
Currently, 15-year mortgages are available at more attractive rates than 30-year terms, but they also entail higher monthly payments. Which is better? A look at the analysis.

Selecting the Mortgage Term: How to Compare the Alternatives

By Clarence C. Rose

In today's real estate finance environment, most home buyers and investors have numerous alternatives available to them from which to select the mortgage loan most appropriate for their financial situation. The many choices available can be somewhat confusing, even for the experienced real estate purchaser. Mortgages come in many varieties and available options. If the real estate purchaser makes the right choice in mortgage financing, the terms of the mortgage contract can be very rewarding financially, while selecting a mortgage that is not suited for one's financial situation can be frustrating and costly.

One very important consideration facing real estate buyers is the selection of the mortgage term. This article conducts a comparison of the 15-year versus the 30-year term mortgage and examines the critical rate of return necessary on other available investments for maximizing the net worth of the buyer under each option.

Mortgage Loan Term Considerations

Mortgage loans can be constructed to include almost any payback duration. While mortgage loan terms may include five, seven, 10, 15, 20, 25, or 30 years, the most common terms are 15-year and 30-year mortgages. When a real estate buyer is trying to decide which mortgage terms to select, there are several important factors to consider.

Mortgage Rate Variations: One very important factor to consider in selecting the mortgage term is which mortgage term offers the lowest rate. A national survey conducted by the Federal Home Loan Mortgage Corporation in March 1996 reported that 15-year term mortgages are available on average at a rate of $\frac{1}{2}\%$ lower than the average rate charged by financial institutions for 30-year term mortgages. This can make a substantial difference in the annual interest expense

to the buyer.

Also, a $\frac{1}{2}\%$ reduction in the interest rate over the full term of a mortgage can save the buyer thousands of dollars of interest expense on a home mortgage or investment property loan.

Closing Cost Variations: Mortgage loan closing costs may vary among different lenders for different term loans. Loan closing costs include the loan origination fee and points charged by the lending institution to the borrower. While the costs may vary, there is no consistent pattern for costs charged by lenders for mortgage loans of different terms. A few financial institutions charge slightly higher fees for 30-year term mortgages. However, the majority of lending institutions charge the same closing costs for both 15-year and 30-year term mortgages. As a result, closing costs generally will not influence the mortgage term selection by the buyer. The closing costs usually will be the same amount whether the buyer selects a 15-year or 30-year term mortgage, but the buyer needs to be aware of possible variations with some lenders.

Loan Qualification Consideration: While selecting a 15-year mortgage over a 30-year term mortgage will usually result in a lower interest rate, the shorter payoff time period will result in higher monthly mortgage payments. Because higher monthly mortgage payments are required for shorter-term mortgages, loan applicants may find it easier to meet loan qualification guidelines with longer-term mortgages. The most common mortgage loan qualification requirement is that the monthly mortgage payment (principal + interest + $\frac{1}{12}$ th annual property taxes + $\frac{1}{12}$ th annual property insurance) must not exceed 28% of the applicant's gross monthly income. Selection of a shorter mortgage term may be limited for individuals who are seeking mortgage loans that would exceed the 28% limit. Another loan qualification guideline that may influence the term of the loan is that the applicant's intended monthly mortgage payment ($P + I + T + \text{Ins.}$) plus all other monthly consumer debt obligations must not exceed 36% of the applicant's gross monthly in-

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come. In certain situations, the selection of a longer-mortgage term may be required in order to meet the loan qualification guidelines.

Available Investment Options

Assuming that the real estate purchaser meets the buyer loan qualifications for the 15-year mortgage and that the higher monthly mortgage payments will not impair the cash needed monthly by the buyer for normal living expenses, the major decision criteria on the part of the real estate buyer should be to select the course of action that will maximize the buyer's net worth from the mortgage loan selected for the period of anticipated property ownership. When comparing a 15-year versus a 30-year term mortgage, the real estate purchaser should consider how the additional monthly mortgage amount required for the shorter-term mortgage could otherwise be invested if the longer-term mortgage were selected. The investment options available to the buyer may be considered the opportunity costs that are associated with selecting the 15-year term mortgage instead of the 30-year mortgage.

