AG217 Summary:

Portfolio Management & Security Analysis

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AG217 Course Summary

Variables

$\boldsymbol{N}$ = Number of Assets
$\boldsymbol{t}$ = Time

$\boldsymbol{P}$ = Portfolio
$\boldsymbol{f}$ = Risk-Free Asset
$\boldsymbol{m}$ = Market
$\boldsymbol{i}$ = Asset i

$\boldsymbol{E(R)_i}$ = Expected Return of Asset i
$\boldsymbol{w_i}$ = Weight of Asset i
$\boldsymbol{(1 - w_i)}$ = Weight of Asset k
$\boldsymbol{\sigma_i}$ = Standard Deviation (Risk) of Asset i
$\boldsymbol{\sigma_i^2}$ = Variance (Risk) of Asset i
$\boldsymbol{\rho_{i,k}}$ = Correlation Between Assets i & k
$\boldsymbol{cov_{i,k}}$ = Covariance of Assets i & k
$\boldsymbol{In}$ = Number of Input Values

$\boldsymbol{\beta_i}$ = Beta Value of Asset i (Sensitivty of Asset i to Another)
$\boldsymbol{\alpha_i}$ = Abnormal Return of Asset i (Residuals' Distance from SML)

$\boldsymbol{P_t}$ = Price at Time
$\boldsymbol{CF_t}$ = Cash Flow (Coupon) at Time [Final Year of Bond: $\boldsymbol{CF_t = (CF_t + fv)}$]
$\boldsymbol{y}$ = Yield to Maturity
$\boldsymbol{fv}$ = Face Value of Bond
$\boldsymbol{Y}$ = Current Yield
$\boldsymbol{S_{0,t}}$ = Annualised Spot Rate Between Time 0 & Time
$\frac{\boldsymbol{S_{0,t}}}{\boldsymbol{2}}$ = Semi-Annual Spot Rate Between Time 0 & Time
$\boldsymbol{E(S)_{t1,t2}}$ = Expected Spot Rate Between Time 1 & Time 2
$\boldsymbol{f_{t1t,2}}$ = Forward Rate Between Time 1 & Time 2 = $\boldsymbol{E(S)_{t1,t2}}$
$\boldsymbol{i}$ = Interest Rate = $\boldsymbol{y}$
$\boldsymbol{D}$ = Duration
$\boldsymbol{D_A}$ = Modified Duration
$\boldsymbol{C}$ = Convexity
$\boldsymbol{R_u}$ = Unexpected Return

Mean Variance Analysis

1: Expected Return

Expected Return of a Two-Asset Portfolio

$$E(R)_p = w_x E(R)_x + w_y E(R)_y$$

Expected Return Generalised to Infinite-Asset Portfolio

$$E(R)_P = \sum_{i=1}^{N} w_i E(R)_i$$

Expected Return of a Two-Asset Portfolio w/ Risk-Free Asset

$$E(R)_p = w_f R_f + w_m E(R)_m$$

2: Variance & Standard Deviation as Risk Measures:

Variance of a Two-Asset Portfolio

$$\sigma_P^2 = w_x^2\sigma_x^2 + w_y^2\sigma_y^2 + 2w_x w_y cov_{x,y}$$

Variance of a Risk-Free Asset Portfolio

$$\sigma_P^2 = w_m^2\sigma_m^2$$

As: $[\sigma_f = 0]; \ \therefore [cov_{x,y} = 0]$

Variance Using the 1/N Strategy

$$\sigma_P^2 = \left(\frac{1}{N}\right)\sigma^2 + \left(\frac{N-1}{N}\right)cov$$

3: Correlation & Covariance Between 2 Assets' Returns:

Correlation

$$\rho_{x,y} = \frac{cov_{x,y}}{\sigma_x \sigma_y}$$

Covariance

$$\therefore cov_{x,y} = \sigma_x \sigma_y \rho_{x,y}$$

$\boldsymbol{Where}\ [\boldsymbol{\rho = 1}]$: Perfect Positive Correlation (Together)
$\boldsymbol{Where}\ [\boldsymbol{\rho = -1}]$: Perfect Negative Correlation (Apart)
$\boldsymbol{Where}\ [\boldsymbol{\rho = 0}]$: No Correlation

4: Optimal Weights in a Zero-Risk & Perfect Negative Correlation Portfolio:

Perfect Negative Correlation: $[\boldsymbol{\rho = -1}]$
This Yields a Zero-Risk Portfolio: $[\boldsymbol{\sigma_p^2 = 0}]$

$$w_x = \frac{\sigma_y}{\sigma_x + \sigma_y}$$

$$w_y = \frac{\sigma_x}{\sigma_x + \sigma_y}$$

5: Inputs of Variance & Covariance:

Inputs of Variance

$$In_{\sigma_i^2} = N$$

Inputs of Covariance

$$In_{cov} = N\left(\frac{N-1}{2}\right)$$

Asset Pricing

1: Abnormal Return:

$$\alpha_P = R_P - E(R)_P$$

2: Expected Return:

Recall the R_f Tangent to the Efficient Frontier

$$E(R)_P = R_f + \sigma_P \left(\frac{E(R)_m - R_f}{\sigma_m} \right)$$

Expected Return on the Capital Market Line (CML)

$$E(R)_P = R_f + w_m(E(R)_m - R_f)$$

Expected Return on the Security Market Line (SML)

$$E(R)_i = R_f + \beta_i(E(R)_m - R_f)$$

$\boldsymbol{Where}$: $\left(E(R)_m - R_f\right)$ = Market Risk Premium
$\boldsymbol{Where}$ $[\boldsymbol{\beta = 1}]$: Tracking the Market Folio
$\boldsymbol{Where}$ $[\boldsymbol{\beta \neq 1}]$: Actively Investing
$\boldsymbol{Where}$ $[\boldsymbol{\beta > 1}]$: Aggressively Investing (Expect Market Folio Increase)
$\boldsymbol{Where}$ $[\boldsymbol{\beta < 1}]$: Defensively Investing (Expect Market Folio Decrease)

3: Beta Values of Stocks and Portfolio:

Beta Value of Asset i

$$\beta_i = \frac{cov_{i,m}}{\sigma_m^2}$$

Beta Value of Portfolio

$$\beta_P = \sum_{i=1}^{N} w_i \beta_i$$

Bond Pricing

1: Price of Bond:

$$\boldsymbol{P_0 = \sum_{t=1}^{N} \frac{CF_t}{(1+y)^t}}$$

2: Current Yield on Bond:

$$\boldsymbol{Y = \frac{CF}{P_0}}$$

3: Yield to Maturity Estimation:

1) Find Upper & Lower Limits of P Varying y
2) Conclude 1% Δy Gives: $(P_{upper} - P_{lower}) = \Delta P_{1\%\Delta y}$

$$\textbf{3)} \quad \Delta y_{req} = \frac{P_{upper} - P_0}{\Delta P_{1\%\Delta y}}$$

4) Convert y_{upper} to Percentage and Add Number from (3)

4: Spot Rates:

Price of Bond Using Spot Rates

$$\boldsymbol{P_0 = \frac{CF}{\left(1 + \frac{S_{0,t}}{2}\right)^t}}$$

Spot Rates

$$\boldsymbol{S_{0,t} = 2\left(\left(\frac{CF}{P_0}\right)^{\frac{1}{t}} - 1\right)}$$

Where Spot Rates Are Semi-Annual (E.g. 1 Period [$t=1$] Means 6 Months)

Expected Spot Rates

$$E(S)_{t1,t2} = 2\left(\frac{\left(1+\frac{S_{0,t2}}{2}\right)^{t2}}{\left(1+\frac{S_{0,t1}}{2}\right)^{t1}} - 1\right)$$

Forward Rates

$$E(S)_{t1,t2} = f_{t1,t2}$$

5: Duration of a Bond:

Duration

$$D = \frac{\sum t\left(\frac{CF_t}{(1+i)^t}\right)}{P_0}$$

Modified Duration

$$D_A = \frac{D}{(1+i)}$$

Where Duration (Years) Captures Sensitivity of a Bond to Δi

6: Convexity of a Bond:

$$C = \frac{1}{2}\left(\frac{\sum t(t+1)\left(\frac{CF_t}{(1+i)^t}\right)}{P_0}\right)$$

7: Unexpected Return:

With Duration

$$R_u = -D_A \Delta i$$

With Duration & Convexity

$$R_{u\,w/C} = -D_A \Delta i + C(\Delta i)^2$$

Where Unanticipated Return is Represented as a Percentage %

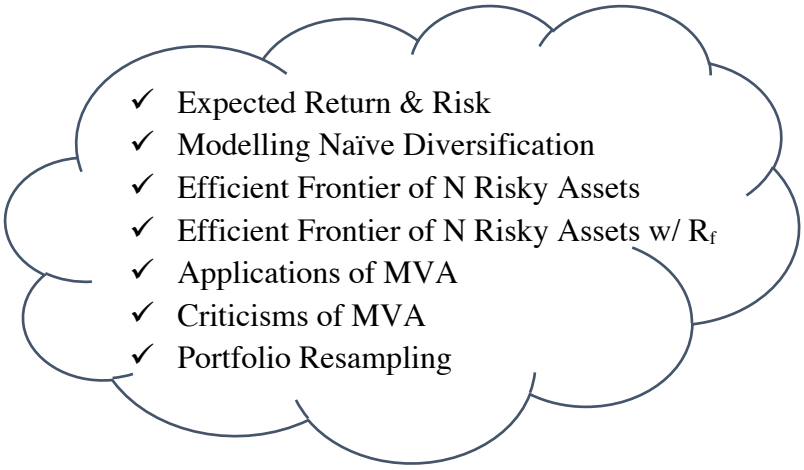
Essay Plan 1 – Mean Variance Analysis

Historical Essay Themes

1) Benefits and risks of international diversification
2) Uses of MVA and evaluation of problems
3) Why naïve diversification reduces risk

