Is a House a Good Investment?

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Part of the American Dream is to own your own home, whether it be a log cabin in Oregon, a farmhouse in Iowa, or a penthouse in Manhattan. The financial reality is that a home is the largest investment most people ever make. For many, it becomes their most profitable investment; for some, it becomes a financial and emotional disaster.

How can we tell whether a house is likely to be a profitable or unprofitable investment? Residential real estate is usually valued by looking at "comps"—the prices for recent transactions involving comparable homes. The comps may be analyzed informally by realtors, or systematically by multiple regression models and other statistical techniques (e.g., Isakson 1998; Detweiler and Radigan 1996, 1999; Nguen and Cripps 2001). Comps can help us judge whether the price of a particular house is high or low relative to the prices of other houses, but they tell us nothing about whether housing prices are high or low in an absolute sense—whether the economic value of a house justifies its price.

Some clients ask questions about housing prices. First-time homebuyers may ask, "Is now a good time to buy?" Clients who are buying a house may ask if they should make a larger or smaller downpayment. Clients who already own homes may ask if trading up is a good investment, or if downsizing is a smart financial move. We have also had clients ask if we are in a housing bubble and if they should sell their houses and rent until sanity returns. If they don't ask these questions, perhaps they should. The largest investment they will ever make should be analyzed with at least as much care as their other investments.

One appealing way to address these questions is to determine the present value of the anticipated cash flow from a house. This is a robust and well-established procedure that is widely used to value bonds, stocks, business projects, and commercial and industrial real estate. It is can also be used to value owner-occupied houses.

The Rent Alternative

The primary cash flow from owner-occupied housing is the rental payments a homeowner would otherwise have to pay. Some authors recognize that renting is an alternative to buying a house, but simply list the pluses and minus of buying and renting (Goodman 2001, Miller 2002, Orman 2001).

A more substantive approach is to compare the monthly mortgage payments with the monthly rent for a similar property. For example, in its 2002 housing report, the Joint Center for Housing Studies of Harvard University estimated that in 2001 the average renter paid $481 per month while the buyer of the median single-family home paid $821 in after-tax monthly mortgage payments. This comparison is obviously flawed. The median single-family home isn't necessarily equivalent to the average rental property. Even if it were, the monthly mortgage payments depend on the size of the downpayment and the length of the mortgage. Suppose, for an extreme example, that someone paid cash for a house and had no mortgage payments. Is buying therefore better than renting? Also, the Harvard calculations don't consider that rents can be expected to increase over time, while mortgage payments are constant and end when the loan is repaid.

UCLA's Anderson Forecast recommends, analogous to stocks, looking at a house's P/E: the ratio of the house's market value to its annual rental value. (Feldman 2003). However, their data are not actual housing prices and rents but price indexes and rent indexes. Because index levels are meaningless, they look at the changes in each index and see signs of a housing bubble when the price index increases faster than the rent index. However, just as with stocks, there are valid reasons for P/Es to go up and down and for different housing markets to have different P/Es. If interest rates fall, as they did between 1993 and 2002, the P/Es for stocks, houses, and other assets should rise. Houses with rapidly growing rents should have high P/Es. In fact, their data show that the housing markets with the strongest P/Es are those in which rents were increasing the most rapidly. Anderson Forecast's fundamental principle—that houses can be valued the way stocks are valued—is valid. However, just as with stocks, we need a model to project future earnings and, just as with stocks, the P/E is suggestive, but not definitive.

Quinn (1997) shows a table that compares the costs of buying and renting, taking into account rent increases, but this table ignores property taxes, utilities, and maintenance and other expenses, and assumes a 7-year holding period. Personal finance textbooks are not much better. For example, Keown (1998) uses a worksheet with a 7-year horizon that neglects present value and rent increases. Ramaglia and MacDonald (1999) does the same, but additionally ignores the equity component of mortgage payments, the appreciation in a house's value, and selling costs.

Our clients deserve a thoughtful analysis. This article will discuss the relevant financial principles and show how to use a spreadsheet to compare buying and renting by calculating the present value of a house's cash flow.

Intrinsic Value

The best way to answer the question of whether a house is a good investment is to think of houses the same way we think of stocks and apply the same intrinsic-value principles. When we consider buying stock, the proper question is not whether it is a good company, but whether the stock is cheap or expensive. Is it worth what it costs? When we consider buying a house, we should ask the same question—not whether it is a good house, but whether the house is cheap or expensive. Is it worth what it costs?

