GLOBAL FINANCIAL STABILITY: SHORT AND LONG RUN PROSPECTS

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END OF YEAR CONFERENCE, ROME, December 2009

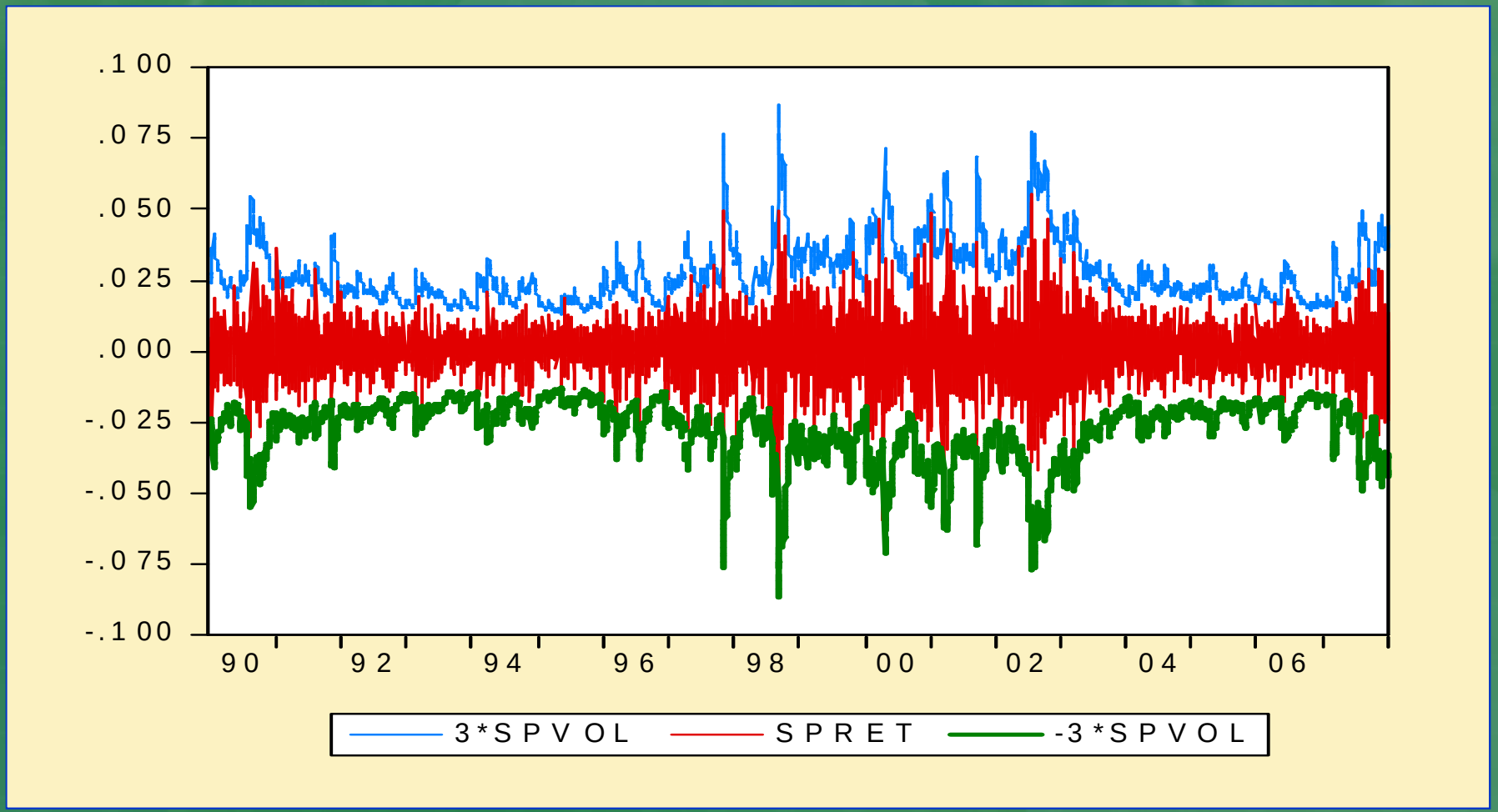
WHAT IS FINANCIAL MARKET VOLATILITY?

- Unpredictable movements in asset prices.
- Although we cannot predict future asset prices we can predict their magnitude.
- Thus we can predict risk
- How can we do this and does it work in turbulent times?

ARCH MODEL

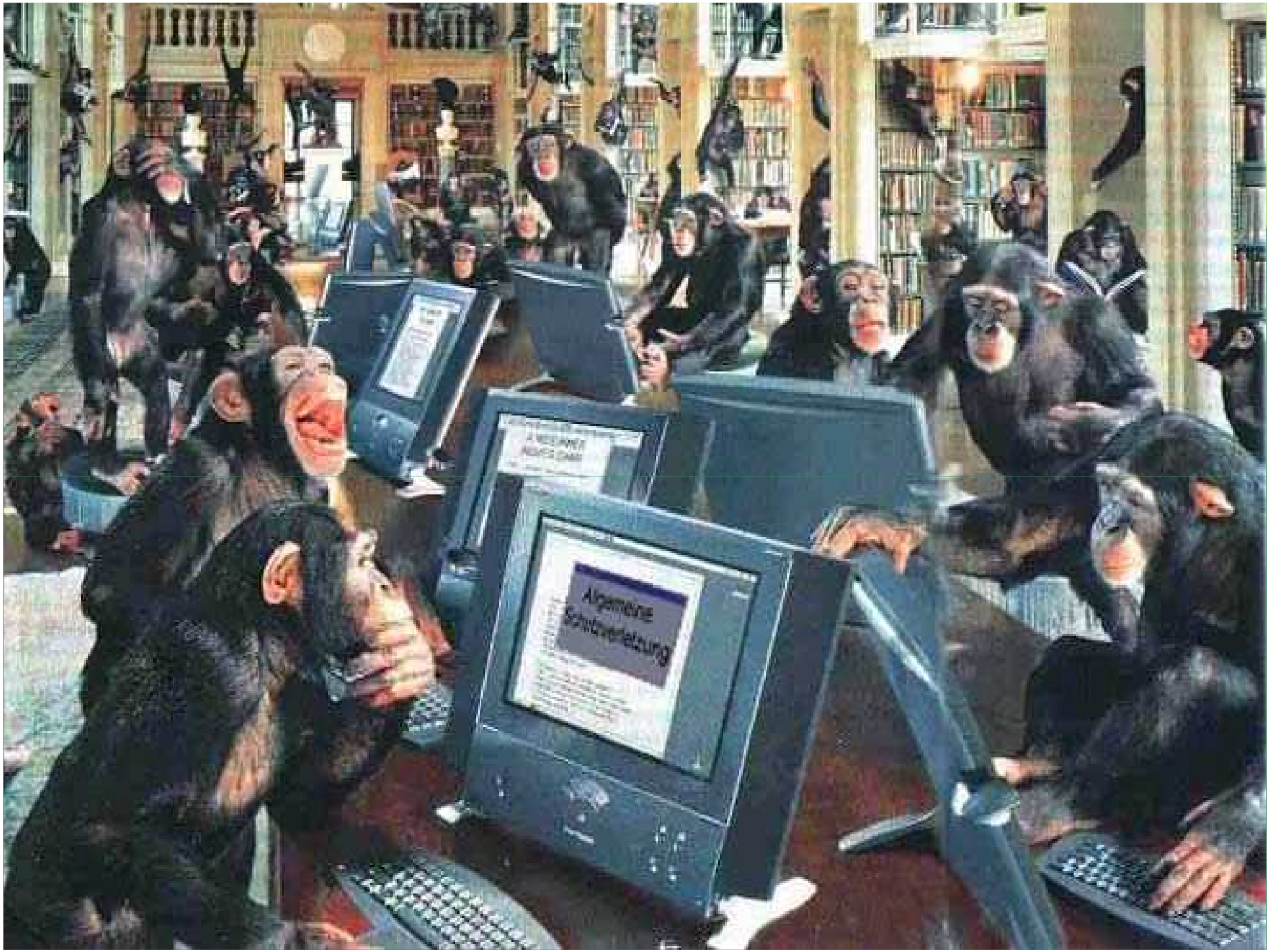
- The ARCH model predicts the variance of returns on the next day.
- Autoregressive Conditional Heteroskedasticity
- It relies on two features of returns
  - Volatility Clustering
  - Mean Reversion of Volatility
- Econometric Methods fit this model to data including many varieties, GARCH, TGARCH,…

Plus and Minus three Sigma



SURPRISING SUCCESS

- Although the original application of ARCH was macroeconomic, the big success was for financial data.
- Why does it work?
- What makes volatility high?


