Financial Instruments and Markets
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REAL ESTATE

This article, prepared for students in Economics 104, is meant to be a supplement to the lectures about real estate.

1. Terms

Although not all of of the terms below are ***highlighted in red*** you are responsible for them on the exam.

ARM - Adjustable rate mortgage where the interest rate which determines the monthly payment is adjusted over the life of the loan. See the description in **Section 2** below.

LTV - The loan-to-value ratio, the size of the mortgage divided by the appraised value of the home. Conventional loans require this to be at least 80%. If this number is above 100%, as it is for many Americans in the real estate crisis, the loan is said to be "***upside down***," because the homeowner owes more than the home is worth.

Appraisal - Required when you initiate or refinance a mortgage, this is the act of evaluating what your home would be worth on the market. It is done by a licensed ***appraiser***, who will do "***comps***" (local comparisons of the prices of equivalent homes) and will visit your home to evaluate condition, upgrades and additions, verify square footage, and so forth,

APR - When you shop for a home loan the interest rate that will attract you is called the "advertised rate," which is the simple annual interest rate that you must pay on the balance of your loan. The U.S. Government also requires lenders to publish an **APR** (annual percentage rate), which is supposed to factor in all loan costs, including points and fees, in the interest rate calculation. This **APR** has proven to be more confusing than enlightening. Some web sources claim that the **APR** calculation turns the annual compounding into daily compounding (the continuous natural log rate) but that is erroneous. The U.S. Department of Commerce has a program that lenders can download to help in the calculation of the **APR**.

Prime loans - Mortgage loans of the highest quality, requiring full documentation of employment and income, high credit score for the borrower (above 700 or even 750), and **LTV** for the loan of a maximum of 80%.

Alt-A - Alternative-A mortgage loans are classified as less risky than **sub-prime loans** but much riskier than **prime loans**. **Alt-A** loans usually either lack some degree of documentation, such as income verification or employment verification, or are extended to borrowers with low credit scores, like 650 and below, or a high **LTV**, such as 90% or 95%. These loans were mostly **ARM** loans (see below) with **teaser** rates and negative amortization. This class of loans were a source of major credit failure during the real estate bubble that began in 2007.

Sub-prime - The worst quality mortgage loan and the origin of the first wave of the real estate bubble that began in 2007. Many of these loans were simply fraudulent. The application did not verify income or employment or neither, allowing the borrower or an unscrupulous agent to inflate incomes. Applicant credit scores were often well below 650. All of these loans had high **LTV**, like 95%, and some required no down payment (effectively an **LTV** of 100%).

Negative amortization - Used commonly with **Alt-A** and **sub-prime** loans, **negative amortization** will be part of any **ARM** loan that offers (1) an interest rate below market rates in the first few months of the loan (for the purpose of reducing the monthly payment initially) and/or (2) a monthly payment of interest only for the first few months, generating a payment so small that it does not even allow principal reduction of the loan value. Consequently the deficiency is added to the principal value of the loan, increasing the loan balance over the early months of the loan. This **negative amortization** obviously will insure that loan payments are very high after the subsidized months have ended, raising the prospect of default. Such loans always have a large **pre-payment penalty**, making it difficult or impossible to refinance the loan. The step-up in interest rates guaranteed by **negative amortization** is one of the reasons why such loans were a large part of the real estate bubble of 2007.

Teaser rate (also called "buy-downs") - A below-market interest rate that is offered for the first few months on a loan (typically an **ARM**) that is intended to make it easier for the homebuyer to qualify for a loan. Such a loan will always be a **staircase loan** and will typically have **negative amortization** and will always have a sizeable **pre-payment penalty** because obviously the lender must be eventually repaid on net at market rates.

Pre-payment penalty - Always a feature of **ARMs** with **teaser rates** and **negative amortization**, and some other loans as well, this loan contract clause prevents the borrower from refinancing the loan without first paying a monetary penalty, which is typically quite large (like $60,000 on a $300,000 loan, possibly with a declining balance over time. This is to protect the lender, otherwise a borrower who undertakes a **teaser loan** that charges, say, 2% for the first year, 4% below market rates, could refinance if home prices rose over the year before the rate on the **teaser loan** kicked up to an above-market rate. Law requires that this penalty ***be clearly identified in the loan document - and it is***, so always review the entire loan document to see if your loan has a pre-payment penalty. ***If your loan does not have a pre-payment penalty, it will explicitly state that it does not!*** This feature doomed many **Alt-A** and **sub-prime** loans generated between 2004 and 2007 and contributed greatly to the real estate bubble.

