



FINM3406

Real Estate Finance

Lecture 9

Mortgages

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Outline

- What is a mortgage – historic context and legal framework
- Current issues and trends in Australian mortgages
- Mortgage mathematic – amortisation calculations
- Mortgage backed securities (and GFC)

Objectives

- Understand the legal and historical context of mortgages in Queensland and the role they play in real estate finance
- Understand the role of mortgages as part of collateralised debt obligations and how this influenced the GFC
- Be able to explain and apply the different types of mortgage repayment structures

WHAT IS A MORTGAGE?

What is a Mortgage?

- Term mortgage comes from old Norse French “mort” meaning death and “gage” referring to a “pledge.”
- A mortgage is taken over a property as security for a loan. A mortgage is a contractual arrangement where one party (the mortgagor) provides property as security for a loan provided by the other party (the mortgagee). When the debt is repaid, the mortgage expires.
- The offer of property as a security becomes an interest in the land for the lender. The land becomes encumbered by the mortgage – historically mortgagee held the physical Certificate of Title to effectively stop any sale without the debt being paid off.
- Like leases it creates both contractual rights (rights *in personam*) and property rights (rights *in rem*).

Overview of Mortgages in Queensland

- A mortgage is a legal agreement between a borrower and a lender in which the borrower pledges property as security for a loan.
- In Queensland, mortgages are governed by the Part 7 of the *Property Law Act 1974* (currently a Property Law Bill 2023 is before parliament – will update but not fundamentally alter rules)
- A mortgagee (the lender) has the right to take possession of or sell the property if the borrower defaults on the loan.
- Mortgages **must** be registered on the title of the property to be enforceable against third parties. Otherwise just contractual remedies for lender against borrower.

Registered Mortgages

- A registered mortgage is a legal interest in the property that is recognized by law and is registered on the property's title.
- A registered mortgage gives the mortgagee the right to take possession of or sell the property if the borrower defaults on the loan.
- If a mortgage is not registered, it may not be enforceable against third parties, and the mortgagee may not have the legal right to take possession of or sell the property in the event of default.
- It's important for both borrowers and lenders to ensure that a mortgage is properly registered on the title of the property in order to ensure that the rights and obligations under the mortgage are legally binding and enforceable.

Equity of Redemption

- The equity of redemption is the borrower's right to redeem the property by paying the outstanding debt before the mortgagee exercises their power of sale.
- The equity of redemption is a fundamental principle of mortgages in Queensland.
- The mortgagee must provide the borrower with notice before exercising their power of sale.
- The borrower has the right to challenge the mortgagee's decision to exercise their power of sale in court.

Power of Sale

- The power of sale is the mortgagee's right to sell the property in the event of default.
- Mortgagee in Possession – can lead to a sale or can result in mortgagee operating the property.
- The mortgagee must **strictly** comply with certain requirements before exercising their power of sale, such as providing notice to the borrower – opportunity to remedy etc.
- If the sale of the property does not cover the outstanding debt, the borrower may still be liable for the remaining amount.
- If the sale generates more than the outstanding debt, the mortgagor will receive the difference (after mortgagee's costs).

Mortgagee in Possession

- If the rent received from taking possession of a property is more than the mortgage payments, the mortgagee may be able to keep the difference as income. However, the mortgagee must still comply with the terms of the mortgage and act in good faith towards the borrower.
- Under the Property Law Act 1974 in Queensland, if a mortgagee takes possession of a property and generates income from it, they must apply the income towards the following in the following order of priority:
 1. Any expenses associated with managing the property, such as repairs, maintenance, and insurance.
 2. The mortgage payments owed by the borrower.
 3. Any other amounts owed by the borrower under the mortgage or related agreements.

CURRENT ISSUES & TRENDS

Mortgage Affordability



Source: IBISWORLD D1131 Mortgage affordability BED Report – September 2022

Mortgages from an Investment Perspective

- Broadly, mortgages are divided into **residential mortgages** and **commercial mortgages**.
Differ in several respects:
 - Individual residential loans are much smaller amounts on average, but much more numerous than commercial loans
 - Residential owner-occupied properties generate no income, so the lender depends on the individual borrower's income to service the loan, while commercial loans can be serviced by the income produced by the property securing the debt.
 - Resi borrowers are not financial or business professionals and are only in the market for a loan on occasion, commercial borrowers are typically commercial or financial entities staffed by professionals with much greater financial expertise.

Mortgages from an Investment Perspective

- Commercial properties tend to be more unique, while single-family homes tend to be more homogenous
- Social and political concerns, and the resulting government involvement, are much greater regarding residential loans than commercial loans, including different statutory and common laws governing foreclosure and bankruptcy for residential versus commercial loans
- Residential mortgage business has become more of a “mass production” fairly standardised industry.
- Commercial mortgages remains more of a “custom shop” where individual loans are crafted and negotiated.

Calculating Loan Payments and Balances

- There are **Four Basic Rules** for calculating loan payments and balances:
 - **Rule 1:** The interest owed in each period equals the applicable interest rate times the outstanding principal balance at the end of the previous period : $INT_t = (OLB_{t-1})_{rt}$.
 - **Rule 2:** The principal amortised (paid down) in each payment equals the total payment (net of expenses and penalties) minus the interest owed: $AMORT_t = PMT_t - INT_t$.
 - **Rule 3:** The outstanding principal balance after each payment equals the previous outstanding principal balance minus the principal paid down in the payment: $OLB_t = OLB_{t-1} - AMORT_t$.
 - **Rule 4:** The initial outstanding principal balance equals the initial contract principal specified in the loan agreement: $OLB_0 = L$.

