Real Estate Investment Newsletter – January 2003

When to use Leverage to Boost Returns

Many authors praise the benefits of leverage – that is borrowing other people's money to increase one's own returns. On the other hand there are those who go bankrupt from borrowing too much. In fact we can calculate exactly those situations where leverage hurts returns rather than helping. Returns on real estate must drop below the mortgage rate by enough to offset the value of the higher depreciation tax deductions (of a leveraged position) before we would be worse off using borrowings to increase our holdings.[1] Otherwise leverage boosts returns on equity invested. I will explain the mathematics and then illustrate with an example.

When we purchase a property we will generally have good estimates of its net operating income (NOI) and the depreciation allowable on the property. Dividing the NOI by the price gives us the cash flow yield of the property – also known as the *Cap rate*. We also know the marginal tax rate on our income. The unknown appreciation rate is thus the key estimate for determining whether leverage will help us or hurt us. In mathematical terms leverage will work against us if

*Appreciation < (Mortgage Rate – Cap Rate) * (1-Tax) – Depreciation Rate * Tax.*

Tax is the marginal tax rate. I will use 40% to illustrate. *Depreciation rate* is the percentage of the purchase price attributable to the building (rather than the land) divided by the tax life of the building. For example, 80% of the cost of apartments is the building and the tax life is 27.5 years. This gives us a depreciation rate of 2.9% on the purchase price (i.e. we deduct 2.9% of purchase price each year).

If both the mortgage rate and the Cap rate are 6.5%, then these terms cancel out and any appreciation rate less than –1.16 (-2.9% * 40%) would

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[1] Meaning returns and mortgage interest on an after-tax basis.

cause leverage to work against us. That is, returns using leverage would be less than un-levered returns if the property loses 1.16% or more of its value. Next we'll look at an example investment opportunity to illustrate the benefits of leverage and how bad things must become before leverage would work against us.

In Merced California there were recently several properties for sale totaling $4.5 million. We could buy one or more of these and mortgage them or not. Each property generates net operating income of 8% of its asking price. I.e. a million dollar property throws off $80,000 before debt service and taxes. For purposes of illustration let's assume we have the choice of buying a property for $1,000,000 with no mortgage or we can buy properties worth $4,000,000 using our $1,000,000 in equity and a $3,000,000 mortgage at 6.5% for 30 years. Mortgage payments would cost us $227,544, but $33,532 of this is repayment of principal in year 1. The leveraged property would generate $320,000 in net operating income ($4,000,000 * 8%). We'll assume each property will appreciate 2.5% per year and net operating income will grow by 3.5% per year. In the first year of operations we can calculate and compare cash flows and returns:

	With Leverage	Without Leverage	Difference
Operating Free Cash Flow	92,456	80,000	12,456
Increase in Equity	133,532	25,000	108,532
Total Return in Dollars pre-tax	225,987	105,000	120,987
Return on Investment pre-tax	22.6%	10.5%	12.1%
Taxable income[2]	9,624	50,909	
Tax at 40% of taxable income	3,849	20,364	(16,514)
After-Tax Free Cash Flow	88,606	59,636	28,970
Total Return in Dollars after-tax	222,138	84,636	137,501
After Tax Return on Equity as %	22.2%	8.5%	13.8%

Here we see that current market conditions imply leverage will generate roughly $29,000 higher after-tax cash flow – roughly 50% higher than the 100% equity choice. In addition, under our 2.5% appreciation assumption, after-tax returns using leverage are more than 2.6 times the

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[2] Depreciation tax deductions equal 80% of purchase price divided by 27.5 years: 116,364 for the leveraged property, 29,091 for the un-leveraged property.

returns we get without leverage – a $137,500 difference. In subsequent years these differences grow.

Analysis of Results by Year	1	2	3	4	5
After-Tax Cash Flow - Leveraged	88,606	94,428	100,425	106,601	112,960
After-Tax Cash Flow - 100% equity	59,636	61,316	63,055	64,855	66,717
Difference in Cash Flow	**28,970**	**33,111**	**37,369**	**41,746**	**46,243**
Total Return After-Tax - Leveraged	222,138	232,705	243,661	255,020	266,799
Total Return After-Tax – 100% Equity	84,636	86,941	89,321	91,777	94,313
Difference in Total Return Dollars	**137,501**	**145,764**	**154,340**	**163,243**	**172,486**
Difference in % Return on Investment	13.8%	14.6%	15.4%	16.3%	17.2%

Cash flows are a fact but, as mentioned earlier, if appreciation turns negative, leverage could still work against us. If we add the build-up in equity due to principal payments ($33,532) to the cash flow difference ($28,970), we find that with no change in property value, leveraged returns exceed the all-equity returns by $62,502 in year 1.   This implies that a 2.1% drop in property values would cause the decline in the leveraged property's value to exceed the decline in the un-leveraged property by enough to offset its cash flow advantage (I.e. 62,502 is about 2.1% of the $3 million property value difference). Therefore, we see that leverage only works against us for these investment choices when property values decline by more than 2.1% per year – on average over our holding period.

Conclusion
Given that long run declines in property values in California are highly unlikely, we conclude that leveraging properties that generate returns greater than the mortgage rate is highly advantageous to investors. Understanding and using leverage is one of the keys to maximizing returns, but there are many other important aspects. When you are ready to invest, call Berkeley Investment Advisors to help you cover all the bases.

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