



UNIT 6 – 3

Fixed vs. Adjustable Rate Mortgages

Slightly more than half of the mortgages issued in 2005 were fixed rate mortgages, while the majority of the remaining ones were of the adjustable rate variety. Make no mistake about it – if you are looking for a mortgage, more than likely you will have to make a choice between the two. So, what is the adjustable rate mortgage and how does it differ from the more traditional fixed rate variety?

The basic premise of the **adjustable rate mortgage** is that the rate – and hence the size of the monthly payment – changes along with changes in the level of interest rates in the economy. If interest rates go down, then the rate on your mortgage goes down and your monthly payment becomes smaller. Or, if interest rates rise, then the rate on your mortgage will rise and your payment gets larger.

Because the size of your monthly payment can go either up or down, there is a bit more risk involved when a borrower takes out an adjustable rate mortgage. Timing, it turns out, is critical so you may not want to pick up an adjustable rate loan if interest rates are likely to rise in the next five years.

On the other hand, adjustable rate mortgages offer much more stability to the lender than does the traditional fixed rate mortgage. We'll have more to say about this in the next section, but the real reason that they are used more now than in the past is that lenders have pushed so hard for people to use the,

Case Study Application

The case study application, like before, is designed to illustrate some of the key points made in the text. However, because we are now studying a different type of mortgage, we'll have to let Bill and Rhonda consider the option of an adjustable rate mortgage as well as the fixed rate one that we have been examining so far. Other than that, all of the numbers are the same as before.



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 enough for the down payment, 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.

That sounded good to Bill and Rhonda, but they also saw an ad on TV that promised a 3/1, 5½%, 30-year adjustable rate mortgage that will carry a lower initial monthly payment. The ARM has a 2% margin and each adjustment period has a 2% cap, with a 6% lifetime cap. To complicate matters further, he also saw a program where an economist claimed that interest rates are likely to rise an average of 1% per year for each of the next four years, so he also wants to take these expectations into account as well.

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.

The History of Adjustable Rate Mortgages

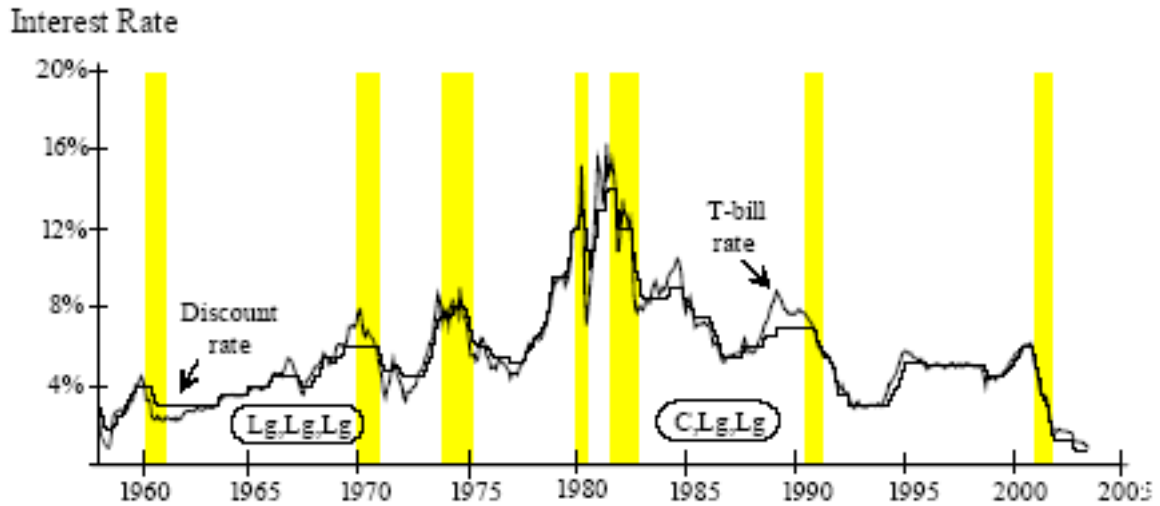
Adjustable rate mortgages have been around for more than 50 years, but they really became popular with lenders in the 1970s when interest rates started to rise. [Figure 6-7](#) shows how interest rates behaved from the 1960s until 2005, with virtually all rates hitting historic highs in the early 1980s.