The intrinsic value of a stock depends on its cash flow. The same is true of a house, with the wrinkle that one of the financial benefits of owning a home is not having to pay rent to someone else. The intrinsic value calculations for a house are a bit messy, and are best done with a spreadsheet. But first, let's develop some insight through a simplified analysis.

Paying Cash

Consider first the unlikely case where you pay cash for a house, the same way that you might pay cash for a stock. Just like a stock, your rate of return consists of the income and the capital gain or loss:

$$\text{percentage rate of return} = 100\text{x}\left(\frac{\text{income}}{\text{price}}\right) + \text{percentage capital gain}$$

The income from a stock is the dividends. If you pay $100 for a stock that currently pays an annual dividend of $2, the income is 2%; if the stock's price increases by 7%, your total rate of return is 9%.

For a house, the income is the rent you would otherwise have to pay to live in this house minus the expenses associated with home ownership. If you would otherwise pay $2,500 a month ($30,000 a year) to rent this house, home ownership implicitly gives you $30,000 that you otherwise would pay to someone else. On the other hand, as a homeowner, you will have to pay property taxes, insurance, maintenance, and some utilities that you would not have to pay directly if you were a renter. If these expenses are $18,000 a year, then your implicit net annual income is $30,000 - $18,000 = $12,000. If the price of this house is $400,000, then the $12,000 net income provides a 3% return: 100x($12,000/$400,000) = 3%.

To this we add the capital gain. A simple procedure would be to predict the rate of increase in the consumer price index (CPI) and assume that housing prices will rise by a comparable amount. If, for example, the CPI is predicted to increase by 5 percent a year, you might assume that housing prices will increase by 5 percent a year, too. Adding a 5% capital gain to the 3% income gives a total return of 8%.

Although this analysis is for a single year, it works year after year if housing income and prices increase at identical rates, which would keep the income/price ratio constant. Here, if income and price rise by 5% annually, the income/price ratio will stay at 3% and the annual percentage return will continue to be 8%.

If housing income and prices do not increase at the same rate, then the income/price ratio (and its inverse, the price/income ratio) will change over time. Suppose, for example, that price/income ratio for a group of houses is $400,000/$12,000 = 33.33 and that housing income increases by 5% a year. If housing prices also increase by 5% a year, the price/income ratio will stay at 33.33. If, instead, housing prices increase by 10% a year, the price/income ratio will increase by about 5% a year, to 53 after 10 years and 85 after 20 years. If, on the other hand, housing income increases by 5% a year and housing prices are constant, the price/income ratio will fall by about 5% a year, to 20 after 10 years and 13 after 20 years. These sorts of calculations can provide a reality check if we are tempted to assume that prices will increase at a substantially faster or slower rate than income over an extended period of time.

Leverage

A client bought her first house in 1971 for $28,000. She made a $4,000 downpayment and borrowed $24,000. Seven years later, she sold the house for $56,000, twice what she paid for it. This works out to an impressive, but not extraordinary, return of 10.4 percent a year.

But wait! She only invested $4,000 of her own money in this house. Let's see how much her equity increased. The monthly payments on a 30-year mortgage don't reduce the principal much for the first several years and, indeed, she still owed the bank almost $22,200 when she sold this house. After repaying the mortgage, her $4,000 investment in 1971 turned into $56,000 - $22,200 = $33,800 of equity in 1978. A 100 percent increase in the value of the house increased her equity by 745 percent, from $4,000 to $33,800! Her annualized return was 35.6 percent. All she did was buy a rather ordinary house that appreciated by 10.4 percent a year, and she made 35.6 percent a year—better than Warren Buffett.

The point of this story is not that this client is a better investor than Warren Buffett—she's not—but that the leveraged purchase of a house can be an astonishingly profitable investment. In this example, $4,000 in equity was used to reap the returns on a $28,000 house, which created 7-to-1 leverage: $28,000/$4,000 = 7.

You may have noticed that we left out some details, like the rental savings and the mortgage payments. We will soon see how to take these into account. The general principle for leverage is that your financial success depends on whether your investment return from the house (the net income plus capital gain) is greater than the mortgage rate. If it is, the extraordinary leverage involved in most home purchases can make a house the most profitable investment you will ever make. If it isn't, it can be a money pit.

