



## UNIT 7 – 2

### Ask the Right Questions!

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As you can see from the previous unit, mortgages can become pretty complex, and in fact most of them are! There may not be a lot you can do about it, but approaching the issue of selecting a mortgage using a reasoned, structured approach makes a lot of sense. After all, a mortgage is an enormous investment, and so it is well worth your while to understand it as best you can.

Most of the so-called “custom,” “boutique” or “designer” mortgages that you see today are simple variations of the simple mortgages that were explained in units 6-1, 6-2 and 6-3 of the previous chapter. We also saw some hybrids of the two in unit 7-1, but these are normally just variations of the simple fixed and/or ARMs.

In order to sort this out, it helps to ask questions, and by that we mean a *lot* of questions. You’ll also find that it will be useful to record and organize all of the responses to your questions so that you can go back and compare your alternatives later on. The worksheets in this section will help you do just that, but even then you will probably run across some additional variations that were not specifically discussed in this or any other unit.

Finally, the worksheets in this section will not tell you exactly which mortgage is best for you, but they will help clarify your options so that you can make a better, more informed choice. After all, the right mortgage for you may be the wrong one for someone else, but only you can make the final choice.

#### Case Study Application

The case study in this unit is an extension of the one in unit 7-1. This time, however, we are going to add a third choice and then analyze the options and record the responses on worksheets so that we can better see the differences between the alternative mortgages.



## **CASE STUDY: BILL AND RHONDA'S DILEMMA**

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Bill and Rhonda 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 which type of mortgage best suits their needs. They now have three possible options.

First, they still had their original deal which was an 8% fixed rate, 30-year mortgage that would result in 360 monthly payments of \$1,027.27. The principal on this mortgage would be fully amortized, so the loan would be fully repaid at the end of the loan.

A second option was a TV ad that promised a 30-year interest only (or I-O) mortgage with a 7% rate and lower monthly payments of \$816.67. The interest rate would be adjusted annually subject to a 2% cap, and the mortgage would have a 6% lifetime cap. However, because they would only pay interest, they would still owe \$140,000 at the end of 30 years.

A third option was that they could get a 7%, 30-year GPM that had a fixed payment of \$416.67 for the first 12 months of the mortgage. After the first year was up, the mortgage would switch over to a 29-year ARM that also had a 2% annual cap and a 6% lifetime cap. However, because the initial monthly payments were so low, the unpaid interest would be *added* to the principal so that the balance owed would increase, rather than decrease, during the first year of the mortgage. Then, at the end of the first year, the monthly payment would reset at the 7% rate subject to a 2% annual cap. This means that the new interest rate could be as high as  $7\% + 2\% = 9\%$ , or as low as  $7\% - 2\% = 5\%$ .

Finally, and to complicate matters further, Rhonda and Bill heard that economists are still predicting that interest rates are likely to rise an average of 1% per year for the next four years, so they also want to take these expectations into account.

With a little bit of analysis, they will soon be ready make some final plans with regard to the type of mortgage that would be best for them.

### **The Mortgage Comparison Worksheets**

In order to compare the three mortgage options in the case study, we'll use the mortgage comparison worksheets on the next page. Note that there are three worksheets – one that describes the initial terms of the mortgage, a second that can be used to identify changes in the second or any other year, and a third to summarize or at least identify other changes that might happen over the life of the mortgage.



We'll also assume that our economists were wrong and that interest rates went up 2% in the first year, and then increased by 1% annually during each of the next 5 years.

### Initial Mortgage Information

First of all, we want to summarize the information for each of our three mortgages. We do that in worksheet A, although only the information for the I-O and the GPM are shown since all of the information for the 30-year fixed rate mortgage is so simple.

To start, we note that the 30-year fixed rate mortgage (not shown here) has a monthly payment of \$1,027.27, followed by the I-O with \$816.67<sup>1</sup>, and the GPM of \$416.67. Based on this initial information, it would seem as if the fixed rate mortgage is the least desirable, regardless of your preferences for the other two.

As far as the I-O mortgage is concerned, it looks as if the annual rate could reach 13% if interest rates were to rise that high, but other than that, nothing stands out. The problem is that the principal, or the amount still owed, never goes down.