Allgemeine
Schulordnung

BETTER ANSWER

- Economic news on future values and risks moves prices
- Volatility is the natural response of a financial market to new information.
- News arrives in clusters.
- *High volatility means a cluster of important news!*

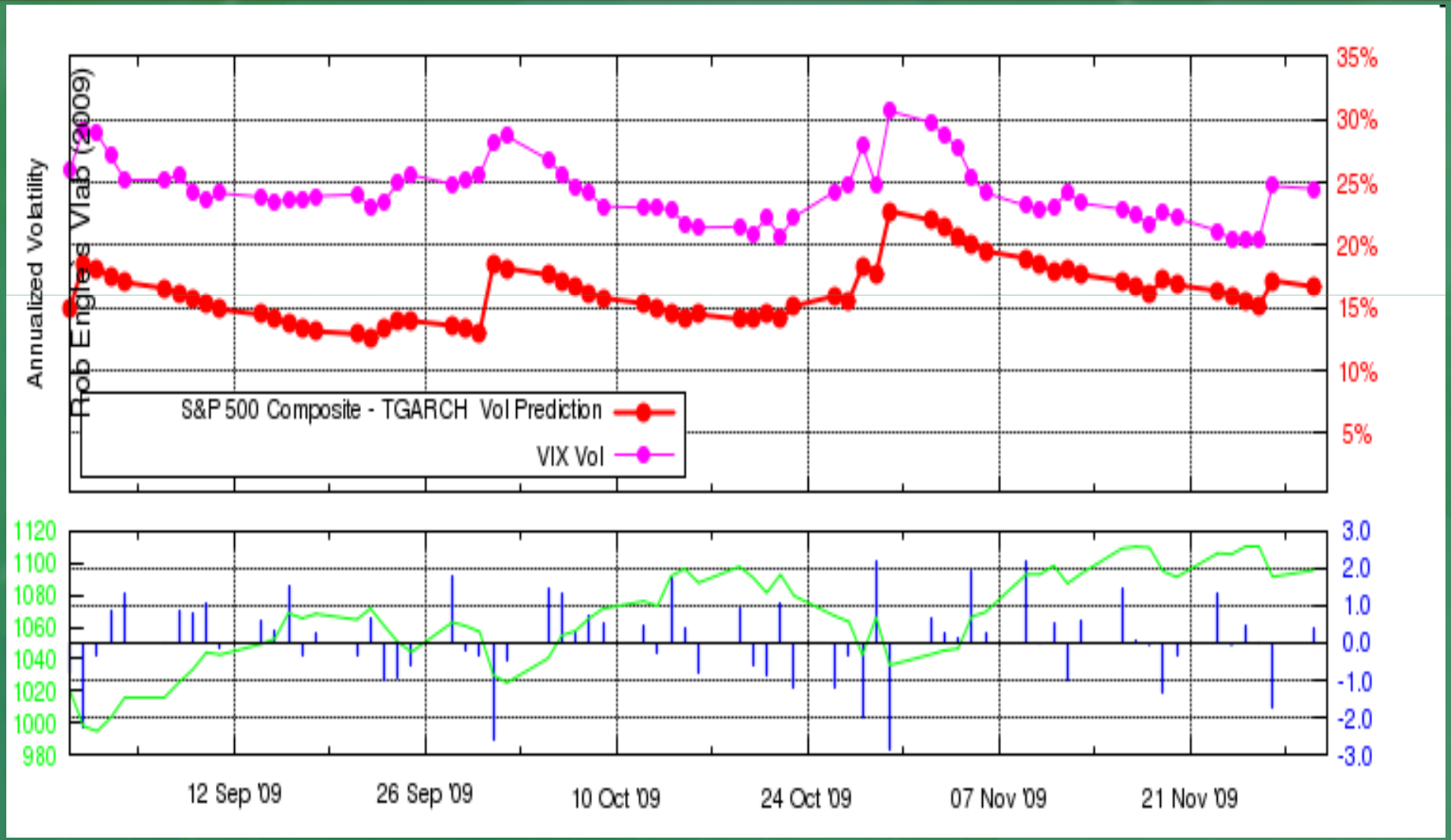
VOLATILITY

Through November 25,2009

VLAB **http://vlab.stern.nyu.edu**

S&P500 and VIX

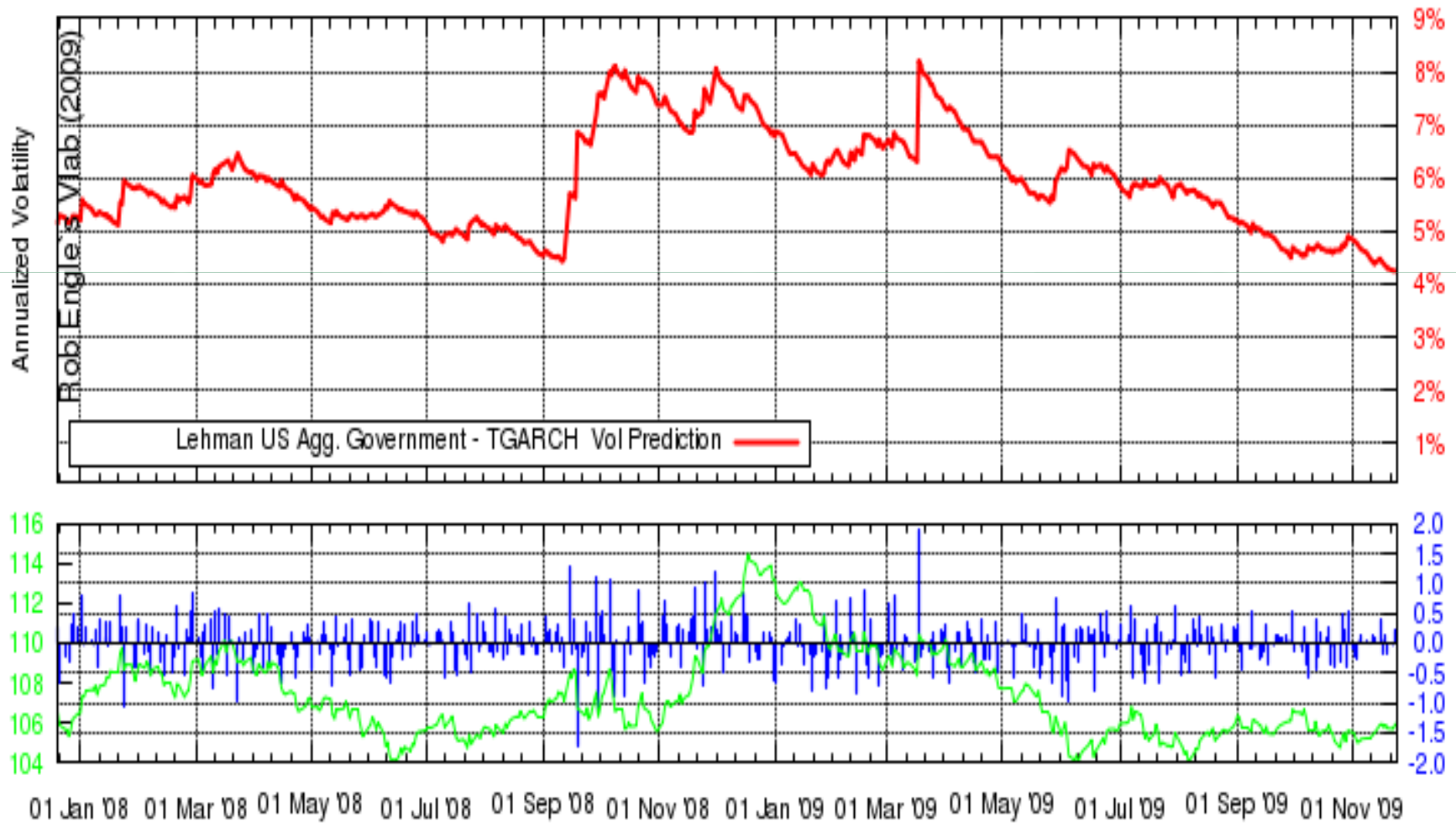
FORECAST FOR DEC 1, 2009



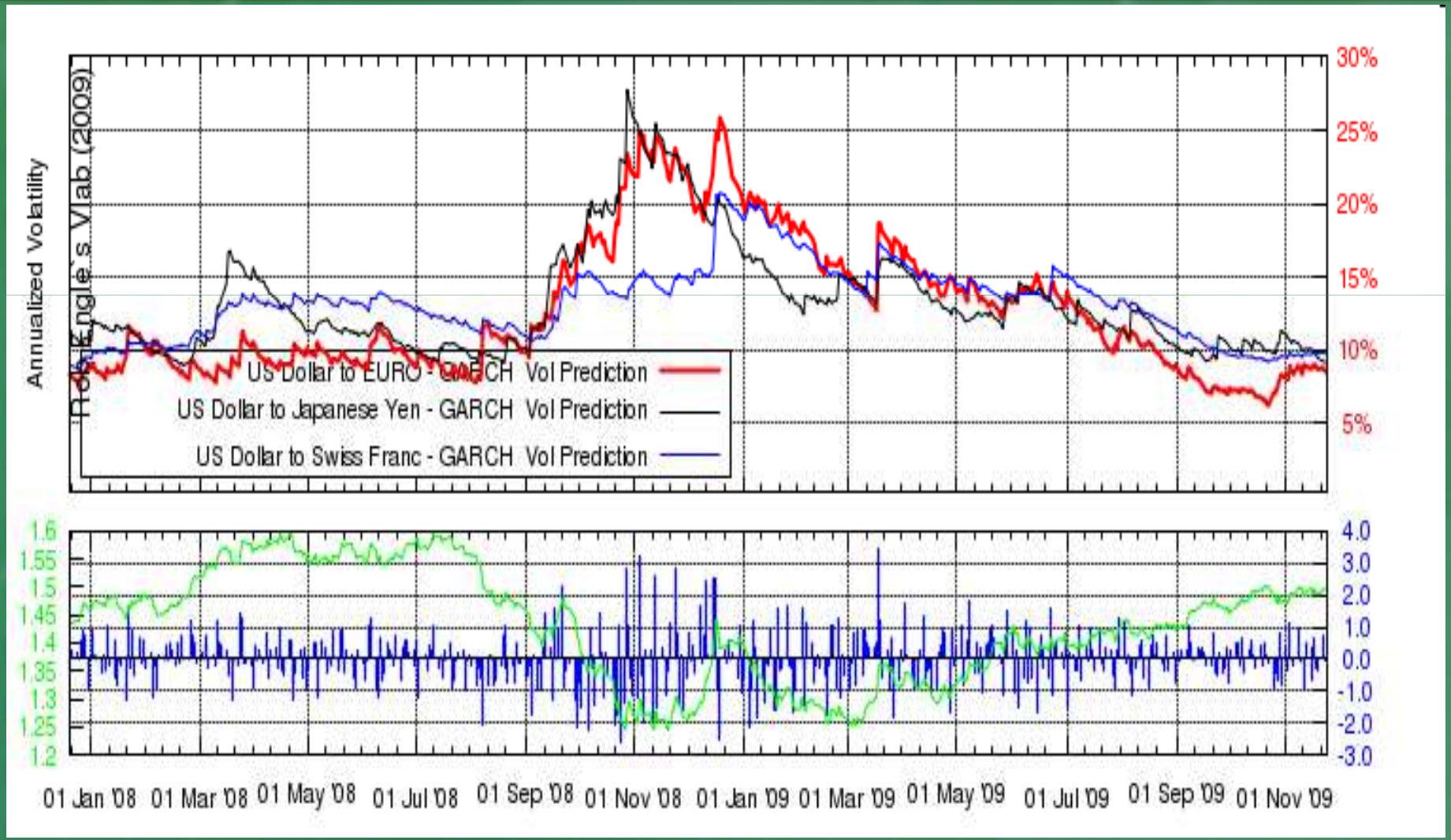
US Sectors


Financials SPDR - TGARCH Vol Prediction
Energy SPDR - TGARCH Vol Prediction
Healthcare SPDR - TGARCH Vol Prediction
Industrials SPDR - TGARCH Vol Prediction
Annualized Volatility
Rob Engle's Vlab (2009)
160%
140%
120%
100%
80%
60%
40%
20%
Jan '08
Mar '08
May '08
Jul '08
Sep '08
Nov '08
Jan '09
Mar '09
May '09
Jul '09
Sep '09
Nov '09