A More Complete Analysis

We've now discussed two issues that are crucial to understanding the financial implications of home ownership:

- The return on a house is the net rental savings plus the capital gains.
- Leverage works in your favor if the house's rate of return is greater than the mortgage rate.

A full analysis is complicated by several factors: (a) unlike other expenses, mortgage payments don't grow each year; (b) a mortgage has a finite life; (c) mortgage payments build equity; and (d) the part of the annual mortgage payment that is tax-deductible interest declines over time. We can use a spreadsheet to handle this complexity. We record each cash payment or receipt as it occurs so that we can take into account the time value of money. If we are sticklers for timing, we can use the exact dates on which mortgage payments are made, property taxes are paid, and so on. Because the cash flows are guesstimates, it is generally sufficient to work with monthly or annual approximations.

The guiding principle is to determine the after-tax cash flow each year. Don't be sidetracked by accounting labels. All we really care about are the dollars coming in and dollars going out. Cash is king! In general, the equation for the net present value (NPV) looks like this

$$NPV = -\text{downpayment} + \frac{X_1}{(1+R)^1} + \frac{X_2}{(1+R)^2} + \ldots + \frac{X_n}{(1+R)^n} + \frac{(\text{sale proceeds}) - (\text{mortgage balance})}{(1+R)^n}$$

where the cash flows are discounted by the homebuyer's required rate of return R. The initial cash flow is equal to the downpayment and other closing costs. The net cash flows X_t until the sale of the house consist of each period's rental savings net of the mortgage payments and other expenses associated with home ownership. The final cash flow is the sale price net of the brokerage commission and other expenses and the mortgage balance including any prepayment penalties.

The required return R depends on the rates of return available on other investments. The initial downpayment ties up funds that could otherwise be invested in bonds, stocks, and other assets; as the years pass, the net rental savings free up funds that can be reinvested elsewhere. The required return depends on current interest rates but, because there is considerable uncertainty about the net cash flow from a house, a homebuyer may use a required return similar to that applied to stocks and comparably risky investments.

A free program for calculating a house's NPV is available at this web site: http://www.smithfinancialplace.com. Table 1 shows a summary spreadsheet for HW, a single 34-year-old college professor who lives in a Los Angeles suburb. She was looking at a 3-bedroom, 2-bath house with approximately 2,000 square feet of living space located in an attractive area with similar homes. The price of the house was $400,000 and she would make an $80,000 down payment. We assume that rents, housing prices, and most of her housing expenses will grow by 4% a year. Although we used monthly data, Table 1 shows an annual summary for selected years, with the variables defined in the Appendix.

In our example, the net cash flow is negative for the first 7 years, but the homeowner is building up equity in an appreciating asset and the NPV is positive by the fourth year. Figure 1 shows the NPVs for 5-, 10-, and 20-year horizons using required returns ranging from 0 to 20%. The NPVs increase with the holding period because (a) the mortgage payments are fixed while the net rental savings grow over time, causing the cash flow to go from negative to increasingly positive; and (b) the homeowner is building up equity in an appreciating asset. HW should buy if her NPV is positive and rent otherwise. Here, the NPV is generally positive unless she requires a double-digit after-tax return. If she has an 8% required return and anticipates staying in the house for 10 years, her $80,000 investment has a net present value of $35,000. In the current financial environment, few investments look so promising.

What a Difference a Model Makes

This example illustrates the weaknesses of simpler approaches. For instance, it is clearly misleading to ignore property taxes, utilities, insurance, and maintenance—which, on an after-tax basis, are approximately two-thirds the size of mortgage payments.

Even if these other expenses are taken into account, it misleading to compare the initial annual cost of home ownership with the initial annual rent. In our example, the annual cash flow is negative the first year, with the rent $3460 less than the mortgage payments plus other expenses. Those who simply compare current rent with current housing expenses would conclude that renting is less expensive. But the rent saving grows over time, while the mortgage payments do not, and the mortgage payments build up equity in an increasingly valuable property. Even with the 8% sales expense, HW can anticipate a large positive NPV if she lives in the house for more than a few years.

More generally, the after-tax cash flow from buying a house is typically small or negative for the first few years, as the rental savings barely cover (or fail to cover) the costs of home ownership. As time passes, with rent growing and mortgage payments fixed, the after-tax cash flow becomes a substantial positive number. In addition, the homeowner's equity is growing, but can easily be swamped by substantial selling costs if the house is sold soon after purchase. These transaction costs underlie the generally sound advice that most people should not buy a house unless they plan to keep it for a while.