1) Introduce Mean Variance Analysis

- Markowitz (1992)
- Single period model
- Aim to maximise utility of wealth at [t=0] by optimising portfolios
- Occurs when asset returns **(R)** are Normally Distributed
- Based on quadratic utility functions of investors meaning their utility depends on expected returns **(E(R))** and risk ***(omega)***
- Decisions are purely based on these two factors as investors are assumed to be risk averse
- The efficient frontier shows optimal GMV portfolio based solely on optimising E(R) in comparison to *omega*
- Introducing return on risk free assets ($\mathbf{R_f}$) shows a new tangency point of the optimal portfolio die to the ability to lend and borrow at the risk-free rate
- Investors will choose the portfolio which offers the highest possible return for given risk
-



2.1.1) Briefly Describe International Diversification

- When risk is proposed to be reduced by investing in foreign markets as well as domestic markets due to the more attractive correlations between foreign-domestic assets as opposed to intra-domestic correlative assets

2.1.2) Detailed Description of International Diversification

- Briefly describe correlation
    - Do what degree factors move together, in this case it is assets
    - Correlation > 1: perfect positive movement (same direction)
    - Correlation < 1: perfect negative movement (opposite direction)
    - Correlation = 0: no correlation
- Explain intra-domestic market correlation
    - Many domestic markets move together (offset foreign loss)
    - Currency exchange is constant
    - Correlations are true correlations
- Explain foreign-domestic market correlation
    - Many foreign markets move together (offset the domestic loss)
    - Correlations can vary with exchange rate
    - Correlations are nominal and don't account for exchange variation
- Explain why choosing foreign-domestic over intra-domestic will reduce risk
    - The exchange rate widens the margin for offsetting errors and enhancing positive returns

2.1.3) Analysis of International Diversification

<u>Advantages/Benefits:</u>

1) Losses in either domestic or foreign markets can be largely offset by large gains in the opposite market as it involves investing in a new country rather than just a new stock/index in the same market
2) The pound is valuable so market changes are seen to be more extreme when adjusted to relative currency
3) Domestic investment is more attractive due to exchange rate; therefore, the exchange difference enhances domestic gains in foreign markets
4) Raises interest rate and therefore can increase personal investment in domestic markets as well as foreign due to higher proposed return
5) Also allows for diversification into growth opportunities, for example in developing countries

Disadvantages/Risks:

1) There can be higher transaction costs when investing in foreign markets – higher commission (USA), higher selling costs (USA), higher taxes (USA) so dilution of gains
2) Can increase political risk as many foreign countries are more economically volatile – contradicts risk-aversity in MVA
3) Possibility of decreasing domestic exports due to implied higher interest rate and therefore, exchange rate
4) Can decrease domestic corporate investment due to raised domestic interest rate
5) Lack of familiarity in foreign markets therefore higher chance of human error

3.1) Conclude Upon International Diversification

- Risk is reduced when considering international diversification as correlations between domestic and foreign assets are more extreme
- Offsets extreme losses more efficiently
- More effective than intra-domestic correlative diversification
- Agrees with risk-aversity in MVA

2.2.1) Describe & Explain Preliminary Uses of MVA

- Aware of average historic returns
- Gives an idea of expected future risk
- Use to highlight a range of portfolios based on the budget constraint
- Personal selection of portfolios on this "Efficient Frontier"
- Optimal weights are shown – highlights buy positions and short-sell positions (where you sell a borrowed asset and buy back when the price has declined never having owned it before – form 0 to (-) to (+))
- Correlative statistics between assets – personal choice – risk reduction
- "2 Fund Spanning": use two assets on the Efficient Frontier to fins all of the other optimal portfolios available given the risk and budget constraint
- An be used in conjunction with ($\mathbf{R_f}$) to minimise risk further – T-Bills/bonds etc.

2.2.2) Describe & Explain Further Uses of MVA

1) Asset Allocation
    - Highlights optimal asset class investment
    - Differentiates between optimal amounts of stocks, bonds, real estate, commodities etc.
    - Highlights use of either;
    - Strategic Asset Allocation: where long-term optimal weights are selected based primarily on return, or;
    - Tactical Asset Allocation: where short-term optimal weights are selected based on impulse E(R) and immediate risk
2) Equity Optimisation
    - Compares your proposed portfolio to a benchmark
    - Highlights possible abnormal return relative to benchmark [$\mathbf{r} = R_i - R_{B\text{-}MRK}$]
    - Allows you to rank possible portfolios on possible differential return rather than just volumetric return
3) Index Tracking
    - MVA minimised tracking error
    - For example, when not able to replicate an index, face liquidity and trading costs, and when faced with ethical restrictions

2.2.2) Describe & Explain Problems With MVA

1) Variance is a Poor Risk Measure
    - For example, if you make abnormal return relative to E(R), that isn't risk but it is considered risk
    - Could use a [When: *(omega)* < 0; …] parameter to define this in scripting
    - Does not account for time-varying covariance so as time increases, risk estimates become less accurate
    - Alternative Risk Measures;

- Lower Partial Std. Dev. (LPSD): When std. dev. is returned using only values (<) E(R), and;
- Value at Risk (VAR): Highlights worst possible scenarios – tail risk on Normal Distribution