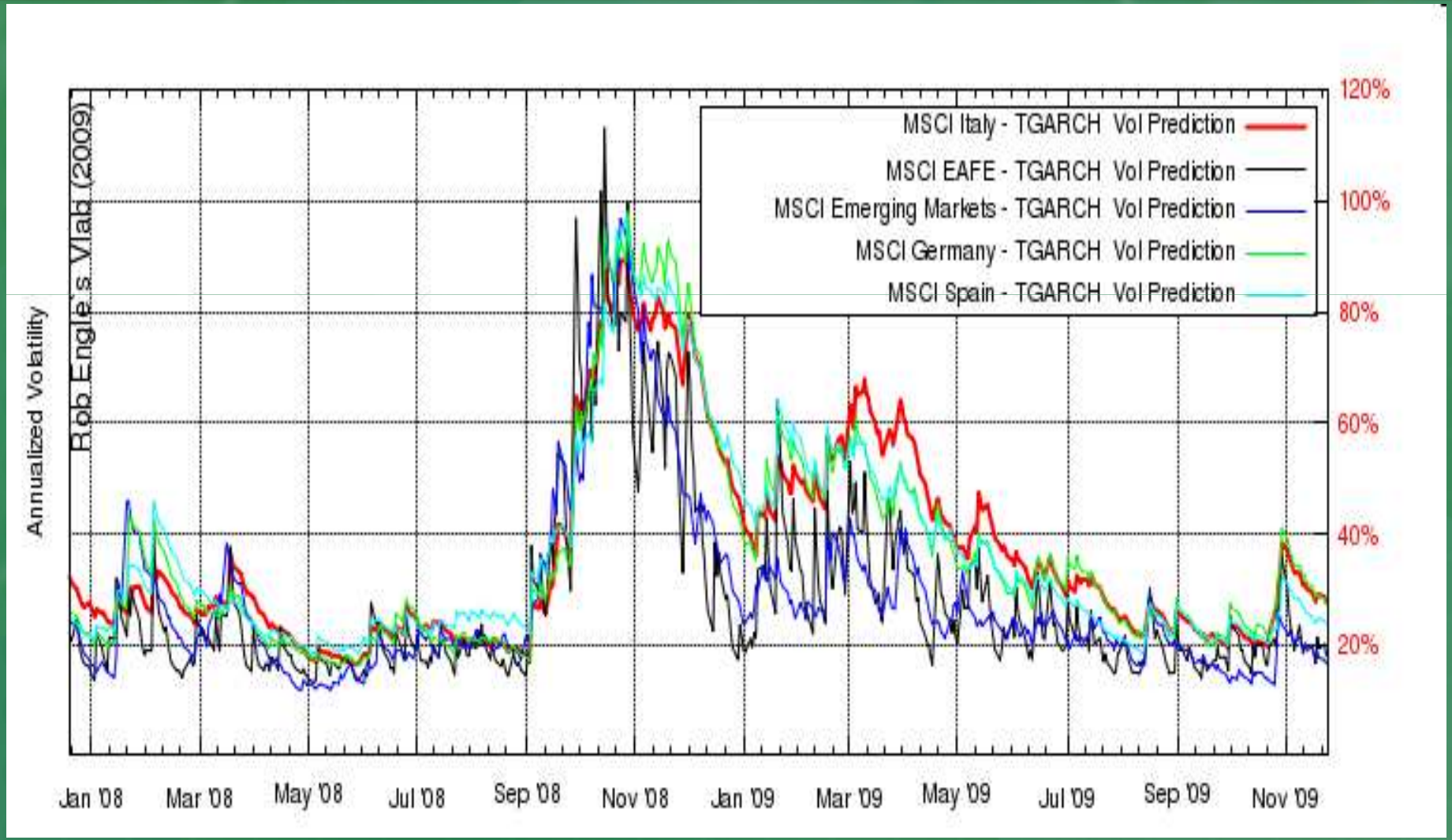
US BOND PRICES



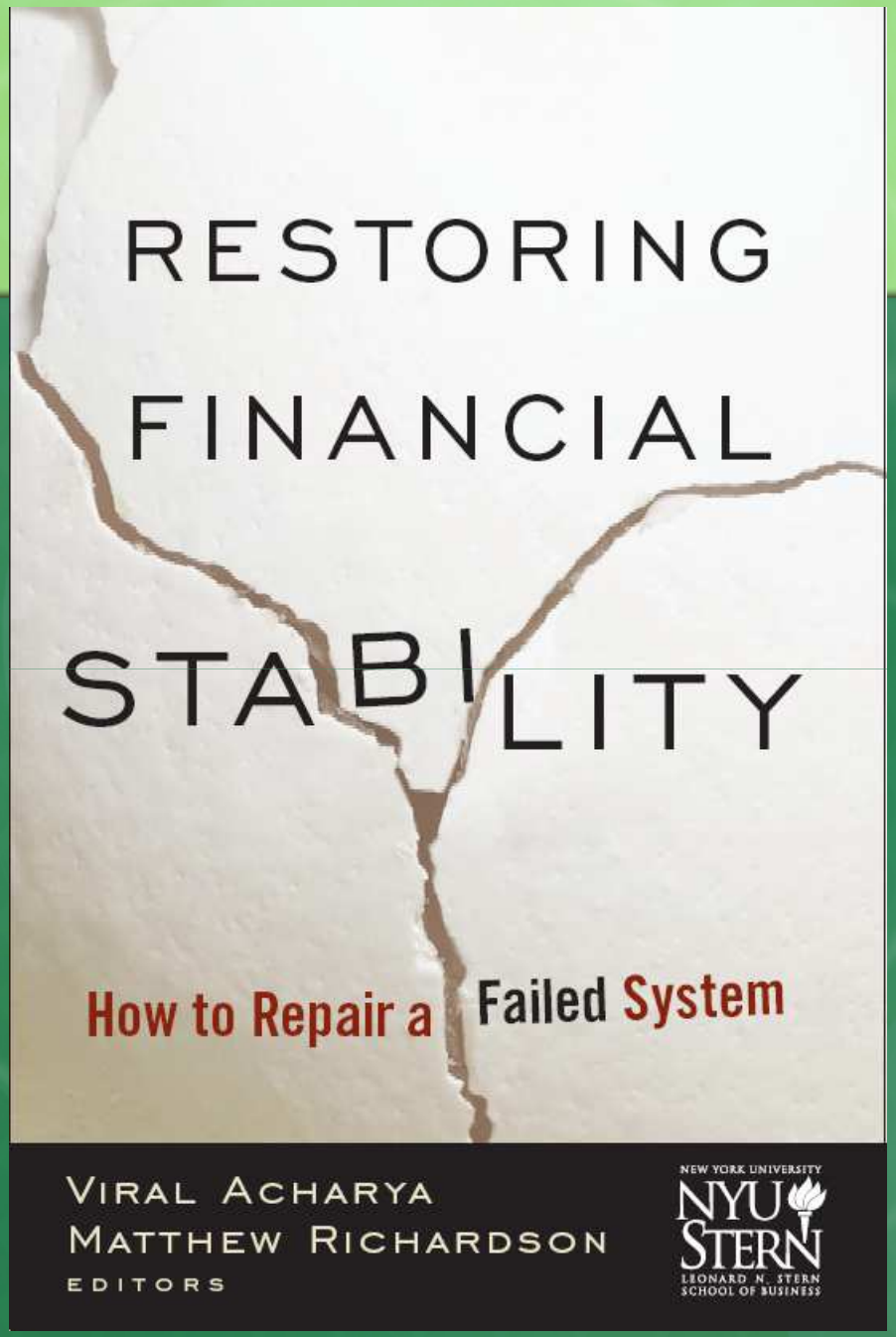
EXCHANGE RATES



INTERNATIONAL EQUITIES



FINANCIAL CRISIS - CAUSES


RESTORING
FINANCIAL
STABILITY
How to Repair a Failed System
VIRAL ACHARYA
MATTHEW RICHARDSON
EDITORS
NEW YORK UNIVERSITY
NYU STERN
LEONARD N. STERN SCHOOL OF BUSINESS

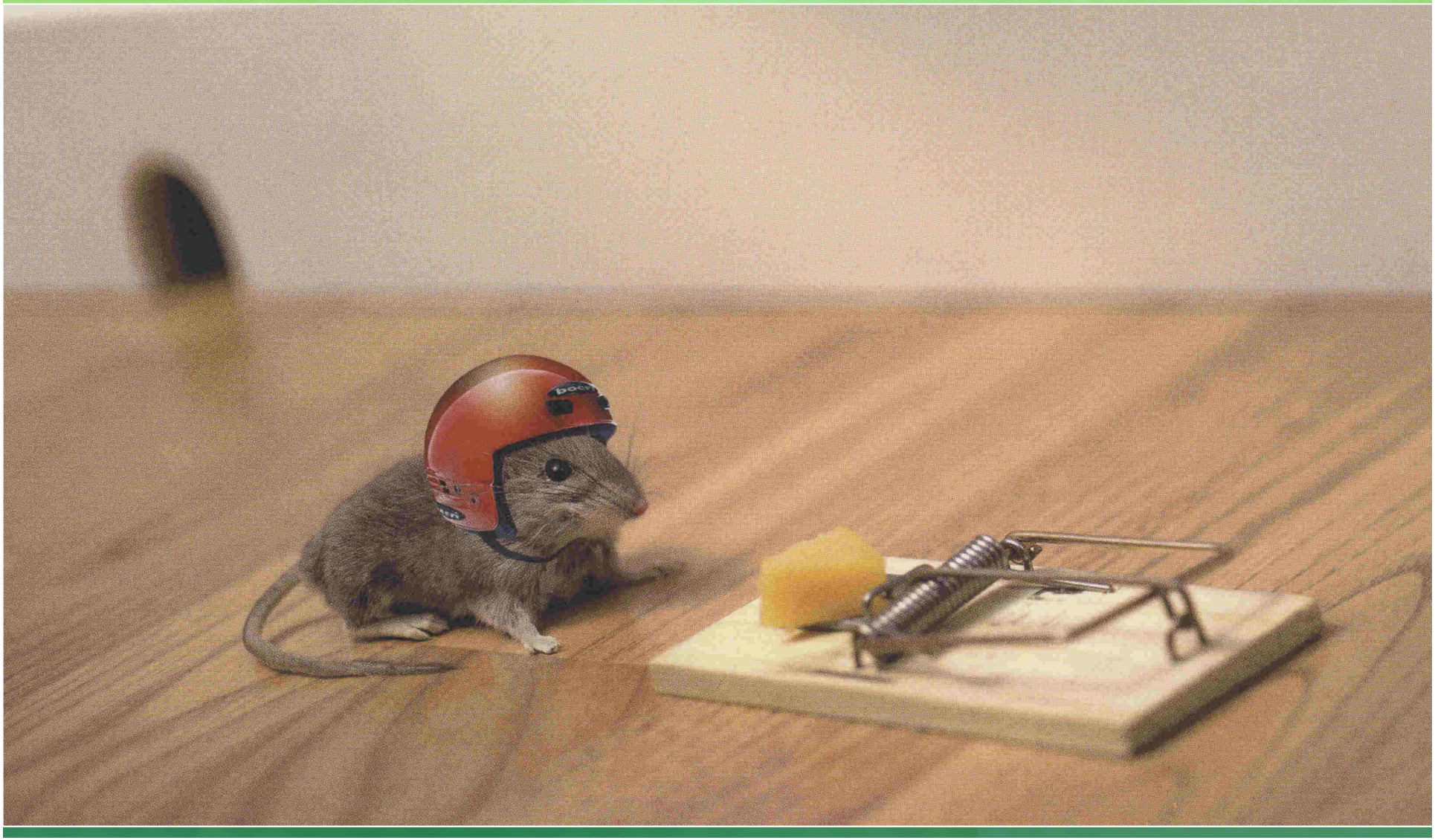
FUNDAMENTAL CAUSES OF FINANCIAL CRISIS

- ***Risk was underestimated*** by many market participants (traders, money managers, bank ceo's and boards, ratings agencies, regulators, investors and probably risk managers)

- ***Many of these had strong incentives to ignore risks*.**

IMPROVING RISK MEASUREMENT

WERE WE PREPARED?



SHOULD WE HAVE KNOWN?

- Would a good econometrician and risk assessor have known that the financial crisis was coming?
- Would the crisis have been in the confidence set?
- Was there information that risk assessment typically misses?
- Would economics have helped?

