The Development of a Simplified DCF and Multiples in Going Concern Valuation, Incorporating Leverage and Growth

by

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Fixed Multiple Enterprise Value (FMEV)

I. A note on a misleading academic concept that you must "erase" from your consciuous and unconcious minds:

Academics use a different terminology, which in my view creates quite a bit of confusion because it does not capture the essence of the difference between a "pure going-concern" and the "resource-conversion" attributes of a business. Instead of talking about a "going-concern" they make the distiction between "operating" and "non-operating" assets. They fail to realize that resource conversion entails much more than identifying a non-operating asset like "excess cash". For example, a retailer can operate out of stores that are owned. A resource conversion activity, which may generate quite a bit of value, is to convert owned real estate to other ownership and control, in a sale and leaseback transaction to a publicly listed REIT, for example. This is an example where if you stuck to the rigidity of the academic view, you would have missed an important source of value to take into consideration when you are appraising the value of a company.

II. Valuation of the assets of a business from a "strict going concern" perspective.

It is a very generally held principle that the value of a business is the sum of all discounted future cash flows. As we already saw, this is the "strict or pure going concern" view of a company and it only considers ONE source of wealth creation (cash flows or reported earnings). But let us remember how we define a pure going concern:

A strict or pure going concern is a business whose asset value derives from it conducting its day to day operations the same way it has always conducted them, managed the same way it has always been managed, financed the same way it has always been financed and controlled the same way it has always been controlled. A simple way of thinking of a strict going concern is as a business that is not engaged in activities like: mergers, acquisitions, spinoffs, buyouts, recapitalizations, subject to changes of control, etc.

In this section of the course we shall be very precise in the manner we define these cash flows:

The appraisal of the value of the assets of a business "as a pure going concern" is the sum of all discounted future unlevered free cash flows from operations (UFCF). (Later I will explain why this calculation yields the value of assets of a pure going-concern). This measure of cash flows excludes non-recurrent, non-operating cash flows and cash flows related to resource conversion activities.

So:

PV(UFCF) = Appraisal of the value of the assets of a business as a pure going concern.

III. Where does DCF and EV come from?

Although not strictly the origin of the Discounted Cash Flow methodology, Drs Modigliani and Miller, back in 1953, pretty much popularized the idea while studying the problem of

whether the investment and financing decisions were independent or not. In their formulation, they also established the concept of Enterprise Value or EV, even though they never labeled it that way. Let us examine their simple formulation and identify the key developments of DCF and EV embedded in their formulation.

In its simplest form the formulation stated the following:

$$S+D = (1-t)*EBIT\_o / r\_u$$

where:

S is the market capitalization of the business, i.e. market value of its equity,

D is the market value of its long term debt,

EBIT is the operating income of the business assumed to be a known perpetuity, and

r_u is the unlevered discount rate for "flows of the same risk class", i.e. a discount rate.

First, let us say in words what the formula states. It states that the market value of the capital structure of the business MUST be equal to the present value of its free cash flows. Why am I equating free cash flows to the after tax operating income when free cash flows should be equal to (1-t)EBIT + DA - CAPEX - ΔNWC? Because in the Modigliani and Miller (M&M) world, operating income did not grow. In that world, CAPEX was only "maintenance CAPEX", i.e. equal to DA to maintain the earning power of the assets. And, since the business did not grow there was no need for increases in net working capital, i.e. ΔNWC=0. Thus, since DA-CAPEX=0 and ΔNWC=0, then, (1-t)EBIT is actually unlevered free cash flows.

Under the assumption of the existence of equilibrium pricing at all times, S+D must be equal to (1-t)EBIT/r_u. This follows from understanding that free cash flows are cash flows remaining for the service of the capitalization, i.e. all other business constituents (cost of goods, pensions, IRS, other SG&A) have already been paid and what remains "belongs" to the providers of long term capital. Note also that in the traditional calculation of EV, D is "net debt", i.e. D-excess cash. In M&M world businesses do not carry "excess cash", thus D is simply long-term debt at market value.

Understanding what M&M did will get you far in understanding many of the valuation concepts used today, its origins and limitations. Let me try to summarize:

1. EV represents the pure going concern value of the assets of a business.

2. DCF is a means of calculating the value of the assets of a pure going concern that is independent of security market valuation.

3. The "equality" between EV and DCF is purely theoretical, i.e. "normative", which means it should exist.

IV. Valuations based on this principle, typically called "discounted cash flow" DCF analysis, can be:

a. Time consuming. To mean anything, DCF has to be derived from a very carefully built set of pro-forma financial statements, which forces the analyst to truly understand the business at hand; not a real problem if you get paid to do it.

b. Very sensitive to the many assumptions that need to be made; i.e. growth, margins, competition, access to capital markets, etc.

c. Based on projections of the future, which are notoriously innacurate. The calculated DCF value largely depends on a multiple to value cash flows extending beyond the 5 year forecast period. Example; 35% of calculated asset value is likely to be based on the five years for which the analyst makes detailed assumptions about the business, and 65% of the calculated value will be based on a much simpler valuation method. This only fact, can significantly reduce the absolute value of the DCF approach. The approach is quite useful however, insofar as the analyst must learn the company business well in order to model its financial results for the first five years with any degree of reasonableness.

d. As we shall see, an approach to multiples using DCF can become very useful in the analysis of market multiples.

V. In practice most investors use a simplified approach to make appraisals of the going concern value of assets:

The multiple methodology.

This method multiplies some company's annual measure of "*flows*" (EBIT, Revenue, EBITDA, Earnings) by a fixed number to estimate either the going-concern value of the company's assets (fixed multiple enterprise value: EBITDA*Multiple) or the value of the equity capitalization (Earnings* P/E multiple, Revenue*P/R), etc.

Examples:

1. Revenue * Multiple of Revenue = Enterprise Value
2. EBITDA * Multiple of EBITDA = Enterprise Value
3. Earnings * Multiple of Earnings = Equity Value

One popular cash flow proxy is EBITDA. Why?

Unlike earnings, EBITDA is very difficult to manipulate:

i D&A is added back. So there is no possibility of manipulating the number by changing depreciation methods.

ii Not influenced by capitalization structure. (i.e. how much debt there is)

iii. Not influenced by tax shields since it is a before taxes measure.

iv. The look-through problem will not exist since non-operating sources of income will be excluded from its calculation (dividends) and <20% affiliates will be added to valuation as separate and salable assets, at market prices.

v. etc.

Calculation:

Income Statement		
Sales	$	500.00
Cost of Goods Sold	$	375.00
Gross Margin	$	125.00
Sales, General, and Administrative excl D&A	$	40.00
Depreciation and Amortization	$	30.00
Operating Income (EBIT)	$	55.00
Earnings before Interest, Taxes, Depreciation and Amortization (EBITDA)	$	85.00

VI. What is a multiple anyway?

Remember from your basic finance courses when you learned to calculate present values?

A multiple is the equivalent to the present value of a $1 annuity for a given time period.

Formula for the present value of an annuity:

- The Present Value of an Ordinary Annuity could be solved by calculating the present value of each payment in the series using the present value formula and then summing the results. A more direct formula is:

  $PVOA = PMT\ [(1/i)*(1- (1 / (1 + i)^n)] =$ Multiple when PMT is set to $1.
  Where:

  PVOA = Present Value of an Ordinary Annuity.
  PMT = Amount of each payment. When we set PMT=$1 we make the PVOA the multiple.
  i = Discount Rate Per Period.
  n = Number of Periods. In valuation, n corresponds to the number of years.

