

Northfield's 20th Annual Research Conference

The Potential Impact of Housing Derivatives

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Fostering Useful Financial Innovations

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Contrasting Housing and Stock Markets

	Market Value	Transaction Volume	Transaction Costs	Derivatives Outstanding
US Stocks	\$21 Trillion	\$32 Trillion	0.5%	\$ 7 Trillion
US Housing Equity	\$23 Trillion	\$ 2 Trillion	3 – 10%	\$ 0.0001 Trillion
Mortgages	\$11 Trillion	\$ 3 Trillion	--	\$ 6 Trillion *

Considering the size of the asset class, the absence of home equity derivatives is striking.

- *Primarily mortgage-backed securities.
- Sources: Federal Reserve, BIS and Analytical Synthesis estimates.

Plan

- This presentation will discuss home price derivatives:
 - Why home price derivatives would be beneficial
 - Why a market does not exist yet
 - Why a market is developing now

Preliminaries

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 - No
 - But housing futures are a different story
 - And they can be sold short, too

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- Is all innovation good?
 - No, sub-prime mortgages are innovation run amok
- Housing futures and housing swaps
 - There are nascent markets in futures and swaps.
 - It is an open question which form will succeed
 - When I say futures I mean “futures or swaps”.
- There are two indices, my examples use S&P Case-Shiller

Why Should Housing Derivatives Be Useful?

■ Housing Market Characteristics

- High transaction costs
- Very difficult to separate investment from consumption
- Lumpy
- Virtually impossible to invest passively
- Impossible to sell short

■ As a consequence, house price risk is poorly distributed

- Many people are too long or involuntarily short
- Most people are too concentrated
- Institutions cannot invest in the market

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■ Home price derivatives and related products should be able to address these problems.

Who Would Housing Derivatives Help?

■ Individuals

- Prospective first-time home buyers
- Elderly seeking retirement income
- Reduce financial risks

■ Hedgers

- Home builders
- Mortgage bankers and insurers
- Mortgage, municipal bond and equity investors

■ Investors

- Global investors
- Endowments and pensions improving return/risk
- Active managers

Home Price Equity Financial Landscape: 2007



The diagram illustrates the financial landscape of home price equity in 2007. It features three white ovals on a blue background. On the left is a vertical oval labeled 'Individuals'. On the right is another vertical oval labeled 'Hedgers'. At the bottom center is a horizontal oval labeled 'Investors / Asset Managers'. The ovals are positioned to show the relationships between these three groups in the market.

