AN APPLICATION OF THE ADJUSTED PRESENT VALUE (APV) METHOD

LEVERAGED BUYOUT

Julia S. Kwok, Ph. D.
Professor of Finance
Northeastern State University

Learning Objectives

1. Understand what a leverage buyout is and its costs and benefits.
2. Understand the effects of leverage on the value created by a project.
3. Apply the Adjusted Present Value (APV) method and Weighted Average Cost of Capital (WACC) approach to value firms with leverage.

CONTENTS

WHAT IS A LEVERAGED BUYOUT?

- An acquisition of another company using a significant amount of borrowed money (bonds or loans) to meet the cost of acquisition.
- When a buyer commits a small portion (10% to 30%) of the required capital and uses debt (70%-90%) to cover the difference.
- The purchase is usually funded by a combination of the company's existing cash on hand, borrowed funds.
- The assets of the company being acquired are often used as collateral for the loans, along with the assets of the acquiring company.
- Recent S&P Global estimates have overall buyout volume in the US in 2017 at approximately $40 billion and growing.

BENEFITS OF A LEVERAGED BUYOUT

- Ability to sell a business that might not be at its peak performance but still has cash flow and the potential for growth.
- Allows buyers to access more expensive investment options that they wouldn't otherwise have access to with a small amount of upfront capital.
- Financial leverage yields high returns due to the size of equity investment
- Financial leverage can be used in short-term, low-risk situations where high degrees of capital are needed.

COSTS OF A LEVERAGED BUYOUT

- High financial leverage creates high risks despite the high returns
- LBOs will often focus on cutting costs and make investments in equipment and real estate, leading to decreased competitiveness in the long term.
- LBOs sometimes result in downsizing and layoffs
- Over-optimistic forecasts of the revenues of the target company may also lead to financial distress after acquisition.

ADJUSTED PRESENT VALUE (APV) METHOD

$$APV = NPV + NPVF$$

Examples of financing effects: Tax Subsidy to Debt, Costs of Issuing New Securities, Costs of Financial Distress, Subsidies to Debt Financing

APV METHOD

$$APV = \sum_{t=1}^{\infty} \frac{UCF_t}{(1+R_0)^t} + \text{Additional effects of debt} - \text{Initial investment}$$

APV ILLUSTATION

All Equity Firm

- Use unlevered cost of equity Ro to discount the Incremental after-tax cash flow
- Negative net present value
- Decision Rule: Invest if NPV >0
- Decision: Not to invest

Firm with Leverage

- APV=NPV+NPVF
- e.g. Tax shield from Bond =Tax rate*Bond value*IR for bond
- Use the cost of debt to discount the tax shield from Bond
- Decision Rule: Accept the project if APV >0
- NPV can be <0, as long as NPVF > NPV, then APV>0

APV IMPACTS

- Subsidized financing and the debt tax shield will increase APV
- Flotation cost and Financial distress cost will reduce APV

APV EXAMPLE – NPV

Consider a project with the following timing and incremental after-tax cash flows for an all-equity firm are:

The unlevered cost of equity is R_0 = 10%:

$$NPV_{10\%} = -\$1{,}000 + \frac{\$125}{(1.10)} + \frac{\$275}{(1.10)^2} + \frac{\$400}{(1.10)^3} + \frac{\$500}{(1.10)^4}$$

$$NPV_{10\%} = -\$17.06$$

The project would be rejected by an all-equity firm: $NPV < 0$.

APV EXAMPLE – NPVF

The firm finances the project with \$600 of debt at $R_B = 8\%$.

The company's tax rate is 21%, so they have an interest tax shield worth $T_C B R_B = .21 \times \$600 \times .08 = \$10.08$ each year.

The net present value of the project under leverage is:

$$APV = NPV + NPV_{\text{debt tax shield}}$$

$$APV = -\$17.06 + \sum_{t=1}^{4} \frac{\$10.08}{(1.08)^t}$$

$$APV = -\$17.06 + \$33.39 = \$16.33$$

So, the project *with debt should be accepted*

THE LEVERAGED BUYOUT EXAMPLE

In this leveraged buyout, the debt level of the company changes through time. Since the debt level changes through time, the APV method is appropriate for evaluating the LBO.