Staircase - Identifies the feature of a loan with a **teaser rate** or any other below-market rate that guarantees that at some point, after a few months or years, that the interest rate will be raised, possibly in multiple steps (hence the staircase) to market or above-market rates.

Association fees - When buying a home you may be required to join a ***Homeowners' Association***, which is responsible for maintaining common areas, parks, sidewalks, and general building maintenance for condominiums- whatever is under their jurisdiction. They charge a monthly fee that must be paid and should be considered part of your monthly payment. Always ask about **Association fees** when buying a home and ask what the **Association** maintains. For condos or homes that are in **Associations** that offer many recreational amenities, these fees can be quite high, hundreds of dollars per month. The Governing Boards of these **Associations** are elected by the homeowners, but experience has shown that some are much more responsible that others. If talking to potential neighbors when considering a home purchase, you should ask about the local **Association**.

PMI - Private mortgage insurance, paid by borrower monthly, insures against default, usually levied on non-conventional loans where down payment was less than 20%. This fee is excessive and unfair for the homeowner, and should be avoided whenever possible. When inquiring about a loan, always ask if the loan requires PMI. Unless you have no other options, keep shopping. PMI becomes a problem if you have less than 20% down. But there are ways around PMI. See the discussion of the 80-10-10 loans below for an example.

First and second mortgage, or first and second trust deed - A first mortgage or first trust deed simply refers to the primary loan on your home. The lender has the first right of foreclosure and claims if you default on your loan. A second mortgage is a second loan taken out using the equity in your home as collateral. Home equity loans are usually second mortgages.

Equity - The present market value of your home minus all of the debt you owe that is secured by your home; generally, market value less all mortgage balances.

Escrow - A detailed and complicated process that you must complete as part of buying a home. **Escrow** is managed by a licensed ***escrow agent*****,** who does all of the work for you, then charges a fee (few hundred dollars). Although time consuming, **escrow** is largely a painless process and works well, and actually serves to protect you as a home owner. The escrow agent insures that all documents, including loan documents, are properly prepared and signed, all government compliance is met, title insurance is established, deeds are properly prepared, and that there is a proper transfer of title. The escrow also holds all cash related to the transaction until title has been transferred to the new homeowner.

Home Equity Loan - A loan that you can take out later (after buying your home and building up equity) which uses the equity in your home as security (typically a second mortgage). You can usually borrow up to about 80% or 90% of equity (e.g. if your house has a present market value of $200,000, you still owe $120,000 on the loan, you have equity of $80,000, and you borrow up to about $64,000 with a home equity loan). Probably a lot of your educations are being paid for with these. Ask. If so, give your parents a big hug and say THANK YOU! It's a *major sacrifice* to give up equity. Note: In the late 1990s through the sub-prime crisis, some loans borrowing up to 125% of the value of homes were advertised as home equity loans. These are not the same class of loan, however, because interest paid on loans that, in total with other mortgages, ***exceed 100% of the market value of the home are not interest deductible***.

Refinance - This simply means that you are paying off an old loan on your house and taking out a new loan, presumably under better terms, such as lower interest rates. This is a great way to get rid of PMI after you have some equity in your house.

Points - When you get a home loan, whether for original finance, refinance, or even home equity, you will normally pay lending fees called points to the lender. One point is equal to 1% of the loan value. Therefore, if there are two points advertised on a $120,000 loan, these two points will cost you (will be assessed as fees) $2,400. These are *in addition* to other fees, such as appraisal. Points can either be paid in cash or rolled into the principal value of the mortgage. If points are paid in cash at loan origination, then in the year they were paid they are deducted from taxable income.

Fees - Other fees will be assessed when either a house is sold or a new loan is undertaken. They include appraisal (an estimate of the value of your house by an appraiser; around $500 or so), title search and title insurance (making sure that there is no conflict in legal title; around $200 each), escrow fees (only when the house is sold; around $700), and even such things as termite inspections, etc. As stated above, points are also fees.

Impounds - You are always required to pay property taxes and insurance on your home. The payments are made either annually (in the case of insurance) or semi-annually (property taxes). Many lenders require (and you often have this option, even if not required) that you make the payments through them, where your monthly payment for you loan reflects this assessment, the funds are accumulated by the lender, then paid when due. In other words, if property taxes and insurance equal $2400 per year, your lender will add $200 per month to your monthly payment. This amount is called an impound.

2. Types of loans -

1. 30 year fixed rate - The old conventional loans, still very popular and still very advisable, where the interest rate and the payment is fixed for thirty years. In the early years of the loan, over 95% of the payment goes to interest.