Individuals

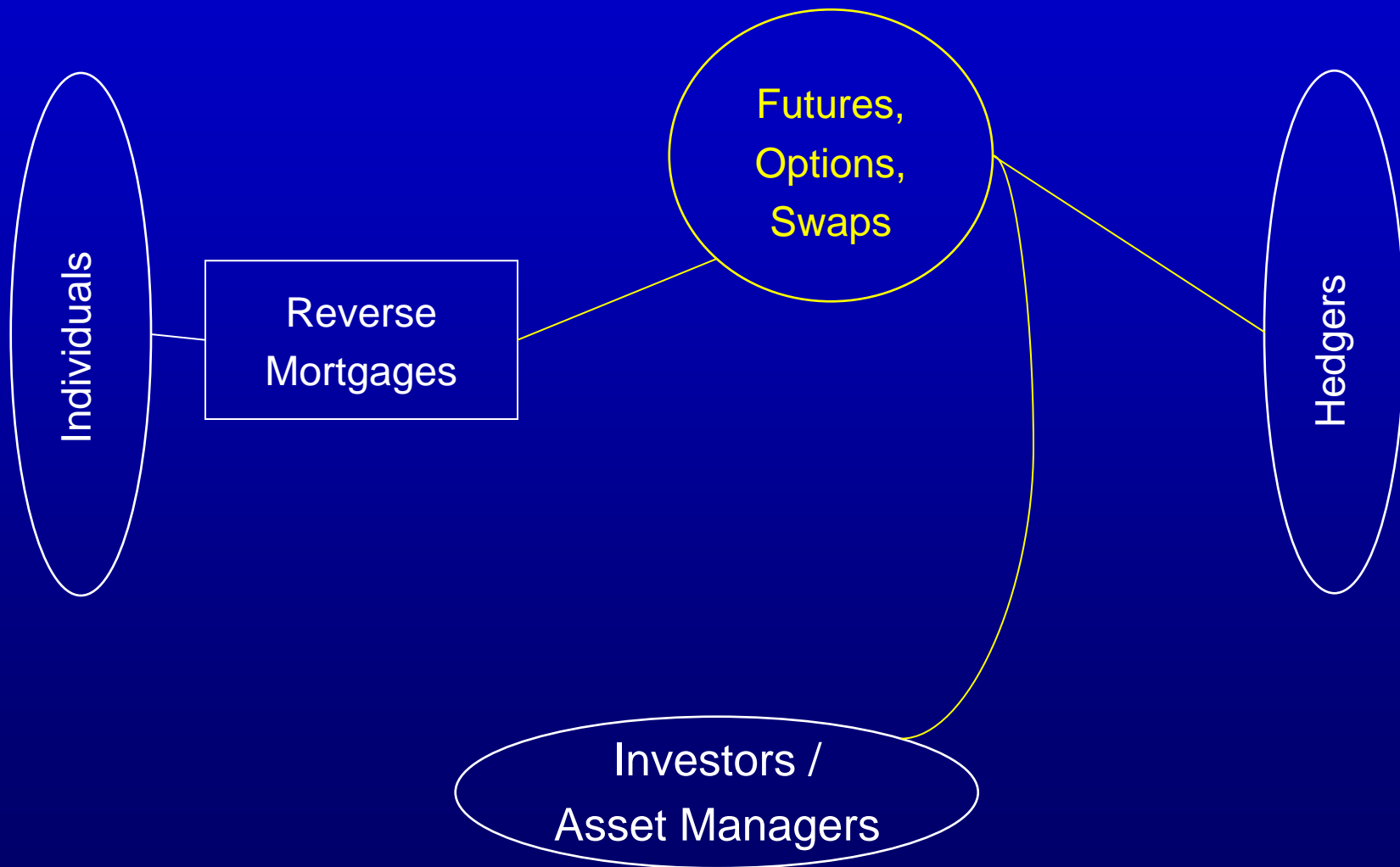
Hedgers

Investors /
Asset Managers

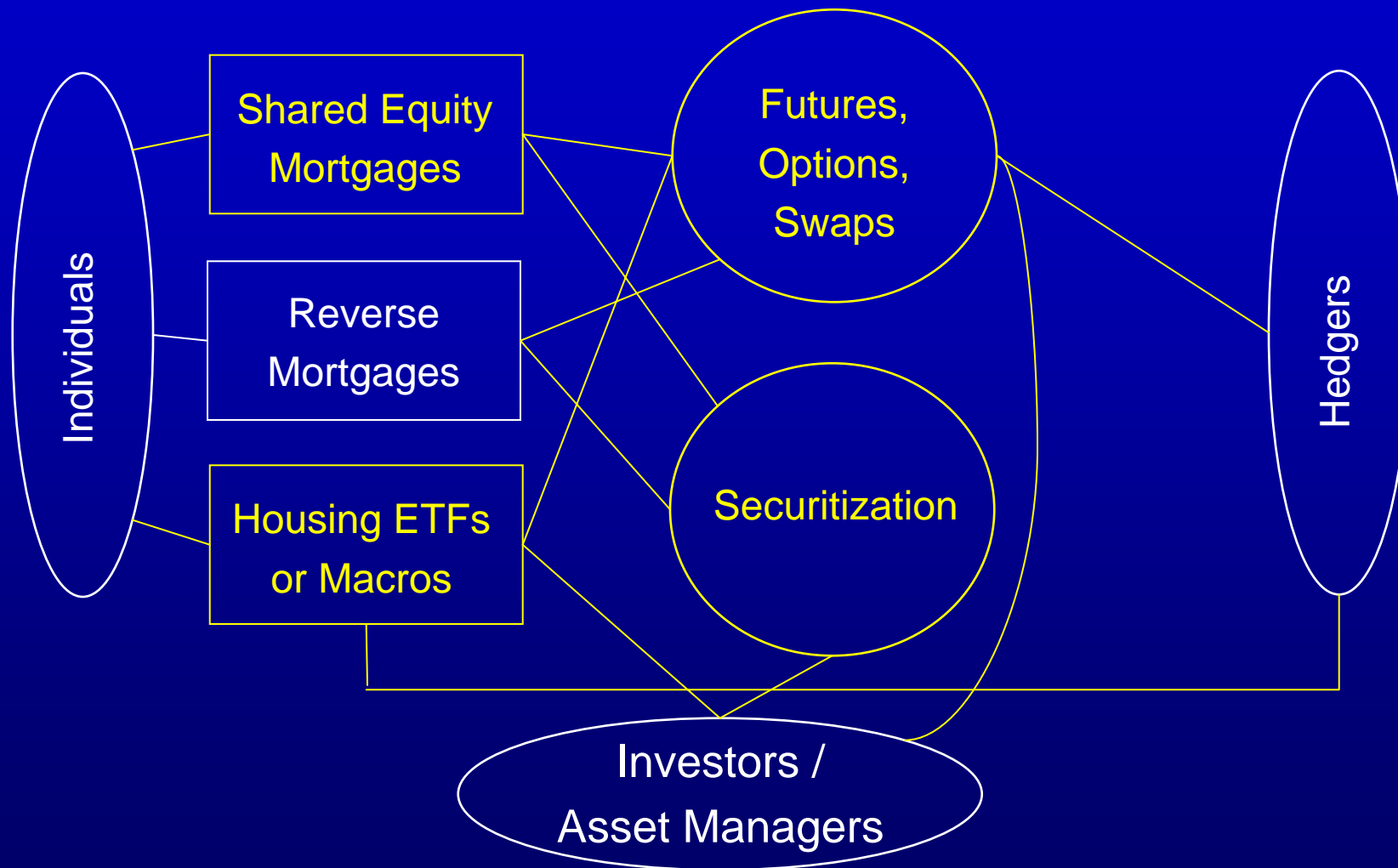
Home Price Equity Financial Landscape: 2007



Home Price Equity Financial Landscape: 2009?



Home Price Equity Financial Landscape: 2009?



Prospective Home Buyers

- Martha and George Young:

- 25 Years old
- Renting 1-bedroom apartment
- They plan to have children and buy a 3-bedroom house in 5 years

- Martha and George are effectively short a house.

This is a substantial financial risk.

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- Solution:

- Create an ETF based on their metro-area home price index
- This would have a higher expected return than money-markets and reduce their risk.

Elderly Seeking Retirement Income

■ Abigail and John Elder:

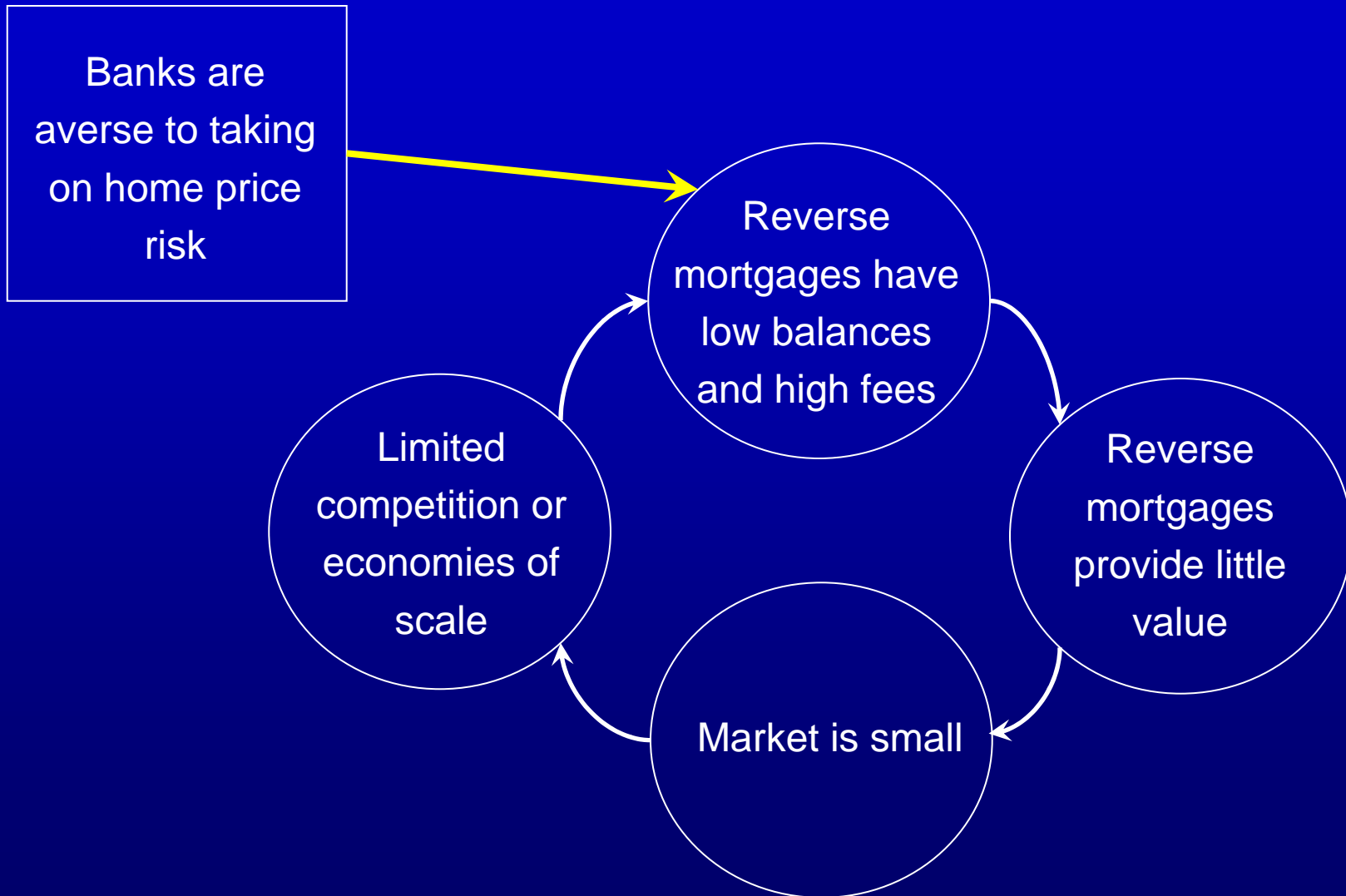
- 65 Years old
- Retired
- Own their home with no mortgage
- Would like to use home equity in retirement

