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HPR = (cash + capital gains) / initial period value
Geometric Mean = $[(1+HPR_1)(1+HPR_2)(1+HPR_3)\ldots(1+HPR_n)]^{1/n}$ - 1
Sharpe Measure$_p$ = $[(r_p - r_f) / \sigma_p]$
Treynor Measure$_p$ = $[(r_p - r_f) / \beta_p]$
Jensen's Alpha = $r_A - [r_f + (r_m - r_f)\beta_A]$

(Asset Allocation Effect) = [(Actual Portfolio Weight)-(Policy Portfolio Weight)]
x[(Asset Class Return in Policy Portfolio)-(Total Return of Policy Portfolio)]
(Security Selection Effect) = [(Actual Portfolio Weight)x(Asset Class Return in Actual Portfolio)]
-[(Actual Portfolio Weight)x(Asset Class Return in Policy Portfolio)]
Total Return = YTM Effect + Interest Rate Effect + Sector Effect + Residual Effect
Impact Return = Sector Return x Portfolio Weight

R^2 = 1 - [Variance (e_i) / Variance (R_i)]

Allocation Effect = $\Sigma_i[(w_{ai} - w_{pa}) \times (R_{pi} - R_p)]$
Selection Effect = $\Sigma_i[(w_{ai}) \times (R_{ai} - R_{pi})]$

Policy Effect = Return on the long-term strategic portfolio - Return on the bond market index
Management Effect = Return on your actual bond portfolio - Expected Return on long-term
strategic portfolio
Rate Anticipation Effect = Expected Return on your actual bond portfolio according to BML -
Expected return on the long-term strategic portfolio
Analysis Effect = Actual calculated return of buy&hold strategy - Expected return on actual
bond portfolio according to BML
Trading Effect = Return on actual bond portfolio - Actual calculated return of
buy&hold strategy
Trading Effect = Total management effects - (Rate Anticipation + Analysis Effects)
Total Return = Income Return + Price Change Return
Total Return = Expected return on a portfolio of treasury bonds + unexpected return on a
portfolio of treasury bonds + return from the manager's actions related to rate
anticipation + return from spread/quality management + return attributable to the
selection of specific securities

Performance Presentation Standards

==flashcard concepts==

- A COMPOSITE is a set of portfolios that follow the same investment style
- a CURRENCY OVERLAY STRATEGY is a portfolio of currency hedges or positions (futures, options, or forwards) that are managed separately from the core portfolio that is being hedged
- A WRAP-FEE portfolio is an account in which a client is charged a specific fee or fees not based directly on specific transactions for investment advisory services or transaction execution
- The development of the AIMR-PPS was guided by a need for a common, accepted set of ethical principles to ensure fair representation and full disclosure in presenting investment results. The Standards are designed to meet the following 4 goals

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- *Achieve greater UNIFORMITY and COMPARIBILITY among performance presentations*
- *IMPROVE the service offered to investment management clients*
- *ENHANCE industry professionalism;*
- *Bolster industry SELF-REGULATION*
- To comply with AIMR-PPS, a firm must adopt the Standards on a Firm-wide basis and only a firm can claim compliance of the AIMR-PPS
- Total Firm Assets include ALL Discretionary (i.e., the manager has control over how the funds are invested) and Non-Discretionary Assets. Do not include portfolio components such as currency overlay portfolios and derivatives overlays UNLESS the firm manages the underlying assets
- As of January 1, 1997, All Composites and Performance Presentations must include Accrued Income in Market Value Performance Computations. Also, all Performance Presentations must include a Measure of Composite Dispersion
- Write down both the REQUIRED & RECOMMENDED Standards & Memorize. You will see a question that relates to the AIMR-PPS, and separate the new Standards
- Reasonable & Consistent Criteria should be applied to the Creation of Composites. Note that this is a theme that is carried throughout the AIMR-PPS. If the design of a process or procedure is left up to the firm, the firm should apply reasonable, consistent treatment of the process on a firmwide basis. Relevant factors that can be used to group portfolios include:
  - *Investment Management Style*
  - *Risk Characteristics*
  - *Client Characteristics*
  - *Firm Control over Investment Strategy Implementation*
- Fully document all procedures and processes. Make sure that historical returns are well documented
- Branch Offices of an overall larger firm cannot claim compliance unless the entire firm is in compliance with the AIMR-PPS or unless the branch is held out to the public as a separate entity
- A Non-discretionary account is defined as an account where the client imposes investment restrictions that impede the application of the firm's investment strategy. Non-discretionary portfolios should not be included in discretionary composites
- Portfolios that are too small to be representative of the firm's investment strategy may be excluded from composite construction. The following criteria are allowed when establishing minimum portfolio size limits:
  - Portfolios below the limit are deemed non-discretionary
  - Portfolios below the limit are a small percentage of total firm assets
  - The firm does not accept new accounts below the limit
- Convertible Instruments should be classified as equity securities unless otherwise directed
- A multiple asset portfolio is comprised of securities from several different asset classes
  - If the firm can alter the asset allocation within the balanced portfolio, then a "balanced composite" should be created
  - If the firm cannot alter the balanced portfolio's asset allocation, then the portfolio should be split into composites made up of the various asset classes. It is important that the portfolio's cash position be allocated proportionally to each separate composite

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- AIMR suggests that wrap-fee accounts be grouped in separate composites from non-wrap-fee accounts
- Interest income must be computed on an accrual basis. You should include the income that would have been received had the security actually been sold at the end of the performance period
- The OBJECTIVE of composite return is to use a method that will give the same value as if the composite were treated as a portfolio. Asset-weighting must be used
- Return results must include the effects of leverage. Also, return results must be restated to an all-cash basis if the portfolio used leverage and those same securities could have been purchased without leverage. All-cash returns must be computed and disclosed as supplemental information if the manager has full discretion over the use of leverage
  - If leverage is discretionary to the manager at the request of the client, then only the actual cash amount of assets should be used when computing firm assets
  - If the client Requires the use of leverage, then firm assets should reflect the increase in asset size created through the use of leverage
- Taxes should be realized in the same period that a taxable event has occurred. Also, taxes on income from bonds should be accounted for on an accrual basis
- The performance results of a past affiliation may not be used to represent the historical record of a new affiliation. The guiding principle here is that performance is the responsibility of the firm, not the portfolio manager -changes in personnel shouldn't alter composite results.
- *Investment Strategy Risk* measures the risk that changes in the economy, industry, or firm will adversely affect portfolio returns. The time-series standard deviation of returns, beta, Sharpe and Treynor measures are all indicators of investment strategy or external risk
- Internal Risk, or COMPOSITE DISPERSION measures how consistently a manager applies an investment strategy across portfolios within a composite. The AIMR-PPS require that managers disclose the dispersion of portfolio returns within a composite. The appropriate measure of internal dispersion is the asset-weighted standard deviation
- *Accounting Leverage* results when some part of the firm's assets are financed by liabilities or borrowing (Total Assets > Net Assets)
- *Economic Leverage* results when the portfolio return is expected to be more volatile than the return from a benchmark (unlevered) portfolio

Problem Set: AIMR-pps
1. LIST & DESCRIBE Four REQUIRED performance Calculations under AIMR's PPS
Internal Dispersion
Total Return (Annualized & Asset-weighted)
10 year performance record
Cash & Cash equivalent returns

