

Week One

Modigliani and Miller and the Irrelevance of Debt Policy

Outline of Course

- Capital structure, corporate payouts, and their:
 - + theoretical irrelevance
 - + tax consequences
 - + information content
 - + incentive effects
 - + Roughly a third of the course
- Introduction to capital budgeting under uncertainty
 - + Two weeks

Outline of Course, Continued

- Options embedded in corporate liabilities
 - + Warrants, convertible and callable bonds, equity
- Option pricing basics
 - + Binomial and Black-Scholes models
- ‘Real options’ and flexibility
 - + Option to expand or contract
 - + Investment timing options

Stockco Data

- Number of shares: 1,000,000
- Price per share: \$10
- Market value of shares: \$10 million

	<u>State of the Economy</u>			
	Slump	Stagnant	Normal	Boom
Operating Income	\$750,000	\$1,000,000	\$1,125,000	\$1,500,000
Earnings per Share	\$0.75	\$1.00	\$1.125	\$1.50
Return on Shares	7.5%	10%	11.25%	15%

N. B.: Probabilities are such that the normal outcomes are the expected outcomes

Leverfund Data

- Number of shares: 600,000
- Price per share: \$10
- Market value of shares: \$6 million
- Market value of debt: \$4,000,000
- Interest Rate: 8%

Leverfund Outcomes

	<u>State of the Economy</u>			
	Slump	Stagnant	Normal	Boom
Operating Income	\$750,000	\$1,000,000	\$1,125,000	\$1,500,000
Interest on Debt	\$320,000	\$320,000	\$320,000	\$320,000
Equity Earnings	\$430,000	\$680,000	\$805,000	\$1,180,000
Earnings per Share	\$0.72	\$1.13	\$1.34	\$1.97
Return on Shares	7.2%	11.3%	13.4%	19.7%

Levered Portfolio Strategy

- Buy: 1000 shares of Stockco
- Price per share: \$10
- Market value of shares: \$10,000
- Borrow: \$4,000
- Interest @ 8%: \$320

Levered Portfolio Strategy

Outcomes

	<u>State of the Economy</u>			
	Slump	Stagnant	Normal	Boom
Operating Income	\$750	\$1,000	\$1,125	\$1,500
Interest on Debt	\$320	\$320	\$320	\$320
Equity Earnings	\$430	\$680	\$805	\$1,180
Net Return on \$6,000	7.2%	11.3%	13.4%	19.7%
Return of Leverfund	7.2%	11.3%	13.4%	19.7%

Unlevered Portfolio Strategy

- Buy: 600 shares of Leverfund
- Price per share: \$10
- Market value of shares: \$6,000
- Lend: \$4,000
- Interest @ 8%: \$320

Unlevered Portfolio Strategy

Outcomes

	<u>State of the Economy</u>			
	Slump	Stagnan t	Norma l	Boom
Earnin gs per Share	\$0.72	\$1.13	\$1.34	\$1.97
Earnin gs: 600 Shares	\$430	\$680	\$805	\$1,180
Interest on Debt at 8%	\$320	\$320	\$320	\$320
Total Earnin gs	\$750	\$1,000	\$1,125	\$1,500
Net Return on \$10,000	7.5%	10%	11.25%	15%
Return of Leverfund	7.5%	10%	11.25%	15%

Summary of Arbitrage Reasoning

- Borrowing to buy stock in unlevered firm generates same return as investment in levered firm
- Buying stock in levered firm and lending generates same return as investment in unlevered firm
- Strategies with same returns should sell for same price or else investors can make something for nothing

Aside on the Advice of Financial Planners

- Financial planners often suggest investors hold roughly 60% of their financial assets in equity and 40% in bonds
- U. S. corporate liabilities have typically been about 60% equity and 40% debt
- Financial planners seem to want investors to unlever Leverfund!

No Magic in Financial Leverage

- Balance sheet
 - + right hand side consists of real assets
 - + left hand side consists of financial assets
- Can one create value by shuffling paper claims on real assets (sounds like alchemy)?
- Efforts to increase value by tinkering with capital structure are fruitless in well-functioning capital markets
 - + M&M Proposition I

Supermarket Analogies of M&M

- Supermarket pricing theory: price of whole
 - + Price of whole pie not dependent on how it is sliced
 - + Price of chicken no more than one assembled from parts
 - + Price of milk equals that of skim milk plus cream
- Real world: whole pies, chicken, and milk actually cost less than assembled parts

Reasons for the Failure of Supermarket Pricing Theory

- Chicken arbitrage potentially costly
 - + Demand side costs: consumers willing to pay extra to pick and choose pieces
 - i.e., too costly for them to perform chicken arbitrage
 - + Supply side costs: costly for supermarket to cut up chickens and sell pieces separately
- Both conditions necessary
 - + No demand side costs imply consumers do chicken arbitrage
 - + No supply side costs imply competition eliminates piece surcharge

Financial Policy Analogy

- Firm sells its real assets to investors as a package of financial assets
 - + Firm that issues only common equity sells its assets whole
 - + Firm that issues complex package of securities sells its assets in pieces
 - + Desired complex package has higher price only if costs on both demand and supply sides
 - must be costly for firm to create complex package
 - must be costly for investors to replicate it

Financial Policy, Chicken Arbitrage, and Transactions Costs

- Dollar magnitudes
 - + Arbitrage profit only \$0.50 if it costs \$2.50 to buy a chicken and \$3.00 to buy it as parts
 - + Same percentage valuation error on \$250 MM of real assets is \$50 MM
 - costs of leverage so low as to create nearly perfectly elastic supply and, hence, no leverage premium
- Suggests capital structure changes will not affect values as long as investors value real assets underlying paper assets

Interest Rates and the Homemade Leverage Argument

- Individuals borrowing at corporate rate may seem implausible
- But transaction done with margin account
 - + use liquid capital (like T-bills) as margin
 - + margin accounts have low interest rates
- Corporations use illiquid assets as collateral
- Their borrowing rates ought to be higher than margin account borrowing rates
 - + They are!