

Housing Prices, Mortgage Lending & Vulnerability to Financial Crises

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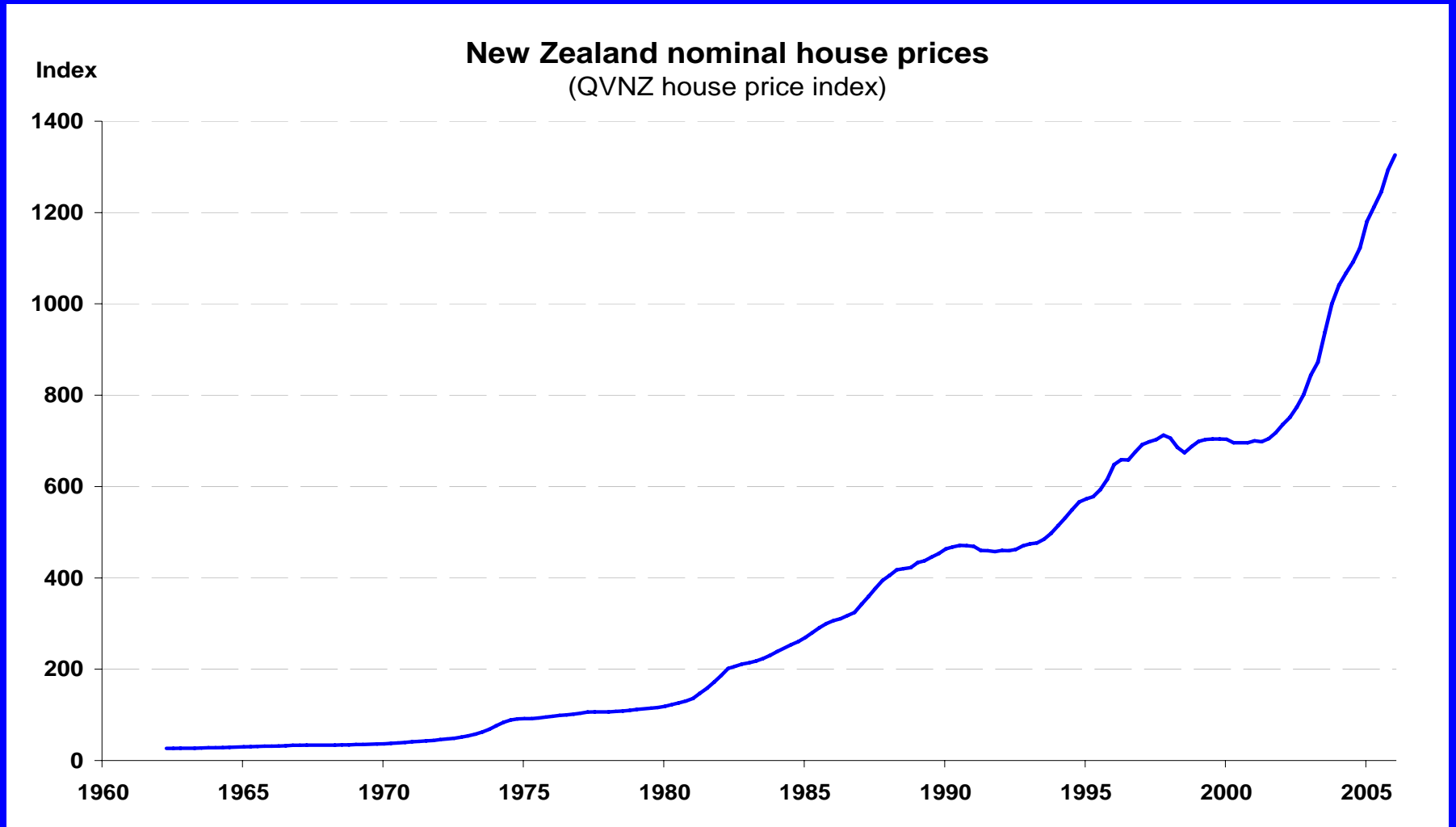
**Workshop on Financial Sector Balance Sheets &
Vulnerability to Financial Crises**

September 25, 2006

Housing, the Deceptively Safe Asset

- ✓ Relative to other assets available to households
 - Provides shelter & access to other location-specific benefits, while appreciating in value
 - Housing benefits usually tax free
 - Easier to leverage
 - Nominal prices often rise rapidly, but seldom fall
 - When demand weakens, owner-occupiers generally hold-out until demand strengthens and/or *inflation-adjusted* prices fall enough to clear the market

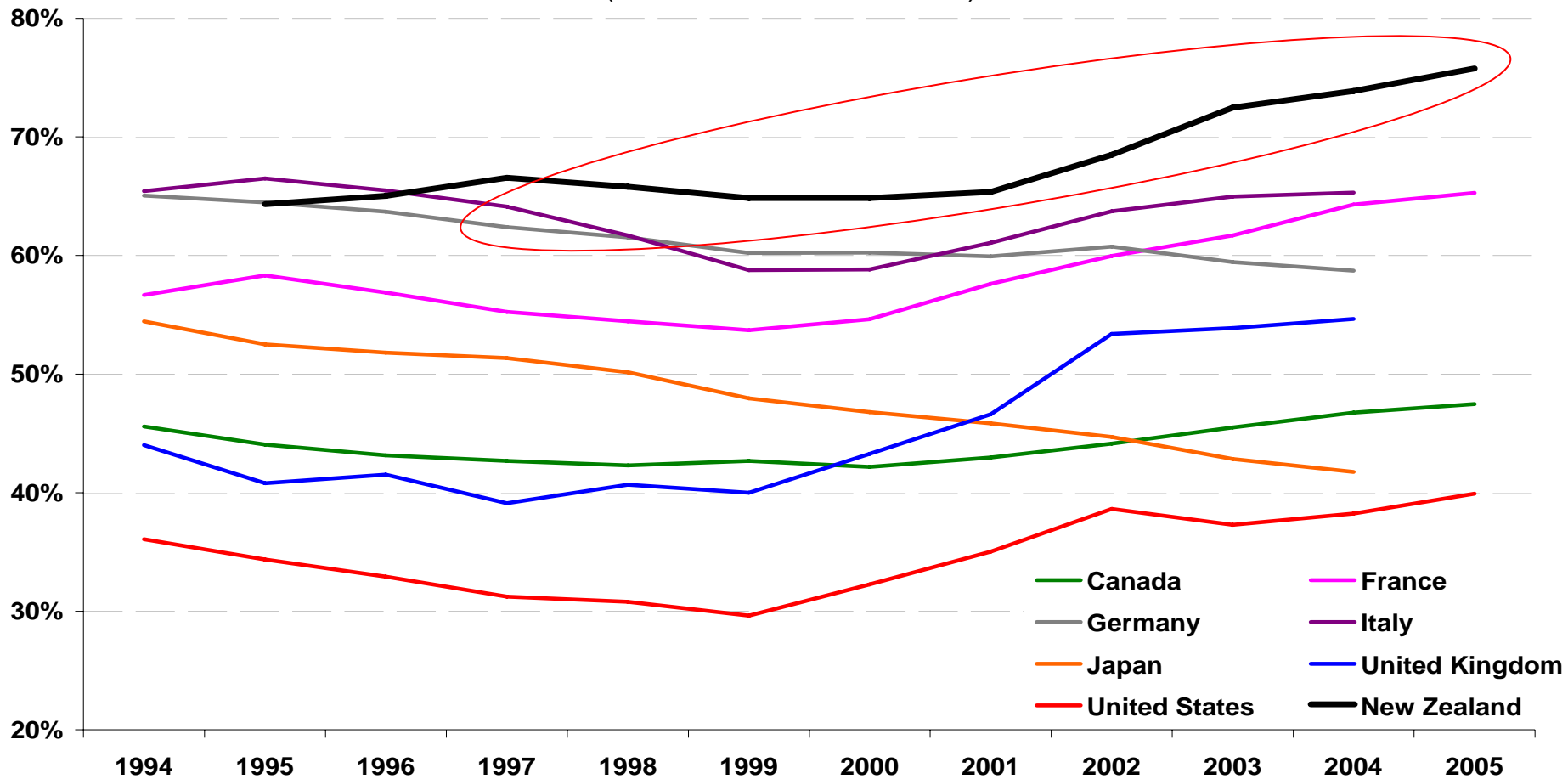
New Zealand Residents Have Enjoyed Rising Nominal Prices for >40 years



NZ Households have Exceptionally Large Exposures to House Prices

Residential housing as a proportion of total household assets

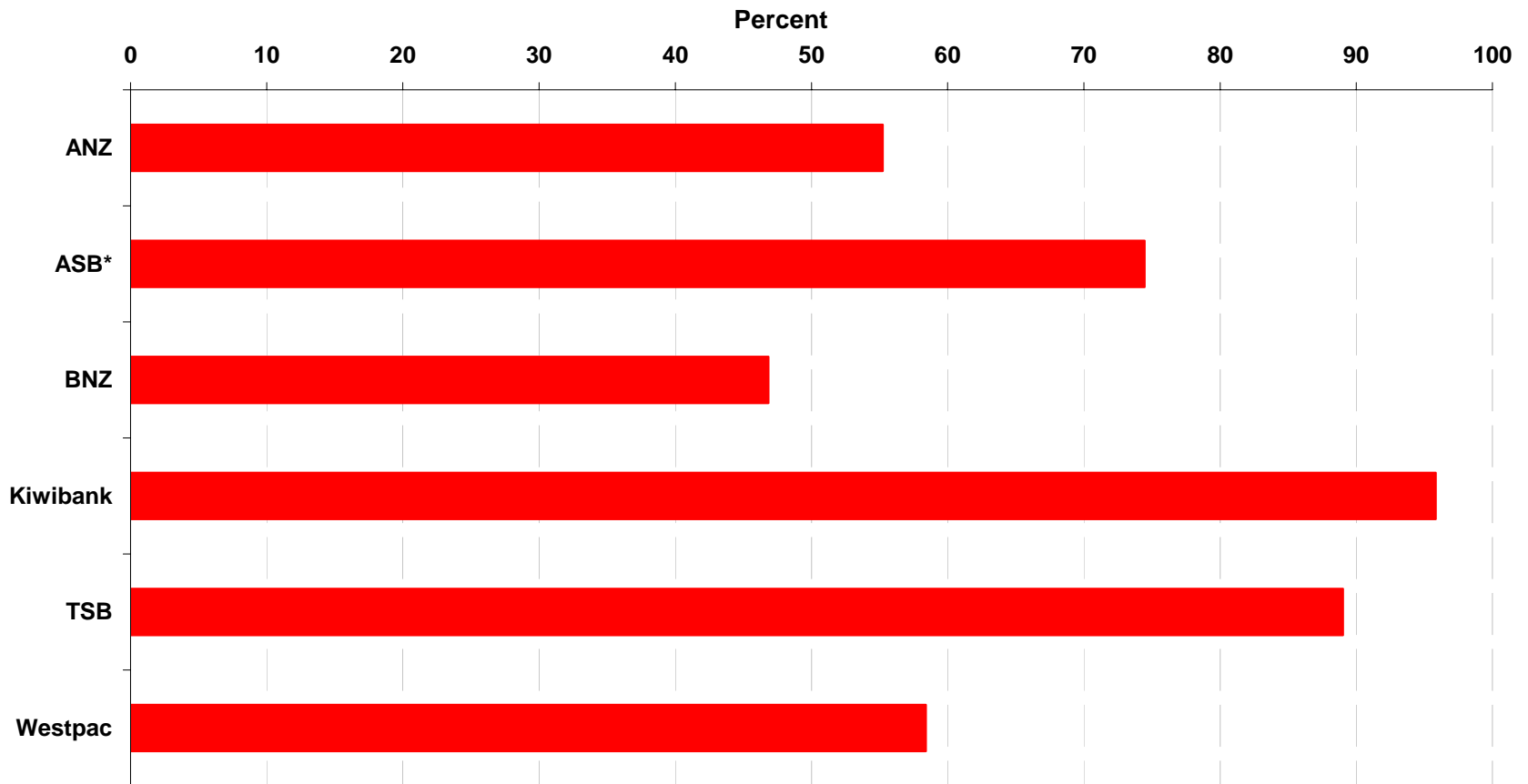
(Source: OECD and RBNZ)