Four Basic Rules

- Abbreviations

$L =$ Initial contract principal (the loan amount)

$R_t =$ Contract simple interest rate applicable for payment in period t

$INT_t =$ Interest owed in period t

$AMORT_t =$ Principal paid down in the period t payment

$OLB_t =$ Outstanding principal balance after the period t payment has been made

$PMT_t =$ Amount of the loan payment in period t

Applying the Rules to Design Loans

- There are a number of loan types which the Four Rules can be applied to:
 - Interest-only loan
 - Constant Amortization Mortgage (CAM)
 - Graduated Payment Mortgage (GPM)
 - Adjustable Rate Mortgage (ARM)

Interest Only Loan

- $PMT_t = INT_t = OLB_t \times i$
 - or equivalently: $OLB_t = L$, $AMORT_t = 0$ for all t
- Oldest and most basic of loan payments.
- In interest only loan, no amortization of principal
 - Outstanding loan balance remains constant throughout the life of the loan
 - Entire original principal must be paid back to the borrower in a lump sum (balloon) at the loan's maturity date.
 - Regular loan payments consist purely of interest
 - If interest rate is fixed, loan payments will remain constant

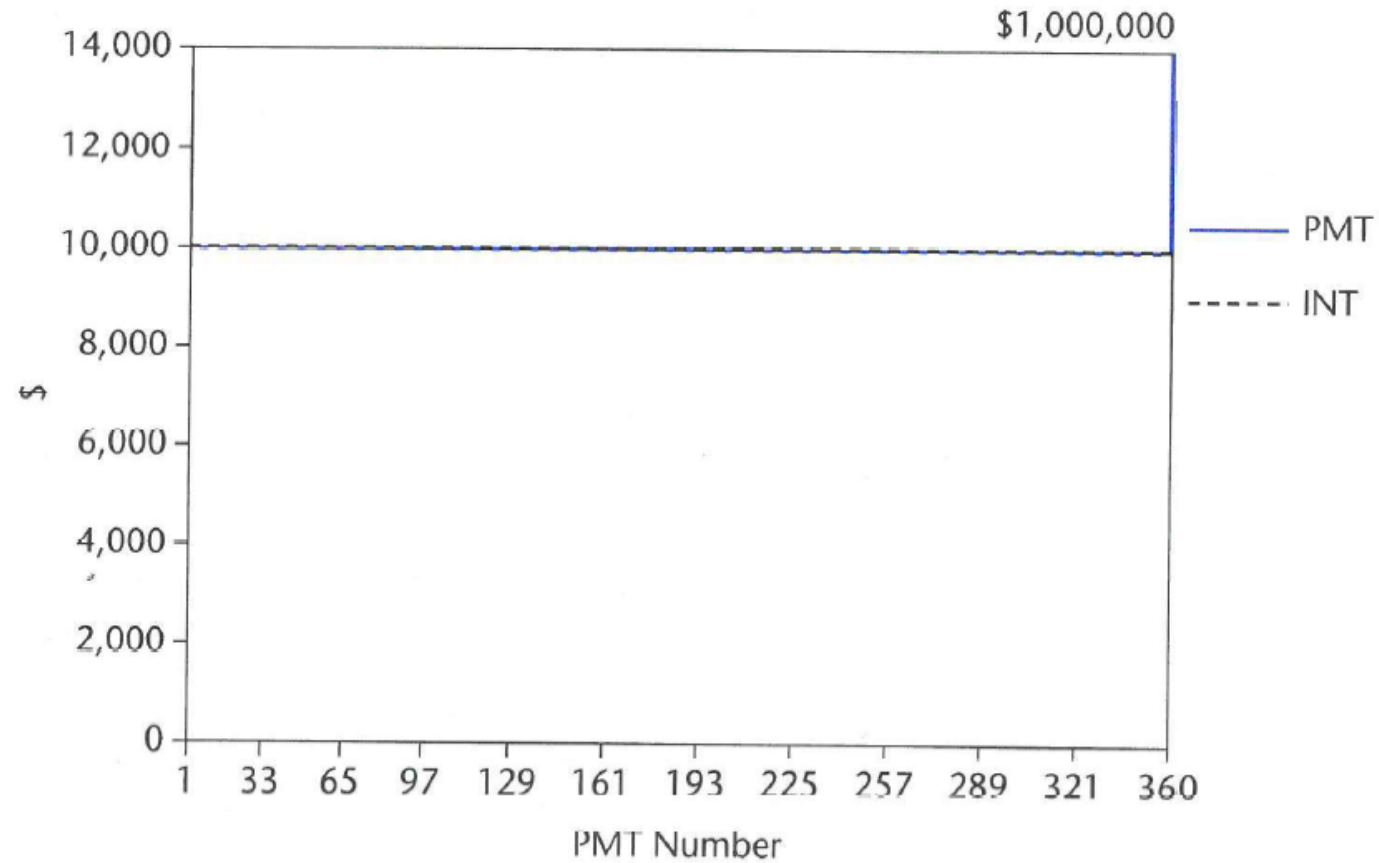
Interest Only Loan

- Normally, a relatively short term maturity 4 to 5 yrs, so best is used to finance property investments with correspondingly short holding periods (or re-finance during longer holding periods).
- Used extensively for taxation purposes.
- The repayment spike at the end of the loan confronts the borrower with the need to either refinance the loan or sell the property when the loan matures.
 - Can cause problems if either the property or the debt market is not favourable at that time.

Interest Only Loan

- Classical payment pattern of long-term corporate and government bonds and is not unusual in commercial mortgages.
- Has advantage to the borrower of regular payments that are less than those of equivalent amortising loan.
- Because principal is not paid down, maximises the total dollar magnitude of interest paid over the lifetimes of the loan, compared to other amortizing loans.

Interest Only Loan



Source: Geltner, et al. 2014

Interest Only Loan

Month	Rules 3 & 4 OLB (Beg)	PMT	Rule 1 INT	Rule 2 AMORT	Rules 3 & 4 OLB (End)
0					\$1,000,000.00
1	\$1,000,000.00	\$10,000.00	\$10,000.00	\$0.00	\$1,000,000.00
2	\$1,000,000.00	\$10,000.00	\$10,000.00	\$0.00	\$1,000,000.00
3	\$1,000,000.00	\$10,000.00	\$10,000.00	\$0.00	\$1,000,000.00
...
358	\$1,000,000.00	\$10,000.00	\$10,000.00	\$0.00	\$1,000,000.00
359	\$1,000,000.00	\$10,000.00	\$10,000.00	\$0.00	\$1,000,000.00
360	\$1,000,000.00	\$1,010,000.00	\$10,000.00	\$1,000,000.00	\$0.00

EXHIBIT 17-1 Interest-Only Mortgage Payments and Interest Component (\$1 million, 12%, 30-year, monthly payments)

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Source: Geltner, et al. 2014

Interest Only Mortgages

Key Advantages

- Low payments (compared to principal & interest)
- Payments are entirely tax deductible
- PMTs always the same (easy to budget/administer) for fixed rate loans.
- Payments do not vary with maturity.
- Very Simple, easy to understand loan

