UNIT 6 – 2

The Mortgage Amortization Schedule

A home mortgage is a contract that requires the homeowner to make a fixed number of monthly payments over the life of the mortgage. The ***duration***, or length of the mortgage, is usually determined at the outset when the contract is signed. However, if the borrower wants to pay if off early, it is possible to make additional payments, and thus reduce the duration. While this will not appeal to everyone, it does give you the option to reduce your debt in the event of an unforeseen cash windfall such as the receipt of an inheritance.

On the other hand, the borrower does not have the option to increase the duration of the mortgage although it is possible to negotiate a new mortgage and use it to pay off the old one. When interest rates reached historic lows, as they did in 2001-03, many people took advantage of the new lower rates to do just that – refinance to either lower their monthly payment or even shorten their mortgage.

So, while some people may simply make their monthly payment and elect to make no changes, many others will pay theirs off early, refinance, or even switch over to a flexible rate mortgage (discussed in the next section) before the final payment comes due. Because of this, it makes a lot of sense to keep track of your progress on the mortgage so that you can always evaluate your options.

In this section we are going to look at the ***mortgage amortization schedule***, or table. This is no more that a simple listing of monthly payments with the monthly payment broken down into two parts: principal reduction and interest on principal. We think you'll agree that it's a useful concept.

Case Study Application

Since we want to show the value of the mortgage amortization schedule, we'll stay with the short case study introduced in the last section and reprint it below.

CASE STUDY: BILL AND RHONDA'S DILEMMA

Bill and Rhonda have a combined income of $86,000 and they want to buy a home that will require a modest $140,000 mortgage. They have saved enough money for the down payment, and so their problem now is to figure out how much they will have to pay monthly, and how long they will have to make the payments.

After talking to several local lenders, Bill and Rhonda found that their best deal was an 8% fixed rate, 30-year mortgage that would result in a monthly payment of "about" $1,050. Bill and Rhonda could actually afford to make a slightly higher monthly payment, but the lender just gave them the single approximation for the 30-year loan.

The loan officer promises to get back to Bill and Rhonda in a few days, but they'd really like to know more about their options so that they would be better prepared to discuss the matter the next time they met with the loan officer.

The Mortgage Amortization Schedule

We'll start with our previous example of a $100,000, 30-year, 7% fixed-rate mortgage that requires 360 monthly payments of $665.30. If we use the "Table" option on the Kentucky Real Estate Commission's mortgage calculator, we can generate the schedule you see in Figure 6-5 on the next page.[1] Only a portion of the schedule is shown because it has 360 rows, or one for every payment.

The columns in the figure show the size of the payment (fixed at $665.30 because it is a fixed-rate loan), and the breakdown of the payments into interest paid and reduction of the outstanding principal, where the ***principal*** is the amount owed.[2] Finally, in the last column we see the remaining balance after the monthly payment was made.

- Using the Kentucky Real Estate Commission's mortgage calculator found at http://www.pathwaystohomeownership.org, recompute Bill and Rhonda's monthly payment and then generate a mortgage amortization schedule.
- According to the schedule, how much do Bill and Rhonda owe after the first payment?

[1] This option appears only after the size of the monthly payment has been computed.
[2] See footnote number 1 on page 3 of the previous section to see how we used the Kentucky Real Estate Commission's mortgage calculator to find the $665.30 monthly payment.

Computing Principal and Interest

Assuming that we already have found the monthly amortized payment, the first thing we have to do is compute the amount of interest owed on the outstanding principal for the first month.

Figure 6-5: The Mortgage Amortization Schedule

Month	Interest Paid	Principal Paid	Remaining Balance
1	583.33	81.97	99918.03
2	582.86	82.44	99835.59
3	582.37	82.93	99752.66
4	581.89	83.41	99669.25
5	581.40	83.90	99585.36
6	580.91	84.39	99500.97
7	580.42	84.88	99416.09
8	579.93	85.37	99330.72
9	579.43	85.87	99244.85
10	578.93	86.37	99158.48
11	578.42	86.88	99071.60
12	577.92	87.38	98984.22
13	577.41	87.89	98896.33
14	576.90	88.40	98807.92
15	576.38	88.92	98719.00
16	575.86	89.44	98629.56
17	575.34	89.96	98539.60
18	574.81	90.49	98449.12
19	574.29	91.01	98358.10
20	573.76	91.54	98266.56
21	573.22	92.08	98174.48
22	572.68	92.62	98081.87
23	572.14	93.16	97988.71
24	571.60	93.70	97895.01
25	571.05	94.25	97800.77
26	570.50	94.80	97705.97
27	569.95	95.35	97610.62
28	569.40	95.90	97514.72
29	568.84	96.46	97418.25
30	568.27	97.03	97321.23

To do this, we use the simple interest formula:

Interest = (Principal)(rate)(time)

And, to shorten the notation, we'll let "I" stand for the interest owed; "P" stand for the principal outstanding, "r" stand for the interest rate on a monthly basis, and "t" stand for the amount of time involved. Next, we plug in the numbers to find I.[3]

I = (P)(r)(t)
= ($100,000)(7%/12)(1 month)
= ($100,000)(0.005833)(1) = $583.33

If you look in the third column of Figure 6, you'll see the $588.33 interest charge that is due for the *first* payment. And, with a monthly payment of $665.30, once the $588.33 is taken out, $81.97 is left to reduce the principal. So, after the first monthly payment is made, only $99,918.03 (or $100,000 - $81.97) is owed.