- Excel: PV(rate,nper,pmt,fv,type)

- How do you adjust the annuity formula if cash flows grow over time?

  $PVGA = PMT\ [(1/(i-g))*(1 - ((1 + g)/(1+i))^n)\ ]$
  Where:

  PVGA = Present Value of a Growing Ordinary Annuity.
  PMT = Amount of each payment = 1 makes it a multiple.
  i = Discount Rate Per Period; g = Growth rate per period.
  n = Number of Periods.

So... what multiples correspond to what "hurdle rates" and growth rates?

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Discount Rate	Growth Rates				
	0.0%	2.0%	4.0%	6.0%	8.0%
10%	**9.4x**	**11.2x**	**13.6x**	**16.8x**	**21.2x**
15%	**6.6x**	**7.5x**	**8.6x**	**10.1x**	**12.1x**
20%	**5.0x**	**5.5x**	**6.2x**	**7.0x**	**8.0x**
25%	**4.0x**	**4.3x**	**4.7x**	**5.2x**	**5.8x**
30%	**3.3x**	**3.6x**	**3.8x**	**4.2x**	**4.5x**
35%	**2.9x**	**3.0x**	**3.2x**	**3.4x**	**3.7x**

VII. Why EBITDA and EBITDA multiples instead of Earnings and Earnings multiples and P/E ratios?

EBITDA is a measure of operating cash flows the removes any "method of financing" effects; i.e. interest on any debt and taxes paid. Before we get into these adjustments, I want to highlight why removing financing effects may be desirable. The discussion that follows explains a few of the shortcomings of using "earnings" and "earnings' based ratios" in valuation.

The shortcomings of earnings and P/E ratios.

For firms in the same industries, comparable competitive risks, cycles, etc, the P/E ratio is touted as a measure of relative value.

Making valuations or comparisons based on P/E ratios is very difficult. Why? See example.

Limitations of P/E Based Analysis

	Firms		
Income Statement	A	B	C
Sales	$ 1,000.0	$ 3,000.0	$ 2,000.0
Cost of Goods sold	$ 560.0	$ 1,740.0	$ 1,200.0
Gross Margin	$ 440.0	$ 1,260.0	$ 800.0
Gross Margin (%)	*44.0%*	*42.0%*	*40.0%*
Sales, General and Admin.	$ 270.0	$ 870.0	$ 520.0
Depreciation & Amortization	$ 80.0	$ 125.0	$ 50.0
Interest Expense	$ 71.9	$ 54.3	$ -
Total Expense	$ 421.9	$ 1,049.3	$ 570.0
Total Expenses (%)	*42.2%*	*35.0%*	*28.5%*
Pretax Income	$ 18.1	$ 210.8	$ 230.0
Taxes	$ (6.3)	$ (73.8)	$ (80.5)
Net Income	$ 11.8	$ 137.0	$ 149.5
	1.2%	*4.6%*	*7.5%*
Shares	14	190	150
Earnings per share	$ 0.84	$ 0.72	$ 1.00
Share Price	$ 12.00	$ 12.00	$ 12.00
P/E	14.2x	16.6x	12.0x

In the example:

(a) One would be tempted to conclude that company C's common stock is the "cheapest" since it sells for the smaller P/E ratio, or multiple of earnings.

(b) Each firm share of common stock sells for the same price.

(c) The firms are obviously of different scales: B>C>A

(d) Debt levels are proportionately different: A pays more interest than B but B is a much larger firm, C has no debt.

(e) Net income and P/E ratios provide limited information.

(f) Hard to compare these firms.

This example highlights the need for some adjustments to account for at least:

(a) Differences in Leverage

(b) Differences in the taxation due to different capital structures.

(c) Differences in past investment decisions, depreciation methods, etc.

The following table illustrates how EBITDA can be used to calculate:

(a) Fixed multiple enterprise value (FMEV)

(b) Fixed multiple equity value; i.e. FMEV - LT Debt = FMEVE

(c) EV/EBITDA multiples.

	Firms		
	A	B	C
EBITDA Calculation			
Net Income	$ 11.8	$ 137.0	$ 149.5
+Taxes	$ 6.3	$ 73.8	$ 80.5
+Interest Expense	$ 71.9	$ 54.3	$ -
+Depreciation & Amortization	$ 80.0	$ 125.0	$ 50.0
EBITDA	**$ 170.0**	**$ 390.1**	**$ 280.0**
EV Calculation			
+Market cap	$ 168.0	$ 2,280.0	$ 1,800.0
+Debt	$ 685.0	$ 775.0	$ -
-Excess Cash	$ 40.0	$ 150.0	$ 120.0
EV	$ 813.0	$ 2,905.0	$ 1,680.0
Selected Data			
EBITDA/Revenue	17.0%	13.0%	14.0%
Debt/EBITDA	4.0x	2.0x	0.0x
EBITDA/Share	$ 12.14	$ 2.05	$ 1.87
EV/EBITDA	4.8x	7.4x	6.0x
FMEV @ 6x (going concern)	$ 1,020.0	$ 2,340.6	$ 1,680.0
FM-Equity	$ 335.0	$ 1,565.6	$ 1,680.0
FM-Equity/Share	$ 23.9	$ 8.2	$ 11.2
Earnings per share	$ 0.8	$ 0.7	$ 1.0
Share Price	$ 12.0	$ 12.0	$ 12.0
P/E	14.2x	16.6x	12.0x

VIII. Using Fixed Multiple Enterprise Value to Calculate Value of Equity

The fixed multiple enterprise value of equity is defined as (EBITDA x Multiple - Debt) = FMEVE. EBITDA*Multiple gives you the FMEV or the pure going concern value of the assets of the business. Once we subtract Long Term Debt from this value, we get an appraisal of the value of equity, which can be used to compare the valuation of the different companies.

(a) Firm C which appeared to be the "cheapest"on a P/E basis now appears to be fairly valued with an FMEVE/share of 11.20.

(b) Firm B which appeared to be "relatively" overvalued from a P/E point of view, now appears to be quite overvalued with an F-EV/share of $8.24.

(c) Firm A which which appeared to be neither overvalued nor undervalued from a relative P/E basis, now looks clearly undervalued by a large amount. Its FMEVE/ share value is $23.93.

The validity of the answers is directly dependent on choosing an appropriate multiple.

Relationships between Multiples

Although we know how to calculate multiples, it is a different story to know how to use them and how to compare these multiples across companies. The first issue we shall tackle is the one about making sense out of the different market multiples for one company. This is to answer questions like: "*if the P/E ratio of the company is 19x, what does this say about the EV/EBITDA ratio or the EV/EBIT ratio?* First, a reminder of the notation we'll use.

Glossary:

EBIT = earnings before interest and taxes.

EBITDA = earnings before interest, taxes, depreciation and amortization.

D = Market value of Long Term Debt.

S = public market value of equity.

EV = enterprise value = S+D; if EV = S because D=0, we give EV a special name; i.e. EV_u, the unlevered enterprise value.

t = tax rate

r_d = interest rate on debt. This the the weighted yield to maturity of all debt in the company capitalization.

r_u = capitalization rate for after tax earnings for an unlevered firm.

R = company annual sales.

NI = company reported net income as per a 10K, for example.

E = earnings for a time period, which is equal to NI*(1-dp)

dp = dividend payout ratio.