DATA

- **An old conglomerate with products in snacks, cosemetics and home security system**
- **Proposed Changes: 25% leverage and spinoff the home security division**
- **Growth rate at the end of 5 years will be 3.5%**
- **Cost of Debt: 12.5% for the first 5 years and then 8%.**
- **Current SP: $29; 385m shares**
- **Return on Assets: 14%**
- **Tax rate: 21%**

DATE GIVEN

		2019	2020	2021	2022	2023
	Sales	$2,419.00	$2,713.00	$2,923.00	$2,992.00	$3,114.00
	Costs	643.00	844.00	888.00	960.00	1,011.00
	Dep	427.00	454.00	473.00	496.00	506.00
	EBT	$1,349.00	$1,415.00	$1,562.00	$1,536.00	$1,597.00
	Interest Payments	2120	2045	2851	2779	2875
	Changes of Capital expenditures	$246	$213	$267	$271	$267
	Change in NWC	–107	–164	$89	$84	$95
	Asset sales	1,250	905			

HOW TO PROCEED

Step 1: Calculate PV of unlevered CFs for YR 1-5

Step 2: Calculate PV of unlevered CFs beyond YR 5

Step 3: Calculate PV of interest tax shields for YR 1-5.

Step 4: Calculate PV interest tax shields beyond YR. 5

STEP 1: CALCULATE PV OF UNLEVERED CFS FOR YR 1-5

The income statement does not include interest, so it is the projected unlevered cash flows of the company.

To find CFs each year,

operating CF = net income + Depreciation expenses +/- any changes of capital expenditures +/- changes in net working capital + the AT asset sales.

STEP 1: CALCULATING PV OF UNLEVERED CFS FOR YR 1-5

	2019	2020	2021	2022	2023
Sales	$2,419.00	$2,713.00	$2,923.00	$2,992.00	$3,114.00
Costs	643.00	844.00	888.00	960.00	1,011.00
Dep	427.00	454.00	473.00	496.00	506.00
EBT	$1,349.00	$1,415.00	$1,562.00	$1,536.00	$1,597.00
Tax	283.29	297.15	328.02	322.56	335.37
Net income	$1,065.71	$1,117.85	$1,233.98	$1,213.44	$1,261.63
+ Dep	427.00	454.00	473.00	496.00	506.00
+/- Changes Capital expenditures	$246	$213	$267	$271	$267
+/-Change in NWC	–107	–164	$89	$84	$95
+ AT Asset sales	1,250	905			
Unlevered cash flows	$2,881.71	$2,099.85	$1,528.98	$1,522.44	$1,595.63

STEP 1: CALCULATE THE PV OF UNLEVERED CFS FOR YR 1-5

Unlevered cash flows will be discounted at the unlevered cost of equity, which is 14%.

Since the company currently has no debt, the required return on assets = cost of equity.

PV of the unlevered CFs for the next 5 years will be:

$$PV = \$2,\ 881.71/1.14 + \$2{,}099.85/1.14^2 + \$1522.44/1.14^3 + \$1{,}522.44/1.14^4 + \$1{,}595.63/1.14^5$$

$$PV = \$6{,}905.73$$

STEP 2: CALCULATE THE PV OF THE UNLEVERED CFS BEYOND YR 5

Assume CFs will grow at 3.5% into perpetuity, i.e. g=3.5%.
Discount these CFs at the unlevered return on equity, i.e. Ro=14% .

Using the Gordon Growth model, $PV_5 = CF_6/ (Ro-g)$ where $CF_6 = CF_5*(1+g)$.
So the value of this perpetual CFs in YR 5 will be:

Unlevered CF value in Year 5 = [$1,595.63 (1 + .035)]/(.14 – .035)

Unlevered CF value in Year 5 = $15,728.35

The present value today of this terminal value is:

$PV = \$ 15,728.35 /1.14^5$
PV = $8,168.81

STEP 3: CALCULATE THE PV OF INTEREST TAX SHIELDS FOR YR 1-5.