2) Requires Normal Distribution
   - That is, only based on optimising utility relative to budget constraint for given risk
   - If not normally distributed, may continue to highlight high R folios rather than accounting for the extreme risk in these scenarios
3) Single-Period Analysis
   - MVA is single-period only and therefore neglects a lot of investors
   - People are interested in multi-period funds such as pensions
4) Asset Liability Non-Modelling
   - MVA neglects the fact that many funds or organisations face future liabilities such as paying pensions, endowments and disbursements to insurance companies – also applies to fraudulent endowments such as bribes to authorities etc.
   - The "Monte-Carlo" financial planning models R_P with regards to these additional factors and therefore can determine more long-term asset distribution
5) Linear Programming
   - Simplified MVA
   - Ignores risk and therefore just focuses on E(R)
   - Hence, risk-aversity is disregarded
   - Based on a lower chance of achieving E(R)
6) Estimation Risk
   - Based on historic returns and therefore, risk – in-sample
   - Don't know true returns or risk
   - So, Jobson & Korkie (1981): simulation approach
   - Simulate values and compare to true values for more accurate risk and return predictions

3.2) Conclude Upon MVA Uses & Problems

- MVA is a useful tool to predict future risk and return based on historical values
- It allows you to select optimal portfolios and their respective weights
- However, it is simple and is subject to error when generalised – as seen in the problems with MVA section

2.3.1) Define Naïve Diversification

- Invests in more assets in hope that risk will be reduced
- This is due to increased volume in correlation

2.3.2) Factors Allowing Reduced Risk

- Great Initial Gain in Risk Reduction
  - Graph of [$y = k^{(-x+k)}$]
  - Shows that as assets are added to a portfolio initially, risk is reduced fast as there are proportionately more opposites to create
  - As more are added, similarity increases meaning there is no newness [diversification] added
  - Therefore, you reach a point where it is pointless to add stocks
- Perfect Negative Correlation
  - Graph of symmetrical (relative to x-axis) lines upward sloping and downward sloping from a given point on the y-axis
  - That is, gains perfectly offset losses
- International Diversification (Correlation)
  - *See Previous Notes***

2.3.2) Factors Allowing Reduced Risk

- *See Conclusive [Correlative] Points from Previous Notes***

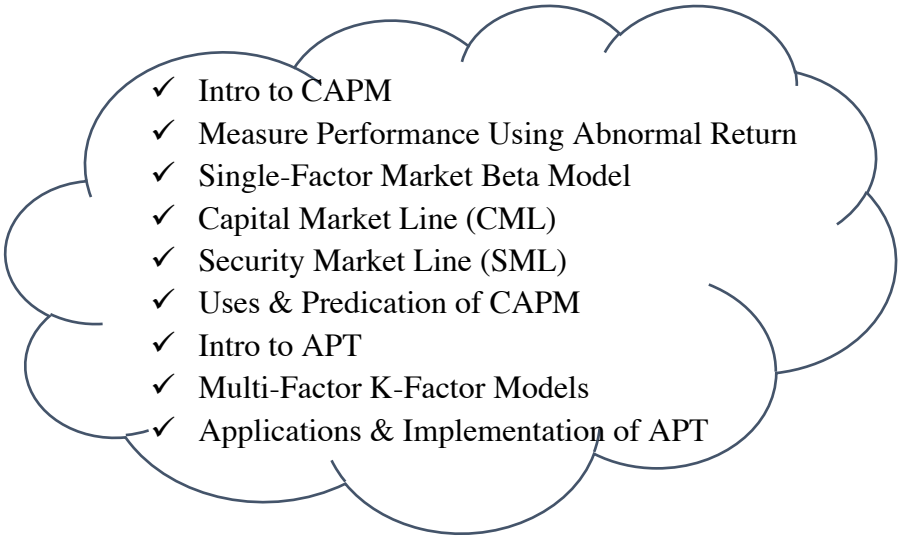
Essay Plan 2 – Asset Pricing

Historical Essay Themes

4) Predictions of CAPM, empirical evidence and cross-sectional ß testing
5) APT and empirical evidence, additions and factor investing

1) Introduce Asset Pricing

- Makes statements;
- "Don't invest in companies in the same market" due to similarity;
- "Investors are concerned with the state in which the market falls" implying extremity of situations and timescale
- Compares natural fluctuation in the economy [business cycle] to tail risk [anomalies such as recessions]
- Based on Capital Asset Pricing Theory (CAPM) (single-factor model) or alternative;
- Arbitrage Pricing Theory (APT) (multi-factor model)



2.1.1) Intro to & Assumptions of CAPM

- Sharpe (1964)
- Based on Markowitz Portfolio Theory
- It is a single-factor model, meaning it only takes into account statistics such as E(R), risk and ß values

For the Creation of a Compact Model, CAPM Assumes:

1) Investors are MV optimisers – they take highest E(R) for given risk
2) Markets are competitive & frictionless
    - They ignore taxes, trading-costs, buying/selling restrictions
3) Investors have the same efficient frontiers – return and risk expectations are the same
4) R_f exists
    - There is an optimal folio where demand (=) supply
    - There is a tangency folio where the R_f frontier meets the MV frontier
    - This tangency folio (=) market folio
    - Market folio: every possible asset is included (e.g. stocks, real estate, commodities etc.)
    - The R_f frontier is called the Capital Market Line (CML)
    - CML has equation based on risk free return, expected market return and std. dev. of both market and the folio
    - All efficient folios are combinations of R_f and market folio

