FINM3406 Tutorial Run Sheet

**Week 10 – Mortgages**

The main aim for this session is to get students to work through some of the formulas for calculating mortgages and build an amortization table from first principles (in excel) rather than just rely upon a mortgage calculator they can find on the internet.

**Tutorial Activities for Students**:

**Activity One**

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?

Note: To answer these questions try to prepare an amortisation table in excel using the formulas from last week's lecture slides

1. Calculate the annual payment in year 10 based upon a Constant Amortisation Mortgage.



1. Calculate the annual payment in year 10 based upon a Fully Amortising Mortgage.



**Activity Two**

You can afford to pay $1,600/mth on a 30 year mortgage at an interest rate of 8% p.a., compounding monthly.

1. What is the maximum amount you can borrow? To determine the maximum amount you can borrow, you can use the formula for calculating mortgage payments:

PV = [PMT \* (1 - (1 + r/n)^(-n\*t))] / (r/n)

Where PV is the present value of the loan, PMT is the monthly payment, r is the annual interest rate, n is the number of compounding periods per year, and t is the number of years of the loan.

Substituting the given values, we get:

PV = [$1,600 \* (1 - (1 + 0.08/12)^(-12\*30))] / (0.08/12)

PV = $218,053.59

Therefore, the maximum amount you can borrow is $218,053.59

1. If you borrow up to 80% of the value of a house, what is the most expensive house you can afford to purchase? The maximum house you can afford to purchase is:

$218,053.59/ 0.8 = $272,566.99

Therefore, the most expensive house you can afford to purchase is $267,865.85.

1. How much deposit do you need to save? To determine the deposit required, you can subtract the loan amount from the total purchase price of the house:

Deposit = $272,566.99- $218,053.59 = $54,513.40

Therefore, you need to save a deposit of $54,513.40.

1. What is the most expensive house you can afford to purchase if you can afford $2,000/month (assuming you still need an 80% LVR)?

To determine the most expensive house you can afford if you can afford $2,000/month, with an interest rate of 8% per annum, compounded monthly, and an 80% LVR loan, you can use the formula:

P = (A \* (1 - (1 + r/n)^(-n\*t))) / (r/n)

where P is the loan principal, A is the monthly payment, r is the annual interest rate, n is the number of compounding periods per year, and t is the number of years of the loan.

Substituting the given values, we get:

P = ($2,000 \* (1 - (1 + 0.08/12)^(-12\*30))) / (0.08/12)

P = $272,566.99

This is the maximum loan principal you can borrow. The maximum house price you can afford would be:

Max. House Price = $272,566.99/ 0.8 = $340,708.74

Therefore, the most expensive house you can afford to purchase with a monthly budget of $2,000 and an 80% LVR loan is $340,708.74.

**Activity Three**

1. What is a collateralized debt obligation (CDO), and how does it work?

A CDO is a complex financial instrument that pools together a group of assets, such as mortgages, and issues securities that are backed by the cash flows generated by those assets. These securities are divided into different classes, or tranches, with the senior tranche receiving payments first and the lower tranches receiving payments only after the senior tranche is paid in full.

1. How are mortgages used as collateral in CDOs, and what is the purpose of pooling them together?

Mortgages are typically pooled together into a special-purpose vehicle (SPV) that issues different classes of securities, known as tranches. This allows investors to invest in a diversified pool of mortgages rather than a single mortgage. The pooling of mortgages can also provide more liquidity to the mortgage market.

1. What are tranches, and how do they work in the context of a CDO?

Tranches are different classes of securities that are issued by a CDO, with each tranche having different risk and return characteristics. A senior tranche is typically the safest, and it receives payments first from the cash flows generated by the mortgages. Lower tranches are riskier and receive payments only after the senior tranche is paid in full. Lower tranches offer higher yields to investors but also come with a higher risk of default.

1. What is a mortgage, and how does it work in the context of property ownership?

A mortgage is a legal agreement between a lender (mortgagee) and a borrower (mortgagor) that allows the borrower to borrow money to purchase a property, with the property serving as collateral for the loan. The mortgagee has a security interest in the property until the loan is repaid.

1. What is the equity of redemption, and how does it apply to mortgages in Queensland? What happens if the mortgagee exercises their power of sale and the sale does not cover the outstanding debt?

The equity of redemption is the right of the mortgagor to redeem their property from the mortgagee by paying the outstanding debt. In Queensland, the mortgagee must follow certain legal procedures before exercising their power of sale, and if the sale does not cover the outstanding debt, the mortgagor may be liable for the shortfall.