This cash-flow structure also creates a potentially fatal flaw for analyses that examine just one horizon of, say, 3, 5, or 7 years. Suppose we look at a 3-year horizon and find that the NPV is negative. This doesn't necessarily mean that the house is a bad investment. Maybe it will be a good investment if we stay in the house for 7 years. Or maybe it won't. The only way to find out is to look at several horizons. Similarly, suppose we look at a 7-year horizon and find that the NPV is positive. That doesn't necessarily mean that the house is a good investment if we stay in the house for only 3 years.

What about the house's P/E? In our example, the current P/E is $400,000/$24,000 = 16.7. Is that high or low? We can't tell unless we look at the other costs and benefits of home ownership, consider projected growth rates, and take into account current market interest rates. What about the change in the P/E? This is even less informative. Housing prices happen to have increased much faster than rents in this particular area over the past several years, causing the housing P/E to increase substantially. But an increased P/E doesn't necessarily mean this house is a bad investment. With our plausible assumptions, this house looks like an excellent investment.

What Matters Most?

Don't be dismayed by the fact that you cannot provide exact values for the future cash flow. We don't need to know the values to the last penny. The way to handle imperfect knowledge is to try a range of values. More generally, it is a good idea to do a sensitivity analysis to see whether the buy/rent decision is reasonably robust or depends critically on certain key assumptions. We will show three examples.

First consider mortgage rates of 8% and 10%, in addition to the 6% base case. Figure 2 shows the NPVs for a 10-year horizon. The effects of mortgage rates on the NPVs are very strong because the financial market conditions that increase interest rates also increase the prospective buyer's required rate of return. Suppose, for simplicity, that the mortgage rate and required return both increase from 6% to 8% and then 10%. The NPV falls from $62,246 (point A) to $9,307 (point B) and then -$34,444 (point C). Two conclusions are apparent: (a) higher interest rates make buying less appealing, and (b) an income approach to valuing a house should take mortgage rates into account.

For those clients who ask about the size of their downpayments, we can think of a larger downpayment (or any principal repayment) as an investment with a rate of return equal to the mortgage rate. Whether this is a good or bad idea depends on whether the required rate of return is larger or smaller than the mortgage rate. Figure 3 shows the NPVs for a 10-year horizon and downpayments of 10%, 20%, and 30%. With a 35% marginal tax rate, the after-tax interest rate on a mortgage with a 6% interest rate is (1 - 0.35)*6% = 3.9%. Thus if the homebuyer's after-tax required rate of return is larger than 3.9%; the NPV is increased by a smaller downpayment (and larger loan). If the homebuyer's after-tax required rate of return is less than 3.9%; the NPV is increased by a larger downpayment (and smaller loan). At a 3.9% required return, the size of the downpayment doesn't affect the NPV. If the mortgage rate happens to depend on the size of the downpayment, then we can change both parameters.

Now let's consider how the NPV is affected by the projected growth rate of rent, housing prices, and various expenses. Figure 4 shows the NPVs for a 10-year horizon and 0%, 4%, and 8% growth rates. The growth rate is clearly a crucial parameter. The purchase of this house will not be financially rewarding unless there will be some growth in rents and housing prices.

The price is also a crucial parameter as there is some price at which this house is too expensive. At $400,000, this house looks like a good investment if rents and prices increase at plausible rates. Figure 5 shows the NPVs for a 10-year horizon if the price were $600,000 or $800,000. At $800,000, this house is not financially appealing unless they buyer required return is less than 5.5%.

If HW didn’t have the $80,000 down payment or couldn’t handle the negative cash flow for the first few years or didn’t plan to stay in the house for at least four years, we would have advised her not to buy this house. But she could afford it and she planned to stay in the house for at least 6 years.

She decided to buy the house.