- Performance is based on abnormal return [$(alpha) = R_p – E(R)_p$]
    - The average fund underperforms due to trading-costs etc.
- **CML** (Capital Market Line): [$E(R) = R_f + w_m(E(R)_m - R_f)$]
- **SML** (Security Market Line) (now based on ß's): [$E(R) = R_f + ß_i(E(R)_m - R_f)$]
    - Beta compares R of stock to the market return – how sensitive stock is to the market
    - When the beta value is 1, it tracks the market, any deviation form 1 means trading is active
    - If the beta value is greater than 1, aggressive trading (expect market increase)
    - If the beta value is less than 1, defensive trading (expect market decrease)

2.1.2) Uses & Predictions of CAPM

1) Evaluate Fund Performance
    - Is fund (>) market?
2) Index Tracking
    - Calculate beta market value of index
    - Compare to beta of a portion of a larger index
    - Invest in a proportionate folio of large index with beta portfolio (=) beta market in

3) Stock Selection
    - The further along the positively sloping SML, more reason to buy. Vice-versa
4) Estimates average E(R)'s and *(omega)*'s

It Predicts:

1) The market folio lies on the efficient frontier
2) Assumes that beta drives R [**Cross-Sectional Regression (R & ß)**]
    - Disregards unique stock characteristics
    - Shows how reliable beta values are when estimating R
    - [$R^2 \neq 0$] in regression so reject H_0 of betas being a suitable driver of R in UK sample
3) Only beta values explain why E(R) differs across stocks
    - Again, assumes there are no unique driver characteristics to stocks
    - This can be disproven with another **Cross-Sectional Regression** using the sample stock characteristic of Size
    - There is relation found between size

****OVERALL CAPM CAN BE DISPROVEN****

2.1.3) Limitations of CAPM

6) We cannot identify market portfolio
    - CAPM is untestable – usually market indices are used as proxies, CAPM uses no proxies – for example, market portfolio includes human capital
    - Ignore and proceed
7) Poor empirical performance
    - Needs more than just beta values
8) Estimation risk
    - True beta values and abnormal returns are unknown – based on history, as with MVA
    - Also, time-varying – which is neglected

3.1) Conclude CAPM's Effectiveness

- It can be used to predict asset returns and therefore prices, at a very simple level
- It is naïve and only involves statistics, not characteristics
- It can be disproven using Cross-Sectional Regression

2.2.1) Intro to & Assumptions of APT

- Alternative to CAPM
- Multi-factor model meaning it accounts for a greater number of characteristics than in the simplicity of solely using statistics in CAPM
- Again, assumes risk aversity – MV optimising investors
- Regresses unknown "K-Factors" relative to assets – explains covariance matrix
- Includes the beta values of these factors in an alike regression to the one seen within the SML in CAPM
- It is based on the fact that: "if you can price the factors making up an asset, you can price an asset"
- It assumes;
- 1) The combination of K-Factors lies on the "ex-ante" MV frontier
- 2) There is a linear relationship between
- 3) Risk is captured by the beta of individual K-Factors rather than the market

2.2.2) Implementation & Applications of APT

Based on Identifying Common K-Factors:

1) Statistical Factors
    - Explains covariance in terms of what factors give most covariance
    - Factors are ranked and presented in order for a decision to be made
    - Still doesn't tell us why there is covariance (recall, factors are unknown)
2) Macroeconomic Factors
    - Factors selected based upon what people would assume would affect E(R) – hence, economic theory
    - But, a lot of factors have no economic basis
3) Portfolio Factors
    - Factors based upon stock characteristics

Empirical Evidence:

1) Fama & French (1993) Add to E(R) Model
    - Size: (**SMB**) 0-cost folio
    - Value/Growth: (**HML**) 0-cost folio (Value e.g. dividends, Growth e.g. expect share price increase)
    - *More are added later*
    - Profitability: (**RMW**) 0-cost folio (difference in R between profitable and unprofitable companies)
    - Investment: (**CML**) 0-cost folio (difference in R between conservative/aggressive companies)
2) Carhart & Stambaugh (1997) Add More
    - Momentum & Liquidity: (**FF** Model)
3) Daniel, Hirshleifer & Sun (2017) Create New Behavioural Model

- Market Factor
- Financing Factor (stock issues, market anomalies etc.)
- PEAD Factor (market anomalies post-earning announcements)

4) Frazzini & Pedersen (2014)
   - Betting Against Beta: (**BAB**)
5) Asness, Frazzini & Pedersen (2018)
   - Quantity Minus Junk: (**QMJ**)

- *"Multi-factor models outperform single (APT (>) CAPM)"*
- *"Fama & French add a strong number of factors in order to give accurate results"*

Factor Investing

- Comes under Applications of APT
- Involves investors with long-term horizons
- Select factors which suggest highest average R in the long-term
- Benefits investors as they are less effected by short-term poor performance factors/fluctuations/high risk
- **For Strong Average R:**
- Large Companies (<) Small Companies
- Growth Companies (<) Value Companies
- **Factor Investing Depends on Ability to Sell:**
- When: Factor Investing (>) Industry – Short-Sell
- When: Factor Investing (<) Industry – Don't Short Sell
- –
- Can combine factors with industry in order to increase E(R) and decrease risk
- The question is: *"can investors exploit new factors?"*