Advantage - No uncertainty, payments are fixed, wonderful during inflations, good tax advantage.

Disadvantage - Usually rates are higher, at least at time of loan origin, sometimes hard to get, especially without 20% down.

2. 15 year fixed rate (also 20) - Now very popular. Same as the 30 year fixed except amortized over 15 years instead of 30.

Advantage - Paid off in only fifteen years, so equity accumulates faster, rates usually lower than 30 year FRM. These are especially suitable for families where the primary earner is within 10 to 20 years of retirement (because the house will be paid off about the time of retirement).

Disadvantage - Monthly payments are about 15% to 20% higher than 30 year FRM, and offers *less* of a tax break because more of payment is going to principle reduction.

3. **Adjustable Rate Mortgages (ARMs)** also called **Variable Rate Mortgages (VRMs)** - There are many kinds of ARMs. Generally, the rate you pay on the loan is adjusted up and down as interest rates rise or fall. Usually pegged to some interest rate measure, such as "LIBOR 3-month rate plus 5%" or "the 11th District cost of funds,. These ARMs often have ***caps***, which are upper limits on how high rates can go. These are often offered at **teaser rates**, or **buy downs**, where the rate offered for the first six months to two years is far below the rate you will ultimately pay. *Investigate the interest structure of an ARM very carefully - especially the advertised teaser*. These are often used to get people to qualify for the loans, and in my opinion are *misleading* if not dishonest.

Most **sub-prime** and **Alt-A** mortgages were **ARMs,** and many had **teaser rates, negative amortization**, and **pre-payment penalties** discussed in the terms above in **Section 1**.

However, **prime ARM**s of high quality are also available on the market.

Advantage - At time of loan origination (even past the teaser) rates are often very low - sometimes 2% or 4% or more below 30 year FRM. These loans are usually easier to get and are typical of loans that do not require 20% down.

Disadvantage - The borrower obviously picks up a considerable part of interest rate and inflations risk - your monthly payment will rise, and sometimes a lot, if interest rates rise. The payment may rise well above the level that would have been seen with a 30 or 15 year FRM.

4. 80-10-10s, 80-15-5s and similar loans - These loans, very popular since the 1990s, are designed for borrowers with good credit and inadequate cash for a down payment. On an 80-10-10, the borrower puts 10% cash down (rather than the conventional 20%), takes out a conventional 80% 30-year or 15-year mortgage at a low rate, and finances the remaining 10% with (typically) a 7-, 10- or 15-year second mortgage at a higher interest rate. For example, a typical arrangement for a $200,000 loan would have been to pay a $20,000 down payment, to finance $160,000 on a conventional 30-year first-trust-deed mortgage at 6 ¾%, and finance the remaining $20,000 on a 15-year second-trust-deed mortgage at 9¾%, all arranged by the same lender. The 80-15-5 allows 5% down and a second for 15% of the loan value, but at a higher interest rate for the second.

Advantage - Allows the borrower to avoid the ridiculous and excessive PMI fees, which are normally assessed when less than 20% down-payment is made, and allows the borrower to get a good conventional loan at a very good rate.

Disadvantage - Until the second-trust-deed mortgage is paid off, the effective interest rate on the loan is the weighted sum of the two rates (in the example above, that would be
[(0.80/0.90) X 6¾] + [(0.10/0.90) X 9¾] = 7.08%), and the second mortgage is active, it will be more difficult to get a conventional home equity loan. Neither of these are serious disadvantages.

5. 5/25s , 7/23s, 10/20s (and similar loans – also sometimes designated as **5/30s**, **7/30s**, and **10/30s**) - These are loans for five years (the 5/25), seven years (7/23s), and 10 years (10/20s) that are *amortized* over 30 years. In other words, on a 5/25 you make the same payment you would as though the loan was a 30 year FRM, but at the end of five years you must pay off the remaining balance of the loan, almost the entire principle, called a ***balloon payment***, or refinance. These loans are often used for second mortgage.

Advantage - Typically offered at low rates (since they're short term loans). Useful if you *know* you'll be moving within five or seven years.

Disadvantage - It's obvious - you have to refinance!

3. Tax Considerations

1. Monthly payments - Your monthly home payment is typically broken into four components:

Principal reduction:	not tax deductible
Interest payment:	tax deductible
Insurance:	not tax deductible
Property taxes:	tax deductible

In the early years of the loan, the deductible components of the payment will be about 90% of the total payment. If your loan payment is $1,200 per month, more than $1,000 will be deductible.

Deductible from what? Deductible from taxable income. If you have a taxable income of $60,000 per year, the example in the previous paragraph will reduce your taxable income to $48,000 per year.

