Chapter 15

VALUE, LEVERAGE, AND CAPITAL STRUCTURE

Chapter 15
Learning Objectives

- Understand the value of an equity investment in real estate
- Understand how the use of debt can alter cash flows
- Understand the concept of an optimal balance of debt and equity financing

VALUATION OF REAL ESTATE INVESTMENTS

- The value of an income-producing asset is a function of the income accruing to the asset
- Income is generally measured as some form of cash flow
- Cash flows and discount rate can be hard to determine because of the nature of the asset

FINANCIAL LEVERAGE

- Investor has two basic sources of financing: debt and equity
- Financial leverage is the use of debt in financing – Real estate investors commonly use leverage – we call it a mortgage
- Positive leverage is the use of debt at a cost less than the return on the asset
- Positive leverage increases the return on equity

- Negative leverage is the use of debt at a cost greater than the return on the asset
- Negative leverage reduces the return on equity
- Neutral leverage is when the debt cost is equal to asset return and return on equity is not affected
- Using negative or neutral leverage makes no sense from a financial point of view
- Investing in assets that would result in negative leverage makes no sense

- The risk to the equity is increased by the use of financial leverage
- Leverage allows the cash flows to be divided into two components: less risky and more risky
- Value can be created if debt holder and equity holder have different risk-return preferences
Financial Leverage

- More risk-averse investor can invest in the lower-risk debt and less risk-averse investor can invest in riskier equity
- Tax-deductibility of interest payments on debt make it advantageous
- Federal government subsidizes the use of debt by providing tax relief

Real Estate Cash Flows

- Can be a difference between cash flow and taxable income calculations
- Cash flow contains items that are actual inflows and outflows regardless of whether or not they are tax-deductible
- Taxable income contains items that are tax-deductible whether or not they are actual cash flows (think depreciation, which results from a previous cash flow)

Real Estate Cash Flow Structure

- Cash Flow Structure is
  - Gross Rent (GR)
  - minus Vacancy (VAC)
  - plus Other Income (OI)
  - equals Effective Gross Income (EGI)
  - minus Operating Expenses (OE)
  - equals Net Operating Income (NOI)

- Cash Flow Structure continued is
  - Net Operating Income (NOI)
  - minus Mortgage Payment (MP)
  - equals Before-Tax Cash Flow (BTCF)
  - minus Tax Liability (Savings) (TXS)
  - equals After-Tax Cash Flow (ATCF)

Income Taxes from Operations

- Taxes From Operations are
  - Effective Gross Income (EGI)
  - minus Operating Expenses (OE)
  - equals Net Operating Income (NOI)
  - minus Interest Expense (INT)
  - minus Depreciation (DEP)
  - equals Taxable Income (TI)
  - times Investor’s Marginal Tax Rate (t)
  - equals Taxes (Savings) TXS

Real Estate Cash Flow Structure

- After-Tax Equity Reversion is
  - Estimated Selling Price (ESP)
  - minus Selling Expenses (SE)
  - equals Net Sales Price (NSP)
  - minus Unpaid Mortgage Balance (UMB)
  - equals Before-Tax Equity Reversion (BTER)
  - minus Taxes on Resale (TXR)
  - After-Tax Equity Reversion (ATER)
REAL ESTATE CASH FLOW STRUCTURE
- Taxable Income from Resale is Estimated Selling Price (ESP) minus Selling Expenses (SE)
- equals Amount Realized on Sale (AR)
- minus Adjusted Basis (AB)
- equals Total Gain from Sale (TG)
- minus Depreciation Recovery (DR)
- equals Capital Gain from Resale (CG)

REAL ESTATE CASH FLOW STRUCTURE
- Income Taxes on Resale are Depreciation Recovery (DR)
- times Depreciation Recovery Tax Rate (t_d)
- equals Depreciation Recovery Tax (DRT)
- Capital Gain times Capital Gains Tax Rate (t_g)
- equals Capital Gains Tax (CGT)

REAL ESTATE CASH FLOW STRUCTURE
- Total Tax on Resale is
  - Depreciation Recovery Tax (DRT)
  - plus Capital Gains Tax (CGT)
  - equals Total Tax on Resale (TXR)

R.E. CASH FLOW EXAMPLE
- A real estate investor has the following information on a warehouse:
  - Purchase Price is $1,125,000 with acquisition costs of $36,000 (Basis is Acq Cost, plus value of improvements = Purchase plus Acq – Land value)
  - 33,600 leasable square feet
  - Initial rent of $12/sq. ft. per year and will increase 5 percent per year
  - Vacancy rate of 5% of gross rent per year