DA = depreciation and amortization.

em = EBITDA / R or EBITDA margin.

cw = (CAPEX+ΔNWC) / R or (CAPEX+ΔNWC) / Sales.

j = DA / R

g = growth rate (the context will dictate what is growing: to cut down on annoying notation).

M = generic designation for a multiple.

M_d = D / EBITDA multiple; a frequently used ratio by lenders to measure credit support or leverage.

M_e = EV / EBIT multiple.

M_ed = EV/ EBITDA multiple.

M_R = EV / R multiple; i.e. sales multiple.

M_pe = S / E multiple or the price earnings multiple before payment of dividends.

Let us now first recognize relationships between EBITDA, EBIT, NI and R. The objective is to be able to relate any of these financial measures to EBITDA. To do this, we have defined certain ratios of sales, like *em and j*.

1. EBITDA can be simply defined as R*em
2. EBIT can be written in terms of EBITDA as EBIT = (1- DA/EBITDA)*EBITDA or EBIT = (1-j/em)*EBITDA.
3. NI can be written in terms of EBITDA as NI = (1-t)*[(1-j/em)*EBITDA - r_d*D]
4. Since E is NI*(1-dp), then, retained earnings is E = (1-t)*(1-dp)*[(1-j/em)*EBITDA - r_d*D]

As a value analyst, EBITDA refers to "adjusted EBITDA" NOT GAAP EBITDA. What is adjusted EBITDA? It is the number that represent a reasonable and realistic going concern performance of the business. As a general rule, items that are either non-recurring or non-operating should be ignored in the calculation of adjusted EBITDA. One must be analytical when making judgments about "what is" non-operating or non-recurrent. Any extraordinary item should be eliminated from the calculation of adjusted EBITDA.

Likewise, since Net Income is calculated by subtracting taxes and interest expenses from "EBIT" one must be analytical about which EBIT will be used in the calculation of Net Income. If one uses GAAP EBIT, the relationships between multiples will only hold true if and only if we also used GAAP EBITDA modified by extraordinary items.

The point that I am trying to make is that the analyst must use judgment to decide which numbers are the most meaningful for the purposes of the analysis.

Relationships between different types of Multiples

We will now move to understand the relationship between the EBITDA multiples (M_ed), EBIT multiples (M_e), earnings multiples (M_pe) and sales multiples (M_R).

1. Relationship between M_ed (EV / EBITDA) and M_pe (S / E or P/E):

M_ed = EV / EBITDA =

= [S + D] / EBITDA =

= S/EBITDA + D/EBITDA =

= S/EBITDA + M_d

Since S = E * M_pe, and E = NI*(1-dp) = (1-dp)*(1-t)*(EBIT - r_d*D), then:

S = (1-dp)*(1-t)*(EBIT - r_d*D) * M_pe

but recognizing that EBIT can be written as (1-j/em)*EBITDA we can rewrite M_ed as:

M_ed = [(1-dp)*(1-t)*{(1-j/em)*EBITDA-r_d*D}*M_pe]/EBITDA + M_d

= (1-dp)*(1-t)*{1-(j/em)-r_dM_d}*M_pe + M_d (1)

Example: As of the end of the 2013 fiscal year, based on information presented in the Hexcel 10K report*:

Based on this information, its EV/EBITDA multiple should be:

M_ed = (1-0.0)*(1-0.2894)*{(1-0.0353/0.1968)-(0.025*0.8843)}*25.68 + 0.8843 = 15.5x

The actual multiple is 15.0x.

2. Now let us invert the relationship and find the formula to express the **P/E** ratio (M_pe) as a function of the **EV/EBITDA** market multiple (M_ed):

M_pe = [M_ed - M_d] / (1-dp)*(1-t)*{1-(j/em)-rM_d} (2)

Taking the example above and the actual market EV/EBITDA multiple of 12.28x, then the implied P/E multiple should be:

M_pe = [15.0 - 0.8843] / (1-0.0)*(1-0.2894)*{1-(0.03353/0.1968)-0.025*0.8843} = 24.8x

Versus the actual P/E ratio of 25.7x. Why the discrepancy?

The explanation rests on all the "other" charges that go into the calculation of Net Income but are ignored in this framework. For example, non-operating or non-

recurring (both income and expense) items that are outside of the calculation of EBITDA are used in the calculation of Net Income.

To the value investor, the GAAP multiples may not be an accurate reflection of the valuation of the going concern. GAAP numbers must be adjusted accordingly using judgment and a purpose.

3. Now let us find the multiple **EV/EBIT** or M_e and its relationship to the **EV/ EBITDA** or M_de multiple.

M_e = EV / EBIT

= [S+D] / EBIT; recall that EBIT = (1-j/em)EBITDA, so

= [S+D] / (1-j/em)EBITDA

= M_ed / (1-j/em)]

(3)

Example: for the case above, if the calculated M_ed is 15.5x, then

M_e = 15.5/(1-0.0353/0.1968) = 18.9x

4. We can also get the revenue multiple **EV / Sales** or M_R and its relationship to the **EV/ EBITDA multiple** as follows:

M_R = [S+D] / R = since R = EBITDA/em, then

= [S+D] / EBITDA / em

= em*[S+D]/EBITDA

= em*M_ed (4)

For the case above, M_R would be 0.1968*15.5 = 3x

5. **EV / EBITDAR** multiple. Retail companies and airline companies (to name a few) have substantial off-balance sheet liabilities in the form of operating leases. Although the annual lease payments are either included in the cost of goods sold or the sales, general and administrative expenses, they are recurrent in nature and akin to payments on long term debt; i.e. when capitalized they represent a large liability. For these companies, EV is calculated as the as E + D + L, where L is the capitalized value of the operating leases. Since the measure of cash flow used in the calculation of the multiple must correspond to what is needed to service these three sources of capital, EBITDA must be adjusted by adding back the amount of annual lease payment on those leases. Customarily, the size of the lease liability is obtained by applying a multiple to the annual lease payments. Often, the standard multiple applied is 7x. Although there are alternative methods for calculating the size of the liability, like looking into the Lease note to the financial statements, we shall use the standard multiple to derive the relationship between EV/ EBITDA and EV*/ EBITDAR where EV* = EV + L.

   I start by defining the ratio of annual operating lease payments over EBITDA as:

   i) re = l / EBITDA, this is the equivalent of the reciprocal of a lease coverage ratio; i.e. the percent of EBITDA cash flow that goes to pay for operating leases for the year.

   ii) L = 7*re*EBITDA,

   iii) EBITDAR = EBITDA*(1+re)

   iv) EV = EBITDA*M_ed, then

   v) EV* = EV + L = EBITDA*M_ed + 7*re*EBITDA and

   vi) M_dar = EV* / EBITDAR = EBITDA*[M_ed+7*re] / EBITDA*(1+re) = [M_ed + 7*re] / (1+re)

   vii) As a function of M_dar, then M_ed = M_dar*(1+re) - 7*re = M_dar + [M_dar - 7]*re

   Example:

   For Wal Mart fiscal year 2010:

   i) M_ed = 7.67x

   ii) EBITDA = $32,075 million,

   iii) EV = $210,166.1 + ($41,340 - $7,907) + $2,487 = $246,086 million.

   iv) l = $1,800 million.

   v) re = $1,800 / $32,075 = 0.05612

   vi) M_dar = [7.67 + 7*0.05612] / 1.05612 = 7.63x

Notice how simple it is to go from the M_ed multiple to the M_dar multiple. The key to move from one to the other is simply the lease to EBITDA coverage ratio, re.

