Asset Management, Asset Managers & Systemic Risk

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[1]The opinions expressed in this presentation are those of the authors and are not meant to represent the opinions or official positions of Lyxor Asset Management.

Outline

Main Results

- Distinction between asset managers and investment management

  Does asset management pose systemic risk? YES

  $\neq$

  Are asset managers SIFIs? NO

- Size of assets managers is not the appropriate criterion for SIFI designation (because of the business heterogeneity)
- The main risk is the run/redemption/liquidity risk posed by collective investment funds
- Systemic risk should then be analyzed at the asset class level
- Fixed-income instruments are the main concern of systemic risk due to the liquidity risk
- We have to reinvent liquidity measures for the bond market, because equity-based measures (spread, volume, etc.) are not relevant and are useless in distressed markets

Aftermath of the Global Financial Crisis

Systemic risk

- Basel III
  - Capital (CCB, HLA)
  - Interconnectedness (CCR, $1.25 \times \rho\,(\mathrm{PD})$, CVA)
  - Liquidity (Liquidity Coverage Ratio & Net Stable Funding Ratio)
  - Leverage ratio
- Dodd-Frank (2010)
- Volcker rule (2010)
- G-SIBs & G-SIIs (2013)
- Total Loss Absorbency Capital (TLAC)

Shadow banking

- Dodd-Frank (2010), AIFMD (2011), MiFID 2 (2014), PRIIPS/KID (2014), EMIR (2014)
- Fall-back approach for the banking book (BCBS, 2013)
- Money market funds (IOSCO, 2012)
- Bank-like prudential supervision for Nomura and Daiwa in Japan
- Non-banks originated 42% of US mortgage credit in 2014 (10% in 2009)

NBNI SIFI

In 2011, G-20 nations tasked FSB and IOSCO with developing a methodology to identify Non-Bank Non-Insurance Systemically Important Financial Institutions (NBNI SIFIs)

- January 2014: 1st FSB-IOSCO proposal
- March 2015: 2nd FSB-IOSCO proposal
- Three phases:
  1. Identification methodology to be completed end of 2015
  2. Development of policy measures to limit and address systemic risk created by NBNI SIFIs
  3. Creation of an International Oversight Group to conduct yearly assessments
- Methodology should be broadly consistent with indicator-based methodology already used for banks and insurance

BUT

- Broad ranging scope: shadow banking sectors (finance companies, market intermediaries, broker-dealers, asset managers and their funds, etc.)

Motivation

Asset Management as source of systemic risk is new!

1. What is the appropriate lens or unit to assess systemic risk in asset management? Funds, family of funds, asset managers or asset managers and funds?
2. What shape and form should prudential policies take? Capital requirements? Liquidity coverage ratios?
3. Should we use the same criteria to assess systemic risk as for banks and insurance, i.e. mainly size? What about non-linear and threshold effects due to strategic situation of an institution and complexity of portfolios (including instruments, strategies, and liquidity)?

$\Rightarrow$ We focus on Points 1 and 3 here.

Systemic Risk & SIFIs

Systemic risk

- Often opposed to idiosyncratic risk (CAPM, APT)
- $\neq$ systematic market risk (Hansen, 2012)
- $=$ "distress" risk of the entire system
- Can be caused by the idiosyncratic risk of an institution (propagation risk)

Systemically Important Financial Institutions (FSB, 2010)

SIFIs are financial institutions whose distress or disorderly failure, because of their size, complexity and systemic interconnectedness, would cause significant disruption to the wider financial system and economic activity.

$\Rightarrow$ Three kinds of SIFIs: banks (SIB), insurers (SII) and others (NBNI SIFI)

The Supervisory Approach for Banks

Table: Scoring system of G-SIBs

	Category		Indicator	Weight
1	Size	1	Total exposures	1/5
2	Interconnectedness	2	Intra-financial system assets	1/15
		3	Intra-financial system liabilities	1/15
		4	Securities outstanding	1/15
3	Substitutability/financial institution infrastructure	5	Payment activity	1/15
		6	Assets under custody	1/15
		7	Underwritten transactions in debt and equity markets	1/15
4	Complexity	8	Notional amount of OTC derivatives	1/15
		9	Trading and AFS securities	1/15
		10	Level 3 assets	1/15
5	Cross-jurisdictional activity	11	Cross-jurisdictional claims	1/10
		12	Cross-jurisdictional liabilities	1/10

$\Rightarrow$ In 2015, there are 30 G-SIBs: 2 in Bucket 4 (HSBC & JPMorgan Chase), 4 in bucket 3 (Barclays, BNP Paribas, Citigroup & Deutsche Bank), 5 in bucket 2 and 19 in bucket 1.