2. DISCUSS the proper construction and maintenance of composites under AIMR's PPS

-All actual fee-paying discretionary portfolios must be included in at least one composite defined according to similar strategy or investment objective
- Composites must include new portfolios at the start of the next performance measurement period (at least quarterly) after the portfolio comes under management or according to reasonable and consistently applied firm guidelines
- Composites must excluded terminated portfolios after the last full performance measurement period the portfolios were under management, but composites must continue to include terminated portfolios for all periods prior to termination
- Portfolios must not be switched from one composite to another unless documented changes in client guidelines make switching appropriate
- Convertible & other hybrid securities must be treated consistently across and within composites
- Asset-only returns must not be mixed with asset-plus cash returns

3. DESCRIBE the allocation of cash and cash equivalent returns in multiple-asset portfolio performance measurement
Returns from cash and cash equivalents held in portfolios must be included in return calculations, and the cash and cash equivalents must be included in the portfolio amount (total assets) on which the return is calculated

4. LIST & DESCRIBE 2 Additional requirements for the construction and maintenance of international composites under AIMR's PPS
Subsectors of larger international composites may be used to create stand-alone composites only if the subsectors are actually managed as separate entities with their own cash allocations and currency management
The benchmark for any currency overlay portfolio must be calculated in accordance with the mandate of the portfolio unless the benchmark is actually the currency return on a published benchmark

5. DISCUSS the advantages & disadvantages of the daily valuation method v. the modified Dietz Method
The daily valuation mode's main advantage is that it is not an estimate. It calculates a true time-weighted rate of return. However, a disadvantage of this method is that it may not be practical. It requires precise valuation of the portfolio on the date of EACH cash flow. If there are errors in the pricing of securities, it could lead to greater errors than if an estimation method had been used.

The advantage of the modified Dietz method is that it does not require portfolio valuation on the date of each cash flow. That makes this method much easier to use. However, because it calculates an estimate, it's less accurate than the daily valuation model. These estimates could become distorted if there is one or more large cash flows or if there is high market volatility

6. DISCUSS whether an asset-weighted return may be more appropriate than an equal-weighted return for a composite. Explain
An asset-weighted approach is preferred because the goal of obtaining a composite return is to use a method which will get a return equal to that if we had treated the composite as one big portfolio. An equal-weighted return method can only meet this objective if the portfolio market

values are equal or if their returns are equal. However, an asset-weighted method will work because it adjusts the portfolio returns for the portfolio size

7. DISCUSS Gross of Fee v. Net of Fee calculations. Why does AIMR prefer Gross of Fee return calculations
Gross of fees means before management fees are deducted. Net of fees means after management fees are deducted. AIMR prefers the gross method because the fees may be scaled to the size of the assets or they may be negotiable. The fees that someone else pays may not be the same as you will pay

8. A portfolio has a beginning market value of $50,000. It earns a steady return of 1% per month. Total management fees are equal to .1% per month. Calculate Gross and Net Market values as well as total return after 1 year, 2 years, and 20 years. (Set up a table)

Time	Gross Market Value	Net Market Value
1	$50000(1.01)^{12} = 56341.25$	$50000(1.01)^{12}(1-.001)^{12} = 55668.86$
2	$50000(1.01)^{24} = 63486.73$	$50000(1.01)^{24}(1-.001)^{24} = 61980.44$
20	$50000(1.01)^{240} = 544627.68$	$50000(1.01)^{240}(1-.001)^{240} = 428367.87$

9. A composite calculates its return on a quarterly basis. The first month in the period earned a return of 2%. The second month's return was 0.5%. The third month's return was 1%. Calculate the quarterly return
$C_{QT} = (1.02)(1.005)(1.01) - 1 = .0353$

10. A portfolio manager wants to calculate the composite's annual return. He knows that the first quarter's return was 5%, the second quarter's return was 2.8%, the third quarter's return was 0.9% and the answer to problem 9 was the 4th quarter's return. Calculate the composite's annual return.
$C_Y = (1.05)(1.028)(1.009)(1.0353) - 1 = .1276$

11. A composite includes 3 portfolios. Portfolio A has a beginning market value of $10,000 and earned a return of 7.5%. Portfolio B has a beginning market value of $100,000 and earned a 3% return. Portfolio C has a beginning market value of $50,000 and earned an 8% return. Calculate the Equal-weighted return and the Asset-weighted return.
$C_{Equal} = (7.5+3+8)/3 = 6.167\%$
$C_{Asset} = [(10000)(.075)+(100000)(.03)+(50000)(.08)] / (10000+100000+50000) = .048$ or 4.8%

12. Explain why it may be better to use the Sharpe measure rather than the Treynor Measure
It is more appropriate to use the Sharpe Measure when the portfolio being evaluated represents all of the investor's marketable assets. However, if the portfolio is only one of several portfolios the Treynor Measure may be the best measure

13. Why is β an important measure of risk
β is an important factor because it shows how volatile a stock, portfolio, etc. is compared to the market. For the same return, a low beta is usually preferred

14. What is a benchmark? Explain the advantages and disadvantages of indexes

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Benchmarks are typically represented by market indexes, manager universes and/or normal portfolios which are used for comparison purposes. Benchmarks are compared to portfolios to asses the portfolios risk and returns. An index is good because it's an independent representation of the market and it's easily available. An index can have disadvantages including: it assumes cost-free transactions, it assumes reinvestment income, and it can be used wrongly if the portfolio strategy doesn't mirror the index

15. Explain why Asset-weighted calculations are preferred over equal-weighted calculations
Asset-weighted calculations are preferred because they adjust for the portfolio size and give more accurate, meaningful results when compared with equal-weighted calculations

16. What are the advantages and disadvantages of high-low and range measures
Advantages of high-low and range methods are: they are simple, easy to calculate and easy to interpret. The disadvantages include the fact that one extreme value can skew all of the data and therefore this method is not an adequate measure of risk by itself

17. Explain the characteristics that make a risk measure valuable
A measure of risk is most valuable if its is free of manager manipulation, it is easy to interpret, and it can be applied in a uniform manner to managers of all sizes

18.

Portfolio	Return	Capitalization
A	5%	150,000
B	7	300,000
C	8	250,000
D	10	200,000
E	14	100,000

Calculate the rate of return of the worst quartile and the best quartile. Explain the major advantage of this method
QDD4 = (150000/250000)(.05) + (100000/250000)(.07) = 5.8%
QDD1 = (150000/250000)(.1) + (100000/250000)(.14) = 11.6%
The major advantage of the QDD method is that it is not prone to extremes because it only covers 1/4 of the data, yet it still gives the client an idea of what's going on. An extreme value has less effect on this measure.

19. If a portfolio has:
Composite Performance = 12%
Risk-free Rate = 4%
Portfolio σ = 15%
Portfolio β = 1.1
Calculate the Sharpe & Treynor Measures
SM_P = (.12-.04)/.15 = .5333
TM_P = (.12-.04)/1.1 = .0727

20. Return of British Portfolio in US Dollars

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Current Price Index	230.567
Previous Price Index	242.000
Annualized Yield	5.04
Monthly Yield	0.42
Witholding Tax	25.0%

Calculate the monthly net-of-dividend tax benchmark
$[(230.567/242.000) \times \{(.42/100) \times (1-.25)+1\}-1] \times 100 = -4.4243$

21. What are the differences between the accounting and the economic definitions of leverage?
Accounting leverage occurs when debt is used to finance some of the assets. Economic leverage occurs when the portfolio return is expected to be proportionately more volatile than the benchmark

22. Are stocks bought on margin considered levered? Why and in what sense?
Yes, stocks bought on margin are leveraged in both the accounting and economic sense. It should be restated on an all-cash basis.