Opportunity costs include the benefits foregone or not received by the buyer from the additional cash outflow required by the 15-year term mortgage over the 30-year term mortgage.

For example, a home buyer purchasing a \$125,000 home, placing a down payment of \$25,000 and financing \$100,000 would be required to pay monthly mortgage payments of \$716.41 with a 30-year term mortgage (\$100,000 at 7.75% for 30 years) versus \$912.86 a month with a 15-year term mortgage (\$100,000 at 7.25% for 15 years). (Note: The mortgage rate is calculated at $\frac{1}{2}\%$ less with the 15-year mortgage than with the 30-year mortgage to reflect the actual market differences.) The difference between these two payments is \$196.45 per month, and this amount would be available to the buyer to be spent elsewhere or invested if he selects the 30-year mortgage.

Net Worth Accumulation Analysis

The major attractive feature of the 15-year mortgage over the 30-year mortgage is the realization of having a home or real estate in-

vestment property paid off in a relatively short period of time. By selecting a 15-year term mortgage, a buyer financing \$100,000 would have the loan paid in full at the end of 15 years, while a buyer selecting a 30-year term mortgage would still owe an unpaid mortgage balance of approximately \$76,000 at the end of 15 years. The actual increase or decrease in the buyer's net worth by selecting the 15-year term mortgage over the 30-year term mortgage is contingent upon how the buyer spends or invests the monthly difference between the two monthly payments and the ability of the buyer to deduct the mortgage interest expense for tax purposes.

Table 1 is a summary comparison of a \$100,000 15-year term mortgage versus a \$100,000 30-year term mortgage. The required monthly mortgage payment for the 15-year mortgage illustrated is \$912.86, while the payment for the 30-year mortgage is \$716.41. The buyer, as part of the mortgage selection process, must decide if an additional payment of \$196.45 per month, or \$2,357.40 annually, is worth the faster loan principal reduction and corresponding increase in the

Table 1.
Fifteen-Year vs. 30-Year Mortgage Loan Comparisons
(Loan Amount: \$100,000)

15-year term at 7.25%	
Monthly payment (P + I) =	\$912.86
30-year term at 7.75%	
Monthly payment (P + I) =	\$716.41
Total payment difference:	\$196.45

Year	15-Year Term Mortgage		30-Year Term Mortgage	
	Interest Paid (\$)	Unpaid Balance (\$)	Interest Paid (\$)	Unpaid Balance (\$)
1	7,124.39	96,170.04	7,719.26	99,122.31
2	6,837.31	92,052.99	7,648.77	98,174.13
3	6,528.70	87,627.34	7,572.62	97,149.86
4	6,196.96	82,869.94	7,490.35	96,043.21
5	5,840.35	77,755.94	7,401.48	94,847.74
6	5,457.02	72,258.61	7,305.46	93,556.26
7	5,044.95	66,349.20	7,201.74	92,161.05
8	4,601.99	59,996.83	7,089.69	90,653.79
9	4,125.83	53,168.30	6,968.64	89,025.48
10	3,613.97	45,827.92	6,837.86	87,266.40
11	3,063.75	37,937.31	6,696.58	85,366.04
12	2,472.28	29,455.24	6,543.96	83,313.05
13	1,836.48	20,337.36	6,379.08	81,095.18
14	1,153.02	10,536.03	6,200.96	78,699.19
15	418.33	0.00	6,008.53	76,110.77
Total	64,315.32		105,064.98	