FSB-IOSCO Proposed Methodology

- Concerns:
  1. Finance companies (purview of FSB);
  2. Market intermediaries, esp. securities broker-dealers (purview of IOSCO);
  3. Investment funds: collective investment schemes (CIS) and hedge funds (purview of IOSCO).
- Goal: Identify largest potential sources of systemic risk, no matter how unlikely, rather than likelihood of a systemic shock originating with a particular institution
- Several steps:
  1. "Materiality Threshold" lists per jurisdictions
  2. Detailed assessments (using quantitative and qualitative indicators)
  3. Final NBNI SIFI list by *International Oversight Group*.
- Annual frequency

FSB-IOSCO Proposed Methodology

Materiality threshold for AM (FSB-IOSCO, 2015, page 11):

- For investment funds
  - (i) Option 1: USD 30 billion in NAV *and* balance sheet financial leverage of 3 times NAV **or** net AUM $\geq$ USD 100 billion.
  - (ii) Option 2: Gross AUM $\geq$ USD 200 billion *unless* investment fund is not a dominant player in its markets (for example substitutability ratio $< 0.5\%$ or fire sale ratio $< 5\%$)
- For asset managers (either in combination or exclusively)
  - (i) Option 1: "balance sheet total assets" $\geq$ USD 100 billion
  - (ii) Option 2: AUM $\geq$ USD 1 trillion

FSB-IOSCO Scoring System for Asset Management

Category		Investment funds		Asset managers
Size	1.1	Assets under management	1.1	Assets under management
	1.2	Gross notional exposure	1.2	Balance sheet assets
Interconnectedness	2.1	Balance sheet financial leverage	2.1	Leverage Ratio
	2.2	Leverage ratio	2.2	Guarantees and other off-balance sheet exposures
	2.3	Ratio of GNE to NAV		
	2.4	Ratio of collateral to NAV		
	2.5	Counterparty credit exposure		
	2.6	Intra-financial system liabilities to G-SIFIs		
	2.7	Nature of investors		
Substitutability	3.1	% of trading volume	3.1	Market share measured by revenues
	3.2	% of holdings per certain asset classes	3.2	Market share measured by AUM
	3.3	Ratio of NAV to the size of the underlying market		
Complexity	4.1	% of non-centrally cleared derivatives	4.1	Impact of the organisational trade volume structure
	4.2	% of re-used collateral	4.2	Difficulty in resolving a firm
	4.3	% of HFT strategies		
	4.4	Liquidity profile		
	4.5	Ratio of unencumbered cash to GNE		
	4.6	Ratio of unencumbered cash to NAV		
	4.7	Amount of less liquid assets		
Cross-jurisdictional activities	5.1	Number of jurisdictions in which a fund invests	5.1	Number of jurisdictions
	5.2	Number of jurisdictions in which the fund is sold or listed		
	5.3	Number of jurisdictions where the fund has counterparties		

$\Rightarrow$ Same framework than for G-SIBs and G-SIIs

Some asset managers are already under a SIFI regulation

Asset manager	AUM[a]		SIFI
BlackRock Inc.	4,324.0		
Vanguard Group Inc.	2,752.9		
State Street Global Advisors	2,344.7	✓	State Street
Fidelity Investments	2,159.8		
JP Morgan Asset Management	1,598.0	✓	JPMorgan Chase
BNY Mellon Investment Management	1,582.9	✓	Bank of New York Mellon
PIMCO	1,535.0	✓	Allianz SE
The Capital Group Cos. Inc.	1,338.8		
Deutsche Asset & Wealth Management	1,289.0	✓	Deutsche Bank
Prudential Financial	1,107.0	✓	Prudential Financial, Inc.
Amundi	1,071.7	✓	Group Crédit Agricole
The Goldman Sachs Group Inc.	1,042.0	✓	Goldman Sachs
Northern Trust Asset Management	884.4		
Franklin Templeton Investments	879.1		
Wellington Management Co. LLP	834.4		

[a] in USD BN.

Source: Pensions & Investments Magazine (2014).

