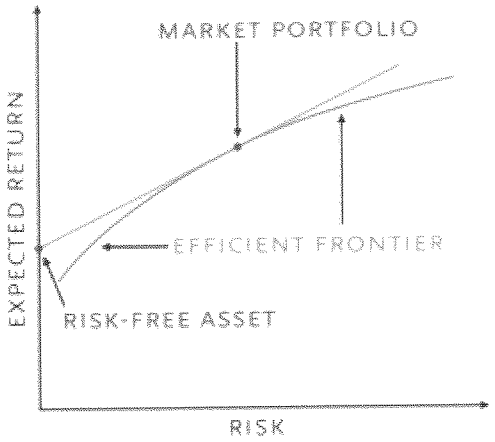
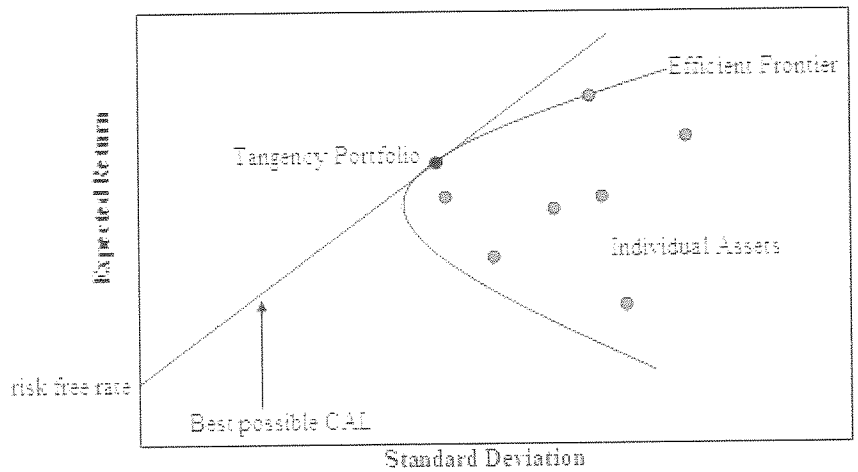
LECTURE 6

Modern Portfolio Theory (MPT):



CHALLENGED BY BEHAVIORAL ECONOMICS



Efficient Frontier is the intersection of the Set of Portfolios with Minimum Variance (MVS) and set of portfolios with Maximum Return

The Keynesian "Animal Spirits"

Animal spirits" is the term John Maynard Keynes used in his 1936 book *The General Theory of Employment, Interest and Money* to describe emotion or affect which influences human behavior and can be measured in terms of consumer confidence. Trust is also included or produced by "animal spirits". Several articles and at least two books with a focus on "animal spirits" were published in 2008 and 2009 as a part of the *Keynesian resurgence*.

The original passage by Keynes reads:

"Even apart from the instability due to speculation, there is the instability due to the characteristic of human nature that a large proportion of our positive activities depend on spontaneous optimism rather than mathematical expectations, whether moral or hedonistic or economic. Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as the result of animal spirits - a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities."

Keynes seems to be referencing David Hume's term for spontaneous motivation. The term itself is drawn from the Latin *spiritus animales* which may be interpreted as the spirit (or fluid) that drives human thought, feeling and action.

NEW

THE EFFICIENT MARKET HYPOTHESIS AND BEHAVIORAL FINANCE (Chapters 8 and 9)

Wall Street Article – November 3, 2009 – "Crisis Compels Economists to Reach New Paradigm"

LEVERAGE CYCLE

Chapter 8

Random Walks and the Efficient Market Hypothesis

Example - $100, predicting the stock will go to $110 in 3 days - if everyone uses the same model, no one is willing to sell – the net effect would be that the stock jumps to $110.

The theory of movement of the stock is that it moves on new information, which by definition should be unpredictable, therefore the movements of the stock should be unpredictable – this is the essence of the argument that stock prices should follow a **RANDOM WALK** – that is, that price changes should be random and unpredictable.

The notions that all stocks already reflect all available information is referred to as the **EFFICIENT MARKET HYPOTHESIS (EMH).**

Example: "found a $20 bill on the ground" story

COMPETITION AS A SOURCE OF EFFICIENCY – models created, gathering information, go to investor's conferences, read the body language..... Picking a horse on the track – examining the way the horse before it runs – the OTC example (the bum)

"Information is Power" – "behind the hand – 50/50 - Spend money on information – seeking the Alpha