23. Is a portfolio of call options on stocks leveraged? Explain. Should it be restated on an all-cash basis
This portfolio may or may not be considered leveraged. It's not leveraged in accounting sense (Total Assets = Net Assets). It is leveraged in the economic sense because the return will be different than a portfolio that actually bought the stocks. It should not be restated to an all-cash basis for several reasons. 1.) the portfolio is already all-cash, 2.) Restatement to a similar stock portfolio would rely on hypothetical transactions that are not verifiable

24. If a manager has several portfolios which are traded exactly the same, but some use leverage while others don't, can they be combined in the same composite
They can be included in the same composite, as long as the portfolios are restated to an all-cash basis to avoid blended returns

25. Explain the difference between an option-overwriting strategy and a buy-and-write strategy
These two strategies differ in two major areas: the role of the option and the role of the stock. The option-writing over-writing strategy chooses stocks based on merits for long-term investment and the call option is merely intended to produce incremental returns. The buy-and-write strategy uses the stock and call option as a hedged unit that isn't meaningful separately. In this case, the call acts as a price hedge.

26. A portfolio uses leverage. The portfolio's 50% on margin with beginning gross value = $25,000 (including margin borrowing). Interest expense (at 10%) = $1250. Portfolio ending value = $30,000. What is the all-cash return
$R_{AC} = (30000+1250)/25000 = 1.25$ or 25%

AIMR's PPS

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- The following investment performance practices have historically made performance comparisons difficult. Representative accounts, survivorship bias, portability of results, and varying time periods
- Go back to the Actual AIMR-PPS and memorize the requirements and recommendations relative to (a) the construction and maintenance of composites, (b) the calculation of returns, (c) the presentation of results, and (d) disclosure
- AIMR completed the Global Investment Performance Standards (GIPS) in 1998
- A manager can transport her performance from a previous firm if (a) all investment decision makers transfer to the new firm, (b) the staff and decision-making processes remain intact, (c) prior firm results are disclosed to clients, and (d) appropriate documentation is available
- A merged firm can transport its performance to the new firm if (a) all decision makers transfer to the new firm, (b) most of the assets come to the new firm, (c) the staff and decision-making processes remain intact and independent, and (d) the previous data is available

Moosehead Investment Management

- Do not include results from previous employment in performance presentations
- To claim compliance with AIMR-PPS, all mandatory disclosures must be met
- Simulated results cannot be mixed with actual results
- All fee-paying accounts must be included in at least one composite
- Supervisors are responsible for the actions of their employees

Problem Set: AIMR's PPS by Stokes

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1. John Jakes, CFA, is a portfolio manager for a large investment company - Dimk & Associates. John has worked for the firm for 5 years as head of the small-cap equity department. The firm has been in business for 25 years and has had a small cap department for 12 years. John has been asked by the marketing department of his firm to make a presentation to several new clients. John has prepared the following presentation materials.

The small-cap division has enjoyed phenomenal successes over the past five years. You will notice from the graph of past performance that the Dimk Small-cap fund exhibits a strong negative correlation with the S&P 500. The Dimk small-cap fund will provide better than average diversification to your pension fund. The Dimk Small-cap fund is your ticket to high returns! Dink Small cap fund
S&P 500

All returns are equally-weighted, arithmetic average returns generated from both actual and simulated portfolios. The actual portfolios used in performance computations were required to have at least $100,000 in net value. Returns are computed net of commissions except for model portfolio results that are reported on a gross of fee basis. This presentation complies with AIMR's performance presentation standards

Comment on the validity of John's claims regarding the performance of Dimk small-cap fund. Identify any potential violation of AIMR's PPS

John claims that the Dimk fund has produced stellar returns but provides no concrete evidence of this. The comparative returns are generated by the S&P 500 - a portfolio that cannot be considered an adequate bogey for a small-cap portfolio. In addition, John's claims of negative correlation appear to be erroneous. In one year, 1995, were returns negatively correlated with the broader market. In other periods, the Dimk Fund appears to move in tandem with the S&P 500. Hence, without further information on the correlation characteristics of other funds, we cannot accurate determine the correlation benefits of the Dimk fund

PPS requirements that have been violated
- Presentation of Annual Returns - Jakes includes one quarter of partial-year returns in the same chart as annual returns. The partial year results should be mentioned in a footnote
- 10-years performance record. The fund has been in existence for 12 years and only 5 years of data are presented
- All fee-paying portfolios should be included. Jakes appears to be excluding portfolios with values of under $100,000 from his calculations
- Use of simulated results. Only actual portfolios may be used to compute the performance of composites
- Value-weighted returns. Jakes uses equally weighted returns in his computations
- Time-weighted, geometrically linked returns. Jakes uses time-weighted, arithmetic returns
- Claim of Compliance. Jakes claims compliance with the PPS when in fact there are several glaring errors and omissions

Problem Set: global investment performance standards

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1. Below are performance results of the ABC Investment firm:

ABC Investment Firm Performance Results: Balanced Composite, 1/1/95 - 12/31/99

Year	Total Return	Benchmark return	#Portfolios	Total Assets at end of Period
1995	24.2	20.1	30	303
1996	10.2	10.8	33	344
1997	15.5	12.2	38	399
1998	18.8	18.8	40	424
1999	22.8	19.8	44	488

ABC Investment Firm has prepared and presented this report in compliance with the Global Investment Presentation Standards (GIPS) except that the returns were calculated on a dollar-weight basis

Notes:

1. ABC Investment Firm is a Balanced Portfolio Investment Management fund that invests solely in French securities. ABC investment firm is defined as an independent investment management firm that is not affiliated with any parent organization

2. Valuations are computed in French Francs and from Reuters

3. The dispersion of annual returns is measured by the standard deviation across asset-weighted portfolio returns represented within the composite for the full year

4. The composite was created on March, 1996. Data used in the presentation prior to that time was obtained from a mathematical modeling technique using a similar management style. A complete list of firm composites and performance results is available upon request

IDENTIFY 4 violations of the GIPS

Some, but not necessarily all, violations of the GIPS include the following:

- No measurement of composite dispersion were included
- Total firm assets for each period was not disclosed
- The compliance statement cannot include exceptions
- There is no disclosure information on the construction of the custom benchmark for the balanced fund
- Composites must include only assets under management and may not link simulated or modeled portfolios with actual performance
- Performance results were not identified as being gross or net of investment management fees and other fees paid by the clients to the firm or to the firm's affiliates

2. Below are the investment results of XYZ Company

XYZ Investment Firm Performance Results: Balanced Composite 1/1/95 thru 12/31/99

Year	Total Return	Benchmark Return	Composite Deviation	#Portfolio	Total Assets	%Firm Assets	Total Firm Assets
1995	18.22	16.66	8.3%	10	100	50	200
1996	11.33	10.22	7.2	16	161	48	335
1997	-2.23	8.25	9.2	19	169	43	393
1998	13.54	21.22	6.0	21	200	42	476
1999	19.77	13.00	8.8	23	221	41	539

Notes:

1. The XYZ Investment firm is a balanced portfolio that invests solely in Country A. The XYZ firm is defined as an independent investment management firm that is not affiliated with any parent organization

2. The benchmark: 50% Country A Stock Index; 50% Country A Bond Index. Annualized Compound Composite return = 11.84%, annualized compound benchmark return = 13.77%

3. Cash accounting is used for fixed-income securities

4. Dollar-weighted rates of return are linked geometrically, without adjustments for cash flows

5. Valuations are computed in Country A currency from the Currency Company

6. The dispersion of annual returns is measured by the standard deviation across asset-weighted portfolio returns represented within the composite for the full year