Building a simplified DCF model and calculating multiples when leverage and growth are included

One important limitation of using multiples to compare the valuation of assets or equity of different companies is that company multiples are the result of multiple factors. Two important factors that can account for differences between multiples are leverage and expected growth. When comparing multiples of two companies, one may "appear" to be "overvalued" because it has a higher than average multiple in its industry. A higher multiple may be a sign of overvaluation, but it also may mean that the company has more leverage and/or that it is expected to grow at a faster rate than competitors. Which one is which? The only way of disentagling the reasons for a higher multiple is to build a model which can be used to do the task.

I will show how important growth (or expectations for growth) and leverage are in the determination of multiples.

First a reminder of the effect on leverage on the amounts that a company has available to service its capitaization. As explained before, thanks to the US tax code, interest payments are deductible from income for income tax purposes and therefore reduce the amount of taxable income on which the total tax bill is calculated. The result of this is that after accounting for the effect of this tax shield, more earnings *before* interest are available to service the interests and claims of both equity and debt holders respectively. To see this, one only needs to calculate the *after tax* earnings *before* interest is paid, available to servicing both equity and debt for a company that uses debt in its financing mix as follows:

$$(EBIT - Interest)*(1-t) + Interest =$$

$$= EBIT - Interest - t*EBIT + t*Interest + Interest =$$

$$= (1-t)*EBIT + t*Interest$$

A company using no debt to finance its assets will only have (1-t)*EBIT to service its capitalization. One that uses debt in its capitalization, takes advantage of the tax deductibility of interest payments to reduce its tax bill and this reduction in the tax bill is the "tax shield" and is calculated as t*Interest.

I will calculate enterprise value as the present value of after tax EBIT plus the present value of the tax shield as if these flows were to happen to perfpetuity. The implicit assumptions made here are that current EBIT_o is paid in perpetuity (for now), that growth refers to growth in EBIT, and that the discount rate r_u is known and constant. The present value of interest payments at the debt *ytm* yields D.

$$EV \equiv S+D \text{ and } S+D \text{ should be "according to academics" equal to:}$$
$$(1-t)*EBIT_o / (r_u - g) + t*D$$

Remember that EV ≡ S+D BUT saying that S+D = (1-t)*EBIT_o / (r_u - g) + t*D, is "theory".

The implicit assumption embedded in the term that is "theory" is that value comes exclusively from the "going concern" attribute of the company; i.e. its ability to generate recurrent flows from its operations. This approach does not factor other sources of wealth creation like unreported appreciation of assets, unused credit capacity, etc. This is an important shortcoming to valuation approaches that are based on this principle. For now, we shall continue with the expression:

$$EV \equiv S+D = (1-t)*EBIT_o / (r_u - g) + t*D$$

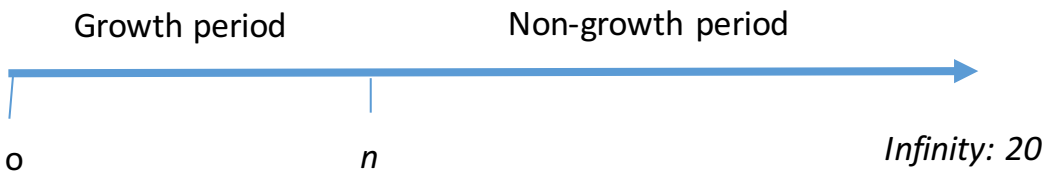
using the fact that EBIT_o = (1-j/em) EBITDA_o we can rewrite as:

$$EV \equiv S+D = (1-t)*(1-j/em)\ EBITDA_o / (r_u - g) + t*D$$

Another embedded assumption in the above expression is that D&A = CAPEX (the equivalent to assuming that CAPEX is "maintenance" CAPEX) and ignores the additional working capital needed to effect growth in EBIT. Think about what this means. It means that even though we are assuming the perpetuity grows over time, there is no corresponding increase in CAPEX or NWC to support this growth. This does not make sense. The other explicit asumption is that these two flows; i.e. the after tax unlevered cash flows from the going concern, and the tax shield, are perpetuities and hence are capitalized by applying the appropriate rates to each of them ([r_u-g] to the going concern flows and [r_d] to the tax shield flows represented by the extra cash available to service the capitalization due to the deductibility of interest from taxable income).

An more practical formulation must relax these unreasonable assumptions. I shall deal with all these assumptions at once.

I am going to assume that human beings are pretty bad at forecasting an uncertain future, so that the growth rate assumption will only be made for a finite period of time, say, only 5 years or *n*. After this certain period, we shall assume that no growth occurs anymore; i.e. the company is in its mature stage, or whatever.



An expression for Unlevered Free Cash Flows can be written as a function of EBITDA as follows:

$$\mathbf{UFCF = \{(1-t)(1-j/em) + j/em - cw/em] \} EBITDA\_o}$$

where:

- t = tax rate;
- j = DA / Revenue;
- em = EBITDA / Revenue;
- cw = (CAPEX + ΔNWC) / Revenue
- (1-t)(1-j/em) EBITDA = (1-t)EBIT;
- [(j-cw)/em]EBITDA_o = DA - (CAPEX + ΔNWC).

I will be using the formulas for the present value of a growing annuity for the growth period (1) and a non-growing perpetuity for the second period (2):

1. PV of an annuity that grows for n time periods:

$$\sum_{i=1}^{n} \left(\frac{1+g}{1+r}\right)^{i} \equiv \mathrm{A}$$

2. PV of a non-growing perpetuity from time *n* on, back to today:

$$\frac{1}{r*(1+r)^{n}} \equiv \mathrm{B}$$

3. PV of an a non-growing annuity for n time periods:

$$\sum_{i=1}^{n} \frac{1}{(1+r)^{i}} \equiv C$$

What needs to be understood is that under this alternative specification, it is unlikely that CAPEX+ΔNWC will continue to be different from D&A in the "no growth period" but rather we shall assumme that D&A = CAPEX and that ΔNWC=0, i.e. there will be no net increase in net working capital since the business is not growing. Hence, this adjustment should only apply for the growth period and not for the period with no growth.

This is then how we write the expression above (I write both expressions, the one that keeps the assumption that D&A=CAPEX and that no need for investment in net working capital is needed to grow the business, and the more realistic assumption that those assumptions are not realistic):

$$EV \equiv S+D = [(1-t)(1-j/em) + j/em]*A*EBITDA\_o -(cw/em)EBITDA\_o*C +$$
$$+(1-t)*(1-j/em)* EBITDA\_n * B +$$
$$+t*M\_d* EBITDA\_o$$

The EV/EBITDA multiple

Dividing both sides by EBITDA_o and simplifying noting that EBITDA_n / EBITDA_o = (1+g)^n we can further rewrite as:

$$EV/EBITDA_o \equiv (S+D)/EBITDA_o = [(1-t)(1-j/em) + j/em]*A - (cw/em)*C + \\ +(1-t)*(1-j/em)*(1+g)*B + \\ +t*M_d \quad (5)$$

Although it looks intimidating, the formula can be seen in three pieces:

a) the first piece corresponds to the portion of the multiple reflecting the effect of growth for the first n periods. During this period we are assuming that capital expenditures plus changes in net working capital are going to be larger than depreciation and amortization in order to support growth.

b) the second term corresponds to the portion of the multiple that corresponds to the value coming from the no growth period that goes to perpetuity, and

c) the third term corresponds to the effect of leverage.

