Risk Management for Households The Democratization of Finance

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Risk Management Is Less than Half Way from Optimal

The correlation of consumption changes across countries is even lower than the correlation of income changes across countries (David Backus, Patrick Kehoe and Finn Kydland, *Journal of Political Economy*, 1992)

Need to *democratize finance*. (*New Financial Order*, Princeton, 2003)

Why Does It Take So Long?

- Wheeled toys (Mexico Late Classic Period, between 650 and 950 A.D.) but no wheeled vehicles in pre-Columbian Americas
- Wheeled suitcases, Bernard Sadow, 1972, Robert Plath 1991
- Movie subtitles invented in 1920 (Abraham Schomer, *The Chamber Mystery)* but virtually never used again in silent movies
- Desks over exercise bikes—still not done (Mayo Clinic)

  (from *New Financial Order*, 2003)

Outline of Talk

- Reasons for optimism for progress in the democratization of finance
- Real estate risk management
- Longevity risk management
- Energy (oil) risk management

Reasons for Optimism

- Development of financial theory
- Behavioral finance
- Information technology

Radical Financial Innovation
Example: Germany Social Security 1889

- Financial theory: concept of insurance (*Versicherung*), large risks, Lujo Brentano, Gustav Schmoller
- Psychological theory: overconfidence, wishful thinking, hyperbolic discounting *Schriften des Vereins für Sozialpolitik*
- Information technology making this possible: paper, typewriters, filing cabinets, German bureaucracy, pasting 11 million stamps on cards
- Invention copied around the world, same social security principles in U. S. today

Behavioral Finance

- Neo-Institutional and behavioral theories are centrally important in analyzing the evolution of institutions including market instruments and financial intermediaries, but are unlikely to provide significant and stable explanations of asset prices and resource allocations.” Robert Merton and Zvi Bodie 2004

Kahneman and Tversky on Framing Science 30 January1981

- “Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows: If program A is adopted, 200 people will be saved, If program B is adopted, there is 1/3 probability that 600 people will be saved and 2/3 that no people will be saved.” Which of the programs would you favor?”
- A 72% B 28%

Kahneman and Tversky on Framing Science 30 January1981

- “Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows: If program C is adopted, 400 people will die, If program D is adopted, there is a 1/3 probability that nobody will die, and a 2/3 probability that 600 will die.”
- C 22%, D 78%

Wishful Thinking Bias

- People exaggerate probability that their team will win.
- People exaggerate probability that the candidate they favor will win.

Attention Anomalies

- Attention is fundamental aspect of human intelligence and its limits
- Social basis for attention
- Inability to account for one's attention
- "No arbitrage assumption" of financial theory: No ten-dollar bills lying around. Does not require everyone is paying attention.

Mental Compartments

- Shefrin & Thaler: Compartments: current wage, asset, and future.
- Shefrin & Statman: Investors have a “safe” part of their portfolio that they will not risk, and a “risky” part of their portfolio that they can have fun with

Representativeness Heuristic

- People judge by similarity to familiar types, without regard to base rate probabilities (sensitive, artistic woman, sculptress or bank teller)
- Tendency to see patterns in what is really random walk