The \$416.67 GPM also looks attractive although the annual interest on that mortgage could also reach 13% if interest rates were to get that high. This time, however, we note that negative amortization will occur because the initial monthly payment is nowhere near high enough to cover the 7% annual interest, so the amount owed will actually go up rather than down.

For example, we note that the monthly GPM payment of \$416.67 is exactly \$400 less than the monthly interest on the I-O loan. The lender doesn't forget about the \$400, however, as it is simply added to the principal – which means that each subsequent addition to the principal will be larger than the last. So, over the first 12 months, both the interest and the principal would grow as follows:

$$\begin{aligned}\text{Month 1 Interest} &= (\text{Principal})(\text{Rate})(\text{Time}) \\ &= (\$140,000)(.07)(1/12\text{months}) = \$816.67\end{aligned}$$

$$\begin{aligned}\text{Month 2 Interest} &= (\text{Principal})(\text{Rate})(\text{Time}) \\ &= (\$140,000 + \$400)(.07)(1/12\text{months}) = \$819.00\end{aligned}$$

$$\begin{aligned}\text{Month 3 Interest} &= (\text{Principal})(\text{Rate})(\text{Time}) \\ &= (\$140,400 + \$402.33)(.07)(1/12\text{months}) = \$821.35\end{aligned}$$

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$$\text{Month 12 Interest} = (\text{Principal})(\text{Rate})(\text{Time})$$

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<sup>1</sup> Interest = (Principal)(Rate)(Time) = (\$140,000)(.07)(1/12months) = \$816.67



## Mortgage Comparison Worksheet

### A. Initial Mortgage Information

	First Mortgage Option		Second Mortgage Option	
Name, address, and phone number of lender	<b>ABC Mortgage Company</b> 1-800-123-4567		<b>Mortgages-R-Us</b> 1-866-572-9876	
Amount of mortgage	\$140,000		\$140,000	
Length (term) of mortgage	30 years, or 360 months		30 years, or 360 months	
Initial interest rate	7.00%		Interest accrues at 7.0%	
Initial monthly payment	\$816.67*		\$416.67/mo for first 12 mos.	
Pmt includes taxes, insurance?	no		no	
Type of mortgage	Fixed Rate		Fixed Rate	
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	X
	Interest-Only	X	Interest-Only	
	Other Hybrid		Other Hybrid	
Number of months before first interest rate reset?	Fixed Rate	No resets	Fixed Rate	No resets
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	12 mos
	Interest-Only	12 mos	Interest-Only	
	Other Hybrid		Other Hybrid	
How often can the mortgage be adjusted and the interest rate be reset over the life of the mortgage?	Fixed Rate	Never	Fixed Rate	Never
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	annually
	Interest-Only	annually	Interest-Only	
	Other Hybrid		Other Hybrid	
What is the maximum interest rate cap for every reset?	Fixed Rate	No change	Fixed Rate	No change
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	2%
	Interest-Only	2%	Interest-Only	
	Other Hybrid		Other Hybrid	
Given the initial rate and the lifetime cap, how big can the interest rate get over the life of the mortgage?	Fixed Rate	None	Fixed Rate	None
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	7% + 6% = 13%
	Interest-Only	7% + 6% = 13%	Interest-Only	
	Other Hybrid		Other Hybrid	
Is it possible for <i>negative amortization</i> (a larger amount owed) to ever occur?	Fixed Rate	No	Fixed Rate	No
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	yes
	Interest-Only	no	Interest-Only	
	Other Hybrid		Other Hybrid	

\* The Kentucky Real Estate Commission Mortgage Calculator at <http://www.nku.edu/~codek> is used to amortize a mortgage. An I-O mortgage is never amortized, so the payment is  $(.07/12)(\$140,000) = \$816.67$

$$= (\$144,557.78 + \$426.57)(1/12\text{months}) = \$843.24$$

If we were to continue this process, we would find that the total principal owed after 12 payments would increase to \$144,984.32. Then, at the end of the first year it would be time for the interest rate to reset, and we would now have to pay interest on the *additional* \$4,984.32 as well as the initial \$140,000.