The rise in home mortgage rates, it turned out, put bankers and other mortgage lenders in a profit bind in the 1970s. For example, many 30-year fixed-rate home mortgages were issued in the 1960s at 3% and 4% rates. As interest rates began to rise, banks had to pay increasingly more for the money they were borrowing from depositors in the form of CDs, time deposits, and savings deposits. By the mid 1970s, many banks found themselves paying more for the money they were borrowing than they were getting for the money they had already lent out.

For example, in mid-1975 a lender might have had a portfolio of 4% mortgages and a portfolio of 6% liabilities (so banks were paying an average of 6% on the short-term money they borrowed while only earning 4% on their long-term loans). This put a squeeze on profits. They wanted to change the nature of the mortgage to give them more protection.



Figure 6-7: Historical Interest Rates in the U.S. Economy, 1960-2005



Source: *Everyday Economic Statistics*, McGraw-Hill, 2005

The solution for the mortgage lenders was the adjustable rate mortgage. Lenders correctly reasoned that a mortgage whose interest rate went up when the general level of interest rates went up would protect their profit margins. If interest rates were to go down, then the lenders would still be able to maintain a differential between the borrowing rate and the lending rate.

- Looking at [Figure 6-7](#), what do you think would have happened to the interest rate (and hence the monthly payment) on an adjustable rate mortgage between 1979 and 1980? Between 1980 and 2000?
- Suppose that Bill and Rhonda were looking at an adjustable rate mortgage in mid-2005. If you compare interest rates in that year to the historical rates shown in [Figure 6-7](#), what do you think will happen to home mortgage rates from 2005-09?
- Does it look as if 2005 was a good year to take out a 30-year ARM? Why or why not?

How the Adjustable Rate Mortgage Works

In general, the nature of the adjustable rate mortgage, or ARM as is more frequently called, is straightforward. First, the borrower and lender agree on an initial interest rate and length of time that that rate will prevail. Suppose, for example, that the rate on a 30-year ARM will be fixed for two year periods, and then readjusted at the end of that time to bring the rate more into conformity with other interest rates.



At the end of the two years, the lender recomputes the mortgage using the new interest rate and the *remaining* principal. In addition, the new mortgage will be for 28 years because two years have already gone by. The original ARM contract will usually specify how much the new interest rate can go up or down in each two-year period, and it is likely to have some limit on the total amount that the interest can be adjusted over the life of the mortgage.

ARM Terminology

Let's suppose we are now talking about a 30-year, 5%, \$100,000 mortgage that can be readjusted every two years. To understand all the features of the mortgage, you'll have to first become acquainted with the following terminology:

The Number System: Most ARMs have a number associated with them such as 7/1, 5/1, or 3/1. In this **number system**, the first number refers to the number of years in the initial period during which the interest rate cannot change. The second number refers to the length of time between subsequent readjustment periods. So, a 2/1 ARM will have a fixed rate for the first two years, after which the rate can be adjusted once every year.

The Margin: Think of the **margin** as an initial markup (expressed as a percent) that is *added* to the stated interest rate. So, a 5% ARM with a 2% margin will actually cost you 7% at the very beginning of the mortgage.

The Cap: The **adjustment period cap** is the size of the adjustment that can be applied to the mortgage during any one adjustment period. To illustrate, suppose that the annual cap is $\frac{3}{4}\%$ on a 30-year 2/1 ARM. That means that interest rate on the mortgage can be increased or decreased by a maximum of $\frac{3}{4}\%$ in each of the third, fourth, and fifth through 30th years of the mortgage. However, a **lifetime cap**, also known as a *ceiling* (if the rate goes up), or a *floor* (if the rate goes down) limits the maximum adjustment that can be applied to the initial interest rate. So, the interest rate on a 5% ARM with a 2% margin and a 6% lifetime cap can never become larger than 13%, or smaller than 1%.

