Financial and Economic Time Series Class

Thoughts on the Credit Crisis

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Plan for credit crisis section

- Causes of the crisis
- How did it happen / what can we learn
- How can we fix it?
  - Short term
  - Long term
- What should we do differently?

Causes of Recent Bank Failures

- Many people point to government actions as a cause of this crisis
- There were many bad regulations and an absence of good ones.

  largely because of industry pressure
- Government has made a lot of mistakes during the crisis too.

- But I agree with (and would generalize) this statement

  "Despite what the Bank of Scotland would have you believe, the Bank of Scotland failed because of stupid decisions by the Bank of Scotland" – John Kay

Securitization Overtook Banks

Securitization and Financial Booms and Busts (2008)

Hyun Song Shin

Princeton University

Forecast of crisis

- **Letter to Financial Times, 30 July 2007**
- **Jonathan Reiss writes**
- **"… sophisticated risk-management systems may well be a trap as they were in 1997-98. First, they may create undue complacency, lulling institutions into thinking that they can 'manage' the risk."**

Forecast of crisis, part 2

- **Second, the sophisticated risk-management techniques almost inevitably involve selling risky assets when market risk increases. While that may be possible for a single investor, in fact, many investors will be behaving similarly. This may well create a feedback loop that exacerbates the price declines. It is this very mechanism that is likely to drive correlations among asset classes upward as Mr El-Erian projects. And they rely on liquidity they may find to be scarce. I suspect that some of the worst losses will be experienced by investors with sophisticated risk management capabilities who relied on them too heavily.**