7. Performance results are presented before management, custodial fees, and trading commissions

Identify five violations of GIPS

Some violations of GIPS include the following:

- Accrual accounting must be used for fixed-income securities (not cash accounting)
- Time-weighted returns must be used for calculation purposes (not dollar-weighted)
- Returns must be adjusted for cash flows
- Performance results must be presented after all trading commissions
- The minimum asset level below which portfolios are not included in the composite must be disclosed
- The percent of composite assets that are non-fee paying portfolios must be included

Evaluation of Portfolio Performance

flashcard concepts

- A dollar-weighted return is the IRR that equates the dollars invested in the fund with the dollars removed. Do not use dollar-weighting to compute manager performance since the investor has discretion over fund cash inflows and outflows
- Time-weighting does not depend on cash flows. There are 2 types of computations: arithmetic returns and geometric returns. An arithmetic return is a simple average and is useful when estimating expected returns. The geometric average is best for computing historical performance since it measures the actual growth of $1 invested
- If returns are variable, the geometric average will always be less than the arithmetic average
- Total risk can be measured by the standard deviation whereas systematic risk is measured by β
- Make comparisons between funds with similar investment objectives and styles. Benchmark portfolios should exhibit the same characteristics as the portfolio being evaluated
- Memorize the following formulas:

Sharpe Measure$_P$ = (r$_p$ - r$_f$) / σ_p $\rightarrow$ The Sharpe measure is the slope of the capital allocation line. Use the Sharpe measure to evaluate portfolios that comprise the majority of the investor's funds

Treynor Measure$_p$ = (r$_p$ - r$_f$) / β_p $\rightarrow$ The Treynor measure evaluates performance relative to systematic risk or β. If you are looking to add a security to an overall larger portfolio, use Treynor

Jensen's α = r$_A$ - [r$_f$ + (r$_m$-r$_f$)β_A] $\rightarrow$ Jensen's α measures the distance that a security's expected return lies above or below the SML

- Portfolio performance has 2 components: (a) return from selectivity and (b) return from systematic risk
- Return from selectivity is the return the manager earns over a portfolio with the same β that lies on the SML. This return can be further decomposed into (a) net selectivity - the return attributable to excess diversifiable risk, and (b) diversification - return from selectivity after accounting for net selectivity

- Return from systematic risk is the expected excess return above the risk-free rate given the manager's beta. This return can be broken down into (a) return from manager's risk (the return earned by taking excess systematic risk over the investor's target rate of risk) and (b) the return from investor's risk (the return over the risk-free rate attributable to the investor's target level of systematic risk
- Stock mutual funds consistently under-perform broad market averages. Also, many mutual fund studies suffer from survivorship bias
- No-load mutual funds tend to dominate load funds in terms of risk-adjusted returns
- Funds that have low turnover rates tend to outperform high-turnover funds
- Funds with low expenses tend to outperform high expense funds
- The APT (arbitrage pricing theory) and other multi-index models can be used to measure relative investment performance and verify the portfolio manager's commitment to a particular investment style

Problem Set: evaluation of portfolio performance by elton & gruber

1. You are the manager of a large pension fund and are evaluating the performance of Netwink & Associates - a small stock portfolio management firm. You have gathered information on the performance of other small stock mutual funds and have plotted the data for the last four years below:

Year	S&P 500	Netwink
1992	12%	8%
1993	13%	5%
1994	5%	8%
1995	16%	10%

Netwink & Associates Small Stock Portfolio Performance
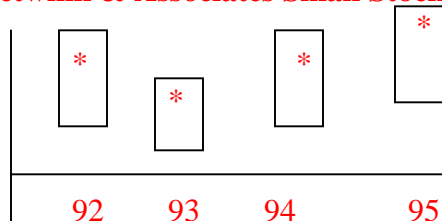
NOTE: the top & bottom of each bar represents the 25th and 75th percentile performance respectively of all small stock mutual funds

Using only the information provided, EVALUATE the performance of Netwink & Associates over the period from 1992-95. IDENTIFY one additional piece of information that would be valuable in your evaluation

The table relates Netwink's performance relative to a bogey that does not contain stocks of similar style. Therefore, the fact that Netwink has routinely under-performed relative to the S&P 500 should not be of much concern. The chart shows Netwink's performance relative to portfolios that are managed with a similar style. Relative to an appropriate investment universe, Netwink has been performing above average. They are not producing stellar results (they never break into the top quartile) but they are relatively consistent and are able to produce above average returns.

Some of your answers may have alluded to the short time horizon. Four years of data is clearly not enough to generate a valid conclusion regarding historical performance

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The additional piece of information that is needed is the RISK LEVEL of Netwink's portfolio relative to other funds. The level of both systematic and total risk would be valuable additions to the data set and would indicate whether or not the above average returns were achieved at the expense of high risk levels.

2. COMPARE & CONTRAST the Treynor measure of portfolio evaluation with the Sharpe Measure

Comparison: Both the Treynor and Sharpe measures show the slope of the line that depicts all portfolios that can be generated between the risk-free asset and the risky portfolio. With both measures, you are looking for the portfolio or asset that generates the highest slope. They both measure excess return per unit of risk

Contrasting Features: The key contrasting feature is the measure of risk employed. The Treynor measure uses the systematic risk of the portfolio (β) while the Sharpe measure uses total risk (σ) as the risk measure. Sharpe would be used when evaluating a portfolio that will make up the majority of the investor's portfolio (total risk matters most). Treynor should be used when the portfolio will be an addition to an overall larger portfolio (market risk matters most)

3. The following performance data about the Big Gain Fund & the S&P 500 appears below

	Big Gain	S&P
Return	40%	22%
σ	32%	20%
β Value	1.26	1.00

The risk free rate is 5%. Calculate the Sharpe Ratio, the Treynor measure, and Jensen's α. Analyze the results obtained.

Sharpe Ratio:

Big Fund: $(.40-.05)/.32 = 1.09$

S&P 500: $(.22-.05)/.20 = 0.85$

Treynor Measure:

Big Fund: $(.40-.05)/1.26 = 0.28$

S&P 500 $(.22-.05)/1 = 0.17$

Jensen's α:

Big Fund: $.40 - [.05+(.22-.06)\text{x}1.26] = .1484$

S&P 500: 0

According to the Sharpe ratio, the Big Fund out-performed the S&P 500 on a risk-adjusted basis (when risk is defined as total risk). According to the Treynor measure, The Big Fund out-performed the S&P 500 on a risk-adjusted basis (when risk is defined as systematic risk). The Jensen's α measure indicates the excess return for the Big Fund over what the SML says it should be is 14.84%

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4. You are the manager for a large pension fund and are attempting to gauge the ability of your equity managers to effectively time the market. You have been provided with the following graphs to aid in your analysis.
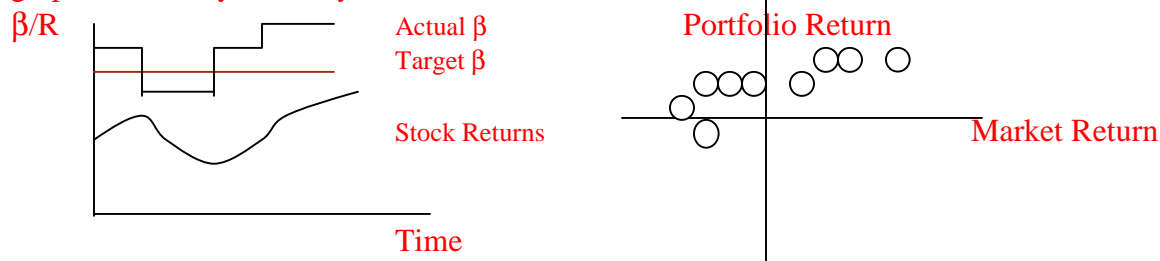
Using only the graphs, evaluate the ability of the manager to time the market
Both graphs clearly illustrate the ability of the manager to effectively time the stock market. Chart 1 shows that at the peak of stock market returns, the manager cut her portfolio β to well below the fund's target beta. As the market began to pick up steam, she effectively increased the fund's beta back above the target beta. Chart 2 also shows a non-linear pattern of returns between the fund and the market. From this chart you can see that when the market was up, the fund's returns were up significantly. Also, when the market was down, the fund's results were buffered.

