

Asset and Risk Management in a Post-Crisis Market

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Disclaimer

This presentation is partly based on work I did as president of RiskMetrics Group and is inspired by dialogues with colleagues. The RiskMetrics is now a part of MSCI Inc. I have left the company and take the sole responsibility for these slides.

I thank professor Andrew Ang at Columbia and Antti Ilmanen, Ph.D., Senior Trader at Brevan Howard Asset Management for very valuable input.

The Crisis Exposed Investors to the Two Pitfalls of Institutional Investments

#1 Pro-cyclical investments

Even institutional investors could not resist behaving with the herd, risk being built in “good times” was not sustained when “bad times” occurred

#2 Overly complex portfolios

Example: Huge allocations to “alternatives” and advanced instruments blurred the true risk characteristics of portfolios and imposed unnecessary high risk and costs. Diversification didn’t work because complexity hid the underlying drivers of returns – which turned out to be the same

Typical institutional investors spend 80-90 percent of their time on implementation issues, building complexity, rather than on strategic and ALM issues that normally determine 80-90 percent of expected risk and return

Overcoming Human Behavioral Deficiencies

A key takeaway from the financial crisis is about the role of human behavior, the lack of adherence to rationality and the tendency to move with the herd.

The ultimate long-term investor is contrarian. Building a successful investment strategy is to acknowledge the pro-cyclical human instincts and safeguard against it by setting up institutional frameworks.

Asset management and risk management are two sides of the same coin. Asset management must be based on the underlying risk factors. Risk management should be centered along the basic strategic choices: why do we take on the risk initially and are we rewarded for the risks that we are taking?

Agenda

Changes in the perceptions of financial markets and risk

Living with Knightian uncertainty

Building robust decision making systems

Building robust portfolios

Risk factor based asset management

Changes in the Perceptions of Markets and Risks

Out: Efficient market hypothesis, beliefs in equilibrium models based on rational behavior

In: Financial markets as adaptive, complex network systems, learning from biology etc. (Back to studies of dis-equilibrium, Fisher, Keynes, Kindleberger, Minsky, etc; more behavioral finance, more on reflexivity, but without throwing all efficient market hypothesis theories away, and being extremely humble about our ability to predict market movements)

The Financial Markets are Complex Networks

The global financial markets are complex, adaptive networks. We know from nature that such networks can have distributions with thin middle and long, fat tails.

Adaptivity and feedback loops, learning from other network disciplines such as epidemiology: SARS, the Spanish flu, yellow fever. Behavioral dynamics leads to panic hoarding of liabilities, distressed sales of assets.

Uncertainty, chains of claims in networks. Who is really at the end of this chain? Impossible to know the ultimate counterparty risk.

Innovation and complexity; risk of financial instruments hidden (an asset backed CDO could consist of 1 billion pages of documentation)

Not diversity, but a monoculture. Large financial institutions followed the same strategies, leveraged up and did invest in the same markets

Paradoxically, the ability to readily hedge and diversify risk for individual participants increased systemic risk due to greater coupling and potential for cascading failure

Power laws govern network dynamics

Law of the few (e.g, 80-20 rule)

Fat-tailed distributions (e.g., Pareto, Student t)

Seen all over the world, from wealth distribution to city sizes

Mainly inspired by: Rethinking the Financial Network, by A. G. Haldane, Bank of England, April 2009
See also: A Demon of Our Own Design: Markets, Hedge Funds, and the Perils of Financial Innovation, R. Bookstaber, 2007

Living with Knightian Uncertainty

[Any given] “instance” ... is so entirely unique that there are no others or not a sufficient number to make it possible to tabulate enough like it to form a basis for any inference of value about any real probability in the case we are interested in. The same obviously applies to the most of conduct and not to business decisions alone.

Frank Knight, 1921, quoted from Bernstein, 1996

By “uncertain” knowledge ... I do not mean merely to distinguish what is known for certain from what is only probable. The game of roulette is not subject, in this sense, to uncertainty ... The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention ... About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know! *John M. Keynes, 1937, response to criticism of The General Theory, quoted from Bernstein, 1996*

Reality Versus Models

“[T]he basis of weather forecasting is looking from a satellite and seeing a storm coming, but not predicting that the storm will form. The behavior of economic phenomena is far more complicated than the behavior of liquids or gases.”

(Mandelbrot 2008, in a PBS New Hour interview on October 21)

A complex environment has an enormous potential to generate truly confusing surprises.

Reality is immensely more complex than models, with millions of potential weak links.

After a crisis has occurred, it is relatively easy to highlight the link that blew up, but before the crisis, it is a different matter.

...this change in paradigm, from irrelevant to critical linkages, can trigger massive uncertainty, which can unleash destructive flights to quality.

From: R.J. Caballero, Macroeconomics after the Crisis: Time to Deal with the Pretense-of-Knowledge Syndrome, JEL, 2010

The Ultimate Risk: “Bad Times”

Even very “diversified” portfolios performed badly during the crisis

Many asset classes and investment strategies tend to have the same risk characteristics during stress events

Two ways to “escape”:

- Take down the overall risk level
- Hedge, insure or time the portfolio against “bad times”

Lower risk means lower long-term return

Market timing may be extremely risky and insurance very costly

- Will rewards for taking bad times risk increase?
- Will investors find new, smart ways of taking risk on/off?

Confusing Risk with Volatility

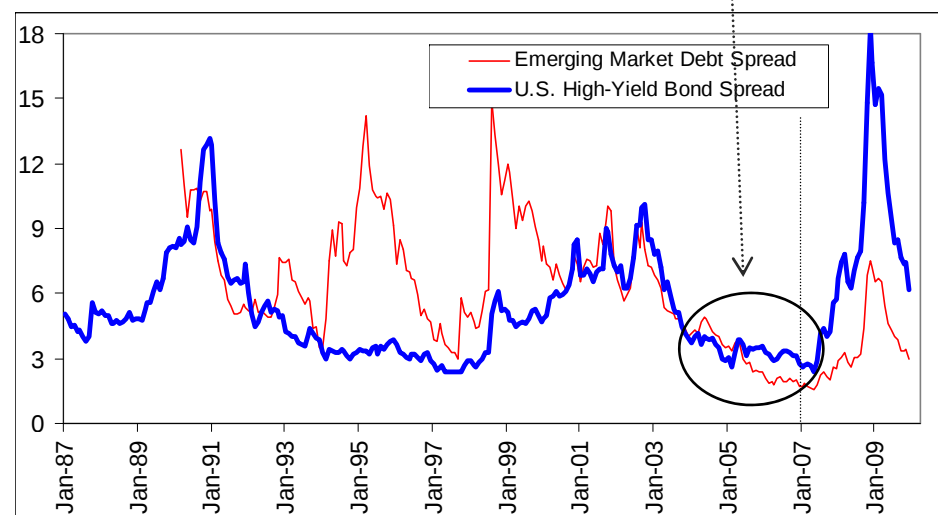
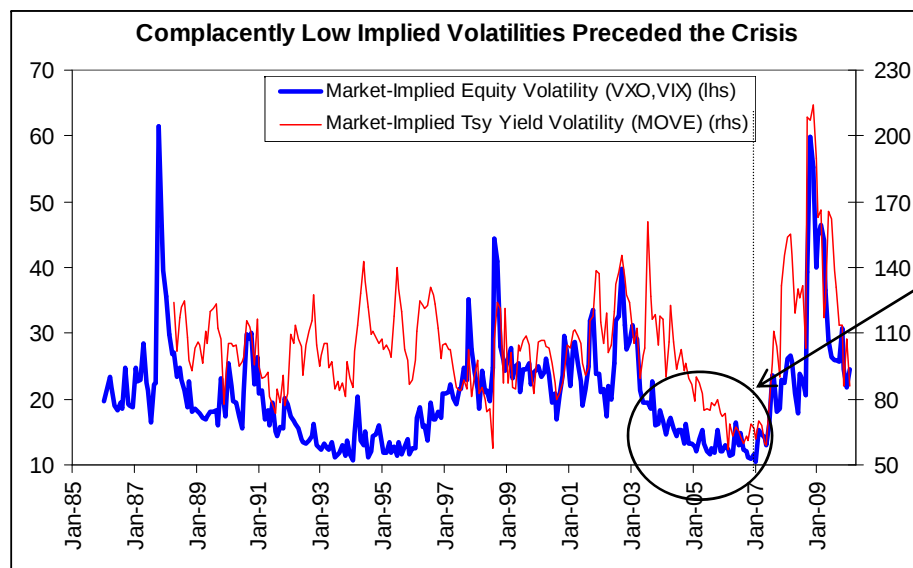
“Risk appears to be at its greatest when measures of it are at their lowest” Quote from Mark Carney, Governor of the Bank of Canada, at the 2009 Jackson Hole conference