Example: Say the expectation of annual EBITDA growth for Windstream (NYSE:WIN) is 10%. We are going to assume that r_u (the "cost" of unleverd equity or the expected annual rate of return you expect to make on an unlevered investment in Windstream) is 12% and that beyond 5 years people have no clue what will happen. (even 5 years seems a stretch but since new aircraft ramp-up is going on that use a lot more composite materials, and that barriers to entry a large, it may make some sense).

The data as of fiscal year 2011 is the following:

t = 28%;

CAPEX+ΔNWC is expected to be $200 million per year for the next 5 years;

D&A is $954 million;

Sales were $4,807.9 million in 2011;

EBITDA_o was $1,881.5 million in 2011;

Debt (D) was $8,788 million, and therefore M_d = 4.7x

Interest on Debt was $568.3 million;

Its price per share was $9.47, the number of shares 588.4 million, yielding a market cap of $5,572.1 million.

Cash on hand was $65 million

Net Income $568 million

Dividend payout ratio is 25%

Market EV /EBITDA = 7.6x; Market P/E = 26.85x

What are the three components?

In the case where we make specific assumptions on what the CAPEX+ΔNWC will be during the growth period.

Growth period multiple component:	3.6x; (1-t)(1-j/em) + j/em]*A -(cw/em)*C
Perpetuity non-growth period:	3.0x; (1-t)*(1-j/em)*(1+g)^n * B
Contribution of leverage:	1.3x; t*M_d
Total:	7.9x

The decomposition of the multiple into its three components can be very useful to people that are building DCF models because, as will be seen later, it provides for a straightforward way of:

a) Inferring the unlevered cost of equity from an observed market multiple.

b) by doing the above we avoid using a lot noisier measures of this "cost".

c) allowing us to apply a multiple to the terminal EBITDA found at the end of the forecast period based the analyst own assumptions and the actual effect of leverage.

d) allowing for the use of the formula to find the *wacc* directly.

e) doing a DCF without doing a full blown DCF.

The P/E multiple

Next, I'd like to show the P/E multiple as a function of leverage and growth. I am making the same assumptions about growth; i.e. growth is known for a finite period but after that it is assumed to be zero going forward.

From the valuation equation:

$$EV \equiv S+D = [(1-t)(1-j/em) + j/em]*A*EBITDA_o -(cw/em)EBITDA_o*C + +(1-t)*(1-j/em)* EBITDA_n * B + +t*M_d* EBITDA_o$$

$$S = [(1-t)(1-j/em) + j/em]*A*EBITDA_o -(cw/em)EBITDA_o*C + +(1-t)*(1-j/em)* EBITDA_n * B - (1-t)M_d*EBITDA_o$$

now, Earnings = $E = (1-dp)*(1-t)*[(1-j/em)*EBITDA_o - r_d*M_d*EBITDA_o]$

$$= (1-dp)*(1-t)*[(1-j/em) - r_d*M_d]*EBITDA_o$$

using the above definitions we can start writing the multiple in its three parts: the growth period term, the non-growth period term and the leverage term. Again, if we assume CAPEX+ΔNWC not equal D&A (in this case CAPEX + ΔNWC = 200 vs. D&A = 954), then the P/E ratio is:

$$S / E = \{ [(1-t)(1-j/em) + j/em]*A*EBITDA_o -(cw/em)EBITDA_o*C + + (1-t)*(1-j/em)*EBITDA_n*B - - (1-t)*M_d*EBITDA_o \} / \{(1-dp)*(1-t)*[1-(j/em)-r_d*M_d]*EBITDA_o\}$$

Total =

simplifying even further, for the conventional approach we get:

S / E =	{ (1-t)(1-j/em) + j/em]*A* -(cw/em)*C		3.63x
	+ (1-t)*(1-j/em)*(1+g)^n *B		3.01x
	- (1-t)*M_d } /		-3.36x /
	{(1-t)*(1-dp)*[(1-j/em)-r_d*M_d] }		0.1336
		=	24.51x

Example

We shall now examine the issues that arise when one wants to use these multiple formulas. One of the issues is that the growth rate is seldom the same for EBITDA and NI. The table below shows the historical rates of growth of EBITDA and NI for Hexcel Corporation for the period 2003 to 2010.

	EBITDA	NI
2005	13.0%	363.3%
2006	-7.9%	-52.5%
2007	14.5%	-9.1%
2008	3.4%	85.0%
2009	-15.6%	-45.9%
2010	20.4%	25.0%
ACRR	**6.9%**	**16.5%**

- Since the growth rates are likely to be different, one cannot as easily go back and forth between one multiple and the other as we saw we could do when we developed the multiple formulas in the absence of growth. "Expected growth" is now a very important and unobservable determinant of multiples. The existence of non-recurring, and non-operating items will affect the relationship between multiples. Extraordinary items enter in the calculation of earnings but not in the calculation of EBITDA. So, one adjustment you must make to ensure that both EBITDA and earnings "reflect" only going concern activities is to eliminate "non-operating" items from the calculation of earnings.
- Take for example the EV/EBITDA example used previously. If growth expectations for EBITDA were to be reduced from 10% per year to 6.9% per year (more in line with the historical average), the multiple would be reduced from 11.0x to 9.0x. Likewise, if EBITDA growth expectations were to increase to 15%, the multiple would go from 11.0x to 15.3x.
- Compare this to the small effect that moderate changes in leverage will have. For example if leverage measured in terms of Debt/EBITDA were to decrease from 1.63x to 1.0x (a 39% decrease), the multiple would go from 11.0x to 10.8x, a very small (1.8%) effect. If the Debt/EBITDA were to go from 1.63x to 3x (almost a doubling of debt relative to the credit support given by EBITDA) the EV/EBITDA multiple would go from 11.0x to 11.4x, also a very small amount.
- In conclusion, changes in growth expectations dwarf the effects of leverage on EV.

How to use what we learned in a DCF analysis?

In DCF analysis there are two places where we use either a multiple or a discount rate. After we calculate unlevered free cash flows we need to pick a discount rate for such flows. The conventional way of doing this is:

1. Obtain the beta for the particular stock,

2. Adjust the found beta for the amount of leverage and find the enlevered beta,
3. Use the unlevered beta to calculate the cost of equity,
4. Armed with the cost of equity and a target capital structure, calculate the WACC

The procedure outlined above does not explicitly incorporate the effect of expected growth on this non cash cost. We can solve for the cost of unlevered equity taking into account both leverage and expected growth more explicitly. Moreover, we shall be taking expected growth into account in a more realistic way. The new steps would be:

1. Calculate the market EV/EBITDA multiple using the latest company either 10K or 10Q report and public market price for the common stock. It is important to do this with original sources of information. Do not trust secondary sources like services that will provide the multiple.
2. Determine your forecast period. Be realistic in how many future periods you think you may forecast. For the purposes of this exercise, we shall use Hexcel Corporation. and we shall assume a 8 year period. You will generally use between 3 and 8 years.
3. The unobservable input is usually the unlevered cost of equity. We want to set up a spreadsheet so that the formula inputs are:
   i. the expected growth rate in EBITDA (gr_e)
   ii. the the cost of unlevered equity (r_u)
   iii. the forecast horizon (n)
4. Set up the spreadsheet so that you can calculate the three components of the formula separately.
5. Come up with a reasonable growth rate assumption based on your knowledge of the company, company reports, analyst reports and your own research. This is going to be the growth rate prevailing for the forecast period. For Hexcel Corp. we shall assume a growth in EBITDA of 14.6%.
6. Come up with a forecast horizon. For Hexcel Corporation we pick a forecast period of 8 years.
7. Use the GoalSeek function in Excel to set the "formula multiple" excluding the leverage multiple equal to your calculated multiple from 1 by changing the cost of equity.