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Appendix: Variables Uses in Table 1

1. The first column records the years.
2. The rent savings are what the client would have to pay to rent this house. We assume that the rent is initially $2,000 a month and grows by 4% a year. One attractive feature of a house's implicit rental income is that it is an after-tax cash flow. If you would pay $24,000 a year in after-tax income to rent a house, then home ownership gives you an extra $24,000 in after-tax cash that you otherwise would pay in rent.
3. The third column records the mortgage payments. We assume a 30-year $320,000 mortgage at a fixed 6% interest rate. We report the total payments here and take into account the tax savings after determining the interest portion of the mortgage payment.
4. Annual property taxes are initially $4,000 (1% of the acquisition cost) and grow by 2% a year, as limited by California's Proposition 13.
5. Mortgage interest and property taxes are an itemized deduction with a tax saving equal to the amount paid multiplied by the client's marginal tax rate. If the client pays state income taxes that are deductible from federal income taxes, the net marginal tax rate is equal to $m = 1 - (1 - f)(1 - s)$, where f is the marginal federal tax rate and s is the marginal state tax rate. HW's marginal tax rate m is 35%.
6. Column 6 encompasses utilities, insurance, maintenance and other expenses that HW will make if she buys instead of renting. These are generally not tax-deductible unless part of the home is used for business purposes. Her anticipated total is $8,520 and is projected to grow by 4% a year. If any major remodeling expenses are anticipated, the cash outlays should be recorded in the year they will occur and any effect on the market value of the house should be recorded in column 8.
7. Column 7 is the net cash flow each year if the house is not sold. This net cash flow is the

sum of the entries in columns 2-6.

8. For the sale price, we assume that the market value of the house increases at the same 4% rate as does the rental value, and that the brokerage commission and other expenses associated with the sale are equal to 8% of the sale price. Capital gains that exceed $250,000 for a single person or $500,000 for a married couple filing jointly are subject to a 15% tax.
9. The mortgage balance is shown with a negative sign since it will be a cash outflow if the house is sold and the mortgage is paid off. The prepayment penalty, if any, should be included if the mortgage is paid off early. This mortgage had no prepayment penalty.
10. Column 10 is the NPV for an 8% after-tax required rate of return. If, for example, the house is sold in year 5, the NPV is calculated using the $80,000 downpayment in year 0, the net cash flow in column 7 for years 1-4, and a net cash flow in year 5 equal to the sum of columns 7, 8, and 9.

Table 1 HW's Analysis, Base Case

1 Year	2 Rent Savings	3 Mortgage Payments	4 Property Taxes	5 Tax Savings	6 Other Expenses	7 Net Cash Flow	8 Net Sales Price	9 Mortgage Balance	10 NPV (R=8%)
1	24000	-23023	-4000	8083	-8520	-3460	382720	-316070	-21773
2	24960	-23023	-4080	8026	-8861	-2978	398029	-311896	-12513
3	25958	-23023	-4162	7964	-9215	-2477	413950	-307469	-4143
4	26997	-23023	-4245	7898	-9584	-1957	430508	-302767	3412
5	28077	-23023	-4330	7826	-9967	-1417	447728	-297774	10219
10	34159	-23023	-4780	7374	-12127	1604	544730	-267794	35035
15	41560	-23023	-5278	6726	-14754	5232	660835	-227356	48038
20	50564	-23023	-5827	5809	-17950	9573	782883	-172811	50273
25	61519	-23023	-6434	4526	-21839	14749	931374	-99239	50192
30	74848	-23023	-7103	2742	-26571	20893	1112035	0	48679