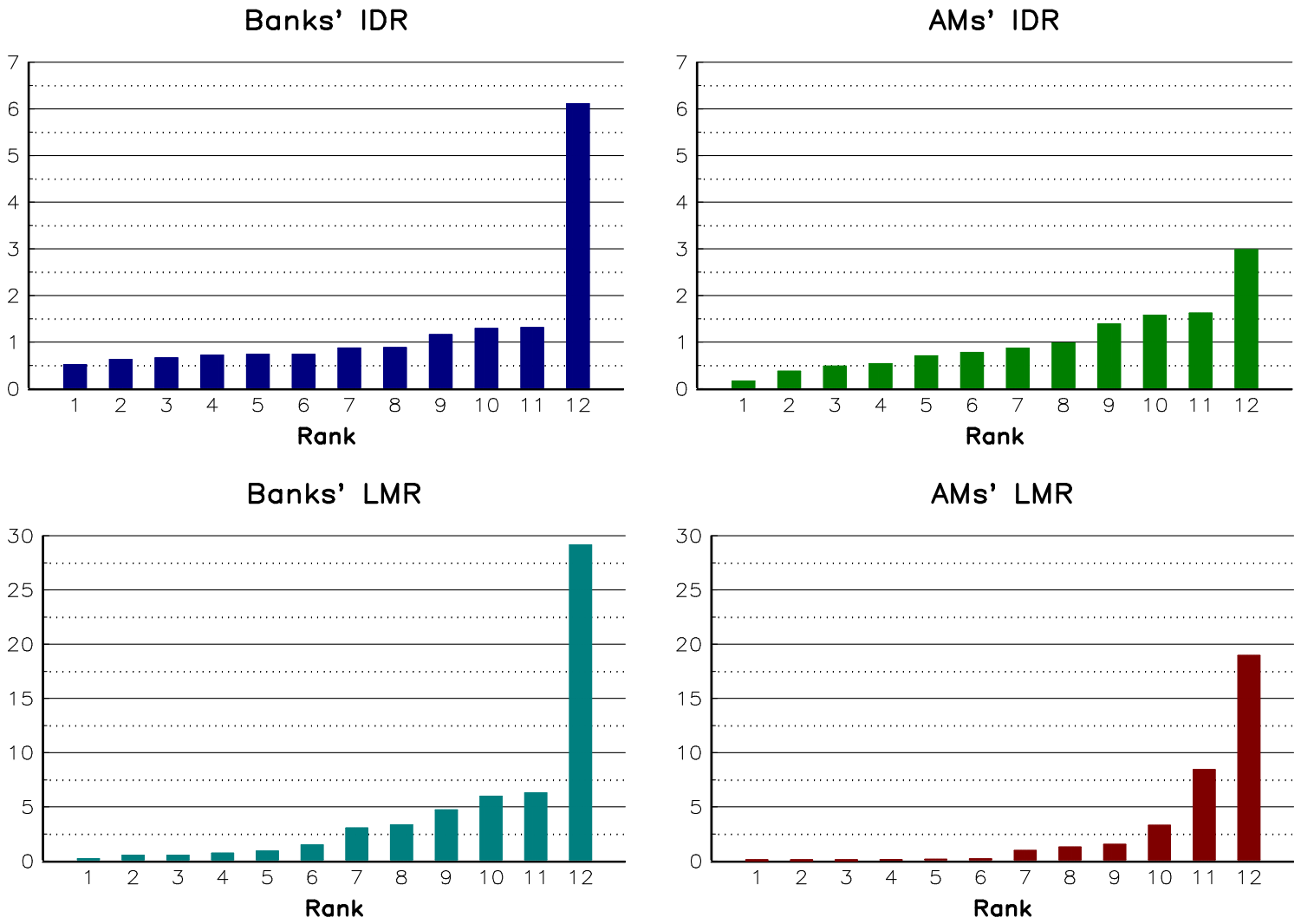
Comparing Income Risk Between Banks and AMs

- Income Dispersion Ratio: $\mathrm{IDR}_i = \dfrac{\sigma\left(\Pi_{t,i}\right)}{\mathbb{E}\left[\Pi_{t,i} \mid \Pi_{t,i} > 0\right]}$ where $\sigma\left(\Pi_{t,i}\right)$ is the time standard deviation of income of stock i while $\mathbb{E}\left[\Pi_{t,i} \mid \Pi_{t,i} > 0\right]$ is the average normal income of stock i.
- Loss Magnitude Ratio: $\mathrm{LMR}_i = \dfrac{\max_t L_{t,i}}{\mathbb{E}\left[\Pi_{t,i} \mid \Pi_{t,i} > 0\right]}$ where $\max_t L_{t,i}$ is the maximum loss observed for a given period.