2. Points - Points paid at loan origination *or any loan fees expressed as a percentage of loan value* are deductible from taxable income. If the points are paid in cash they are deductible in the same tax year. If the points are rolled into the loan balance (not paid in cash and added to the loan balance) they are deductible on a straight-line amortized basis over the life of the loan. For example, if you paid 2% points on a $200,000 loan and rolled the points into the loan balance (making the loan a $204,000 loan) you can deduct ($4,000/30)=$133 per year.

4. Home Purchases

I. The fundamental steps in buying a new home:

1. Know generally what you are looking for in a home, although be flexible, and begin to shop around. Put some prior thought into this. Once you have made a decision, you will normally be asked to pay an *earnest* fee of $1,000 or $2,000 or so.

Note: The next three steps can also be arranged by the home seller or real estate agent. It is smart to understand that they will be doing this, and smarter to understand that *you* have the right to do it instead (usually).

2. Find the right lender and loan at agreeable interest rates and terms. (Sometimes, of course, you have no choice on this - especially if you have chosen a house because it is offered with a first-time-home-buyer or FHA or VA loan package).

After this you must qualify for the loan and begin the tedious and involved process of providing paperwork for loan approval. This will often take more than a month and *can* be a frustrating experience. You can help yourself by keeping these records intact and available *long prior* to any time that you might buy a home; *keep good records and clean credit*.

A s described in the lecture, loan qualifications were so relaxed as to be essentially non-existent between 2004 and 2007, and this resulted in the real estate bubble that began in 2007. Because of that fiasco, loan qualifications are stricter than ever!

Conservative qualifying conditions are discussed below. Here is what the paperwork involves (this varies some from lender to lender and as conditions change):

(a) 1040 for last two or three years, to verify income.

(b) Some formal documentation of your employment, and your employer will probably be contacted by phone. Many lenders like to see at least two to three years at the same job.

(c) Your credit records, as maintained by TRW and other credit agencies, must be *impeccable*. *Every single blemish on that credit record* must be either cleaned of or explained *in writing*. If you have an unpaid medical bill from four years ago from a hospital, even if disputed, you must pay it. If you were late on a credit card payment three years ago, you may have to write a letter explaining why.

(d) You must provide account numbers and balances for all financial accounts. In most cases, they will check independently to see if you have sufficient cash. They will question large movements of cash or mysterious deposits.

(e) They ask you to list all debts. Again they check.

(f) ... and all of this information and more is requested on a *long, detailed* loan application. If you have good records, it's easy to fill out. If you don't ...

3. Shop for home insurance. Find out if you are required to have flood or earthquake insurance. Rates are *highly variable* and *highly competitive*.

4. Find an escrow agent (although normally the home-seller or even lender will do this - just understand that there *is* and escrow agent and there *is* such a thing as escrow.

The escrow agent pulls together all documentation, does a title search, arranges title insurance, and generally goes through the long checklist of insuring that absolutely everything required has been done - all fees are paid, the loan is arranged, all papers for transfer of title have been prepared, and so forth. Putting all of this together is called *going through escrow*. The escrow agent will present you with a mountain of paperwork to sign. Right after that, you get the key.

5. An attorney?? Normally, you would never involve an attorney in a home purchase. (They can be rather expensive). They would be involved in a clear legal question of any kind arose, or if any of the paperwork was not standard (if you were signing a privately written contract under unusual loan terms, for example). Seldom needed, but don't forget they're there if serious problems arise.

II. Qualifying

1. Cash down-payment required -

$5,000 minimum anyway for earnest fees, move-in etc.

1% to 2%	First-time-home-buyer
5%	FHA/VA (Federal Housing Admin, Veterans)
10%	Certain buy-down and qualifiers through home sellers and some lenders, typically an **ARM**.
20%	Conventional

Note: The first three options usually require Private Mortgage Insurance (PMI), which can be quite expensive, making a "low-down" loan nearly as expensive to service as a loan with a higher down.

2. Income required -

This varies from lender to lender and by the type of loan, and also seems to change over time as lenders get more or less cautious.

The *rough rule of thumb* is that your loan payment should not take more than **30%** to **35%** of your net income (combined, of course, if married), and in some cases, no more than **40%** of net income after debt service (of credit cards, autos, and other loans).

Therefore, as a rough estimate,

(a) divide your net paycheck (summed with your partner, if joint) by three, and that will be a rough estimate of the monthly payment you can afford,

(b) subtract about 20% from this for monthly contribution to property taxes and insurance,

(c) find the difference remaining on the mortgage payment interest rate sheet given prevailing interest rates,

(d) figure out the value of the house you can afford, taking into account the down-payment you anticipate making.

