LECTURE 2

CHAPTER 3 (partial)

Financial statements provide the fundamental information that we use to analyze and answer valuation questions.

- How valuable are the Assets of a firm?
- How did the firm raise the funds to finance these assets?
- How profitable are these assets?
- How much uncertainty (or risk) is embedded in these assets?

Back to Basics:

1. What do the Balance Sheet measure? A = L + NW
2. What does the Income statement tells us? R – E = NI
3. What conclusions can we derive by analyzing Cash Flow Statement? NI adjusted -/+ WCI&F activities = CF

ASSET MEASUREMENT AND VALUATION

Accounting statements do a reasonable **good job** of categorizing the assets owned by a firm, a **partial job** of assessing the value of these assets, and **poor job** of reporting uncertainty about asset value.

Back to Basics:
Balance Sheet – start with the Original Cost and then accumulating +/- Income or Loss via Income activities +/- Cash Inflows/Cash Outflows via Cash Flow activities – Historical Approach – Starting at MV=BV and then MV could be higher or lower than BV – the difference will be difficult to measure as time goes.

- 3 basic principles are valued in underlie the way assets that accounting statements:
    1. BV is the best estimate of value (Commercial Bankers think so)
    2. Distrust of MV (Investment Bankers don't think that is the case) – Volatility of MV versus stability of BV

3. Conservative – underestimating the value rather than overestimating - Does probability of default come to mind

Back to Basics:

$$\uparrow A_{(own)} = L_{(Owe)} + NW_{(Keep)} \uparrow$$

Similar to

$$\uparrow EV_{(MV)} = \underset{(D - C)}{{}_{net}D_{(Owe)}} + E_{(MV)} \uparrow$$

Measuring Asset Value – From the Financial Statements

- Purchase Accounting creating GOODWILL – bridge of MV to BV

PROFESSOR's NOTES-Not included in the Text Book

Net Book Value

The main features, of net book value, include:

- Net book value equals the total equity shown on the balance sheet derived from total assets minus total liabilities.
- It reflects total issued equity adjusted for the effect of historical retained earnings, divided payments, and repurchase of stock.
- It is based on accounting conventions – generally accepted accounting principals (GAAP) which reflect the valuation of individual groups of assets, and, more influentially over time, the measurement of retained earnings derived from recording of individual revenues and expenses from income statement.

The main advantages and disadvantages of net book value as an analytical measurement is:

- Net book value is a historical accounting measurement, reflecting all of the weakness endemic in accrual accounting as a measurement of historical cash flows. Further, it does not measure the impact of value future cash flows.
- Net book value is nevertheless used extensively as a measurement of valuation. For example, certain types of companies are valued and analyzed by comparing market value to book value (e.g. banks and other financial institutions). This reflects the importance, which the market places on underlying value (primarily liquidation value) of the assets of the firm.
- Net book value, sometimes referred to as net worth or equity, is also an important measurement since it is the basis for most loan agreement financial covenants, and provides lenders with the requisite trigger in their agreements in the event of deterioration in book value below a certain point. For lenders, therefore, net book value is an important measurement of value.

Liquidation Value

Financial institutions such as the banks, creditors, mainly are interested in the Liquidation Value of the hotel or restaurant property. It has the following principal characteristics:

- Liquidation value can be defined in a number of settings including orderly liquidation on-site, forced liquidation on-site, orderly liquidation off-site, and forced liquidation off-site.
- Liquidation values will include, in addition to the expected proceeds of the assets themselves, the cost of selling the assets. As a result the on-site/off-site issue is very important, and will be reflected in valuations given by valuation experts.
- In coming up with such liquidation values, valuation experts will use a highly professional, comparative approach, which reflects sales of similar assets in similar locations.
- This approach is used frequently by asset-based lenders where the uncertainty or volatility of projected cash flows demands a detailed

understanding of "backdoor" sources or repayment – most important the assets themselves i.e. the sale of the building.

- Lenders will also implicitly include liquidation values in lending criteria through the conservatism of advance rates against individual sets of assets (e.g. 75% against eligible receivables, 50% against eligible inventory, or 50% against eligible PP&E).
- For the shareholder, this valuation approach has limited benefits in maximizing potential shareholder value (unless, of course, the company is already in distress). The approach involves a discounting of book values- and is therefore even more conservative than the net book value approach – and does not reflect any future cash flows discounted back to present value today.