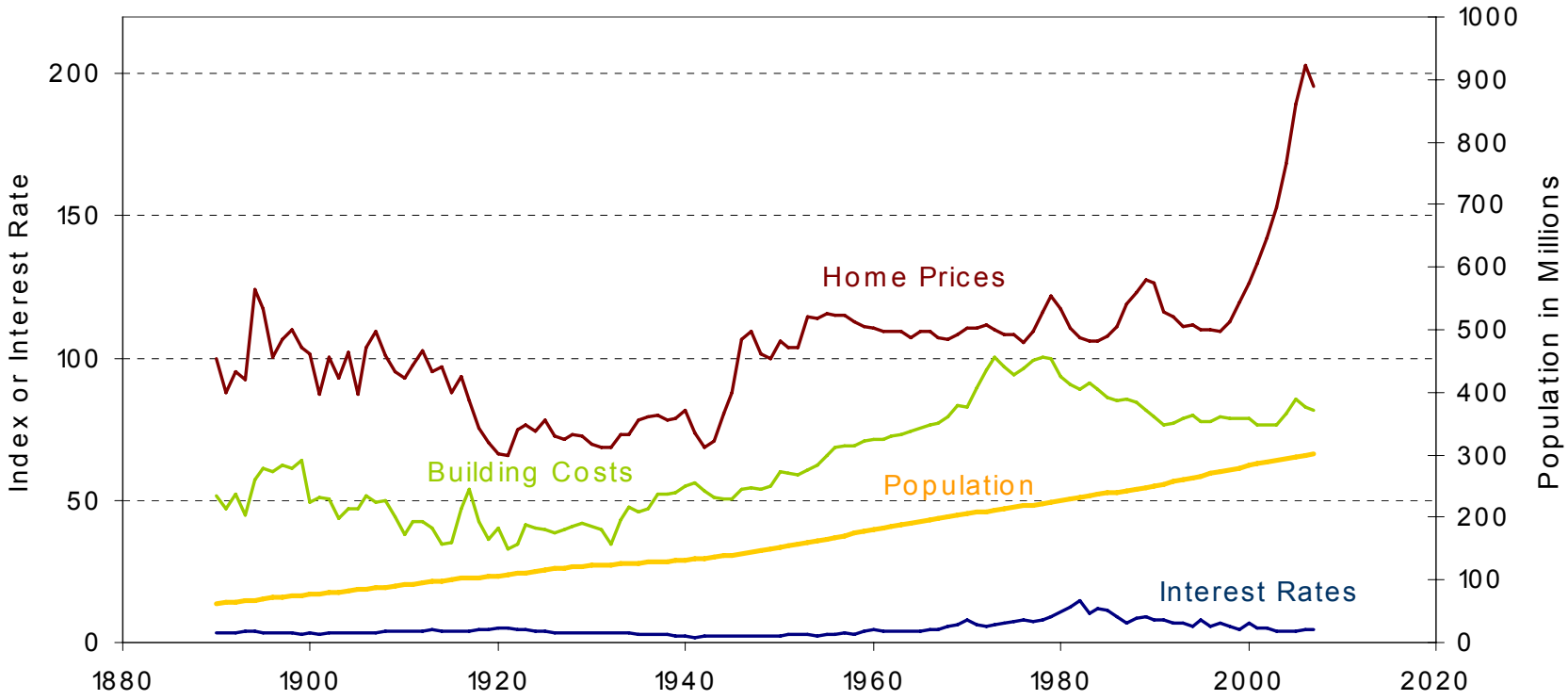
Culture and Social Contagion

- Social cognition, collective memory
- Durkheim, 1897, suicide rates differ across countries for no more reason than different cultural themes
- A global culture in today's world