Interest Only Mortgages

Key Disadvantages

- Big ‘balloon’ payment (refinancing risk amplified because term of loan is generally short)
- OLB never decreased (therefore Interest payments never decrease)
- Can have slightly higher interest rates than amortising loans
- Lack of principal pay down can increase default risk
- Builds equity slower than with amortising loan structures
- **The predominant loan type for investment properties – commercial and residential.**

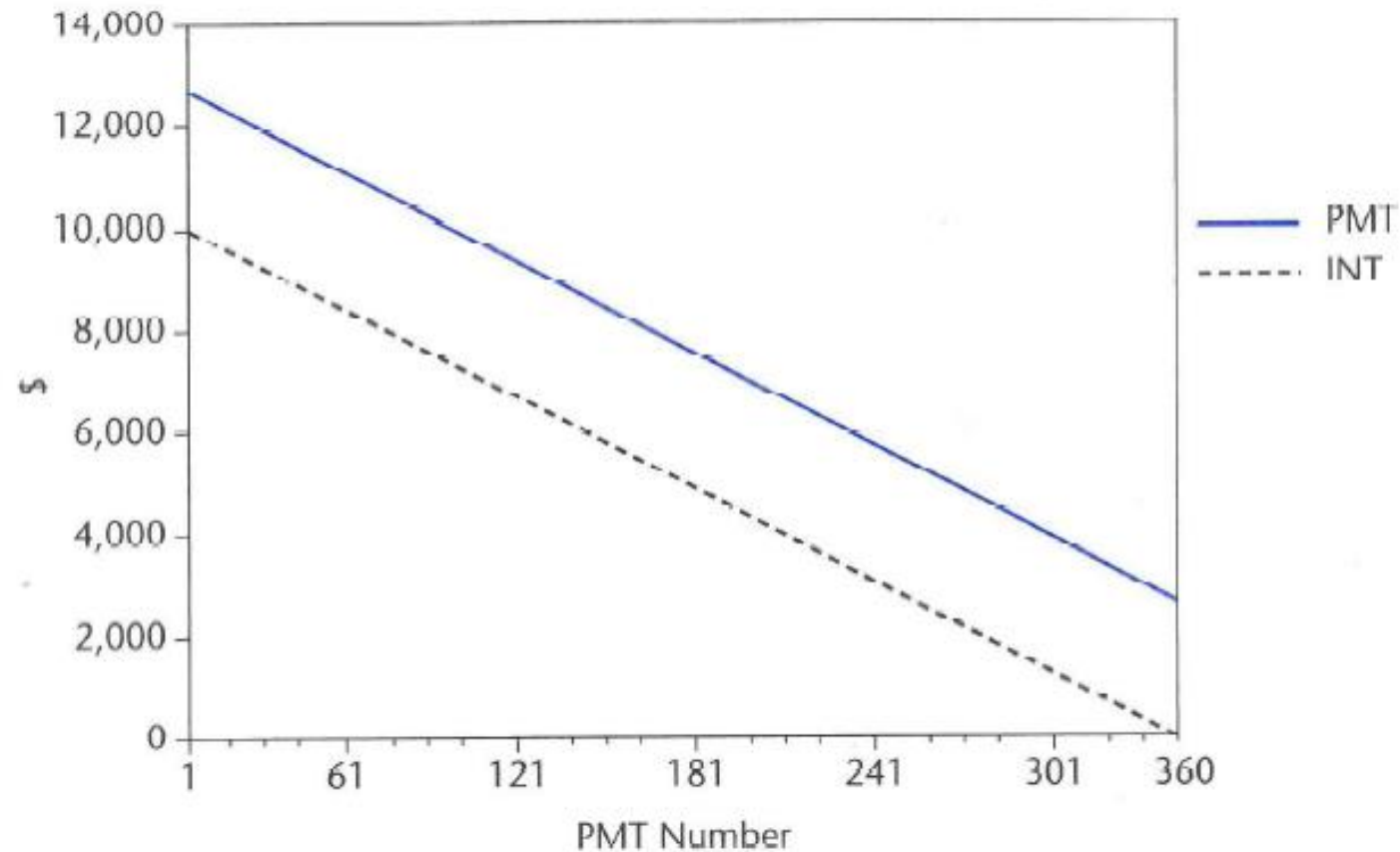
Interest Only Mortgages - Example

- $\text{Interest PMT} = \text{OLB} \times I$
- $= \$1,000,000 * (12\%/12)$
- $= \$10,000$
- Total PMT = \$10,000
- Using the capital not paying it back, outstanding loan amount remains constant

Constant-Amortisation Mortgage (CAM)

- $AMORT_t = L/N$, all t
 - Simplest way to solve the problem of the repayment spike at the end of the interest-only mortgage is to pay down a constant amount of principal in each loan payment.
 - Such loans used for a time in the 1930s when interest-only loans were causing havoc during the Great Depression and when persistent deflation resulted in declining rent and land values.
 - Characterised by a declining payment pattern. As the loan balance is reduced by a constant amount each period, the interest owed falls by a constant amount as well.

Constant-Amortisation Mortgage (CAM)



Source: Geltner, et al. 2014

Constant Amortisation Mortgage (CAM)

- Payments on a CAM are computed by dividing the initial principal by the number of payments to compute the amortisation amount per period, and then applying rule 2 to compute the total payment due each period as the sum of the amortisation and the interest computed based on rule 1.
- Capital Sum (Principal paid back incrementally)

Constant Amortising Mortgage - Example

- \$1,000,000, 30 year loan, monthly payments, 12% interest
- $AMORT_t = L/N$, all t
- $= \$1,000,000 / 360$
- $= \$2,777.78$

- $Interest\ PMT = OLB \times I$
- $= \$1,000,000 * (12\%/12)$
- $= \$10,000$

- Total PMT = $\$2,777.78 + \$10,000$
 $= \$12,777.78$

Constant Amortising Mortgages

Month	Rules 3 & 4 OLB (Beg)	Rule 2 PMT	Rule 1 INT	AMORT	Rules 3 & 4 OLB (End)
0					\$1,000,000.00
1	\$1,000,000.00	\$12,777.78	\$10,000.00	\$2,777.78	\$997,222.22
2	\$997,222.22	\$12,750.00	\$9,972.22	\$2,777.78	\$994,444.44
3	\$994,444.44	\$12,722.22	\$9,944.44	\$2,777.78	\$991,666.67
...
358	\$8,333.33	\$2,861.11	\$83.33	\$2,777.78	\$5,555.56
359	\$5,555.56	\$2,833.33	\$55.56	\$2,777.78	\$2,777.78
360	\$2,777.78	\$2,805.56	\$27.78	\$2,777.78	\$0.00

EXHIBIT 17-2 Constant-Amortization Mortgage (CAM) Payments and Interest Component (\$1 million, 12%, 30-year, monthly payments)

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Source: Geltner, et al. 2014

Constant Amortising Mortgages

Key Advantages

- Results in a quicker reduction in the outstanding balance
 - Suits borrowers who dislike bearing debts
- Quicker recovery of interest for lenders
- Allows for tax shield at the beginning of the loan because of the higher amount of interest.