“The received wisdom is that risk increases in the recessions and falls in booms. In contrast, it may be more helpful to think of risk as *increasing* during upswings, as financial imbalances build up, and *materialising* in recessions.” By Andrew Crockett in 2000, quoted from Hyun Song Shin, Risk and Liquidity, 2009

The “Great moderation” and “golden decade” was characterized by high and stable economic growth and low volatility in financial markets, until August 2007. The low volatility was confused with low risk, while the expected risk premiums in many assets were record low.

Risk should be assessed and monitored in multidimensional ways, building a “dashboard” of measures that, in addition to volatility and early warning indicators, should also include expected risk premiums. A key question: How much of the expected risk will be rewarded?

Low Volatility. Low Risk Premiums. High Risk



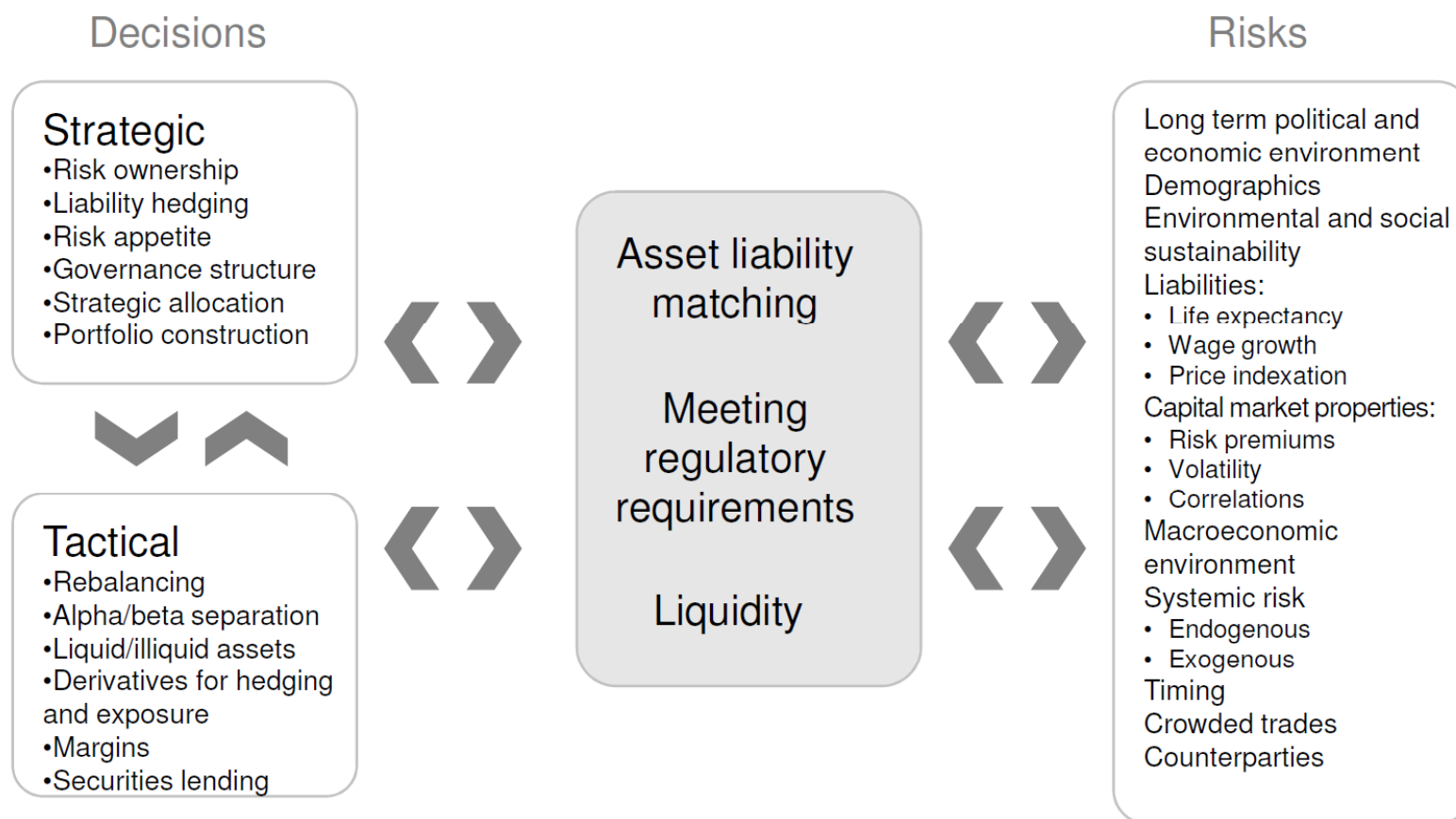
Charts from Antti Ilmanen

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Complexity in Decision Making



Strategies that can be optimal for the long-term liability matching, can force dysfunctional actions in the short term, and vice versa.

Example: The role of liquidity management was underestimated before the crisis. Cash needs for capital calls, hedging programs etc. enforced costly restrictions on the execution of investment strategy.

Manage Risk and Live with Uncertainty

Even with more knowledge on the nature of financial markets – and improvements in how we monitor and assess risk, investors will continue to face and live with uncertainty

Proper investment strategy and risk management are about:

Building robust decision making systems

Building robust portfolios

Risk factor based asset management

Building Robust Decision Making Systems

Avoiding the biggest mistakes

Acknowledge uncertainty, own limitations and behavioral deficiencies

Build institutional clarity

Establish predefined decision rules

The Biggest Mistakes

- Procyclical investments
- Lack of competence
- Overly complex portfolios
- Lack of consistent risk aggregation

(Not a complete list!)

