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Real Estate Finance: A Technical Note Based on "Shady Trail"

I. The "Set-Up"¹

The "set-up" is a presentation of the pretax income and expenses of a particular property initially "free and clear" of debt service. Operating income and expenses are separated from capital items such as tenant improvements (TIs) required to fix up the space, leasing commissions required to lease the space, and capital expenditures required to maintain the property.

Usually a vacancy factor is deducted from revenues to allow for tenant turnover, actual vacancy, and/or bad credit loss. Especially during the early years of a project's life when actual capital expenditures may be minimal, a structural reserve is usually deducted from cash flow to build up a cash reserve for expensive items such as a new roof.

A typical set-up might look like the following for Shady Trail at the fair market rent of \$3.25/SF:

Table 1. A Set Up

Base Rent (\$3.25/sq. ft. x 120,000 sq. ft.)	\$390,000
+ <u>Expense Reimbursements</u>	<u>118,000</u>
= Gross Income	\$508,000
- Less Vacancy @ 5%	<u>25,400</u>
= Net Revenues	\$482,600
- Operating Expenses (per case)	118,000
- <u>Capital Reserves</u>	<u>15,000</u>
= Cash Flow from Operations(CFO) ²	\$349,600
- Tenant Improvements	0
- Leasing Commissions	<u>0</u>
= Cash Flow after Capital	\$349,600

¹ See Appendix A for a Glossary of Terms.

² Also known as NOI net operating income (although different from NOI in the finance or accounting worlds). Sometimes referred to as "Free and Clear Cash Flow" or free and clear of financial payments such as mortgage interest, mortgage amortization and land lease payments as well as capital expenditures. Capital expenditures may include tenant improvements, leasing commissions and/or structural improvements such as a new roof, parking lot or elevator.

Senior Lecturer Arthur I. Segel prepared this note as the basis for class discussion.

II. Capitalization Rate/Return on Assets/Return on Costs

A Capitalization Rate or "cap rate" is usually defined as cash flow from operations (CFO) divided by the market value before any debt financing. This is done for the sake of simplicity and assumes that cash flow is stabilized as an annuity in perpetuity. Obviously a more accurate discounted cash flow (DCF) model would pick up the variance in cash flows over time and the longer term return.

Often real estate investors use "NOI" or net operating income interchangeably with cash flow from operations. Appendix B is a further discussion on Real Estate Financial Analysis and how certain common terminology may be at variance with finance and accounting. Cash flow from operations may be more accurate in that NOI has a somewhat different meaning in finance and accounting. Different investors may treat capital reserves differently so one always needs to ask whether any capital reserves have been assumed and whether for valuation purposes they are above or below the cash flow from operations (CFO) line. For this course, cap rates will be after capital reserves. Investors will also make different vacancy assumptions or credit loss assumptions so one always needs to understand the detail when comparing cap rates from one project to another. Cap rates may also be called a Return on Assets (ROA) or Return on Costs.

Cap rates are determined at any given time by the marketplace. One key determinant of cap rates is the perceived risk of the property or property type. For example, because today a hotel is generally considered to be a riskier investment than a multifamily project, the cap rate for a hotel is typically higher than for a multifamily project. Thus, in the case of the hotel, the CFO might be divided by 11% (an 11% cap rate) and the CFO from the apartment might be divided by 8% in determining the potential value or sales price. Another example might be the cap rate on two similar buildings in the same market with a different lease structure. The cap rate for a building with a credit tenant on a long-term lease would generally be lower (i.e., would have a higher value) than a cap rate for a weak credit tenant on a shorter-term lease. Finally, perceptions about the returns available from alternate investments will influence cap rates on real properties.

If the price paid for of Shady Trail is \$4 million, then the cap rate (or the return on assets) is as follows, based on the above numbers:

Table 2: Cap Rate

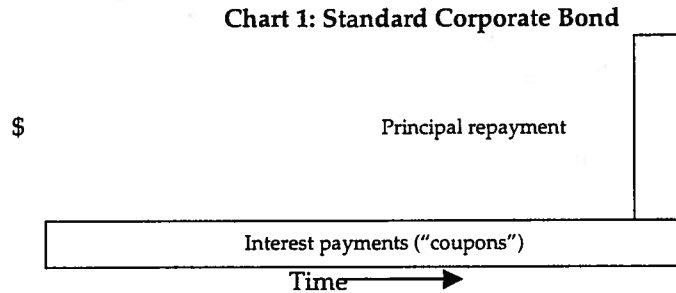
$$\left(\frac{\$349,600 \text{ (CFO)}}{\$4,000,000 \text{ (Cost)}} \right) = 8.74\%$$