Constant Amortising Mortgages

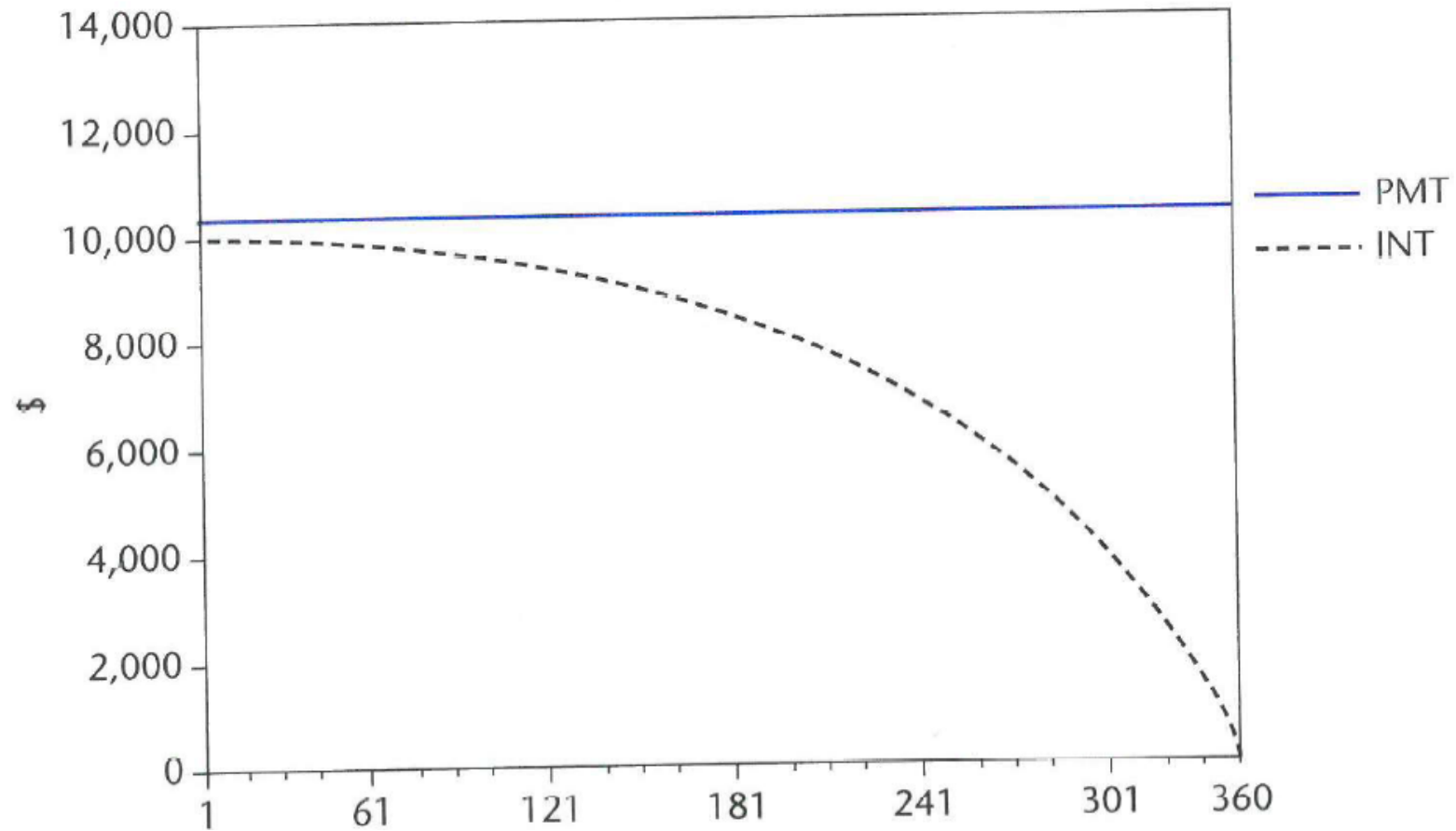
Key Disadvantages

- Difficult for borrowers to manage because this method requires larger payments at the onset of the loan
 - Borrowers incomes that tend to increase over the years
 - High initial payments does not match the likely income generation of the property
- Change in payment contributions may make it difficult to manage budgets
- In an economy free of persistent deflation, declining payment pattern is undesirable.
 - From mortgage investors, CAM likely requires an inconvenient reinvestment of capital each period as the mortgage is amortised.
- **Not widely used today**

Fully Amortising Mortgages

- Fully amortising means the regular PMTs will fully repay the loan by the end of the term.
- Each payment comprises the interest accrued since the last PMT + a portion of the remaining principal balance.
- PMT is constant over loan term (at fixed i), but the proportion of the principal (PPMT) & interest (IPMT) components of PMT alter over time
- Loan terms of between 15 & 30 years common

Fully Amortising Mortgage



Fully Amortising Mortgage - Example

- \$1,000,000, 30 year loan, monthly payments, 12% interest

- $PMT_t = PMT$, all t

$$PMT = L \frac{r}{1 - 1 / (1 + r)^n}$$

$$PMT = 1,000,000 \frac{1\%}{1 - 1 / (1.01)^{360}}$$

$$PMT = \$10,286.13$$

- $Interest\ PMT = OLB \times I$
 - $= \$1,000,000 * (12\%/12)$
 - $= \$10,000$
- $AMORT = PMT - Interest$
 - $= \$10,286.13 - \$10,000$
 - $= 286.13$
- $OLB = L - PMT$
 - $= \$1,000,000 - \286.13
 - $= \$999,713.87$

Fully Amortising Mortgage

Month	Rules 3 & 4 OLB (Beg)	Rule 2 PMT	Rule 1 INT	AMORT	Rules 3 & 4 OLB (End)
0					\$1,000,000.00
1	\$1,000,000.00	\$10,286.13	\$10,000.00	\$286.13	\$999,713.87
2	\$999,713.87	\$10,286.13	\$9,997.14	\$288.99	\$999,424.89
3	\$999,424.89	\$10,286.13	\$9,994.25	\$291.88	\$999,133.01
...
358	\$30,251.34	\$10,286.13	\$302.51	\$9,983.61	\$20,267.73
359	\$20,267.73	\$10,286.13	\$202.68	\$10,083.45	\$10,184.28
360	\$10,184.28	\$10,286.13	\$101.84	\$10,184.28	\$0.00

Fully Amortising Mortgage - Exercise

- You want to borrow \$100,000. A lender agrees to loan you the money at 10% p.a., compounded annually, over a 20 year term.
- What annual PMT is necessary to amortize (pay off) the loan?