Procyclical Investments

Inappropriate risk ownership and strategy

Is the purpose of the fund/institution defined clearly?

Is the risk decision taken by the ultimate owner of the risk?

Is the strategy and implementation anchored with the risk owner?

Are the possible consequences understood by the owner?

Typical mistakes:

Risk level is set too high in “good times”, risk owner must take down risk when “bad times” occur

The risk decision is not taken by or anchored with the risk owner, the risk owner blames the manager, takes over control and downscales risk at the worst possible time

Lack of Competence

History is full of examples on investors that engage in activities they don't fully understand, and on financial intermediaries that don't explain all properties of complex products and misuse information asymmetry to take advantage of clients in unethical ways

The financial industry is all about principal – agency dilemmas. You easily become a victim if you engage (directly or indirectly) in activities beyond your core competence and skill set

Recent example: Investment banks have sold derivative contracts to Italian local governments for an aggregate value USD 35 bn, swapping interest rates on long-term debt to short term variable rate. The deals are packed with fees and complexity.

Milan has now raised criminal charges against four banks and 13 individuals

FINANCIAL TIMES

Milan swaps case puts banks in hot seat

By Vincent Boland

Published: March 18 2010 18:50 | Last updated: March 18 2010 18:50

If any European country was going to be a test bed for the raging global debate on the use of complex derivatives, it was Italy.

Not only is the country, at the sovereign level, one of the eurozone's most indebted nations, with a debt to GDP ratio that the Italian finance ministry estimates will be 116.9 per cent this year. It also has heavily indebted local authorities, where the ticking timebombs are really located.



This week one of those time bombs erupted. A judge in Milan on Wednesday levelled charges of fraud against four international banks – Deutsche Bank, Germany's Depfa, UBS, and JPMorgan – and ordered 11 bankers and two former municipal employees to stand trial for their roles in a complex and controversial €1.7bn (\$2.3bn) bond issue that the city claims has hurt it financially.

Alfredo Robledo, the Milan chief prosecutor, sounded almost tentative in his summing up of the seriousness of the case against the banks when the judge's ruling was

Improving the Toolbox. Building a Disciplined Structure

Improving the toolbox

- Integrate short and long horizon and strategic and tactical analysis
- Look for systemic risks and regime changes, be aware of market adaptivity, tipping points and power laws, build early warning indicators
- Build dashboards to catch the various dimensions of risk
- Aggregate risk over all risk factors across portfolio / company
- Treat model assumptions as endogenous while pursuing “what if” scenarios and stress tests

A disciplined structure

- Well defined risk ownership, all risk taking anchored with owner
- Complexity in implementation aligned with competence/professionalism and the quality of the monitoring systems
- Empowerment of independent and central risk management functions
- A culture that encourages integrity and diversity and questioning of “authorities” (avoiding group think)

Decision Discipline

1. Avoid entering investments / risk exposures at unreasonably high prices / low risk premiums
2. Build in explicitly forward looking decision rules (like rebalancing) to avoid the worst possible outcomes (pro-cyclicality) and benefit from mean reversion

Combine 1. and 2. in strategic exercises that bring together a full understanding of factor exposures and build economic/ financial scenarios and stress events: “Fire drills” for the risk owners

Building Robust Portfolios

Risk Factor Based Asset Management

Building a Robust Portfolio

The expected return and risk of institutional portfolios are dominated by some key risk factors

Even if the investment approach is fundamental bottom up (e.g. stock picking), or absolute return strategies (e.g. hedge funds), the total risk is largely driven by factors

A successful investment strategy must be based on an explicit understanding of what those key factors are

Portfolio construction will in the future shift away from adding together alpha-seeking managers towards a transparent, top down, risk-controlled loading of beta factors – based on efficient use of public market standard instruments and by applying leverage and long/short techniques to achieve optimal diversification of the underlying risk factors

Building Blocks of Portfolio Construction

Understanding factor and strategy exposure

Harvesting risk premiums

Diversifying portfolios based on the underlying risk premium drivers

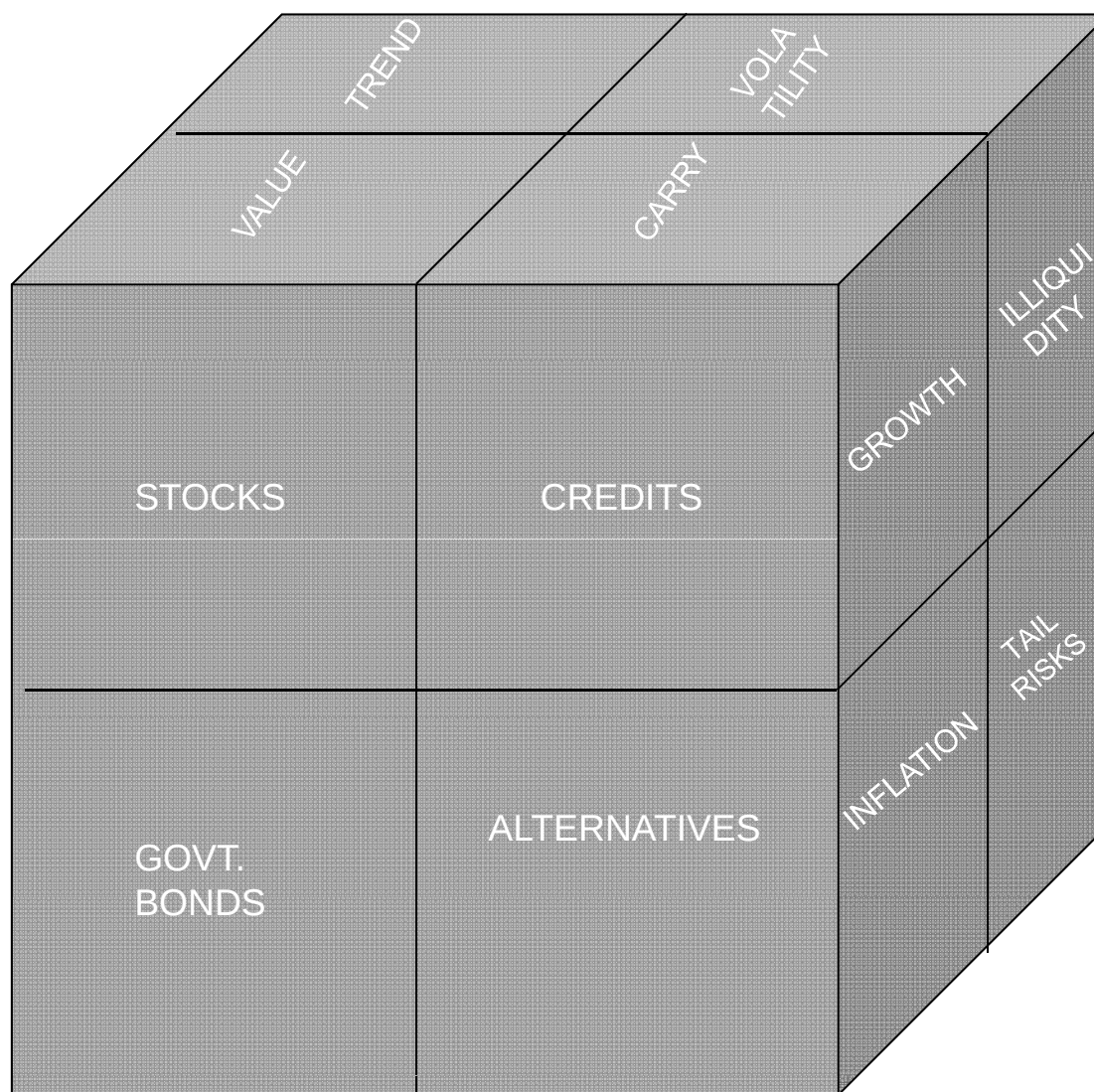
Separating alpha and beta when possible

Reconsidering the role of alternatives

Minimizing agency conflicts

Mechanical rebalancing, or even “valuation dependent rebalancing”

Beyond Asset Classes



Source: Antti Ilmanen, "Expected Returns", forthcoming at Wiley.