Example:

Hexcel Corp. 10K 2013

M_d	0.88x	(1-t)		71.2%	
em:	19.7%	j/em		18.0%	
j:	3.5%	1-j/em		82.0%	
r_d:	2.50%	1/(rho-ge)		-21.95x	
t	28.8%	((1+ge)/(1+rho))^n		1.384x	
Market EV/EBITDA	12.5x	1/rho		10.00x	
GAAP numbers 10K		(1-t)*(1-j/em)		0.58	
CAPEX + NWC	$ 200.00	(1-t)(1-j/em)+((j-cw)/em))	$	1,366	
D&A	$ 59.40	1-j/em-r_d*M_d		0.798	
Sales	$ 1,678.20	1/rho*(1+rho)^n		4.67x	
EBITDA	$ 330.3	(1+ge)^n		2.966	
EBIT	$ 270.90	cw		11.92%	
Ajusted LT Debt	$ 292.0	Price per share	$	*40.8*	
LT Debt	$ 292.00	# of Shares outstanding (000)		95.4	
Surplus Cash	$ 65.5	Float (%)		98%	
Mkt Cap	$ 3,893.3	Float Shares		93.874	
EV	$ 4,119.8				
Interest	$ 7.3				
Extra Borrowing	$ -				
Anticipated M_d	0.88				
Annual Rent	$ -				
Capitalized Leases	$ -				
EBITDAR Analysis?	No				
(Ebitda - Capex)/EV	3.16%				
WACC	-				

Estimated Multiple based on Growth and Unlevered cost of equity assumptions below

		EBITDA*x
Multiple for n periods	(Term I)	4.14x
PV of Terminal Multiple	(Term II)	8.08x
Leverage Multiple	(Term III)	0.25x
Estimated Multiple: M_ed		**12.5x**
Price per share at M_ed (GC):		***$ 40.11***
Surplus Cash per share (RC):		***$ 0.69***
Total value per share		$ 40.80
Discount (Premium)		0.0%
Number of growth years		8
Assumed Unlevered cost of equity		10.00%
Imput Growth in EBITDA		14.6%

The first output shows the simplified DCF spreadsheet where we found the growth rate that makes the calculated price equal to the market price, with an assumed cost of unlevered equity of 10%. This is the equivalent of finding an "implied" growth rate by the market.

Hexcel Corp. 10K 2013

M_d	0.88x	(1-t)		71.2%	
em:	19.7%	j/em		18.0%	
j:	3.5%	1-j/em		82.0%	
r_d:	2.50%	1/(rho-ge)		-21.14x	
t	28.8%	((1+ge)/(1+rho))^n		1.401x	
Market EV/EBITDA	12.5x	1/rho		10.18x	
GAAP numbers 10K		(1-t)*(1-j/em)		0.58	
CAPEX + NWC	$ 200.00	(1-t)(1-j/em)+((j-cw)/em))	$	1,378	
D&A	$ 59.40	1-j/em-r_d*M_d		0.798	
Sales	$ 1,678.20	1/rho*(1+rho)^n		4.81x	
EBITDA	$ 330.3	(1+ge)^n		2.966	
EBIT	$ 270.90	cw		11.92%	
Ajusted LT Debt	$ 292.0	Price per share	$	*40.8*	
LT Debt	$ 292.00	# of Shares outstanding (000)		95.4	
Surplus Cash	$ 65.5	Float (%)		98%	
Mkt Cap	$ 3,893.3	Float Shares		93.874	
EV	$ 4,119.8				
Interest	$ 7.3				
Extra Borrowing	$ -				
Anticipated M_d	0.88				
Annual Rent	$ -				
Capitalized Leases	$ -				
EBITDAR Analysis?	No				
(Ebitda - Capex)/EV	3.16%				
WACC	-				

Estimated Multiple based on Growth and Unlevered cost of equity assumptions below

		EBITDA*x	
Multiple for n periods	(Term I)	4.17x	Sum T1, T2
PV of Terminal Multiple	(Term II)	8.33x	**12.5**
Leverage Multiple	(Term III)	0.25x	
Estimated Multiple: M_ed		**12.8x**	
Price per share at M_ed (GC):		***$ 41.10***	
Surplus Cash per share (RC):		***$ 0.69***	
Total value per share		$ 41.79	
Discount (Premium)		2.3%	
Number of growth years		8	
Assumed Unlevered cost of equity		9.82%	
Imput Growth in EBITDA		14.6%	

In the second output, the GoalSeek function yields a cost of unlevered equity of roughly 9.82%. We can calculate the *wacc* in two different ways. One is to use GoalSeek again to set the multiple resulting from the sum of the first two components equal to the market calculated multiple, in this case 12.5x. Doing this we eliminate the leverage factor from the equation and we back out the WACC directly. The other way is the more traditional one of weighing each rate by the weight of each in the capital structure. The resuts are likely to be slightly different.

Understanding Credit and Credit Analysis

Credit Risk.

Credit risk: the probability that a money default will happen. Broadly speaking the are two types of events of default. Money defaults and non-moneydefaults. We shall define credit risk as the probability that an issuer fails to pay when payment is due; i.e. a money default.

The difference between *credit risk analysis or credit analysis* and *distressed analysis* is equivalent to predicting whether a storm is likely to happen while waters are calm, and trying to steer a ship in the middle of the storm (Stve Moyer). In this class we shall superficially study *credit risk analysis*, in the NYC Distress Seminar in May 14-18, we study *distressed analysis*.

Credit risk is a function of:

Leverage

Priority

Time

Understanding *Leverage*.

To understand leverage one must first understand the sources of credit support. Leverage and credit support are the two sides of the same coin. Low levels of credit support imply high levels of leverage and vice-versa. So, remember low credit support = high leverage, and high level of credit support = low levels of leverage. The sources of cash used to repay debt (interest and principal) as it comes due are:

Credit support comes in three different forms:

1) Cash flow from operations
2) Collateral (the value of assets that can be sold and can be pledged as security)
3) Access to capital markets (the ability to either refinance or raise additional capital)

What are the consideration of lenders when they lend money regarding "leverage" or credit support?

Are cash flows adequate support for the loan?

Are they very volatile or stable?

Who do they have to share the cash flows or support with? (other claimants)

If cash flows are inadequate or too volatile or have to be shared with others, the lenders will also require other sources of support, notably pledges of collateral. The borrowers will grant security interests in the collateral (i.e. ownership). The gives rise to "secured" credit.

Examples of secured credit:

(1) A loan secured by a Mortgage. The mortgage is a security interest in real property held by a lender as security for a debt.

(2) Working capital lines secured by inventory and receivables (borrowing bases defined as a percent of the value of inventory and receivables).

Depending on the type of "credit support" contractually given by the borrower to the lender we have two types of lending: secured and unsecured. Unsecured credit is credit given on the overall ability of a company to repay. Viewed from the point of view of the lenders, they will have secured claims on the company assets or unsecured claims. (bankruptcy jargon).