Statistic	Income Dispersion		Loss magnitude	
	Banks	AMs	Banks	AMs
Median	0.81	0.82	2.26	0.59
Mean	1.30	1.04	4.75	2.91
Standard deviation	1.54	0.77	7.99	5.60

Source: Bloomberg & Authors' calculation.

Distributions of IDR and LMR



Source: Bloomberg & Authors' calculation.

What is the Business Risk of Asset Managers?

Net income π_t of the fund manager

Under some assumptions, we obtain the following expression:

$$\pi_t = m_t A_0 e^{\int_0^t (R_s - m_s + \delta_s)\,\mathrm{d}s} - C_t - L_t$$

where A_0 is the assets under management at time $t = 0$.

5 key parameters:

- Management fee m_t
- Gross performance of the fund manager R_t
- Intensity of net flows δ_t
- Operating cost C_t
- Operational losses L_t

The ~~Systemic~~ Systematic Risk of Asset Managers is high

- The profitability of AMs is a leverage on returns R_t
- This relationship is very sensitive to the management fee
- 2 types of asset managers:
  1. Low fees with more stable income
  2. High fees with less stable income (performance fees)
- Regarding expenses, the income of an asset manager is sensitive to operational losses
  - Asset Management is a low-risk business (Basel II)
  - Operational losses occur because of explicit and implicit guarantees

$\Rightarrow$ The beta of (equity) AMs is larger than 1 ($\beta \approx 1.5$ on average).

$\Rightarrow$ AMs are SIFIs using academic measures of systemic risk (MES, Δ CoVaR and SRISK)

Largest mutual funds (in USD BN)

Fund	AUM	Asset class		
		Equity	Bond	Diversified
Vanguard Total Stock Market Index Fund	406.5	✓		
Vanguard Five Hundred Index Fund	209.4	✓		
Vanguard Institutional Index Fund	195.5	✓		
Vanguard Total Intl Stock Index Fund	162.5	✓		
American Funds Growth Fund of America	149.4	✓		
Vanguard Total Bond Market Index Fund	144.6		✓	
American Funds Europacific Growth Fund	133.5	✓		
PIMCO Total Return Fund	117.3		✓	
TianHong Income Box Money Market Fund	114.8			
Fidelity® Contrafund® Fund	110.6	✓		
American Funds Capital Income Builder	100.7			(80 / 20)
American Funds Income Fund of America	99.7			(80 / 20)
Vanguard Total Bond Market II Index Fund	93.4		✓	
Franklin Income Fund	92.4			(50 / 50)
American Funds Capital World G&I Fund	91.0	✓		
Vanguard Wellington™	90.7			(60 / 40)
Fidelity Spartan® 500 Index Fund	90.0	✓		
American Funds American Balanced Fund	83.0			(60 / 40)

Source: Morningstar's database, May 5, 2015.

FSB-IOSCO's materiality threshold: Most of eligible mutual funds are equity index funds $\Longrightarrow$ Problematic!