Table 2.
Fifteen-Year vs. 30-Year Mortgage
Cash Flow/Loan Reduction Summary

Year	Cumulative Difference in Total Payments (\$)	30-Year Term Loan Balance (\$)		15-Year Term Loan Balance (\$)		Cumulative Difference in Loan Reduction (\$)
1	2,357.40	99,122.31	–	96,170.04	=	2,952.27
2	4,714.80	98,174.13	–	92,052.99	=	6,121.14
3	7,072.20	97,149.80	–	87,627.34	=	9,522.46
4	9,429.60	96,043.21	–	82,869.94	=	13,173.27
5	11,787.00	94,847.74	–	77,755.94	=	17,091.80
6	14,144.40	93,556.26	–	72,258.61	=	21,287.65
7	16,501.80	92,161.05	–	66,349.20	=	25,811.85
8	18,859.20	90,653.79	–	59,996.83	=	30,656.96
9	21,216.60	89,025.48	–	53,168.30	=	35,857.18
10	23,574.00	87,266.40	–	45,827.92	=	41,438.48
11	25,931.40	85,366.04	–	37,937.31	=	47,428.73
12	28,288.80	83,313.05	–	29,455.24	=	53,857.81
13	30,646.20	81,095.18	–	20,337.36	=	60,757.82
14	33,003.60	78,699.19	–	10,536.03	=	68,163.16
15	35,361.00	76,110.77	–	0.00	=	76,110.77

tion process. If the real estate buyer has investment opportunities available that are expected to exceed the critical rate of return, then selecting the 30-year term mortgage is advisable. If, however, investments are not available that offer a rate of return greater than the critical rate, than the selection of the 15-year mortgage is advisable.

For example, if an investor were to invest \$2,357.40 annually for 15 years, an aftertax return of 10.2% would be required to accumulate \$76,110.77 at the end of 15 years. Thus, the 10.2% return is the critical rate—the minimum rate of return that a mortgagor would need to earn in order to financially justify the selection of a 30-year term

buyer's equity in the real estate.

Table 2 is a comparison of the annual mortgage cash outflows and loan reduction differences between the 15-year and 30-year term mortgages. As can be seen in Table 2, the total additional mortgage payments required for the 15-year term mortgage during years one through 15 is \$35,361.00; this is the additional amount of total payments required over the 15 years if the 15-year term mortgage is chosen. In contrast, the 30-year term mortgage has a \$76,110.77 balance still remaining after 15 years; this represents the amount by which the 15-year term mortgage has accelerated the equity build-up, since it has no loan balance remaining after 15 years. In order to determine if the selection of the 15-year term mortgage is the right financial course of action for an individual, the rate of return required on the additional mortgage payments required in order to equal the accelerated equity build-up must be calculated.

Analysis of the Investment Return Required

In order to determine the rate of return that an investor would need to earn in order to accumulate \$76,110.77 in 15 years [the accelerated equity build-up] by investing the \$2,357.40 annual difference between the two mortgages, the annual difference was assumed to be invested by the mortgagor for years one through 15, and the required rate of return was calculated in order for the series of annual investments to equal \$76,110.77 at the end of 15 years. This calculated rate is the critical rate influencing the mortgage selec-

tion process. If the real estate buyer has investment opportunities available that are expected to exceed the critical rate of return, then selecting the 30-year term mortgage is advisable. If, however, investments are not available that offer a rate of return greater than the critical rate, than the selection of the 15-year mortgage is advisable.

For example, if an investor were to invest \$2,357.40 annually for 15 years, an aftertax return of 10.2% would be required to accumulate \$76,110.77 at the end of 15 years. Thus, the 10.2% return is the critical rate—the minimum rate of return that a mortgagor would need to earn in order to financially justify the selection of a 30-year term mortgage under the current real estate mortgage finance conditions.

Analysis Using Aftertax Cash Flows

Since most real estate purchasers can take advantage of the mortgage interest expense tax reductions, the critical rate was also calculated using the annual aftertax cash flow differences between the 15-year and 30-year term mortgages. The major factor influencing the aftertax cash flow differences between the 15-year term and 30-year term mortgage is the tax rate of the individual. The higher the individual's tax rate, the higher the lost tax savings from the interest expense deduction.