■ Reverse mortgage is an appealing idea but the amount they can access is limited and costs are high

■ Solution:

- A futures market would allow banks to hedge the home price risk. Terms of reverse mortgages should improve.

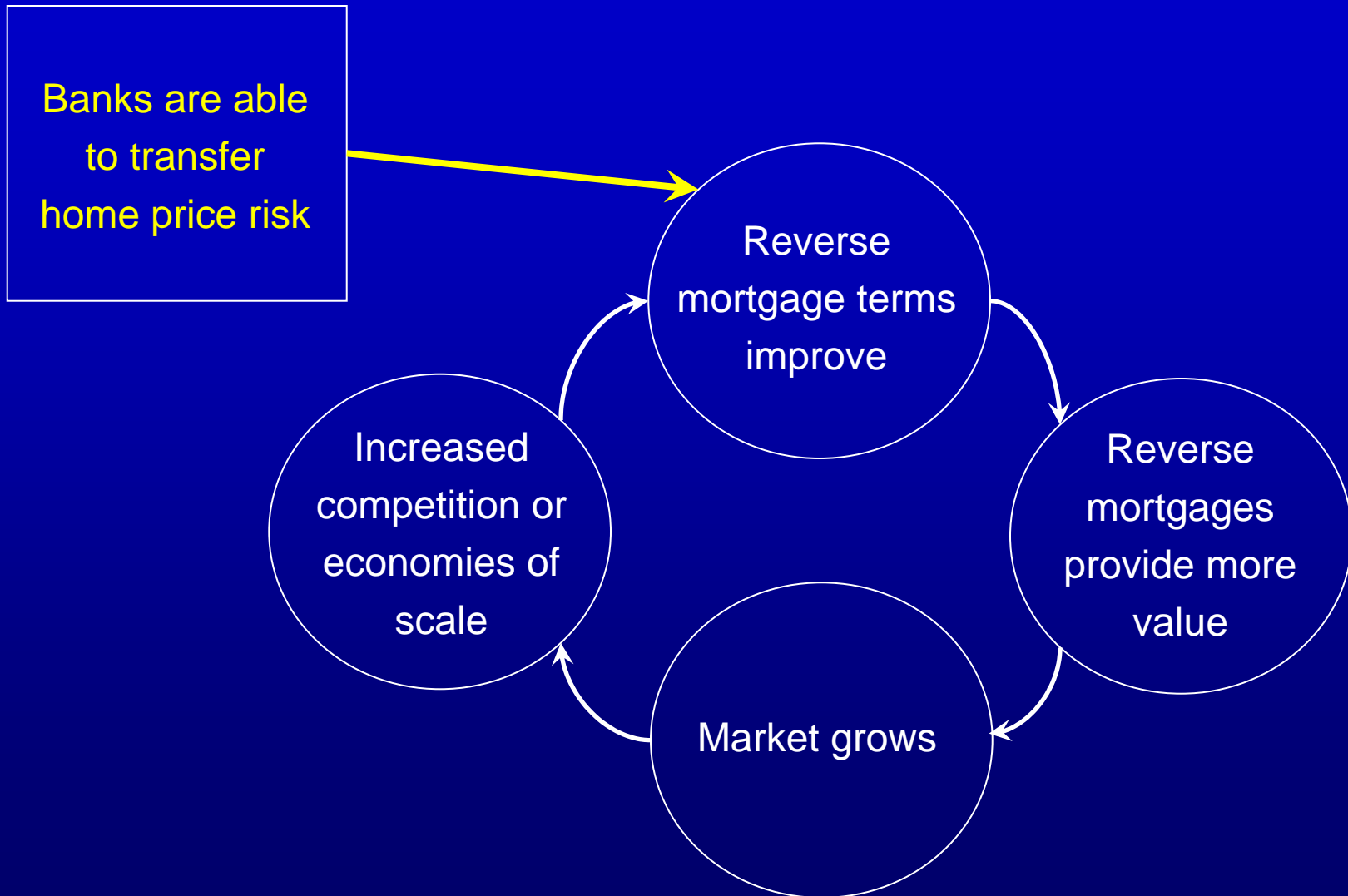
Vicious Cycle Inhibiting Reverse Mortgages



Virtuous Cycle Improving Reverse Mortgages

Banks are able
to transfer
home price risk

Virtuous Cycle Improving Reverse Mortgages



Shared Equity Mortgages: A Valuable Innovation

■ Shared Equity Mortgages terms:

- Buyer/owner receives funds for participation in home appreciation
- Buyer/owner pays SEM on sale
(or earlier at owner's option)
- Payment of a set percentage of house price
(possibly increasing over time)
- Cost to borrower related to home appreciation
- Likely to be packaged with a conventional mortgage:
20% of home price financed with SEM,
70% with a conventional mortgage.

Shared Equity Mortgages: A Valuable Innovation

- Advantages of 20% shared equity mortgages + 70% conventional
 - Lower interest payments
 - Lower risk for borrower
 - Lower default risk to lender/investor
 - Finance first-time purchases (or upgrades)
 - Reduce mortgage “lock-in” when home prices decline.

- Shared equity mortgages would be attractive to a broad spectrum of borrowers if priced reasonably.