Diagnosis

- **Financial system in a very vulnerable situation**
  - **Ready to collapse**

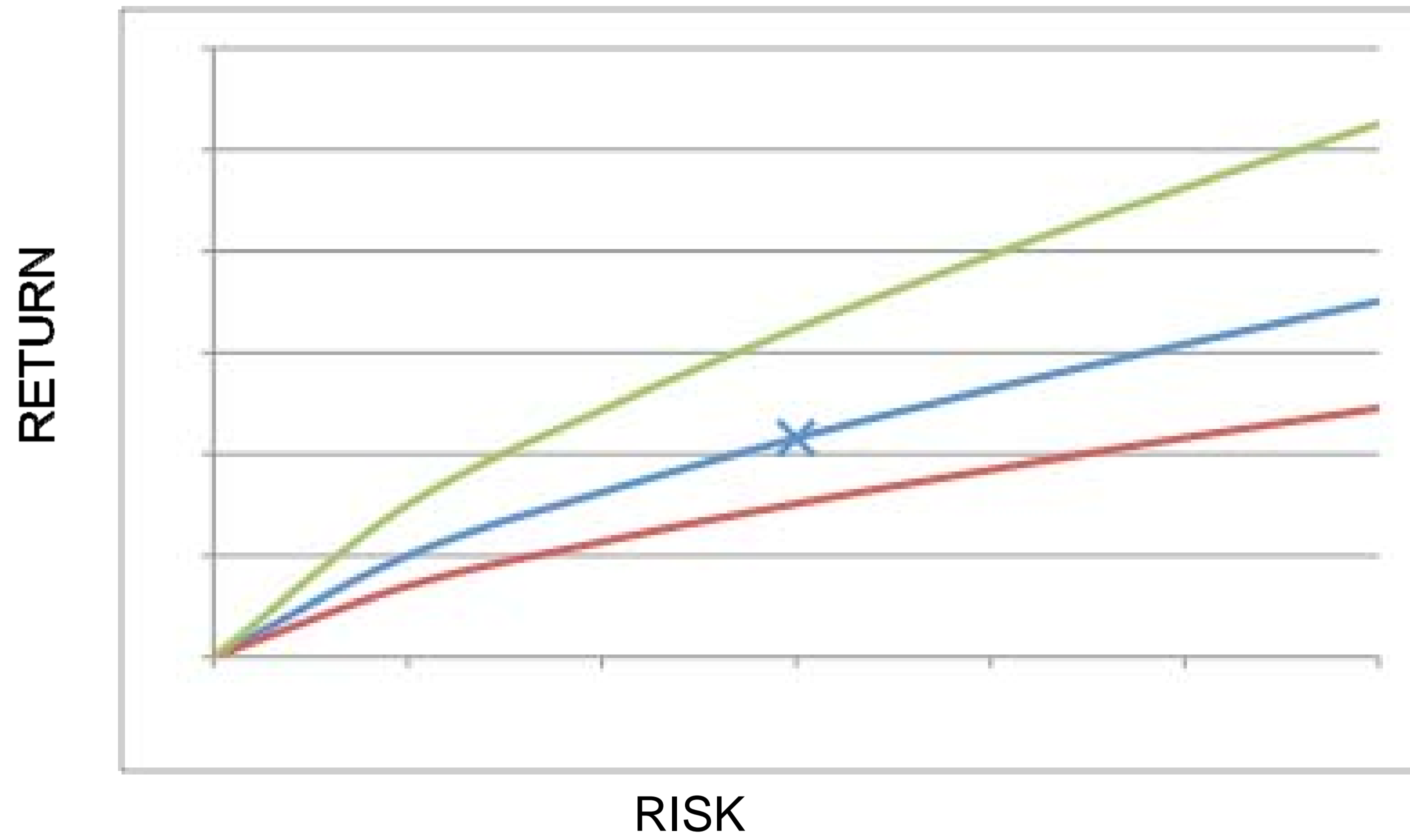
- Housing bubble bust

- Deeper issues:
  - Corporate governance and incentive problems
  - Global imbalances
  - Inadequate savings & savings rate
  - Manufacturing decline

What Can We Learn from this Crisis