Table 4 is an annual aftertax cash flow analysis for a real estate buyer in the 33% tax bracket comparing the 15-year versus the 30-year term mortgage. The difference in the monthly mortgage payment is used as the base for the analysis with appropriate adjustments for the interest expense tax savings. As can be seen in Table 4, the annual lost tax savings to a real estate purchaser who selects a 15-year term mortgage increases steadily as the outstanding mortgage loan decreases. The annual aftertax cash flow is the annual mortgage payment plus the lost tax savings from the interest expense difference between the two mortgages

Table 3.
Estimating the Critical Rate Required
(Using example from Table 1)

Data Needed for Calculations:

1. Amortization schedules for the loans being considered.
2. Annuity factor table (sum of an annuity table), financial calculator, or computer software that can calculate a return on an annuity investment. (An annuity factor table is included at the end of this article in Table 5.)

Calculation of Critical Rate:

• **Step 1: Determine the annual mortgage payment difference.**

Example: Monthly Mortgage Difference x 12 = Annual Difference
 \$196.45 x 12 = \$2,357.40

• **Step 2: Determine (from the longer-term mortgage amortization schedule) the remaining unpaid balance of the longer-term mortgage for the year that the shorter mortgage is paid in full.**

Example: Remaining Mortgage in 15 Yrs. with 30-Yr. Term = \$76,110.77

• **Step 3: Calculate the annuity factor for your annual investment.**

Example: Annuity Factor = $\frac{\text{Remaining Mortgage (Step 2)}}{\text{Annual Difference (Step 1)}} = \frac{\$76,110.77}{\$2,357.40} = 32.286$

• **Step 4: Locate the calculated annuity factor for the given interest rate and number of years in Table 5 to the nearest percentage. This is the critical rate.**

Example: Using the annuity factor table (Table 5), look across the row for 15 years (the number of years that the difference in mortgage payments is available for investment) and locate the number closest to the annuity factor of 32.286. Using Table 5, we find that the closest number is in between the columns for 10% and 11%. The following calculation may be used to be more precise.

From the annuity factor table:

Actual Annuity Factor	32.286	Annuity Factor: 11%	34.405
Annuity Factor: 10%	<u>31.772</u>	Annuity Factor: 10%	<u>31.772</u>
Difference	0.514	Difference:	2.633

$$\frac{0.514}{2.633} = 0.195 \quad 10\% + 0.195 = 10.195\%$$

The critical rate for the annuity factor of 32.286 is 10.195%, rounded to 10.2%.

(\$2,357.40 plus the annual lost tax savings). The amount of money shown in the aftertax cash flow column is the amount an investor would have available each year to invest if the 30-year term mortgage were selected instead of the 15-year mortgage.

Similar to the previous calculations, the annual differences between the two mortgages were assumed to be invested at a rate to equal the remaining mortgage balance of \$76,110.77. However, since the aftertax cash flows vary because of the changes in the mortgage interest expense each year, the use of an annuity table was not appropriate. A financial calculator or financial computer software may be used to calculate the required return. Using the annual aftertax cash flows as an-

nual investments, the critical rate was calculated to be 6.8%. A rate of return greater than 6.8% on the annual differences would result in an accumulated sum greater than the remaining outstanding loan balance with the 30-year term mortgage and the investor (mortgagor) could use the funds to pay off the remaining mortgage debt and have funds left over.

Summary and Conclusion

Fifteen-year term mortgages are currently available at rates averaging ½% less than 30-year term mortgages. If the real estate mortgage finance environment changes, increasing the spread between the 15-year versus 30-year term mort-

gages, the selection of the 15-year mortgage would be more favorable than this analysis indicates. If the difference becomes less in the future, the benefits of selecting the shorter term mortgage would be reduced.