Interest tax shield = interest paid * the tax rate.

To find PV (interest tax shield), we need to discount these at the pretax cost of debt, 12.5%.

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so the PV (interest tax shield) for the first five years is:

$$PV = (\$2120)(.21)/1.125 + (\$2045)(.21)/1.125^2 + (\$2,851)(.21)/1.125^3 + (\$2,779)(.21)/1.125^4 + (\$2,875)(.21)/1.125^5$$

$$PV = \$1,854.92$$

STEP 4: CALCULATE THE PV OF INTEREST TAX SHIELDS BEYOND YR 5.

- Debt will be reduced and maintained at 25% of the value of the firm from that date forward.
- WACC method is used to calculate a terminal value for the firm at the target capital structure.
- We then decompose it into an all-equity value and a value from tax shields.
- Need to use the IR on the debt (8%) beyond Year 5 in these calculations.

STEP 4: CALCULAT THE PRESENT VALUE OF INTEREST TAX SHIELDS BEYOND YR5.

The levered cost of equity can be found with Modigliani-Miller Proposition II with corporate taxes:

$$R_S = R_0 + \frac{B}{S}(1 - T_C)(R_0 - R_B)$$

$R_S = .14 + (.25)(.14 - .08)(1 - .21)$

$R_S = .1519$, or 15.19%

Now, we can calculate the WACC for the company beyond YR 5.
The WACC at this point will be:

$$R_{\text{WACC}} = W_B(1 - T_C)R_B + W_S R_S$$

$R_{\text{WACC}} = [B/(B + S)](1 - T_C)R_B + [S/(B + S)]R_S$

$R_{\text{WACC}} = [.25](1 - .21)(.08) + [1/1.25](.1519)$

$R_{\text{WACC}} = .1373$, or 13.73%

STEP 4: CALCULATING THE PRESENT VALUE OF INTEREST TAX SHIELDS BEYOND THE FIRST FIVE YEARS.

We can use the WACC to calculate the terminal value of the levered company, which will be:

$$V_L = [\$1{,}595.63(1 + .035)]/(.1373 - .035)$$
$$V_L = \$16{,}143.47$$

STEP 4: CALCULATE THE PV OF INTEREST TAX SHIELDS BEYOND YR 5.

Using Modigliani-Miller's valuation of a levered firm:

$$V_L = V_U + T_C B$$

we can value the interest tax shield as:

$16,143.47 = $15,728.35 + Interest tax shield
Interest tax shield = $415.12

This is the value of the interest tax shield beyond Year 5. Discounting this at the cost of debt over the first five years, we find the value today is:

$$PV = \$415.12/1.125^5$$
PV = $230.36

TOTAL VALUE OF THE COMPANY TODAY

We have valued all future cash flows of the company.

The value of the unlevered cash flows today is:

Value of unlevered CF = $6,905.73 + 8,168.81
Value of unlevered CF = $15,074.54

And the value of the interest tax shield today is:

Value of interest tax shield = $1,854.92 + $230. 36
Value of interest tax shield = $2,085.28

OFFER PRICE OF THE LEVERAGED BUYOUT

So, the total value of the company today is:

Value of company today = $15,074.54 + $2,085.28
Value of company today = $17,159.82

So, the most the group should offer per share is:

Price = $17,159.82 /215
Price = $79.81

SUMMARY

1. The adjusted present value (APV) approach takes into account the use of debts to finance projects.
2. APV is frequently used when the level of debt is known over the project's life such as leveraged buyouts and leases.
3. The value of a leveraged firm is the sum of the PV of the value of the unlevered firm plus the PV of interest tax shield.

THANK YOU

Julia S. Kwok

kwok@nsuok.edu

(918)313-0808

https://www.linkedin.com/in/julia-kwok/