Replacement Value

Replacement value is exactly what it says: the amount a potential acquirer would have to pay to replace the assets at today's market prices. Though rarely used for hotel assets, it has the following characteristics:

- It is most commonly applied when valuing an entire business process or system compared to just individual assets.
- It includes not just the original cost, but also the soft costs of engineering, installation, maintenance, and add-ons.
- It will also reflect the benefits of marketing and distribution arrangements with other parts of the business.
- It is rarely used as a stand alone valuation technique, but more usually in conjunction with earnings multiples in order to derive a median price
- It is particularly pertinent for long-term sale/leaseback transactions where the lessor values assets for the purposes of determining his/her effective economic life in conjunction with his/her cash flow generating ability.
- As a result, replacement value will almost always yield a higher valuation for a firm or a business than that of either net book value or liquidation value. Bankers rarely use it unless they are participating in both the equity and debt components of a leveraged lease of existing system assets.

Back to the Text Book – Chapter 3

Measures of Profitability – From the Financial Statements

- ROA and ROE (Pretax and After tax)

    1. NI /(Average Assets) and NI/(Average BV of Equity)

    2. EBIT / (Average Assets) or EBIT / (Average BV of Equity)

- Return on Invested Capital = EBIT (1-t) / BV of Debt + BV of Equity - Cash

Measuring Risk from the Financial Statements

- Liquidity Ratios (Current Ratio, Quick Ratios, A/R Turnover/Days)
- Profitability Ratios (Margins, ROE, ROA)
- Activity Ratios (Inventory Turnover/Days)

- Altman's Z-Score – From Professor Notes

Z Formula	
Z = 1.2x(WC/TA) + 1.4x(RE/TA)+3.3x(EBIT/TA)+0.6x(MVE/Liabilities) + 0.99x(Sales/TA)	
WC = Working Capital	
TA=Total Assets	
RE=Retained Earnings	
MVE=Market Value of Equity	
Z-Score	**Bankruptcy**
1.8x or less	Likely
Between 1.8 - 3.0	Uncertain
3.0 or abpve	Not likely

CHAPTER 4 (Partial)

Basics of Risk

When valuing assets and firms, we need to use discount rates that reflect the riskiness of the cash flows. The cost of debt has to incorporate a default risk in the debt, and the cost of equity has to include a risk premium for equity risk.

William Sharpe's Capital Asset Pricing Model (CAPM), Ross's Arbitrge Pricing Model (APM)

CAPM:

$$\text{Expected Return on Equity} = Rfr + \beta \cdot p$$

Where Rfr = Risk Free rate
β = Beta
p = (Historical Return of Equity – Rfr)

APM:
If investors can invest risklessly and earn more the risk rate, they found an arbitrage opportunity. (alpha). The premise of the arbitrage pricing model is that investors take advantage of such arbitrage opportunities, and in the process eliminate them. APM breaks risk down into firm-specific (ε) and market risk components (m) which depends on a lot of economic factors such as GDP, inflation and interest rates.

$$R = E(R) + m + \varepsilon$$

Where R = Actual Return
E(R) = Expected Return
M = Market adjusted risk return such

$$M = \beta_1 F_1 + \beta_2 F_2 + \beta_3 F_3 \ldots + \beta_n F_n$$

F= Unanticipated changes in market factors (premium)
ε= firm specific adjusted risk return

- **Probability define risk (ρ)**
- **Alphas (α) and Betas (β)**
- **Volatility defines Risk (σ)**

What is Risk and how do we quantify?

Professor's Notes:

Scenarios Analysis and Probability Distributions

	Scenarios	Probability	HPR	WAHPR
Boom Growth	1	0.25	44%	11.00%
Normal Growth	2	0.5	14%	7.00%
Recession Growth	3	0.25	-16%	-4.00%
				14.00%

HOW DO WE QUANTIFY THE UNCERTAINTY OF INVESTMENT???