In the current real estate finance mortgage environment, the selection of the 15-year term mortgage compared to the 30-year mortgage may be a wise financial decision for many homebuyers and real estate investors. In order to maximize net worth accumulations over a 15-year time period, an individual investor in the 33% tax bracket who can take full

advantage of the interest expense deductions, would need to earn 6.8% after taxes on the annual differences between the 15-year and 30-year mortgages. This equates to a 10.15% before tax return on the aftertax annual cash flow differences between the two mortgages in today's financial environment ($\text{Return} \times [1 - \text{Tax Rate}] = \text{Aftertax Return}$, or $10.15\% \times 0.67 = 6.8\%$).

Considering that the selection of a 15-year term mortgage has virtually no investment risk, the option should be considered very attractive.



Table 4.
Fifteen-Year vs. 30-Year Mortgage:
Annual Aftertax Cash Flow Analysis

\$100,000 loan: 30-year term at 7.75%

\$100,000 loan: 15-year term at 7.25%

Investor combined federal and state tax rate = 33%

Year	Annual Interest Expense			Annual				Annual Aftertax		
	30-Year	15-Year		Lost Tax Savings				Cash Flow		
	Term	Term		(Difference × 33%)				(Lost Savings + \$2,357.40)*		
	(\$)		(\$)		(\$)		(\$)		(\$)	
1	7,719.26	–	7,124.39	=	594.87	x	0.33	=	196.31	2,553.71
2	7,648.77	–	6,837.31	=	811.46	x	0.33	=	267.78	2,625.18
3	7,572.62	–	6,528.70	=	1,043.92	x	0.33	=	344.49	2,701.89
4	7,490.35	–	6,196.96	=	1,293.39	x	0.33	=	426.82	2,784.22
5	7,401.48	–	5,840.35	=	1,561.13	x	0.33	=	515.17	2,872.57
6	7,305.46	–	5,457.02	=	1,848.44	x	0.33	=	609.98	2,967.38
7	7,201.74	–	5,044.95	=	2,156.79	x	0.33	=	711.74	3,069.14
8	7,089.69	–	4,601.99	=	2,487.70	x	0.33	=	820.94	3,178.34
9	6,968.68	–	4,125.83	=	2,842.85	x	0.33	=	938.14	3,295.54
10	6,837.86	–	3,613.97	=	3,223.89	x	0.33	=	1,063.88	3,421.28
11	6,696.58	–	3,063.75	=	3,623.83	x	0.33	=	1,198.83	3,556.23
12	6,543.96	–	2,472.28	=	4,071.68	x	0.33	=	1,343.65	3,701.05
13	6,379.08	–	1,836.48	=	4,542.60	x	0.33	=	1,499.06	3,856.46
14	6,200.96	–	1,153.02	=	5,047.94	x	0.33	=	1,665.82	4,023.22
15	6,008.53	–	418.33	=	5,590.20	x	0.33	=	1,844.77	4,202.17
Total:	105,064.98	–	64,315.32	=	40,749.66	x	0.33	=	13,447.39	

* Total annual mortgage payment difference ($\$196.45 \times 12$) plus the total annual lost tax savings.

Table 5.
Annuity Factors for Various Interest Payments and Number of Years

No. Yrs.	5%	6%	7%	8%	9%	10%	11%	12%
5	5.526	5.637	5.751	5.867	5.985	6.105	6.228	6.353
10	12.578	13.181	13.816	14.487	15.193	15.937	16.722	17.549
15	21.579	23.276	25.129	27.152	29.361	31.772	34.405	37.280
20	33.066	36.786	40.995	45.762	51.160	57.275	64.203	72.052
25	47.727	54.865	63.249	73.106	84.701	98.347	114.413	133.334
30	66.439	79.058	94.461	113.283	136.308	164.494	199.021	241.333