The Index: The **index** is a published interest rate series – usually based on U.S. Treasury bond yields or the London LIBOR rate (the rate at which banks in London borrow from other banks) – that is used to adjust the ARM rate. So if the index should go up (or down) 1% from one adjustment period to the next, the ARM will also be adjusted by the same amount unless limited by the cap.

- If Bill and Rhonda decide to take out the 3/1 ARM in the case study, what will be the initial interest rate on the mortgage (don't forget to include the margin)?
- How long will it be before the initial rate can be changed? How often can it be changed after that?



An Example with Rising Interest Rates

Suppose that we are considering a 2/1, 30-year, 5%, \$100,000 mortgage with a 2% margin, a 1% adjustment-period cap, and a 6% lifetime cap. Perhaps one of the first things we want to do is to analyze the worst-case scenario by assuming that interest rates start to go up one percent annually right after the mortgage is signed.

To start, we'll use the Kentucky Real Estate Commission's mortgage calculator to compute the \$665.30 payment on a 30-year, \$100,000, 7% (the 5% rate plus the 2% margin) mortgage. This generates the same amortization table as previously shown in [Figure 6-5](#), so we won't bother to reproduce it here.

However, what is of interest in [Figure 6-5](#) is the amount still owed after 24 monthly payments have been made – or \$97,894.95 to be exact.

Now, if interest rates have been rising at a rate of 1% per year ever since the mortgage was signed (remember that this is a worst-case scenario), it is now time to readjust the rate on the mortgage. Rates have risen a total of 2% in the first two years, but the adjustment period cap limits the rise to 1%. To find the new payment, we return to the mortgage calculator and input 8% (the new rate), \$97,894.95 (the amount still owed) and 28 years (the amount of time remaining after 24 payments have been made). The new monthly payment, shown in [Figure 6-8](#), is \$731.04 for each of the next twelve months.

Figure 6-8: The Third Year of a 30-year, 5%, 2/1 ARM

| Month | Interest Paid | Principal Paid | Remaining Balance |
|-------|---------------|----------------|-------------------|
| 1 | \$652.63 | \$78.41 | \$97,816.54 |
| 2 | 652.11 | 78.93 | 97,737.62 |
| 3 | 651.58 | 79.45 | 97,658.16 |
| 4 | 651.05 | 79.98 | 97,578.18 |
| 5 | 650.52 | 80.52 | 97,497.66 |
| 6 | 649.98 | 81.05 | 97,416.60 |
| 7 | 649.44 | 81.59 | 97,335.01 |
| 8 | 648.90 | 82.14 | 97,252.87 |
| 9 | 648.35 | 82.69 | 97,170.18 |
| 10 | 647.80 | 83.24 | 97,086.95 |
| 11 | 647.25 | 83.79 | 97,003.15 |
| 12 | 646.69 | 84.35 | 96,918.80 |

At the end of the third year, we can see from [Figure 6-8](#) that \$96,918.80 is still owed. And, suppose that when it is time to readjust the mortgage, the index adds another percentage point to the loan, driving it to 9%. To find the new payment, we again return to the mortgage calculator to enter \$96,918.80, 9%, and 27 years to get the monthly payment of \$797.76 and the next 12 months of the amortization schedule as shown in [Figure 6-9](#):



Figure 6-9: The Fourth Year of a 30-year, 5%, 2/1 ARM

| Month | Interest Paid | Principal Paid | Remaining Balance |
|-------|---------------|----------------|-------------------|
| 1 | \$726.89 | \$70.87 | \$96,847.93 |
| 2 | 726.36 | 71.40 | 96,776.52 |
| 3 | 725.82 | 71.94 | 96,704.58 |
| 4 | 725.28 | 72.48 | 96,632.11 |
| 5 | 724.74 | 73.02 | 96,559.08 |
| 6 | 724.19 | 73.57 | 96,485.51 |
| 7 | 723.64 | 74.12 | 96,411.39 |
| 8 | 723.09 | 74.68 | 96,336.71 |
| 9 | 722.53 | 75.24 | 96,261.48 |
| 10 | 721.96 | 75.80 | 96,185.67 |
| 11 | 721.39 | 76.37 | 96,109.30 |
| 12 | 720.82 | 76.94 | 96,032.36 |

We would then continue this process, raising the annual rate by 1% annually until the 6% lifetime cap had been reached. So, in this worst-case analysis, a simple 5% ARM with a 2% margin and a 6% lifetime cap could actually result in an annual rate of 13%.