Not all innovation is good

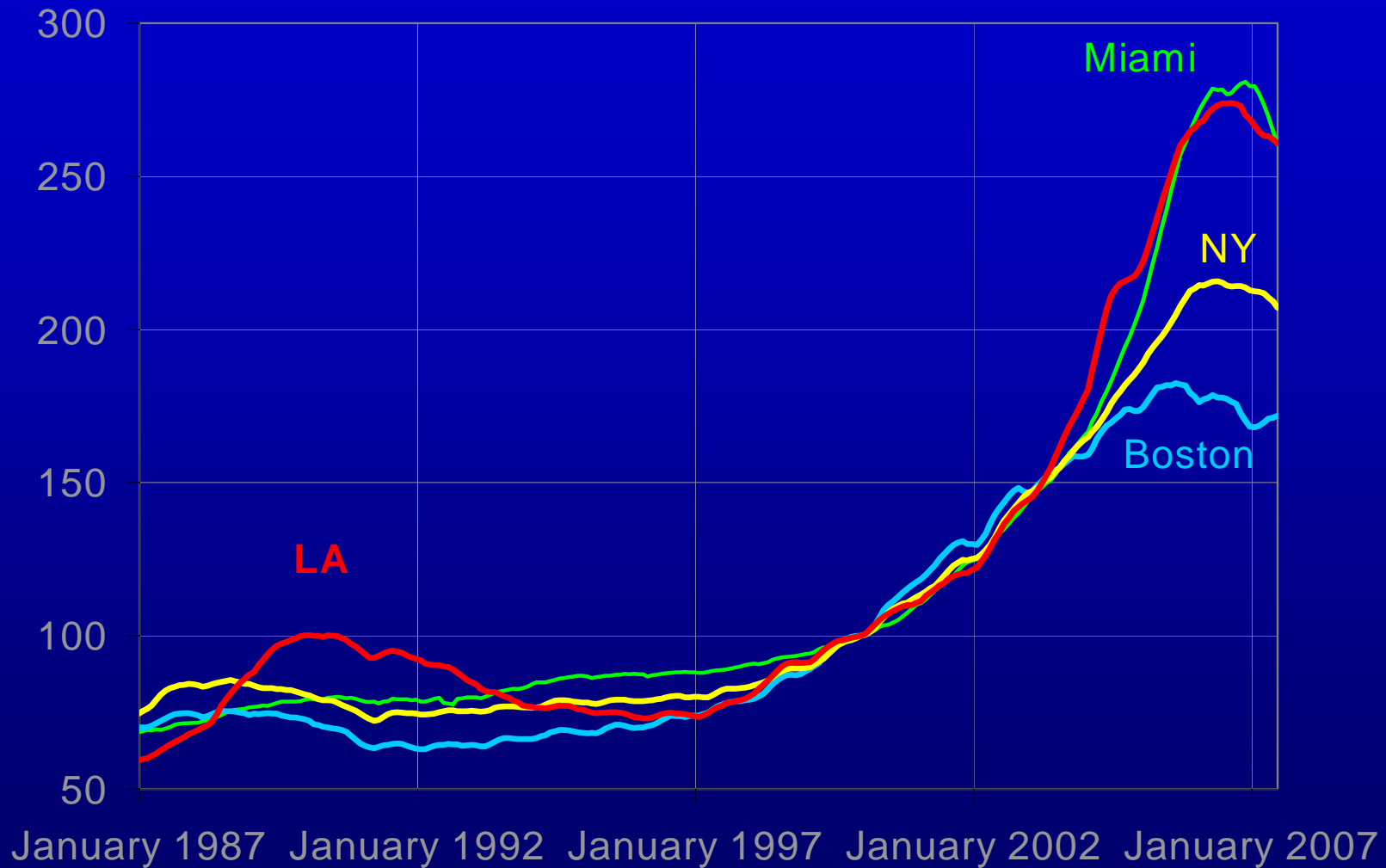
■ Contrasting Shared equity with sub-prime mortgages

	<u>Shared equity mortgages</u>	<u>Sub-prime mortgages</u>
Payments	Reduced for the life of the mortgage	Reduced for 2 years then increased
Impact on borrower	Decreases risk	Increases risk
Lender's risk	House price risk	Default risk
Fees	Need to be moderate to support the product	Enormous
Horizon	Long	Short

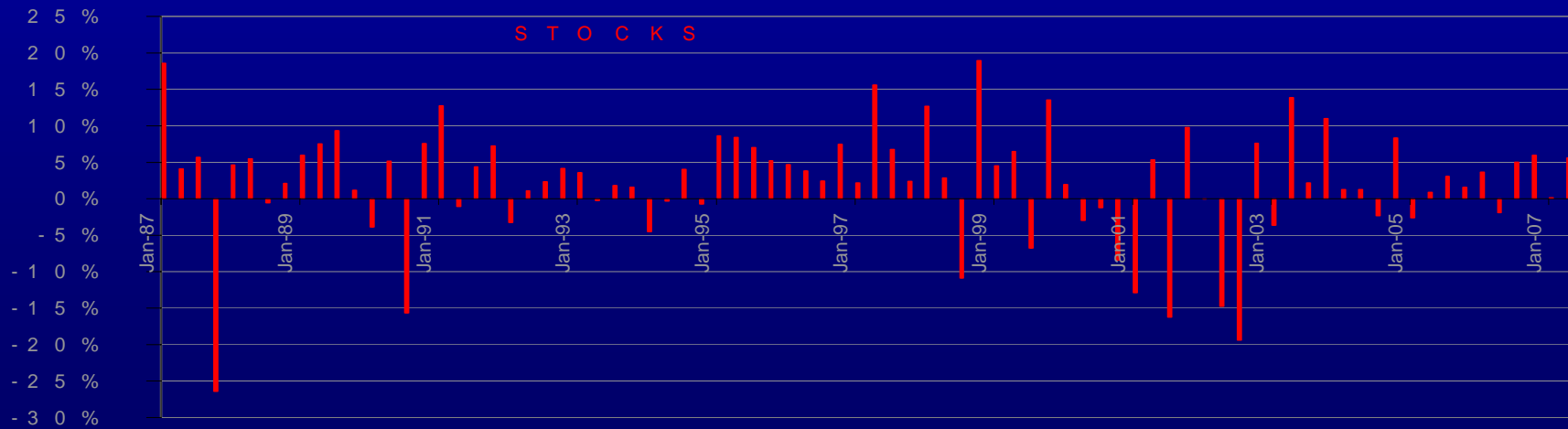
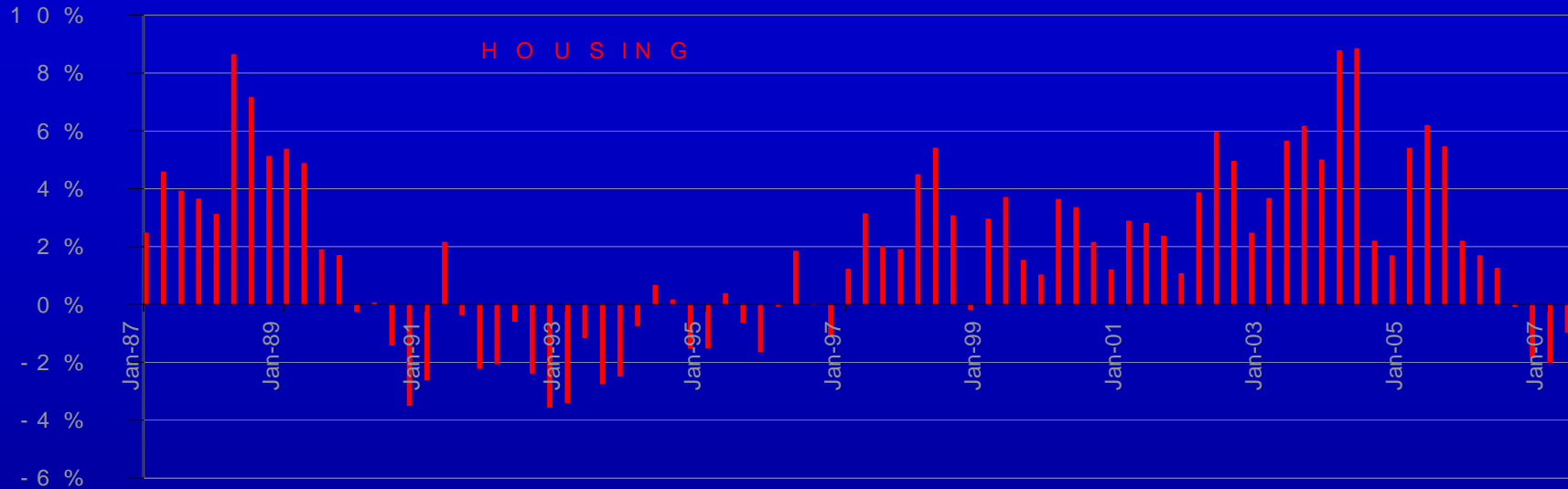
Hedging Applications

