



TYING UP LOOSE ENDS

The trouble starts after you tell me you are done..

BUT WHAT COMES NEXT?

Value of Operating Assets	Since this is a discounted cashflow valuation, should there be a real option premium?
+ Cash and Marketable Securities	Operating versus Non-operating cash Should cash be discounted for earning a low return?
+ Value of Cross Holdings	How do you value cross holdings in other companies? What if the cross holdings are in private businesses?
+ Value of Other Assets	What about other valuable assets? How do you consider under utilized assets?
Value of Firm	Should you discount this value for opacity or complexity? How about a premium for synergy? What about a premium for intangibles (brand name)?
- Value of Debt	What should be counted in debt? Should you subtract book or market value of debt? What about other obligations (pension fund and health care)? What about contingent liabilities? What about minority interests?
= Value of Equity	Should there be a premium/discount for control? Should there be a discount for distress
- Value of Equity Options	What equity options should be valued here (vested versus non-vested)? How do you value equity options?
= Value of Common Stock	Should you divide by primary or diluted shares?
/ Number of shares	
= Value per share	Should there be a discount for illiquidity/ marketability? Should there be a discount for minority interests?

1. THE VALUE OF CASH

- The simplest and most direct way of dealing with cash and marketable securities is to keep it out of the valuation - the cash flows should be before interest income from cash and securities, and the discount rate should not be contaminated by the inclusion of cash. (Use betas of the operating assets alone to estimate the cost of equity).
- Once the operating assets have been valued, you should add back the value of cash and marketable securities.
- In many equity valuations, the interest income from cash is included in the cashflows. The discount rate has to be adjusted then for the presence of cash. (The beta used will be weighted down by the cash holdings). Unless cash remains a fixed percentage of overall value over time, these valuations will tend to break down.

AN EXERCISE IN CASH VALUATION

	Company A	Company B	Company C
Enterprise Value	\$1,000.0	\$1,000.0	\$1,000.0
Cash	\$100.0	\$100.0	\$100.0
Return on invested capital	10%	5%	22%
Cost of capital	10%	10%	12%
Trades in	US	US	Argentina