III. Leverage and Cash-on-Cash Returns

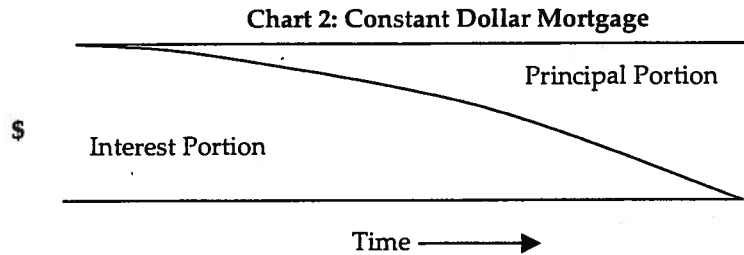
Investors can employ debt to create financial leverage through a mortgage secured by the real property. When the carrying cost—i.e., the interest rate plus principle payments—is lower than the return on assets, then greater financial leverage increases the returns to the investor. This is called "positive leverage." Conversely, financial leverage decreases or is "negative" when the carrying cost is greater than the property's ROA.

Real estate debt or mortgages (when they are secured by the real estate) come in many forms. Sometimes, for example, lenders such as construction lenders lend on an interest-only basis with a balloon payment at the end. More typically, lenders require some pay-off of principal over time. Unlike corporate bond payments, in which the principal is paid in one lump sum at the maturity

date, real estate mortgage payments reduce the principal throughout the life of the loan (similar to your student loans). A corporate bond payment scheme is as follows:



"Constant dollar" mortgages are structured such that the borrower has the same amount to pay each period. The amount of principal paid down by each payment is obviously the difference between the fixed payment amount and the interest charged on the remaining principal. During the early years, most of the payment goes for interest with a small amount of principal being amortized. As the loan is paid down, the interest portion decreases and the principal portion increases, as the following diagram demonstrates:



Note that even though the amortization of the loan may be 30 years, the maturity may be different—e.g., 10 years (as it is in Shady Trail). In that case, there would be a balloon payment due at the end of 10 years.

The "debt service" is the fixed payment amount as a percentage of the initial principal. This is higher than the interest rate of the loan because, as mentioned above, some amount of principal is paid down with each payment. In Shady Trail, the interest rate is 6%, but the debt service or loan constant is 7.19%. This loan constant is the \$201,448 (annual payment amount) divided by \$2.8MM. The \$201,448 is comprised of \$167,064 of interest payments in the first year and \$34,384 of principal payments. The only way to calculate the amount of the fixed payment (and by extension, the debt service) for a particular loan, given its length (e.g. 30 years), interest rate (e.g. 6%), interest period (e.g. monthly) and amount (e.g. \$2.8MM) is with mortgage tables or an iterative numerical method such as deployed in financial calculators or spreadsheets with "goal seek". Mortgage calculators vary slightly in their output of fixed payments, based on rounding, interest period used (i.e. weekly, monthly, quarterly, annually) and other factors. The lending institution calculates the fixed payment you must use, which is usually slightly different than what you calculate on a mortgage calculator. Nevertheless, the ability to estimate this payment is useful.

The cash-on-cash return before tax is the ratio of cash flow after debt service divided by the equity invested. Again, different real estate investors may use different language and different definitions

so one always needs to understand the detail to any returns being quoted. In the case of Shady Trail, the before-tax Cash Flow after Financing divided by the equity (or cash-on-cash return) would be 12.3% based on \$1,200,000 of equity:

Table 3: Deriving Cash-On-Cash Returns

Cash Flow before Financing (CFBF)	\$349,600
Debt Service (7.19% constant)	<u>201,448</u>
Cash Flow after Financing (CFAF) ³	\$148,152

$$\text{Cash - on - Cash} \left(\frac{\$148,152 \text{ (CFAF)}}{\$1,200,000 \text{ (Equity)}} \right) = 12.3\%$$

IV. Taxation

U.S. tax laws are complicated and transitory. While real estate owners must keep one set of books on a cash basis, tax-paying investors must keep another set of books for tax purposes.