So Do NZ Banks

Mortgages to total lending for selected New Zealand banks

(June 2006 disclosure statements, *information for ASB reflects March 2006 data)

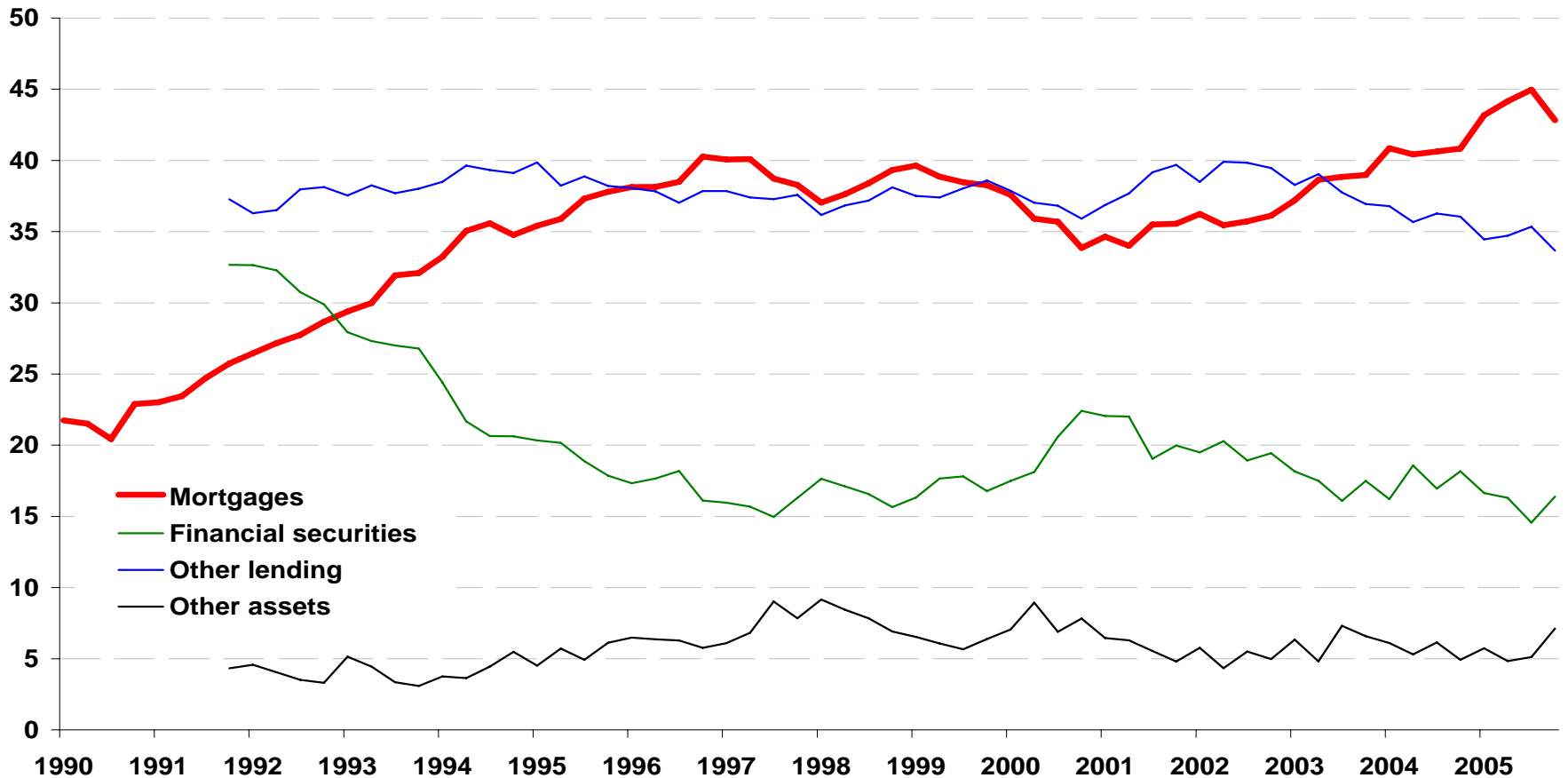


Mortgage Exposure Rising Relative to Total Assets

Percent

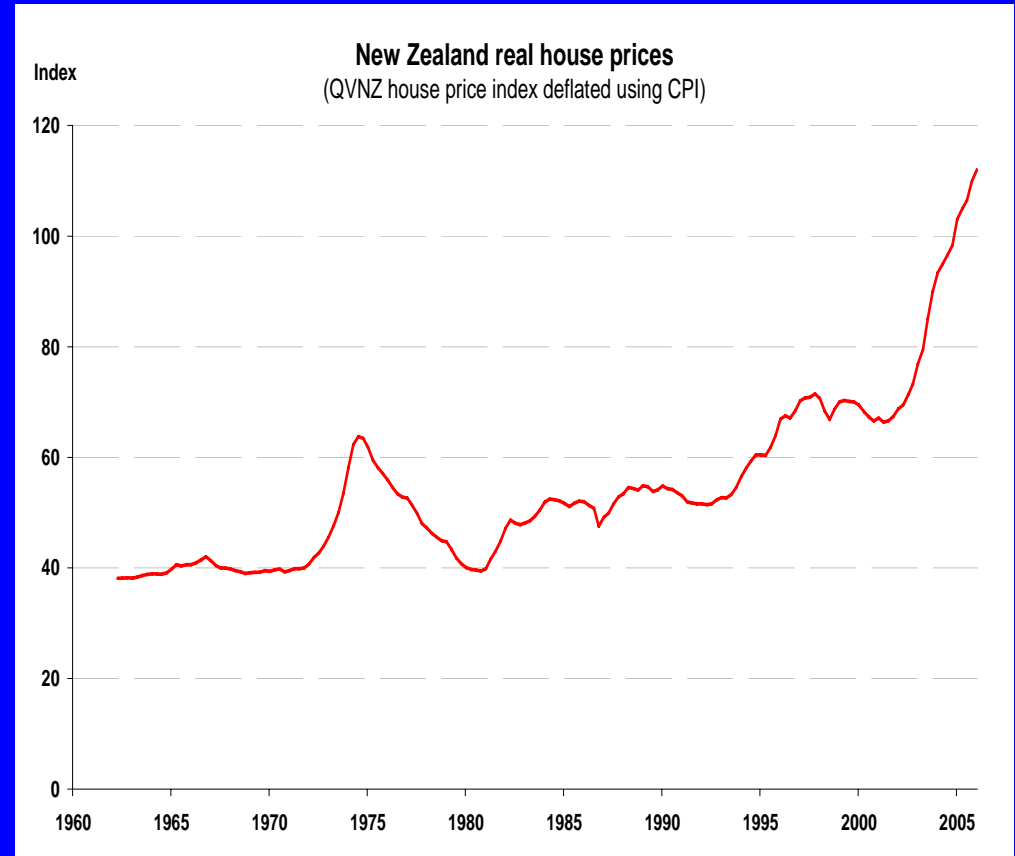
NZ bank exposure to residential mortgages has been increasing

(Mortgages as a percentag of total assets for NZ banks)



International Experience has Shown that Booms are often followed by Busts

- ✓ OECD study of 18 countries, 1970-2005I
 - 20 instances of declines in real prices of 25% or more
 - NZ, from 1973III to 1980IV, 37.8% decline



But at Long Intervals

- ✓ IMF study of 14 countries
 - 1 bust every 20 years on average
 - Less frequent than stock market crashes, but lasted twice as long, with output losses twice as large
 - Often associated with financial instability and sometimes large budgetary costs from recapitalization of banking systems

Busts Need Not be Preceded by Booms

- ✓ Severe economic shocks can cause fall in house prices even without boom
 - NZ would have experienced some distress in '70s even if no preceding boom
 - 2 oil shocks
 - Loss of preferred access to British markets
 - Excessively rigid and protectionist policies
 - But preceding boom may have made the adjustment process longer & more painful

Preceding Boom May Create Imbalances that Need to be Unwound

- ✓ Undoubtedly increases the length and severity of the adjustment process
- ✓ IMF study showed housing busts more likely to be preceded by booms than stock market crashes
- ✓ Boom may give rise to bust, even without an economic shock
 - Japanese bust occurred mainly because of a shift in sentiment
 - Decline in inflation-adjusted housing values has continued for 15 years

Plan of Attack

- ✓ Why are housing markets subject to booms and busts?
- ✓ Has the New Zealand housing boom gone too far?
- ✓ What might be the consequences?
- ✓ What could be done to reduce vulnerability to a housing bust?

Housing markets are especially subject to booms & busts because..

- ✓ Imperfect information: no central exchange where current prices are instantly recorded
 - Overstate to justify larger loan
 - Understate to minimize property taxes
- ✓ Illiquidity: assets are heterogeneous, transactions costs are high, trading is infrequent
- ✓ Absence of 2 main constraints on sustained departures from fundamental prices in other markets
 - No short selling: no organized futures or options markets
 - Inelastic supply in the short to medium term

Fundamental Determinants of Property Prices

✓ Drivers of demand

– Growth in income

- The distribution of income

– The cost and availability of credit

– Demographic factors

- Population growth

- Growth of cohort in 30s

- Household formation trends

- Emigration trends

– *The anticipation of higher prices*

Fundamental Factors (cont'd)

✓ Supply Factors

- The amount and quality of “buildable” land
 - Overtime can change with technology and reclamation projects
- Planning restrictions and zoning laws
- Construction costs
- The cost and availability of credit

The dynamics of land pricing drive most property booms

- ✓ During the boom phase, property prices rise much higher than construction costs
- ✓ The Carey model of land prices → provides a simple framework for analysis
 - Number of investors (N)
 - Increases in the fundamental price (P^*)
 - Increases in the heterogeneity of beliefs (h)
 - Financial resources available to investors (L)
 - The supply of land (Z)

The Carey Model of Land Prices

- ✓ In the general case

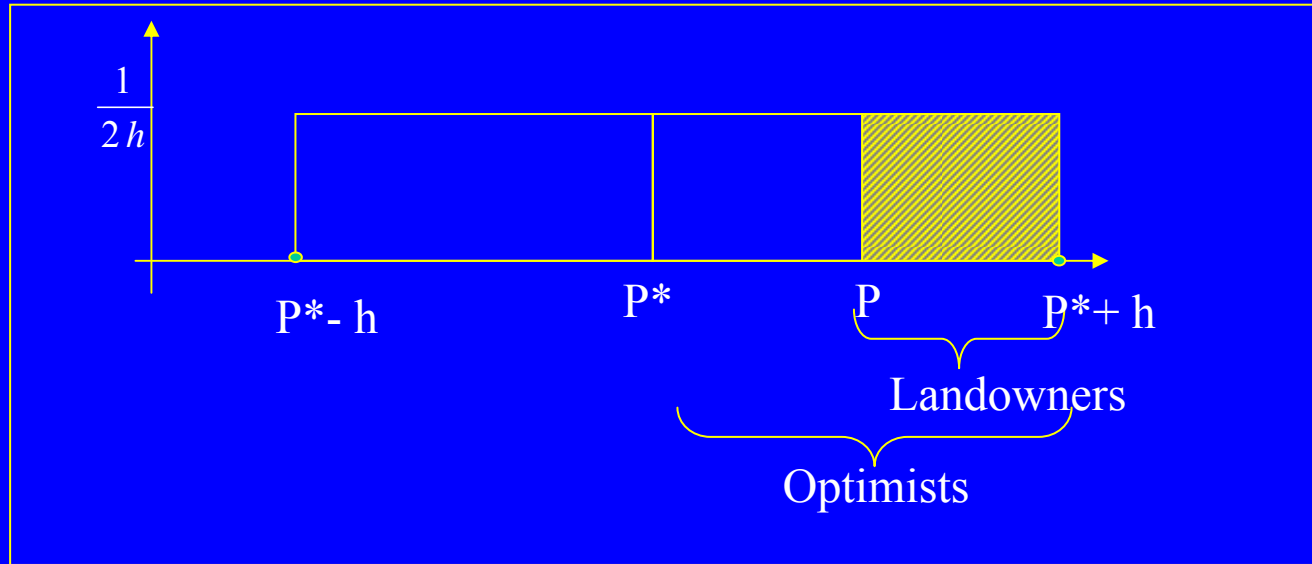
$$N (1 - F(P)) L = P Z$$

$$P = [N (1 - F(P)) L] / Z$$

- ✓ In the case of the uniform distribution

$$P = [N (P^* + h) L] / [2 h Z + N L]$$

When Reservation Prices are Uniformly Distributed



- If number of investors (N) \uparrow , $P \uparrow$.
- If fundamental price (P^*) \uparrow , $P \uparrow$.
- ✓ If heterogeneity of beliefs (h) \uparrow , $P \uparrow$.
- If supply of real estate (Z) \uparrow , $P \downarrow$
- ✓ If supply of resources to investors (L) \uparrow , $P \uparrow$.