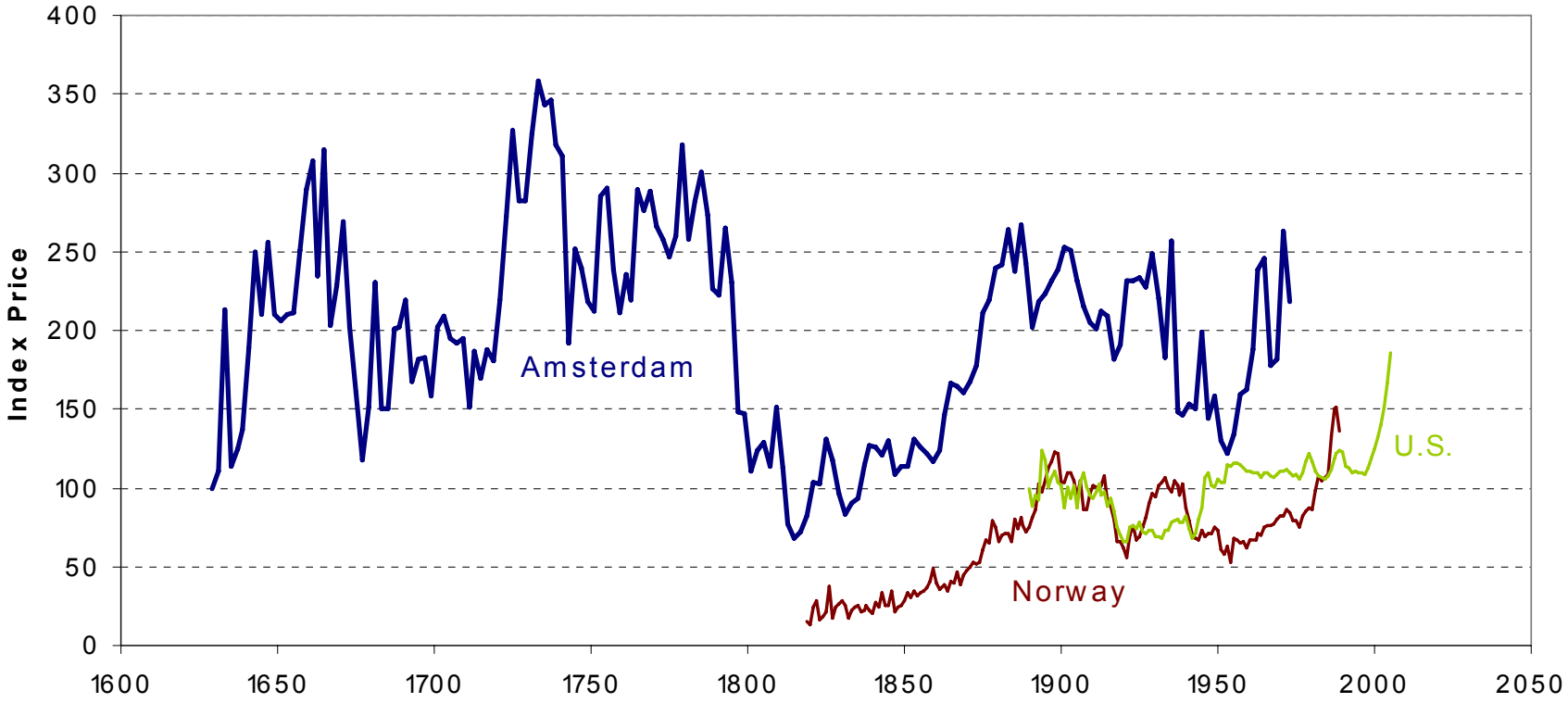
Endowment Effect

- Merton and “selling the national jewels”
- Daniel Kahneman, Jack L. Knetsch, and Richard Thaler, “Experimental Tests of the Endowment Effect and the Coase Theorem.” coffee mugs

US Home Prices and Economic Fundamentals, 1890-2007



Historical Real Home Prices in Norway, Netherlands and US



Home Equity Insurance

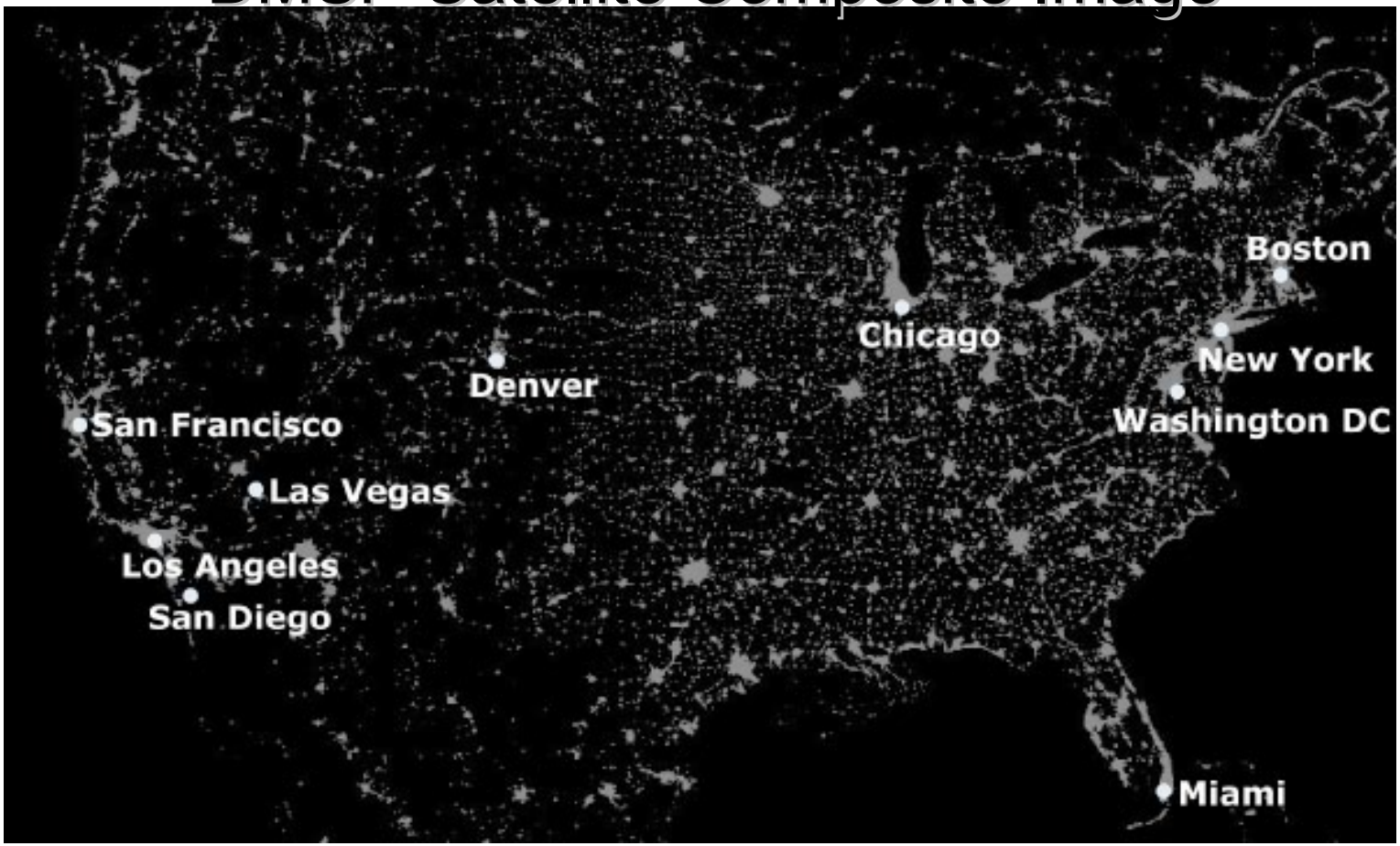
- Risks to values of homes greater than risks by fire
- Oak Park, Illinois, 1977
- Chicago Home Equity Assurance Program 1988
- Index-based insurance, Shiller and Weiss 1994
- Yale-Syracuse-NRC program, 2002