R.E. CASH FLOW EXAMPLE
- Operating Expenses are 40% of EGI
- Mortgage is 75% LTV ratio, 20 years, monthly payments, 9% contract rate, 3% financing costs, 5% prepayment penalty for the first six years of mortgage life (Ann PMT = 91097.30)
- PMT(PV=843750, N=240, I/YR=9) = 7591.44
- BAL 60 = 748465.72 (5% = 37423.29 penalty)
- Expected increase in value is 3.50% per year, 8% selling expenses (1.035^5 * 1,125,000 = 1,336,147)
- Holding period is 5 years
- Initial Cash Outlay = 1125000 + 36,000 + 25,312.5 (points) – 843,750 (mort) = 342562.50

R.E. CASH FLOW EXAMPLE
- 80% depreciable (80% of 1125000 + 36000 = 928800. Dep over 39 years = 23815/yr)
- Investor is an active participant, is in a 28% marginal tax bracket, and requires an after-tax equity yield of 15%
- Compute the ATCFs and the ATER for the holding period
- Calculate the NPV and the IRR
### R.E. CASH FLOWS FROM OPERATIONS

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128520 = 91097 + 37423 (prepay penalty)

### INCOME TAXES FROM OPERATIONS

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Note: Year 1 DEP = 11.5/12 of others (mid month rule)

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105902 includes the 37423 prepay penalty
**CASH FLOW FROM RESALE**

- Est Sale Price: 1336147
- Sales Exp: 106891
- Net Sale Price: 1229256
- Unpaid Mort Bal: 748466
- BT Equity Reversion: 480790
- TX Resale: 39511
- AT Equity Reversion: 441279

**INCOME TAXES FROM RESALE**

- Est Sale Price: 1336147
- Sales Exp: 106891
- Amt Realized: 1229256
- Adjusted Basis: 1043909
- Total Gain: 185347

**INCOME TAXES FROM RESALE**

Split gain into two sources (taxed w/ own rate)

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- DRT = 29273
- CGT = 10238

- DRT = 29273
- CGT = 10238

= TXR = 39511

**CASH FLOW SUMMARY**

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**CASH FLOW ANALYSIS**

- NPV @ 15%: $256,668
- IRR: 35.50%

**CASH FLOW ANALYSIS**

- Net Present Value (NPV)
  - The present value of the cash flows minus the present value of the cash outflows
  - Appropriate discount rate is the risk-adjusted required rate of return
  - In the previous example the after-tax cash flows are equity cash flows thus the appropriate discount rate is the required equity yield
CASH FLOW ANALYSIS

- **NPV** = \( \sum_{t=0}^{n} \frac{CF_t}{(1 + r_e)^t} \)
- where \( CF_t \) is the cash flow in time \( t \), \( r_e \) is the discount rate for equity, and \( t \) is the number of time periods

**Decision rule for NPV**
- Accept those independent projects that have positive or zero NPVs
- Reject those independent projects that have negative NPVs

**The Internal Rate of Return (IRR)** is the discount rate at which the NPV is zero, i.e., the discount rate at which the present value of the cash inflows is equal to the present value of the cash outflows

**The IRR equation is:**

\[ 0 = \sum_{t=0}^{n} \frac{CF_t}{(1 + IRR_e)^t} \]

where \( CF_t \) is the cash flow in time \( t \), \( r_e \) is the discount rate for equity, and \( t \) is the number of time periods

**Decision rule for IRR**
- Investor’s required return is used as the benchmark
- Accept those independent projects with IRRs equal to or greater than the required return
- Reject those independent projects with IRRs less than the required return

**Comparing NPV and IRR**
- In making a simple accept/reject decision, NPV and IRR cannot give conflicting recommendations
- Mutually exclusive projects may lead to conflicting recommendations, usually resolved in favor of NPV
- Multiple IRRs
- Reinvestment rate assumption
CASH FLOW ANALYSIS

- Optimal Capital Structure
  - The proportions of debt and equity used in financing that maximize the value of the asset
  - NPV and IRR may be affected by the use of debt
  - Arguments that the use of debt cannot affect value: Modigliani and Miller

CASH FLOW ANALYSIS

- Reconciling MM argument with the use of debt
  - With income taxes the use of debt could increase the after-tax cash flows
  - Agency costs could increase the cost of debt

CASH FLOW ANALYSIS

- Real estate investing in the real world
  - Acquisition costs must be written off over the depreciable life of the property
  - Financing costs must be written off over the life of the mortgage
  - A prepayment penalty is fully deductible in the year it is paid
  - A set-aside into a replacement reserve is not a tax-deductible expense