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Agricultural
Finance

Rodney Beard

Transactions cost
theory

Agency theory

Debt choice

AGEC 3603 Agricultural Finance

Lecture 1 - Introduction

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Capital structure

- ► Sole proprietorship
- ► Partnership
- ► Corporation

Why do firms exist?

- ▶ Transactions cost argument
- ▶ Hiring labor
- ▶ Markets vs. Firms Argument

Agency Model

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- $V(I)$ is the firm value achieved with investment I (Firm value is generally the discounted value of future profits)
- Cost $C(X)$ of providing non-pecuniary benefits X, i.e. managerial "perks".
- Value of these benefits to the firm $P(X)$
- Net benefits $B(X) = P(X) - C(X)$
- Optimal level of non-pecuniary benefits

$$\frac{\partial B(X^*)}{\partial X^*} = \frac{\partial P(X^*)}{\partial X^*} - \frac{\partial C(X^*)}{\partial X^*} = 0$$

Economic cost of managerial "perks" to the firm

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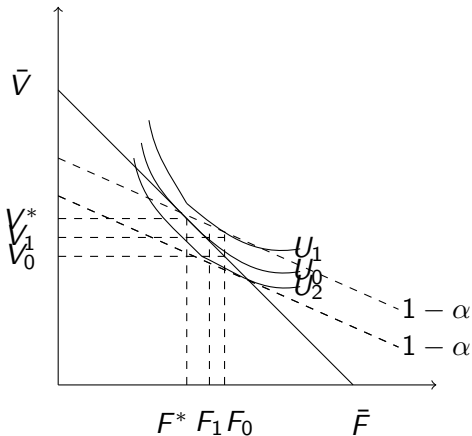
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$$F(X) = B(X^*) - B(\hat{X})$$

Selling part ownership

- ▶ Owner/operator sells α shares
- ▶ Investor receives αV in return for investing I

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Debt choice

- firm organized as sole proprietor
- Owner "chooses" mix of firm value V and "perks" F to maximize utility
- Loss in firm value due to sale of shares (think of how selling shares reduces stock price) $\bar{V} - V_0$

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Is this model viable as a model of the farm firm?

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Debt choice

- ▶ most farms are owner/operated
- ▶ Exception sharecropping
- ▶ Sharecropping models address similar issues but analysis is slightly different
- ▶ sharecropping doesn't involve sale of shreas as such but is more a tenant farmer/absentee landlord relationship

New forms of ownership: Farming meets Fintech

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- ▶ Increased need for capital and growth in scale could necessitate sale of shares
- ▶ Then the Jensen and Meckling model might apply
- ▶ New forms of finance for farms, crowdfunding via internet (Fquare, Barnraiser, Farmfund, AgFunder)

Debt choice

- ▶ How do firms choose their capital structure
- ▶ Why do agricultural firms rely primarily on debt?
- ▶ Modigliani-Miller theorem

Modigiliani-miller theorem - Proposition 1

The Value of Assets is independent of the combination of debt and equity.

Business Firms	
Assets	Liabilities
Productive capital	Debt owed to households
	Equity in firms owned by households

Households	
Assets	Liabilities
Debt of firms	Household net worth
Equity in firms	

Assets	Liabilities
Productive capital	Household net worth

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Modigliani-miller Proposition I

WACC is independent of the Debt-Equity ratio

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Proof

Consider 2 firms: Firm 2 is levered firm 1 isn't.
Assume

$$V_2 > V_1$$

Step 1: Investor invests I in company 2 and gains a return $Y_2 = \alpha(I - rD_2)$, investor not firm borrows D_2 is the investors debt

Step 2: Investor sells αE_2 equity and buys $e_1 = \alpha(E_2 + D_2)$ of shares in company 1.

▶ Return to investor is

$$Y_1 = \frac{\alpha(E_2 + D_2)}{E_1}I - r\alpha D_2 = \alpha\frac{V_2}{V_1}I - r\alpha D_2$$

If $V_2 > V_1$ then $Y_1 > Y_2$
Owner's of second company will their shares in 2 to buy shares in 1 reducing V_2.

Proof continued

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What if $V_1 > V_2$
Investor obtains a return

$$Y_1 = \alpha I$$

Investor exchanges shares in company 1 for shares in company 2 and bonds

$$e_2 = \frac{E_2}{V_2} e_1$$

and

$$d = \frac{D_2}{V_2} e_1$$

Then

$$Y_2 = \alpha \frac{E_1}{V_2} I$$

Is Y_1 or Y_2 bigger?

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So investor sells shares in company 1 and buy shares and debt in company 2. Undoing "leverage" in company 1.

Conclusion:
Arbitrage leads to vlaue of levered and unlevered firms being eauted

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Modigliani-miller - Proposition II

The cost of equity is increasing in the degree of leverage

$$WACC = \frac{D}{D+E}k_D + \frac{E}{D+E}k_E$$

Rearrange to get $k_E = (WACC - \frac{D}{D+E}k_D)\frac{D+E}{E}$

$$k_E = WACC\frac{D+E}{E} - \frac{D}{E}k_D$$

$$k_E = WACC\frac{D}{E} + WACC - \frac{D}{E}k_D$$

$$= (WACC - k_D)\frac{D}{E} + WACC$$

This is also known as the leverage $\frac{D}{E}$ formula

Monetary Policy and the farm Firm

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Debt choice

- Increasing interest rates (will impact cost of debt) depending on loan conditions
- This reduces cost of equity