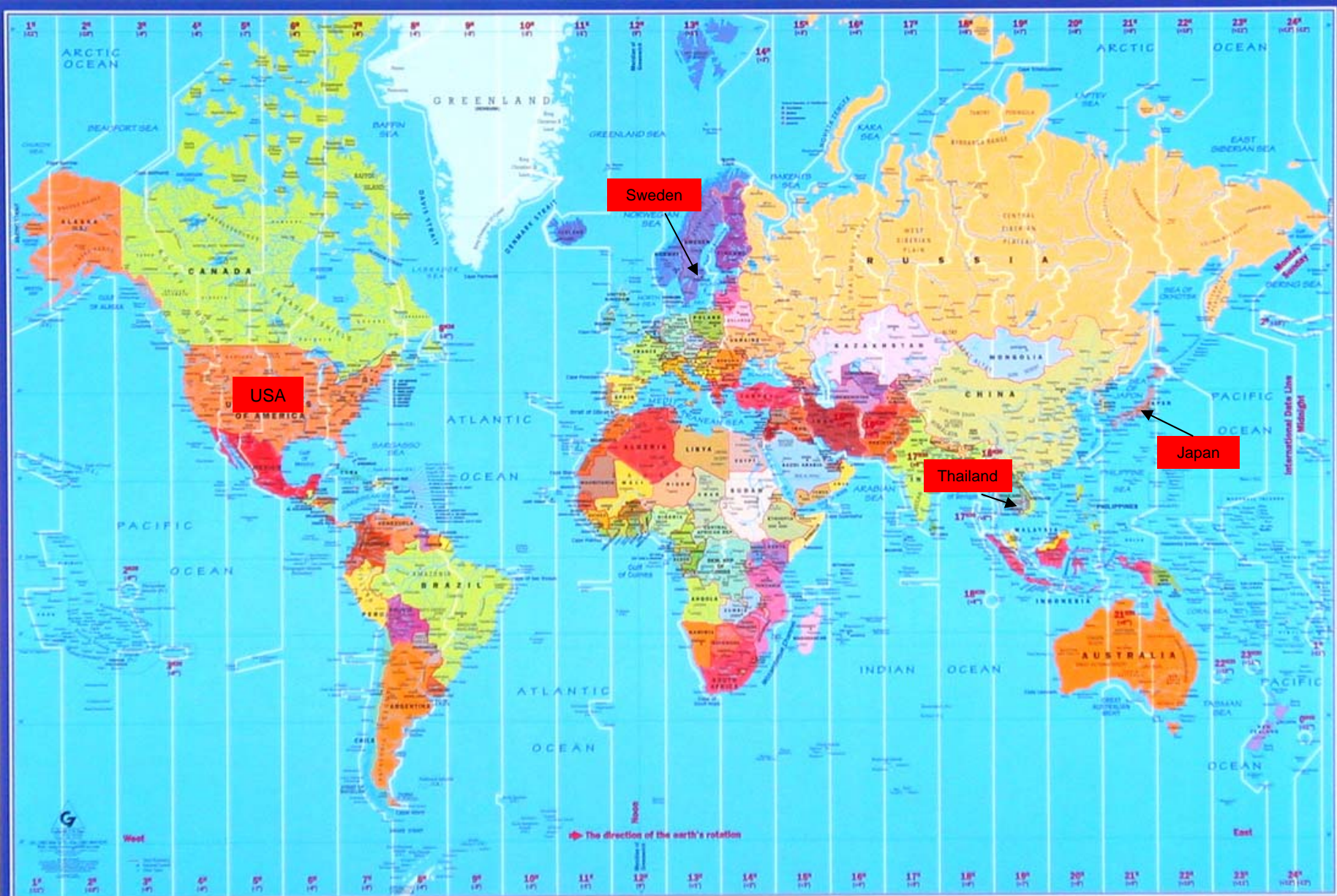
On the Margin, Optimists Get the Mortgages

- ✓ An easing of the terms or an increase in the availability of mortgage financing thus contributes to increases in home prices
 - As home prices grow, optimists can extract equity (MEWs) and borrow more to buy additional houses
- ✓ Banks' indirect exposure to the level of home prices increases
- ✓ When the boom turns to bust, banks may be under stress

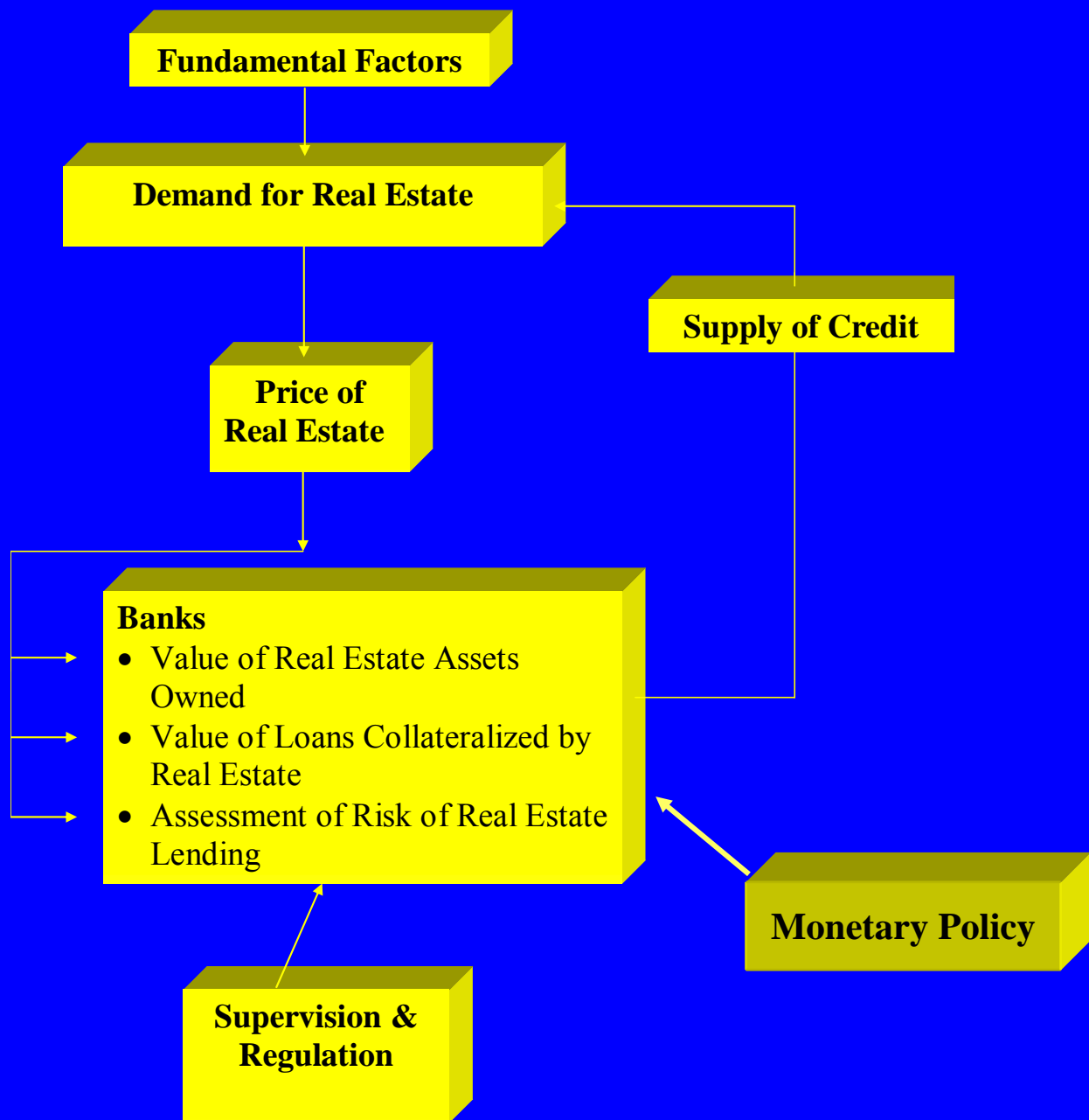
Real estate booms are often followed by banking crises

- ✓ Correspondence holds
 - for a wide variety of regulatory systems
 - for a broad range of levels of development
- ✓ Consequence for the real economy depends on the role of banks in the financial system
 - Banks hold about 23% of total financial assets in US
 - Banks hold more than 75% of total financial assets in Japan, New Zealand and most developing countries

Boom/Bust Dynamic in Very Different Financial Systems



Bank lending helps drive real estate prices



How does bank lending contribute to the booms & busts?

- ✓ Assume that banks seek to maximize expected profits subject to a constraint that the risk of insolvency not exceed some maximum amount
- ✓ This framework enables us to analyze determinants of the supply of mortgage lending

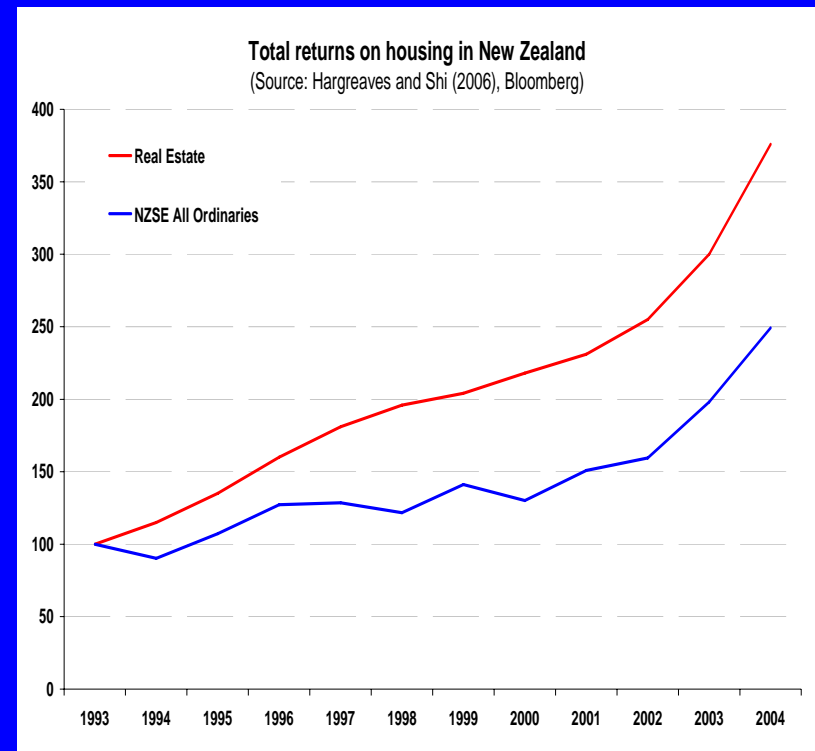
The Desired Loan Concentration...