To calculate ordinary income taxes, a depreciation factor is added to the operating expenses. Depreciation rates are regulated by the tax code, and at present, a conventional commercial property is depreciated over 39 years (27.5 years for a residential property). The theory is, properties wear out over time and they need to be replenished with new capital such as new roof, elevators, heating and cooling systems, and so on. Land is not depreciated.

In addition to calculating the depreciation for tax purposes, one also deducts interest but not principal payments. In 2003, Congress enacted a new tax structure. (Please refer to HBS Case No. 379-192, "Note on Taxation," by Arthur I. Segel.) For purposes of this exercise, we will use the 2003 maximum current ordinary federal tax rate of 35%.

³ Although there is some amortization of principal, it is not factored into the cash on cash return.

In the case of Shady Trail, the ordinary tax calculation on income would be as follows:

Table 4: Deriving Taxable Income and Ordinary Taxes

Cash Flow from Operations (CFO)	\$349,600
Less:	
Depreciation ⁴	87,179
Debt Service ⁵	201,448
Plus:	
Principal	34,384
Capital Reserve	<u>15,000</u>
Taxable Income	\$ 110,357
Taxes @ 35%	\$ 38,625

The calculation for the first year's after-tax cash flow on Shady Trail would be as follows:

Table 5: Year 1 After Tax Cash Flow

Cash Flow After Financing (CFAF)	\$148,152
Less: Taxes	<u>38,625</u>
After-Tax Cash Flow	\$109,527 ⁶

To calculate an after-tax internal rate of return or net present value, one needs to make an estimate of the residual value of the property upon sale. The taxes due upon sale are more complicated and are subject to capital gains tax, which is currently less than the ordinary income tax rate. Note that no taxes are due on a refinancing. The tax calculation would be derived as follows.

First, the book value for tax purposes requires adjusting the original purchase price by adding the cost of any capital (such as a new roof) to the property over the holding period, less any depreciation taken over the time period. Using Shady Trail again as an example over the projected holding period of five years, the calculation of book value would be as follows:

Table 6: Derivation of Book Value

Purchase Price	\$4,000,000
Plus: Capital Expenditures	75,000
Less: Depreciation taken	<u>435,895</u>
Net Book Value	\$3,639,105

Our next step is to calculate the Net Sales Price at the end of our five-year assumed holding period. This is done as follows:

⁴ Depreciation is based on a purchase price of \$4.0 million, less land at \$600,000 depreciated over 39 years.

⁵ Debt service is comprised of principal and interest, or 6% on our assumed \$2.8 million mortgage with a 30-year amortization schedule, or a constant of approximately 7.19%.

⁶ Each year the taxes vary by the amount of taxable income. Appendix C shows the calculation in detail for five years.

As of this writing (May, 2003) the ordinary tax rate is 35%.

Table 7: Derivation of Net Sales Price

Base Rent (\$3.25/sq. ft. increasing 3% per year for 5 years multiplied by 120,000 sq. ft.)	\$ 452,116
+ Expense Reimbursements (\$118,000 increasing 3% per year for 5 years)	<u>136,794</u>
= Gross Income	\$ 588,910
- Vacancy @ 5%	<u>29,445</u>
= Adjusted Gross Income	\$ 559,465
- Operating Expenses	136,794
- Capital Reserves	<u>15,000</u>
= Cash Flow from Operations (CFO)	\$ 407,671
Capped at 9% to ascertain value	\$ 4,529,678
- 5% Transaction Costs	<u>226,483</u>
= Net Sales Price	\$4,303,195

Then, we deduct the Book Value from the Net Sales Price to ascertain the Gain as follows:

Table 8: The Taxable Gain

Net Sales Price	\$4,303,195
Less: Book Value	<u>3,639,105</u>
Gain	\$ 664,090

The gain is comprised of two components which are taxed differently. The depreciation taken previously or "recaptured" is currently taxed at 25%, and the balance of the long-term gain is taxed at 15%. Again, for Shady Trail, the calculation would be as follows based on our assumptions:

Table 9: Taxes Due on the Taxable Gain

Gain	\$664,090
Depreciation Taken	\$435,895
Taxes at 25%	\$108,974
Balance of Gain	\$228,195
Taxes at 15%	\$ 34,229
Total Taxes Due	\$143,203

To arrive at the after-tax residual value for the taxable investor, one would take the net sales price (again after all transaction costs), and deduct the outstanding mortgage balance and the taxes due. Again for Shady Trail, the calculation would be as follows based on our assumptions:

Table 10: Sales Proceeds after Tax

Net Sales Price	\$4,303,195
Less: Mortgage Balance	2,605,521
Less: Taxes Due	<u>143,203</u>
Sales Proceeds After Tax	\$1,554,471

V. Internal After-Tax Rate of Return (IRR)

After one has identified the after-tax annual cash flows and the after-tax residual sales proceeds, one can arrive at a current purchase price that will meet one's after-tax internal rate of return requirement. If one is a nontaxable investor such as a pension fund or endowment, then the internal rate of return is computed in the same way but without the extra costs of taxation. Usually institutional investors refer to IRRs without leverage and with a 10-year holding period. Again, the 10-year holding period is merely a convention.

Using Shady Trail and (for simplicity's sake) a five-year projection, the after-tax IRR would be approximately 13.5% based on (1) the \$4.0 million purchase price, (2) the initial equity of \$1,200,000, assuming constant annual rent payments, and (3) after-tax cash flow as follows in Table 11.

Table 11: The Cash Flow to Derive the After-Tax IRR

Initial Equity	(\$1,200,000)
Year 1 after-tax cash flow	109,527
Year 2 after-tax cash flow	108,785
Year 3 after-tax cash flow	107,997
Year 4 after-tax cash flow	107,160
Year 5 after-tax cash flow (\$106,300) plus Sales Proceeds after Tax (\$1,544,471)	\$1,660,771

Once one has calculated the purchase price under this given set of assumptions, one can vary the individual assumptions and perform sensitivity analyses to determine the effect on either the overall value or on the internal rate of return.

Appendix A: Glossary of Terms:

Amortization: The periodic writing off of an asset over a specified term. Also the periodic repayment of debt over a specified time.

Book Value: The value of a property as a capital asset (cost plus additions to value, less depreciation).

Capitalization (or Cap) Rate: A rate of return used to calculate the capital value of an unlevered income stream. In a way, it is the inverse of a price/earnings ratio. The formula is *value equals the cash flow from operations (CFO) divided by the value of the asset*. Sometimes CFO is referred to as Net Operating Income (NOI) but not the same NOI in the sense of traditional finance or accounting.

Cash Flow from Operations (CFO): All the revenues less all operating expenses.

Cash-on-Cash Return: Shows the cash return after all expenses, including capital and debt service before tax divided by the equity.

Constant Dollar Mortgage: A mortgage where the debt service payments are equal or constant over time.

Debt Service: Periodic payments on a loan, with a portion of the payment for interest and the balance for repayment (amortization) of principal.

Free and Clear: The CFO before capital or debt financing, i.e. free and clear of debt.

Going in Yield: Usually refers to the cap rate.

IRR (Unleveraged/leveraged): The discount rate at which the present value of the future cash flows of an investment equals the cost of the investment. It is used to measure the annual return on a given investment and to compare different investment opportunities. The IRR is typically quoted by institutional investors on an unleveraged ten year hold. In the case of Shady Trail the IRR is on a five year holding period with leverage. Therefore, one always needs to ask the assumptions when an IRR is being used.

Loan Constant: The yearly percentage of interest and principal expressed as a percent of the original loan amount which remains the same over the life of an amortized loan. For example: A \$1000 loan at 9% interest for 20 years can be amortized at \$9.00 per month. The constant rate is figured by finding one year's payments ($\$9.00 \times 12 \text{ months} = \108), and expressing this amount as a percentage of the principal originally borrowed (10.8% of \$1000).

Net Operating Income (NOI): Income from property after operating expenses have been deducted, but before financing expenses (interest and principal payments), depreciation, capital expenditures, tenant improvements, leasing commissions, and income taxes have been deducted. This is not the same definition of NOI for accounting, tax or finance.

Reserve Amount: The amount allocated for periodic replacement of building components during a property's economic life. For example, an investor in an industrial building might require a \$.15/SF of reserves to replace the roof or parking lots eventually over time.

Return on Assets (Return on Costs): A performance measure obtained by dividing annual cash flow from operations by total property cost. Used most often by lenders to make certain there is sufficient cash flow to service the debt. It is a static measure that looks at only one year of performance, without considering tax effects or the effects of any future sale or refinancing.

Set Up: Shows the basic revenues, expenses, capital improvements, and financing for a given year.

