Advanced Algorithmic Trading and Portfolio Management

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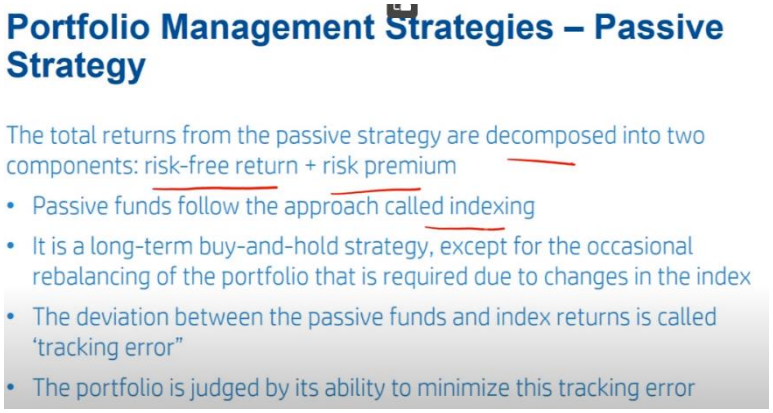
Lecture-12

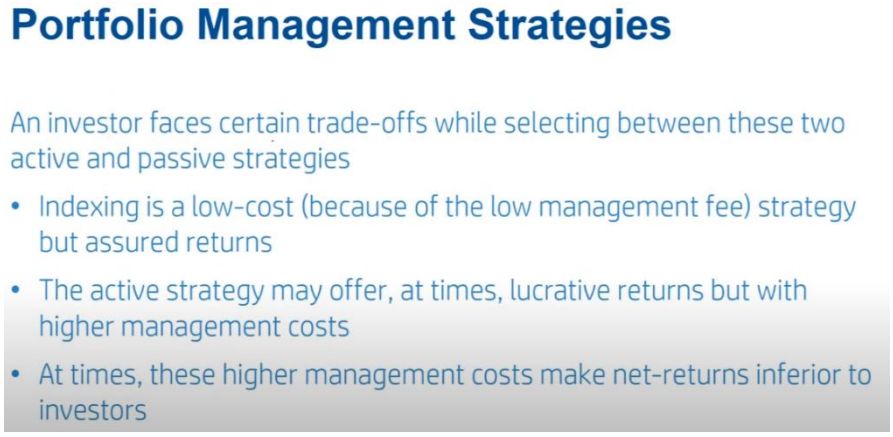
Week 4

In this lesson, we will discuss the fundamental strategies of portfolio management and portfolio performance evaluation. We start the discussion with passive portfolio management strategies and performance evaluation with index portfolios and tracking errors. Then, we will discuss active portfolio management strategies. We will also examine various investing styles. The discussion will conclude with Value versus Growth investing. Portfolio Management Strategies In this video, we will introduce active and passive portfolio management strategies.

Portfolio management strategies can be classified into two categories, passive category and active category. Passive category portfolios or fund managers that operate into passive category try to replicate some index like NIFTY50 or SMP500. Since there is not much effort in terms of time and resources in constructing the portfolio because the benchmark is always given, so not much effort is required in terms of acquisition of information and therefore these strategies involve very less management fees. In contrast, active portfolio management requires lot of time and resources in continuous accumulation of information which is desired in order to achieve higher risk adjusted returns as compared to the

benchmark or market index that is being tracked in order to perform better and provide superior returns.



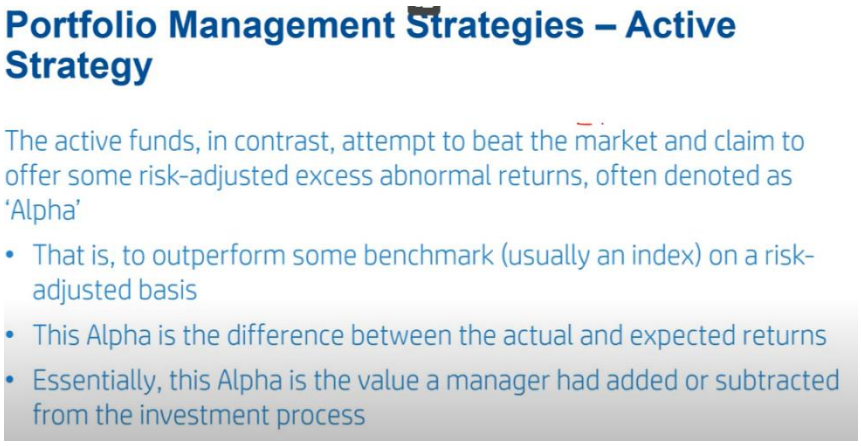


Given this effort of management, they charge certain excess fees in comparison or in contrast to the passive category portfolio. In the passive fund management or in the passive strategy of fund management, the returns are often decomposed into two components, one is risk-free return and other is risk-renium. Passive funds follow a strategy often called as indexing. It is like a long-term buy and hold strategy. There is an occasional rebalancing of portfolio which is due to the changes in index, so index composition also changes over time and these passive fund managers are required to, since they are required to track that index, they need to also rebalance their holdings.

