

Should the Home Mortgage Be Paid Off?

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ABSTRACT

Families in the United States have home ownership as a goal. The United States Congress considers home ownership so important that the Federal income tax code allows interest paid on home mortgages to be deducted before computing personal income tax liability. The favorable tax status of mortgage interest led some financial planners to tell families, "the mortgage should not be paid off since interest expense reduces your tax liability." It is the purpose of this paper is to address the questions, "How desirable is a home mortgage?" How much tax will a family save if they do not pay off the home mortgage?

INTRODUCTION

The Government of the United States has encouraged the private ownership of homes since the 1930's. Prior to the 1930's the typical mortgage was for five years with a down payment of 40%. Only interest was paid until the final principle payment or balloon payment.¹ When the economic depression hit families were unable to pay off the balances on their mortgages and many lost their homes.

To aid recovery from the depression Congress created the Federal Housing Administration in 1934. The FHA's insurance program protected mortgage lenders from default on long-term fixed rate loans. However, long-term loans were not popular with lending institutions so in order to refinance FHA insured loans Congress created the Federal National Mortgage Association.²

The Congress of the United States has also encouraged home ownership through income tax laws. The Internal Revenue Code, Section 163(h) sets out the conditions under which a taxpayer may deduct interest on a home mortgage from his or her income before computing the personal tax liability. The tax code defines what a qualified residence is and how much interest is deductible. The Code states that the interest paid on "acquisition indebtedness" may not exceed \$1,000,000 (\$500,000 in the case of a married couple filing separately).³

Because of the favorable tax status of interest paid on home mortgages many financial planners tell families, "the house should not be paid off since the interest expense reduces your tax liability." But is this really true? Before telling a family they should not pay off the home mortgage the financial planner should know the goals of the family.

¹ <http://www.ginniemaec.gov/about/History.asp?Section=About>

² Ibid.

³ IRC, Sec 163(h)

It is the purpose of this paper to address the question, "How desirable is it to have a home mortgage?" And as one might suspect, the answer depends on the family's goals. Does the family have the goal of maximizing long-term wealth or does the family have the goal of maximizing discretionary income? And, just how much tax will a family save if they opt not to pay off the home mortgage?

COMPUTATION OF A HOUSE PAYMENT

The formula used to compute a house payment can be found in books on personal finance, corporate finance, investments, accounting and economics. In this discussion the term "house payment" will mean only the payment to interest and principle. Typically "house payment" would include the four items of interest, principle, insurance and property taxes. T

he standard formula for computing a house payment is:

$$\text{Annual Payment} = \frac{\$ \text{Borrowed}}{\text{Present Value Factor}} \quad (1)$$

Where the present value factor is:

$$\text{PVF} = \frac{1 - (1+i)^{-t}}{i} \quad (2)$$

"i" is the annual rate of interest.

"t" is the life of the loan in years.

Most house payments are made monthly. The formula can be modified to compute monthly payments by dividing the annual interest rate (i) by 12 (this is the monthly interest rate) and multiplying the variable "t" (number of years) by 12 (number of payments in a year) to reflect the total number of payments made during the life of the mortgage.⁴

To demonstrate the computation of an annual payments assume a family is borrowing \$75,000 for 30 years with a fixed annual interest rate of 6.00%. By substituting into the above formula the present value factor would be 13.76483 and the payment would be \$5,449 annually.

Amortizing a loan is the process by which a loan is paid off. The following table presents the annual amortization of a \$75,000, 30-year loan with a 6.00% annual interest rate. The annual payment is \$5,449.