5. You are evaluating the performance of a mutual fund that claims to have a 'large-cap global value strategy'. You have collected data on the fund's returns and the returns to a US large-cap value index, a US small cap stock index, and an international stock index. The results of an excess returns regression are provided below

(Excess Return$_{portfolio}$) = α + β_1(Excess US Value Index Return) + β_2(Excess US Small Index Return) + β_3 (Excess International Index Return) + ϵ

α = .23 (t = .67)
β_1 = .56 (t = .89)
β_2 = 1.89 (t = 4.23)
β_3 = 1.14 (t =2.34)

Using only the data provided, evaluate both the manager's performance and his claims regarding the mutual funds' investment strategy
We will assume that the US value and international stock indexes are the appropriate benchmarks for evaluation. The fund did not outperform in this case because the alpha of the regression is not significantly different from zero (t=.67)
From the regression results we can see that the majority of the fund's returns are attributable to US small stocks and international equities - not a value strategy. The coefficient on US value stocks is small and insignificantly different from zero whereas both the small stock and international coefficients are clearly statistically significant. Hence, we should further investigate the managers claims regarding the use of a 'large-cap value' strategy
Some of you may be questioning the validity of the regression model. This is not an appropriate answer in this case because you were instructed to use only the data provided

6. Discuss the historical performance of US mutual funds relative to broad US market averages. LIST three mutual fund characteristics and comment on their relationship to mutual fund performance

Academic research shows that stock mutual funds consistently UNDER-perform the broad market averages. In addition, most studies of mutual fund performance suffer from SURVIVORSHIP bias. The presence of survivor bias makes mutual fund performance look better than it actually is by excluding the performance records of those funds that went out of business or merged prior to the end of the study period

Mutual Fund Characteristics & Performance

- *No-load v. load funds*: Although no-load funds still tend to underperform relative to market averages (alpha = -.84), no-load funds clearly dominate funds that carry an initial sales charge (alpha = -1.55)
- *Turnover*: Funds that exhibit low portfolio turnover rates outperform funds with high levels of asset turnover
- *Management fees and Administrative Costs*: (expense:asset ratio) Funds with low average expense ratios tend to outperform funds with high expense ratios
- *Size*: No relationship has been found that relates the size of the fund to its performance

7. CONTRAST the dollar-weighted return methodology with the time-weighted methodology. Suggest the best return computation methodology for a manager of a large open-ended mutual fund.

Dollar-weighting considers the timing of the cash flows into and out of the fund. The methodology involves determining all portfolio cash flows and computing the IRR of the fund. Alternatively, time-weighting does not consider fund cash flows. Each period, holding period returns are computed and these HPRs are then averaged using the geometric mean. The geometric time-weighted return measures the performance of a $1 initial investment in the fund. In most cases, the manager of a large, open-ended fund DOES NOT have control over cash flows into and out of the fund. Therefore, time-weighting is the appropriate measure of return

8. DISCUSS three problems with modern portfolio theory as they relate to the evaluation of portfolio performance

Borrowing & Lending at the Risk-free rate: The four single index portfolio evaluation models described above both assume that investors can borrow and lend at the risk-free rate - not a valid assumption in most cases

Changing Risk Levels: One of the market timing methodologies above involved adjusting the beta of the portfolio in anticipation of market movements. But what if the beta is not stable. What if the beta changes over time. The authors show that using historical data to estimate beta can lead to erroneous conclusions about the current riskiness of a fund. In other words, a beta derived using historical data may not accurately reflect the current risk level of the fund

Changing the definition of the market portfolio: Notonly is beta unstable through time, beta is also dependent on the market index used in its calculation. For example, a computed beta using the DJIA may be significantly different than the beta computed using the S&P 500.

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9. You are attempting to evaluate the performance of several equity managers for your firm's pension plan relative to modern portfolio theory. Develop a four component decomposition of portfolio return that considers CAPM and target risk levels that you have set for each manager
We can start the analysis by breaking total excess return into 2 components:
- ***Return from Selectivity*** $= r_A - r_{A'}$. Selectivty is the return that the manager earns over and above a naïve portfolio of the same risk
- ***Return from Systematic Risk*** $= r_{A'} - r_f$. This is the expected excess return for the risk level of the manager's portfolio

Now we break each of the two components described above into 2 additional segments as follows (1) Return from Selectivity = Net Selectivity + Diversification; and (2) Return from Systematic Risk = Return from Manager's Risk + Return from Investor's Risk
- ***Net Selectivity*** $= r_A - r_{A''}$. Since the manager's portfolio does not lie on the SML, then it must have some extra diversifiable risk. Therefore, we find a NAÏVE PORTFOLIO A" that has the same amount of total risk to see if the manager is earning a high enough return to compensate for the additional diversifiable risk that she is exposed to
- ***Diversification*** $= r_{A''} - r_{A'}$. Diversification is the remaining return over a naïve portfolio with the same systematic risk after we have accounted for the additional diversifiable risk of the portfolio
- ***Return from Manager's Risk*** $= r_{A'} - r_T$. In this case, the manager accepted systematic risk above the level specified by the investor
- ***Return from Investor's Risk*** $= r_T - r_f$. This is the investor's target return minus the risk-free rate

10. Discuss 2 methods to implement a market timing strategy and identify 2 methods for evaluating the effectiveness of a market timing strategy
Market Timing: There are 2 ways to time the market:
- Alter the asset allocation of the portfolio (move into stocks when you think the market will rise) &
- Change the risk exposure of the portfolio (extend bond durations when you think interest rates will fall).