## Second Year Mortgage Information

It gets more interesting when we get to the second year because that is when the interest rate is reset on the I-O and the GPM. So, since the I-O started out at 7% with a monthly payment of \$816.67, and since our economists were wrong and interest rates actually went up by 2%, the monthly interest jumps to 7% + 2% = 9%, and the monthly payment on the I-O now becomes:

$$\begin{aligned} \text{Monthly Interest} &= (\text{Principal})(\text{Rate})(\text{Time}) \\ &= (\$140,000)(.09)(1/12\text{months}) = \$1,050.00 \end{aligned}$$

Next, we carry this new monthly over to the second year worksheet and then fill in the appropriate entries in the middle of the worksheet.

As for the GPM, the rate on that also goes to 9%, only now the mortgage is going to be amortized so that nothing is owed after 29 more years. So, we go to the Kentucky Real Estate Commission mortgage calculator and find that a 9%, \$144,984.32, 29-year mortgage has a monthly payment of \$1,174.60.

### Mortgage Comparison Worksheet

#### B. Second Year

	First Mortgage Option		Second Mortgage Option	
Name, address, and phone number of lender	<b>ABC Mortgage Company</b> 1-800-123-4567		<b>Mortgages-R-Us</b> 1-866-572-9876	
Amount of mortgage	\$140,000		\$144,984.32	
Remaining mortgage duration	29 years, or 348 months		29 years, or 348 months	
Number of months before next interest rate reset?	Fixed Rate	No resets	Fixed Rate	No resets
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	12 mos
	Interest-Only	12 mos	Interest-Only	
	Other Hybrid		Other Hybrid	
What will the annual interest rate be after the first rate reset?	Fixed Rate	Same as original	Fixed Rate	Same as original
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	9.0%
	Interest-Only	7% + 2% = 9%	Interest-Only	
	Other Hybrid		Other Hybrid	
What will be the new monthly payment after the first reset?	Fixed Rate	Same as original	Fixed Rate	Same as original
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	\$1,174.60**
	Interest-Only	\$1,050.00*	Interest-Only	
	Other Hybrid		Other Hybrid	
Is it possible for <i>negative amortization</i> (a larger amount owed) to ever occur?	Fixed Rate	No	Fixed Rate	No
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	not after yr 1
	Interest-Only	no	Interest-Only	
	Other Hybrid		Other Hybrid	

\* The I-O mortgage is never amortized, so the new payment is  $(.09/12)(\$140,000) = \$1,050$ .

\*\* Because the unpaid interest is added to the unpaid balance, you now owe \$144,984.32! So, use the calculator find the payment that will amortize \$144,957 over 29 yrs at 9%.



This leaves us with three outcomes in the second year. The first mortgage, the 30-year fixed payment option, still has a monthly payment of \$1,027.27 and some of the principal will have been paid back. In comparison, the I-O mortgage will have a monthly payment of \$1,050 with \$140,000 still owed at the end of two years. The GPM will have a \$1,174.60 monthly payment in the second year, and will feature a growing principal in the first year and a modestly shrinking one in the second – although more exact computations would show that the principal is still in excess of \$140,000.

### **Remaining Life of Mortgage Information**

Nothing ever changes with the fixed rate option, so we again note that the monthly payment remains the same at \$1,027.27 for the life of the mortgage.

As for the I-O version, however, the 6% lifetime cap could have two extreme outcomes, one based on a rate of 7% + 6% or 13%, the other based on 7%-6% = 1%. So, the range of payments would be as follows:

$$\begin{aligned}\text{Worst case: } \text{Monthly Interest} &= (\text{Principal})(\text{Rate})(\text{Time}) \\ &= (\$140,000)(.13)(1/12\text{months}) = \$1,516.67\end{aligned}$$

$$\begin{aligned}\text{Best case: } \text{Monthly Interest} &= (\text{Principal})(\text{Rate})(\text{Time}) \\ &= (\$140,000)(.01)(1/12\text{months}) = \$116.67\end{aligned}$$

The actual outcome, of course, depends on what happens to interest rates over time, something that is notoriously difficult to predict – and you will still owe \$140,000 at the end..

Finally, the actual rate for the GPM will also vary extensively, but the size of the payment will depend on the amount of principal owed and the size of the principal that is being amortized after the initial year, so there are too many variables to make any reasonable computations. However, in general we would observe that the monthly payments on the GPM would be higher than the monthly payments on the I-O since the principal owed is not being reduced on the I-O mortgage.

### **Summarizing the Options**

As you can see, three relatively simple mortgages can offer widely different outcomes. Perhaps the safest is the standard fixed rate mortgage because you will always know how much you will have to pay, and you know that you will owe nothing at the end of the mortgage.