- Assuming the worst case for Bill and Rhonda, what would be the interest rates that they could face in each of the first 5 years of their ARM alternative?
- Again assuming the worst case for Bill and Rhonda, what would be their monthly payments in each of the first 5 years of the ARM alternative?

An Example with Falling Interest Rates

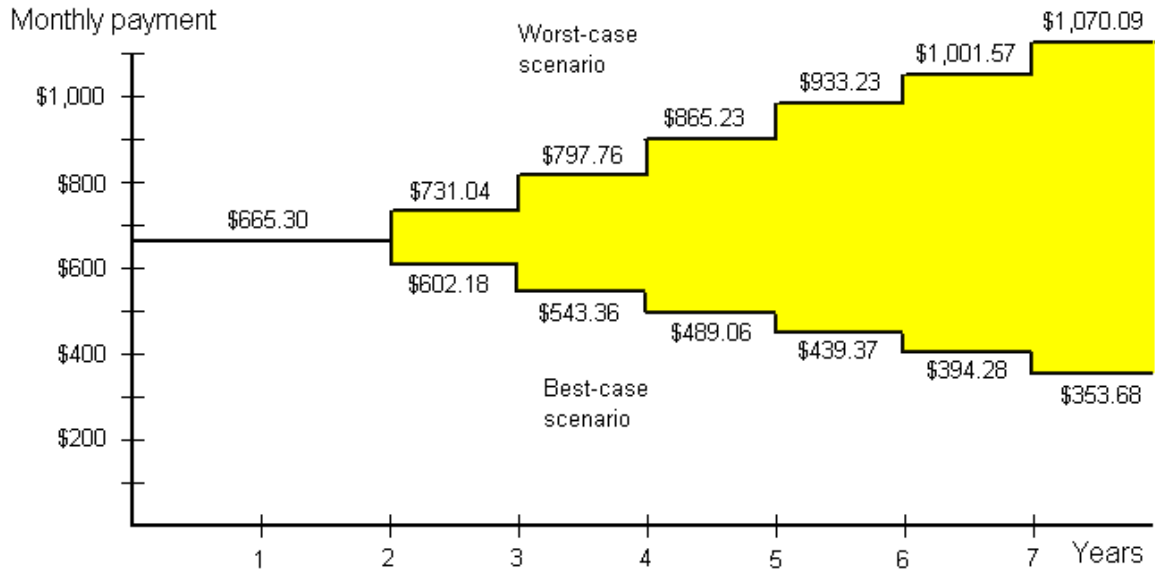
The worst case does not always happen of course, and during the 2000-2004 period many homeowners were delighted to see their ARM rates fall again and again as the general level of interest rates went down.

If we were to analyze the best-case scenario, then the process would be similar to the one described above – only each successive recomputation would be done with a lower rate. Since we've already seen the process, however, we'll try to summarize everything in [Figure 6-10](#).

As you can see, the payment remains the same at \$665.30 for the first two years of the mortgage (remember that it was a 2/1 ARM). After that, the payments began to diverge depending on whether the rate went up or down every year. After the 6% lifetime cap is reached in the 8th year, however, the monthly payment can go no higher or lower.



Figure 6-10: Payment Limits on a 30-year, 7%, 2/1 ARM



Realistically, neither of the two outcomes shown in [Figure 6-10](#) is likely to happen. Over time, the rates will go up in some years and down in others. As long as the rate changes do not exceed the 6% lifetime cap, they can go up and down a little bit every year for years 3 through 30.

- Assuming the best-case for Bill and Rhonda, what would be the interest rates that they would face in each of the first 5 years of their ARM alternative?
- Again assuming the best case for Bill and Rhonda, what would be their monthly payments in each of the first 5 years of the ARM alternative?