Evolution of Home Price Indices

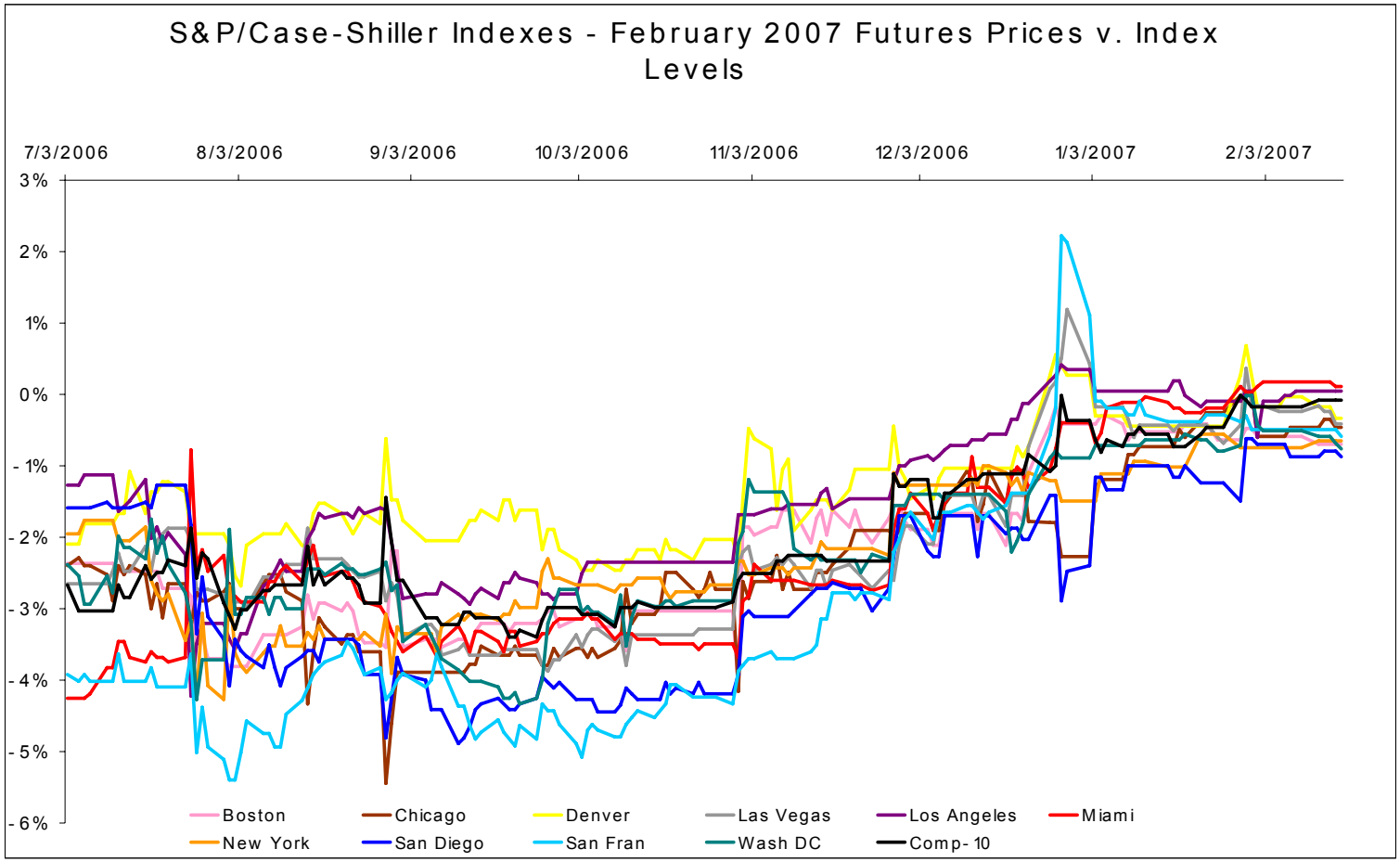
- Electronic files of home sales became available in late 1980s
- Econometric techniques (repeat sales), Case and Shiller, late 1980s
- Track record of Case Shiller Weiss, Inc. as index provider slowly developed
- Co-branding with Standard & Poor's as S&P/Case-Shiller Indices