Size and Liquidity

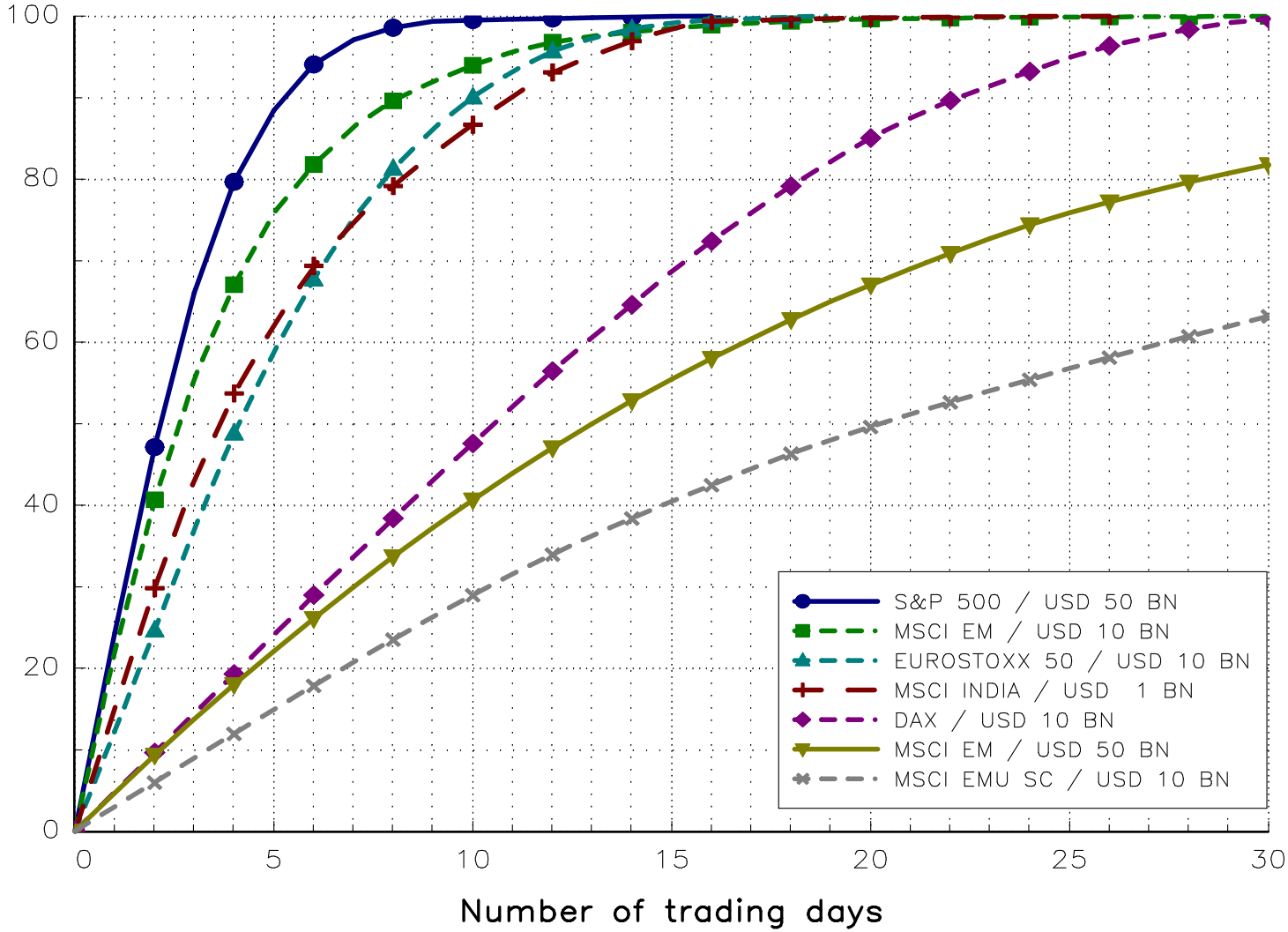
Table: Statistics of the liquidation ratio (AUM = USD 10 BN, ADV = 10%)

Statistics	S&P 500	ES 50	DAX	NASDAQ	MSCI EM	MSCI INDIA	MSCI EMU SC
t (in days)	Liquidation ratio $\mathscr{LR}(t)$ in %						
1	88.4	12.3	4.8	40.1	22.1	1.5	3.0
2	99.5	24.7	9.6	72.6	40.6	3.0	6.0
5	100.0	58.8	24.1	99.7	75.9	7.6	14.9
10	100.0	90.1	47.6	99.9	93.9	15.1	29.0
α (in %)	Liquidation time $\mathscr{LR}^{-1}(\alpha)$ in days						
50	1	5	11	2	3	37	21
75	1	7	17	3	5	71	43
90	2	10	23	3	9	110	74
99	2	15	29	5	17	156	455

Source: Bloomberg & Authors' calculation (data as of April 30, 2015).

- Long-only CW index funds are not more systemic than active funds, even if they are more exposed to the systematic risk (e.g. Flash Crash of August, 24 2015).
- Absolute materiality threshold is sensitive to the market performance.

Size and Liquidity



Source: Bloomberg & Authors' calculation.