- ✓ Increases as expected value of assets increases
- ✓ Increases as the capital requirement decreases
- ✓ Increases as promised returns increase
- ✓ Increases as the expected probability of default (π) decreases
- ✓ Increases as perceived correlation with the rest of the portfolio decreases

Investment in Housing Appears to Have Been Very Profitable

- ✓ Banks don't break out profitability by line of business, but have been very profitable through the cycle

Returns have been high relative to shares



Why have banks and households been willing to assume such heavy concentrations of exposure to home prices?

1. Disaster myopia
2. Perverse incentives
3. Poor data and inadequate analysis

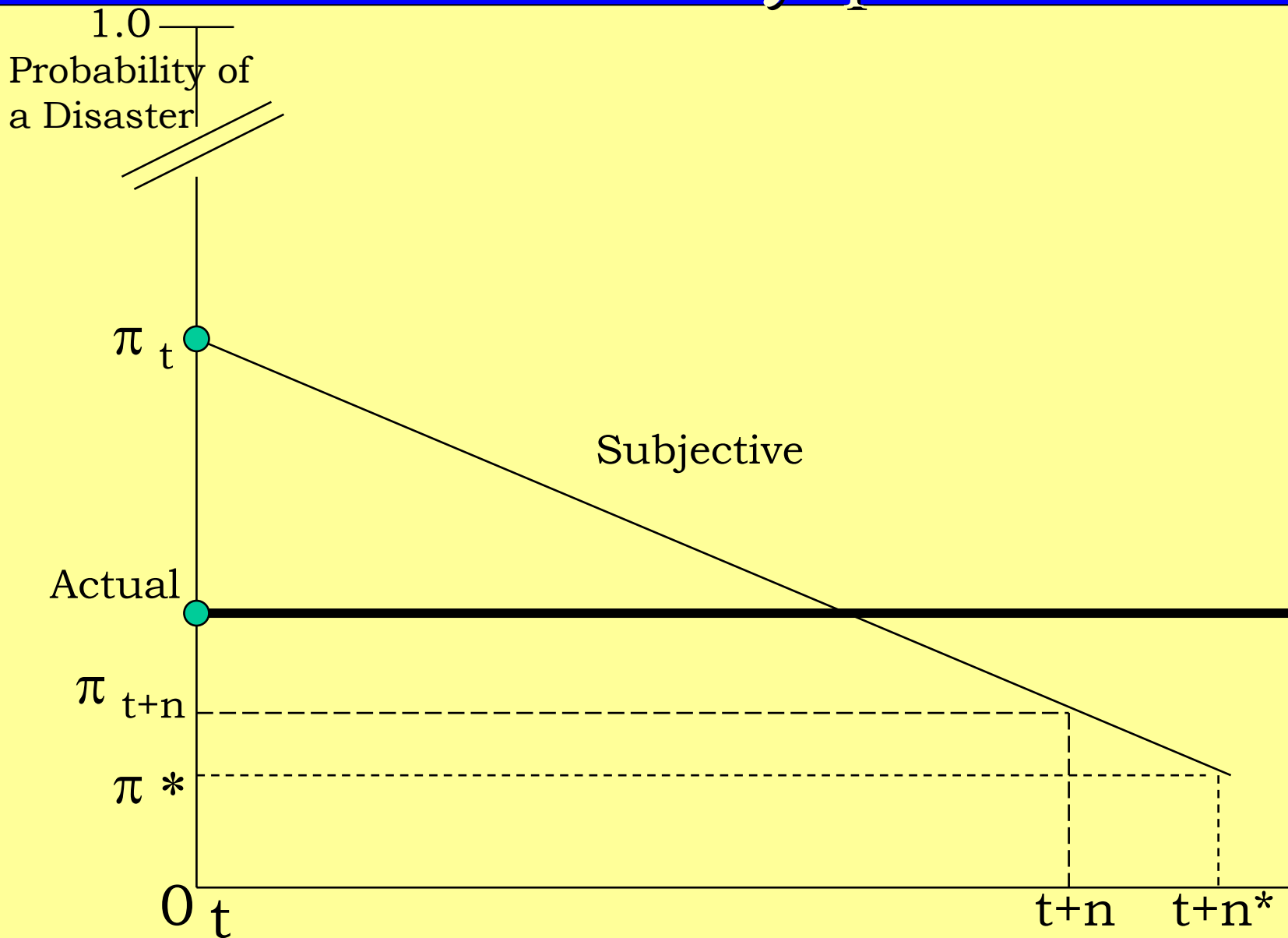
The Future of Housing Prices is Subject to Uncertainty

- ✓ We lack sufficiently precise analytical models to provide reliable estimates
- ✓ The experience with defaults has been very limited
 - The last sustained downturn was arguably irrelevant because NZ was a very different economy
- ✓ How do decision-makers form expectations in such situations?

1. Disaster Myopia

- ✓ Subjective probabilities depend on
 - Availability heuristic
 - Availability bias: a declining function of period since last shock
 - Threshold heuristic
 - Overconfidence bias
 - Cognitive dissonance

Disaster Myopia



Institutional factors that enable disaster myopia in the banking sector

- ✓ Managerial accounting systems that favor activities subject to low-frequency losses
- ✓ Recognition of fees upfront as income
- ✓ Bonuses tied to current revenues
- ✓ High job mobility among risk takers
- ✓ Intense competition in banking markets
 - Drives out participants who are not disaster myopic
 - Appearance of high profitability attracts new entrants

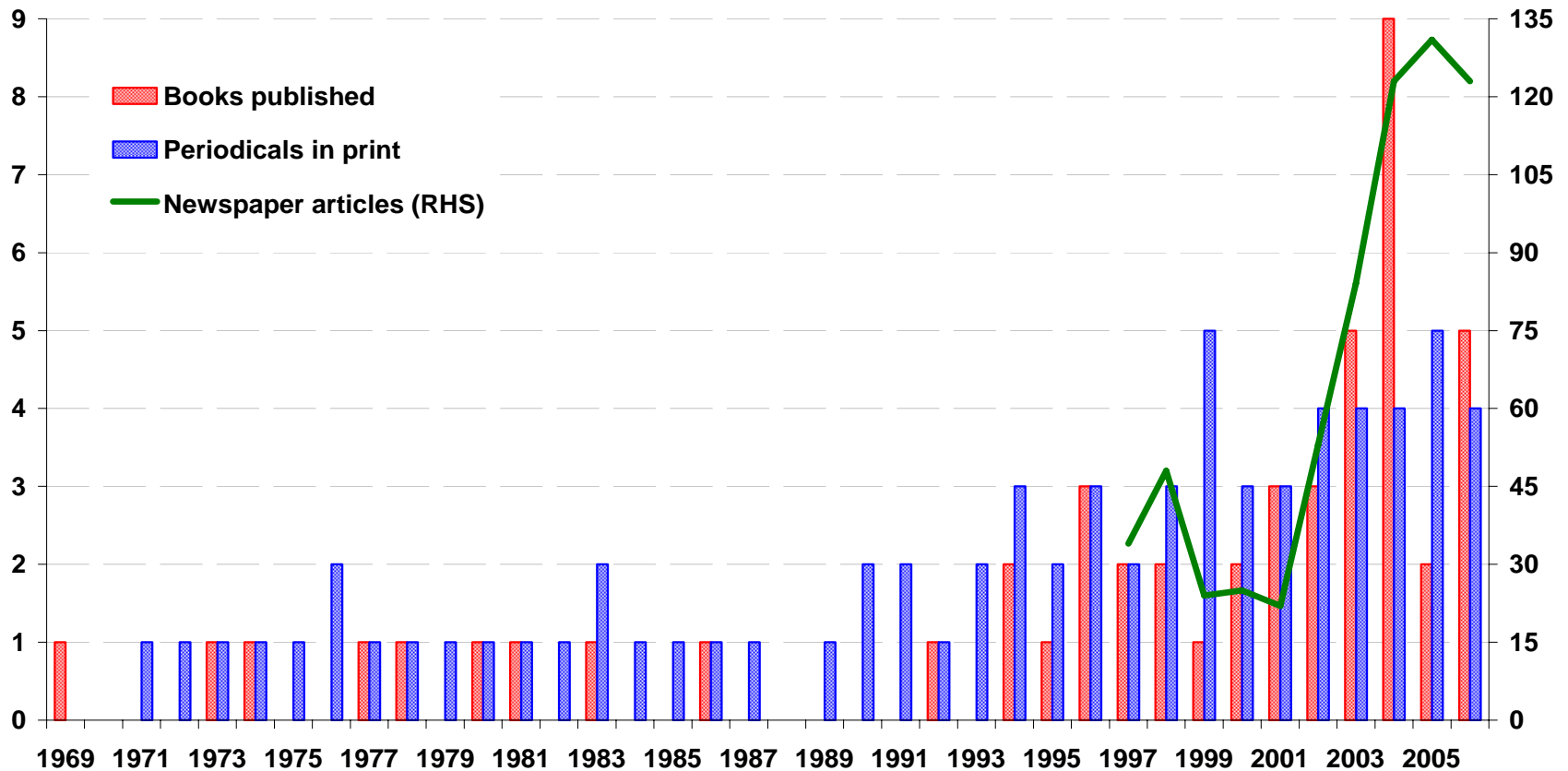
Media Heightens Awareness of Returns, but Not Risks

Annual frequency

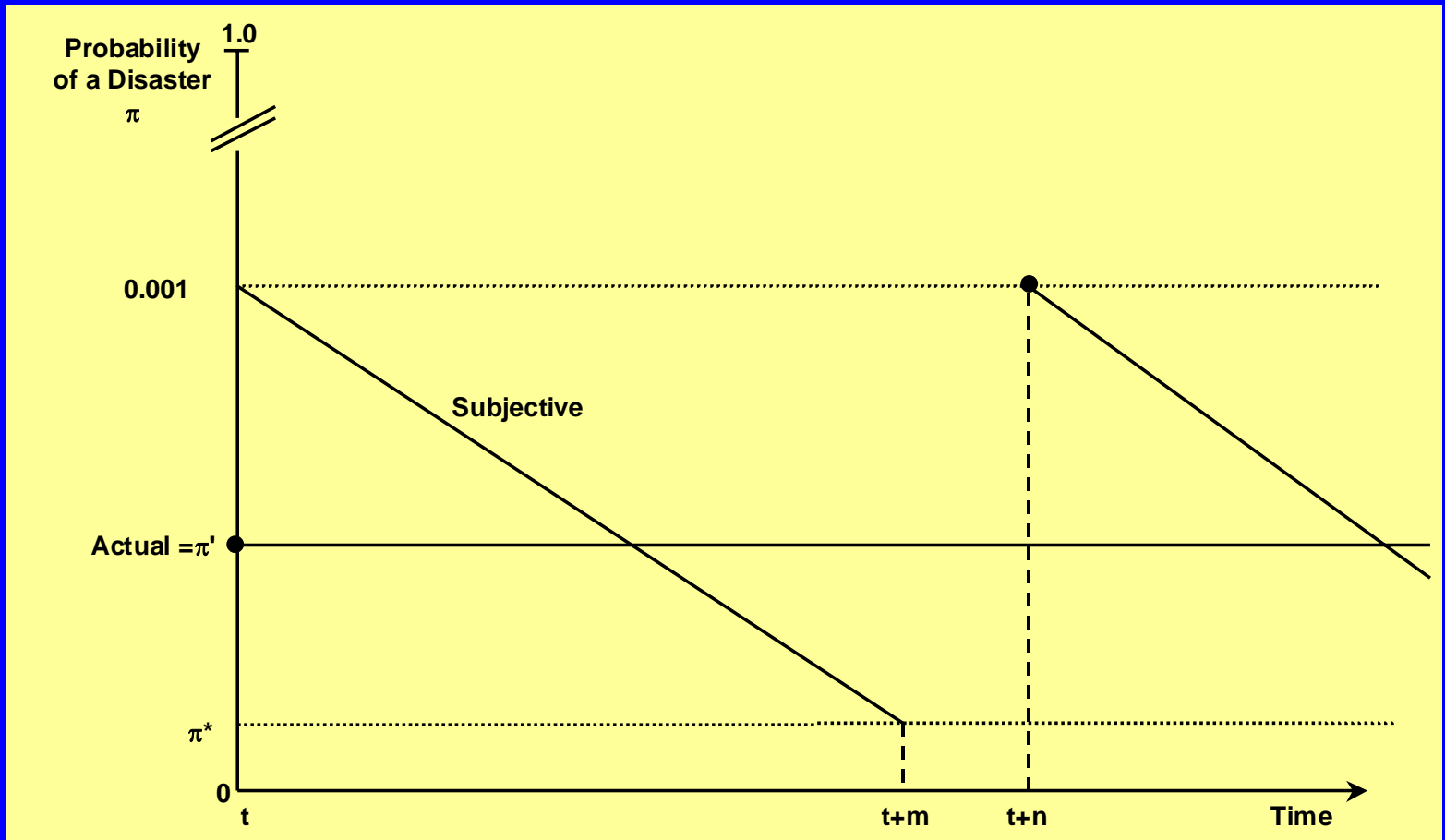
Annual number of books, periodicals and newspaper articles published on real estate investment in New Zealand