FORECAST PERFORMANCE IN VLAB

- During the financial crisis, the short run forecasts were just as accurate as during the low volatility period.
- One month ahead forecasts were less accurate during the crisis but were still within the 1% confidence interval of historical and theoretical experience.
- See Brownlees, Engle, Kelly,”A Practical Guide to Forecasting in Calm and Storm”

SHORT RUN VS. LONG RUN RISK

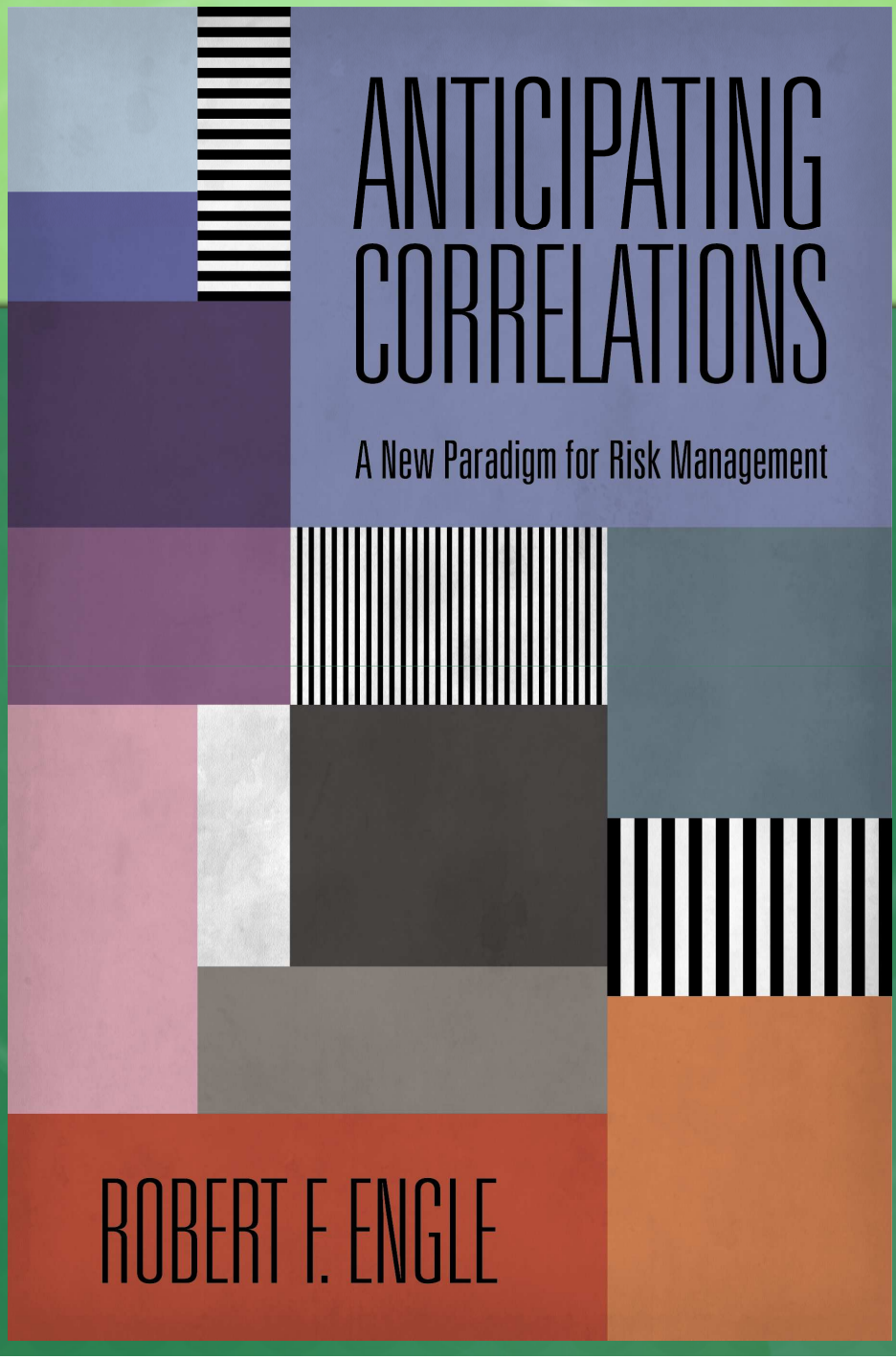
- Widely used risk measures are Value at Risk and Expected Shortfall.
- These measure risk at a one day horizon (or 10 day which is calculated from 1 day)
- However, many positions are held much longer than this and many securities have long horizons.
- *There is a risk that the risk will change!!*

INVESTING IN A LOW RISK ENVIRONMENT

- Many investors took low borrowing rates and low volatilities as opportunities to increase leverage without much risk.
- Structured products such as CDOs were very low risk unless volatility or correlations rose.
- Insurance purchased on these positions made the risks even lower as long as the insurer had adequate capital.
- Credit spreads were low because volatility was low.

WHAT HAPPENED?

- Volatilities and correlations rose and all these low risk positions became high risk and impossible to sell without deep discounts.
- Insurance became worthless as insurers were undercapitalized.
- Options market and many forecasters including myself believed volatility would rise.
- Risk measurement does not have a good way to incorporate this information.


ANTICIPATING CORRELATIONS
A New Paradigm for Risk Management
ROBERT F. ENGLE

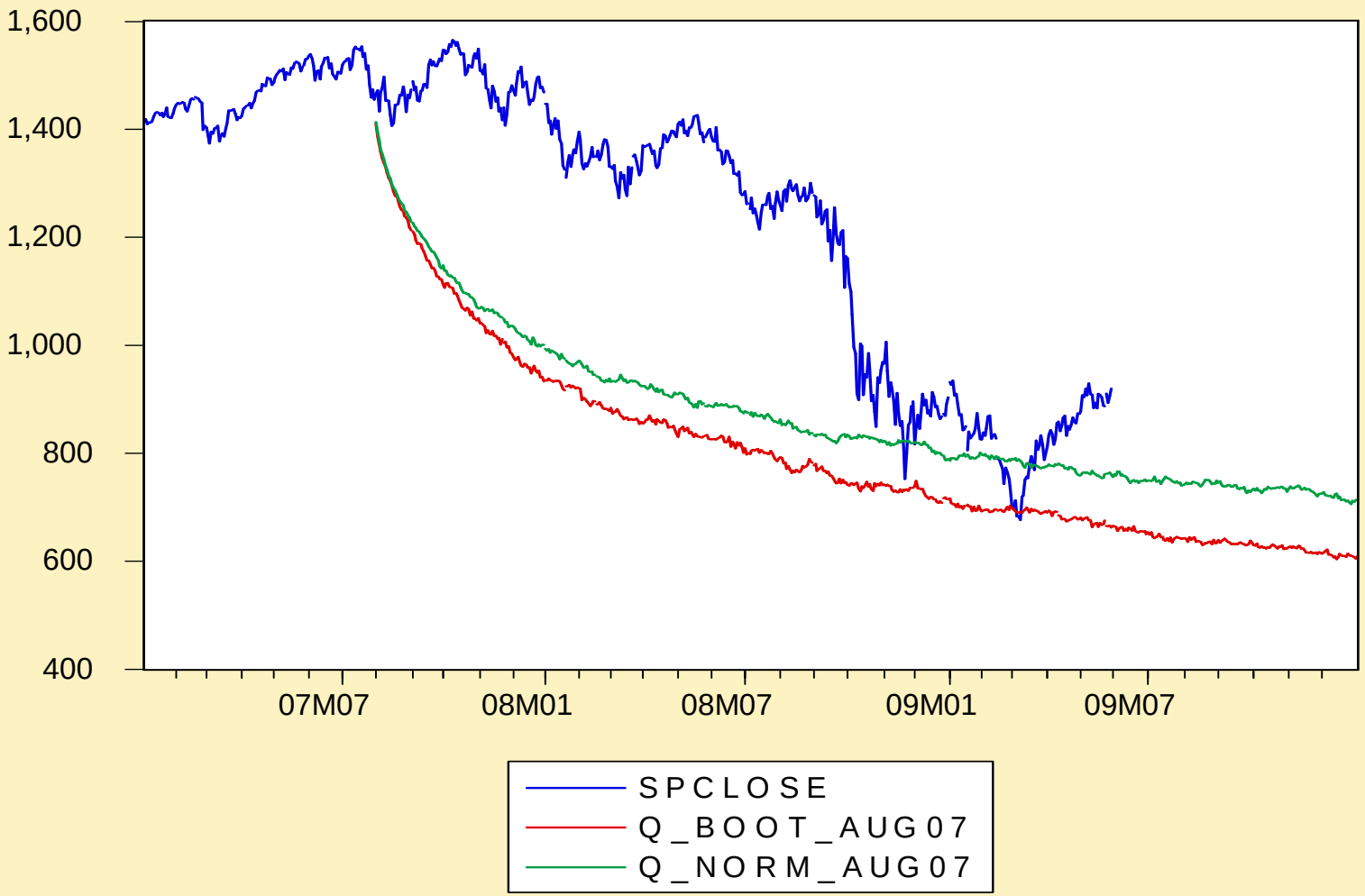
HOW TO MEASURE TERM STRUCTURE OF RISK?