Fully Amortising Mortgages

Key Advantages

- Build equity faster
- No balloon Pmt (no refinancing stress if loan runs full term & reduced refinancing stress if doesn't run full term)
- Longer loan term can reduce financial risk
- Can have slightly lower interest rates than interest only loans
- Principal pay down can decrease default risk over time.
- Low Pmts possible with long amortisation periods.
- If on a fixed rate, Pmts constant so easy to budget/administer.
- Flexibility allows trade-offs e.g. between Pmts & terms, etc

Fully Amortising Mortgages

Key Disadvantages

- Higher payment than interest only, particularly shorter term loans, hence reduced cashflow
- Principle component of payment is not tax deductible

Are the predominant loan type for owner occupier home loans.

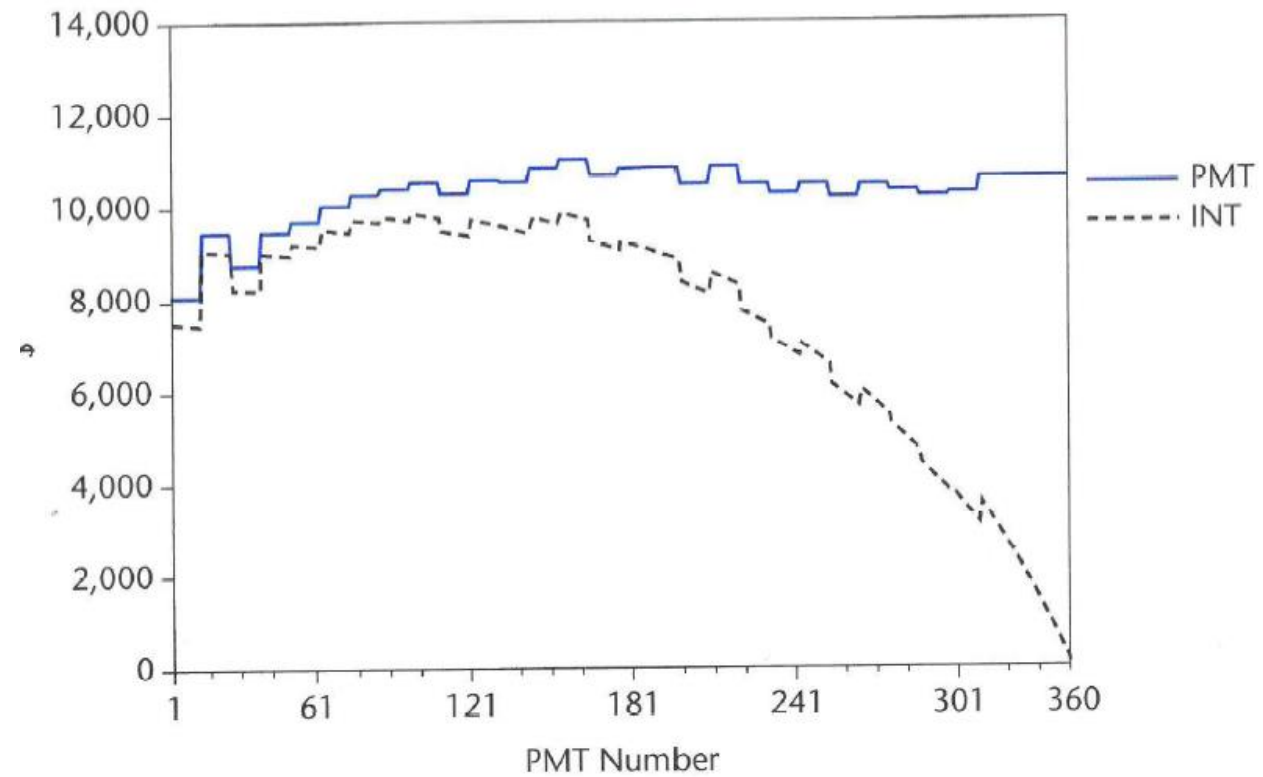
Adjustable Rate Mortgages (ARM)

- Another way to improve affordability for a borrower is to allow the contract interest rate in the loan to adjust periodically to changes in the interest rates prevailing in the debt market.
- Reduces interest rate risk for the lender, making a lower interest rate possible.
- Interest rates applicable over the life of an ARM are likely to vary up and down over time

Adjustable Rate Mortgages

- Reduce the initial interest rates for long-term mortgages during times when a steeply upward-sloping yield curve is prevailing in the bond market.
 - Short-term bonds are priced with a lower yield than long term bonds
 - Tends to occur when inflation is expected to increase in the long term, or when short-term real interest rates are temporarily depressed due to stimulative government policy
- ARM may be a long term mortgage, it is like a chain of short-term fixed rate loans linked together because the interest rate can be adjusted at relatively short intervals.