When the *second* payment is made, the interest charge is slightly lower because less is owed. The computations for the second month are as follows:

I = (P)(r)(t)
= ($99,918.03)(7%/12)(1 month)
= ($99,918.03)(0.005833)(1) = $582.86

Now, $582.86 may not be much smaller than the first interest payment of $588.33, but it does mean that slightly more of the monthly payment, amounting to $82.44, can be applied to the principal to bring it down to $99,835.59.

Finally, the amount of interest owed on the 3rd through the 360th payment is computed exactly the same way.

- What is the amount of interest on the outstanding principal for Bill and Rhonda's first and third payments? (Do the computation by hand or generate the mortgage amortization table with the mortgage calculator on this site).

- As far as Bill and Rhonda's mortgage is concerned, how much would they owe after their first, second and third monthly payments?

[3] Note that we convert the 7% annual rate of interest into a monthly rate by dividing 7% by 12. If the 30-year mortgage required 120 quarterly payments, the "r" would be 7%/4.

Making Additional Payments

In the introduction to this lesson, we said that you could pay of the mortgage early – or even just make some extra payments to get it paid off earlier. Let's see how this works.

Suppose that your mortgage is reflected in Figure 6-5, and that it is time for you to make your third payment of $665.30 – but you also happen to have an extra $250 that you could put toward the mortgage. How would you do it?

The answer, partially disclosed in Figure 6-6, is simpler than you might think. For example, if you look at the figure, you can see that you will owe $99,752.66 after you make the third payment. So, all you have to do is enclose and additional payment of $251.70 (or $83.41 + $83.90 + $84.39) along with the regular $665.30 payment and your outstanding balance will amount to $99,500.97 (or $99,752.66 - $83.41 - $83.90 - $84.39, plus or minus a penny for rounding).[4] Since the $99,500.97 is the amount of outstanding principal in the 6th row, your next payment will be your 7th payment, *meaning that it only took you three months to make the equivalent of six monthly payments*. This is an important point, so we'll restate it again, albeit a little differently:

Whenever you make an extra payment, it reduces your principal and saves on the amount of interest paid!

So, by making the three extra principal payments of $83.41, $83.90, and $84.39 (which amounts to $251.70), you *avoid* making principal payments of $581.89, $581.40, and $580.91 (which amounts to $1,744.20). Another way to

Figure 6-6: Making Additional Principal Payments

Month	Interest Paid	Principal Paid	Remaining Balance
1	583.33	81.97	99918.03
2	582.86	82.44	99835.59
3	582.37	82.93	99752.66
4	581.89	83.41	99669.25
5	581.40	83.90	99585.36
6	580.91	84.39	99500.97
7	580.42	84.88	99416.09
8	579.93	85.37	99330.72
9	579.43	85.87	99244.85
10	578.93	86.37	99158.48

[4] Almost all mortgages allow for prepayments like the one described here without penalty, but you can check with your lender just to make sure.

look at it is to realize that *every $1 spent on additional principal payments now results in <u>not</u> having to pay $6.93 interest*. Is this a good return on the dollar? Many people think it is, and so they regularly make additional payments when they make the regular one.[5]

Finally, at first it may seem strange to make an odd-sized payment like $251.70, so why not just make an extra payment of $100, $250, or whatever other amount you can afford that month? The answer is that you <u>can</u> make whatever payment you want – although you might lose track of where you are on the amortization schedule. So, our advice is to match the size of the extra payment with the amounts in the "Principal Paid" column so that you'll always know where you are with respect to the number of remaining payments.

- Using the algebra in this section, break Bill and Rhonda's first monthly mortgage payment down into interest and principal.
- If Bill and Rhonda wanted to effectively "halve" or reduce the duration of the mortgage by 50 percent by making two payments every month instead of one, how big would the first payment be?
- Do you think that Bill and Rhonda will be able to double up on their mortgage payments like this for every payment in the mortgage? Why or why not?

Revisiting the Tax Consequences of a Mortgage

In the previous lesson (Unit 6-1), we saw that the interest paid on a home mortgage is tax deductible. Now we can use the mortgage amortization schedule to tell us exactly how much interest is paid over the course of a year.

For example, suppose the mortgage amortization schedule in <u>Figure 6-5</u> represents your mortgage and that the first payment was made in January. To keep things simple, we'll also assume that you made no additional principal payments like those discussed in the previous section. Using these assumptions, the annual amount of interest paid would be $6,967.81 (or $583.33 + $582.86 + $582.37 + … + $577.92).[6]

As for the tax savings, suppose that you were in the 28 percent marginal tax bracket (meaning that your taxable income was between $119,950 and $182,800), then the tax benefit to you would be (from Unit 6-2, page 6):

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[5] The amount of interest saved per dollar spent will be different for every mortgage, and the ratio of interest saved to principal paid in this example, or $6.93 = $1,744.20/$25.71, will even go down as more progress is made on repaying the mortgage, so be sure to check the mortgage amortization schedule regularly to see where your stand.

[6] Although your bank will usually make it easy for you by sending a simple statement of annual interest paid.

Federal tax savings = (marginal tax bracket)(annual interest paid)
= (0.28)($6,967.81)
= $1,950.99

In other words, your federal income taxes would be $1,950.99 *smaller* because you paid $6,967.81 in annual home mortgage interest.

So, as before, the tax consequences of having a mortgage are considerable as you "get back" $0.28 for every dollar spent on interest. When you get the mortgage paid off, however, the return is even better because you won't pay anything in the way of mortgage interest.

- Using Bill and Rhonda's mortgage amortization schedule, how much interest did he pay in the first year (12 payments)?

- Using Bill and Rhonda's marginal tax bracket, what type of federal tax saving or reduction did he get in the first 12 months of his mortgage?