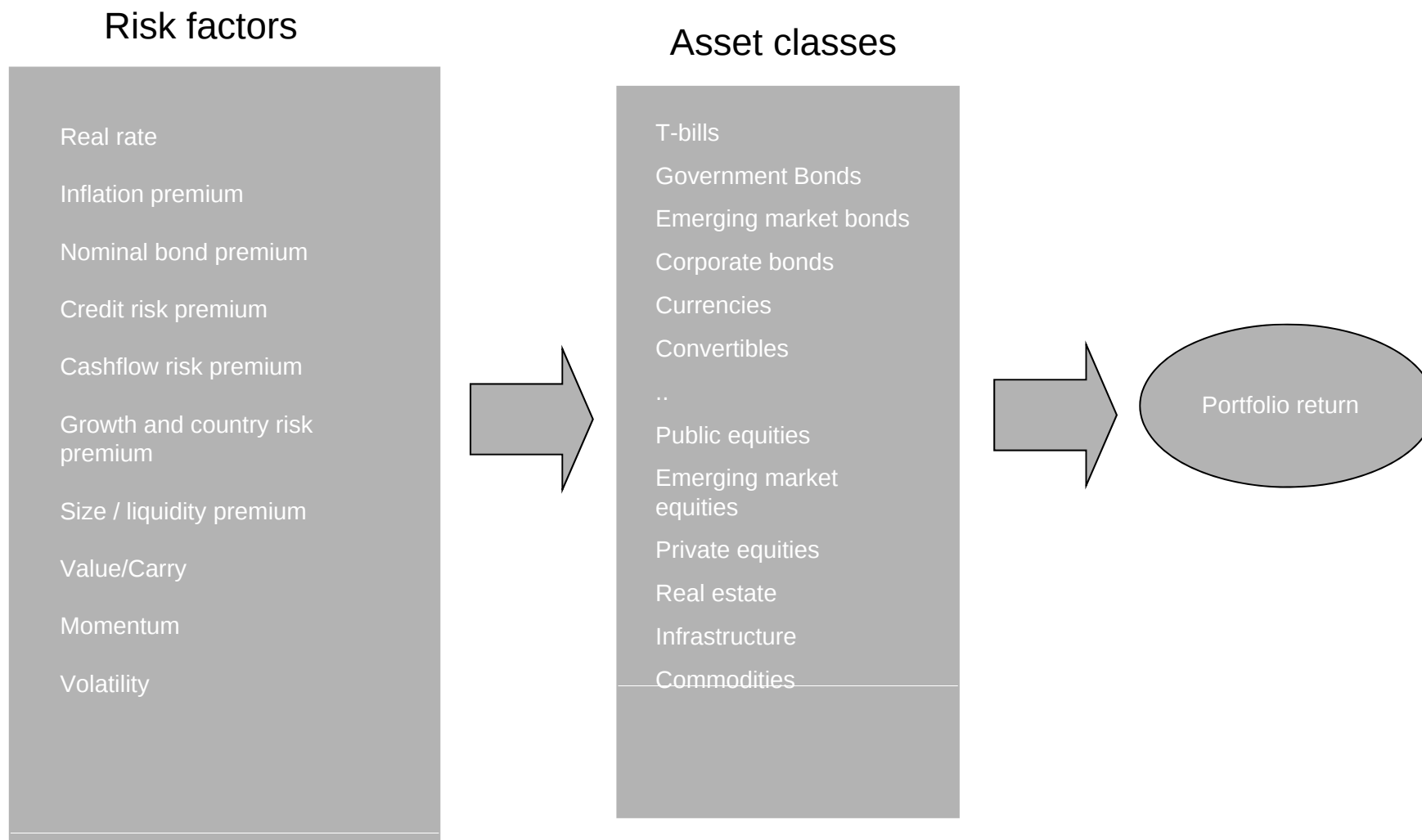
Asset classes Strategies Risk factors

Assets can be correlated due to similar exposures to underlying risk factors

Alpha strategies applied at various instruments and asset classes may not be as different as they appear:

Many alpha strategies showed during the financial crisis a high correlation with the market factor ("bad times"). They resembled selling financial catastrophe insurance, with asymmetric return distribution, and the large losses tended to occur at the worst time. Many carry strategies (front-end, bank risk, fx carry), harvesting liquidity premiums and volatility selling share this characteristic. They may provide good long-term risk to return ratios, but many investors were not aware of the high risk and coincidence with "bad times"

Beyond Asset Classes (2)



Source: Professor Andrew Ang, Columbia

The Role of Alternatives

Why include hedge funds in strategic portfolios?

Hedge funds are not an asset class. They have three characteristics: 1) Applying long short 2) Applying leverage 3) 2/20 fee structure

Hedge funds can be justified in a portfolio if they generate risk and cost adjusted alpha, measured against appropriate benchmarks. However, most of the funds fail to deliver. Typically long/short hedge funds have betas of about 0.5 to 1.0. Many duration-neutral fixed income strategies are really long the spread between long and short rates. Many convertible bond, credit arbitrages, and related strategies really short volatility by selling out of the money puts

Why include private equity in strategic portfolios?

PE is just active equity investment with higher leverage and much less liquidity than listed equities. Most PE managers fail to beat a leveraged small cap benchmark (on a net of costs basis)

PE is an alpha strategy and can be justified in a portfolio when the managers have the capability to improve the governance of companies and not just ride beta factors

The Role of Alternatives (2)

The financial crisis did not only teach us a lesson on the limitations on alternatives as portfolio diversifiers during stress events. We also learned that:

The illiquidity handicap was in general underpriced

Only very professional investors have the ability to pick the right external managers (those who produce risk and cost-adjusted alpha) and understand the often asymmetric risk characteristics of the portfolios

Alternatives can add hugely to portfolio complexity, and the illiquidity (including capital calls) can derail first order portfolio allocations (like rebalancing)

Recent research

The paper by Ang, Papanikolaou & Westerfield (*) consider the effects of including illiquid assets in a portfolio.