- Calculate VaR and ES for long horizons with return processes that allow changing risk.
- Use economic information to improve these estimates
- Continue to use Scenario and Stress Testing

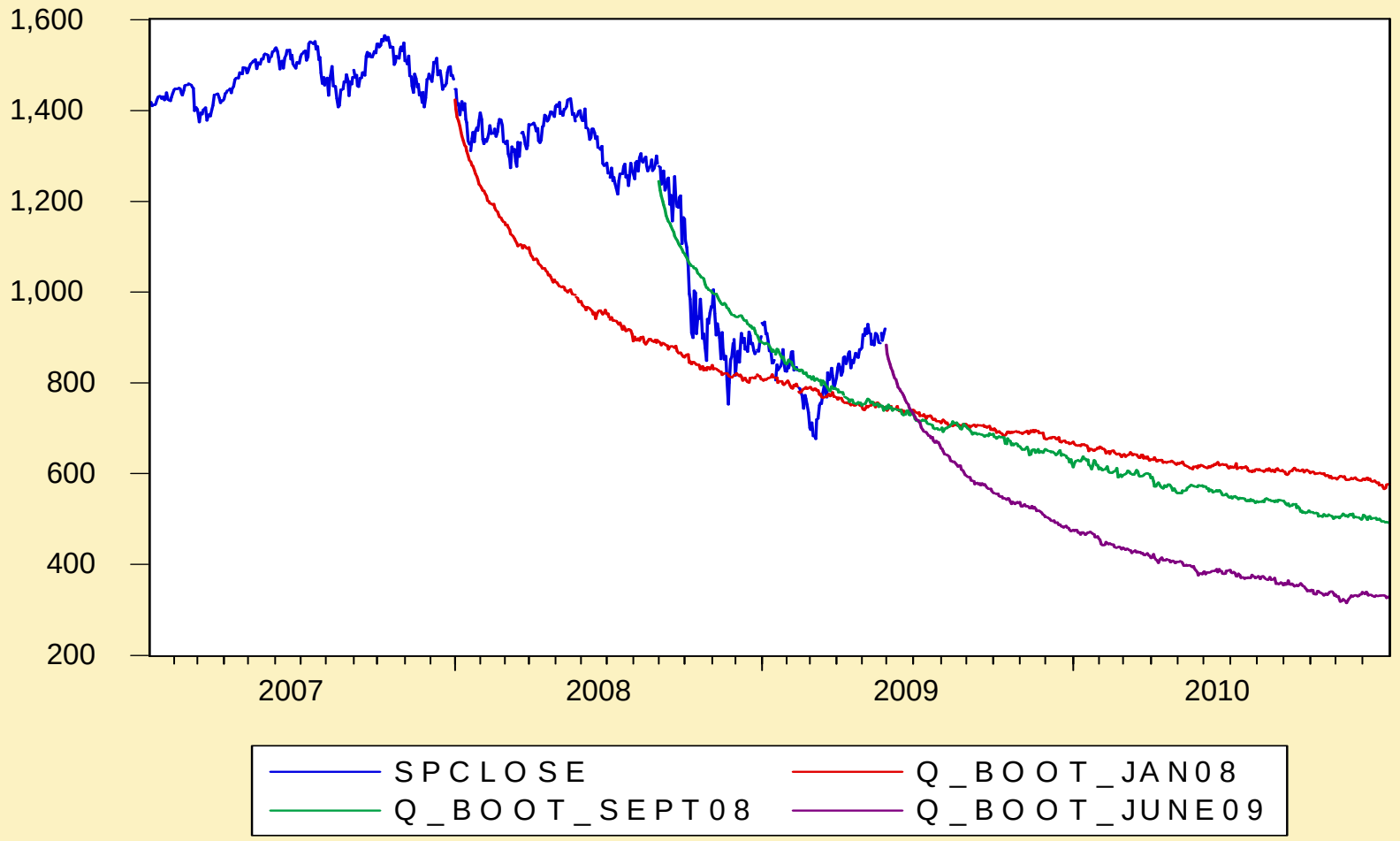
SIMULATED 1% QUANTILES FROM TARCH

- Using S&P500 data through July 2007, estimate a model.
- Simulate from the model 10,000 times and calculate the 1% quantile.
- Assume either normal shocks or bootstrap from historical shocks.