(continued on next page, followed by sample monthly payments)

5. Mortgage Formulas

The formula for calculating a monthly payment on a mortgage, along with an example, is shown in this slide from the lecture:

Mudd Finance

Formula for the monthly payment of a fixed rate mortgage (FRM)

Derived from summing a geometric series:

$$MP = \left[\frac{LP\left(1+{}^{r}/_{12}\right)^{n}\left({}^{r}/_{12}\right)}{\left(1+{}^{r}/_{12}\right)^{n}-1}\right]$$

where MP is the monthly payment, LP is the loan principle, r is the loan rate, and n is the number of payments

$$\$655 = \frac{[100{,}000(1.00583)^{360} X (0.00583)]}{[1.00583^{360} - 1]}$$

example of a \$100,000 30yr FRM financed at 7% … **note!! you must convert annual rate to monthly:** .07/12 = .00583

Note: With an ARM, this is simply recalculated every time the rate changes given the number of payments remaining.

The formula for calculating the loan value that you can afford, along with example, is also shown in this slide from the lecture:

Mudd Finance

Formula for calculating the maximum loan value that you can afford

MMV = Maximum Mortgage Value and variables have the same definition as in the mortgage formula:

$$MMV = MP\left[\frac{12}{r} - \frac{12}{\left(1+{}^{r}/_{12}\right)^{n} r}\right]$$

$$\$100{,}000 = 655\left[\frac{12}{0.07} - \frac{12}{\left(1+{}^{0.07}/_{12}\right)^{360} \times 0.07}\right]$$

Two things to remember:

1. The monthly payment should be no greater than 30% to 35% of your income.
2. Here you are calculating the maximum mortgage value (**MMV**), not the maximum home value (**MHV**). Take into account the down payment. So if you have \$25,000 for a down payment, the maximum home value is \$125.000. If calculated using a percentage down (**PD**), then

$$MHV = {}^{MMV}/_{(1-PD)} = 125K = {}^{100K}/_{(1-0.2)}$$

Keep in mind that the maximum monthly payment that you use (655 in this example) should be no more than 35% of your monthly take-home pay (combined if married).

This standard will be asked of you on the final exam.

Monthly Payment
30-Year Fixed Rate Mortgage
($100,000 loan, simple interest)

Does not include impounds, property taxes, PMI, or property insurance. Add approximately $200 per $100,000 for these. Does not include association fees for condos, etc. Figures are rounded to nearest dollar.

2.750	408	5.375	560
2.875	415	5.500	568
3.000	422	5.675	579
3.125	428	5.750	584
3.250	435	5.875	592
3.375	442	6.000	600
3.500	449	6.125	608
3.675	459	6.250	616
3.750	463	6.375	624
3.875	470	6.500	632
4.000	477	6.675	644
4.125	485	6.750	649
4.250	492	6.875	657
4.375	499	7.000	665
4.500	507	7.125	674
4.675	517	7.250	682
4.750	522	7.375	691
4.875	529	7.500	699
5.000	537	7.675	711
5.125	544	7.750	716
5.250	552	7.875	725

For loans of a different size, multiply payment times proportion. For example, for a $128,000 loan, multiply payment in table time 1.28.

Conversion table: ?=.125 ¼=.250 ?=.375 ½=.500 ?=.675 ¾=.750 ?=.875

Monthly Payment
30-Year Fixed Rate Mortgage
($100,000 loan, simple interest)

Does not include impounds, property taxes, PMI, or property insurance. Add approximately $200 per $100,000 for these. Does not include association fees for condos, etc. Figures are rounded to nearest dollar.

8.000	734	10.125	887
8.125	743	10.250	897
8.250	751	10.375	905
8.375	760	10.500	915
8.500	769	10.625	924
8.625	778	10.750	934
8.750	787	10.875	943
8.875	796	11.000	953
9.000	805	11.125	962
9.125	814	11.250	972
9.250	823	11.375	981
9.375	832	11.500	991
9.500	841	11.625	1000
9.625	850	11.750	1010
9.750	859	11.875	1019
9.875	868	12.000	1029
10.000	878	12.125	1038
10.125	887	12.250	1048
10.250	897	12.375	1058
10.375	905	12.500	1067
10.500	915	12.625	1077

For loans of a different size, multiply payment times proportion. For example, for a $128,000 loan, multiply payment in table time 1.28.

Conversion table: ?=.125 ¼=.250 ?=.375 ½=.500 ?=.675 ¾=.750 ?=.875