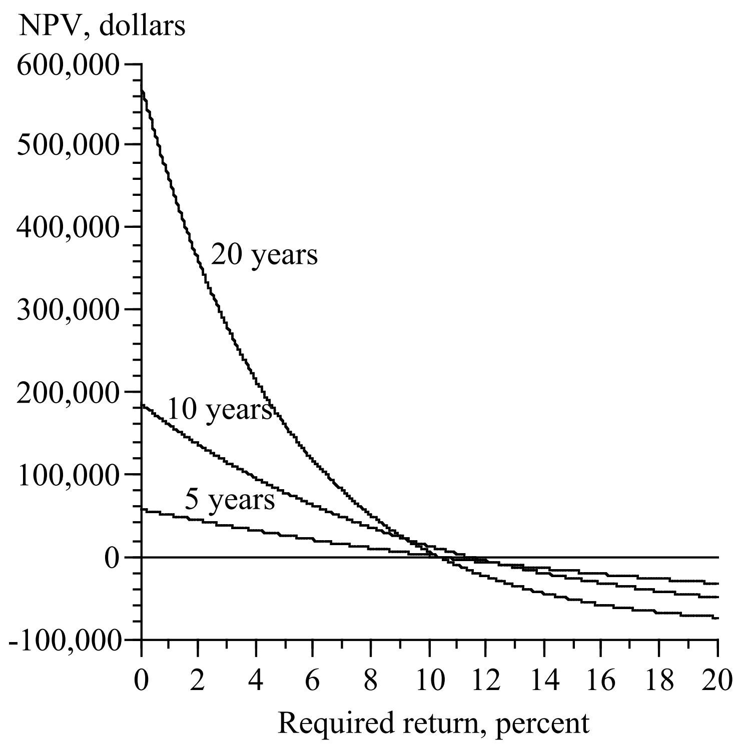

Figure 1 NPVs for Different Horizons

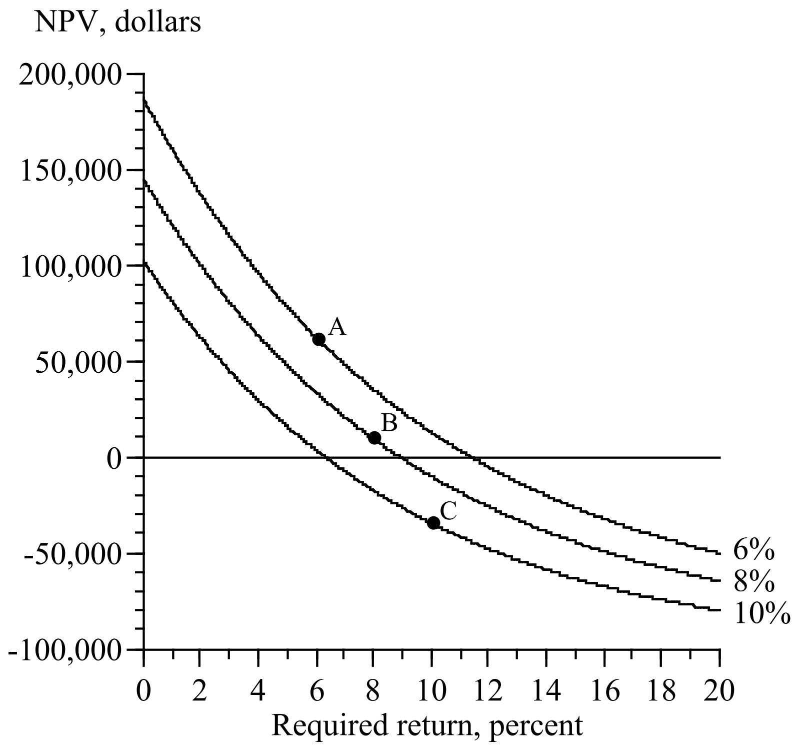

Figure 2 NPVs for a 10-year Horizon and Mortgage Rates of 6%, 8%, and 10%

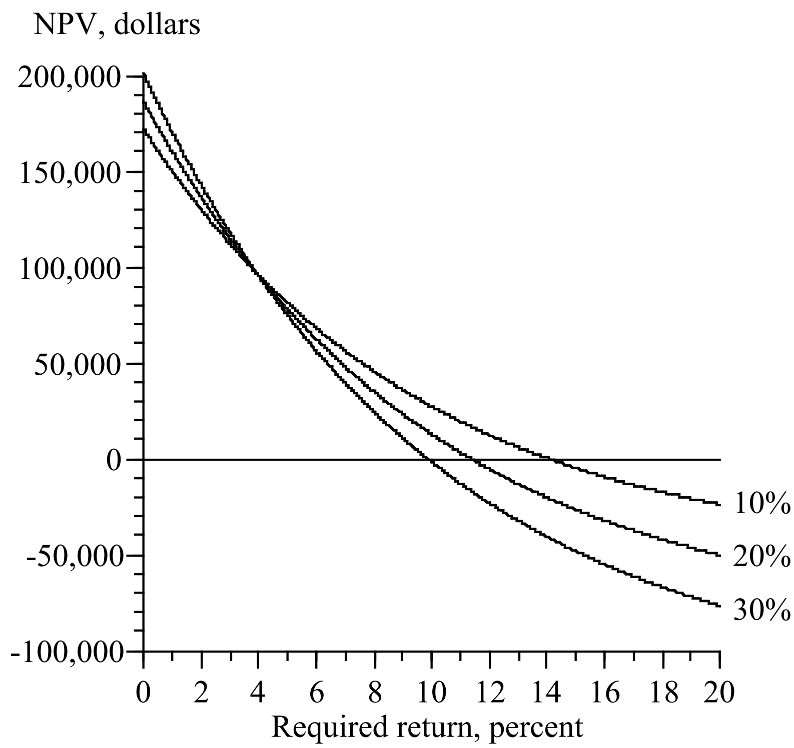