- Futures and options can be used directly for hedging
 - Mortgage originators
 - Mortgage Insurers
 - Realtors
 - Bond and stock investors
 - Home builders
 - can reduce their risk by about 50% using futures/swaps
 - Lower risk could result in lower financing costs

S&P Case-Shiller House Price Index Histories: Selected Cities



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Housing price indices: time-series behavior

■ Autocorrelation of quarterly returns:

Lag	1Q	0.70
	2Q	0.42
	3Q	0.56
	4Q	0.72

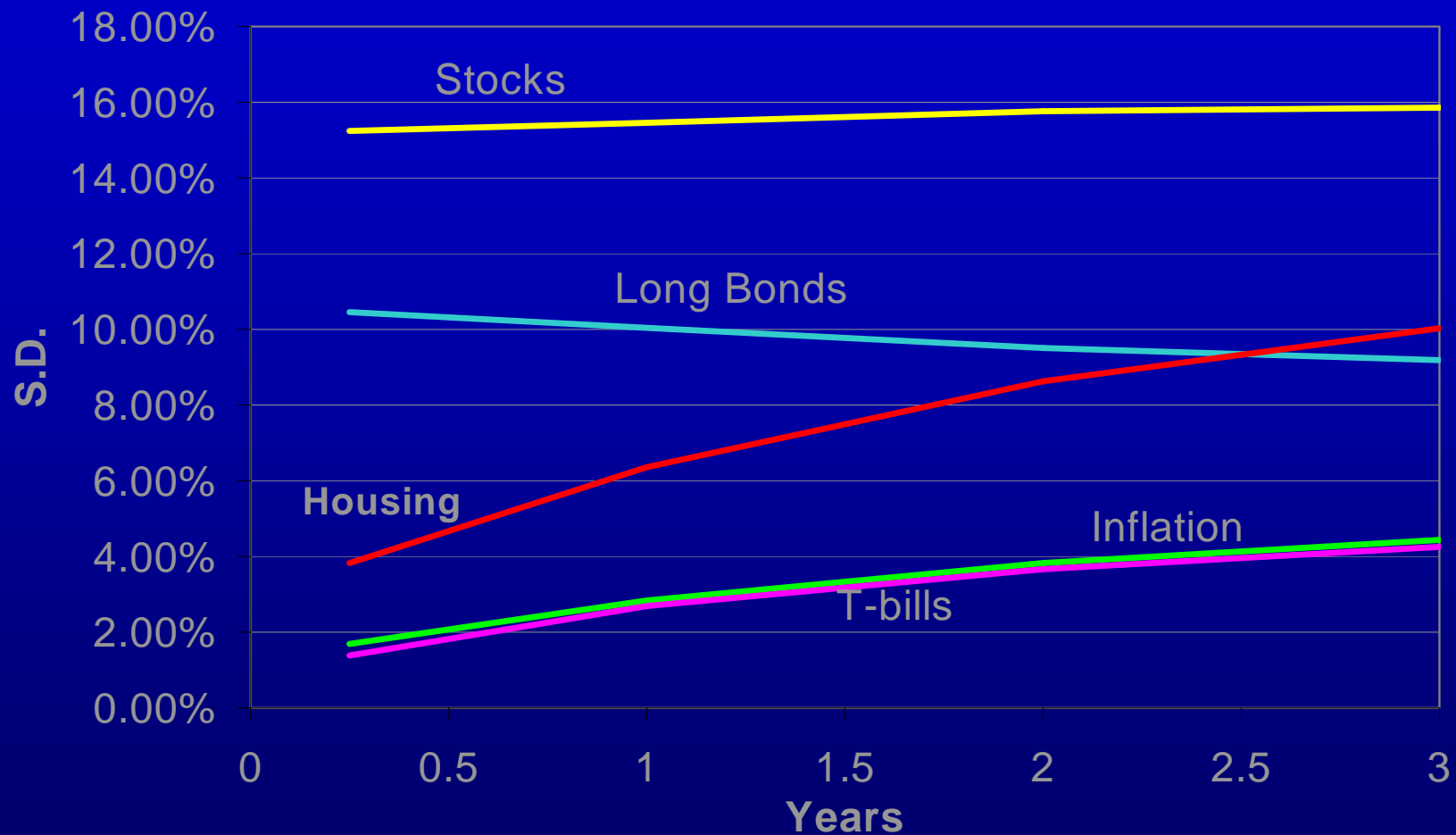
■ Risk for different horizons:

		Annualized
<u>Periodicity</u>	<u>S.D.</u>	<u>S.D.</u>
3-months	1.9%	3.8%
1-year	6.4%	6.4%
2-years	12.2%	8.6%
3-years	17.4%	10.2%

Data for 10-city composite, 1987-2006.

Source: S&P Case-Shiller indices and Analytical Synthesis.