World Real Estate at Night

DMSP Satellite Composite Image



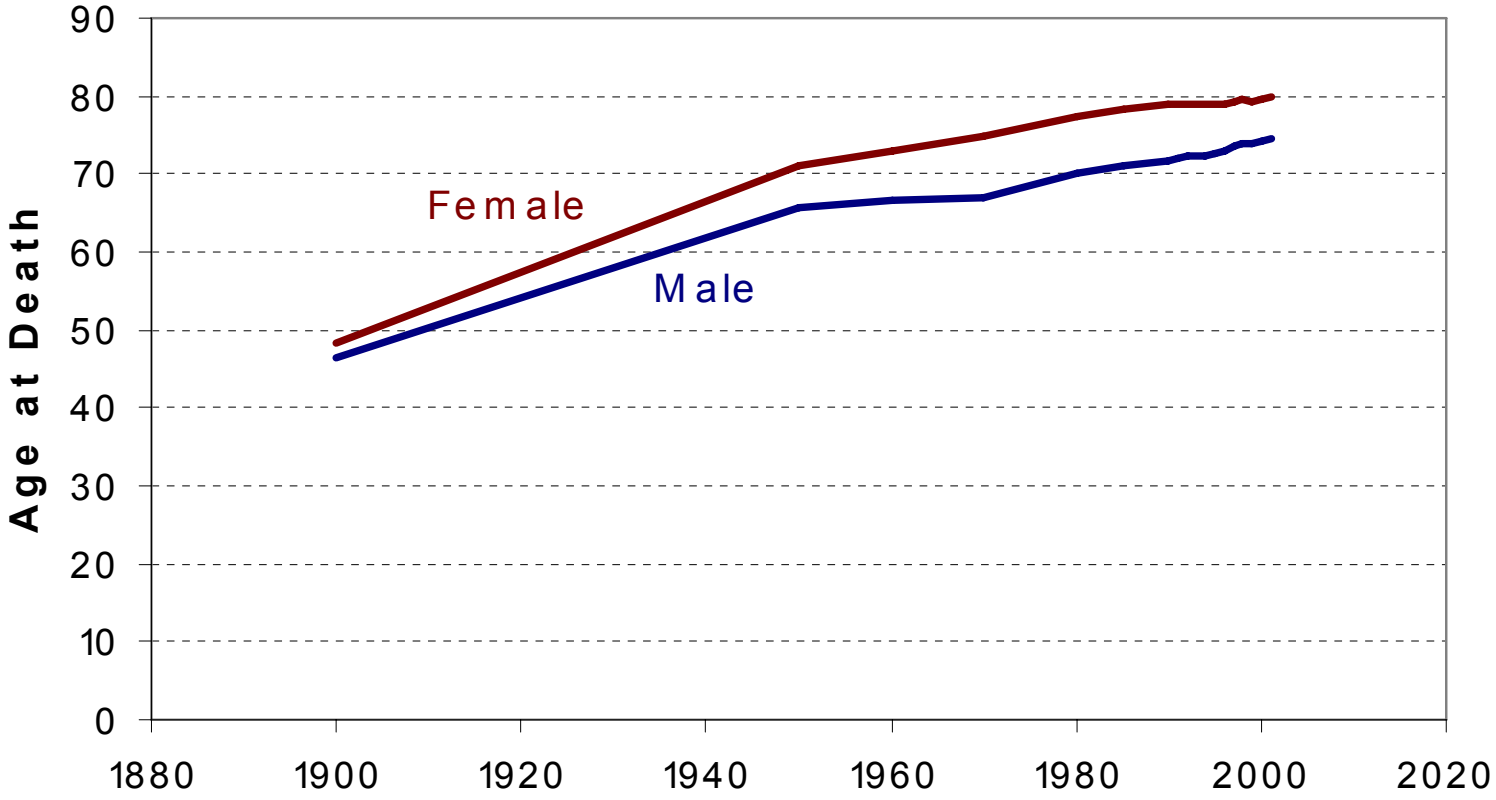
CME Futures Discounts



Pensions and the Risk of Outliving One's Wealth

- Life annuities are an excellent old idea, rarely embraced by the public
- Wishful thinking bias, mental framing
- Public pension funds
- Private annuities