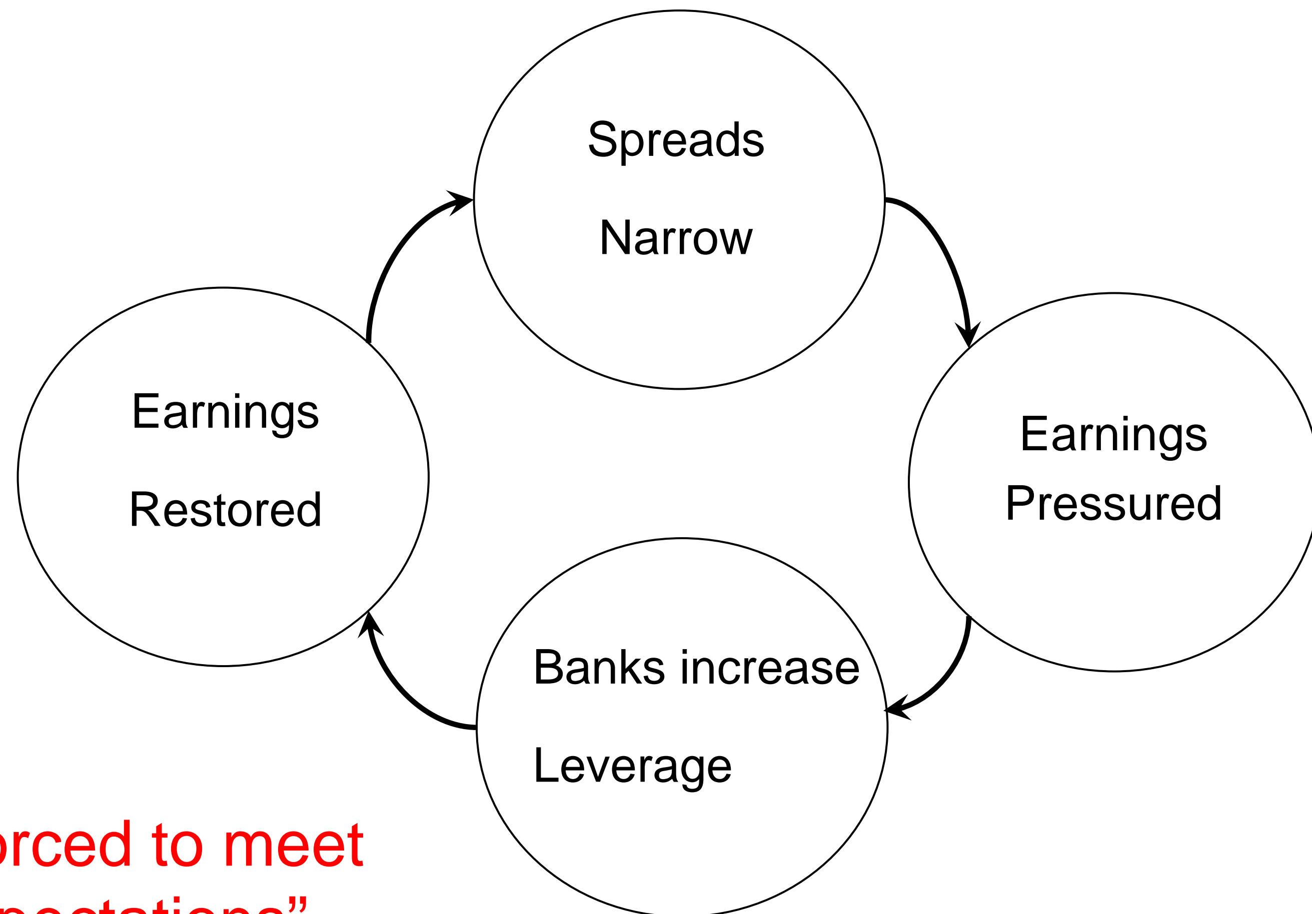
- Feedback is important
- We need more synthesists
- Liquidity is a risk factor, may not be there when needed
- Dynamics matter
- Transparency matters
- Consider multiple time horizons
- Incentives are crucial
- Distributions are not normal
- Volatility is a risk factor, and it varies over time
- Political economy matters