Annual frequency

(National Bibliographic Database on Te Puna, Factiva database for newspapers from 1997 only)



Disaster magnification when a shock jars perceptions



Perverse Incentives in the Banking Sector

- ✓ High leverage and risk shifting
- ✓ Explicit deposit insurance
- ✓ Implicit deposit insurance
 - State-owned banks
 - Lender of last resort operations
 - Purchase and assumption transactions
- ✓ Herding
- ✓ Biases in favor of housing in tax laws or in the way they are enforced

Poor Information & Weak Analysis

- ✓ Inadequate data re: real estate market conditions
- ✓ Inadequate appraisal techniques
- ✓ Lack of transparency re:
 - LTVs
 - Categories of borrowers – e.g. owner occupiers, second homes, investment properties, small business finance
- ✓ Over reliance on real estate collateral
- ✓ Failure to anticipate how correlations may rise in a housing bust

Poor Information & Weak Analysis (Households)

- ✓ Lack of rigor in evaluating investment in housing
 - Failure to inflation-adjust capital appreciation
 - Failure to take account of maintenance and insurance costs
 - Failure to include transactions costs
 - Failure to consider opportunity cost of funds
- ✓ US example: Suppose you bought a house in 1975 at \$150k and sold it in 2005 for \$840k. Did you make a good return?

Real Housing Prices, 1975-2005

Source for housing prices: U.S. Office of Housing Enterprise Oversight

<u>Index</u>	<u>Nominal Return</u>	<u>Real Return</u>
OFHEO Index	5.9 %	1.4 %
S&P 500 Index	12.9 %	8.0 %
T Bill Return	6.1 %	1.5 %

When faced with uncertainty

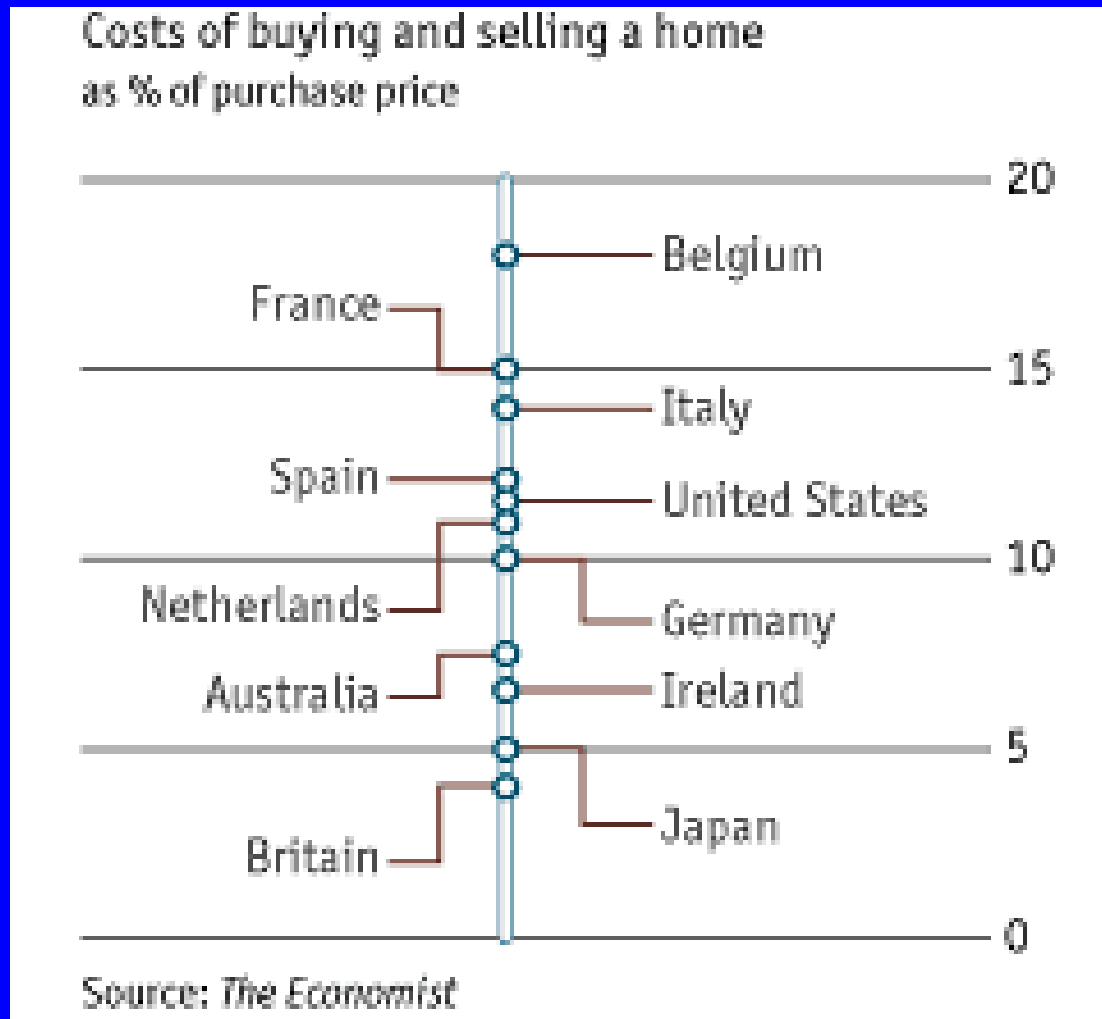
- ✓ A natural tendency to herd
 - Reassures ex ante
 - Minimizes ex post regret

Dubious Beliefs

- ✓ Buying property is far safer than buying shares because bricks and mortar are here forever
 - Harder and more expensive to sell, more expensive to maintain
- ✓ House prices are less likely to overshoot than stock prices because higher transactions costs discourage speculation
 - House price booms are more likely to be followed by busts than stock price booms

Transactions costs are relatively low

- ✓ (NZ real estate agent fees estimated to be around 3.75 percent)



Dubious Beliefs (cont'd)

- ✓ Even if house prices are overvalued, there's little downside risk because interest rates won't return to double-digit levels
 - Japanese house prices have fallen for 15 years despite decreasing interest rates
- ✓ Even if prices overshoot, they will level off, not fall
 - Less true if low inflation
 - Less true if investment in rental property is a significant share of the residential housing market

Dubious Beliefs (cont'd)

- ✓ It's always better to buy than to rent
 - Not if rent is cheaper than the user cost of housing and anticipated appreciation is too high
- ✓ Rising house prices make a country richer
 - Good for those who own
 - Not for those who wish to buy
 - Often a redistribution of wealth from young to old
 - Key exception: sales to foreigners

Has the NZ Housing Boom Gone Too Far?

- ✓ Growth in house prices has far exceeded growth in household income or rents
- ✓ But how far is “too far?”
 - No definitive answer
 - But analysts commonly employ a number of indicators
 - Affordability measures
 - Asset market measures
 - Models of the fundamentals

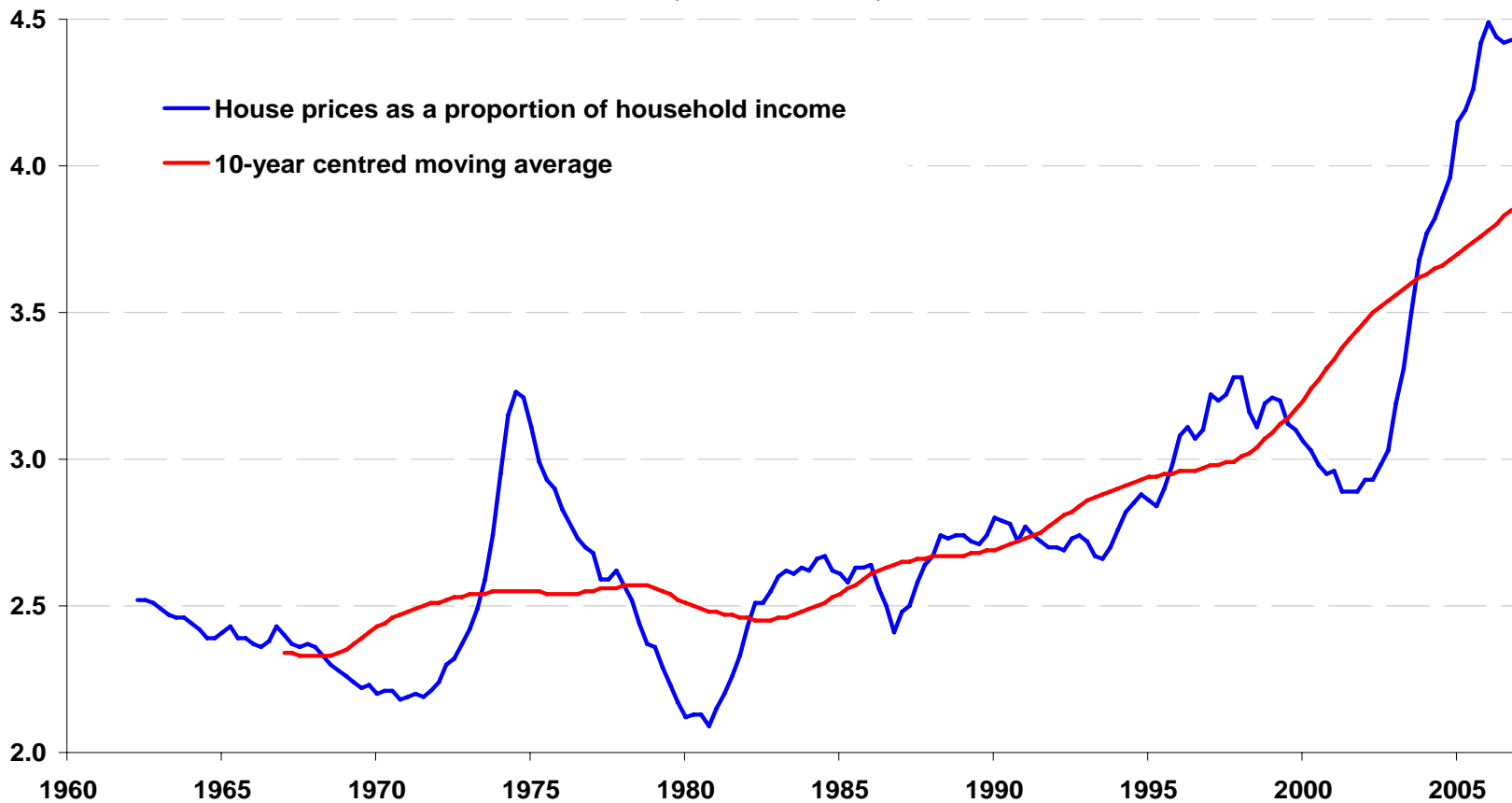
Affordability Measures

- ✓ Robinson, Scobie & Hallinan: “The relationship between housing costs & some ability to pay criteria.”
 - A point along a continuum
 - A measure of the stress that the cost of housing places on household income
- ✓ Most widely cited: Price-to-Income ratio
 - OECD: for 11 of 16 countries, well above long-term averages

For NZ, Record Highs

House prices as a proportion of average household incomes

(Source: RBNZ)