Housing Risk and Correlation Vary With Horizon



Risk and correlation vary with horizon

- Home builder's risk and ability to hedge is time-dependent
 - For longer horizons, the risk rises
 - So does the effectiveness of potential hedges
- Hedging is more important and more effective in the long run.

Improving Endowments' Return/Risk

■ Housing:

- Is very diversifying
- Is positively correlated with inflation
- Futures should price in a return premium.

■ To assess the value of adding housing to an endowment:

- Assume that markets are efficiently priced.
- Examine the impact of adding 10% housing to a portfolio that currently has none.

	Expected Return	Risk	Equity	Bonds	Comm. R.E.	Housing
Equity	9.0%	16.0%	1.0	0.1	0.5	0.2
Bonds	5.0%	5.0%	0.1	1.0	0.1	0.2
Commercial RE	7.1%	12.0%	0.5	0.1	1.0	0.3
Housing	5.9%	10.0%	0.2	0.2	0.3	1.0
Inflation	3.0%	3.0%	0.0	-0.3	0.1	0.2

Improving Endowments' Return/Risk

- Based on **very** conservative assumptions:
 - Adding 10% housing should improve an endowment's total expected return by about 4 b.p. with no additional risk.
 - In real terms, the improvement should be about 7 b.p.
- While this may sound modest, it is equivalent to 40 to 70 b.p. alpha and assumes no skill and efficient market pricing.
- In addition, the hedging demands are largely for short positions.
- This should create an additional premium of at least 50 b.p.

Do You Really Think We Should Invest in Housing Today?

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A synthetic house is constructed from a housing future and a T-bill.

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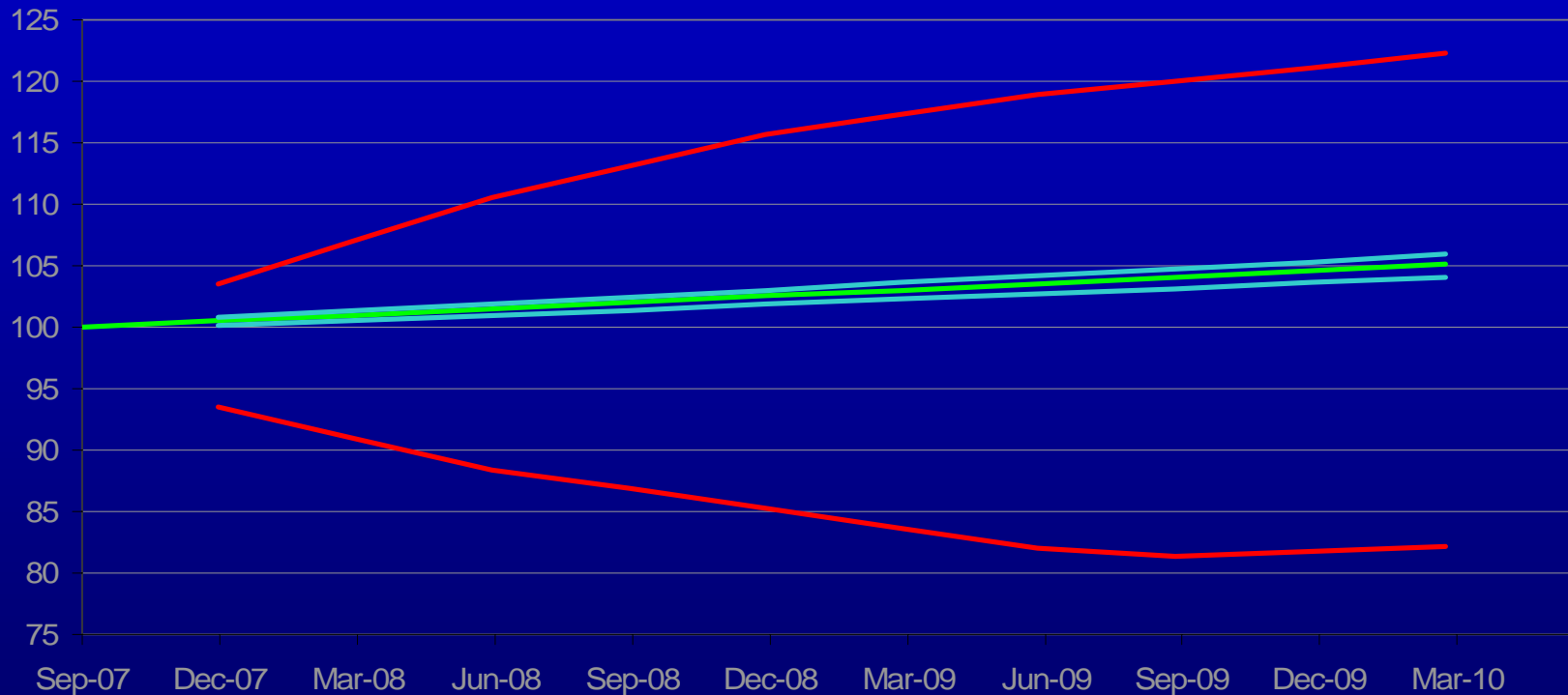
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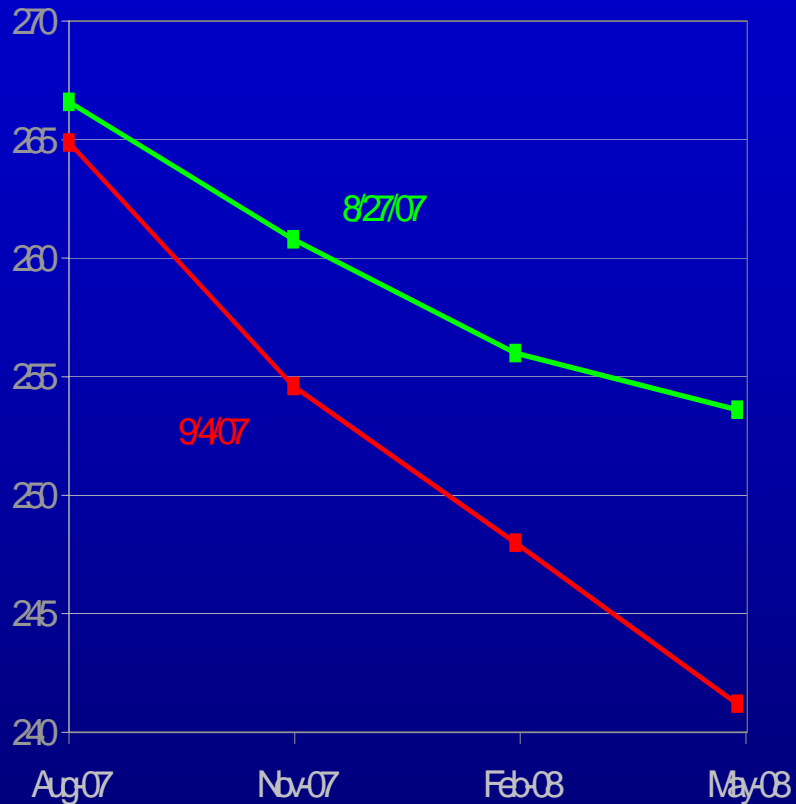
- Housing futures price in the outlook for housing
... and should include a risk premium as well.