In which of these companies is cash most likely to be

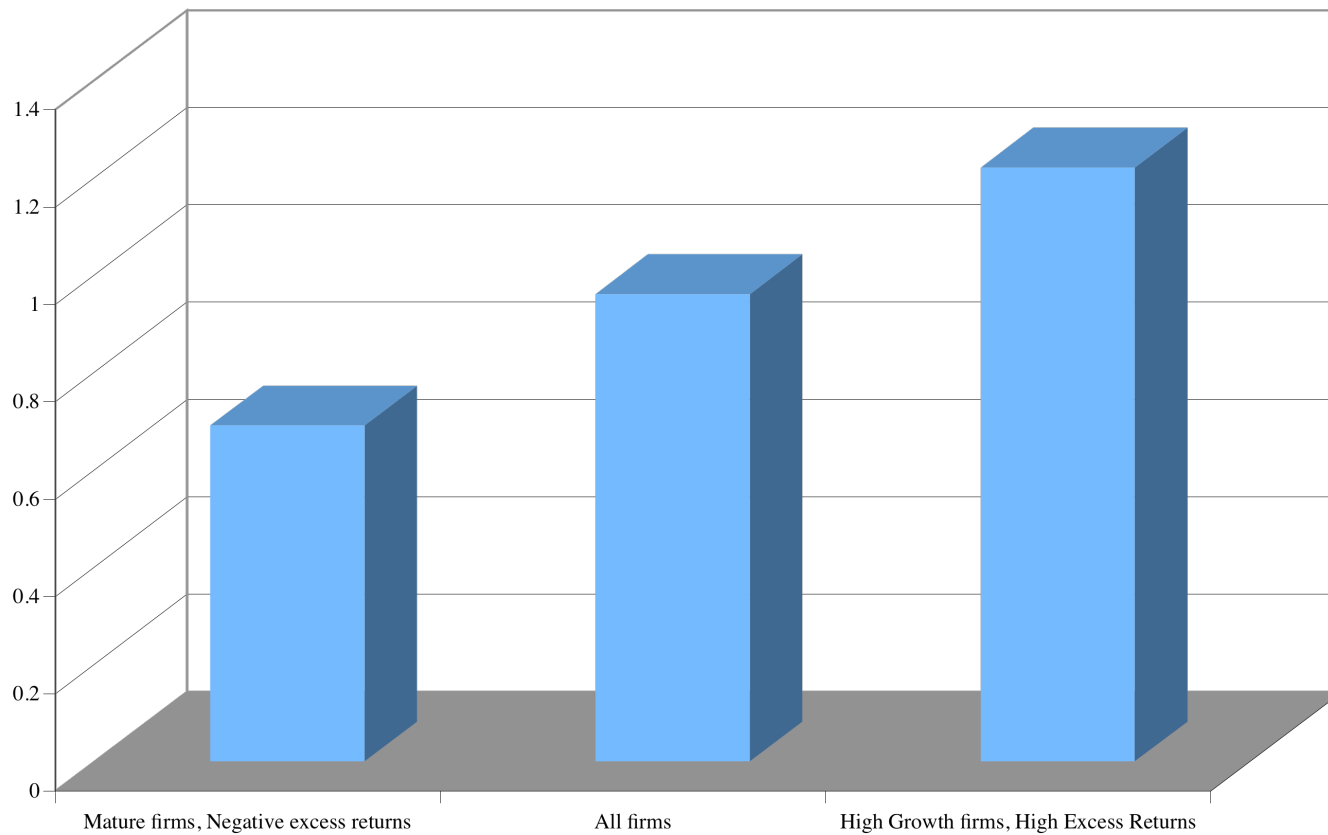
- A Neutral Asset (worth \$100 million)
- A Wasting Asset (worth less than \$100 million)
- A Potential Value Creator (worth >\$100 million)

SHOULD YOU EVER DISCOUNT CASH FOR ITS LOW RETURNS?

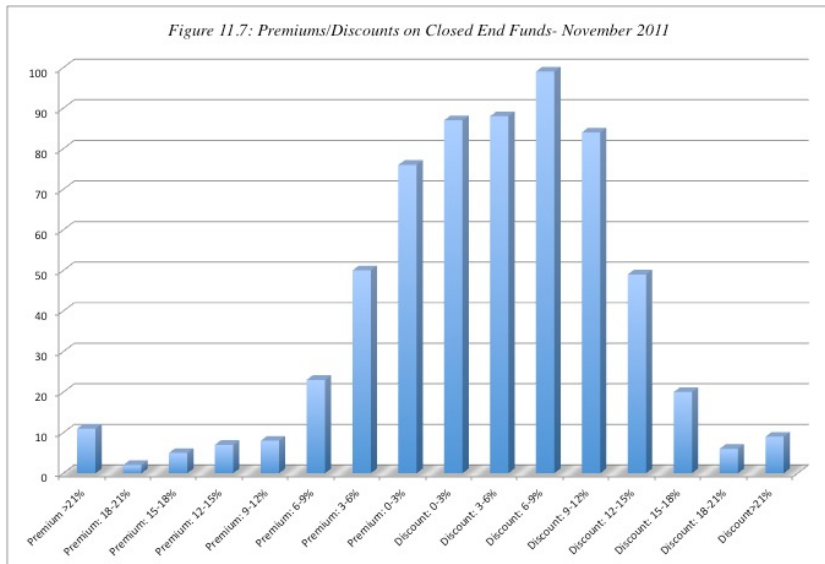
- There are some analysts who argue that companies with a lot of cash on their balance sheets should be penalized by having the excess cash discounted to reflect the fact that it earns a low return.
 - Excess cash is usually defined as holding cash that is greater than what the firm needs for operations.
 - A low return is defined as a return lower than what the firm earns on its non-cash investments.
- This is the wrong reason for discounting cash. If the cash is invested in riskless securities, it should earn a low rate of return. As long as the return is high enough, given the riskless nature of the investment, cash does not destroy value.
- There is a right reason, though, that may apply to some companies... Managers can do stupid things with cash (overpriced acquisitions, pie-in-the-sky projects....) and you have to discount for this possibility.