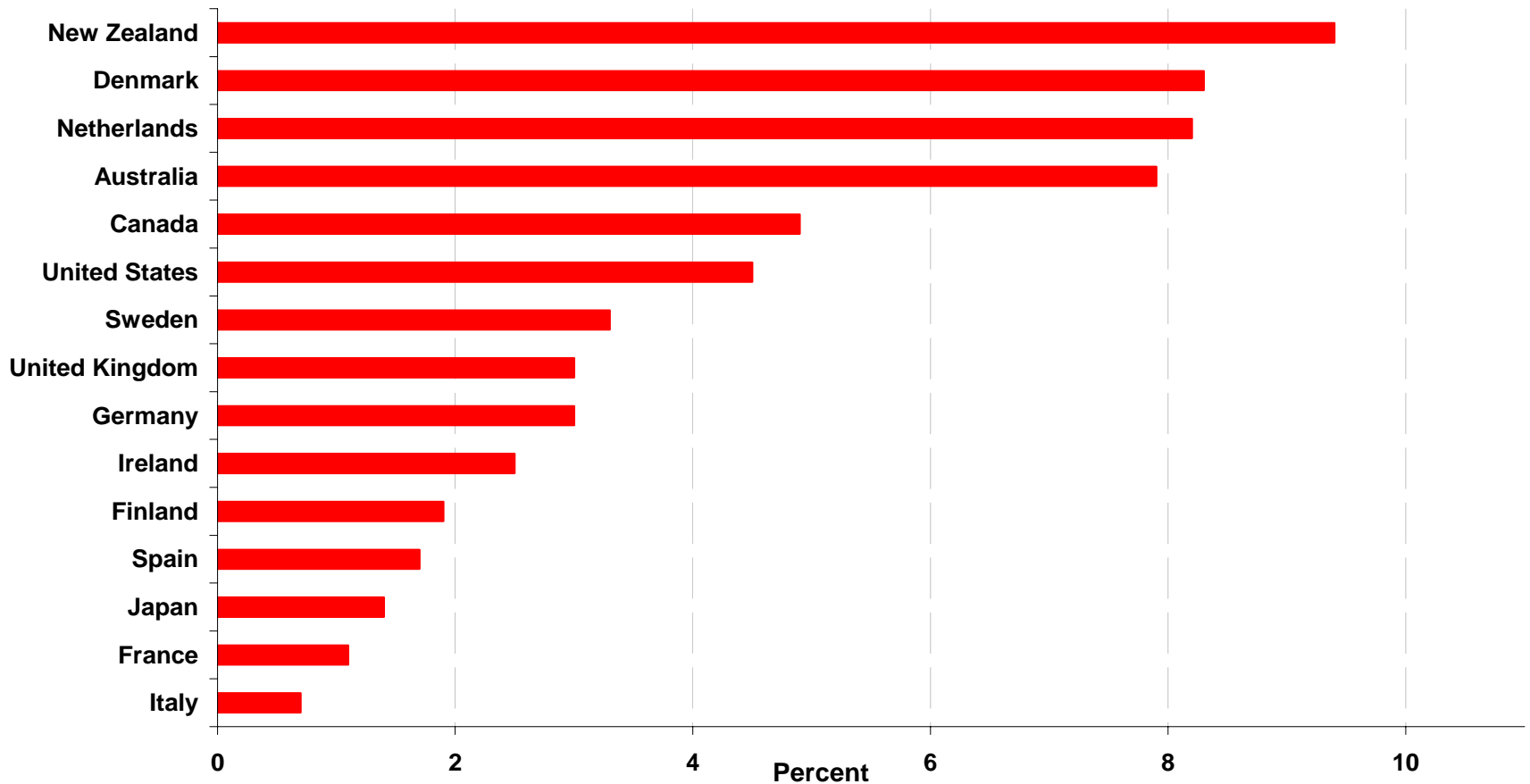
But the Price may be Less Relevant than the Cost of Financing

- ✓ Most households borrow to purchase a home
- ✓ Although debt service obligation depends partly on size of mortgage, it also depends on interest rate
- ✓ In most OECD countries decline in i has more than offset increase in debt
 - Australia & New Zealand are the key exceptions

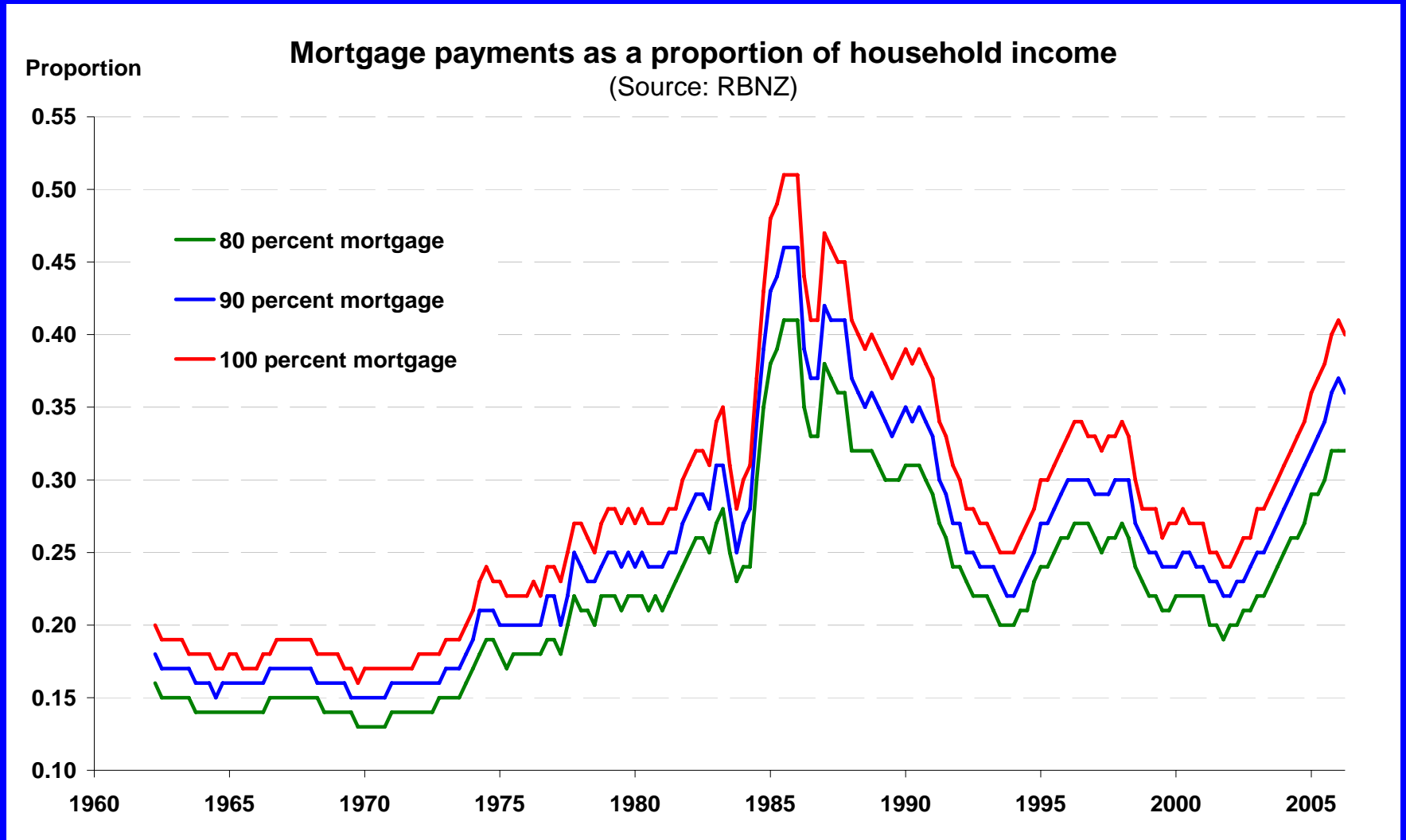
NZ Households have Heaviest Burden

Mortgage interest payments relative to household disposable income

(Source: Girouard et al (p. 20). Interest payments are approximated using mortgage debt, mortgage interest rates and typical loan-to-value ratios. Data is for 2003.)



But Burden is Not Unprecedented



Home-Owners Face Even Greater Costs than Debt Service

- ✓ Annual costs of owning a home include
 - Interest costs
 - Property taxes
 - Depreciation or maintenance costs
 - Opportunity cost of investment foregone
 - Offset by anticipated capital gains on home
- ✓ User Cost perspective begins with assumption that prices will adjust to equate rent with user cost of housing
 - Caveats about arbitrage in housing market

User Cost Approach

✓ $R = P \cdot u = P \cdot r_f + P \cdot \rho + P \cdot t_x + P \cdot d - P \cdot g$

✓ $P/R = 1/u$

- Prices may rise sharply relative to rents, when some component of the user costs drops
- Many believe decline in i has contributed to general increase in prices relative to rents
- Can compare actual ratio to inverse of user cost and infer whether prices are overvalued

OECD User Cost Analysis

(Yearend 2004)

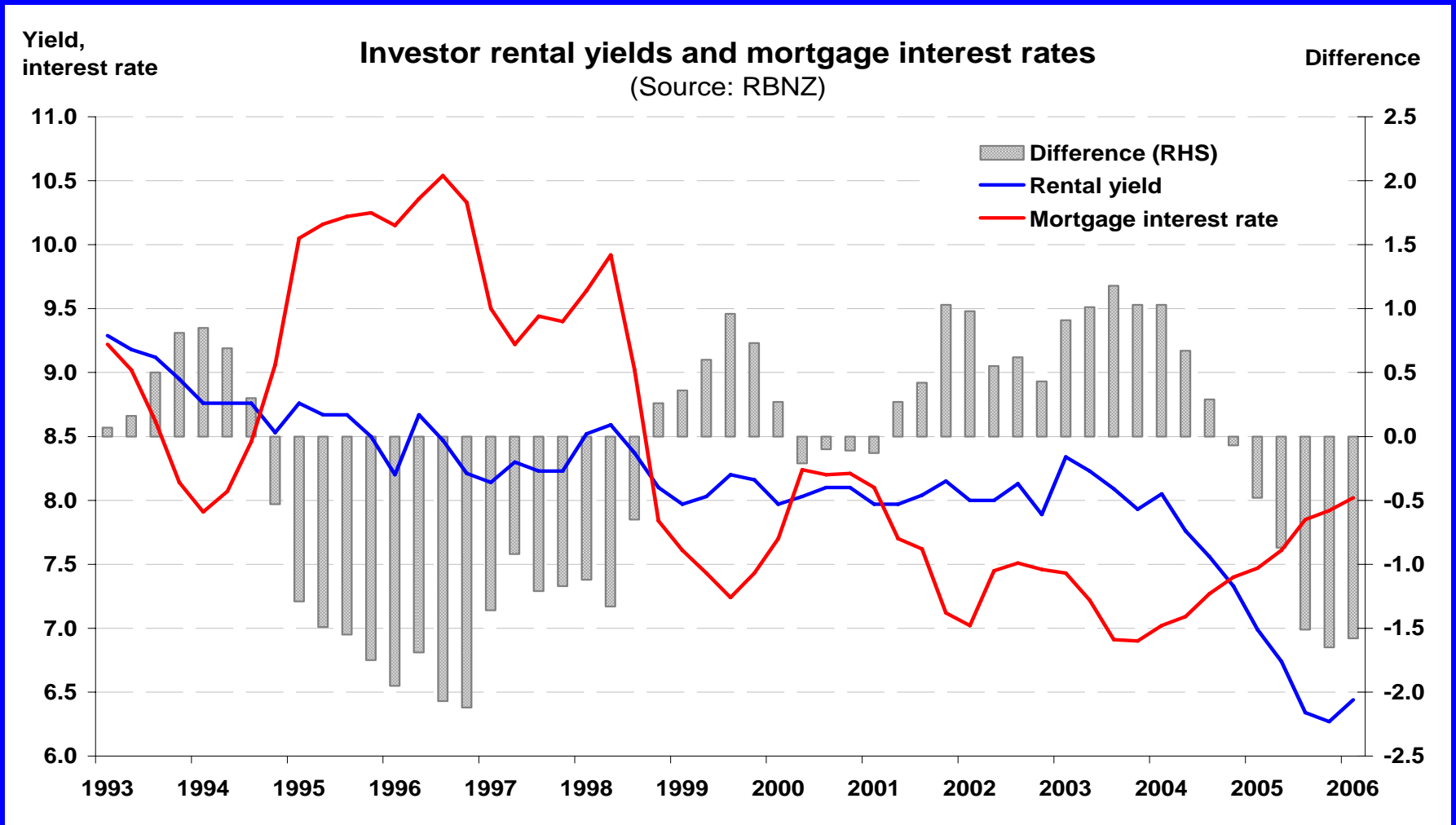
<u>Possible Overvaluation</u>	<u>Possible Slight Overvaluation</u>	<u>Negligible Evidence of Overvaluation</u>	<u>Possible Undervaluation</u>
United Kingdom	France	Finland	Japan
Ireland	Canada	Italy	Germany
The Netherlands	Denmark	The United States	Switzerland
Spain	Sweden		
Australia	New Zealand		
Norway			

Source: Table is based on Girouard et al (2006, p. 22)

Similarly, from an Investor's Perspective

- ✓ An unusually large proportion of NZ households buy homes to generate rental income
- ✓ Rental yield (analogous to inverse of P/E for shares) difficult to track in NZ
 - Rental data only available since '93
 - Cannot link rental income data with corresponding price data
 - Sometimes scale median rental income with lower quartile house prices

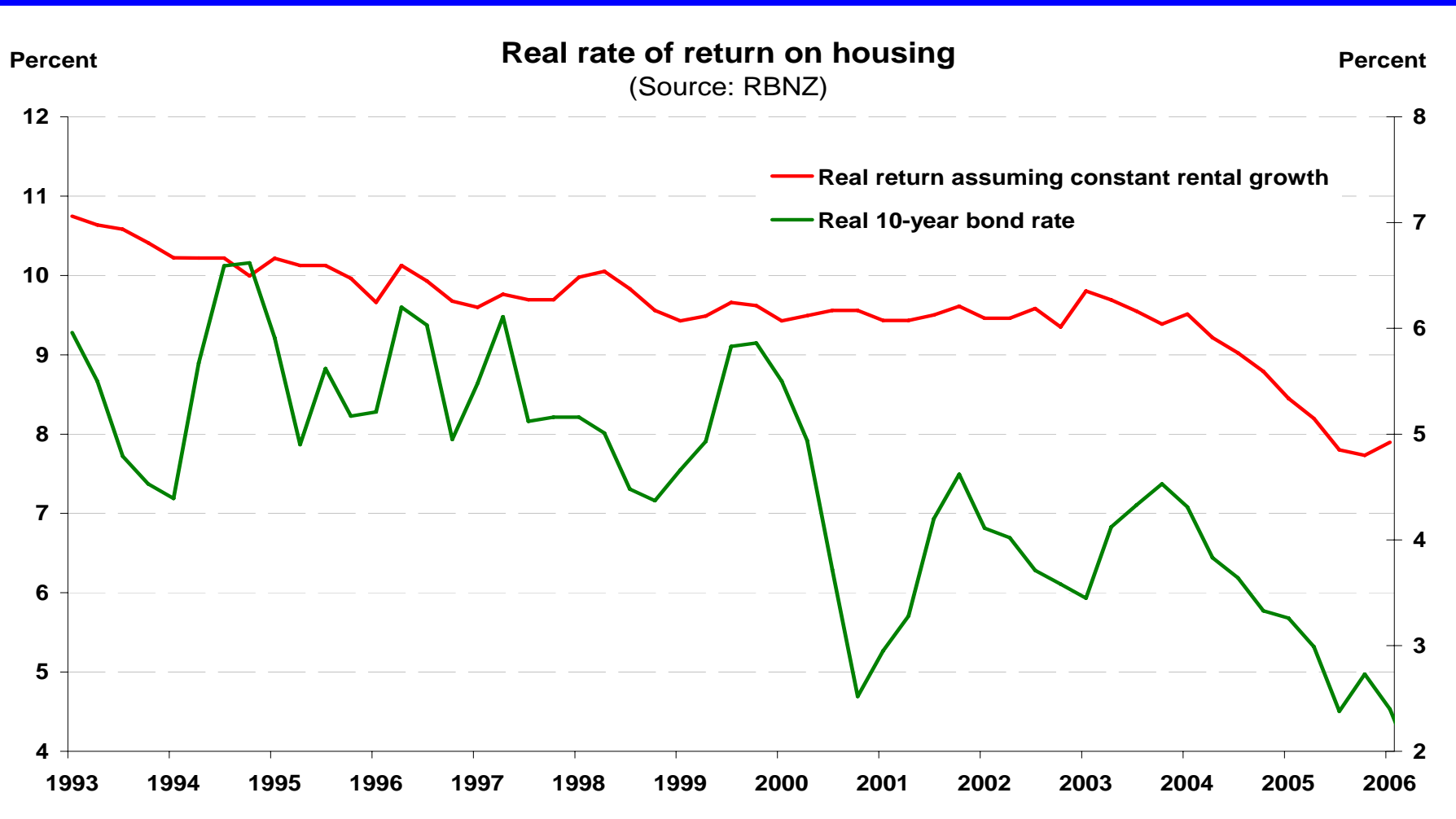
Downward Trend in Rental Income



But Neglects Anticipated Growth in Rents

- ✓ Assume real price is equal to discounted present value of all future real rents, where expected to grow at constant rate g
 - Discount rate is investor's required return on rental property
 - $P = r/(\delta - g)$
 - Can solve for δ
 - $\delta = r/p + g$

Required Returns Trend Down, But in Line with Returns on 10-Year Bond



Measures Based on the Fundamentals

- ✓ Typically, specify l.t. co-integration relationship between house prices and fundamental determinants of supply & demand
 - Fraser, Hoesli & MacAlevey (2006) find yearend prices in 2005 about 25% higher than warranted by real disposable income
- ✓ Probit model of cyclical peaks
 - OECD (June 2006)
 - 37% overvaluation
 - If real prices remain at 2005 levels and interest rates increase by 100 or 200 basis points, only Denmark & NZ in 16 country sample face a roughly 50% change of a down-turn

Summing Up the Evidence

- ✓ Those who wish to be reassured can find some comfort
- ✓ But those who are seriously concerned will not be reassured
- ✓ The important point: No one can be sure whether the boom simply reflects favorable fundamentals, or a worrisome degree of overvaluation
- ✓ But useful to consider worst case consequences & what might be done about them

What might be the consequence of a substantial fall in real home prices?

- ✓ Can't predict the shock, but can identify the worst case
 - A substantial rise in interest rates
 - A substantial increase in unemployment
 - A sharp recession in Australia
- ✓ Impact on household sector
 - Creditor-friendly laws and culture → cutback in all discretionary spending
 - Reductions in
 - Residential construction
 - Small business spending

Impact on Banking Sector

- ✓ Direct channel: losses from defaults
 - Protected by low average LTVs
 - But values may drop substantially before they can be realized
 - Collection process appears to be quite efficient relative to other advanced countries
 - Would processes hold up if numbers increased substantially?
- ✓ Indirect Channels
 - Losses on other lines of business because of drop in consumer spending
 - Loss of confidence & funding crisis
 - Difficulties in rolling over foreign borrowing

But Relatively Strong Shock-Absorbers

- Earnings
- Reserves
- Capital
- Worst case, support from parent banks
 - Does regulatory policy of corporate separateness diminish odds?

What might be done to reduce
vulnerability and safeguard financial
stability?

With Regard to the Banking Sector

	<i>Low Severity</i>	<i>High Severity</i>
<i>High Frequency</i>	Make Provisions & Price e.g. Routine processing errors	Avoid
<i>Low Frequency</i>	Insure e.g. branch robbery	Capital

Capital regulation: will Basel II help?

– Pillar 1

- Standardized Approach lowers capital charge from 50% to 35%
- AIRB depends primarily on estimates of PD & LGD
 - 5 years of data wholly inadequate to capture boom bust cycle in housing
 - QIS5 → reduction of at least 35-40%

– Pillar 2

- Stress tests
 - Both direct and indirect effects
 - Both domestic and foreign experience
 - Focus on co-movements in PD & LGD
- A capital charge for concentration risk?
- Limits on reductions in capital

Mortgage Insurance

- ✓ Common in other markets
 - Often for 100% of the shortfall
- ✓ Much less so in NZ
 - RBNZ did not recognize with capital charge reduction under Basel I
 - Banks consider for the LTVs above 80%
 - Some insure externally
 - Some self-insure
- ✓ Basel II implementation with likely increase incentives for use, by permitting a capital charge reduction to some extent

Securitization

- ✓ Widespread in many other markets
- ✓ Little used in NZ
 - Concerns over loss of customer relationship
 - Do not need funding/cost too high
 - Do not need to economize on regulatory capital
- ✓ But a powerful risk diversification tool
 - Can specialize in underwriting loans
 - While holding a well-diversified portfolio

Greater emphasis on fair value
accounting?

Economists (& securities regulators) prefer fair value accounting (FVA) relative to the current mixed system (MS)

- ✓ The current mixed system includes elements of
 - Historical cost
 - The choice for residential mortgages
 - Lower of cost or market value and
 - Fair value accounting.

Why?

- ✓ FVA tends to reduce the degree of asymmetric information between investors and managers
- ✓ FVA leads to more accurate and up-to-date information about investment opportunities, market conditions and the behavior of firms
- ✓ FVA facilitates more accurate stock prices, and alleviates the control problem between outside managers & firm insiders

MS leaves a gap between market values & book values because it

- ✓ Fails to recognize Δ in value of l.t. instruments & loans due to Δ_i
- ✓ Delays recognition of \downarrow value due to \uparrow credit risk
- ✓ Fails to recognize Δ in value of liabilities
- ✓ Fails to recognize Δ in value of intangibles

Yet, practitioners and bank and insurance regulators often prefer the current mixed system (MS) to FVA.

Why?

It can't be done

- ✓ Many financial instruments do not trade or trade only in very thin markets
- ✓ Marking to model is difficult to verify and may facilitate manipulation of earnings

It shouldn't be done

- ✓ Institutions will shorten the duration of their portfolios
 - The quality and quantity of l.t. finance will suffer
- ✓ FVA would introduce unnecessary and misleading volatility in income statements
 - Until recently many banks were encouraged to smooth reported earnings thru use of hidden reserves
 - FVA may increase volatility in share prices

It shouldn't... (cont'd)

- ✓ Market prices may diverge from long run values for extended periods
 - FVA would distort the capital positions of core institutions
 - Departures from l.t. values are amplified and sustained by bank lending behavior

It shouldn't ... (cont'd)

- ✓ It may undermine the stability of the financial system by exacerbating losses at core FIs
 - Exposures become excessive inadvertently during sustained departures from equilibrium prices
 - Inevitably, shock causes decline in asset prices
 - FIs with excessive exposures become insolvent
 - Deterioration in capital positions may occur so rapidly that no remedial action is possible
 - Insolvencies may become contagious because of
 - *Direct exposures among core FIs*
 - *Perceived exposures among FIs*

The toughest case for FVA is when market prices make a sustained departure from long-term equilibrium values.

- ✓ This can be true for home prices

How does the choice between FVA
and the MS affect the price
dynamics of a residential real
estate boom?