How to measure the performance of these passive funds vis-a-vis benchmark? So the

deviation between passive fund performance and index returns is called tracking error. The passive portfolio is judged by its ability to minimize this tracking error because its objective is not to beat the index but to follow the index, so its efficiency or its ability to perform well is measured by its ability to minimize this tracking error. In contrast to these passive funds, if you look at active funds, they try to beat some kind of index like a benchmark or a market index or some other index and then they try to claim to offer some risk-adjusted excess of normal returns which is in the parlance of fund management often called as alpha. So they try to outperform some kind of benchmark. Generally, this benchmark is some kind of index on risk-adjusted basis.

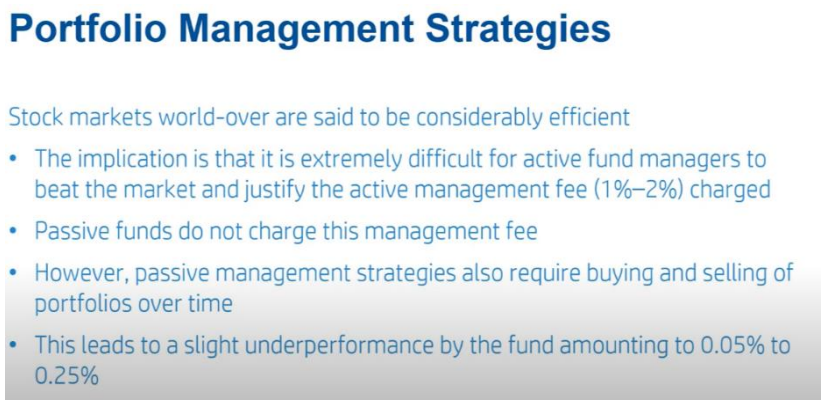
Essentially this alpha is the difference between actual returns that a fund manager has generated are fund minus expected returns that is the returns that are expected from that index. So the difference is called alpha. This is the excess return or the value that a manager has added or subtracted from the investment process. So this is the extra return that the fund manager offers as compared in comparison or in contrast to some kind of benchmark index. While selecting between these active and passive strategies, an investor faces certain trade-offs.



For example, passive fund management or indexing is a low-cost strategy because the management fee is low, but there are assured returns. In contrast, if you look at active strategy, it may offer higher returns which are higher than the benchmark that is being followed, but at the same time there is higher management cost on account of active management, the effort and cost and resources that are required in generating extra information in order to beat that benchmark. Various scenarios or different times these higher management costs can make net returns inferior. For example, at times these higher

management costs in terms of net basis they can make the returns to investors less lucrative or inferior as compared to passive management. In the modern literature on financial markets, theory of info or market efficiency has been well propounded.

We have already discussed that. The theory suggests that stock markets world over are very efficient and therefore the implication is that for fund managers it is very difficult to generate or beat the market and generate excess returns through active management and therefore it is very difficult to justify that excess 1-2% management fee that they charge. Since passive funds do not charge this management fee, there is a slightly higher probability for them to perform better in terms of net returns. But at the same time, please remember passive management also requires buying and selling of securities in the portfolio over time because of portfolio rebalancing that takes place in the benchmark index itself. So this leads to a slight underperformance by the passive fund as well by 0.



05-0.25%. To summarize, in this video we introduced active and passive portfolio management strategies. We also discussed various pros and cons of these strategies. For example, passive management involves less management fee but it also does not offer to beat any benchmark index. It tries to mimic the returns from the benchmark index. In contrast, active management involves trying to gather information and acquire more information about the securities in order to beat the benchmark index.

However, it also involves management fee and therefore sometimes the return, the net returns from active management may also be inferior as compared to or much inferior as compared to the benchmark. So there is a trade-off involved. Passive portfolio management strategies. In this video, we will discuss various passive portfolio management strategies. Broadly there are three techniques that are employed to construct a passive index portfolio.

First is full replication where all the securities in the benchmark index are purchased in their exact proportion to their weights in the index itself. So the entire portfolio is completely fully replicated. While this strategy ensures very efficient tracking because we are completely mimicking the portfolio but the need to purchase and sell so many securities is very cumbersome and it reduces the returns because there are large transaction costs in order to purchase all the securities. Also because we have large number of securities in our portfolio, there are lot of transactions such as payment of dividends and the need to manage these transaction can also be burdensome. Second strategy is sampling.