Figure 3 NPVs for a 10-year Horizon and Downpayments of 10%, 20%, and 30%

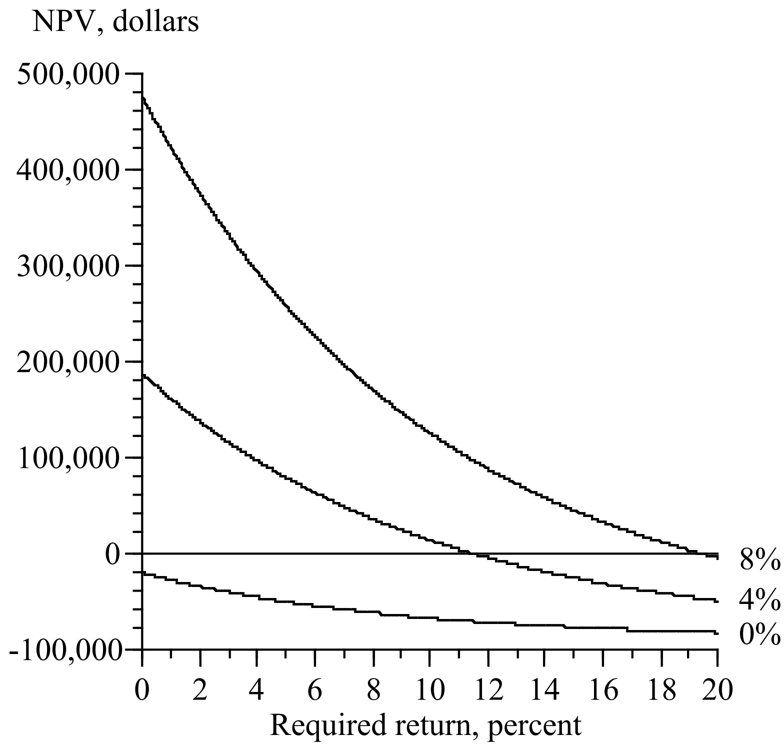

Figure 4 NPVs for a 10-year Horizon and Growth Rates of 0%, 4%, and 8%

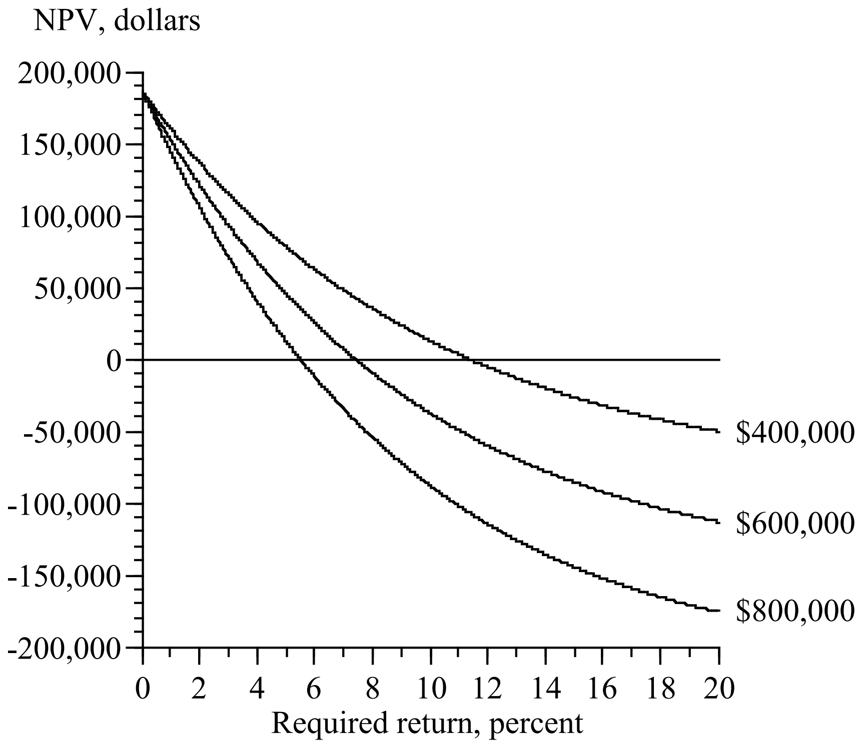

Figure 5 NPVs for a 10-year Horizon and Prices of $400,000, $600,000. and $800,000