To summarize risk with single number we find before the **VARIANCE** as the expected value of the **squared Deviation for the mean.** i.e. the expected value of the squared "surprise: across scenarios.

$$\text{Var. } (r) = \sum \text{^ } 2 = \sum p\,(s)\,[\,r(s) - E\,(r\,)\,)\,\text{^}2$$

A LITTLE CRASH COURSE IN STATISTICS – DEFINITION: VARIANCE

The Variance (which is the square of the standard deviation, ie: σ^2) is defined as:

The average of the squared differences from the Mean.

In other words, follow these steps:

1. Work out the Mean (the simple average of the numbers)
2. Now, for each number subtract the Mean and then square the result (the squared difference).
3. Then work out the average of those squared differences. (Why Square?)

Squaring each difference makes them all positive numbers (to avoid negatives reducing the Variance)

And it also makes the bigger differences stand out. For example 100^2=10,000 is a lot bigger than 50^2=2,500.

But squaring them makes the final answer really big, and so un-squaring the Variance (by taking the square root) makes the Standard Deviation a much more useful number.

Variance = Squared Sigma

***STANDARD DEVIATION: The Standard Deviation (σ) is a measure of how spreads out numbers are**. (Note: Deviation just means how far from the normal). So, using the Standard Deviation we have a "standard" way of knowing what is normal, and what is extra large or extra small.*

	Scenarios	Probability	HPR	WAHPR	Variance
Boom Growth	1	0.25	44%	11.00%	225.00
Normal Growth	2	0.5	14%	7.00%	0.00
Recession Growth	3	0.25	-16%	-4.00%	225.00
				14.00%	450.00
				St. Dev =	**21.21%**

SD (r) = σ = √ Var (r)

E (r) = (0.25 * 44%) + (0.50 * 14%) + (0.25*(-16%)) = **14%**

Sigma ^2 = 0.25 (44 – 14) ^2 + 0.50 (14 – 14) ^2 + 0.25 (-16-14)^2 = 450

And so the SD sigma = √450 = **21.21%**

EXAMPLE

Current Price=	23.50						
	Scenarios	Probability	End-of the yr Price	Dividends	HPR %	WAHPR	Variance
High Growth	1	0.35	$ 35.00	$ 4.40	67.66	23.68	591.41
Normal Growth	2	0.30	$ 27.00	$ 4.00	31.91	9.57	8.62
No Growth	3	0.35	$ 15.00	$ 4.00	(19.15)	(6.70)	731.04

E (r) = **26.55** 1,331.07

HPR = (End of the year Price - Current Price + Div) / (Current Price)

StDev = **36.48**

Standard Deviation = Sq Rt of V

Variance = 0.35 * (67.66 - 26.55) ^ 2 + .30 *(31.91 - 26.55) ^ 2 + .35 * (-19.5 - 26.55) ^ 2

RISK PREMIUM Vs RISK AVERSION (Risk Appetite)

We measure the "Reward" or the difference between the expanded HPR or the Index stock fund and the risk – free rate

HPR – Risk Free Rate = Premium

14% - 6 % = 8%

VOLATILITY Vs RETURN – Relationship

Sharpe Ratio:

Risk Premium over the Standard Deviation of portfolio excess return

$$(E(r\,p) - r\,f\,) / \sigma$$

8% / 20% = 0.4x. A higher Sharpe ratio indicates a better reward per unit of volatility, in other words, a more efficient portfolio

Sharpe Ratio is more useful for ranking portfolios - it is not valid for individual assets – is useful across Asset Classes.

