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

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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

FINANCIAL LEVERAGE

- 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

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FINANCIAL LEVERAGE

- 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)

REAL ESTATE CASH FLOW STRUCTURE

- 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

Year	1	2	3
GR	403200	423360	444528
- VAC	20160	21168	22226
+OI	0	0	0
=EGI	383040	402192	422302
- OE	153216	160877	168921
=NOI	229824	241315	253381

R.E. CASH FLOWS FROM OPERATIONS

Year	4	5
GR	466754	490092
- VAC	23338	24505
+OI	0	0
=EGI	443416	465587
- OE	177366	186235
=NOI	266050	279352

R.E. CASH FLOWS FROM OPERATIONS

Year	1	2	3
NOI	229824	241315	253381
- MP	91097	91097	91097
=BTCF	138727	150218	162284
- TXS	36523	39878	43710
=ATCF	102204	110340	118574

R.E. CASH FLOWS FROM OPERATIONS

Year	4	5
NOI	266050	279352
- MP	91097	128520
=BTCF	174953	150832
- TXS	47754	36506
=ATCF	127199	114326

128520 = 91097 + 37423 (prepay penalty)

INCOME TAXES FROM OPERATIONS

Year	1	2	3
NOI	229824	241315	253381
- INT	75296	73814	72193
- AFC	1266	1266	1266
- DEP	22823	23815	23815
=TI	130439	142420	156107
x t	0.28	0.28	0.28
=TXS	36523	39878	43710

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

INCOME TAXES FROM OPERATIONS

Year	4	5
NOI	266050	279352
- INT	70419	105902
- AFC	1266	20249
- DEP	23815	22823
=TI	170550	130378
x t	0.28	0.28
=TXS	47754	36506

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)

Depreciation Recovery	Capital Gain
DR 117091	CG 68256
x t_d 0.25	x t_g 0.15
=DRT 29273	=CGT 10238

DRT 29273
+CGT 10238
=TXR 39511

CASH FLOW SUMMARY

Year	ATCF	ATER
0	-342563	
1	102204	
2	110340	
3	118574	
4	127199	
5	114326	441279

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

-      n
- NPV = $\sum$ CF$_t$ / (1 + r$_e$)^t
-      t=0
- 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

CASH FLOW ANALYSIS

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

CASH FLOW ANALYSIS

- 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

CASH FLOW ANALYSIS

- The IRR equation is:
-      n
- 0 = $\sum$ CF$_t$ / (1 + IRR$_e$)^t
-      t=0
- 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

CASH FL0W ANALYSIS

- 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

CASH FLOW ANALYSIS

- 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