Futures Curve Moves

- In most financial markets arbitrage defines the futures curve
- Difficulty of trading housing provides latitude for futures price curve



Lack of arbitrage affects the nature of housing futures



■ Market reaction reflects autocorrelation

■ Curve can assume many shapes

Lack of arbitrage affects the nature of housing futures

- Inability to arbitrage has profound effects on futures/swaps:
 - Term structure is flexible and important
 - Shape of the futures curve reflects market forecast
 - Momentum of index is priced in
 - Longer-term contracts are more volatile
 - Hedges must match horizon
 - Abnormal risk premium can be priced in
 - Synthetic housing can be more (or less) attractive than actual housing
 - Futures pricing more efficient than underlying
- Housing futures are more like to crude oil than like stocks.

Return Premium Priced Into Futures

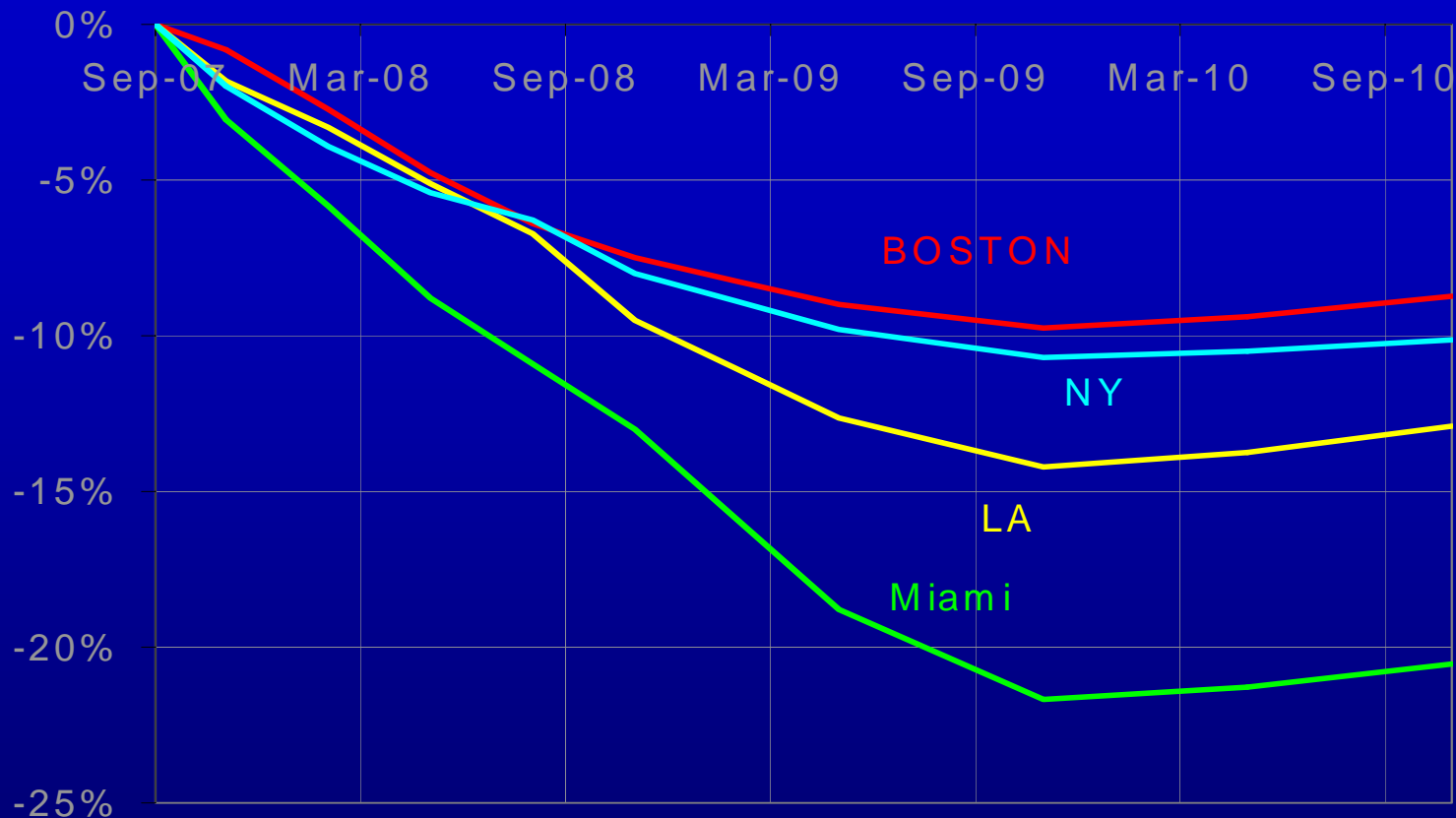
- From August 2006 to August 2007 LA house prices declined 4.1%.
- In August 2006, the August 2007 LA Home Price future was priced 7.4% below the index.
- So, the return on a synthetic LA house was:

$$7.4\% - 4.1\% + 5.0\% \text{ (cash)} = 8.3\% \text{ (ignoring compounding)}$$



Futures Currently Price in Substantial Discounts

% Discount to Spot Index (as of 10/8/07)



Source: Analytical Synthesis mid-point estimates based on futures and swap pricing.

Are the discounts large enough? Too large?

Miami Skyline



Home Price Indices: Past and Market Forecasts



Source: S&P Case-Shiller indices and Analytical Synthesis estimates (as of 10/8/07).

Active Managers' Uses of Housing Futures

- Hedge against other assets
 - financial stocks
 - mortgages
 - municipal credit exposure
- Speculate on
 - housing in general
 - different cities
 - term structure
- Options
 - volatility
 - intra-city
 - skew
 - term structure

Why Don't Housing Derivatives Exist?

- Illiquidity Trap
- Institutional inertia and obstacles
- Difficulty defining an index
- Lack of first mover incentives
- Greed, hubris, myopia

Three Most Important Things for Real Estate Derivatives Market

- Liquidity
- Liquidity
- Liquidity

Two Stable Equilibria

- LIQUID housing derivatives would be very useful.
- But, ILLIQUID housing derivatives are not useful.