In the Up Phase, Higher Prices →

	MS	FVA
Larger loans, given loan-to-value ratio	✓	✓
Loan-to-value ratio often declines in boom	✓	✓
Equity-kicker → bank capital	✓	✓
↑ value of collateral → ↑ in credit quality of loan (likely to be de minimus)		✓
↑ value of collateral → ↑ in refinancings which may be used to buy more real estate	✓	✓
↑ in value of bank's own real estate → ↑ bank capital	✓ if realized	✓
↑ in interest rate → ↓ in loan value & ↓ in capital		✓
↓ loan value before failure to service		✓

In the Down Phase, Lower Prices →

	MS	FVA
Smaller loans, given loan-to-value ratio	✓	✓
Loan-to-value ratio often increases in bust	✓	✓
Equity-kicker → ↓ bank capital	✓	✓
↓ value of collateral → ↓ in credit quality		✓
↓ value of collateral → ↓ in refinancings	✓	✓
↓ in value of bank's own real estate → ↓ bank capital	✓ if realized	✓
↓ in interest rate → ↑ in loan value & ↑ in capital		✓
Likelihood of evergreening	Greater	
Likelihood of supervisory forbearance	Greater	

Main Difference: The Down Phase

✓ Under FVA

- Booms are likely to end sooner
- Evergreening may be less likely
- Supervisory forbearance may be less likely
- Resolution and restructuring likely to happen more quickly

Implications for Monetary Policy

- ✓ Should monetary policy respond to housing booms even if inflation remains in check?
If not
 - Will inflation-targeting inadvertently lead to excessive credit creation that spills over into property markets?
 - Monetary policy can unwittingly accommodate a boom
 - The disruptive impact of bust can undermine monetary policy

But pre-emptive tightening faces serious challenges

- ✓ Is it possible to identify an unwarranted boom early enough and with sufficient confidence to act?
 - If not, contractionary monetary policy may exacerbate the impact of the spontaneous collapse of the boom and exacerbate volatility.
- ✓ To what extent (if any) should a central bank trade-off price stability against asset price stability?
- ✓ If the central bank assumes responsibility for asset prices, will it inadvertently engender moral hazard?

With regard to Housing Markets

- ✓ Immigration flows contribute to boom/bust dynamic
 - Immigrants tend to be wealthier than average resident and probably have a higher propensity to buy property
 - May have led to a ratcheting up of nominal prices
 - Some immigration flows are exogenous
 - HK
 - SA
 - 9/11
 - Some are economically-influenced and highly pro-cyclical
 - Flows of New Zealand residents to and from Australia
 - Flows of New Zealand residents from England and the US
- ✓ Can immigration policy help stabilize the housing market in the event of a bust?
 - Target retirees from US and UK who may be less sensitive to current economic conditions in NZ

With regard to the household sector

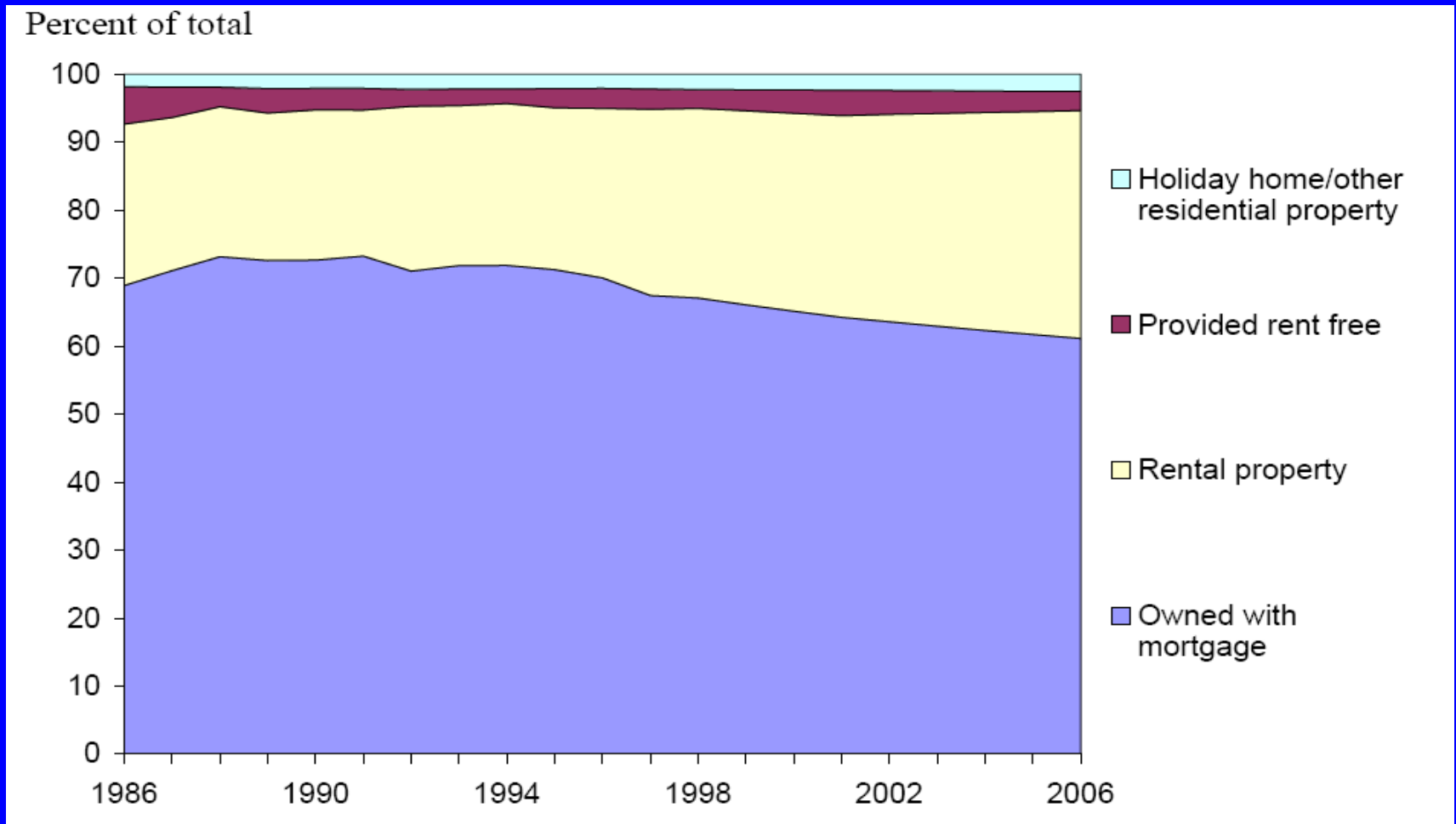
- ✓ Two views on diversification
 - Harry Markowitz
 - Mark Twain
- ✓ New Zealanders seem to follow Mark Twain's advice

NZ is a small, specialized economy

- ✓ A wonderful place to live, but more vulnerable to a wide variety of shocks than larger, more diversified economies
 - Human capital at risk
 - Could offset with diversified financial investments in global market
 - But many New Zealanders prefer to invest in housing
 - Could diversify across NZ (Grimes evidence)
 - But preference for do-it-yourself management & maintenance means often invest nearby
- ✓ Home bias found in most countries is compounded in NZ by preference for buying additional homes!

Rental share has been increasing

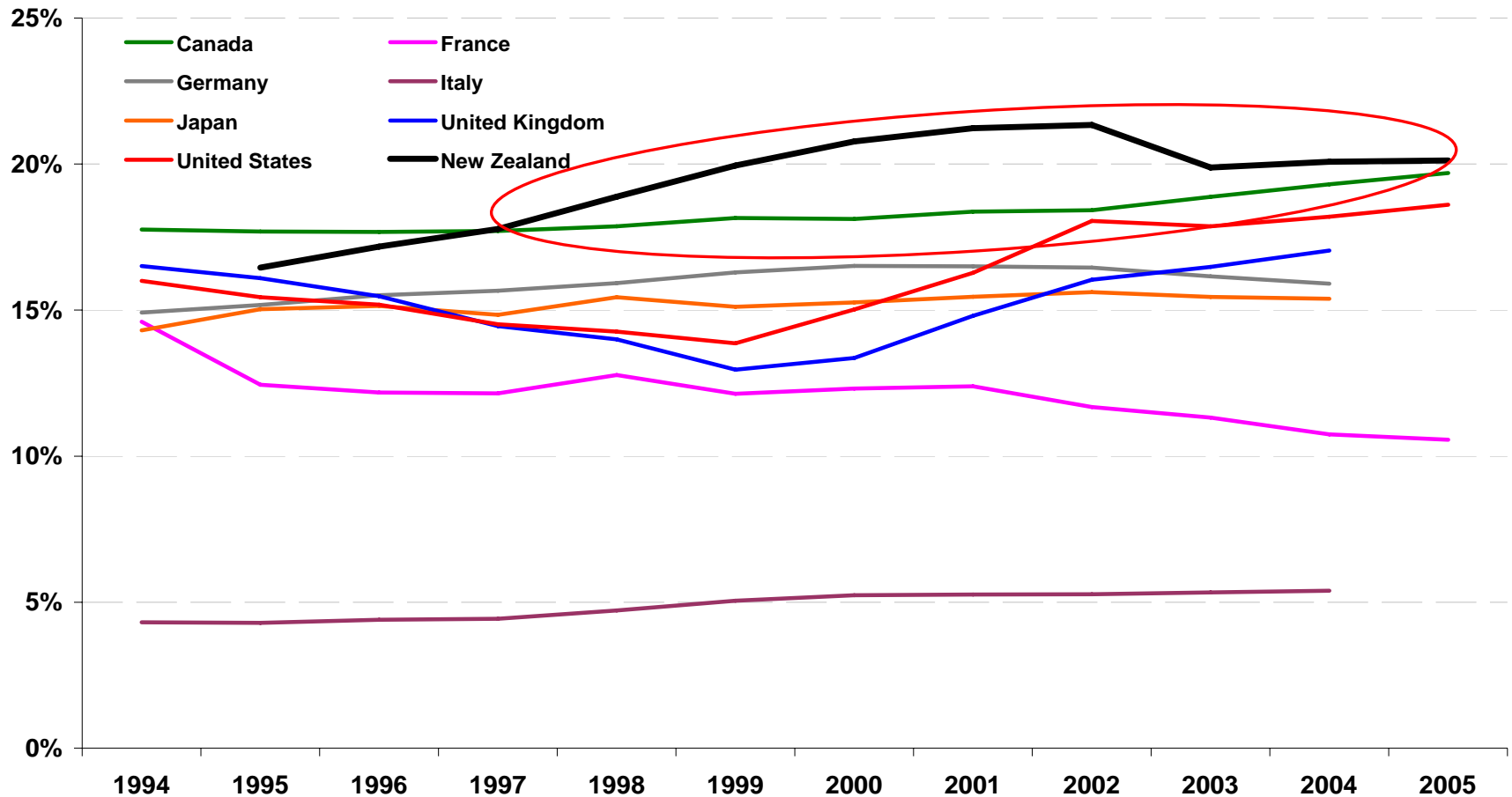
Estimated New Zealand mortgage debt by property type
(Source: RBNZ)



Not only more exposed to residential real estate, but also more leveraged

Household liabilities to total household assets

(Source: OECD, RBNZ)



And because even “fixed rate”
mortgages are fixed for no more than 3-5
years, households bear most of the
interest rate risk

Why this lack of attention to diversification?

- ✓ Across asset classes?
 - Painful experience with liberalization of NZ financial markets in 1987
 - A strong home-ownership culture
- ✓ Across countries
 - Some focus on Australia
 - But it's not a terrific diversification move
- ✓ Tax incentives also play a role

Perverse Incentives for Households

- ✓ Tax incentives favor investment in housing
 - Tax free status of benefits of owner-occupied housing
 - An equal amount of money invested in securities would be subject to tax on interest or dividends
 - The enforcement of the “intention for resale” clause with regard to assets
 - More difficult to enforce with regard to housing
 - More restrictive with regard to securities strategies
 - Actively managed unit trusts
 - Portfolio rebalancing
 - Ability to shelter wage and salary income with losses from investment properties

Lack of Diversification of Household Sector Net Worth is Greatest Source of Vulnerability

- ✓ Propensity to buy houses to rent may cause housing boom to go too far
- ✓ Increases the exposure of the household sector in the event of a bust
- ✓ Places much greater burden on crisis management policies than if household sector well-diversified

Potential remedies

- ✓ Remove incentives to over-invest in housing
- ✓ Provide a broader range of mortgage instruments to help households manage exposure to interest rate risk
- ✓ Encourage provision of a broader range of products to help New Zealanders to diversify their portfolios internationally