Let us talk a little more about "secured credit". Secured debt is debt secured by a "*lien*" on property in which the borrower (debtor) has an ownership interest. A *lien is a security interest* given by the borrower to the lender. This security interest is given through a "*security agreement*" that is usually contained in the *loan agreement* document. Where do you find loan agreements? [as part of 8K reports] Sometimes, you can find useful information in this section of a loan agreement about the appraised value of the property used to secure the loan.

The debt (a company liability and the creditor's claim) is secured to the extent of the value of the creditor's interest in the borrower (debtor) property. This is just precise legal language to say that (a) the borrower can only pledge property to the extent that it is owned, and (b) the extend of security to the lender has to do with the value of the pledged property. If the value of the lender's claim is larger than its interest in the collateral, then the creditor is said to be *undersecured*. If the value of the collateral (property pledged) is higher than the value of the lender's claim, then the lender is said to be oversecured.

One term that should prove useful to know is "encumbered" and "unencumbered" assets. Encumbered assets or property is that property which has been pledged as collateral to others. Unencumbered assets are those which have not been pledge as collateral and can be used. Unencumbered assets increase credit capacity.

Based on these three sources of credit support we have three different measures of "leverage"

An operating or "cash flow" measure of leverage; *Amount of Debt Outstanding ($) / EBITDA ($/year)*. This is a multiple measure whose unit of measurement will be the number of years it would take for the amount of debt outstanding to get repaid out of EBITDA. The larger the number, the lower the cash flow support. Different lenders define limits to what they will lend based on this ratio. Lenders use GAAP numbers to define limits to a company's indebtedness. Example:

LSTA-Multiples

Another cash flow support measure is times interest earned, a measure of how many times we can pay interest with a given cash flow; i.e. EBITDA / Interest Expenses.

An asset support or collateral measure of leverage. *Amount of Debt Outstanding / Total Assets*. Or the debt/asset ratio. Often, a further dissection of this measure only includes

"tangible" assets instead of total assets. This measure is not as useful as one may think for various reasons:

(1) It is normally calculated with the GAAP value of assets. In many occasions, this value may be grossly inadequate (say income producing real estate) as an appraisal of collateral support since GAAP value may not even approximate the value of the assets in liquidation, or in a transaction where there is a willing buyer.

(2) A company may have very little "tangible" assets even though the "going concern" value of those assets may be quite large. Using GAAP assets we miss how valuable those assets are in operation entirely and we get a distorted idea of the true amount of asset support. Along these lines of thinking we may argue that a better measure of asset coverage would then be: *Amount of Debt Outstanding / Enterprise Value*. Unfortunately, enterprise value is not something you can count on in a liquidation. You cannot put a "lien" on enterprise value and foreclose on your property. However, it could be an indicator of how much access to capital markets the company may have.

(3) In multilayered coroprate structures, this measure does not tell us much since all debt may be concentrated in an operating subsidiary and only the assets of such subsidiary are the ones that count, not the assets of the consolidated corporation. This is just another way of saying that it is important to know "who did the borrowing within the corporate structure and where the tangible assets are in the corporate structure". More on this later.

Finally, we have no good or universally accepted way of measuring access to capital markets. One such measure could be an issuer credit rating from one of the major credit rating agencies, another one is the generation of earnings. However, access is difficult to predict since capital markets can be "highly capricious". Think of Lehman Brothers for example and how lack of access put them in Bankruptcy.

What is credit capacity and how does it relate to leverage?

Credit capacity: how much debt can a firm incur prudently. Note that the word prudently really means that the question of credit capacity cannot be answered in an "absolute" manner because it always depends on how much "credit risk" both borrower and lender are willing to assume. The issue of credit capacity typically applies to unsecured lending in that debt will have to be supported from the firm's operating cash flows alone, while secured lending will have an extra layer of credit support given by the collateral pledged.

The advance rate on the collateral will depend on the quality of the collateral (the ability of converting the collateral into cash with minimum loss and in a timely manner), and the stability of its value over time. Even with good collateral, secured lenders must consider the ability of a company to pay also.

Even though it may seem that requiring collateral support on top of cash flow support means double the amount of "security", one must realize that in case the company where to file for Chapter 7 liquidation, the company would cease generating cash flow from operations and the only credit support would be the value of the collateral in liquidation.

Ultimately, the criteria used by secured lenders to extend credit will depend on:

Ability to pay (cash flow support)

1. Extractable EBITDA: Reported EBITDA may not be a good measure of credit support for a raider. There may be "lots" of waste in a corporation which when eliminated would create lots of extra credit support. Page 273 of Predator's Ball!.

   "Why is this company worth fifty dollars a share three months after decided to sell stock at thirty two? This Company [Beatrice] spent hundreds of millions on things an owner-manager might not spend money on. The company spent as much as sevety million dollars a year sponsoring races. Elimination of 70 million dollars a year in cash outflow increases your value by a half a billion dollars a year. The company spent thirty to fifity million dollars on corporate image advertising, so that people would know what Beatrice was. Maybe as an owner you feel it is not important to know what a Beatrice is. You think knowing what Tropicana orange juice and Samsonite luggage [Beatrice products] is good enough. And so there can be another three to four hundred million a year."

2. Meaningfully repay principal over time. (cash flow support over and above payment of interest). This reduces the lender exposure, and minimizes the risk of default if the borrower needs to refinance.

3. Ability to refinance at maturity (access to capital markets, which may be related to keeping certain credit rating, or earnings)

4. Maintaning asset value (collateral value)

All these factors tend to be very different in the case of debenture financing (unsecured financings) that seldom have an amortizing feature and whose repayment depends almost entirely on the company's ability to refinance or raise more capital to repay the original principal.

As you can see, the amount that a company could borrow on a secured basis will depend on quite a few things that will be dependent on both the borrower and the lender. This goes to the heart of the capitalization structure!! A company will be able to borrow NOT what it wants but what lenders will be willing to lend.

Exercise: Use the spreadhseet to see how different conditions (interest rates, EBITDA, tax rates, Capex, etc. may affect the amount Banks may want to lend)

Priority mechanisms and the allocation of credit risk

We have studied the factors that determine the amount of debt that:

1. A debtor may want to borrow.

2. A lender will be willing to lend.

We have not seen, however, how credit risk is allocated between several classes of claims within a capital structure. In our spreadsheet example, we could have made payments to the debentures BEFORE any loan amortization. Why did we not do that?

The primary method by which credit risk is allocated within a capital structure is through the use of ***priorization mechanisms. Priority controls the order of repayment.***

There are four primary techniques for determining payment priorities:

1. Grants of collateral
2. Contractual provisions
4. Corporate structure
3. Maturity structure

Grants of collateral

They give rise to secured credit and we have discussed it previously.

Contractual provisions

A straightforward way of providing priority is through a contractual provision such as a *subordination agreement*. A subordination agreement, contained in either the loan agreement or a debenture indenture, is an intercreditor agreement whereby a creditor agrees to be subordinated in right of payment to other creditor. These subordination agreements survive in Chapter 7 and 11.

The law assumes that all liabilities of a company have the same priority of payment, unless the holders of those claims explicitly agree to reduce their priority of subordinate their claim.

When reviewing subordination provisions it is important to know exactly what claim is subordinated to which other claim. And key to consider is to review documents to ascertain whether the obligation in question is or is not subordinated to "non-debt" claims like "trade claims". All this is important because a capital structure may contain liabilities that are subordinated to other liabilities but not all.