There are 2 ways to measure the effectiveness of a manager's ability to time the market:
- Graph movements in the market against changes in the portfolio's asset allocation or risk exposure
- Plot the return of the fund relative to returns on the market. If the plot is a straight line, then there is no evidence of market timing skill. IF the plot is non-linear, this may be evidence of market timing skill

Evaluating Portfolio Performance

flashcard concepts

- Memorize the following equations in case the command word DISTINGUISH means calculate asset allocation effects

(Asset Allocation Effect) = [(Actual Portfolio Weight)-(Policy Portfolio Weight)]
x[(Asset Class Return in Policy Portfolio)-(Total Return of Policy Portfolio)]
(Security Selection Effect) = [(Actual Portfolio Weight)x(Asset Class Return in Actual Portfolio)]
-[(Actual Portfolio Weight)x(Asset Class Return in Policy Portfolio)]

- Strategic policy decisions are longer-term in nature and involve setting investment policy and choosing an appropriate benchmark portfolio
- Tactical portfolio decisions are short-term portfolio revisions designed to pick up extra return based on perceived inefficiencies in the market. Tactical decisions can involve shifting the asset allocation or swapping individual securities.
- The goal of performance attribution is to separate out the effects of tactical decisions from the strategic or long-term policy decisions
- Price driven investing is also known as value investing. The value investor focuses on the relative price of an asset and tends to hold portfolios that are characterized by low P/E, low P/B, low P/CF and high dividend yield
- Earning growth investors focus their attention on the denominator of the P/E ratio. Growth portfolios are typically characterized by high P/E, high P/B, and low dividend yield. Two types of growth sub-styles are consistent growth and momentum
- A small cap investor focuses on stocks with low market capitalizations. The small cap strategy can be tilted toward value, growth, or take a market-oriented stance and not exhibit a consistent preference for either value or growth
- Market-oriented is the final strategy. The market-oriented investor does not exhibit a consistent preference for either value or growth and tends to build portfolios that have characteristics that are similar to the overall market
- Investment style matters. It is not appropriate to compare a style based portfolio to an overall broader market index because the market index does not likely exhibit the portfolio characteristics that are particular to the style portfolio that is being analyzed. For example, comparing a small cap portfolio to the S&P 500 is inappropriate because the S&P 500 is biased toward large cap stocks (it is a market value-weighted index)
- Memorize the formula for *Impact Return = Sector Return x Portfolio's Sector Weight*

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Problem Set: evaluating portfolio performance by maginn & tuttle

1. Below is return information on Nickell Investment Managers and its benchmark

	Nickell				**Returns**		
Asset Class	Actual	Benchmark	Excess		Actual	Benchmark	Excess
Stock	0.50	0.60	-0.10		10.2	11.3	-1.1
Bonds	0.40	0.35	0.05		8.2	7.4	0.8
Cash	0.10	0.05	0.05		4.4	4.3	0.1

Prepare a Performance Attribution Analysis and DETERMINE the source of any value added
The total portfolio return was (.5)(10.2%) + (.4)(8.2%) + (.1)(4.4%) = 8.82%. The policy portfolio would have earned (.6)(11.3%) +(.35)(7.4%) + (.05)(4.3%) = 9.585%. The total excess loss suffered by the manager is 85 basis points. COMPUTE the asset allocation and security selection effects for this portfolio.

Asset Allocation Effects:

Stocks (.5-.6)x(11.3%-9.585%) =	-.1715%
Bonds (.4-.35)x(7.4%-9.585%) =	-.10925
Cash (.1-.05)x(4.3%-9.585%) =	-.26425
Total Allocation	*-.545%*

Security Selection Effects:

Stocks (.5)(10.2%) - (.5)(11.3%) =	-.55
Bonds (.4)(8.2%) - (.4)(7.4%) =	.32
Cash (.1)(4.4%) - (.1)(4.3%) =	.01
Total Selection	*-.22*

Total Excess Return over Policy	*-.765*

2. Below is return information on Dynamo Investments and its Benchmark

	Dynamo		**Benchmark**	
Sector	Weight	Return	Weight	Return
Banks	40%	12.8%	30%	13.3%
Insurance	30	11.6	30	12.2
Financials	20	10.9	20	11.0
Property	10	10.5	20	10.3

Calculate the Impact return within the portfolio by sector

	Dynamo		**Benchmark**	
Sector	Weight x Return	Impact Return	Weight x Return	Impact Return
Banks	(.40)(12.8%)	5.12%	(.30)(13.3%)	3.99%
Insurance	(.30)(11.6%)	3.48	(.30)(12.2%)	3.66
Financials	(.20)(10.9%)	2.18	(.20)(11.0%)	2.20
Property	(.10)(10.5%)	1.05	(.20)(10.3%)	2.06
Total		*11.83%*		*11.91%*

- Dynamo Investments was fairly well diversified compared to the index
- Two sectors of Dynamo (Banks & Property Trust) outperformed the index
- The other sectors under-performed the index

Dynamo's decision to overweight Bank Stocks was an effective move
Under-weighting the Property Trusts was also an effective move

3. LIST 2 Difficulties with comparing the performance of a bond portfolio relative to manager 'style universes'
Universe Comparison Problems
- Does the manager follow a strategy that is easily comparable to existing style universes
- Has the manager been properly classified by style?
- How much performance data is available for the manager

4. Describe the following equity styles:
i. *Price Driven*: Price driven investing is really just value investing. Value investors focus their attention on the under-pricing of an asset by investing in securities with low P/Es (or low relative P/Es), low P/BV, low P/CF, or high dividend yield. Note that the focus is on PRICE. Many of these stocks 'look bad' from a historical perspective because they are likely to have performed poorly and exhibit below-average historical earnings growth. In some cases, a value stock becomes attractive because the market has over-reacted to recent bad news that has been announced by the firm - forcing the stock price below reasonable valuations based on the firm's long-run potential.
ii. *Earnings Growth*: Earnings growth investing focuses mainly on the earnings growth prospects for the firm. The growth manager is likely to pay a premium for enhanced growth prospects. Hence, growth stocks tend to trade at relatively high P/E multiples and exhibit relatively low dividend yields. The point is that the growth investor focuses her attention on the denominator of the P/E. There are 2 main types of stocks that populate the earnings growth category - consistent growth & momentum. The difference is that the consistent growth shares have exhibited high recent growth, which is expected to continue into the future. Momentum shares may or may not have shown good recent growth, but for whatever reason are expected to show good growth going forward. Technology, service, health care, and consumer stocks tend to dominate a growth strategy
iii. *Small Capitalization*: The small cap strategy invests in firms with low market capitalizations. The small cap stock can be a value or a growth play - said differently, you can employ a value or growth strategy within an overall small stock strategy. The generic small cap strategy simply focuses on the small firm effect - the observation that over long periods of time, small stocks tend to out-perform large stocks on a risk-adjusted basis. Note that small cap shares tend to exhibit higher betas and lower dividend yields.
iv. *Market Oriented*: The market-oriented investor will likely rotate investment styles and opinions as styles come into and out of favor. Another flavor of market-oriented strategy is to simply build a portfolio that has characteristics that are similar to the market portfolio

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Asset Allocation: Management Style & Performance

flashcard concepts

- Asset class factor models decompose portfolio returns that are attributable to various asset classes. The proportion of return that is explained by the factors (R^2) can be attributed to investment style and the residual component of returns (e_i) can be attributed to security selection
- Asset classes used in factor modeling should be (a) mutually exclusive, (b) exhaustive, and (c) have different return patterns
- You can use Sharpe's factor style analysis to develop meaningful benchmark portfolios. For example, regress your portfolio's return against the return to various style indices. The coefficients of this regression would indicate the relative proportions of each asset class in the benchmark portfolio
- You can also use style analysis to detect manager deviations from his advertised style

Problem Set: asset allocation: management style & performance by sharpe

1. It has been shown that asset class factor models can be used to build passive benchmark portfolios. FORMULATE an asset class factor model

As asset class factor model is of the form:

$$R_i = b_{i1}F_1 + b_{i2}F_2 + \ldots + b_{iN}F_N + e_i$$

Where the F's represent returns to various asset classes (i.e., real estate, small stocks, value stocks, mortgage-backed securities, T-bills, long-term bonds, etc.)