Year	Beginning Balance	Annual Payment	Interest Payment	Principle Payment	Ending Balance
1	\$75,000	\$5,449	\$4,500	\$ 949	\$74,051
2	74,051	5,449	4,443	1,006	73,046
3	73,046	5,449	4,383	1,066	71,980
4	71,980	5,449	4,319	1,130	70,850
5	70,850	5,449	4,251	1,198	69,652
6	69,652	5,449	4,179	1,270	68,383
7	68,383	5,449	4,103	1,346	67,037
8	67,037	5,449	4,022	1,426	65,611
9	65,611	5,449	3,937	1,512	64,099

⁴ The formula for monthly payments would be:

$$\text{PVF} = \frac{1 - (1 + (i/12))^{-n}}{i/12}$$

Year	Beginning Balance	Annual Payment	Interest Payment	Principle Payment	Ending Balance
10	64,099	5,449	3,846	1,603	62,496
11	62,496	5,449	3,750	1,699	60,797
12	60,797	5,449	3,648	1,801	58,996
13	58,996	5,449	3,540	1,909	57,087
14	57,087	5,449	3,425	2,023	55,064
15	55,064	5,449	3,304	2,145	52,919
16	52,919	5,449	3,175	2,274	50,645
17	50,645	5,449	3,039	2,410	48,235
18	48,235	5,449	2,894	2,555	45,681
19	45,681	5,449	2,741	2,708	42,973
20	42,973	5,449	2,578	2,870	40,103
21	40,103	5,449	2,406	3,043	37,060
22	37,060	5,449	2,224	3,225	33,835
23	33,835	5,449	2,030	3,419	30,417
24	30,417	5,449	1,825	3,624	26,793
25	26,793	5,449	1,608	3,841	22,952
26	22,952	5,449	1,377	4,072	18,880
27	18,880	5,449	1,133	4,316	14,564
28	14,564	5,449	874	4,575	9,990
29	9,990	5,449	599	4,849	5,140
30	5,140	5,449	308	5,140	0

The loan has a beginning balance of \$75,000 in the first year. During the year the borrower would owe interest of 6%, or \$4,500. From the annual payment of \$5,449 the interest payment is deducted. The difference is the payment made to reduce the principle. In the first year the principle payment is \$949 leaving a remaining balance on the loan of \$74,051.

This process continues throughout the life of the loan. In the last year the balance at the beginning of the year is \$5,140. The annual payment is \$5,449. Of this \$308 is interest, \$5,140 is principle and once the payment is made the loan is fully amortized or paid off.

PERSONAL TAXES

The Internal Revenue Services publishes personal income tax rates. The 2002 rates are presented in the following table.⁵ What is of importance is the marginal tax rate, that is, the proportion of last dollar earned that is paid in taxes.

	Single Individuals	Head of Household	Married Filing Jointly	Married Filing Separately
10.0%	\$0 to \$6,000	\$0 to \$10,000	\$0 to \$12,000	\$0 to \$6,000
15.0%	\$6,001 to \$27,950	\$6,001 to \$37,450	\$6,001 to \$46,700	\$6,001 to \$23,350
27.0%	\$27,951 to \$67,700	\$37,451 to \$96,700	\$46,701 to \$112,850	\$23,351 to \$56,425
30.0%	\$67,701 to \$141,250	\$96,701 to \$156,600	\$112,815 to \$171,950	\$56,425 to \$85,975
35.0%	\$141,251 to \$307,050	\$156,601 to \$307,050	\$171,951 to \$307,050	\$85,976 to \$153,525
38.6%	\$307,051 and over	\$307,051 and over	\$307,051 and over	\$153,526 and over

⁵ These rates are from Bracy & Nebblett at bracynebblett@consultant.com

As the table shows, the marginal tax rate can range from 10%, for a person who has earnings of \$1.00, to 38.6% for persons earning \$307,051 and over. It would be half of this amount, or \$153,525, for married persons filing separately.

It is the marginal tax rate that determines the size of the tax saving created by home interest expense. It would be easy to say it is the income level that determines the tax savings but Congress can change the marginal tax rate at any time. Thus, income is important but the marginal tax rate paid at the income level is what ultimately determines the tax savings.

A HYPOTHETICAL

Consider the situation of a married couple with two dependent children. The family earns a dual salary and has a taxable income of \$80,000 per year before consideration of the home mortgage payment. The couple has recently inherited \$75,000 net of taxes. They have asked their financial advisor the question: "should we use the inheritance to pay off the mortgage, or should we continue to have house payments and invest the inheritance."

Often the financial advisor answers, "keep the house payment because the interest payment will reduce your federal tax liability." However, the proper response to the question depends on the goals of the family. The question that should have been asked is, "What are the family's goals?" The two questions expressing the two financial extremes are:

1. Is the goal to maximize the family's long term wealth, or
2. Is the goal to maximize the family's discretionary income.