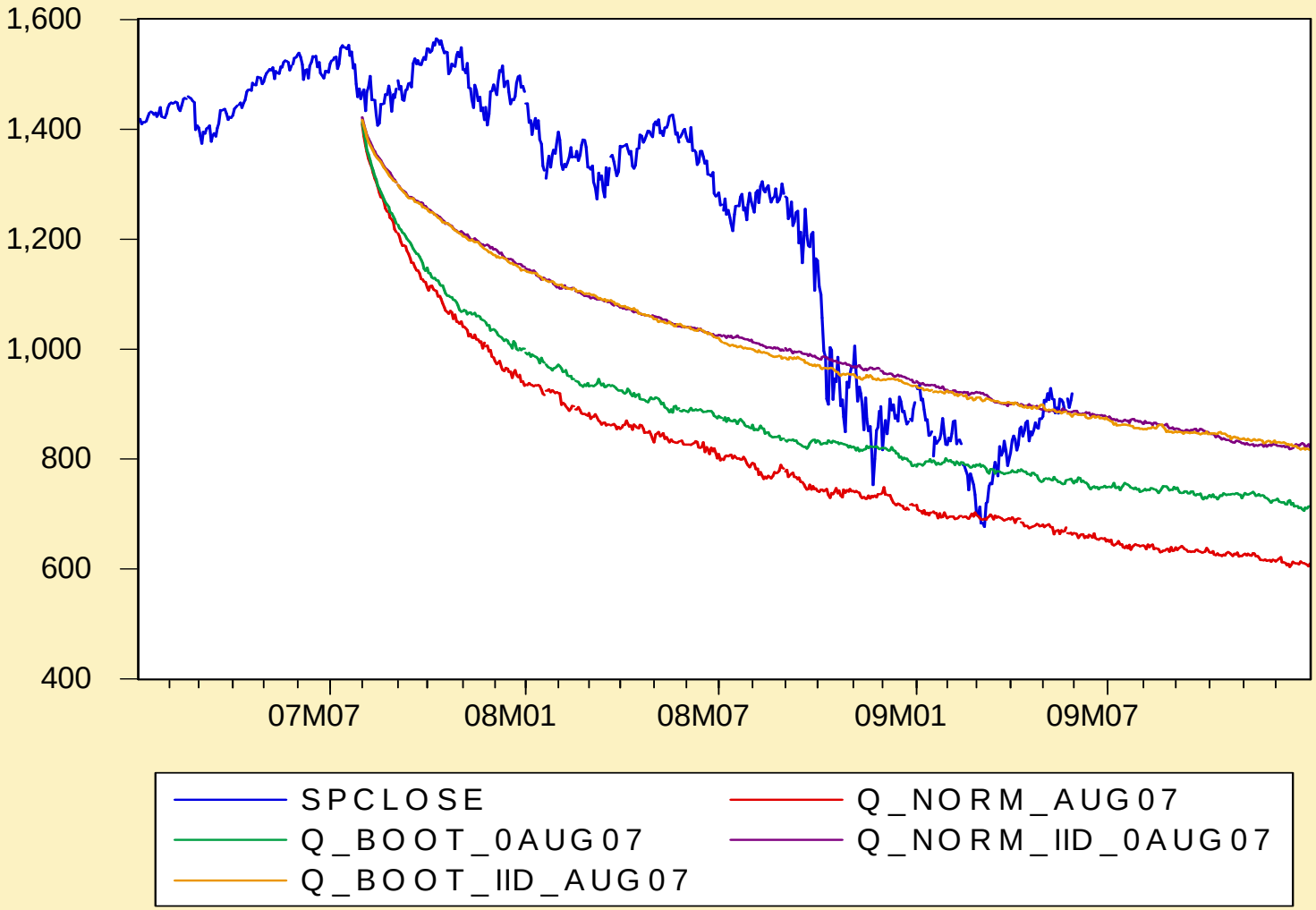
1% Quantiles starting August 2007



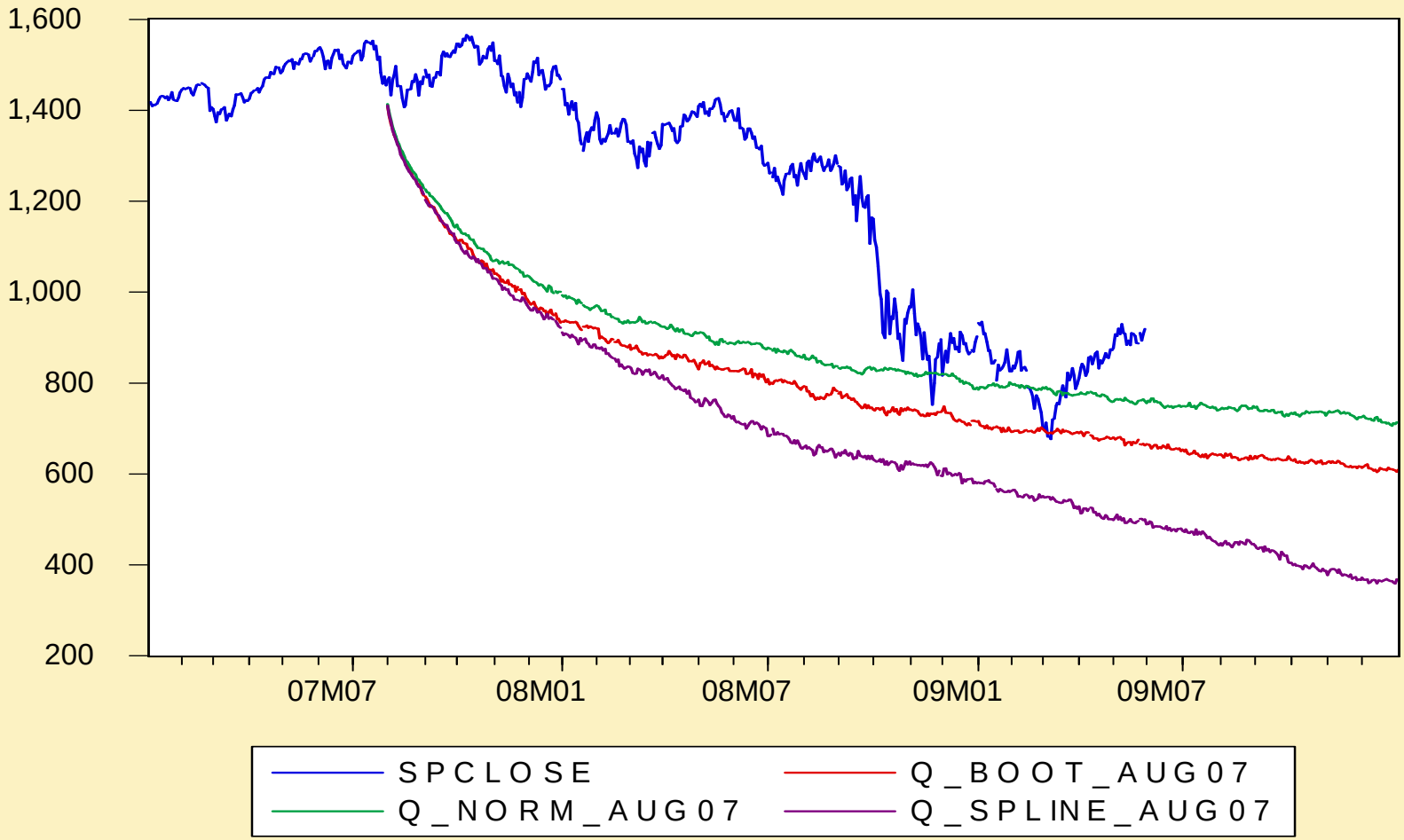
1% Quantiles starting Jan 08, Sept 08 and June 09



1% Quantiles for iid returns



1% Quantile for Spline GARCH with forecast of rising volatility



HOW TO USE LONG TERM RISK ASSESSMENTS

ONE RESPONSE TO LONG TERM RISKS

- Shorten asset holding period
- Reduce positions when risks rise
- Be the first to get out

- This “market timing” solution leads to panic selling and is likely to be part of the explanation for the crisis last fall.

HEDGE AGAINST CHANGES IN INVESTMENT OPPORTUNITY SET

- This is the classic Merton ICAPM solution
- When taking a long term position which is relatively illiquid or may be illiquid, take an offsetting hedge.
- How good are these hedges? Some examples:
  - Volatility
  - Gold
  - Government bonds
  - High grade corporates
  - U.S. Treasuries
- Hedges are expensive and underperform except when you need them. This is to be expected.

LONG TERM RISK

- Investors may take smaller positions as assets are less desirable.
- Long term risks make investing riskier and should lower the price of assets today by increasing the risk premium.
- A reduction in long term risk should increase asset prices today.

HOW TO CORRECT INCENTIVES?

TWO KINDS OF RISK

- INDIVIDUAL RISK
- SYSTEMIC RISK

REGULATION

- Regulate to reduce systemic risk, not all risk
- Tax on biggest, most systemically risky firms – not just financials
- Tax rate is countercyclical – higher when economy is doing well
- Coordinate globally
- Establish legal resolution authority to wind down complex financial institutions in bankruptcy.
- Move OTC derivatives to central clearing where possible and enforce transparency elsewhere.
- Reduce role of ratings agencies in capital requirements and risk regulation.

IT IS TIME

- It is now time to put new regulatory structures in place.
- It is time to coordinate this process globally.
- As the finance sector recovers, there is a temptation to return to business as usual.
- We cannot forsee the next crisis so we need robust institutions and appropriate incentives.

WHAT CAN WE EXPECT?

OR

WHERE ARE WE GOING?

SHORT RUN FORECAST in US

- Third quarter growth positive
- Expect continued slow growth
- Consumer sector is weak because layoffs are consequence of corporate cost cutting.
- Consumer sector is weak because big wealth drop
- Exports are weak until world economy begins to recover and currencies align
- Little fear of inflation even with low interest rates

WHERE IS THE DOLLAR GOING?

- Dollar has depreciated over the last six months. Why?
- Low interest rates and the carry-trade?
- Debt refinancing fears?
- Loss of “safe haven” role as risk appetite returns and volatility falls?

GLOBAL OUTLOOK

- Slow growth
- Potential Asset bubbles in countries receiving capital or with fixed currency regimes.
- Gradual coherent increase in rates (2010?)
- Gradual exit of government from capital market guarantees
- Eventually - recovery of mortgage markets, housing markets and ABS.

LONG RUN RISKS

FUTURE FINANCIAL INSTABILITY

- Reducing this risk will improve financial markets now.
- This is the G-20 agenda and finance ministers globally.
- This risk is being hedged by investors with big appetites for US Treasuries, gold, and maybe volatility products. If the risk is reduced, these products should fall in value.

THE RISK OF WAR AND TERRORISM

- Deteriorating Global Economy
- Increasing income differential between rich and poor countries
- Rising fundamentalism
- Rising social unrest
- Competition for resources

- Increase the risk of War and Terrorism

DEPRESSED ASSET PRICES

- Rising Long run risks lower asset prices as investors are more cautious.
- This raises the cost of doing business and raising capital
- This reduces income of entrepreneurs
- And costs jobs

WHAT TO DO?

- ***PROMOTE PEACE AND STABILITY***
- ***PEACE PERMITS PROSPERITY***

BENEFITS

- Reducing future risk of war/terrorism
- Yields benefits today by
- Improving business and stock market valuations and
- Creating jobs

GLOBAL OVERHEATING

WHAT ARE THE RISKS?

- Scientific evidence seems clear that the climate is changing.
  - CO_2 concentrations are rising rapidly
  - Glaciers and polar ice are melting
  - Warmest years on record are almost all within 10 years.
- But what are the costs? Scientific evidence is not precise.

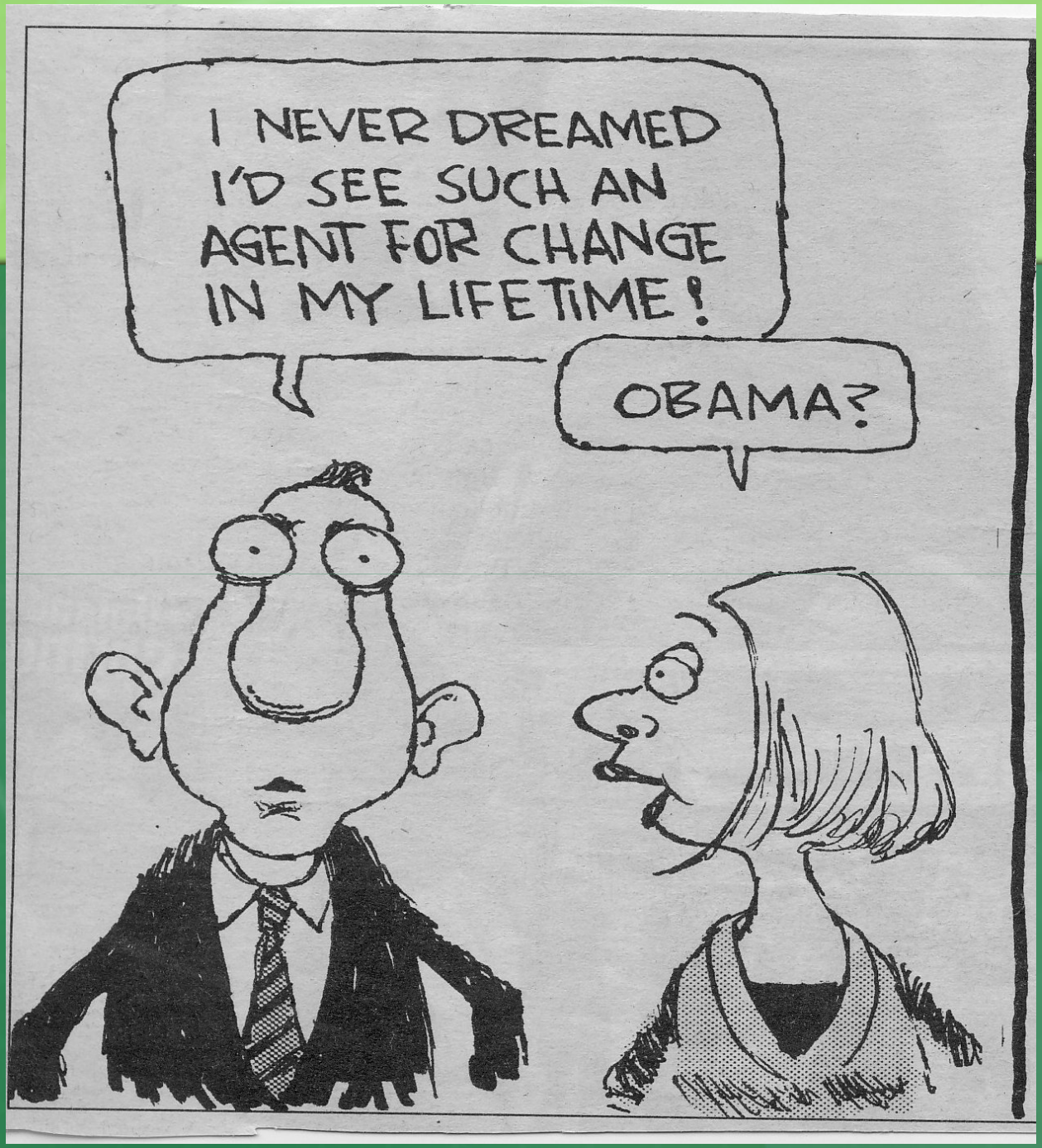
ECONOMIC COSTS

- THE GLOBAL ECONOMY WILL BE UNABLE TO PRODUCE AS MUCH IN THE FUTURE AS IT WOULD WITHOUT CLIMATE CHANGE
- TAXES WILL BE RAISED TO PAY FOR PUBLIC EFFORTS TO MITIGATE THESE COSTS
- COMPANIES WILL HAVE EXTRA COSTS OF DOING BUSINESS SO PROFITS WILL BE LOWER.

IS CLIMATE RISK PRICED?

- Can we see evidence of climate risk in financial markets?
- We would expect that stock prices would be depressed by climate risk.
- This should be especially true of businesses that will suffer from climate change.
- We expect high prices for assets that will benefit from climate change as these are the hedge portfolios.

A SOLUTION


I NEVER DREAMED I'D SEE SUCH AN AGENT FOR CHANGE IN MY LIFETIME!
OBAMA?


©08 AKRON BEACON JOURNAL
4 DOLLARS A GALLON.

High Oil Prices are a Good Thing!

- These encouraged consumers and industry to use less oil
  - Driving in the US was down
  - Hybrid Cars were selling and SUV's were not
  - House prices in the suburbs were declining more than in the central city
  - Ridership on public transportation was up
- Today these effects may be reversed.

A SOLUTION

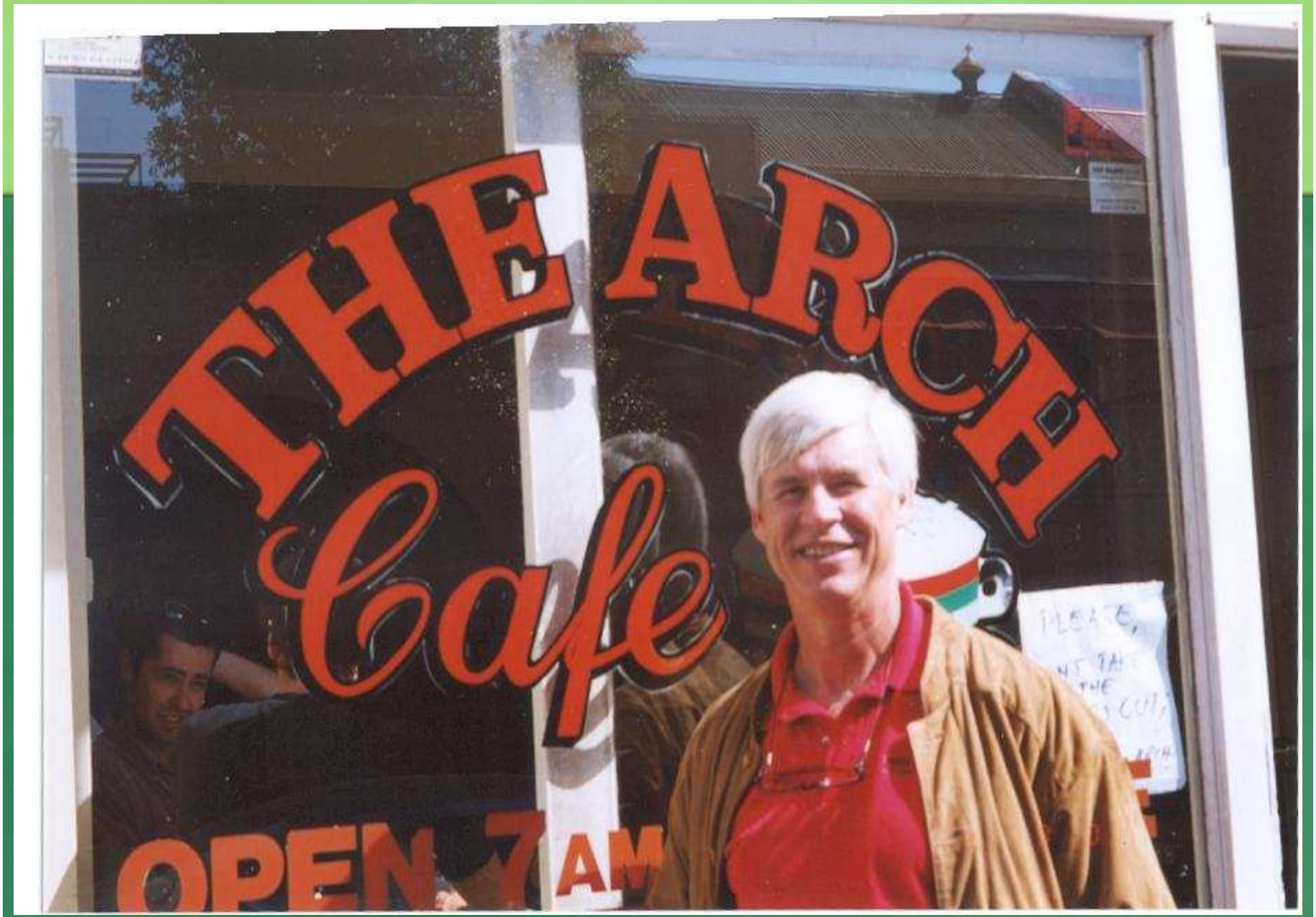
- Most Economists believe the best solution to global overheating is a comprehensive tax on carbon emissions and other greenhouse gases.
  - Only if it is comprehensive will it encourage alternative energy solutions
  - Only if it is comprehensive will efforts to avoid the tax be socially beneficial.
- In a time of big deficits, such a tax might be politically acceptable.

Cap and Trade

- This is the Obama choice
- Kyoto agreement and probably Copenhagen outcome
- Covers only a subset of emissions
- Raises consumer prices only if certificates are scarce.
- Raises revenue only if certificates are sold, not given away.
- Likely to be expensive and ineffective.

CONCLUSION

- Make sure you take only the risks you intend to take including long term risks.
- Regulators should reduce incentives to take systemic risks.
- Policy makers must know that reducing long term risks gives benefits today.


THE ARCH
Cafe
OPEN 7 AM