Adjustable Rate Mortgage



Adjustable Rate Mortgage

Month	Rule 3 & 4 OLB (Beg)	PMT	Rule 1 INT	Rule 2 AMORT	Rule 3 & 4 OLB (End)	Applied Rate
0					\$1,000,000.00	
1	\$1,000,000.00	\$8,046.23	\$7,500.00	\$546.23	\$999,454	0.0900
2	\$999,454	\$8,046.23	\$7,495.90	\$550.32	\$998,903	0.0900
3	\$998,903	\$8,046.23	\$7,491.78	\$554.45	\$998,349	0.0900
...
12	\$993,761	\$8,046.23	\$7,453.21	\$593.02	\$993,168	0.0900
13	\$993,168	\$9,493.49	\$9,095.76	\$397.73	\$992,770	0.1099
14	\$992,770	\$9,493.49	\$9,092.12	\$401.37	\$992,369	0.1099
...
24	\$988,587	\$9,493.49	\$9,053.81	\$439.68	\$988,147	0.1099
25	\$988,147	\$8,788.72	\$8,251.03	\$537.68	\$987,610	0.1002
26	\$987,610	\$8,788.72	\$8,246.54	\$542.17	\$987,068	0.1002
...
358	\$31,100	\$10,605.35	\$356.61	\$10,248.74	\$20,851	0.1376
359	\$20,851	\$10,605.35	\$239.09	\$10,366.26	\$10,485	0.1376
360	\$10,485	\$10,605.35	\$120.23	\$10,485.12	0	0.1376

EXHIBIT 17-5 Adjustable Rate Mortgage (ARM) Payments and Interest Component (\$1 million, 9% initial interest, 30-year, monthly payments; one-year adjustment interval, possible hypothetical history)

Exercise: Calculating Loan Affordability

- You can afford to pay \$1,600/mth on a 30 year mortgage at an interest rate of 8% p.a., compounding monthly.. What is the maximum amount you can borrow?
- If you borrow up to 80% of the value of a house , what is the most expensive house you can afford to purchase?
 - How much deposit do you need to save?
- What is the most expensive house you can afford to purchase if you can afford \$2,000/month?
- How much are your repayments if you can get a 90% LVR loan on this house? Do you have enough deposit? Can you afford the repayments?

Commercial Mortgage Backed Securities

- Commercial Mortgage Backed Securities (CMBS) refers to commercial mortgages that are pooled together and sold to investors.
- Process is known as **securitisation**
- During 1990s and until 2008 CMBS provided new & efficient form of debt capital for real estate
- Improved liquidity and transparency of commercial real estate & integration into other capital markets

CMBS

- CMBS are financial instruments (bonds) backed by pools of commercial mortgages
- CMBS securities provide claims to components of the cash flow coming from underlying mortgages (borrowers pay principal and interest)
- Mortgage loans on individual commercial properties originated by lenders in the primary market are pooled together
- Pool of loans are transferred to a trust – issue and sell classes of bonds to investors.

CMBS in Australia

- Many Australian listed and unlisted property trusts raised debt in this form in the early and mid-2000s
- The CMBS were backed by mortgages over several properties of one trust.
- Provide institutions investors returns based on loan payments and payment of capital at maturity.
- Until 2007 CMBS with AAA Rating were the norm for raising debt at a lower cost than banks.

Key Features of Mortgage Backed Securities

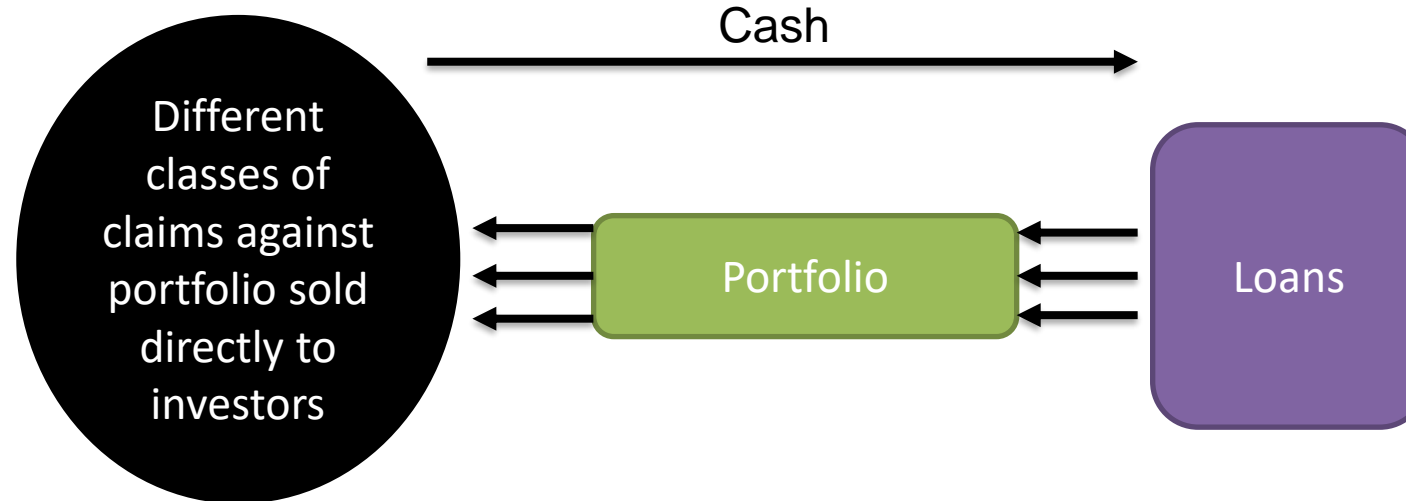
- 1. Securitisation:** process of pooling mortgages
- 2. Tranching:** separation of securities into classes
- 3. Bond Credit Rating:** the riskiness of an investment
- 4. Other:** Loan maturity, waterfall (tiering of creditor payment priority)