Bank Leverage Problem



- How do you react to changes in opportunity?

Bank Leverage Problem: Part 2



"We were forced to meet earnings expectations"
CEO of major global bank

Feedback Is Important

- George Soros has a simple philosophy

- Fallibility: There are always distortions in the market
- Reflexivity: There are interactions between market pricing (and distortions) and reality
- These interactions can exacerbate the distortion for an extended period of time (boom).
- But ultimate collapse (bust)

- We just experienced a super-bubble (1980 – 2007)

Risk was cool and profitable

- Every risk has an upside, find the upside
  - To risk, perchance, to dream
  - If you risk upon a star…
  - I risk therefore I am
  - Risk and you shall receive

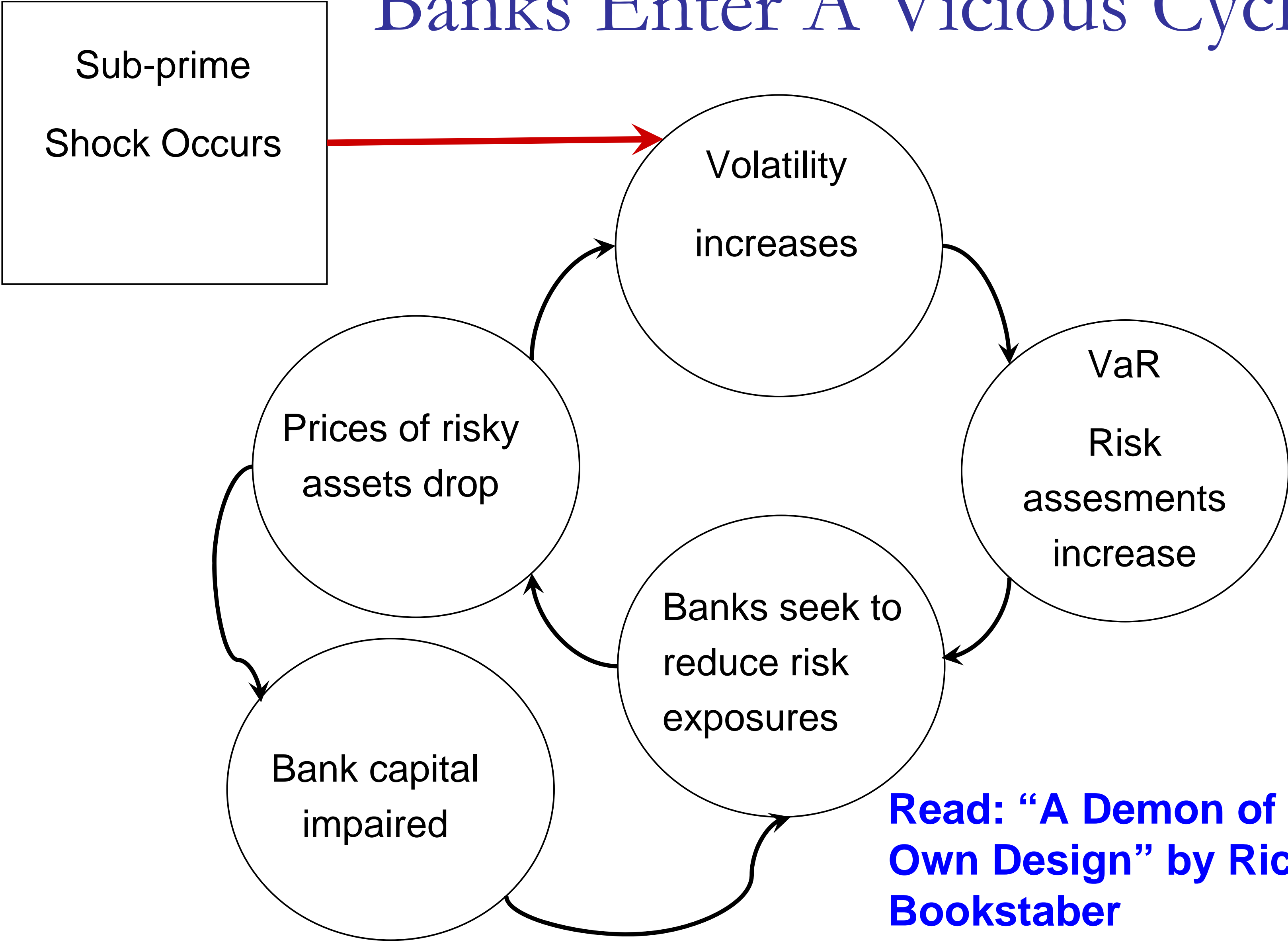
    Advertising of Marsh "the worlds leading insurance broker and strategic risk manager" in 2007
  - http://www.youtube.com/watch?v=f4a4CNR3HL0

- Risk was cool and profitable
- Risk managers were old fogeys

We Need More Synthesis

- Almost no one in the midst of the problem saw it coming
- "**Analysis** is breaking down or taking apart; **synthesis** is bringing together" – Roget's Thesaurus
- There are 1,722,345 analysts in LinkedIn, 63 synthesists.
- The world could use more synthesists.

Banks Enter A Vicious Cycle



Read: "A Demon of Our Own Design" by Richard Bookstaber

Liquidity isn't there when you need it

- It is easy to move risk around
  - Trading is a transfer that relies on buyers and sellers
  - Not everyone can go in the same direction
  - But sometimes they try

- It is easy to create risk
- It is much harder to get rid of risk

Dynamics Matter

- Portfolios are not static but risk assessments usually assume they are.
- Asset managers consider the risk of their current holdings.
- Some managers (typically value) will increase positions when they move adversely. This will create fat tails even if the stock price distribution is normal.