Illiquidity causes the investor to behave in a more risk-averse manner with respect to both liquid and illiquid assets

The illiquidity risk makes illiquid assets much less compelling investments than what is expressed in the standard endowment model

The rebalancing scheme should take into account the right skew of such assets

The illiquidity premium for assets with very low turnover (like once every ten years) may be in the range of 3 – 5 percent

* Ang, A., Papanikolaou, D., Westerfield, M.M. (October 2010): Portfolio Choice with Illiquid Assets.

Rebalancing: Discipline to Stay Clear of Herd Behavior

Two perspectives:

- discipline to avoid herd behavior and procyclicality
- exploit mean reversions and earning a diversification premium

Rebalancing maintains optimal utility and prevents the asset with the highest drift from eventually dominating the portfolio holdings. Thus, rebalancing ensures diversification and mitigates risk

Rebalancing imparts an automatic value bias, buying assets recently declined in price and selling assets with price gains provides liquidity

The big problem is when investors act procyclically. These investors sell assets with poor returns that often have high expected returns going forward and rebalance into assets with low future expected returns

Rebalancing itself also earns a premium even when underlying assets do not have positive expected returns: Booth and Fama's (1992) "diversification return"

Rebalancing should be done at more than just the asset class level: it should also be done within asset classes. This makes market weighting non-optimal

Rebalancing (2)

Critique

Should you continue rebalancing when you have a shift in the economic/financial trends and regime and/or rise in the market risk level?(E.g., Japanese stock market since late in the 1980s, credit boom and bust over the last decade).

(The answer depends on your utility function and ability to understand and predict structural changes....)

Modifications — Valuation Dependent Rebalancing

Build in valuation conditions; avoid rebalancing into asset classes where expected return measures deviate significantly from long-term trends and/or predefined sustainability levels

The deviations from the scheduled rebalancing should depend on predefined criteria; the typical error is to be too late in taking up the risk when markets rebound. And please remember that normally the pressure to deviate from the predefined rules is highest when it is most important to stick with them.

Long-term Investors and “Wannabes”

True long-term investors can benefit from the likely increase in risk premiums on assets that are highly correlated with bad times

They can afford to be contrarian, and by applying decisions rules like rebalancing, they can harvest risk premiums

Institutional investors with shortfall constraints and fixed payout ratios may not have this luxury. (It hasn't helped either that many of them were severely underfunded before the crisis hit)

The current market environment with very low risk free rate, makes it hard for these investors to sustain the risk level

The fall in ability to take risk may reduce expected return (and thus coverage and pay out ratios)

Uncertainty and “Big Decisions”. Risk on/off

Are Dynamic Asset Allocation and Global Tactical Asset Allocation the new things?

Changes in strategic allocation are potentially much more significant than all bottom up implementation decisions combined

Is the natural response to a more risky environment (e.g. my intro on new perceptions of financial markets and risks) to utilize more of the risk budget on fewer — but larger — decisions?

Or should increased awareness of systemic risk and regime changes lead us to be more cautious to make the big calls right (which expose us to the herd behavior and procyclicality?)

Uncertainty and “Big Decisions” (2)

A recent CFA report (*) indicates that some investors respond to the financial crisis by a permanent decrease in their risk appetite.

Another angle is that investors during the boom years, with low volatility, had a risk appetite that was too high

Such procyclical adjustment of risk can be extremely costly

The takeaway is to reconsider the perception and measurement of risk, not confuse risk with just volatility, but relate risk to the sustainability of current valuations, combined with ensuring more robustness in decision making processes and portfolio construction...

**CFA report, Investment Management after the Global Financial Crisis, by Fabozzi, Focardi and Jonas, 2010*

Back to Basics

You need to take risk to achieve higher than risk free return

Alternatives give no silver bullet; at worst they only add to complexity and costs and blur the true risk characteristics of the total portfolio

The reward for taking bad times risk is higher, but fewer investors are probably in a position to harvest such premiums

Engaging in momentum strategies and on/off risk tactics may be a solution, but such market timing-style strategies may be very risky and lead to procyclical behavior if you don't build in decision discipline and improve the risk management toolbox

The investment management paradigm will probably focus less on capital gains and instead emphasize and appreciate more the need for real cash flows.

Example: Infrastructure will be increasingly important as a generator of real cash flows for funds, but we must overcome deficiencies in the asset management model (better alignment between long-term investors and managers; longer time horizon, less leverage)

Conclusion

Asset and Risk Management in a Post-Crisis Market

The financial markets are complex and fragile networks, characterized by adaptivity and reflexivity – and decision makers must cope with real uncertainty (unknown probability distributions)

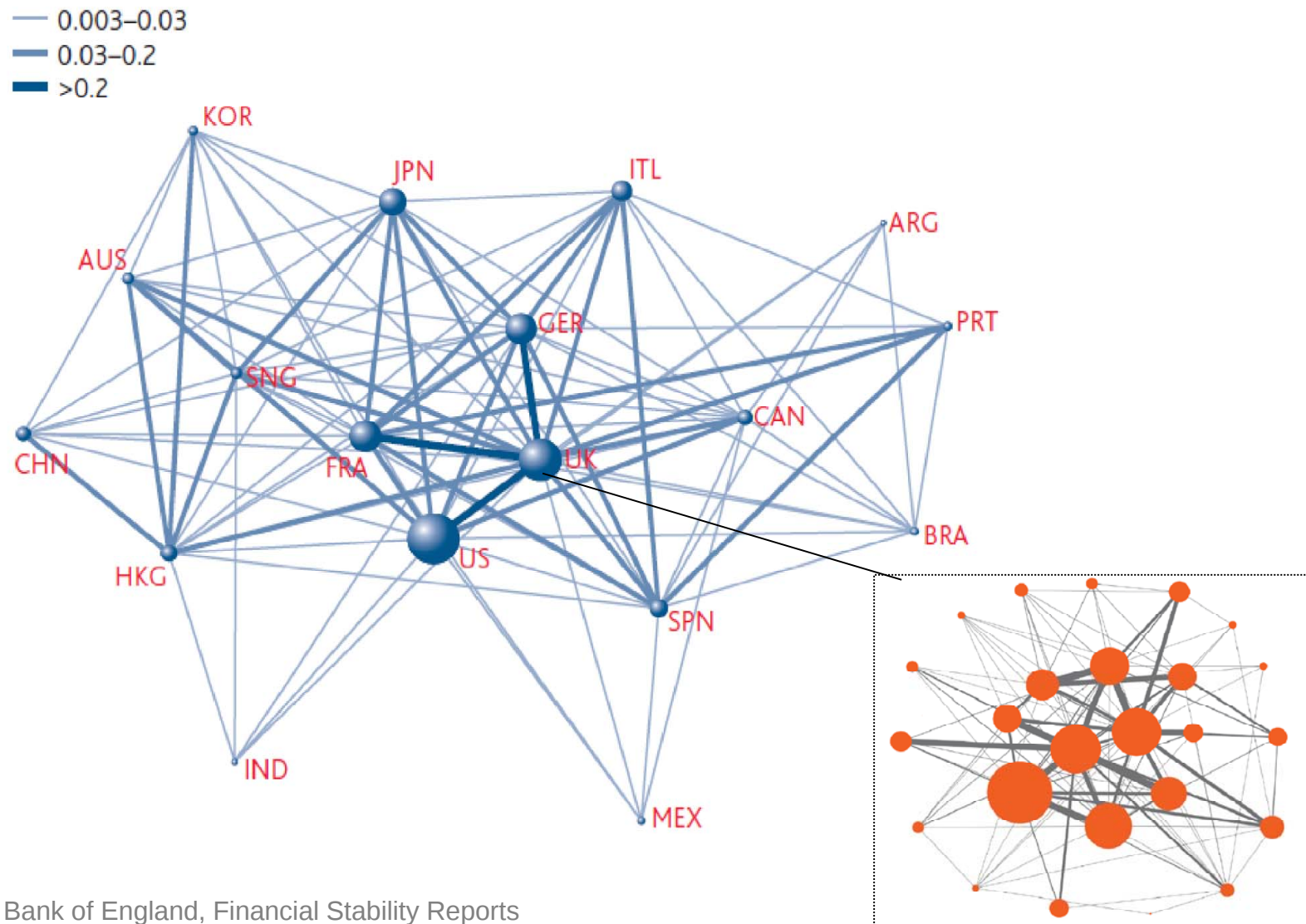
Successful risk and asset management is to guard against behavioral deficiencies, also in the funds/company's own decision making structure, by:

- Acknowledging the uncertainty and own limitations
- Be crystal clear on defining purpose, risk appetite, ownership of the risk making decisions
- Making predefined decision rules to cope with stress events
- Build robust portfolios; that includes applying systematic approaches to harvesting risk premiums and diversify portfolios based on the underlying risk factors
- Align portfolio and instrument complexity with own competence and professionalism
- Build a robust risk management framework, anchored at the top (risk ownership) level

Appendix

Examples: Changes in the Perceptions of Markets and Risks

Example: Global Financial Network, 2005



Leverage: The Dominant Factor Behind the Increased Fragility of the Financial System

The economic backdrop: “The Great Moderation” and “Golden Decade”, high growth, low real GDP volatility, very low real interest rates, low volatility in the financial markets – low perceived risk...

Low real interest rate stimulated leveraging

Low volatility increased risk taking

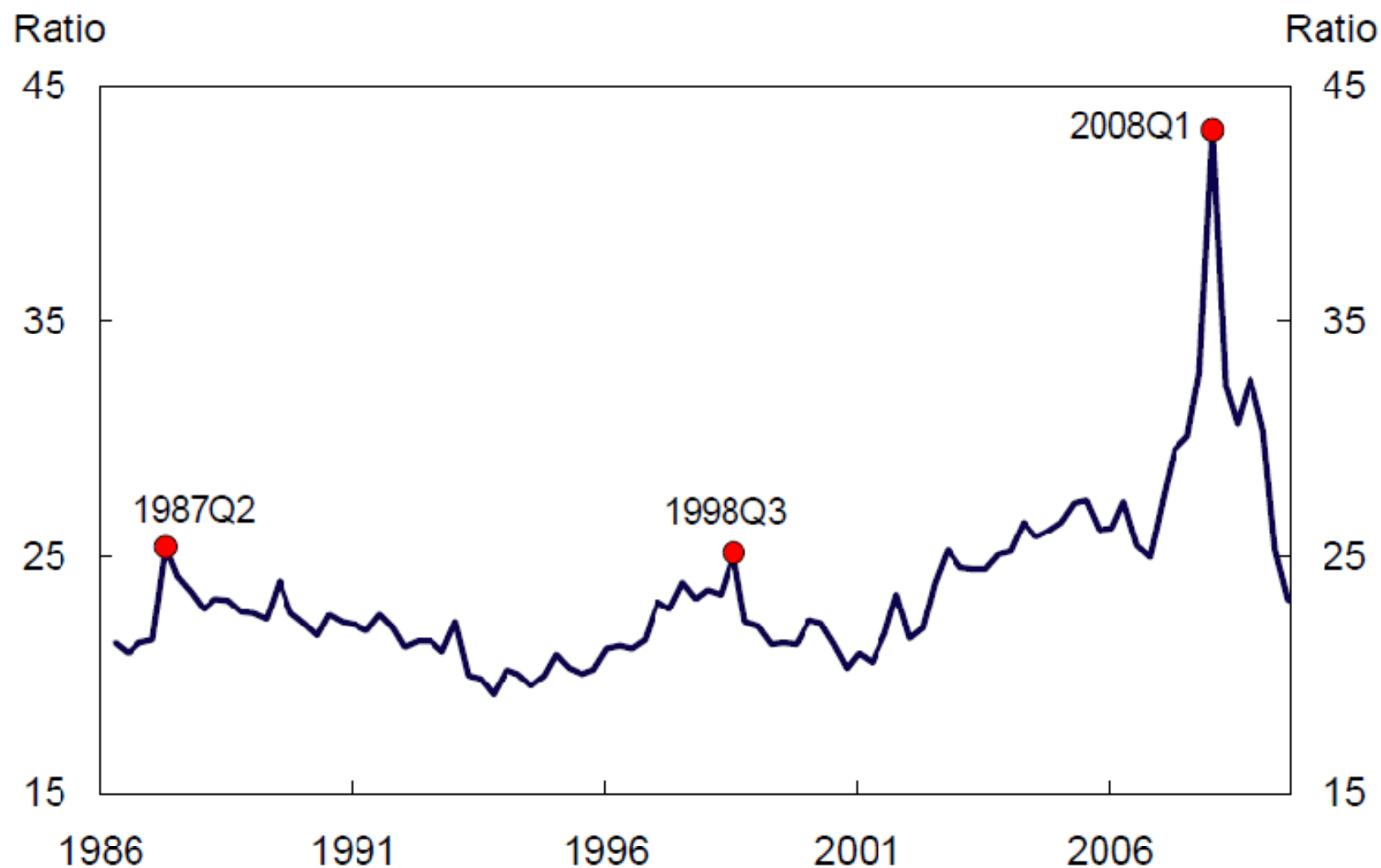
Low expected return in traditional assets moved investors into leveraged positions in new instruments

Helped by financial innovation and ratings agencies working within an corrupt business model

Example: A research paper *) that confirms normal intuition, more leverage of investment positions leads to less stability and high fat tail risk.