CASH: DISCOUNT OR PREMIUM?

*Market Value of \$ 1 in cash:
Estimates obtained by regressing Enterprise Value against Cash Balances*



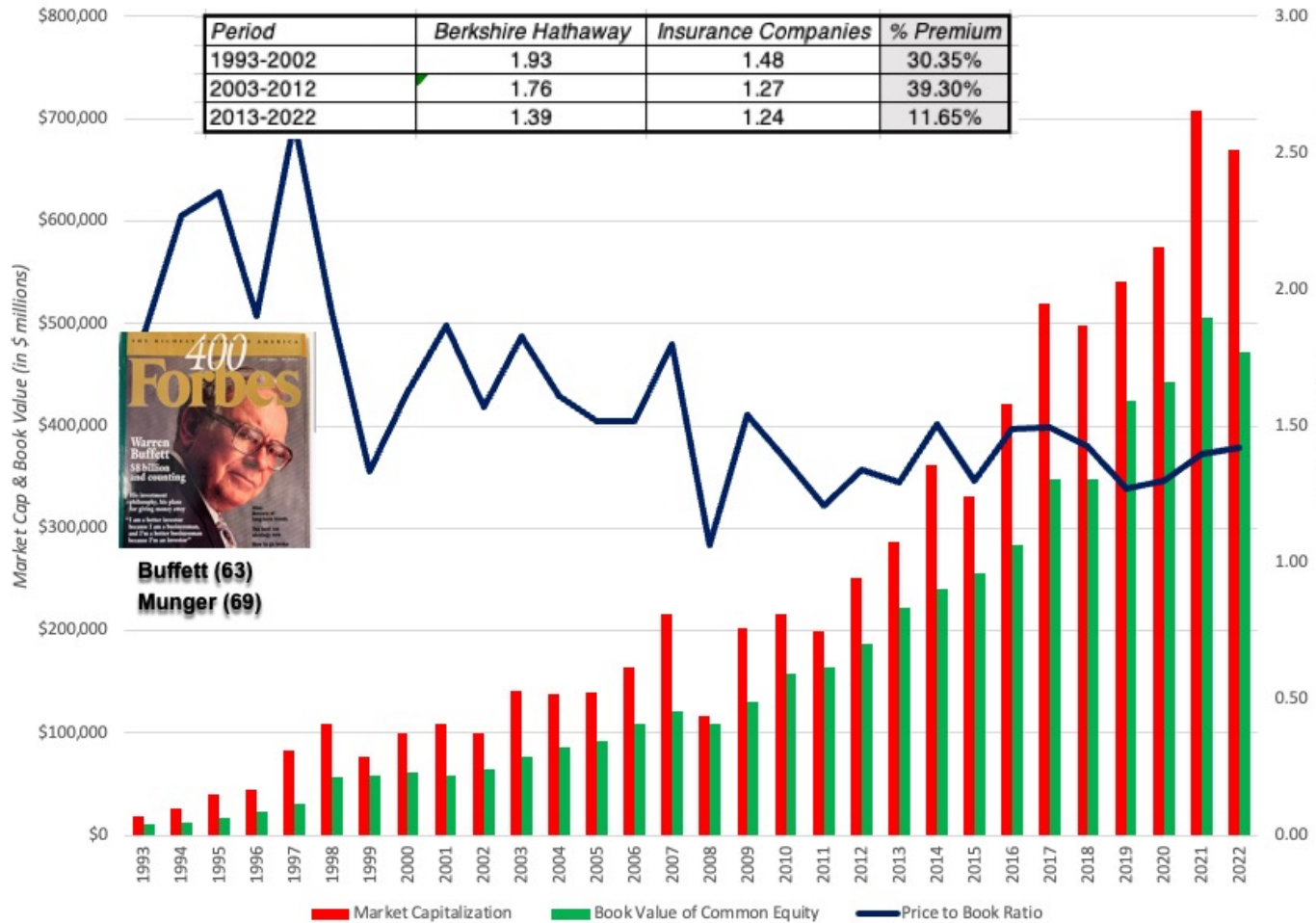
A DETOUR: CLOSED END MUTUAL FUNDS



- Assume that you have a closed-end fund that invests in ‘average risk’ stocks. Assume also that you expect the market (average risk investments) to make 11.5% annually over the long term. If the closed end fund underperforms the market by 0.50%, estimate the discount on the fund.

THE MOST FAMOUS CLOSED END FUND IN HISTORY?

Berkshire Hathaway: Price to Book - 1993 to 2022



Buffett (93)
Munger (RIP)



Buffett (63)
Munger (69)

2. DEALING WITH HOLDINGS IN OTHER FIRMS

- Holdings in other firms can be categorized into
 - Minority passive holdings, in which case only the dividend from the holdings is shown in the balance sheet
 - Minority active holdings, in which case the share of equity income is shown in the income statements
 - Majority active holdings, in which case the financial statements are consolidated.
- In an intrinsic valuation, you would like to estimate the intrinsic value of these holdings and including them in your overall intrinsic valuation of the company.

IF YOU REALLY WANT TO VALUE CROSS HOLDINGS RIGHT

- Step 1: Value the parent company without any cross holdings. This will require using unconsolidated financial statements rather than consolidated ones.
- Step 2: Value each of the cross holdings individually. (If you use the market values of the cross holdings, you will build in errors the market makes in valuing them into your valuation).
- Step 3: The final value of the equity in the parent company with N cross holdings will be:

Value of parent company

– Debt of parent company

+ $\sum_{j=1}^{j=N} \% \text{ owned of Company } j * (\text{Value of Company } j - \text{Debt of Company } j)$

VALUING YAHOO AS THE SUM OF ITS INTRINSIC PIECES

100% of Yahoo! US Equity

Operating assets = \$4383	
+ Cash =	\$4,571
- Debt =	\$1,591
=Parent Equity = \$7,363	

+ 35% of Yahoo! Japan Equity

Operating assets = \$17,884	
+ Cash =	\$3,113
- Debt =	\$0
Equity = \$20,997 35% of value = \$7,349	

+ 22.1% of Alibaba Equity

Operating assets = \$127,484	
+ Cash =	\$27,963
- Debt =	\$6,670
Equity = \$145,587 22.1% of value = \$32,175	

- Loose Ends =

- Taxes due = \$5,017

- Yahoo options = \$298

Equity value = \$41,571 Per share = \$41.19
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IF YOU HAVE TO SETTLE FOR AN APPROXIMATION, TRY THIS...

- For majority holdings, **with full consolidation**, convert the minority interest from book value to market value by **applying a price to book ratio** (based upon the sector average for the subsidiary) to the minority interest.
 - Estimated market value of minority interest = Minority interest on balance sheet * Price to Book ratio for sector (of subsidiary)
 - Subtract this from the estimated value of the consolidated firm to get to value of the equity in the parent company.
- For minority holdings in other companies, convert the **book value of these holdings (which are reported on the balance sheet) into market value by multiplying by the price to book ratio of the sector(s)**. Add this value on to the value of the operating assets to arrive at total firm value.

YAHOO: A PRICING GAME?