Transparency

- Transparency: not a panacea but a help
- Banks are too complex to understand (or, at least, current accounting does not allow it)
  - Cannot answer:
    - What are the sources of earnings?
    - What risks are they taking?
  - Cannot distinguish good banks from bad
  - Hence, people assume all are bad (see, market for lemons, George Akerlof)

Transparency

- Credit Default Swaps, Interest Rate Swaps, etc. are transparent
- However, the settlement system is not
- Lack of central clearing creates a web of counterparty obligation that makes is hard for everyone to track risk
- This was a major reason LTCM needed to be bailed out

  … but we didn’t correct the problem
- CDS have only been a major factor in the failure of one institution (AIG)
- But they are an important transmission mechanism of risk and a major part of the reason the Lehman failure caused so much trauma

Consider Multiple Horizons

- Most VaR models were very short-term
- Implicit assumption was that if risk rose, portfolio would be adjusted
- But, adjustments proved impossible
  - Everyone was trying to go the same way
  - Liquidity disappeared

- CDO risk measured as default experience
- Default experience is a tail event – very vulnerable to a rise in correlations
- Ignored spread volatility in the interim

  It doesn't help if you are right on default experience if you are forced to liquidate early

Incentives Are Crucial

- See Ashcraft and Schuermann charts
- Ashcraft and Schuermann greatly understate the problem
  - Often both sides of the transaction had incentives to distort
    - E.g. a mortgage broker is happy to accept fraudulent applications
  - CDO's of CDOs of CDOs multiply the problem
- Incentives worked very well

  -- People had incentives to behave badly and they did.

Distributions Are Not Normal

- This is very well-known and has been for a long time
- But, people sometimes act as if they believe in normality
- This is ok in some circumstances but not all
  - To estimate the risk of a stock portfolio, it is probably better to ignore skewness and kurtosis.
  - For selling out-of-the-money options, it is not.
  - CDOs are portfolios of short, out-of-the-money options.

Volatility Is Time-Varying
Volatility Is a Risk Factor

- Volatility varies over time and can spike upward
- Assets that perform badly when volatility rises, are likely to underperform simultaneously
- Carry strategies (implicitly or explicitly) are anti-volatility strategies
  - Currency carry trade
  - High yield bonds
  - Value stocks
  - Option writing (particularly put option writing
  - Convertible bond arbitrage
  - Merger Arbitrage
- All of these add value over long periods of time but are subject to simultaneous underperformance even if they appear to have low correlations.

Connections are important

- Markets that are not fundamentally connected may still have a high correlation because the same institutions are invested in both
- Correlations rise during crises
  - High volatility of common factor
  - Liquidation across markets raises correlations
  - Latent factors such as liquidity become prominent
- A popular recommendation is for regulators to produce a "global risk map"

Political Economy

- Regulation is largely driven by industry.
  - 9/23/1998:
    - the Fed brokered the LTCM bailout
    - the Fed also approved the merger of Citicorp with Traveler's (including Salomon & Smith Barney)
- Repeal of Glass-Steagall
  - De facto on 9/23/1998, de jure shortly afterward
  - Gave investment banks a choice of SEC or Fed as regulator (most chose SEC).
- Were Fannie/Freddie pressured to buy sub-prime or did they initiate it?

Political Economy at Company Level

- Intra-company politics matter too.

- Everyone agrees in principal that risk management should be independent and authoritative.
- But it is a drag on profits in good times.
- Would a risk manager who constrained bank leverage in 2004 still be in authority in 2006-7 (when it was most needed).

Understand Model Limitations

- "All models are wrong, some models are useful" George Box
  Better, but less catchy, phrasing is:
  "All models are imperfect, some models are useful"

  - This is not meant as a negative statement
  - It is merely a warning to understand a models limitations
  - Do not lean on it too heavily
  - For example, consider a correlation matrix
    - measuring the risk of a portfolio generated through some other means is quite robust
    - Optimizing a long-only portfolio is more stress
    - Optimizing a long-short portfolio is even more
    - Lower risk tolerance also puts more weight on the correlation matrix

Urns and Ambiguity

- Consider two urns:
  - Urn 1 contains 20 red balls and 20 blue balls
  - Urn 2 contains X red and (40 – x) blue balls,

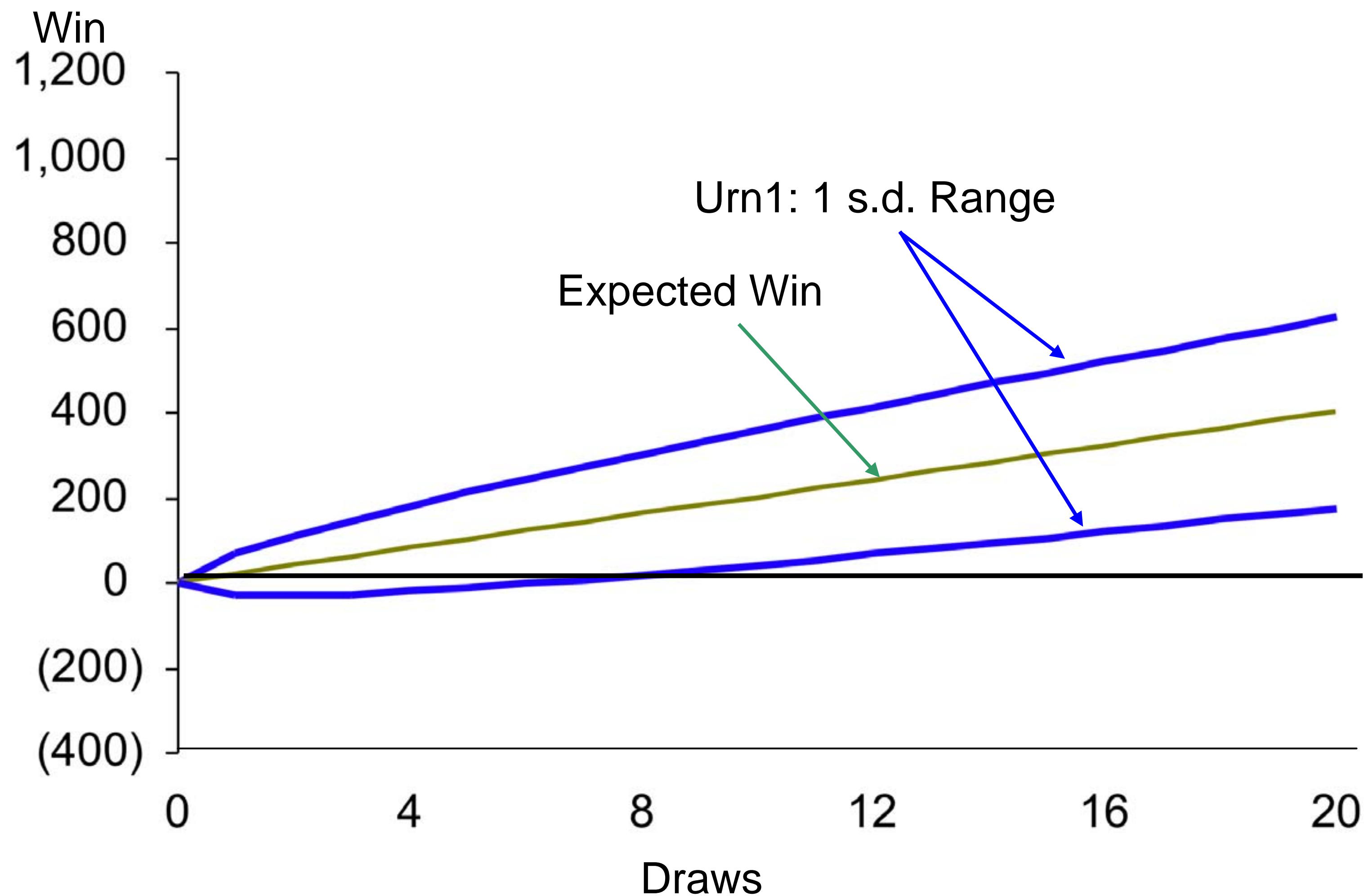
    X was randomly selected from the integers 0 – 40 (inclusive)
- You can pick a color to bet on
- The payoffs are: + $70 if we draw a ball of your color

  – $30 if we draw the other color

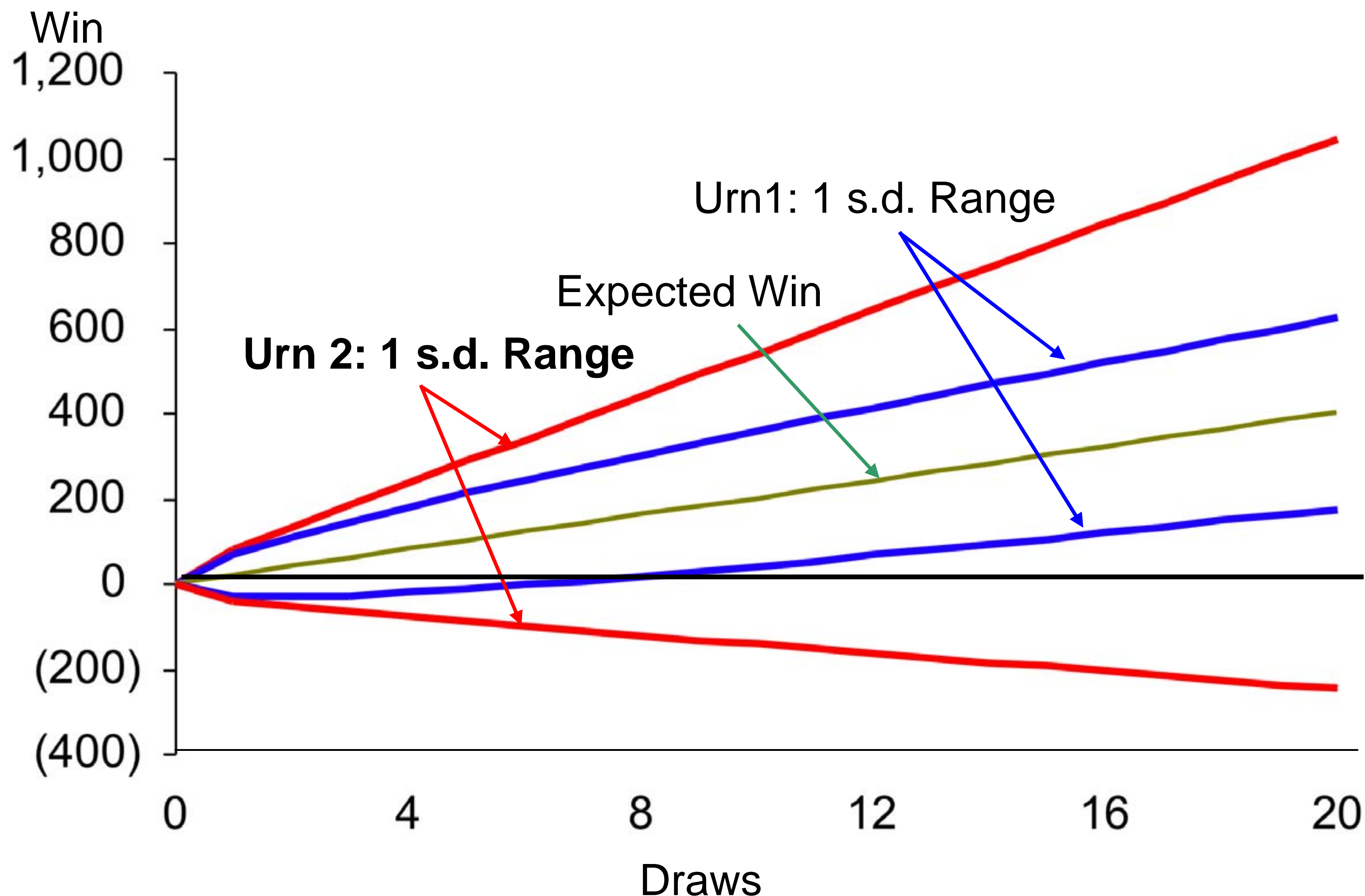
Which urn would you rather draw from?

See: Chipman (1961), Ellsberg (1961), Knight (1921)

Dispersion of Outcomes: Urn1



Dispersion of Outcomes: Urn1 versus Urn 2



Urn1: If we play long enough, you almost surely win

Urn 2: NOT

Ambiguity and Optimal Allocations

- One-period optimization bets too heavily on Urn 2
- Optimal bet declines with the total number of trials you are going to play
- Learning helps but does not overcome the problem because we don't learn fast enough (or not at all).
- How does this relate to the "real world"
- What is the ambiguity of:
  - Stocks
  - Hedge Funds
- Ambiguity does not show up in the wiggles
- Optimal allocations are different for different horizons
  - Longer time horizons penalize ambiguity more

- Explicitly recognizing ambiguity results in more robust results

Question Assumptions

"Doubt is uncomfortable, but certainty is absurd"

– Voltaire

…and sometimes dangerous

"It isn't what you don't know that gets you into trouble, it's what you know that isn't so."

– Josh Billings

How to fix it? (Short term)

- It won’t be easy
- There are multiple, global systemic problems
- There is a lot of pain ahead
- Even if the answer were known, implementing it would be hard

How to fix it? (Short term)

- I certainly don't claim to have all the answers but, here are some "modest proposals"
  - Stimulate the economy
    - Bill just passed is a good start, more would be good
    - Needs to be done globally
  - More disclosure: what if banks disclosed all of their trading positions and the price they are using to value them?
  - Take over failing banks
    - Don't protect stock or bond holders
  - New bank: What if TARP gave $100 billion to Warren Buffet to start a new bank?
      - $1 Trillion in new, productive, lending.

How to fix it? (Long term)

- This also won't be easy
- There is a permanent loss of GDP (that was never really there)
- Wealth effects on consumption still to come
- $40 Trillion decline in wealth globally
- Even to the extent there is agreement on solution, political economy is very hard.

How to fix it? (Long term)

- Again, I don't have all the answers but will make some suggestions
  - Bank management needs to be improved
    - Fix incentive problems
    - Better corporate governance
  - Address global imbalance with infrastructure investment
  - Regulation should focus on protecting system, We should have a system where large complex financial institutions can be allowed to fail
    - Narrow banks (restore Glass-Steagall)
    - Counter-cyclical and systemic regulation
    - Better "plumbing": e.g. clearinghouse, global risk map
  - Consumer financial products safety

Implications for the Financial System

- We are at a major turning point
  end of Soros super-bubble
- The financial system will look different in 10 years
- How is not clear
  - Securitization could drop considerably, or not
  - Asset management and hedge funds could change form and fees could drop, on not
  - Understanding of risk may change, on not
- **There are also opportunities**
  - **There is the potential for the business to serve individual needs much better.**

What Can We Learn from this Crisis

- Operate differently
  - Be aware of the assumptions you are making
    Question them
    Test them
  - Be aware of the limitations of models you are using
  - Build robust models
    - “as simple as possible but no simpler”
    - incorporating ambiguity can help
  - Look at the big picture
    - Study history (especially crises)
    - Hire more synthesists

Recommended Reading

George Akerlof and Robert Shiller, “Animal Spirits”, Princeton University Press, 2009

Richard Bookstaber, “A Demon of Our Own Design” Wiley, 2007

Thomas Giglovich, “How We Know What Isn’t So”, Free Press, 1991

George Soros, “The New Paradigm for Financial Markets: The Credit Crisis of 2008 and What It Means” Public Affairs, 2008