- Problem: annuity providers have to manage aggregate longevity risk

U.S. Life Expectancy, 1900-2001



Efforts to Create Markets for Longevity Risk

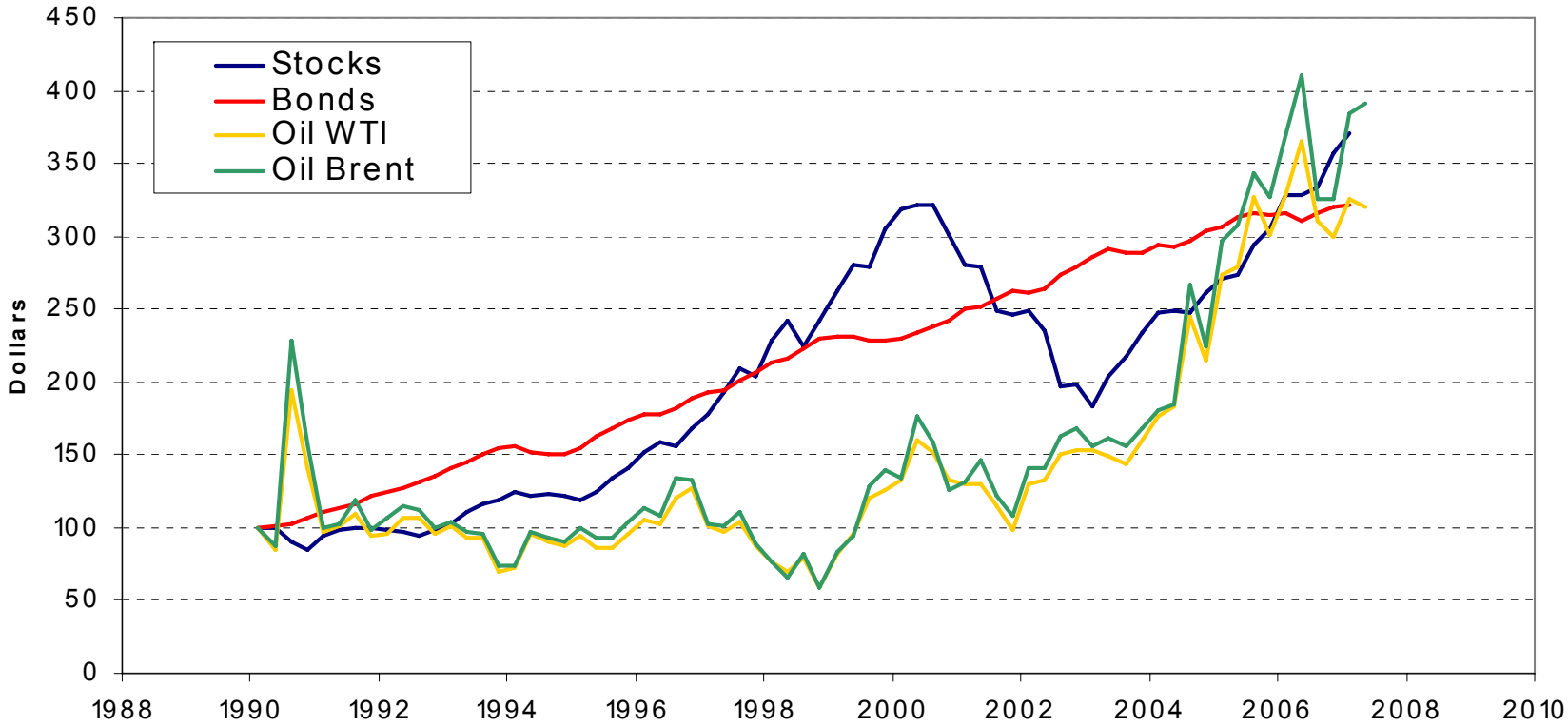
- Swiss Re longevity bond, 2003
- European Investment Bank-BNP Paribas longevity bond 2004
- Swiss Re, takes on £1.7 billion of longevity from Friends Provident in UK