Question 1. Maximizing the family's long term wealth.

If the goal is to maximize the family's long-term wealth then the inheritance should be invested and the family continues to make house payments. This is because of the significance of time when compounding interest over time.

Consider the \$75,000 investment earning 6.00% per year. The following table shows the future value of the investment for different lengths of time. If \$75,000 were invested at 6.00% for 4 years the principle would grow to \$94,686. If the money were invested for thirty years the future value would be \$430,762. The thing to note is the interest earned each year is compounded.

Year	Amount	Year	Amount	Year	Amount
1	79,500	11	142,372	21	254,967
2	84,270	12	150,915	22	270,265
3	89,326	13	159,970	23	286,481
4	94,686	14	169,568	24	303,670
5	100,367	15	179,742	25	321,890
6	106,389	16	190,526	26	341,204
7	112,772	17	201,958	27	361,676
8	119,539	18	214,075	28	383,377
9	126,711	19	226,920	29	406,379
10	134,314	20	240,535	30	430,762

This analysis assumes the return earned on the investment is free of Federal tax. Had the earnings each year been taxed at the 27% marginal tax rate the investment would grow to \$271,381.

Question 2. Maximizing the family's discretionary income.

While it is true that having the interest deduction from a home mortgage does decrease the Federal income tax liability the discretionary income is reduced by considerably more than the tax savings. The following table compares the discretionary income of the family without a house payment to the discretionary income of a family with a house payment. The example is for the first year of the mortgage only.

The table shows an income of \$80,000. The annual house payment is \$5,449. The interest portion of the house payment, \$4,500, is a pretax expense. The taxable income with no house payment is \$80,000 while the taxable income with the house payment is \$75,500. The tax liabilities with and without the house payment are \$20,835 and \$21,600 respectively. The difference in the tax liabilities, \$1,215, is the tax savings from the home mortgage interest expense.

To obtain the tax savings of \$1,215 the family has spent \$5,449 in house payments. To generate the tax savings the family has reduced the discretionary income by \$4,234 (house payment of \$5,449 less the tax savings of \$1,215). The reduction in discretionary income is also the difference between the earnings after taxes plus the principal payment, \$58,400 less \$55,115 plus \$949.

	With House Payment	No House Payment	Tax Savings
Income	\$80,000	\$80,000	
Mortgage Payment	5,499		
Income after house payment	\$74,551	\$80,000	
Income	\$80,000	\$80,000	
Interest	4,500		
Taxable Income	\$75,500	\$80,000	
Taxes (MTR = 27%)	20,835	21,600	\$1,215
Earnings after taxes	\$55,115	\$58,400	

The reduced tax liability of \$1,215 occurs during the first year of the mortgage. Since the balance on the loan is being reduced each year the interest deduction is decreasing each year. This causes the tax savings and the discretionary income to decrease each year. The following table presents the results.

Year	Beginning Balance	Annual Payment	Interest	Principal	Ending Balance	Tax Savings	Reduced Discretionary Income
1	\$75,000	\$5,449	\$4,500	\$ 949	\$74,051	\$1,215	\$4,234
2	74,051	5,449	4,443	1,006	73,046	1,200	4,249
3	73,046	5,449	4,383	1,066	71,980	1,183	4,265
4	71,980	5,449	4,319	1,130	70,850	1,166	4,283
5	70,850	5,449	4,251	1,198	69,652	1,148	4,301
6	69,652	5,449	4,179	1,270	68,383	1,128	4,320
7	68,383	5,449	4,103	1,346	67,037	1,108	4,341
8	67,037	5,449	4,022	1,426	65,611	1,086	4,363
9	65,611	5,449	3,937	1,512	64,099	1,063	4,386
10	64,099	5,449	3,846	1,603	62,496	1,038	4,410
11	62,496	5,449	3,750	1,699	60,797	1,012	4,436
12	60,797	5,449	3,648	1,801	58,996	985	4,464
13	58,996	5,449	3,540	1,909	57,087	956	4,493
14	57,087	5,449	3,425	2,023	55,064	925	4,524