Look for the words "Senior", "Junior", and "Subordination" in loan agreements and debenture indentures.

Corporate Structure

Another way of assigning priorities is through the placement of debt at different levels in the corporate structure. Corporate structures arise out of:

(1) The needs for insulating a parent company from the liabilities of a subsidiary;

(2) To manage disparate operating businesses,

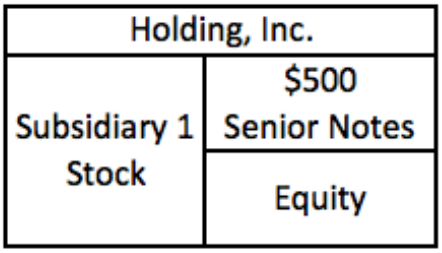
(3) Financial reporting,

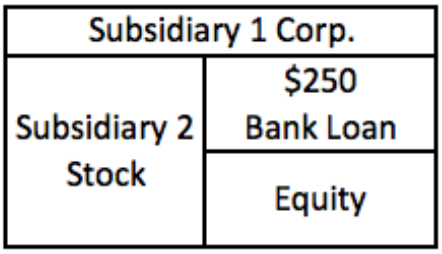
(4) Organizational accountability,

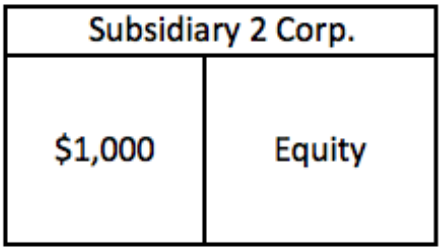
(5) Create or reinforce capital structure priority differences.

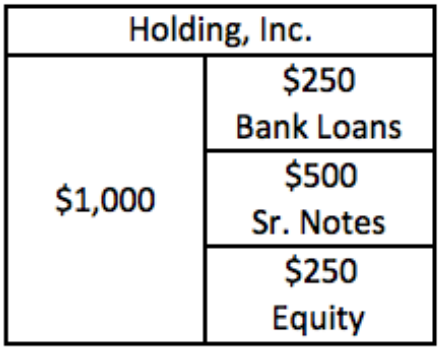
For example a parent company may want an insurance subsidiary to have the highest credit rating and for that reason the insurance subsidiary must be debt free. The borrowing may be done at the parent company level instead of at the subsidiary level. Bottom line, in general, non-operating parent or holding companies own a variety of non-operating and operating subsidiaries. Example: Berkshire Hathaway, GE, etc.

Example:









In the figures above we see the effect that corporate structure will have on the assignment of priorities. On a consolidated basis, one may think that the bank loan may have priority over the senior notes. Suppose (and sty in the consolidated view of the company) that the Senior Notes were the first borrowing were that the company undertook. If the loan lender want seniority over the Senior loan, they would have to get it through their agreement to be subordinated to them in right of payment. Something that would be very difficult to achieve practically. However, if the loan is taken by subsidiary 2, then the loan have "priority" of payment over the senior notes because by operation of law, value flows up in accordance with stock ownership.

So, in the event that a Chapter 7 liquidation is filed what would happen is:

(1) Assets in Sub 2 are sold.

(2) The proceeds from the sale are used to pay the creditors is Sub 1 first.

(3) What remains after paying creditors of Sub 1, go to pay creditors of Holding Corp.

Lenders will seldom allow the operation of law to control the outcome of events. Whenever possible they will try to implement "overrides" to the operation of law like:

(1) Subordination agreements.

(2) Grants of security interests.

(3) Grant of guarantees.

Providing guarantees is a common business practice that can enhance the borrowing capacity of a corporate group. A corporate group member becomes the guarantor of the debts of another. Depending on who gives the guarantee to who you have "upstream", "downstream" and "horizontal" guarantees. Upstream guarantees happen when a subsidiary guarantees the debts of a parent. Downstream guarantees happen when a parent guarantees the debts of a subsidiary. Horizontal guarantees are guarantees provided by a subsidiary to another subsidiary.

(4) Nonrecourse provisions. (opposite to a guarantee) A non-recourse provision, typically found in secured loans, states that in the event of a default on the loan, the lender cannot (has no right) to attempt to recover from other persons (i.e. a subsidiary, management, etc.)

Maturity Structure

Maturity structure is generally a more important consideration when analyzing the characteristics of debentures and bonds. Why? Loans are generally floating rate, require significant amortization over time, and have extensive covenant protections. Since debentures rely mainly on the issuer's ability to refinance as the sole form of credit support, their maturity structure is key to their credit risk.

From the issuer's perspective, the longer the maturity the better, and they are likely to be willing to pay much higher interest to get longer maturities.

From the lender's perspective, the longer the maturity, the longer they are exposed to adverse credit developments.

This tension is exacerbated and creates financing challenges for companies since Senior lenders will not want relatively junior loans or bonds to mature or otherwise be repaid prior to the repayment of the Senior loan. A Senior creditor never wants the erosion of its credit support and using cash to repay a junior lender will do exactly that.

Credit rating agencies tend to disregard term structure.

How capital structures manage credit risk

Once loans are made and/or bonds and debentures issued, the debtor could do things that may materially modify the amount of credit risk that the lender thought was exposed to. Suppose that the company uses the proceeds of a loan for non-productive purposes? All of a sudden, the amount of credit support is reduced considerably since the use of funds does not generate

any increase in enterprise value either through current or future increases in EBIT. Remember what is required of the investment decision to increase enterprise value

dEV / dCapex >= 1 but in our case dEV / dCapex = 0

Lenders manage this risk through the contractual incorporation of "covenants" in the loan agreements and indentures to restrict the flexibility of a company from doing things that may materially increase credit risk and provide the basis for monitoring the loan:

Covenants: GAAP as a building block

Financial (these are calculated on the basis of GAAP numbers)

(1) Debt ratio: defined as Debt/EBITDA.

(2) Interest coverage ratio: EBITDA/Interest Expenses

(3) Debt service coverage ratio: EBITDA/(Interest Expenses + Scheduled Principal Repayments)

(4) Fixed charges coverage ratio: EBITDA/(Service coverage + Capex, Dividends, etc)

(5) Capital expenditures: limits on the max CAPEX.

Affirmative Covenants (things that the borrower must do)

(1) Disclosure: this is a key covenant that allows the lender to monitor the borrower with information not available to the public.

(2) Visitation rights

(3) Maintenance of insurance

(4) Substantive consolidation: this covenant requires that the borrower take action to minimize the risk of substantive consolidation in bankruptcy.

(5) Use of proceeds: makes sure that the borrower uses the proceeds for what it represented it would.

Negative Covenants

(1) Negative pledge: restricts the borrower's granting of security interests in assets.

(2) Debt: restricts the amount of total debt that the borrower can borrow.

(3) Fundamental changes

i) Mergers

ii) Acquisitions

iii) Dispositions

iv) Sale leasebacks

(4) Guarantees or Contingent Liabilities

(5) Dividends

(6) Affiliate transactions

Enforcing the Loan: Events of Default and Remedies

Events of default

(1) Default in payment

(2) Inaccuracy of representations

(3) Breach of covenants

(4) Cross-default

(5) Cross-acceleration

(6) Change of control

(7) Invalidity of guarantee or liens

(8) Material adverse change (MAC)

Remedies

(1) Stop lending

(2) Terminate commitments

(3) Accelerate

(4) Demand payment from guarantors