The I-O mortgage appears to have the advantage of a slightly lower monthly payment, but that can change dramatically if interest rates go either way. Since it is always difficult to predict which way they will go, just remember that if rates are historically low when you get a mortgage – then rates are likely to go up in the



future. Likewise, if rates are historically high, then they are more likely to go down than up. Either way, however, you are still going to owe the full amount of the principal after making monthly payments for 30 or so years.

### Mortgage Comparison Worksheet

#### C. Remaining Life of Mortgage Information

	First Mortgage Option		Second Mortgage Option	
Name, address, and phone number of lender	<b>ABC Mortgage Company</b> 1-800-123-4567		<b>Mortgages-R-Us</b> 1-866-572-9876	
How high can the interest on the mortgage get during the life of the mortgage?	Fixed Rate	No change	Fixed Rate	No change
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	13%
	Interest-Only	13%	Interest-Only	
	Other Hybrid		Other Hybrid	
What is the largest monthly payment that could occur during the life of the mortgage?	Fixed Rate	Same as original	Fixed Rate	Same as original
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	> GPM payment
	Interest-Only	1516.67*	Interest-Only	
	Other Hybrid		Other Hybrid	
Is there a prepayment penalty if the loan is paid off early by refinancing or by selling the home?	Fixed Rate	No	Fixed Rate	No
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	possibly
	Interest-Only	possibly	Interest-Only	
	Other Hybrid		Other Hybrid	
How much is the prepayment penalty?	Fixed Rate	No penalty	Fixed Rate	No penalty
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	need to ask
	Interest-Only	need to ask	Interest-Only	
	Other Hybrid		Other Hybrid	
If <i>negative amortization</i> occurs, how large can the unpaid principal get before the mortgage is recalculated?	Fixed Rate	No	Fixed Rate	No
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	\$144,984 in yr 1
	Interest-Only	N/A	Interest-Only	
	Other Hybrid		Other Hybrid	
At the end of the mortgage, will the principal be fully paid off?	Fixed Rate	Yes	Fixed Rate	Yes
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	yes
	Interest-Only	no	Interest-Only	
	Other Hybrid		Other Hybrid	
If the principal is not fully paid off, how much will still be owed?	Fixed Rate	Yes	Fixed Rate	Yes
	ARM		ARM	
	Pmt Option ARM		Pmt Option ARM	nothing
	Interest-Only	\$140,000	Interest-Only	
	Other Hybrid		Other Hybrid	

\* An I-O mortgage is never amortized, so the highest payment is  $(.13/12)(\$140,000) = \$1,516.67$



The last mortgage, the GPM, offers an attractive low “teaser” payment at first, but it then converts to a more standard variable rate loan after that. Payments can be higher or lower over the long run, depending on how interest rates change, but the payments will be higher than an I-O mortgage because the mortgage will be amortized.

Many other combinations of mortgages are also possible, of course, but most will be variants of the ones described above. If you do find one that is attractive but different, then ask the types of questions we addressed in the worksheets. If you don’t feel comfortable with the math, ask the lender to do them for you – but y all means make every effort to understand the consequences of every little detail as seemingly small changes may have enormous consequences over the life of the mortgage.

Finally, take the time to record and summarize the outcomes of each, and you may even find the PACED Decision Making matrix on the next page. This is the best way to find the mortgage that is the best for you.



## The PACED Decision Making Model

**Directions:** Use the PACED Decision Making Model below to contrast the advantages and disadvantages of your problem. After you have evaluated to the issue, discuss the choice you would make. Complete the analysis by using these five steps in the decision making model:

**Step 1:** State the **P**roblem: \_\_\_\_\_.

**Step 2:** List the **A**lternatives in the first column.

**Step 3:** List the **C**riteria in the first row.

**Step 4:** Evaluate each alternative by placing a “+” or a “-” in the box below each criterion.

**Step 5:** Make your **D**ecision: \_\_\_\_\_  
\_\_\_\_\_.

<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: right;">Criteria ↓</div> <div style="text-align: left;">→</div> </div> <div style="text-align: center; margin-top: 5px;">Alternatives</div>	1.	2.	3.	4.
1.				
2.				
3.				
4.				
5.				

Using the space below, explain why the alternative in step 5 above is the best solution to your problem:

