

Is There a Housing Bubble in Southern California?

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Abstract

Widespread references to a southern California housing bubble rely on indirect measures, such as rapidly increasing prices, expectations of further large price increases, and rising ratios of housing price indexes to household income and to rent indexes. These indirect measures cannot answer the key question of whether housing prices are far above the fundamental values justified by the anticipated cash flow. Matched-pair data collected in the summer of 2004 for rentals and sales of single-family homes in the San Gabriel Valley indicate that the bubble is not, in fact, a bubble in that these houses are still likely to be a good investment.

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U. S. housing prices have risen 60% in the past decade, which is twice the increase in the consumer price index. This is the biggest real gain in housing prices in the past half century and twice as large as the gains during the real-estate booms in the 1970s or 1980s (McCarthy and Peach 2004). In California, median home prices have increased over 20% a year for the past three years, and an April 13, 2004 Los Angeles Times article entitled “Home Prices in LA Soar at Record Rate,” reported that, “The spectacular gains in Southern California have fueled concerns of a possible housing bubble.”

Many knowledgeable observers believe that there has been a speculative bubble in residential real estate prices, particularly on the coasts, that rivals the dot-com bubble in the 1990s and that will have a similarly unhappy conclusion. A collapse in housing prices would pose serious problems for the economy. A 10-20 percent decline would reduce household wealth by \$1.3 to \$2.6 trillion, and would most likely suppress consumption and GDP growth.

The evidence of a housing bubble has been suggestive, but indirect. We use rent and price data for matched homes in several southern California cities to estimate the fundamental value of these houses. This evidence indicates that the bubble is not, in fact, a bubble in that under a variety of plausible assumptions buying a house at current market prices still appears to be a good long-term investment.

What is a Bubble?

Attempts to define a bubble are reminiscent of Supreme Court Justice Potter Stewart’s 1964 comment about obscenity: “I know it when I see it,” a comment that has also been applied to art, humor, and many other concepts that are hard to pin down.

Charles Kindleberger offered this definition:

A bubble may be defined loosely as a sharp rise in price of an asset or a range of assets in a

continuous process, with the initial rise generating expectations of further rises and attracting new buyers—generally speculators interested in profits from trading rather than in its use or earning capacity. The rise is then followed by a reversal of expectations and a sharp decline in price, often resulting in severe financial crisis—in short, the bubble bursts. Other researchers focus on specific aspects of this general concept: rapidly rising prices (Baker 2002), unrealistic expectations of future price increases (Case and Shiller 2003); the departure of prices from fundamental value (Garber 2000), or a large drop in prices after the bubble pops (Siegel 2003)

We define a bubble as a situation where the market prices of a certain class of assets (such as stocks or real estate) rise far above the present value of the anticipated cash flow from the asset. This definition suggests many of the features noted above: price rising rapidly, a speculative focus on future price increases rather than the asset's cash flow, and an eventual drop in market prices. However, these features are only suggestive. Market prices can rise rapidly if fundamental values are increasing rapidly. Speculators can reasonably anticipate large future price increases in a hyperinflation. Market prices can drop (for example, in a financial crisis) even when there has been no bubble. What truly defines a bubble is that the market prices are not justified by fundamentals.

Is the Housing Market Efficient?

True believers in efficient markets are apt to deny that there ever can be a bubble. The market price is always the correct price and is therefore justified by the expectations market participants hold. Even Siegel, who believes there can be bubbles, writes that, “We know that the price of any asset is the present value of all future expected cash flows.” Contrast this with the opening sentence of John Burr Williams' classic treatise, *The Theory of Investment Value* (1938): “Separate and distinct things not to be confused, as every thoughtful investor knows, are real

worth and market price.”

Case and Shiller (2003) report survey evidence of homeowners’ naive beliefs that real estate prices magically rise because a home is in a desirable area or land is scarce. The residential real estate market is populated by amateurs making infrequent transactions on the basis of limited information and with little or no experience in gauging the fundamental value of the houses they are buying and selling. It is highly unlikely that residential real-estate prices are always equal to the present value of the future expected cash flow if market participants almost never consider the future cash flow.

The nearly universal yardstick in residential real estate is “comps,” the recent sale prices of nearby houses with similar characteristics. Comps tell us how much others have paid for houses recently, but not whether these prices are justified by the cash flow. Is a Britannia the British Bear Beanie Baby worth \$500 simply because a Princess Beanie Baby sold for \$500? The nearly universal use of comps by buyers, sellers, real estate agents, and appraisers is the very mechanism by which market prices can wander far from fundamental values. If no one is estimating fundamental value, why should we assume that market prices will equal fundamental values?

In the stock market, professional investors can, in theory, arbitrage and exploit the mistakes made by noise traders. The housing market is fundamentally different in that professionals cannot sell houses short and cannot capture the tax advantages provided for owner-occupied housing by physically occupying multiple houses. If a myopic focus on comps causes market prices to depart from fundamentals, there is no effective self-correcting mechanism.

Supply and Demand

Researchers have used a variety of proxies to gauge whether real estate prices have departed from fundamental values; for example, the ratio of housing prices to household income (Case and

Shiller 2003), which is now substantially higher than a decade ago. The idea is that housing prices are a bubble waiting to pop if the median buyer is priced out of the market. But the affordability of a house has nothing to do with its intrinsic value. Berkshire Hathaway stock currently sells for nearly \$100,000 a share. It is not affordable, but it may be worth the price!

Measures of housing prices over time are notoriously difficult because houses are so heterogeneous in their characteristics and location; it is difficult to measure depreciation and remodeling of existing homes; and it is difficult to measure changes in the quality of home construction over time. McCarthy and Peach (2004) show that, between 1977 and 2003, four popular home price indexes showed price appreciation ranging from 199% (constant quality new homes) to 337% (median price of sales of existing homes).

Even on its own terms, the ratio of housing prices to income doesn't really measure affordability. A better measure would be the ratio of mortgage payments to income. Mortgage rates have fallen dramatically and the ratio of mortgage payments on a constant-quality new home to median family income has fallen steadily, from 0.35 in 1981 to 0.13 in 2003 (McCarthy and Peach 2004).

A supply and demand analysis inevitably leads to a consideration of rents since high housing prices might be justified by high rents. Would you be willing to pay a higher price for rent-controlled housing in Santa Monica simply because the demand is high and the supply is fixed? Not unless you expect rents to rise in the future. Thus, restrictions on building, limited supply of urban land, increasing population, growing incomes of home buyers, lower interest rates are all factors that might justify higher prices, but only insofar as they increase rents.

Some economists cite the fact that house prices have risen faster than rents as evidence of a bubble (Leamer 2002, Hatzius 2004). There has been a 30% real increase in house prices over the past decade and a 10% real increase in rents over this same period (Krainer and Wei 2004),

suggesting that prices are departing from fundamentals.

Housing prices and rents are tied together by the fact that the fundamental value of a house depends on the anticipated rents, in the same way that the theoretical value of bonds and stocks depends on the present value of the cash flow from these assets. However, just as bond and stock prices are not tied rigidly to coupons or dividends, so the fundamental value of a house is not tied rigidly to rents. Among the many factors that affect the price-rent ratio are interest rates, risk premiums, growth rates, and tax laws (including property taxes and income tax brackets).

Thus, just as with a stock price-dividend ratio, the price-rent ratio can rise without signaling a bubble if, for example, interest rates fall or there is an increase in the anticipated rate of growth of rents. In addition, the dwellings included in the price index do not match the dwellings in the rent index, giving us a comparison of apples to oranges (McCarthy and Peach 2004). The ratio of the house price index to the rent index could rise because the prices of houses in desirable neighborhoods increase more than do the rents of apartment buildings in less desirable neighborhoods. Or perhaps the quality of the average house in the price index has increased relative to the quality of the average property in the rent index. And, in any case, to gauge fundamental value, we need actual rent and price data, not indexes with arbitrary scales. Finally, indexes that are averages can be skewed by outliers. The average price might be skewed upward by a few very expensive houses, while the average rent is less skewed.

Buying Versus Renting

Shelter can be obtained either by renting or buying, and we can use present value calculations to decide whether it is less expensive to rent or buy. Such calculations allow us to estimate the fundamental value of a house.

Buying and renting have sometimes been analyzed as demands for different commodities. Rosen (1979) wrote that, "In many cases it is difficult (say) to rent a single unit with a large

backyard. Similarly, it may be impractical for a homeowner to contract for the kind of maintenance services available to a renter.” A decade later, Goodman (1988) observed that, “Until recently, it was easier to purchase small (large) amounts of housing by renting (owning). As a result, households with tastes for small (large) units would rent (buy).”

Today, it is still true that rental and purchase properties differ, on average, in location and attributes. But, on the margin, close substitutes are generally available. It is possible to buy small condominiums and to rent houses with large yards. It is possible to buy or rent small or large houses. Many households have the option of buying houses in communities that provide services very similar to those received by most renters.

We consequently view buying and renting as often being viable alternatives. If a household has the opportunity to buy or rent very similar properties (perhaps even the same property), then the question is not which kind of property to inhabit, but whether to pay for these housing services by buying the property or renting it.

Fundamental Value

Rental savings are an important, though not the only, factor in determining the fundamental value of an owner-occupied house. We have to look at everything that affects the cash flow, including transaction costs, the down payment, insurance, maintenance, property taxes, mortgage payments, tax savings, and the proceeds if the house is sold at some point.

Once we have the projected cash flow, we can value houses the same way we value bonds, stocks, and other assets—by discounting the cash flow by the household’s required rate of return. Specifically, we can calculate the net present value (NPV) of the entire cash flow, including the initial outlay:

$$\text{NPV} = X_0 + \frac{X_1}{(1+R)^1} + \frac{X_2}{(1+R)^2} + \frac{X_3}{(1+R)^3} + \dots + \frac{X_n}{(1+R)^n} \quad (1)$$

X_0 is a negative number equal to the downpayment and out-of-pocket closing costs. X_n is the net amount received when the house is sold and the mortgage balance (if any) is paid off. The intervening cash flows are the rent you would otherwise have to pay to live in this house minus the expenses associated with home ownership, plus or minus the value of nonfinancial factors (such as pride of ownership and a desire for privacy). The rent and other expenses can be estimated from observed data. The intangibles must be assigned values by the household.

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 invested 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 homebuyer can use the projected cash flow and a required rate of return to determine if a house's NPV is positive or negative. If the NPV is positive, the house is indeed worth what it costs; if the NPV is negative, renting is more financially attractive. We can also calculate the internal rate of return (IRR) that makes the NPV equal to zero. The IRR has the virtue of identifying a breakeven required return for which the investor is indifferent about the investment, but it also has several potential pitfalls, including the possibility of (a) an inverted NPV curve (with positive NPV for $R > \text{IRR}$ and negative NPV for $R < \text{IRR}$) if the cash flow is positive in the early years and negative in later years; or (b) multiple IRRs if there is more than one sign change in the cash flow.

It is safest to calculate the NPV for a variety of required rates of return; however, the IRR can often be used for residential real estate because the cash flow is generally negative in the early

years and positive in later years, with just one sign change. A situation that might make the IRR misleading is major remodeling expenses that give negative cash flows in the future and more than one sign change.

Data

We gathered data in the summer of 2004 from the Internet and newspaper advertisements for matched pairs of single-family homes in the San Gabriel Valley, which is in Los Angeles County, just east of the city of Los Angeles. The San Gabriel Valley was once predominantly agricultural, but after World War II the farmlands began their now (almost complete) conversion into suburban communities. We only looked at detached single-family homes, and excluded apartments, condominiums, and houses in gated communities. The Yahoo Maps website was used to determine the driving distance between properties.

The matched rental and sale properties could differ by no more than 100 square feet in size (or by no more than 250 square feet for houses with more than 2500 square feet), no more than 1 bedroom, and no more than half a bath. The driving distance between properties had to be less than 1 mile. The houses were also matched for style (for example, ranch) and in identified amenities, such as a pool. No doubt the properties often differed in other ways (carpet versus wood floors, fireplace or no fireplace), but we can hope that these differences averaged out over our sample. There were often multiple matches (for example, two sales to one similar rental), and we used the best overall match in terms of square footage, distance, and so on. In some cases, there was a perfect match in that a house that had been offered for rent was sold.

If the rental and sale data were for different months, the sales price was adjusted by 1 percent a month, which is the figure used by appraisers at this time. For example, if the rental was listed in July and the matching house sold in June, the sale price was adjusted upward by 1%.

We found 139 observations that matched a sale to a rent that was close by and had similar

characteristics. The average distance between the matched properties is 0.33 miles. Table 1 shows the mean characteristics of the properties and the mean of the absolute value of the difference between the values of the matched properties.

Analysis

The following assumptions were used to determine the cash flow: 20% downpayment, 30-year mortgage, 5% mortgage rate, closing costs equal to 1% of the mortgage, insurance equal to 0.1% of the house's price, maintenance equal to 1% of the price, property taxes equal to 1% of the price, \$2400 for annual utilities, 28% federal income tax rate, 9.3% state income tax rate, 15% capital gains tax (if the capital gains exceed \$500,000), 6% required after-tax return, 8% sales transaction cost (including brokerage fees, closing costs, and fix-up expenses), 3% annual increase in housing prices, rents, and expenses (the average increase in the CPI in the Los Angeles area over the past 5 years), and 2% annual increase in property taxes (as limited by Proposition 13). We calculated the NPV and IRR for finite holdings periods up to 30 years and forever.

For example, we found two adjacent houses on Tulsa Avenue in Claremont. Both are 2530 square-foot ranch houses with four bedrooms, three baths, and a pool. One rented for \$2650 a month; the other sold for \$622,960. Although we used monthly data, Table 2 shows an annual summary of the cash flow for selected years. The homebuyer's anticipated net cash flow is negative for the first 10 years, but the homeowner is building up equity in an appreciating asset and the IRR is positive by the third year. The NPV is negative until the IRR goes above 6%. As the horizon lengthens, the IRR rises initially as the transaction cost becomes less important, and then peaks and declines slightly as the tax-deductible mortgage is paid off. The forever horizon does not depend on an assumed growth rate for the house's price.

Figure 1 shows the NPVs for 5-, 10-, and 20-year horizons using required returns ranging from 0 to 20%. For low required rates of return, 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. The IRRs are where the NPV curves cross the horizontal line at $NPV = 0$. The household should buy if its after-tax required rate of return is less than the IRR and rent otherwise.

It is useful to perform a sensitivity analysis by varying our assumptions so that we can obtain a better feel for the range of intrinsic values for this particular house. Table 3 shows the after-tax IRRs for a variety of assumptions regarding the growth rate of the house's price, rent, and expenses. The after-tax IRRs are reasonably attractive, except for a few scenarios, such as a 10-year horizon with 1% growth in prices, rents, and expenses or a 10-year horizon with 0% price growth.

Commercial real estate is commonly valued by applying a multiple of 5 or 6 times earnings or EBITDA. For our Tulsa Avenue properties, the annual rent is \$31,800 and EBITDA is $\$31,800 - \$6,230 - \$2,400 - \$623 - \$6,230 = \$16,317$. The ratio of the price to the annual rent is $\$622,960 / (\$31,800) = 19.6$ and the ratio of the price to EBITDA is $\$622,960 / (\$16,317) = 38.2$, which are very high by commercial real estate standards.

In general, we shouldn't expect a constant multiple to give a theoretically correct fundamental value for either commercial or residential real estate, since the value of a property depends on interest rates, growth rates, tax laws, and even the down payment if the after-tax interest rate used to discount the cash flow is not equal to the after-tax mortgage rate. Similarly, we should not expect the price-rent ratio to be constant across properties or across time and we should not expect the rent-price ratio or the EBITDA-price ratio to be an accurate estimate of a house's IRR.

Figure 2 shows a scatter plot for all 139 matched pairs of the after-tax IRR for a 10-year

holding period against the annual rent-price ratio. The least squares line is $IRR = -6.6 + 3.0(\text{rent/price})$, with an R-square of 0.985. The NPV equation is very nonlinear and it is remarkable that the relationship between the IRR and the rent-price ratio is so tightly linear. Notice also that not only is the IRR not equal to the rent-price ratio, but the slope is not equal to 1. For every 1 percentage point increase in the rent-price ratio, the IRR increases by approximately 3 percentage points. For example, the IRR is 5.4% if the annual rent-price is 4% and the IRR is 8.4% if the annual rent-price ratio is 5%. Different assumptions about the various parameters will yield a somewhat different fitted line. For example, if we increase the growth rates of rent, price, and expenses to 4%, the fitted line is $IRR = -3.5 + 2.8(\text{rent/price})$, again with an R-square of 0.985.

For our 139 matched pairs, the rent-price ratios ranged from 3.2% to 9.6% (equivalent to price-rent ratios of 31.3 to 10.5), and the after-tax IRRs ranged from 2.8% to 23.1% with a median value of 8.3%. Housing prices have increased rapidly in the Los Angeles area in recent years and many homebuyers may have unrealistic expectations about future prices. The relevant question, however, is not how much prices have increased or how much more people expect them to increase, but whether, at current prices, a house is still a fundamentally sound investment. Our answer is yes.

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Table 1 Mean Values for Rental and Sale Properties

	Rental House	Sale House	Absolute Difference
rent or price	\$2189/month	\$528,236	
square feet	1808	1801	44
bedrooms	3.4	3.3	0.1
bathrooms	2.1	2.2	0.1

Table 2 Cash Flow for Claremont Houses on Tulsa Avenue

Year	Rent Savings	Mortgage Payments	Property Taxes	Tax Savings	Other Expenses	Net Cash Flow	Net Sales Price	Mortgage Balance	NPV R = 6%	IRR (%)
1	31,800	-32,104	-6,230	10,749	-9,253	-5,037	590,317	-491,015	-40,920	-30.7
2	32,754	-32,104	-6,354	10,662	-9,531	-4,573	608,026	-483,286	-27,955	-5.7
3	33,737	-32,104	-6,481	10,569	-9,817	-4,096	626,267	-475,162	-15,870	1.9
4	34,749	-32,104	-6,611	10,470	-10,111	-3,608	645,055	-466,622	-4,615	5.2
5	35,791	-32,104	-6,743	10,364	-10,414	-3,106	664,407	-457,645	5,862	6.8
10	41,492	-32,104	-7,445	9,725	-12,073	-405	770,230	-405,383	48,067	8.9
15	48,100	-32,104	-8,220	8,861	-13,996	2,642	892,907	-338,312	76,654	8.8
20	55,761	-32,104	-9,075	7,704	-16,225	6,061	1,035,12	-252,235	95,221	8.5
25	64,643	-32,104	-10,020	6,166	-18,809	9,876	1,188,438	-141,769	104,012	8.2
30	74,939	-32,104	-11,063	4,134	-21,805	14,101	1,350,896	0	105,710	7.9
forever									142,450	7.3

Table 3 IRRs for Various Growth Rates of Price g_P and Rent and Expenses g_R

g_P	g_R	IRR (%)			
		10 years	20 years	30 years	forever
1%	1%	2.70	3.97	4.06	3.66
2%	2%	6.07	6.43	6.12	5.63
3%	3%	8.89	8.52	7.86	7.26
4%	4%	11.34	10.28	9.45	8.78
1%	3%	3.91	5.78	6.22	7.26
0%	4%	1.45	5.40	6.80	8.78

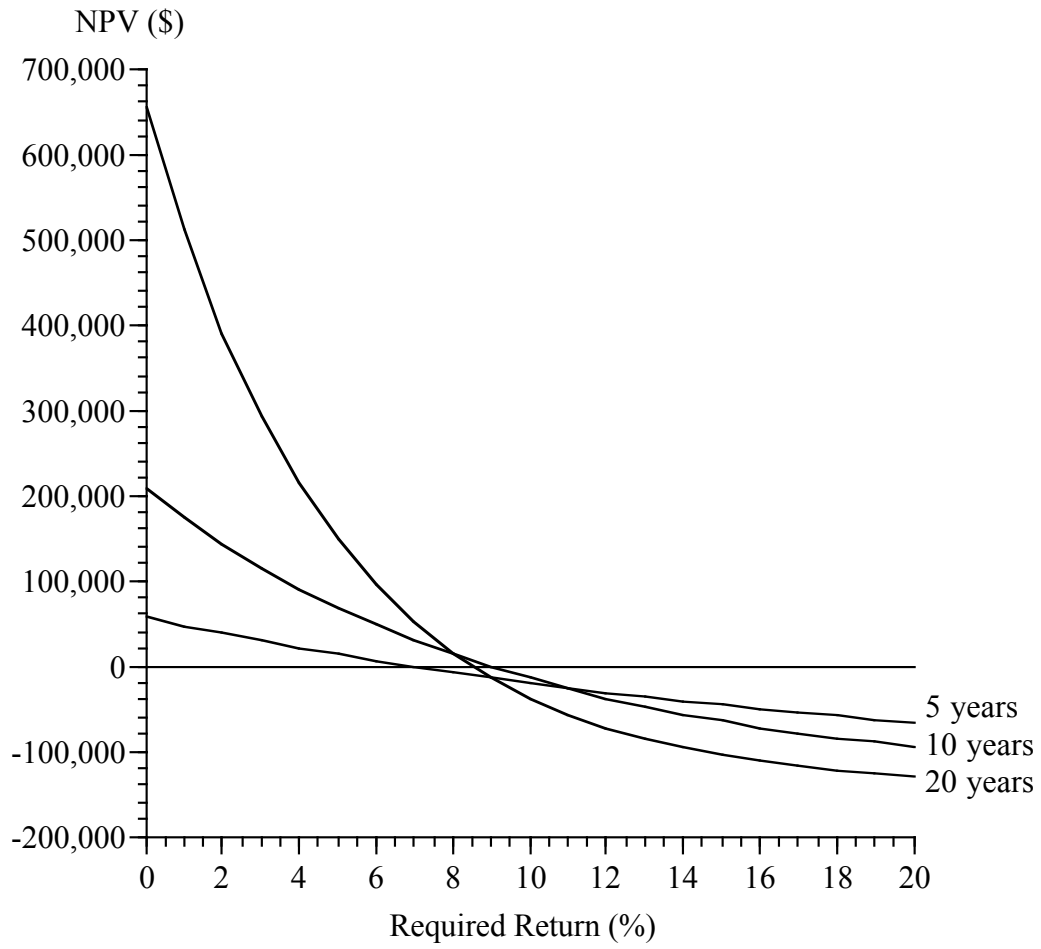


Figure 1 NPVs for Different Horizons

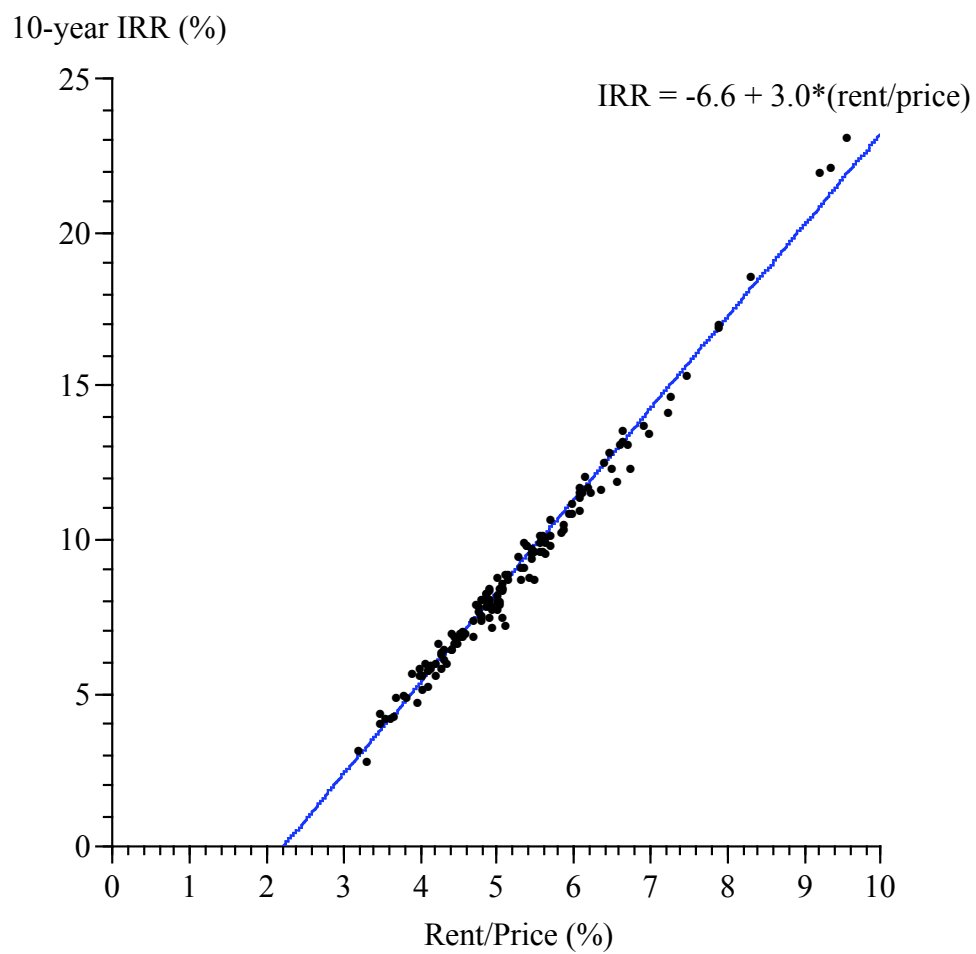


Figure 2 10-year After-Tax IRR vs. Rent/Price