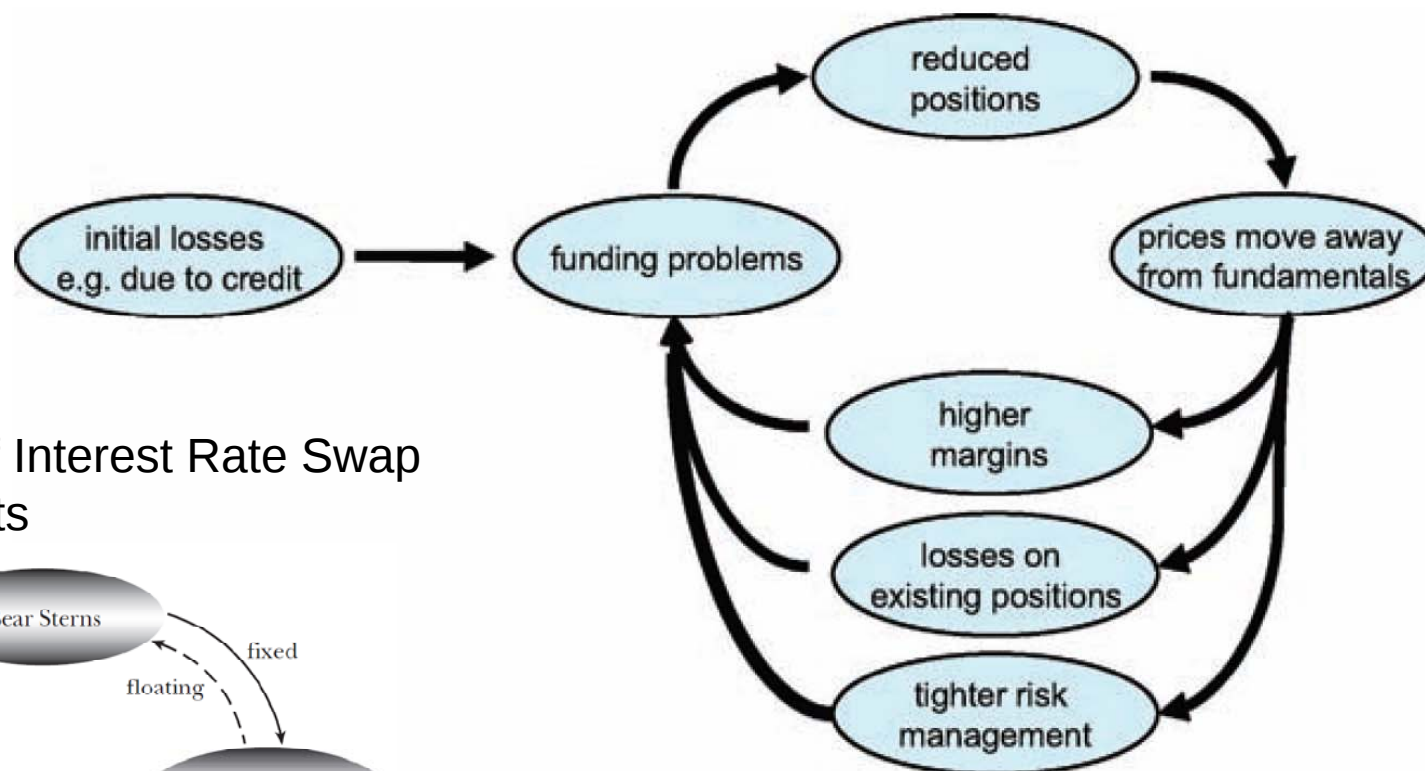
*) Reference: Leverage Causes Fat Tails and Clustered Volatility, Turner et al 2009

Example: Mean Leverage of Primary Dealers, US



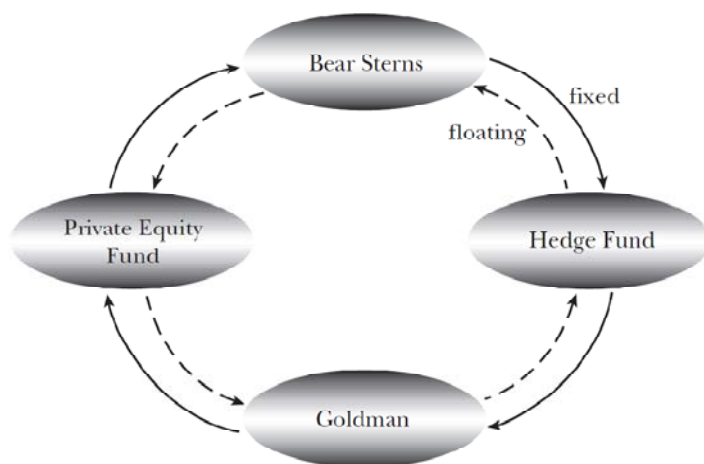
Source: SEC and New York Fed

Liquidity Spirals



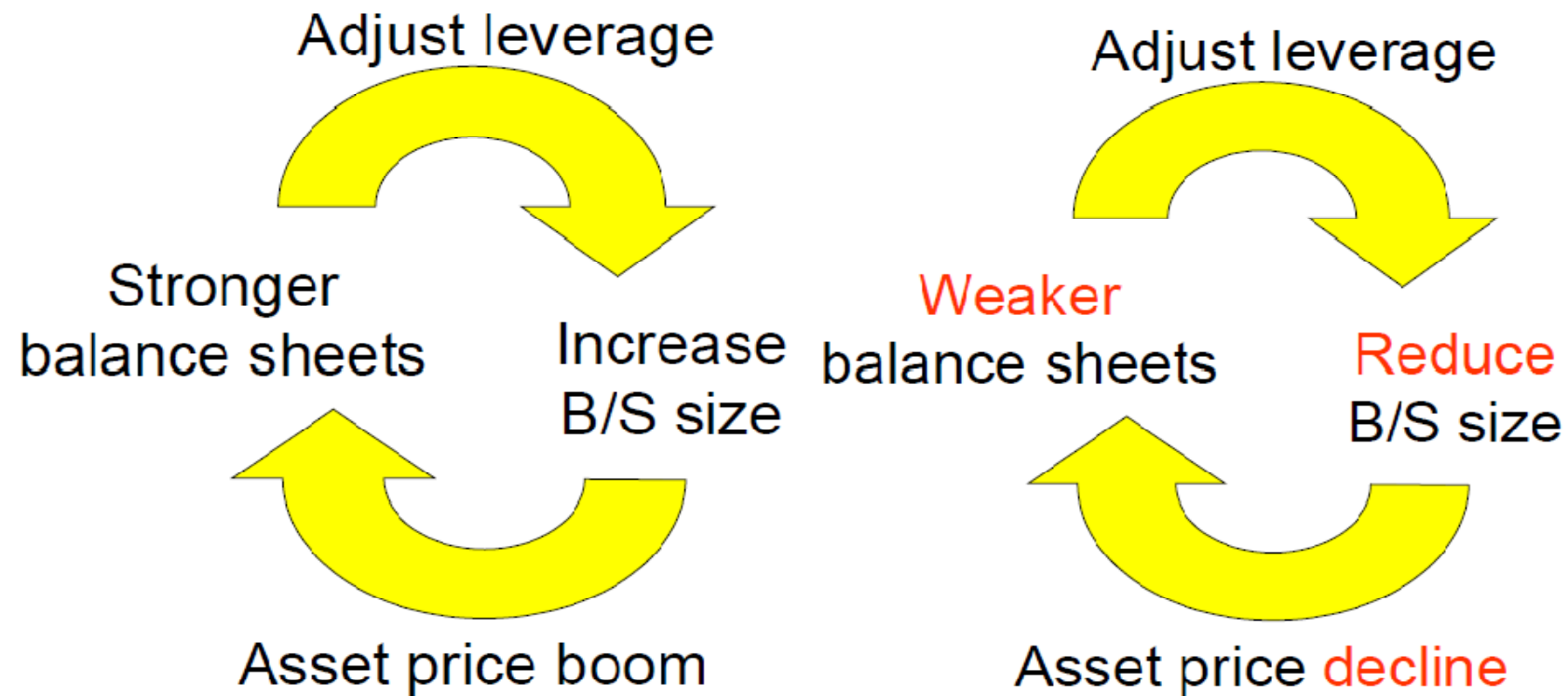
Source: Brunnermeier & Pedersen, 2009

A Network of Interest Rate Swap Arrangements



Source: Brunnermeier 2009

Self-Reinforcing Cycles



From: The Changing Nature of Financial Intermediation and the Financial Crisis of 2007-09, New York Fed Staff Reports 2010