2. DESCRIBE three characteristics of effective asset class factor models. One of the characteristics should refer to the evaluation of asset class factor models

Desirable Characteristics:
- Asset factor models should be *parsimonious* (low number of factors)
- Asset classes should be *mutually exclusive*
- Asset classes should be *exhaustive*. In other words, all asset classes should be represented in the model. For example, you wouldn't want to leave out small stocks.
- Asset classes should have *different returns*
- The factor model should have good *explanatory power*. $\rightarrow$ can be measured by R^2

3. Discuss the use of asset class factor models in the evaluation of active fund managers

Passive fund managers provide investors with a particular Investment STYLE. ACTIVE fund managers provide investors with both STYLE and SECURITY SELECTION

You can use Sharpe's STYLE ANALYSIS to construct meaningful benchmark portfolios. The style analysis allows you to construct a passive investment portfolio that closely follows the style characteristics of a particular manager

The net result of Sharpe's analysis is that *active managers should be evaluated relative to a passive benchmark portfolio of the Same Style*. You should not evaluate managers relative to broad-based market indices.

Benchmark Portfolios

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- A benchmark portfolio is designed to mimic the performance of a passive investment strategy with the same *Style* as an actively managed portfolio. For example, the benchmark for a large-cap growth fund might be the growth component of the S&P 500. Key point: Style Matters
- Effective Benchmark Portfolios are:
    - *Unambiguous*
    - *Investable*
    - *Measurable*
    - *Appropriate*
    - *Reflective of Current Investment Opinions*
    - *Specified in Advance*
- The following steps should be used in benchmark design
    - Identify important aspects of the manager's investment philosophy
    - Select securities that are consistent with the manager's philosophy
    - Select appropriate portfolio weights for each security
    - Review and modify the portfolio
    - Rebalance the portfolio on a periodic basis
- Median manager portfolios fail as benchmarks because they are (a) not specified in advance, (b) ambiguous, (c) not reflective of current investment opinions, and (d) not appropriate
- Other managers evaluation tools that fail as benchmarking devices are (a) the market index, (b) the horse race, (c) peer groups, (d) the Sharpe measure, and (e) multiple factor analysis
- Plan sponsors benefit from benchmarking through an increased understanding of the link between plan objectives and constraints and the managers that invest in plan assets
- Investment managers benefit from benchmarking through (a) a better understanding of their own investment processes and (b) the ability to show investment expertise relative to their chosen investment style - not a broad market index

Problem Set: benchmark portfolios by bailey, Richards & tierney
1. List & Describe FOUR Characteristics of useful benchmarks
Characteristics of a useful benchmark include the following:
- *Unambiguous* : Benchmark securities and their weights within the benchmark are clearly identifiable
- *Investable*: It is possible to replicate and hold the benchmark
- *Measurable*: The benchmark's return can be frequently measured
- *Appropriate*: The benchmark is consistent with the manager's investment style
- *Reflective of Current Investment Opinions*: The manager has knowledge of the securities, which compose the benchmark. Being 'reflective of current investment opinions' refers to different ways a stock can be categorized (i.e., value, growth, high yield, etc.). This knowledge can be positive, negative, or neutral
- *Specified in Advance*: Construct the benchmark prior to manager evaluation

2. Develop a step-by-step procedure for building a useful benchmark portfolio
There are several steps used to enhance benchmark design:

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- Identify important aspects of the manager's investment process
- Select securities consistent with the manager's investment process
- Develop the appropriate weights to attach to each security in the benchmark portfolio
- Review the preliminary benchmark portfolio and make appropriate modifications
- Rebalance the benchmark on a strict periodic basis

3. Compare the benchmark portfolio approach to manager evaluation with 3 alternative approaches to manager evaluation

The following items are comparisons of traditional manager evaluation tools and benchmark portfolios

- ***Median managers***: The median manager benchmark approach suffers from several faults. The median manager approach is not specified in advance, ambiguous, is not reflective of current investment opinions, and may not be appropriate
- ***Market Index***: As previously mentioned, using the market index ignores manager style
- ***The Horse Race***: simply a direct comparison of 2 manager's performance records. Do not take style into account
- ***Peer Groups***: compared relative to the returns generated by a broad range of other managers. Again, style is ignored
- ***Reward-to-Variability***: Sharpe measure does not analyze the performance attributable to active management
- ***Multiple Factor Analysis***: typically, attempt to attribute performance to factors such as market timing, market sectors, and industry exposures. Style differences are not correctly analyzed.

Are Manager Universes Acceptable Performance?

flashcard concepts

- A manager universe is a set of performance results tabulated over many different investment managers. The median manager (the performance of the manager in the middle of the universe) is typically used as a performance evaluation tool
- Manager universes only meet the MEASURABILITY property of effective benchmarks. The median manager is not investable, not specified in advance, ambiguous, and may not be appropriate
- Manager universes suffer from *Survivorship Bias*. Manager universes results are biased upward because poorly performing managers tend to drop out of the universe
- Valid Benchmarks should exhibit:
  - *High Coverage*
  - *Low Turnover*
  - *Positive Active Positions*
  - *Investable position sizes*
  - *Reduced observed active risk*
  - *High correlation with the manager's overall portfolio return*
  - *Low correlation with the manager's return from active management (total return - passive return)*
  - *Similar risk exposure relative to the manager's portfolio*

Problem Set: are manager universes acceptable performance by bailey

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1. CRITICIZE the use of manager universes as acceptable performance benchmarks
Manager Universes only meet the *measurability* property of a valid benchmark
The median manger is usually the focus of the manager universe:
- The median manager can't be specified in advance, is not investable, and is ambiguous
- The median manager is also inappropriate if the median manager has a difficult investment style

The multitude of investment styles present in most manager universes leads to a comparability problem

2. Why do investors like to use manager universes as performance benchmarks
Manager universes are convenient because the data is widely available at a low cost. They also have a naïve appeal, which comes from the ideal that superior management should result in above average performance

3. LIST & DESCRIBE the properties of a valid benchmark
A valid benchmark should exhibit the following characteristics:
- ***Unambiguous***: Benchmark securities and their weights within the benchmark are clearly identifiable
- ***Investable***: It is possible to replicate and hold the benchmark
- ***Measurable***: The benchmark's return can be frequently measured
- ***Appropriate***: The benchmark is consistent with the manager's investment style
- ***Reflective of current opinion***: The manager has knowledge of the securities, which compose the benchmark. Being 'reflective of current investment opinions' refers to different ways a stock can be categorized (i.e., value, growth, high yield, etc.) This knowledge can be positive, negative, or neutral
- ***Specified in Advance***: Construct the benchmark prior to manager evaluation

4. EXPLAIN survivorship bias as it applies to the use of manager universes in performance evaluation
Survivor bias results from a tendency for poorly performing managers to be fired. This interrupts the manager's string of returns and makes the unusable. He then drops out of the manager universe, which then shifts the performance of the universe upward

Evaluation of Portfolio Performance

flashcard concepts

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- Attribution analysis tries to distinguish whether asset allocation factors (market timing & sector rotation) or security selection factors are responsible for portfolio performance

Allocation Effect $= \Sigma_i[(w_{ai} - w_{pa}) \times (R_{pi} - R_p)]$
Selection Effect $= \Sigma_i[(w_{ai}) \times (R_{ai} - R_{pi})]$