To date the longevity risk market is still struggling to gain a foothold

Problems Inhibiting Longevity Bonds

- EIB Bonds were nominal bonds, should be real
- UK Issuers of life annuities were not seriously enough interested in this small issue to take fast action
- Those who would take other side are not easily found, need to look at prices in an established market

Cumulative Returns, 1990-2007



Launching of Oil MacroShares

On November 30th, 2006:
MacroMarkets LLC launched

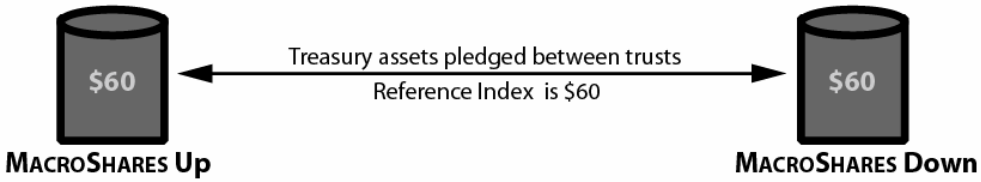
MACROSHARES Oil Up and MACROSHARES Oil Down are listed on the American Stock Exchange.
These securities track the performance (and inverse performance) of West Texas Intermediate Crude Oil.

Ticker Symbols:

AMEX: UCR	MACROSHARES Oil Up
AMEX: DCR	MACROSHARES Oil Down

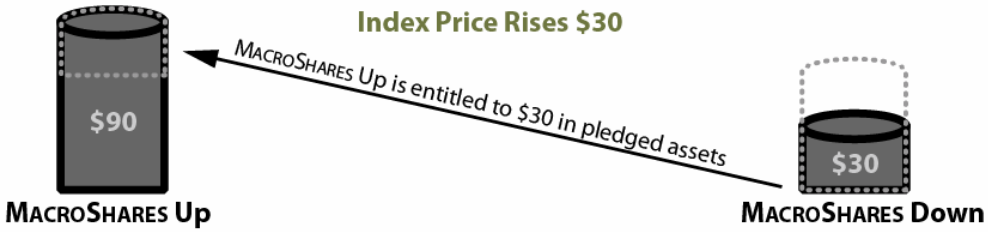
The MacroShares Structure

At inception MacroShares Up and MacroShares Down Trusts are equally priced and equally collateralized.