- So, until they become liquid, market participants have little incentive to trade them.
 - “I’m very interested in housing futures. Let me know when I can trade \$1 billion.”
 - “Few want to waste their precious capital and energy on a lethargic market, traders have shunned the Eurodollar contract – a problem that is then compounded because speculators steer clear”
Institutional Investor, May 1982

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- This is commonly called the “Chicken and Egg Problem”.

Financial Market Innovations

- True derivative markets
 - Stock index futures
 - Interest rate swaps
 - Credit default swaps
 - Volatility trading
 - Exchange-traded funds
- New Markets
 - Mortgage-backed securities
 - Inflation (TIPS, inflation swaps, etc.)
 - Weather derivatives and catastrophe bonds
 - Housing
- Derivative markets take time to develop.
- Truly new markets are harder to create but ultimately more useful.

Catalysts for Other Innovations

- Mortgage-backed securities
 - Residential
 - Government sponsorship
 - Commercial
 - Resolution Trust Corp. Issuance
- Inflation (TIPS, inflation swaps, etc.)
 - Government issuance
- Catastrophe bonds/swaps
 - Catastrophes
- Housing
 - ?

Current State of Housing Derivatives

- Futures and options are traded on the Chicago Mercantile Exchange
 - NY, LA, Chicago, Boston, Miami, San Francisco, San Diego, Las Vegas, Denver, Washington, DC and 10-City composite
 - Terms out to 5 years
- Investment banks are making markets in swaps.
 - Merrill Lynch, Goldman Sachs, Morgan Stanley, Lehman Brothers, Bear Stearns and Deutsche Bank
 - 25-City, NY, LA and Miami
- UK and other markets are more developed than US in both commercial and residential real estate

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Summary

- Housing derivatives could be extremely useful
- Starting a market is not easy
- Substantial institutional efforts are just beginning
- Housing is on the top of the agenda today
- If not now, when?

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The Potential Impact of Housing Derivatives

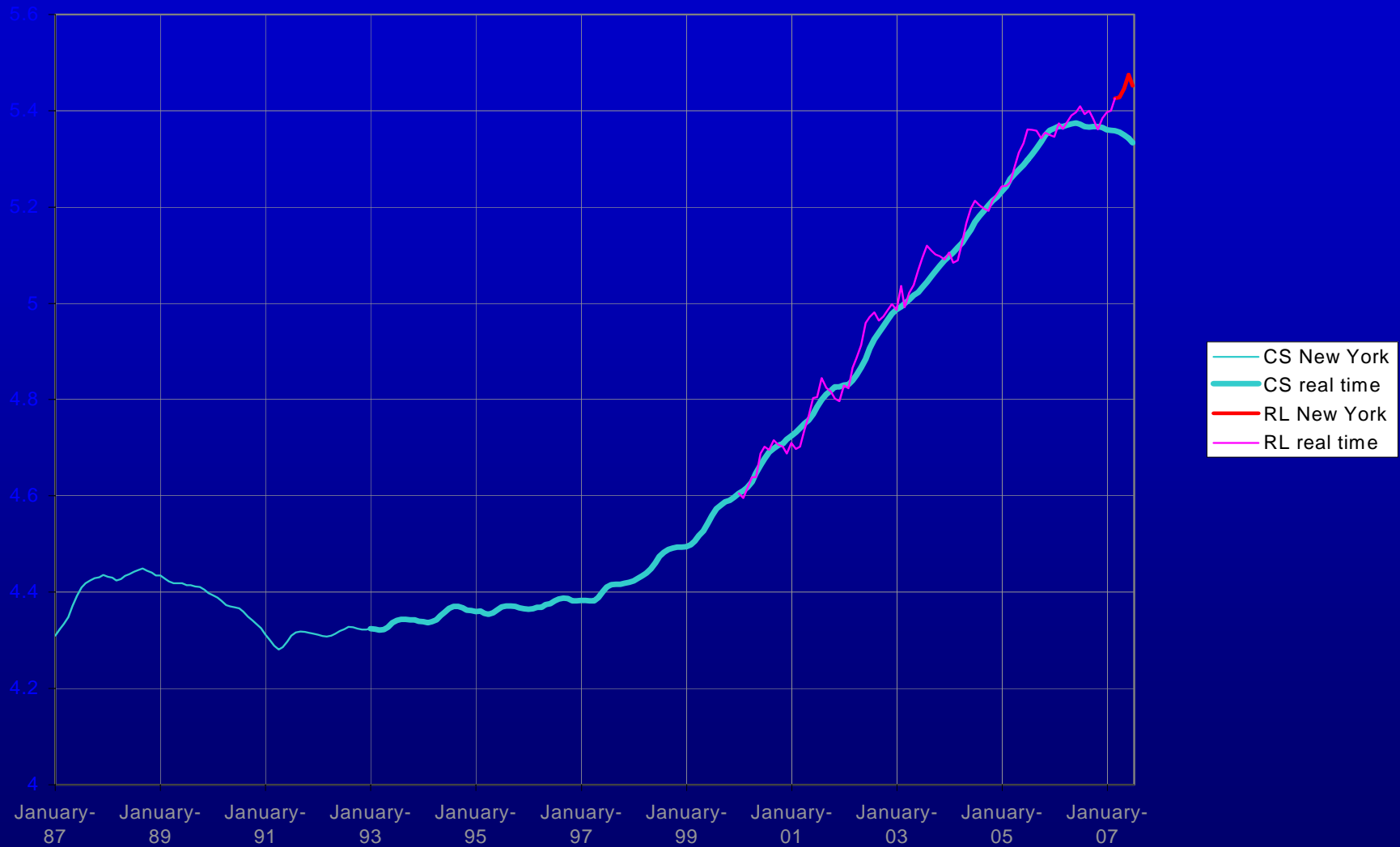
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Comparing Case-Shiller to Radar Logic



Broader Impacts of Introduction of Housing Derivatives

- Better working of mortgage markets
 - Shared Equity Mortgages
 - Improved pricing of reverse mortgages

- Impacts on volatility
 - Housing market responds to fundamentals more quickly
 - Builders and other plan better

- Which leads to:
 - Increased home ownership
 - Lower default rates
 - More volatility in short horizons (1-month to 1 year)
 - Less volatility over longer horizons (2 to 5 years)
 - Less macroeconomic volatility

House Price Indices

	S&P Case-Shiller	Radar Logic
Metric	Index of appreciation	Median price per ft. ²
Approach	Repeat sales	Triple power law
Frequency	Monthly release of 3-month values	Daily release of 1-day, 7-day and 28-day values
History	Calculated since 1990, backfilled to 1975 (or so)	Calculated since March 2007, backfilled to 2000.
Pros:	Long history avoids distortions from mix-shifts	Somewhat more timely more inclusive
Cons:	New homes not included	Subject to mix-shift distortions Noisier
Trading market	Chicago Mercantile Exchange futures and options	Investment Banks Swaps

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