Market Cycles & Social Epidemics

Diffusion of ideas and innovation follow a predictable course once a tipping point is crossed ("The Chasm")

Malcolm Gladwell's "Tipping Point" describes process of social epidemics

Law of the few (Power Law)

1. Connectors (who bring people together)
2. Mavens (information specialists)
3. Salespeople (persuaders)

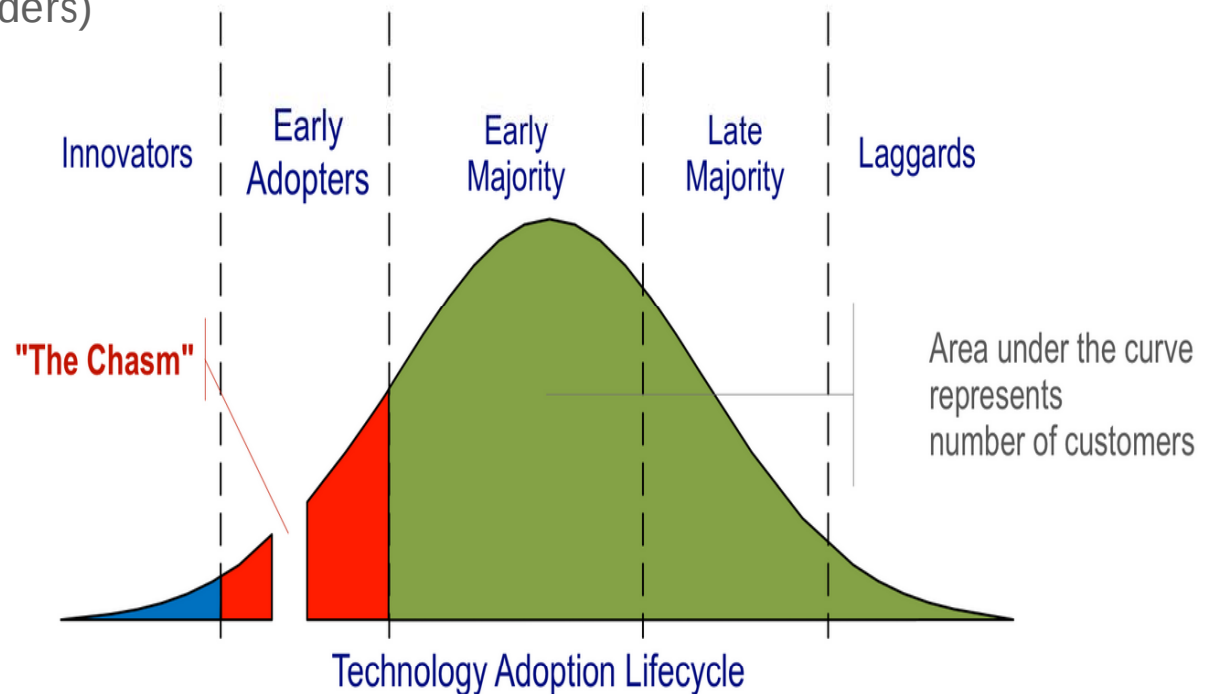
Early Warning

1. Structural risks:

- Innovators provide a perspective of credible scenarios (e.g., Roubini, Shiller, Rogoff, Rosenberg)

2. Tipping points:

- Marked by super-exponential growth and instability due to phase transition... watch early adopters



Source: Wikipedia; see Geoffrey Moore's "Crossing the Chasm" (1999)

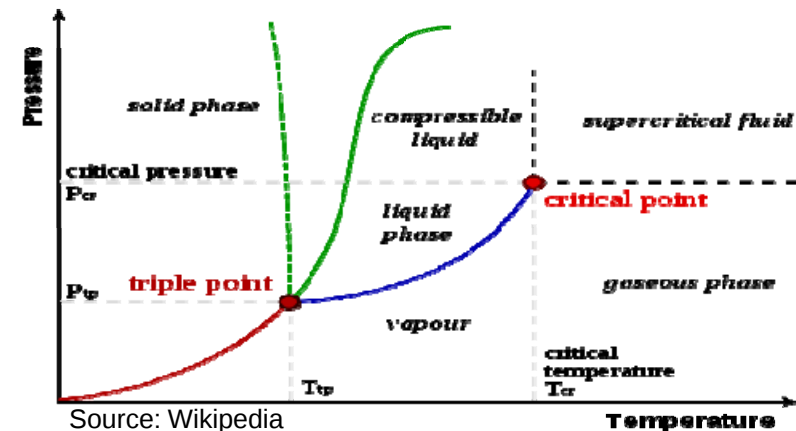
Momentum Takes over when Phase Transition Tipping Points Reached...

Critical points mark dramatic phase transitions, abrupt S-shaped transitions between states with radically different properties.

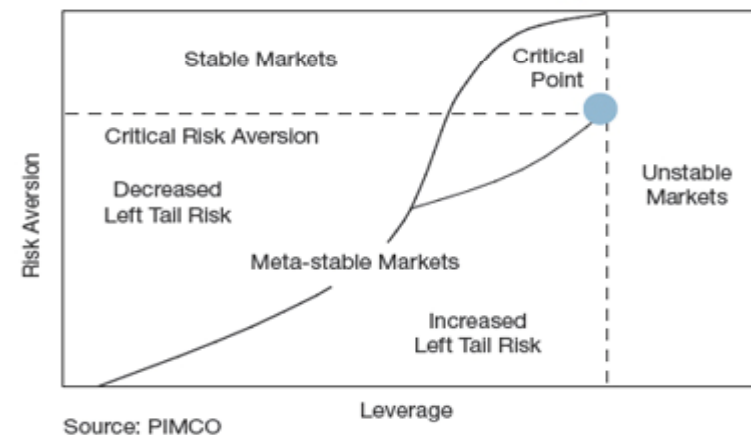
Critical (tipping) points seen all over the world, from material science to ecological systems

Risk aversion is the primary determinant of financial markets tipping points; leverage is an amplifier

Water Phase Diagram



Financial Market Phase Diagram



Risk and Uncertainty

One definition of risk management is controlling left-hand tails. Risk is the probability of tail events given that the distributions are known. The distributions are certainly non-normal and change over time, but they are known.

Uncertainty is that the distributions are unknown and perhaps the full range of distributions cannot be known, at least in finite samples.

Risk managers have usually been pretty good at risk, but a lot of the financial crisis has stemmed from Knightian uncertainty – or unknowable distributions ex ante. Many risk managers have never used normal distributions, at least not in the last 10+ years.

A central feature of the financial crisis is impact of the network effects; factors that are not being measured and the full range of distributions not being known.

Strategic and Tactical Risk Management