VERSIONS OF THE EFFICIENT MARKET HYPOTHESIS

Weak-form Hypothesis	Semi strong-form Hypothesis	Strong form Hypothesis
Asserts that all information that can be derived by examining market trading data such as the history of past prices, trading volume, or short interest. PATTERNS IN STOCK RETURNS • Returns over a short period of time (patents in historic data) – correlation to market/movements… momentum effect • Returns over long horizons – cycles, negative / positive news – EXAMPLE (FATHER-IN-LAW, THE ONEs IN RECESSIONS) •	States that all publicly available information regarding the prospects of a firm already must be reflected in the stock price. Company performance, guidance & outlook, management strength...etc. MARKET ANOMALIES • Fundamental Analysis uses a much wider range of information than does technical analysis. Price-Earning/EBITDA Multiple – us the Starwood example. • Use CAPM to adjust for risk (Starwood DCF analysis) and Betas • Small firm premiums (the table I gave you) • Book to Market ratios (Fema & French) • Post earnings announcements	States that stock prices reflect all information relevant to the firm, even including information available only to company insiders. SEC rules of insiders – Rule 10b-5 Act of 1934 sets limits on trading by corporate officers. INSIDE INFORMATION • A lot of studies were made on insiders trade the stock (buy/sell) – WSJ reports such transactions • SEC requirements – 13D for 5% holdings… Warren Buffet announcements – Burlington Railroad

Efficient Market Hypothesis (EMH) – Implications

- Technical Analysis (patents in the stocks) –
  - Support Levels / Resistance Levels – example on page 236 (8.2) $72 and then decline to $65.... If it begins to climb, the expected resistance level could be at 72 where $72-holders want to recover their investment.
  - Chartists – study chart for patents.

- Fundamental Analysis (Earnings/Dividends/ financial analysis)

Reviewed before (Passive Vs Active Portfolio Management)

ARE MARKETS EFFICIENT?

Few topics:

- Size / magnitude
- Selection Bias Issues (investment scheme – i.e. Leverage) – "Donkey" example
- Dart throwing
- Lucky Event Issue – always read about some investor made a lot of profit (50/50 coin toss , but if 10,000 participate in the coin toll, it won't be surprise that one has a 75%/25% - lucky on the day of the event)
- "Serial Correlation" of stock – lucky streaks
- Looking for behavioral motivations for buying/selling:
  - High Exposure
  - Risk Appetite
  - Tax motivation
  - Resource allocation
- Buy and Hold strategy - despite volatility – upward movement

Chapter 9

Behavioral Finance - People are people and they make decisions differently

- "Irrational Exuberance" – Greenspan 12/2006 – affected the stock markets around the world after he mention that word (Tokyo was down 3.0%, Hong Kong was down 2.0%, UK down 3.0%, U.S. down 2.0%)

Two theories:

1. Investors do not always process information correctly
2. Inconsistent decisions

I.e. Wrist Watch example -

Few Topics for discussions

INFORMATION PROCESSING

- Forecasting Errors – High multiples
- Overconfidence – "Irrational Exuberance"
- Conservatism – the article of banks – in Leverage Cycle

BEHAVIORAL BIASES

- Bluffing – Game theory – "All-in" has nothing, betting slow could have a good hand.
- Mental Accounting – managing other people's money versus your own – Hedge funds always market that aspect of it.
- Regret Avoidance – unconventional choices Vs. acceptable choices when wrong
- Prospect theory - as wealth increases more risk averse.

Chapters 5-9 - Review:

5 TECHNICAL RISK RATIOS – FOR PORTFOLIO MANAGEMENT:

1. **Seeking Alpha** (A measurable way to gauge a manager's ability to outperform the market - Alpha > the Market Return
2. **Calculating Beta** (Volatility compared to Market)
3. **Standard Deviation**: Difference / Variation or Deviation from the mean return
4. **R-squared** – statistical measurement that represents % of fund or security's movement that can be explained by movement in the market bench market (S&P 500) scale 0-100% (85 or higher – beta is valid, less than 70, the Beta is not that important.
5. **Sharpe Ratio**: Relationship between Premium Return (Rf – Ri) and Risk (standard deviation).

Alpha is a risk-adjusted measure of the so-called active return on an investment. It is the return in excess of the compensation for the risk borne, and thus commonly used to assess active manager's performances – often the return of the benchmark is subtracted in order to consider relative performance.

The Alpha Coefficient is a parameter in the capital asset pricing model (CAPM). It is the intercept of the security Characteristic Line (SCL) – In a efficient market the Alpha = 0

ARBITRAGE PRICING THEORY (APT)

- Price where a mispriced asset is expected to be
- Is viewed as an alternative to CAPM, since APT has more flexible assumptions requirements. Where CAPM format required the markets expected returns (based on history), APT uses risky assets' expected return and the risky premium of a number of macro-economic factors.
- One skepticism about the validity of CAPM is the unrealistic nature of the assumption needed to derive it.
- Arbitrage is the act of exploiting the mispricing of two or more securities to achieve risk free profits – **seeking the Alpha**