3.2) Conclude Upon APT's Effectiveness

- CAPM is a single-factor model based on beta values of market
- APT is a multi-factor model based on a combination of beta values of K-Factors
- Fama & French ensure, by implementing a diverse range of factors, that multi-factor models outperform single factors models
- However, many [possible] factors are unassigned and unknown

Essay Plan 3 – Market Efficiency (Saarah)

Critically evaluate the empirical support for the Efficient Markets Hypothesis and explain why this is an important issue for investors. (40 marks)

Introduction:

- What is EMH? Fama (1970), 3 FORMS

Efficient capital markets occur in markets where the price of a financial asset reflects **all available** information about the asset and responds quickly to any new information (Fama, 1970). The reaction to unexpected news is seen straight away in the price of the asset. The prices are based on past, private and public information and is assumed to be a highly accurate representation of the price. The Efficient Market Hypothesis theory states that beating the market is impossible due to the fact that stocks are already completely accurately priced. EMH comes in 3 different forms, weak form, semi strong form, and strong form (Ţiţan, 2015). A market in which prices always reflect all available information can be called 'efficient' (Fama, 1970).

When understanding EMH it is vital to understand the forms at which it occurs. Fama 1970 defines market efficiency into 3 levels; weak form, semi-strong form and strong form. Firstly, weak form refers to the securities and financial assets which only represent historic and past information. A weak form EMH price can only be evaluated as something that represent previous information, other things such as current news are not represented in the price. Secondly, semi strong form takes into consideration past information but also accounts for any public information that is available to set the value of the security. This Can include news reports, accounting reports and company specific information i.e. products introduced. Lastly, strong form encompasses all information that is available in order to value the financial asset. This is all past information, all public information AND all private information. This gives for security prices that represent all information (Fama, 1970)

- Joint Hypothesis Problem
- Implications

Main Body:

Briefly mention the following before going into detail about empirical support of EMH.

Time Series

- Return Predictability, Ball paper
- Seasonal affect, January affect, day of the week affect, weather affects and there is many more Pg 67 of notes.
- Predictability from past returns pg 70
- Lagged info variables, time series predictability

- **Market Efficiency tests**

- **Return Predictability; Ball paper, Seasonal Affect, Predicting Returns from the past.**
- **Event Studies**
- **Tests of Private info; Insider Trading**

Conclusion:

- Mixed evidence creates an unsure conclusion, sit on the fence

Critically examine the challenges that stock return predictability has for the Efficient Markets Hypothesis. (40 marks)

Introduction:

(Same as previous Q but must include a brief intro of SRP)

A stock return is said to be predictable by some variable. No predictability means that the best predictor of tomorrow's return is the constant, unconditional average return. When stock returns are unpredictable, stock prices are said to follow a random walk.

For investors, the presence of return predictability leads to different optimal asset allocation rules in comparison to the belief held under EMH. For academics, return predictability or the lack thereof has substantial implications for general equilibrium models that are able to accurately describe the risks and returns in financial markets.

Main Body:

A key critique of EMH, Stock Return Predictability.

Cross Sectional

- Stock chars
- Returns are predictable, Is it EMH?
- Rely upon an asset pricing model to explain predictability Behavioural finance

Although stock return predictability contradicts the weak form of the EMH, Fama(1991) argues that return predictability does not necessarily imply that markets are inefficient if asset pricing models allow for time-varying expected returns

- **Can outline Importance of EMH to Investors but also involve further questioning of EMH; Joint Hypothesis Problem.**

Time Series

- Return Predictability, Ball paper
- Seasonal affect, January affect, day of the week affect, weather affects and there is many more
- Predictability from past returns
- Lagged info variables, time series predictability

- **Market Efficiency tests**
    - **Return Predictability; Ball paper, Seasonal Affect, Predicting Returns from the past.**
    - **Event Studies**
    - **Tests of Private info; Insider Trading**

Conclusion:

Overall what are the challenges and is there research to suggest EMH can still hold against SRP, if so outline relevancy or irrelevancy.

Essay Plan 4.1 – Bonds: Valuation (Saarah)

Evaluate the main factors that affect the valuation of corporate bonds. (40 Marks)

Discuss the main factors that affect the valuation of bonds. (40 Marks)

Valuation of Bonds

Introduction:

Introduction to bonds, e.g. Bonds are debt securities which make regular fixed coupon payments during the life of the bond and repay the face value of the bond on the maturity date of the bond. Zero-coupon bonds are bonds which only pay the face value of the bond on the maturity date of the bond.