100% of Yahoo! US Equity

EV/Sales* Sales = 0.63*	
\$4672 = \$2,948	
+ Cash =	\$4,571
- Debt =	\$1,591
=Parent Equity = \$5,929	

+ 35% of Yahoo! Japan Equity

EV/Sales* Sales = 7.91*	
\$3929 = \$31,075	
+ Cash =	\$3,113
- Debt =	\$0
Equity = \$34,188	
35% of value = \$11,966	

+ 22.1% of Alibaba Equity

EV/Sales* Sales = 12.18*	
\$7911 = \$96,331	
+ Cash =	\$27963
- Debt =	\$6,670
Equity = \$117,623	
22.1% of value = \$25,995	

- Loose Ends =

Taxes due =	\$4,011
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Yahoo options	\$298
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Equity value= \$39,580
Per share = \$39.19

3. OTHER ASSETS THAT HAVE NOT BEEN COUNTED YET..

- Assets that you should not be counting (or adding on to DCF values)
 - **If an asset is contributing to your cashflows, you cannot count the market value of the asset in your value.**
- Assets that you can count (or add on to your DCF valuation)
 - **Overfunded pension plans:** If you have a defined benefit plan and your assets exceed your expected liabilities, you could consider the over funding with two caveats:
 - Collective bargaining agreements may prevent you from laying claim to these excess assets.
 - There are tax consequences. Often, withdrawals from pension plans get taxed at much higher rates.
 - **Unutilized assets:** If you have assets or property that are not being utilized to generate cash flows (vacant land, for example), you have not valued them yet. You can assess a market value for these assets and add them on to the value of the firm.

AN UNCOUNTED ASSET?

Price tag: \$200 million



The longtime home of Playboy magazine founder Hugh Hefner is to be sold to Daren Metropoulos, a principal at private-equity firm Metropoulos & Co. PHOTO: GETTY IMAGES

4. A DISCOUNT FOR COMPLEXITY: AN EXPERIMENT

	<i>Company A</i>	<i>Company B</i>
Operating Income	\$ 1 billion	\$ 1 billion
Tax rate	40%	40%
ROIC	10%	10%
Expected Growth	5%	5%
Cost of capital	8%	8%
Business Mix	Single	Multiple
Holdings	Simple	Complex
Accounting	Transparent	Opaque

- Which firm would you value more highly?

MEASURING COMPLEXITY: VOLUME OF DATA IN FINANCIAL STATEMENTS

<i>Company</i>	<i>Number of pages in last 10Q</i>	<i>Number of pages in last 10K</i>
General Electric	65	410
Microsoft	63	218
Wal-mart	38	244
Exxon Mobil	86	332
Pfizer	171	460
Citigroup	252	1026
Intel	69	215
AIG	164	720
Johnson & Johnson	63	218
IBM	85	353