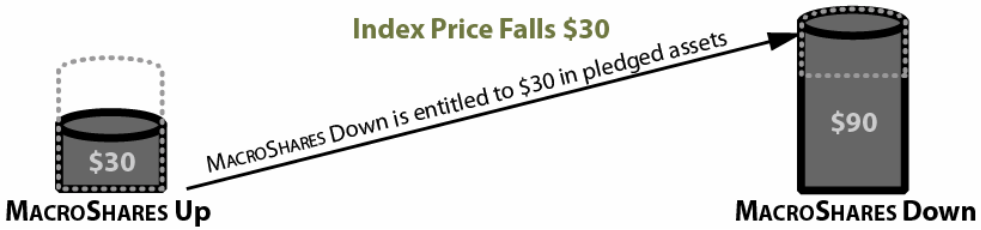
Example 1: Index Rises

MacroShares Up increases in value and MacroShares Down decreases in value proportionally. (excluding accrued income and expenses)



Example 2: Index Falls

MacroShares Down increases in value and MacroShares Up decreases in value proportionally. (excluding accrued income and expenses)



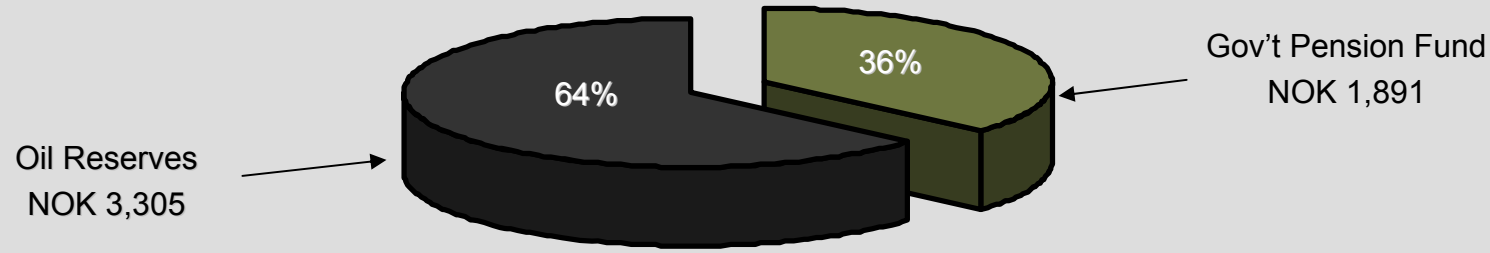
Simple Interpretation of Price

$$P_0 = \int_0^{\infty} \hat{I}_{0t} r_t e^{-\int_0^t r_\tau d\tau} dt$$

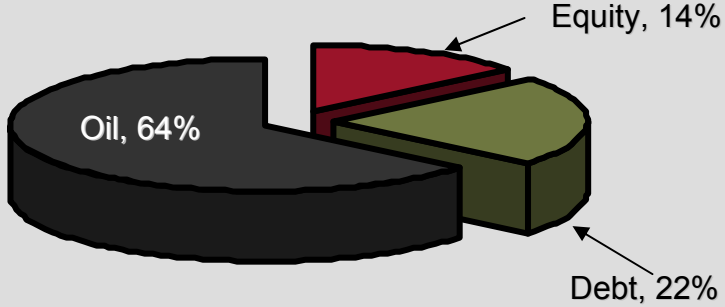
$$P_0 = I_0 + \int_0^{\infty} d\hat{I}_{0t} e^{-\int_0^t r_\tau d\tau} dt$$

Hypothetical Portfolio:
Government Pension Fund with Oil Reserves

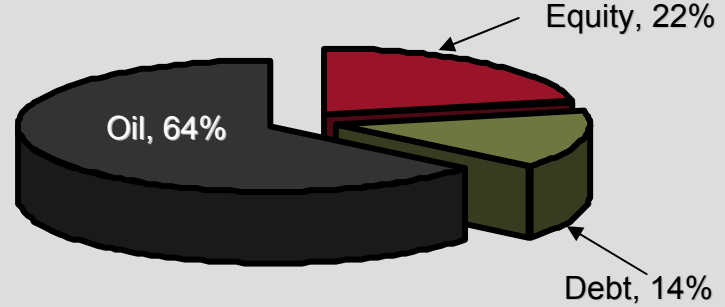
Total Value = NOK 5196 Billion



Today's Benchmark
40% Equity, 60% Bonds



Proposed Benchmark
40% Equity, 60% Bonds



PORTFOLIO HAS TOO MUCH OIL!

Norway Government Pension Fund and Hedging Oil Risk

- MacroMarkets LLC proposal to Norway to put some of the fund in oil MacroShares
- Ronit Walny and I in Norway last week

Efficient Portfolio Frontier