Year	Beginning Balance	Annual Payment	Interest	Principal	Ending Balance	Tax Savings	Reduced Discretionary Income
15	55,064	5,449	3,304	2,145	52,919	892	4,557
16	52,919	5,449	3,175	2,274	50,645	857	4,591
17	50,645	5,449	3,039	2,410	48,235	820	4,628
18	48,235	5,449	2,894	2,555	45,681	781	4,667
19	45,681	5,449	2,741	2,708	42,973	740	4,709
20	42,973	5,449	2,578	2,870	40,103	696	4,753
21	40,103	5,449	2,406	3,043	37,060	650	4,799
22	37,060	5,449	2,224	3,225	33,835	600	4,848
23	33,835	5,449	2,030	3,419	30,417	548	4,901
24	30,417	5,449	1,825	3,624	26,793	493	4,956
25	26,793	5,449	1,608	3,841	22,952	434	5,015
26	22,952	5,449	1,377	4,072	18,880	372	5,077
27	18,880	5,449	1,133	4,316	14,564	306	5,143
28	14,564	5,449	874	4,575	9,990	236	5,213
29	9,990	5,449	599	4,849	5,140	162	5,287
30	5,140	5,449	308	5,140	0	83	5,365
		\$163,460	\$88,460	\$75,000			

Another way to consider the benefit of the tax savings is to look at the total interest paid over the life of the loan. The preceding table shows the annual house payment of \$5,449 results in a total expenditure of \$163,460 over 30 years. Of this, \$88,460 is interest and \$75,000 is principal.

The tax savings resulting from the interest expense is the total interest times the marginal tax rate, \$88,460 times 27%, or \$23,884. The decrease in discretionary income is the total expense, \$163,460, less the tax savings, \$163,460 less \$23,884, or \$139,576. These figures will change with the family's marginal tax rate. The following table presents the total payments throughout the life of the 30-year mortgage, the tax savings and the decrease in discretionary income for various marginal tax rates. As would be expected, as the marginal tax rate increases the tax savings increases.

Marginal Tax Rate	Total Payments	Total Interest	Tax Savings	Decreased Discretionary Income
10.0%	\$163,460	\$88,460	\$ 8,846	\$154,614
15.0%	163,460	88,460	13,269	150,191
27.0%	163,460	88,460	23,884	139,576
30.0%	163,460	88,460	26,538	136,922
35.0%	163,460	88,460	30,961	132,499
38.6%	163,460	88,460	34,146	129,314

In general the difference in discretionary income can be computed using the following steps.

1. House payment times # of payments, $5,449 * 30 = \$163,460$
2. Subtract the amount borrowed
This leaves the total interest paid over the life of the mortgage. 75,000
\$ 88,460
3. Multiply the total interest paid by the marginal tax rate.
This is the total tax savings over the life of the mortgage. 27%
\$ 23,884
4. Subtract the tax savings from the total amount paid, (\$163,460 less \$23,884). This is the decrease in

discretionary income over the
life of the mortgage.

\$139,576

CONCLUSIONS

The argument that one should have a house payment because the interest expenses reduces the Federal tax liability is true. But it does not make since to have a house payment for this reason. With a 10% marginal tax rate the savings in taxes is \$8,846 and the loss of discretionary income is \$154,614. If the marginal tax rate is 38.6% the tax savings is \$34,146 while the loss of discretionary income is \$129,314. The tax savings would be increased if there are state and/or local income taxes.

There are additional reasons for having no house payments. The home is free and clear. This give great peace of mind to many people, or stated differently is a psychic benefit. Owning one's home is protection if one looses his or her job through reduction in force, firing, accident or ill health. The equity in a home also provides a source of funds in an emergency or for the college education of a family member.

Age may be a reason to not have a house payment. A family finds a house they like but do not wish to have a home mortgage during retirement.

Finally, additional disposable income may provide the family with the opportunity for more elaborate vacations. Children remember the year the family went to the ocean, Disneyland, the mountains or Western Kansas. Children do not remember the year the family saved on Federal income taxes because there was a house payment that had a tax deductible interest payment.

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