1. Securitisation: The Principle

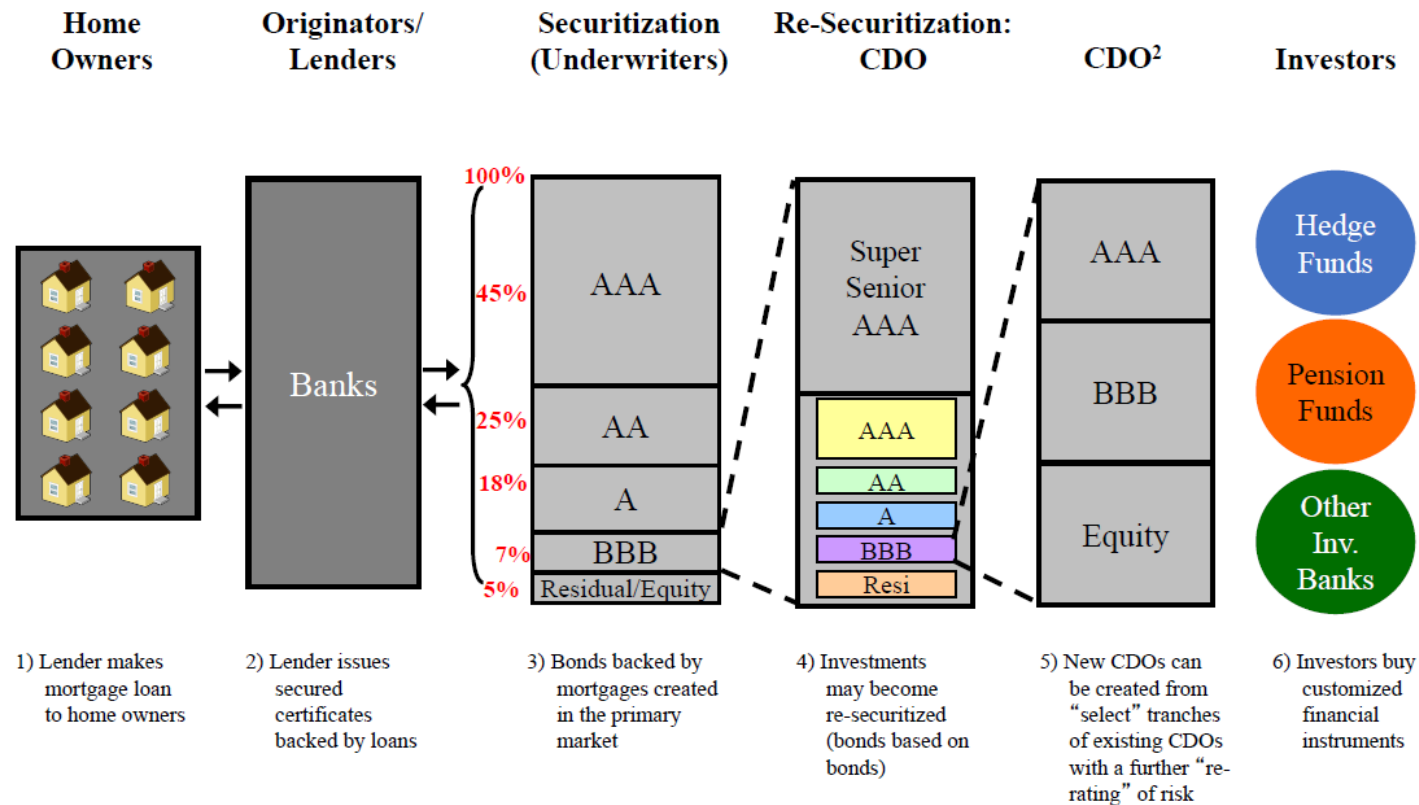
- Loans earn interest but..
 - Are illiquid (maturity mismatch, interest rate risk...)
- Securitisation: bundle loans to standardised sizes and risk and sell the claims:
 - Immediate cash-inflow for the bank
 - Bank provides the service of collecting and passing through the loan cash flows
 - Default risk (by large) with the buyer

1. Securitisation: The Principle

- Combining similar loans in a portfolio
- Creating credit-enhanced claims against the cashflows of this portfolio (waterfall creditor priority)
- Sell these claims to investors



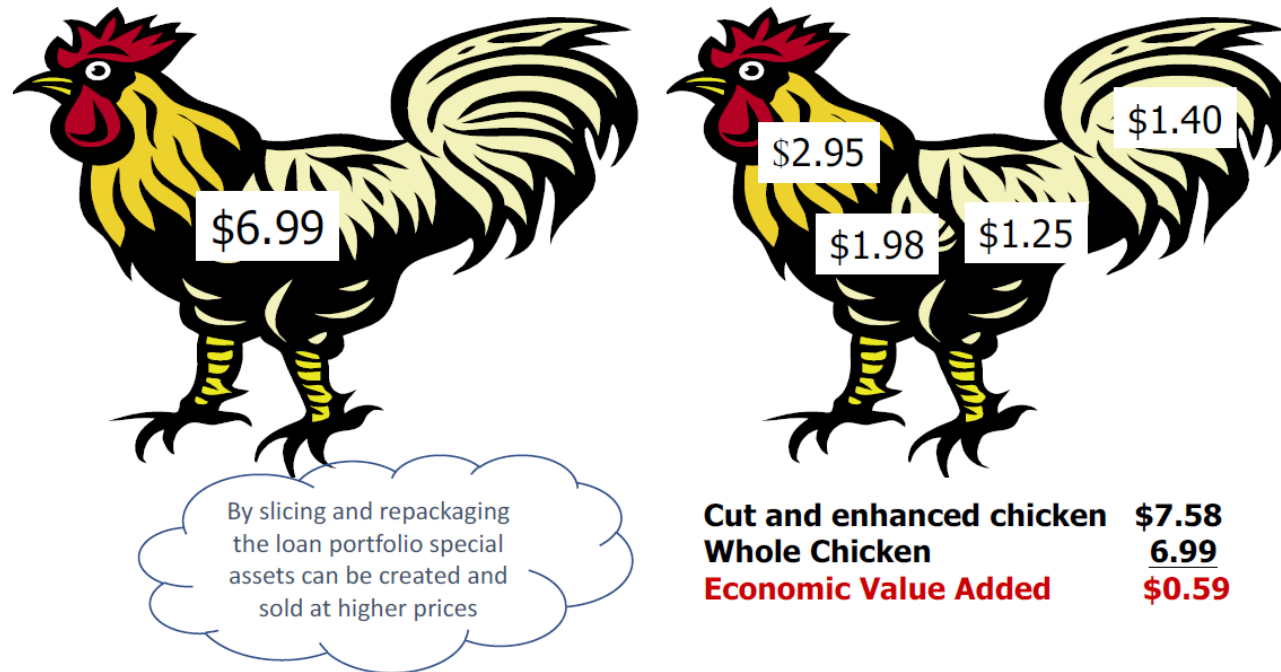
Real Estate Related Securities



Source: Randall D. Guynn, 2009 JRCLS Annual Conference

Securitisation

Why are securitized loans better? “The Chicken Theory”



Source: Dr. JAY SA-AADU

[http://www.africanssea.org/ASEA/\(S/tmpg0g45ustj3o55o5p4d0i4\)\)/Events/Conferences/attachments/conf11th/Securitization%20in%20Financial%20Markets%20Development%20in%20Emerging%20Market%20Perspective%20-%20Prof.%20Jay%20Sa-Aadu%20%5BUniv.%20of%20Iowa%5D%20.ppt](http://www.africanssea.org/ASEA/(S/tmpg0g45ustj3o55o5p4d0i4))/Events/Conferences/attachments/conf11th/Securitization%20in%20Financial%20Markets%20Development%20in%20Emerging%20Market%20Perspective%20-%20Prof.%20Jay%20Sa-Aadu%20%5BUniv.%20of%20Iowa%5D%20.ppt)

