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## CASE STUDY

## IS OWNING A HOME A NET GAIN OR NET LOSS OVER TIME?

## Background

The Carroltons are deliberating whether to purchase a house or continue to rent for the next 10 years. They are assured by both of their employers that no transfers to new locations will occur for at least this number of years. Plus, the high school that their children attend is very good for their college prep education, and they all like the neighborhood where they live now.

They have a total of \$40,000 available now and estimate that they can afford up to \$2850 per month for the total house payment.

If the Carroltons do not buy a house, they will continue to rent the house they currently occupy for \$2700 per month. They will also place the \$40,000 into an investment instrument that is expected to earn at the rate of 6% per year. Additionally, they will add to this investment at the end of each year the same amount as the monthly 15-year mortgage payments. This alternative is called the rent-don't buy plan.

## Information

Two financing plans using fixed-rate mortgages are currently available. The details are as follows.

Plan	Description
A	30-year fixed rate of 5.25% per year interest; 10% down payment
B	15-year fixed rate of 5.0% per year interest; 10% down payment

Other information:

- Price of the house is \$330,000.
- Taxes and insurance (T&I) are \$500 per month.
- Up-front fees (origination fee, survey fee, attorney's fee, etc.) are \$3000.

Any money not spent on the down payment or monthly payment will be invested and return at a rate of 6% per year (0.5% per month).

The Carroltons anticipate selling the house after 10 years and plan for a 10% increase in price, that is, \$363,000 (after all selling expenses are paid)

## Case Study Exercises

1. The 30-year fixed-rate mortgage (plan A) is analyzed below. No taxes are considered on proceeds from the savings or investments.

Perform a similar analysis for the 15-year loan (plan B) and the rent-don't buy plan. The Carroltons decided to use the largest future worth after 10 years to select the best of the plans. Do the analysis for them and select the best plan.

## Plan A analysis: 30-year fixed-rate loan

Amount of money required for closing costs:	
Down payment (10% of \$330,000)	\$33,000
Up-front fees (origination fee, attorney's fee, survey, filing fee, etc.)	3,000
Total	\$36,000

The amount of the loan is \$297,000, and equivalent monthly principal and interest (P&I) is determined at  $5.25\%/12 = 0.4375\%$  per month for  $30(12) = 360$  months.

$$A = 297,000(A/P, 0.4375\%, 360) = 297,000(0.005522) = \$1640$$

Add the T&I of \$500 for a total monthly payment of

$$\text{Payment}_A = \$2140 \text{ per month}$$

The future worth of plan A is the sum of three future worth components: remainder of the \$40,000 available for the closing costs ( $F_{1A}$ ); left-over money from that available for monthly payments ( $F_{2A}$ ); and increase in the house value when it is sold after 10 years ( $F_{3A}$ ). These are calculated here.

$$F_{1A} = (40,000 - 36,000)(F/P, 0.5\%, 120) = \$7278$$

Money available each month to invest after the mortgage payment, and the future worth after 10 years is

$$\begin{aligned} 2850 - 2140 &= \$710 \\ F_{2A} &= 710(F/A, 0.5\%, 120) \\ &= \$116,354 \end{aligned}$$

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Net money from the sale in 10 years ( $F_{3A}$ ) is the difference between the net selling price (\$363,000) and the remaining balance on the loan.

$$\begin{aligned} \text{Loan balance} &= 297,000(F/P, 0.4375\%, 120) \\ &\quad - 1640(F/A, 0.4375\%, 120) \\ &= 297,000(1.6885) - 1640(157.3770) \\ &= \$243,386 \end{aligned}$$

$$F_{3A} = 363,000 - 243,386 = \$119,614$$

## Total future worth of plan A is

$$\begin{aligned} F_A &= F_{1A} + F_{2A} + F_{3A} \\ &= 7278 + 116,354 + 119,614 \\ &= \$243,246 \end{aligned}$$

2. Perform this analysis if all estimates remain the same, except that when the house sells 10 years after purchase, the bottom has fallen out of the housing market and the net selling price is only 70% of the purchase price, that is, \$231,000.



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