MEASURING COMPLEXITY: A COMPLEXITY SCORE

Item	Factors	Follow-up Question	Answer	Weighting factor	Hyundai Heavy Score
Operating Income	1. Multiple Businesses	Number of businesses (with more than 10% of revenues) =	3	2.00	6
	2. One-time income and expenses	Percent of operating income =	5%	10.00	0.5
	3. Income from unspecified sources	Percent of operating income =	15%	10.00	1.5
	4. Items in income statement that are volatile	Percent of operating income =	20%	5.00	1
Tax Rate	1. Income from multiple locales	Percent of revenues from non-domestic locales =	75%	3.00	2.25
	2. Different tax and reporting books	Yes or No	No	Yes=3	0
	3. Headquarters in tax havens	Yes or No	No	Yes=3	0
	4. Volatile effective tax rate	Yes or No	Yes	Yes=2	2
Capital Expenditures	1. Volatile capital expenditures	Yes or No	Yes	Yes=2	2
	2. Frequent and large acquisitions	Yes or No	No	Yes=4	0
	3. Stock payment for acquisitions and investments	Yes or No	No	Yes=4	0
Working capital	1. Unspecified current assets and current liabilities	Yes or No	Yes	Yes=3	3
	2. Volatile working capital items	Yes or No	Yes	Yes=2	2
Expected Growth rate	1. Off-balance sheet assets and liabilities (operating leases and R&D)	Yes or No	No	Yes=3	0
	2. Substantial stock buybacks	Yes or No	No	Yes=3	0
	3. Changing return on capital over time	Is your return on capital volatile?	Yes	Yes=5	5
	4. Unsustainably high return	Is your firm's ROC much higher than industry average?	Yes	Yes=5	5
Cost of capital	1. Multiple businesses	Number of businesses (more than 10% of revenues) =	3	1.00	3
	2. Operations in emerging markets	Percent of revenues =	50%	5.00	2.5
	3. Is the debt market traded?	Yes or No	No	No=2	2
	4. Does the company have a rating?	Yes or No	No	No=2	2
	5. Does the company have off-balance sheet debt?	Yes or No	No	Yes=5	0
No-operating assets	Minority holdings as percent of book assets	Minority holdings as percent of book assets	30%	20.00	6
Firm to Equity value	Consolidation of subsidiaries	Minority interest as percent of book value of equity	20%	20.00	4
	Shares with different voting rights	Does the firm have shares with different voting rights?	No	Yes = 10	0
Per share value	Equity options outstanding	Options outstanding as percent of shares	0%	10.00	0
		Complexity Score =			49.75

DEALING WITH COMPLEXITY

- In Discounted Cashflow Valuation
 - **The Aggressive Analyst:** Trust the firm to tell the truth and value the firm based upon the firm's statements about their value.
 - **The Conservative Analyst:** Don't value what you cannot see.
 - The Compromise: Adjust the value for complexity
 - **Adjust cash flows** for complexity
 - **Adjust the discount rate** for complexity
 - Adjust the **expected growth rate**/ length of growth period
 - Value the firm and then **discount value for complexity** (a complexity discount)
- In relative valuation
 - In a relative valuation, you may be able to assess the price that the market is charging for complexity:
 - With the hundred largest market cap firms, for instance:
 $PBV = 0.65 + 15.31 \text{ ROE} - 0.55 \text{ Beta} + 3.04 \text{ Expected growth rate} - \mathbf{0.003 \#}$
Pages in 10K

5. BE CIRCUMSPECT ABOUT DEFINING DEBT FOR COST OF CAPITAL PURPOSES...

- **General Rule:** Debt generally has the following characteristics:
 - **Contractual commitment** to make fixed payments in the future
 - The fixed payments **are tax deductible**
 - Failure to make the payments can **lead to either default or loss of control** of the firm to the party to whom payments are due.
- Defined as such, debt should include
 - All interest bearing liabilities, short term as well as long term
 - All leases, operating as well as capital
- Debt should not include
 - Accounts payable or supplier credit
- Be wary of your conservative impulses which will tell you to count everything as debt. That will push up the debt ratio and lead you to understate your cost of capital.

BOOK VALUE OR MARKET VALUE

- You are valuing a **distressed telecom company** and have arrived at an **estimate of \$ 1 billion for the enterprise value** (using a discounted cash flow valuation). The company has **\$ 1 billion in face value of debt outstanding** but the debt is **trading at 50% of face value (because of the distress)**. What is the value of the equity to you as an investor?
 - The equity is worth nothing (EV minus Face Value of Debt)
 - The equity is worth \$ 500 million (EV minus Market Value of Debt)
- Would your answer be different if you were told that the liquidation value of the assets of the firm today is \$1.2 billion and that you were planning to liquidate the firm today?