Stabilized Cash Flow from Operations (Stabilized Net Operating Income): Refers to cash flow from operations or net operating income upon achievement of stabilized occupancy, usually 95% in a balanced market and usually occurring in the 2nd or 3rd year of a new property, but possibly earlier or later depending on market conditions.

Yield: Usually the IRR.

Appendix B Real Estate Financial Analysis: A Note on a Note

While there are no major differences between the fundamental finance and accounting concepts learned in most early MBA curriculums and those of the real estate industry, they differ in presentation in certain areas. Here are some ways to relate real estate finance to the standard introductory courses in finance and accounting:

- As mentioned earlier, "Net Operating Income" in real estate is not GAAP accounting since NOI, among other things, in real estate often takes into vacancy and reserve factors. But NOI is often used as a term interchangeably with CFO or Cash Flow from Operations. Most real estate professionals worry first about cash and usually keep three sets of records: one for cash flow projections, one for accounting purposes and one for income tax since accounting and tax records may sometimes have different rules or standards. Therefore, to avoid confusion, one always needs to question the underlying assumptions when examining returns or making comparisons to other properties.
- The definition "Return on Assets" also means something somewhat different in real estate compared to finance and accounting. In finance, ROE is Net Income/Assets, while one can see from the earlier section that in real estate it is a measure of cash flow from operations over assets.
- The way debt payments are structured is different from that of standard corporate bonds (i.e. mix of interest and principal in mortgage payments), and thus the term "Debt Service" can sometimes cause confusion. It is a measure of cash flow (as opposed to earnings) going to service debt.

In the world of real estate finance, investors focus on cap rates and cash-on-cash returns, IRRs and NPVs (net present value) to a lesser degree. Usually when real estate investors talk about returns or yields they are referring to the 10-year unleveraged IRR or the going-in cap rate. Ten-year projections are merely a convention and often one needs to be careful and ask. To calculate an IRR, a residual value is ascertained by "capping" the last year's or the year following the last year's projected cash flow from operations by the appropriate cap rate. Usually the following year's projected cash flow from operations is used in a seller's market (i.e. when prices are high) and the last year's projected net operating income in a buyer's market (i.e. when prices are low.)

Other assumptions must also be made with regard to prevailing market rates, vacancy and structural reserve allowances, operating expenses, tenant improvement allowances, leasing commissions, and inflationary (or deflationary) growth over the projected period. Finally, one has to make an assumption on "turnover" or "rollover" or the probability that the existing tenant, if there is one, will stay or leave. Usually a new tenant requires more capital for tenant improvements to reconfigure space, etc., than an existing tenant.

Depending upon the strength of the investment market, the assumptions may be more or less aggressive or optimistic. Spreadsheet analysis helps one understand the impact of various assumptions on one's analysis. In the world of real estate financial analysis there are a number of

canned software programs which help investors make projections, do sensitivity analysis, and graph the results such as PROJECT and ARGUS.

Appendix C: Calculation of Ordinary Income Taxes by Year

		2004	2005	2006	2007	2008
CFO		\$ 349,600	\$ 349,600	\$ 349,600	\$ 349,600	\$ 349,600
Less:	Depreciation	87,179	87,179	87,179	87,179	87,179
	Debt Service	201,448	201,448	201,448	201,448	201,448
		<u>\$ 60,973</u>	<u>\$ 60,973</u>	<u>\$ 60,973</u>	<u>\$ 60,973</u>	<u>\$ 60,973</u>
Plus:	Principal	34,384	36,505	38,756	41,147	43,604
	Capital Reserve	<u>15,000</u>	<u>15,000</u>	<u>15,000</u>	<u>15,000</u>	<u>15,000</u>
Taxable Income		\$ 110,357	\$ 112,478	\$ 114,729	\$ 117,120	\$ 119,577
Tax Rate*		<u>35.00%</u>	<u>35.00%</u>	<u>35.00%</u>	<u>35.00%</u>	<u>35.00%</u>
Taxes*						
CFAF		\$ 148,152	\$ 148,152	\$ 148,152	\$ 148,152	\$ 148,152
Less	Taxes	38,624	39,367	40,155	40,992	41,852
CFAT		<u>\$ 109,527</u>	<u>\$ 108,785</u>	<u>\$ 107,997</u>	<u>\$ 107,160</u>	<u>\$ 106,300</u>