Liquidity Issues in Bond Markets

- Compared to 2008, the ADV in dollars has decreased by 30% on average in 2014:
  - −50% for municipal bonds
  - −9% for treasury bonds
  - +86% for corporate bonds (no liquidity on corporate debt in 2008)
- Compared to 2008, the ratio ADV/Issuance has decreased by 43% on average in 2014:
  - −41% for municipal bonds
  - −57% for treasury bonds
  - −9% for corporate bonds
- The turnover of a US corporate bond is twelve times lower than the turnover of a US treasury bond

Source: SIFMA & Authors' calculation.

Liquidity Issues in Bond Markets

Differences between equity and bond markets

- In equity markets:

$$\text{Number of intentions to trade} \approx \text{Number of trades}$$

- In bond markets (except for underlying assets of futures contracts):

$$\text{Number of intentions to trade} \gg \text{Number of trades}$$

$\Rightarrow$ What is the signification of the spread?

Liquidity Issues in Bond Markets

Characteristics of non-liquid bond markets

- Mainly a buy-and-hold market and a one-way market driven by buyers
- Sometimes, we observe a market reversal and the bond market becomes a one-way market with only sellers
- This is why the portfolio manager tests the market before trading; if the test is negative, the trade is delayed or the portfolio manager tests the market with a more liquid bond

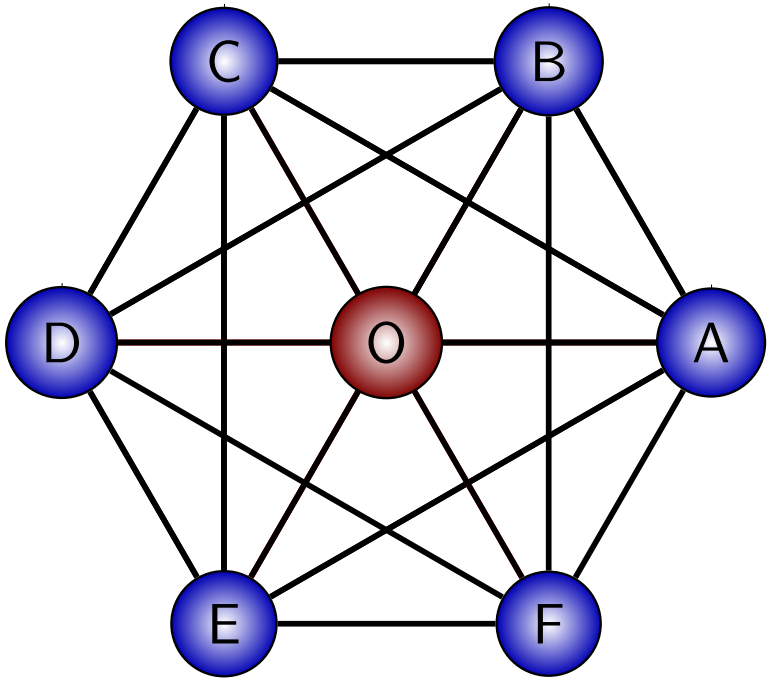
$\Rightarrow$ Equity-based liquidity measures are not relevant (spread, turnover, etc.)

$\Rightarrow$ Complete asymmetry between normal and distressed markets (which is not the case for equity markets):

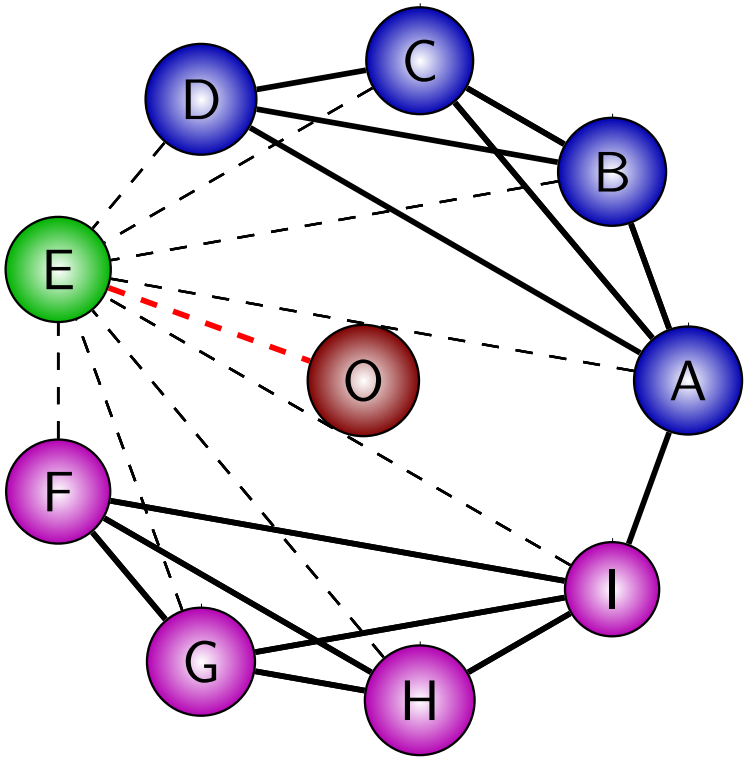
There is no relationship between the spread
of a buyer's market and the spread of a seller's market