BUT YOU SHOULD CONSIDER OTHER POTENTIAL LIABILITIES WHEN GETTING TO EQUITY VALUE

- If you have **under funded pension fund or health care plans**, you should consider the under funding at this stage in getting to the value of equity.
 - If you do so, you should not double count by also including a cash flow line item reflecting cash you would need to set aside to meet the unfunded obligation.
 - You should not be counting these items as debt in your cost of capital calculations....
- If you have **contingent liabilities** - for example, a potential liability from a lawsuit that has not been decided - you should consider the expected value of these contingent liabilities
 - Value of contingent liability = Probability that the liability will occur * Expected value of liability

6. EQUITY TO EMPLOYEES: EFFECT ON VALUE

- In recent years, firms have turned to **giving employees (and especially top managers) equity option or restricted stock packages** as part of compensation. If they are options, they usually are long term and on volatile stocks. If restricted stock, the restrictions are usually on trading.
- These equity compensation packages are clearly valuable and the question becomes how best to deal with them in valuation.
- Two key issues with employee options:
 1. How do options or restricted stock **granted in the past** affect equity value per share today?
 2. How do **expected grants of either, in the future**, affect equity value today?

THE EASIER PROBLEM: RESTRICTED STOCK GRANTS

- When employee compensation takes the form of restricted stock grants, the solution is relatively simple.
 - To account for restricted stock grants in the past, make sure that you count the restricted stock that have already been granted **in shares outstanding today**. That will reduce your value per share.
 - To account for expected stock grants in the future, estimate the value of these grants as a percent of revenue and forecast that as expense **as part of compensation expenses**. That will reduce future income and cash flows.
- This process has been made easier by accounting rules that have changed to require that stock based compensation be expensed in the year that they are granted. Thus, extrapolating past margins already incorporates stock based compensation.

THE BIGGER CHALLENGE: EMPLOYEE OPTIONS

- It is true that options can increase the number of shares outstanding but dilution per se is not the problem.
- Options affect equity value at exercise because
 - Shares are **issued at below the prevailing market price**. Options get exercised only when they are in the money.
 - Alternatively, the company can use cashflows that would have been available to equity investors to **buy back shares which are then used to meet option exercise**. The lower cashflows reduce equity value.
- Options affect equity value before exercise because we have to build in the expectation that there is a probability of and a cost to exercise.

A SIMPLE EXAMPLE...

- XYZ company has \$ 100 million in free cashflows to the firm, growing 3% a year in perpetuity and a cost of capital of 8%. It has 100 million shares outstanding and \$ 1 billion in debt. Its value can be written as follows:

Value of firm = $100 / (.08-.03)$	= 2000
Debt	= 1000
= Equity	= 1000
Value per share	= $1000/100 = \$10$

- XYZ decides to give 10 million options at the money (with a strike price of \$10) to its CEO. What effect will this have on the value of equity per share?
 - None. The options are not in-the-money.
 - Decrease by 10%, since the number of shares could increase by 10 million
 - Decrease by less than 10%. The options will bring in cash into the firm but they have time value.

I. THE DILUTED SHARE COUNT APPROACH

- The simplest way of dealing with options is to try to adjust the denominator for shares that will become outstanding if the options get exercised. In the example cited, this would imply the following:

Value of firm = $100 / (.08-.03)$	= 2000
Debt	= 1000
= Equity	= 1000
Number of diluted shares	= 110
Value per share	= $1000/110 = \$9.09$

- The diluted approach **fails to consider that exercising options will bring in cash into the firm**. Consequently, they will overestimate the impact of options and understate the value of equity per share.

II. THE TREASURY STOCK APPROACH

- The treasury stock approach adds the proceeds from the exercise of options to the value of the equity before dividing by the diluted number of shares outstanding.
- In the example cited, this would imply the following:

Value of firm = $100 / (.08-.03)$	= 2000
Debt	= 1000
= Equity	= 1000
Number of diluted shares	= 110
Proceeds from option exercise	= $10 * 10 = 100$
Value per share	= $(1000+ 100)/110 = \$ 10$
- The treasury stock approach **fails to consider the time premium on the options**. The treasury stock approach also has problems with out-of-the-money options. If considered, they can increase the value of equity per share. If ignored, they are treated as non-existent.

