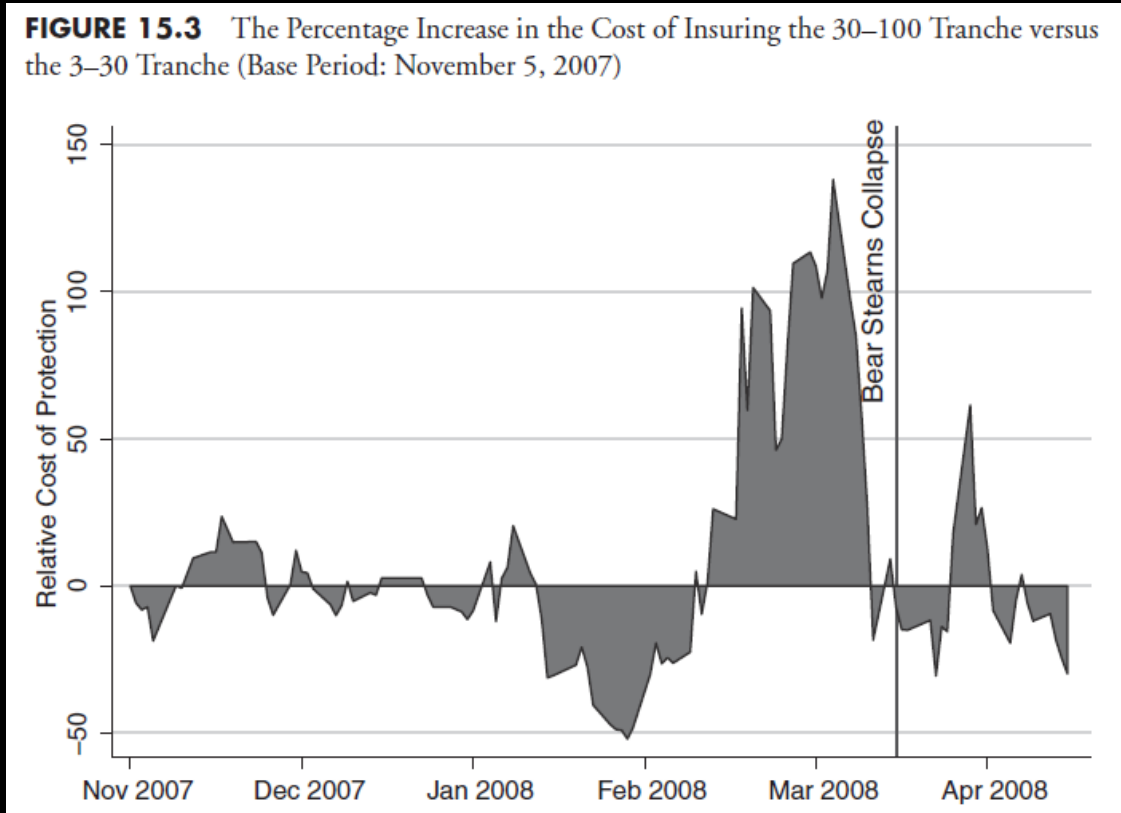
Which trade would you take if you thought 2008 would be a bad year?

Trade 1: Buy insurance 30-100, sell insurance 0-10

Trade 2: Sell insurance 30-100, buy insurance 0-10.

A2. A Story from the Financial Crisis

■ JP Morgan and the Relative Value HF Community



Cost of insuring 30-100 rose by **150%** over cost of insuring 0-10 in March 2008!

Source: Chapter 15 The Crisis of Crowding

A2. A Story from the Financial Crisis

- JP Morgan and the Relative Value HF Community

A market crisis is coming, what trade would you do in the commercial real-estate market?

Trade 1: Buy A rated and short AAA rated.

Trade 2: Short A rated and buy AAA rated.

A2. A Story from the Financial Crisis

- JP Morgan and the Relative Value HF Community

The trade **lost them 39%** unleveraged from September to November 2008 (November losses 26%!)

Why?

1. Post-Lehman behavior was chaotic.
2. New Instrument – CMBX – didn't hedge correctly. Short history, strange holders, AAA held by levered risk averse institutions → **J.P. Morgan found this too.**
3. Became difficult to trade as prices dropped. Value irrelevant...