Why LTCM and not Amaranth or Madoff?

(a) Highly connected network



(b) Sparse network



Some famous losses in the asset management industry:

- Madoff: USD 65 BN (Ponzi scheme; not connected)
- Amaranth: USD 6.5 BN (Gaz futures; low CCR; connected via CCPs)
- LTCM: USD 4.6 BN (large CCR; highly connected)

An Illustration with Money Market Funds

"Following the bankruptcy of Lehman Brothers in 2008, a well-known fund – the Reserve Primary Fund – suffered a run due to its holdings of Lehman's commercial paper. This run quickly spread to other funds, triggering investors' redemptions of more than USD 300 billion within a few days of Lehman's bankruptcy" (Kacperczyk and Schnabl, 2013).

- Deposit insurance extended to MMFs (September 19, 2008)
- ABCP money market mutual fund liquidity facility (AMLF) between September 2008 and February 2010

Remark

Trouble of small MMFs is a signal to redeem for all the investors in MMFs, whatever the size of the MMF.

Proposal for a More Robust Scoring System

- The asset manager's score S is the arithmetic sum of the scores of the different funds that compose the asset manager's portfolios:

$$S = \sum_i S_i$$

- The score of the fund i is defined as follows:

$$S_i = \mathrm{AUM}_i \times \mathrm{LEV}_i \times \lambda_i$$

where LEV_i is the portfolio leverage and λ_i is an asset liquidity factor that depends on the asset class of the portfolio.

An example of liquidity factor calibration

Find the equivalent size x_j of a fund invested in the asset class j which presents the same liquidity profile than a fund of size x_i invested in the asset class i:

$$\frac{\lambda_j}{\lambda_i} = \frac{x_i}{x_j}$$

Key Points

- Size is not the right metric to measure systemic risk (heterogeneity of the asset management industry, contrary to the banking sector)
- The big issue is the run/redemption/liquidity risk
- This risk may be amplified by leverage risk and counterparty credit risk
- This risk highly depends on the asset class
- In July 2015, FSB delays SIFI designation of asset managers (focus on activities, strategies & asset classes)

Computing the Liquidation Ratio

- Consider a fund invested in n assets.
- Denote $(N_1, \ldots, N_n)$ the number of shares held by the fund and P_i the current price of asset i.
- The assets under management are equal to $\text{AUM} = \sum_{i=1}^{n} N_i \cdot P_i$.
- For each asset that composes the portfolio, denote N_i^+ the maximum number of shares for asset i that can be sold during a trading day.
- The number of shares $N_i(t)$ liquidated at time t is defined as follows:

$$N_i(t) = \min\left(\left(N_i - \sum_{k=0}^{t-1} N_i(k)\right)^+, N_i^+\right)$$

with $N_i(0) = 0$.

- The liquidation ratio $\mathscr{LR}(t)$ is the proportion of the fund liquidated after t trading days:

$$\mathscr{LR}(t) = \frac{\sum_{k=0}^{t} N_i(k) \cdot P_i}{\text{AUM}}$$

An example of the liquidity factor matrix

Asset Class		λ_i
Equities	Developed Markets	1.00
	Emerging Markets	1.25
	Small Caps	1.50
Bonds	Short Maturity	1.50
	Sovereign	2.00
	Investment Grade	2.00
	High Yield	2.50
	Emerging Markets	2.50
Foreign Exchanges	Developed Markets	1.00
	Emerging Markets	1.25
Alternative Investments	Commodities	2.00
	Real Estate	3.00
Specialized Funds	Diversified	1.50
	Closed-end Fund	0.00
	CW Index Funds on High Liquid DM Equity Indexes	0?