Statistics Worksheet

Calculating Beta Coefficient

7-month Data

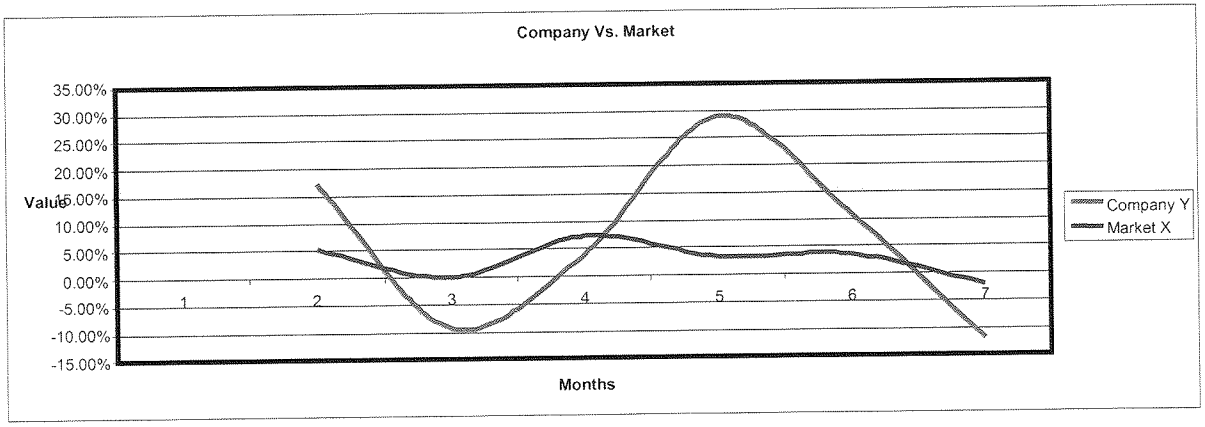
Day	Starwood Hotel Stock Prices	S&P500 Index	Starwood Change HPR	S&P500 Change HPR
30-Apr	20.86	872.81		
29-May	24.47	919.14	17.31%	5.31%
30-Jun	22.20	919.32	-9.28%	0.02%
31-Jul	23.10	987.48	4.05%	7.41%
31-Aug	29.78	1020.62	28.92%	3.36%
30-Sep	33.03	1057.08	10.91%	3.57%
30-Oct	29.06	1036.19	-12.02%	-1.98%

	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 Independent X
predicts value of y given a value of x=1%
predicts the standard error y-value for each x in the regression



2. CALCULATING STANDARD DEVIATION

A	B	C	D	E	F	G	H
81	**Calculating Standard Deviation**						
82							
83							
84	7-month Data						
85	Day	Starwood Hotel Stock Prices Change			Variance		
86	30-Apr						
87	29-May	17.3%			1.14%		
88	30-Jun	-9.3%			2.54%		
89	31-Jul	4.1%			0.07%		
90	31-Aug	28.9%			4.96%		
91	30-Sep	10.9%			0.18%		
92	30-Oct	-12.0%			3.49%		
93	**Average**	**6.65%**		**Variance =**	**2.47%**	=SUM(F115:F121)/C125	
94				**Standard Deviation (Long form) =**	**15.73%**	=SQRT(F122)	
95	**n =**	6	=COUNT(C87:C92)				
96	**n - 1 =**	5	=+C95-1				
97				**Standard Deviation (using Excel) =**	15.73%	=STDEV(C115:C121)	

3. CALCULATING R SQUARE

SUMMARY OUTPUT

Regression Statistics	*Explanation*
Multiple R	0.6072 Square Root of R Square
R Square	0.3687 Low R squared (Beta coefficient is not reliable)
Adjusted R Square	0.2109This is used if more than one x variable
Standard Error	0.1397This is the sample estimate of the standard deviation of the error
Observations	6 Number of observations used in the regression

ANOVA (Analysis of variance) This table splits the sum of the squares into its components

	df	*SS*	*Explanation*	*MS*	*F*	*Significance F*
Regression	1	0.045596541		0.045596541	2.33662503	0.20109
Residual	4	0.078055383	← R^2 = 1- (0.0781/0.1237)	0.019513846		
Total	5	0.123651924	← Total			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.*
Intercept	-0.015561849	0.078318048	-0.1987007	0.8522	-0.2330	0.2019	-0.2330	0.20
X Variable 1	2.782407573	1.820229858	1.52860231	0.2011	-2.2714	7.8362	-2.2714	7.83

4. CALCULATING SHARP RATIO

A	B	C	D
100	**Calculating Sharp Ratio**		
101			
102	Risk Free (rf) =	2.50%	
103	Return =	6.65%	
104	Standard Deviation =	15.73%	
105			
106			
107	**Sharp Ratio**	**0.26**	=+(C132-C131)/C133
108			
109			