- Attribution analysis does not capture differences that exist in the risk structure between the portfolio being evaluated and its benchmark. This will tend to credit returns to managerial skill instead of incremental return for additional risk taken
- Attribution analysis is not an appropriate means of judging the effectiveness of tactical allocation strategies because security selection is a negligible part of tactical strategies and because asset allocation weightings are subject to frequent alterations
- Roll's critique of performance measures centers around their dependence on the CAPM. The CAPM depends on the existence of an all-encompassing optimal market portfolio. Proxies for this market portfolio fall short of this charge and result in a benchmark error
- A benchmark error challenges the evaluation of portfolio performance by not correctly identifying beta and altering the slope of the SML
- The Bond Market Line differs from the SML in the selection of the measure of risk (duration v. beta) and the selection of a proxy for the market index
- The Bond Market Line allows bond returns to be decomposed into the following:
  - The POLICY Effect is the difference between the return on the long-term strategic portfolio and the return on the bond index
  - The MANAGEMENT Effect measures the enhancement in return using active management strategies rather than passive management strategies. Management effects consists of three components
    - The <u>rate anticipation effect</u> is the difference between the expected return on your actual bond portfolio according to the BML and the expected return on the long-term strategic portfolio
    - The <u>analysis effect</u> is the difference between the theoretical return of the Buy&Hold strategy and the expected return of your actual portfolio according to the BML
    - The <u>trading effect</u> is the difference between the return on your actual bond portfolio and the actual calculated return of the Buy&Hold strategy
- Dietz, Folger, and Hardy offer an alternative decomposition of bond performance by dividing total return into an *Income Component* (known in advance) and a *Price Change Component* (not known in advance). The price change component consists of an interest rate effect, a sector/quality effect and a residual effect.
- Fong, Pearson, and Vasicek present yet another decomposition. This analysis consists of *external interest rate effects* (expected and unexpected return on Treasury securities) and *management effects* (maturity, spread/quality, and security selection)

Problem Set: evaluation of portfolio performance by reilly & brown
1. Below is return information on the Wells Fund and its Benchmark:

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Asset Class	*Wells Fund*				*Returns*		
	Actual	Benchmark	Excess		Actual	Benchmark	Excess
Stock	0.60	0.50	0.10		14.3%	13.4%	0.9%
Bonds	0.25	0.40	- .15		8.8	10.2	-1.4
Cash	0.15	0.10	0.05		5.0	5.3	-0.3

Prepare a performance attribution analysis and Determine the source of any value added

Overall Actual Return = (0.60)(0.143) + (0.25)(0.088) + (0.15)(0.05) = *11.53%*

Overall Benchmark R = (0.50)(0.0134) + (0.40)(0.102) + (0.10)(0.053) = *11.31%*

Allocation Effect = (0.10)(0.143 - 0.1131) + (-0.15)(0.102 - 0.1131) + (0.05)(0.053 - .1131) = 0.075%

Security Selection Effect = (.60)(.143-.134) + (.25)(.088-.102) + (.15)(.05-.053) = .145%

Total Value-Added = Allocation Effect + Selection Effect = .075% + .145% = .22%

The 0.22% represents the difference in the overall actual return and the overall benchmark return. The Wells Fund gained 7.5 basis points as a result of market timing (selecting a different allocation system than the benchmark) The Well Fund gained an additional 14.5 basis points by selecting securities that were superior overall to the securities within the benchmark.. In particular, the Wells Fund did a better job at selecting stock investments than the benchmark did. However, the Wells Fund did not do as well at selecting bonds and cash investments as did the respective benchmark

2. Criticize Attribution analysis in the following contexts

i. as a Risk-adjusted Performance Measure - Returns calculated through attribution analysis are NOT risk-adjusted. As a result, attribution analysis will not capture the fact that asset class portfolios can be formed by investors that are riskier than their respective benchmarks. If these portfolios are indeed riskier, then their expected returns should be higher. This higher return would be attributed to managerial skill in attribution analysis rather than the reward associated with taking on higher risk

ii. to judge Tactical Allocation strategies - Attribution analysis is not an appropriate means of judging the effectiveness of tactical allocation strategies because security selection is a negligible part of the tactical strategy and because the asset allocation weightings are subject to frequent alterations. Regression-based methodologies are considered to be a more appropriate way of assessing the success of a manager employing tactical allocation strategies

3. Appraise Roll's critique of evaluating portfolio performance in the following areas:

i. Use of CAPM - The CAPM requires that an optimal market portfolio must exist on the efficient frontier. This portfolio must contain all risky assets and be completely

diversified. The biggest problem with the application of these models is selecting an appropriate proxy for the market index. By default, most analysis of this sort relies on the S&P 500 as the market proxy. However, the S&P 500, while well diversified, certainly does not contain all risky securities. Roll refers to this as benchmark error

ii. Determination of β - The beta values obtained for modeling purposes are derived from the proxy selected for the market portfolio. If the proxy is mis-specified, the beta values will not be accurate

iii. Specification of SML - The SML is likewise obtained from the assumed market portfolio. A mis-specification can alter the slope of the SML. As a result, not only would the slope of the SML become suspect, but also the placement of the portfolio relative to the SML could be altered because of an inaccurate beta value

4. The Hoffman Fixed-Income Managers (HFIM) wishes to perform a bond portfolio analysis based on the Bond Market Line and has supplied the following information concerning their bond portfolio
- HFIM's long-term strategic portfolio has a duration of 12 years implying a 9.75%
- HFIM's actual bond portfolio had an overall return of 9.00 percent with an 11-year duration
- Lehman Brothers Index return was 8.25% with a 9-year duration
- According to the Bond Market Line, the return of the portfolio with an 11-year duration should be 9.25
- The theoretical return of HFIM's buy & hold portfolio was 9.45%
Determine the performance of the bond portfolio by attributing returns into policy effects, rate anticipation effects, analysis effects and trading effects
The total difference between the overall portfolio return and the benchmark index is 0.75% (9.00% - 8.25%)
- *Policy Effect* is the difference between the return on the long-term strategic portfolio and the return on the bond market index. In this case, the policy effect is 1.50% (9.75-8.25)
- *Rate Anticipation Effect* is the difference between the Expected return on your actual bond portfolio according to the BML and the expected return on the long-term strategic portfolio; here, the rate anticipation effect is -0.50% (9.45-9.25)
- *Analysis Effect* is the difference between the theoretical return of the Buy & Hold strategy and the expected return on your actual bond portfolio according to the BML.
Here, it is 0.20 (9.45-9.25)
- *Trading Effect* is the difference between the return on your actual bond portfolio and the theoretical return of the Buy & Hold strategy. Here, it is -0.45% (9.00-9.45)
In Sum:

Return on Market Index		8.25%
Policy Effect	1.50%	
Management Effect		
Rate Anticipation Effect	- .50%	
Analysis Effect	0.20%	
Trading Effect	- .45%	
Overall Portfolio Return		9.00%

5. John Bruner is attempting to analyze the performance of his bond holdings. The overall return to his portfolio is 9.00 percent. The actual treasury yield was 8.00 percent, which was better than the expected yield of 7.75 percent. He has determined that he gained 0.30 percent from

sector/quality selection and an additional 0.25 percent from individual security selection. Calculate the remaining elements (unexpected treasury yield and maturity management return) and analyze the results of his performance

External Interest Rate Effects

E = Expected Treasury Yield	7.75%	
U = Unexpected Treasury Yield	**0.25%**	
Total External Interest Rate Effects		8.00%

Management Effects

M = Return from Management Equity	**0.45%**	
S = Return from Spread/Quality Mgmt	0.30%	
B = Return attributable to specific sec.	0.25%	
Total Management Effects		**1.00%**

Total Return   *9.00%*

John did an excellent job in all factors within his control. He especially benefited from excellent choices selecting bonds in profitable sectors and bond ratings categories. His selection of particular securities and his ability to anticipate rate changes were both profitable for him as well.