Beta Coefficient

Statistics Worksheet

Calculating Beta Coefficient

7-month Data

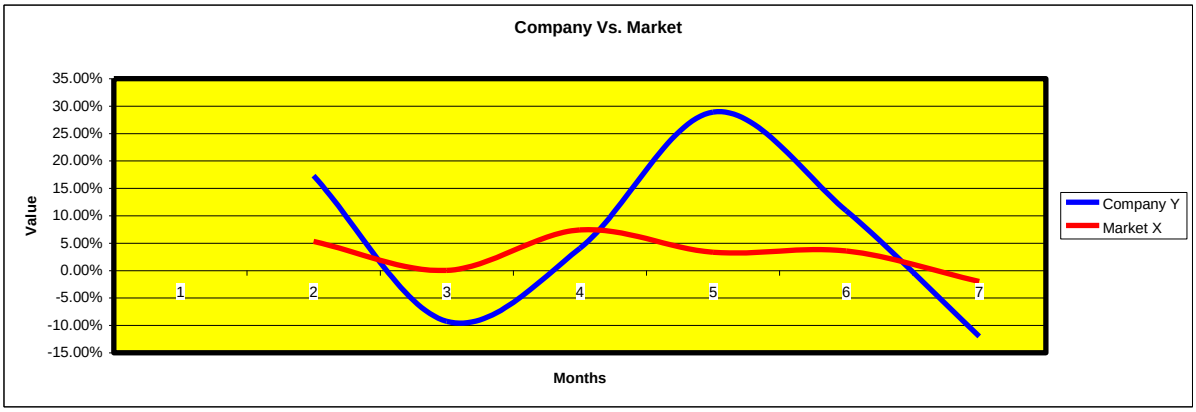
Day	Starwood Hotel Stock Prices	S&P500 Index	Starwood Change HPR	S&P500 Change HPR
30-Apr	20.86	872.81		
29-May	24.47	919.14	17.31%	5.31%
30-Jun	22.20	919.32	-9.28%	0.02%
31-Jul	23.10	987.48	4.05%	7.41%
31-Aug	29.78	1020.62	28.92%	3.36%
30-Sep	33.03	1057.08	10.91%	3.57%
30-Oct	29.06	1036.19	-12.02%	-1.98%

	Dependent Starwood Company Y	Independent S&P Market X	E (Y - Avg Y)	F (X - Avg X)	E x F	F^2	Beta (Slope)
30-Apr							
29-May	17.31%	5.31%	0.10657	0.02359	0.00251	0.00056	
30-Jun	-9.28%	0.02%	-0.15926	-0.02929	0.00467	0.00086	
31-Jul	4.05%	7.41%	-0.02595	0.04465	-0.00116	0.00199	
31-Aug	28.92%	3.36%	0.22269	0.00407	0.00091	0.00002	
30-Sep	10.91%	3.57%	0.04264	0.00623	0.00027	0.00004	
30-Oct	-12.02%	-1.98%	-0.18669	-0.04925	0.00919	0.00243	
Average =	6.65%	2.95%			0.01639	0.00589	2.782408
Variance	2.473%	0.118%					
St. Deviation =	15.726%	3.432%					

$$\frac{\sum [y - Avg(y)] \cdot [x - Avg(x)]}{\sum [x - Avg(x)]^2} =$$

Slope (b)=	2.7824	=SLOPE(C21:C27,D21:D27)
Forecast =	2.7668	=FORECAST(1,C21:C27,D21:D27)
Standard Error =	0.1397	=STEYX(C21:C27,D21:D27)

Relationship between Dependent Y with Indepent X
predicts value of y given a value of x=1%
predicts the standard error y-value for each x in the regression



Beta Coefficient and Sharpe Ratios

Risk Free Rate=	2.50%

Day	ABC Stock	S&P500 Index
30-Apr	23.36	872.81
29-May	26.97	919.14
30-Jun	24.7	919.32
31-Jul	25.6	987.48
31-Aug	32.28	1020.62
30-Sep	35.53	1057.08
30-Oct	31.56	1036.19

CALCULATIONS

Day	Y	X	(Y - Avg Y)	(X - Avg X)		
29-May	15.45%	5.31%	0.09509	0.02359	0.00224	0.00056
30-Jun	-8.42%	0.02%	-0.14362	-0.02929	0.00421	0.00086
31-Jul	3.64%	7.41%	-0.02301	0.04465	-0.00103	0.00199
31-Aug	26.09%	3.36%	0.20149	0.00407	0.00082	0.00002
30-Sep	10.07%	3.57%	0.04123	0.00623	0.00026	0.00004
30-Oct	-11.17%	-1.98%	-0.17118	-0.04925	0.00843	0.00243
Average	**5.94%**	**2.95%**			0.01493	0.00589
Standard Deviation	**14.27%**					

Beta =	2.54

Sharpe Ratio=	0.24

HOMEWORK

- **Spreadsheet- Calculate Beta Coefficient**