- ✓ YTM
- ✓ Current Yield
- ✓ Spot Rates
- ✓ Forward Rates

Main Body:

Factors that affect bond valuation

1) **Interest rates and time to maturity**

The first factor that can have effect on bond valuation is interest rates and the time to maturity. The relationship between the YTM and the maturity of the bond is called term structure, term structure can be divided into 4 theories which help understand why zero coupon bonds with different maturities have different yields and hence, valuations.

a) Segmented Markets
b) Pure Expectations
c) Liquidity Premium
d) Preferred Habit

2) **Default risk**

Investors can be exposed to default risk when investing in bonds, broadly this means that bondholders face the risk of not receiving their coupon payments. In order for investors to understand the default risk attached to a bond there are many bond rating agencies (Expand). A change in the credit ratings on a given bond can have a large impact on the yield and prices of a bond. Mention the ratios used by the agencies and the main criticism faced. (Objective due to the collection of fee and 2008 FC)

Very high quality	AAA	AA
High quality	A	BBB
Speculative	BB	B
Very poor quality	CCC	D

3) Tax Effects

Cash flows on certain bonds could have a tax advantage for certain investors.

4) Option Features in Bonds

i) Call option of issuer
Issuer has the option to buy back the bond at a specified price. Buy back at face value plus a premium. Company will call the bond when a similar straight bond is greater than the callable price.

ii) Sinking fund – part of the issue is bought back each year over the life of the bond. Can either buy bonds directly or call bonds at a set price. Investors risk having their bonds called.

iii) Conversion option
Investor has the option to convert bonds into shares.
Valuing these types of bonds requires option pricing models which you will explore later in your Finance course

Conclusion:

Summaries the 3 key factors of bond valuation by evaluating their effect on the movement of price.

Essay Plan 4.2 – Bonds: Portfolio Management (Saarah)

Discuss the main approaches to bond portfolio management. (40 Marks)

Introduction:

Introduction to bonds, e.g. Bonds are debt securities which make regular fixed coupon payments during the life of the bond and repay the face value of the bond on the maturity date of the bond. Zero-coupon bonds are bonds which only pay the face value of the bond on the maturity date of the bond.

- ✓ YTM
- ✓ Current Yield
- ✓ Spot Rates
- ✓ Forward Rates

Main Body:

Passive Vs Active
Investing in a bond index, lack of liquidity in the bonds makes it a difficult strategy but it is a strategy used by many investors to manage their bond portfolios. On the other hand the use of active duration management. Increase or decrease the duration of the portfolio depending upon whether interest will go up or down.

*Make sure to go into a good amount of detail in regards to Passive vs Active strategies of Bond Portfolio Management. Include; Aggregate interest rate forecasting (market timing), Sector selection – select bond sectors which expect to perform well in the long-run, Sector rotation – overweight sectors that think will perform well in the next period, find mispriced bonds for active bond management.

1) Exact matching (Dedication)
   Find the lowest cost portfolio of bonds that exactly match the cash flows of the future liabilities. A passive investment strategy. Bond portfolio is insensitive to changes in i as will still meet the liabilities.
2) Immunization

Above attempts to eliminate impact of interest rate risk by matching duration of bond portfolio to duration of liabilities. If *i* rates shift, should have similar impact on assets and liabilities.

a) Focused strategy – buy bonds with a duration close to duration of liabilities.
b) Barbell strategy – buy bonds with very different duration measures compared to duration of liabilities.
Immunization can involve a lot of trading due to changes in duration over time.

Risks of immunization strategies include selecting the wrong duration measure. Some duration measures capture different interest rates shifts than others. Also there is the danger of large yield shifts when the portfolio is not immunized.

Conclusion:

Preference of bondholder and amount of time available in order to choose a passive or active strategy.

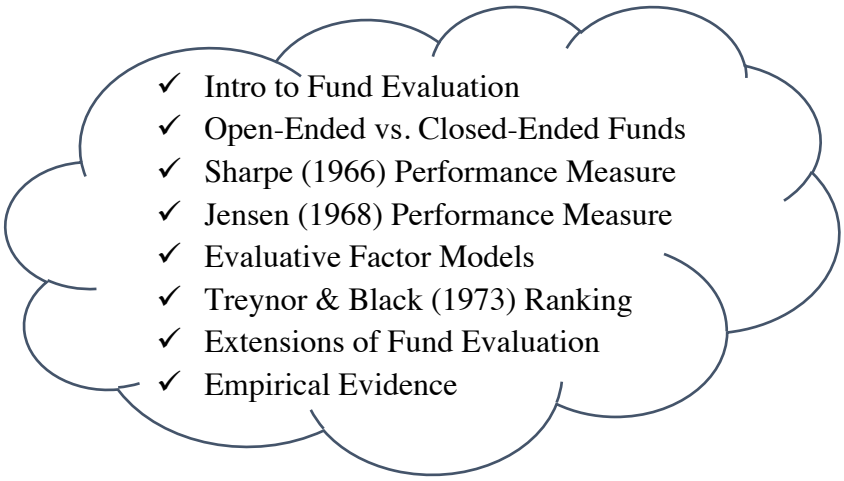
Essay Plan 5 – Evaluating Fund Performance

Historical Essay Themes

6) Main performance measures to evaluate performance
7) Empirical evidence backing mutual funds adding value to investors