2. Value Creation: Tranching

- Different classes of securities are known as **tranches**
- Each tranche is characterised by its priority of claim on the mortgage pool's cash flows
- Bond rating agencies assign a credit quality rating to each bond class.
- AAA Rating – Highest-quality, low risk, investment grade

2. Value Creation: Tranching

- Two dimensions of cash flow claim priority:
 - Credit losses
 - Loan retirement (maturity)
- **Credit losses:** default risk in securities
- **Loan Retirement/ Maturity:** duration and interest rate risk

3. Bond Credit Rating

- Liquid public market in CMBS requirements:
 - Passive investors to feel confident in default risk regardless of their real estate knowledge
 - Otherwise investors would not place their capital or;
 - require such high yields securitisation would be unprofitable or uncompetitive
- Bond rating agencies provide a credit rating for CMBS securities

Bond Ratings for CMBS

Rating			
Moody's	S&P	Structured Finance Indicator (Post 2008)*	Meaning
Aaa	AAA	(sf)	Highest quality, extremely safe High quality investment grade
Aa1	AA+	(sf)	
Aa2	AA	(sf)	
Aa3	AA—	(sf)	
A1	A+	(sf)	
A2	A	(sf)	
A3	A—	(sf)	
Baa1	BBB+	(sf)	Investment grade
Baa2	BBB	(sf)	
Baa3	BBB—	(sf)	
Ba1	BB+	(sf)	Medium to low quality, speculative grade
Ba2	BB	(sf)	
Ba3	BB—	(sf)	
B1	B+	(sf)	
B2	B	(sf)	
B3	B—	(sf)	
Caa1	CCC+	(sf)	Poor quality, some issues in default (speculative to "junk" grades)
Caa2	CCC	(sf)	
Caa3	CCC—	(sf)	
NR	NR	(sf)	Too little information or too risky to rate (generally "junk" grade)

*See explanation in text.

Collateralised Debt Obligations

- Collateralized debt obligations (CDO's)
 - Developed in the boom of 2006-07
 - Lower rated CMBS were re-securitised into a second (or third) layer of pooling and tranching and securities issuance
 - Proved disastrous in financial crisis of 2008-09

The Giant Pool of Money Review

- Global Pool of Money increased from \$36 trillion to \$70 trillion in short period of time (2000 – 2006)
- Led by emerging economies – China, India, Abu Dhabi, Saudi Arabia
- Alan Greenspan – not raising Fed rate
- New loans now available in the mortgage market:
 - Stated income, verified asset
 - Stated income, stated asset
 - No income, no asset (NINA)

The Giant Pool of Money Review

- Investors trust credit rating agencies:
 - Moody's, Standard & Poor's, Fitch
 - Rating agencies using incorrect data
 - Assumed foreclosure rate of below 2% with worst-case scenario of 8% - 12%
 - Historical data now irrelevant because of new mortgage types
 - Foreclosure rate to go to 50%
- “Money good” investments created by pooling thousands of risky mortgages

The Giant Pool of Money Review

- Collateralised debt obligations (CDO's)
 - Pool of MBS tranches, pools of pools
 - Toxic Waste
 - Low-rated, high risk tranches, bundle together, re-tranche which creates a new AAA rated bond
- How do CDO's get re-rated?
- Popularity of MBS drove investors to want more securities
 - More interesting mortgage products came to market
 - House prices booming – some markets seeing doubling in house prices in as short as 12 months

Giant Pool of Money Review

- What led to the collapse?
 - Borrowers taking out loans they cant afford
 - Lenders offering products that should not have been available
 - Increases in interest rates meant borrowers couldn't afford an even high mortgage
 - Foreclosure on millions of houses
- Start to see failure of small banks and mortgage brokers:
 - Silver State Mortgages
- Sub prime mortgage crisis or a credit crisis?

Failure of Lehman Brothers

- In 2006 Lehman Brothers securitised \$146 billion in mortgages
 - Up 10% from 2005
- In 2007 Lehman Brothers underwrote more MBS than any other firm
 - \$84bn portfolio
- March 2008 saw near failure of Bears Stearns hedge funds (second- largest MBS underwriter)
 - Led to a drop in Lehman's stock – 48%

Failure of Lehman Brothers

- June 2008 – second quarter loss of \$2.8bn
- Failure on 15 September 2008
- Largest bankruptcy filing in US history – over \$60bn in assets
- Resulted in international damage of \$300bn outside of the US

Global Financial Crisis

- What is the source of the GFC?
 - Step One: The Boom years
 - Step Two: The Rotten Apple
 - Step Three: Debt Deflation

GFC Step 1: The Boom Years

- Securitisation took off
- Banks and ratings agencies profited from securitisation
- Homebuyers got easier access to loans (subprime)
- House prices increased substantially
- Low interest rates
 - Increase in adjustable rate mortgages
- Homeowners used increase collateral for more loans

GFC Step 2: The Rotten Apple

- Homebuyers' moral hazard
 - 100% debt finance + walk away policy = free game
 - If house prices increase you win
 - If house prices go down the bank loses
- Bank's moral hazard
 - If loans are on the balance sheet the bank can lose
- Rating agencies moral hazard / blind eye (?)
 - Bank pay for the rating; have to keep them happy
 - Rising house prices 'hide the defaults'
- MBS buyer blind eye / herd behaviour (?)
 - Portfolio managers "have" to join the high return / "low" risk party
 - If the party is busted they can claim: "everybody did it too"

GFC Step 3: Debt Deflation

- Non-recourse loans
 - The bank can either have the house or what's left on the mortgage – not both
 - You can turn over the key and walk away free and clear
 - The bank cannot come after you to collect the rest of the money owed
- Say your house is underwater – you owe more on your mortgage than what your house is worth.. What would you do..?

What is the Source of the GFC?

- House prices started to stall once supply caught up with demand in the construction market
- Without rising house prices, bad mortgages result in losses
- MBS market started to show losses
- Participants realised they were sitting on a bubble
- Nobody trusts the assets of others
- MBS markets freeze
- Interbank lending freezes
- = Global Financial Crisis

Is there another GFC coming?

- Years of cheap capital – central banks printing money and low cash rates
- War in Ukraine and Covid – supply side issues results in large i inflation
- US Fed (plus Reserve Bank of Australia and other central banks) increased cash rate (large comparative percentage rise over short period)
- Silicon Valley Bank bankruptcy – role of social media



Questions?