III. OPTION VALUE DRAG

- Step 1: **Value the firm**, using discounted cash flow or other valuation models.
- Step 2: Subtract out the **value of the outstanding debt** to arrive at the value of equity. Alternatively, skip step 1 and estimate the value of equity directly.
- Step 3: Subtract out the **market value (or estimated market value) of other equity claims**:
 - Value of Warrants = Market Price per Warrant * Number of Warrants
: Alternatively estimate the value using option pricing model
 - Value of Conversion Option = Market Value of Convertible Bonds - Value of Straight Debt Portion of Convertible Bonds
 - Value of employee Options: Value using the average exercise price and maturity.
- Step 4: Divide the remaining value of equity by the **number of shares outstanding** to get value per share.

VALUING EQUITY OPTIONS ISSUED BY FIRMS... THE DILUTION PROBLEM

- Option pricing models can be used to value employee options with four caveats –
 - Employee options are **long term**, making the assumptions about constant variance and constant dividend yields much shakier,
 - Employee options **result in stock dilution**, and
 - Employee options are **often exercised before expiration**, making it dangerous to use European option pricing models.
 - Employee options cannot be exercised until the employee is vested.
- These problems can be partially alleviated by using an option pricing model, allowing for shifts in variance and **early exercise**, and **factoring in the dilution effect**. The resulting value can be adjusted for the **probability that the employee will not be vested**.

VALUING EMPLOYEE OPTIONS

- To value employee options, you need the following inputs into the option valuation model:
 - Stock Price = \$ 10, Adjusted for dilution = \$9.58
 - Strike Price = \$ 10
 - Maturity = 10 years (Can reduce to reflect early exercise)
 - Standard deviation in stock price = 40%
 - Riskless Rate = 4%
- Using a dilution-adjusted Black Scholes model, we arrive at the following inputs:
 - $N(d1) = 0.8199$
 - $N(d2) = 0.3624$
 - Value per call = $\$ 9.58 (0.8199) - \$10 e^{-(0.04)(10)}(0.3624) = \5.42

VALUE OF EQUITY TO VALUE OF EQUITY PER SHARE

- Using the value per call of \$5.42, we can now estimate the value of equity per share after the option grant:
 - Value of firm = $100 / (.08-.03)$ = 2000
 - Debt = 1000
 - = Equity = 1000
 - Value of options granted = \$ 54.2
 - = Value of Equity in stock = \$945.8
 - / Number of shares outstanding / 100
 - = Value per share = \$ 9.46
- Note that this approach **yields a higher value than the diluted share count approach (which ignores exercise proceeds) and a lower value than the treasury stock approach (which ignores the time premium on the options)**

OPTION GRANTS IN THE FUTURE...

- Assume now that this firm intends to continue granting options each year to its top management as part of compensation. These expected option grants will also affect value.
- The simplest mechanism for bringing in future option grants into the analysis is to do the following:
 - Estimate the value of options granted each year over the last few years as a percent of revenues.
 - Forecast out the value of option grants as a percent of revenues into future years, allowing for the fact that as revenues get larger, option grants as a percent of revenues will become smaller.
 - Consider this line item as part of operating expenses each year. This will reduce the operating margin and cashflow each year.
- To the extent that accountants have been treating option grants as expenses in the year that they are granted already, you are effectively forecasting their continuance, when you keep those margins.

AND DON'T PLAY THE ADJUSTED EARNINGS GAME

- Over the last decade, just as accountants have come to their senses and treated stock-based compensation as an operating expense, companies and analysts have tried to reverse this move by adding back these expenses to arrive at “adjusted” EBITDA and earnings numbers.
- The rationale that they provide is that options are non-cash expenses, and that they should be added back, just as we do depreciation.
- The truth is that options are not non-cash expenses, but in-kind expenses, where equity in the firm is being paid out to employees. Consequently, you should not be adding them back.