1) Introduce Fund Performance Evaluation

- Similar to Asset Pricing Modelling techniques
- Risk-adjusted measures by Sharpe ('66), Treynor ('67), Jensen ('68)
- First based on the CAPM
- Primarily based on abnormal return (*alpha*) compared to benchmark E(R)
- This is based on:
  - (*alpha*) = 0: neutral performance
  - (*alpha*) > 0: superior performance
  - (*alpha*) < 0: inferior performance
- Fund performance is historic
- Using, for example:
  - Past R's of peer groups (retail funds)
  - Past index R's (institutional funds)
- Open-ended funds: trade to you, valued every day, net of all expenses but "load"
- Closed-ended funds: longevity, buying other securities, no. of shares fixed, no agency costs, don't have to sell when market falls



2.1.1) Sharpe (1966) Performance Measure

- Sharpe (1966)
- Question of (*alpha*) vs. trading-costs shows trouble
- Sharpe: *"how much average excess return per unit of risk is there?"*
- The higher the Sharpe measure, the better
- $SR_P = E(R)_P/(sigma)_P$
- Funds w/ Normal Distribution have (≈) SR's
- Less accurate measure in Non-Normal Distributions (e.g. Kurtosis & Skewness)
- If SR_P (>) $SR_{B\text{-}MRK}$: fund has superior performance

2.1.2) Jensen (1968) Measure

- Jensen (1968)
- Using CAPM again
- Extended by Connor & Korajozyk (1986) to APT
- Jensen regresses the beta values of *k* factors in comparison to the (*alpha*) of the folio
- Where: $(alpha) = E(R)_P - \sum ß_P E(R)_k$
- Captures difference between E(R) of fund and an alternative passive strategy in risk-free and K-Factor folios
- Therefore, the amount invested in each factor is (=) $ß_P^k$
- So, the question is: *"can funds outperform historic benchmarks?"*
- Note that: (*alpha*) does not rank funds as funds take on idiosyncratic risk (risk of residuals in regression)

2.1.3) Factor Models Used to Evaluate

- These are linear factor models

1) Indices based on stock types held by funds
    - Elton, Gruber, Das, Hlvaka ('93)
    - Extend the CAPM to include small stocks and bond index
    - Sharpe: "Style Analysis" – includes more indices, set [ß ≥ 0] to restrict the regression, *"what are the main asset classes invested in?"*
2) Indices based on factors known to explain R's
    - French ('93), Carhart ('97)
    - Captures: size (SMB), value/growth (HML), momentum (WML)
    - Shows: *"can there be abnormal return delivered?", "is there skill in fund management?"*
3) Statistical factors from historical R's
    - Explain covariance of stock R's
    - Lehmann & Modest (1987) is an example

- For example: bond funds – use bond factors; hedge funds – use equity factors and factors that capture the fact that hedge funds can option invest (dynamic trading in other asset classes)
- MatLab results show that there is some exposure/evidence in value companies where: [ß is (+) on HML]

2.1.4) Treynor & Black (1973) Performance Measure

- Treynor & Black (1973)
- "Appraisal Ratio" = AR
- $AR_P = ((alpha)_P/(sigma)_{uP})^2$
- u: represents residuals, therefore captures idiosyncratic risk

2.1.5) Extended Performance Measures

1) Evaluating stock selection & market timing ability
   - Stock Selection: ability to identify under-valued stocks within asset class given
   - Market Timing: ability to forecast future aggregate movements in asset classes (e.g. stocks vs. cash) – generalised to asset allocation
   - Again, estimated using time-series regression
   - Issues:
     → Interim trade bias: when fund manager trades more than return frequently than the return observation interval
     → Manager changes $ß_P$ through timing activities so the time-series regression may be poor
2) Weight-based measures
   - Utilises information about portfolio weights at different points in time
   - Daniel, Grinblatt, Titman, Wermers (1997) is the most common example
   - Considers:
     → (*delta*)P's in comparison to (*delta*)w's
     → Correlation between w's and E(R)
   - Asks: *"does the fund manager change weights inversely or conversely with expected returns?"*
3) Conditional performance measures
   - Ferson & Schadt (1996) best example
   - Assumes: semi-strong efficiency
   - Evaluation is allowed to time-vary
   - Beta values are based on lagged information variables
   - Beta values and risk premiums now vary

3.1) Conclude Upon Performance Measure Techniques

- As fund evaluation techniques are enhanced, they move from linear regression explanation through adding factors and reaching options to include time-varying analysis

2.2) How Mutual Funds Have Historically Performed

- Elton & Gruber (2013)
- Average fund has negative (*alpha*) net of trading costs
- Average fund has positive (*alpha*) gross of trading costs
- *The average bond fund underperforms*
- Performance in persistence
    - Elton, Gruber, Blake (2012): positive (*alpha*)'s for the top 10% of funds
- Berk & Green (2004) argue there is unpredictability due to cash flow impact
    - Performance decreases with fund size due to CF's and need to take on less profitable investments
    - Predictability weakens over time. Observed at 3 years
- Fama & French (2010): bootstrap simulation for cross-sectional regression
    - No skill [$\alpha = 0$]
    - Compares the simulated regression to actual regression
    - Identifies chance or actual performance
- False Discovery Rate: Storey (2002)
    - Distinguishes neutral performance funds, unskilled funds, skilled ones
    - Relates this to the chance factor of returning results

3.2) Conclude Upon Mutual Fund Effectiveness

- NOT A CLUE. NOT ANSWERING!