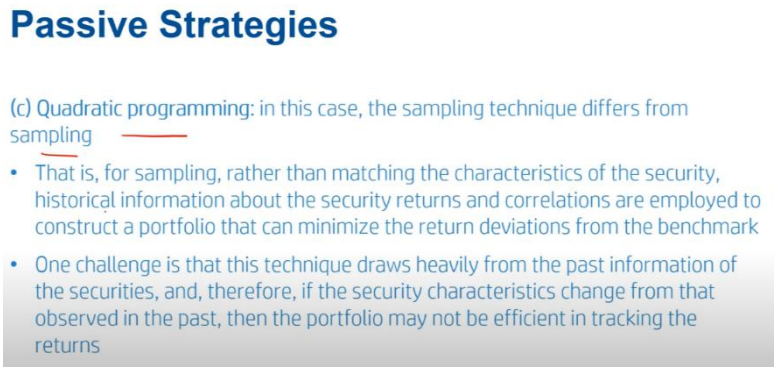
In this strategy, only a limited sample of stocks are employed which broadly represent the industry sector classification as captured by the benchmark. This technique is very intuitive and it solves or relaxes the problem of buying a large number of stocks. For example, to start with we buy the stocks having large weights in the portfolio. So first these large weighted stocks are purchased according to their weight in the index. Next, we look at the small stocks.

Small stocks are not purchased in total. Only a sample of small stocks are purchased with an idea or with an objective to approximate or mimic the aggregate characteristics. For example, these aggregate characteristics may include the beta, sensitivity to market, sensitivity to industry, dividend deal or some other similar characteristics like liquidity. So the sample stocks should mimic these aggregate characteristics in the index. This strategy while it decreases the transaction cost because we are purchasing less number of stocks, a sort of small sample of the overall number of stocks, but the efficiency of tracking decreases.

For example, the portfolio may not exactly mimic or match the returns from the benchmark. There may be a slightly higher tracking error, but this strategy reduces the transaction cost. Third technique employed here is quadratic programming. Although it is similar to sampling in some sense, but unlike sampling where we were trying to match the aggregate characteristics of the portfolio like liquidity, beta, industry sector classification and so on, here we employ the historical information about security or portfolio returns and their correlations. Using these correlations and return information, we try to construct the portfolio that minimizes the return deviations from the benchmark.

That is the objective here is to construct a sample of securities, less number of securities which has a good ability to mimic or obtain returns that are similar. So the deviations from the actual benchmark and our portfolio which only employs a sample of securities, the returns, the deviation between returns is minimum. So this involves quadratic programming and application of computing devices. One challenge here is that this technique draws very heavily from the past information about security returns and correlation. And therefore, often it has been observed in financial markets that security characteristics change over time.

And therefore, since the portfolio was built based on the return and correlation information that is historical in nature, the portfolio may not be very efficient in tracking the returns or forecasting the returns of the benchmark. So that remains one challenge. To summarize in this video, we discussed three passive portfolio management strategies, first full replication, second sampling and third quadratic programming. All these techniques have their pros and cons. For example, full replication strategy involves large number of transactions.



So transaction costs are high, however at the same time, its ability to mimic the benchmark portfolio is good in terms of its efficiency, it is high. Second is sampling. Again, sampling involves less transaction cost. However, its ability to mimic the benchmark portfolio is less efficient. Third is quadratic programming which is similar to sampling, but it relies heavily in historical information about security returns and correlations between securities and therefore its forecasting efficiency may not be very good.

Tracking Error and Index Portfolio Construction

- The main objective of a passive portfolio is to replicate a particular benchmark index
- It does not aim to achieve higher returns but to match the performance of that portfolio
- Therefore, a manager is judged by his performance relative to the performance of the benchmark, using a measure called tracking error

Now, we will discuss tracking error and index portfolio construction. In this video, we will discuss the computation of tracking error for passive portfolio management strategies. For passive portfolio management, the main objective is to replicate a given benchmark index. The idea is not to achieve higher returns, but to match the performance of that benchmark portfolio and therefore the fund manager is judged by his performance relative to the performance of the established benchmark. This measure of performance is often referred to as tracking error.

Tracking Error and Index Portfolio Construction

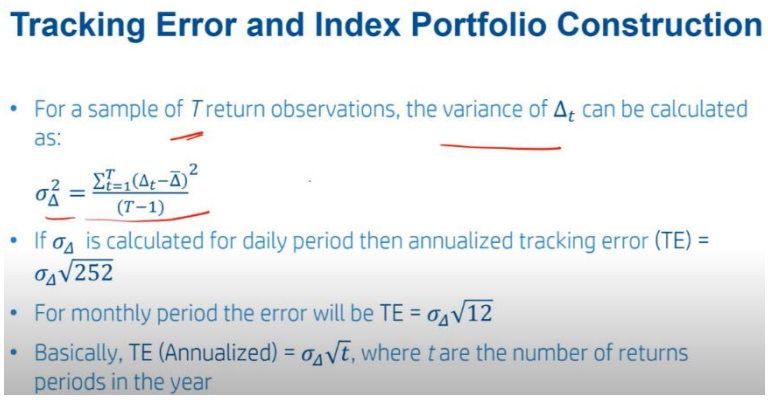
- Consider a period *t* return on a portfolio of *N* assets:
  $R_{pt} = \sum_{i=1}^{N} w_i R_{it}$ where *N* is the number of assets in the portfolio
- The difference between the period t benchmark portfolio and index returns:
  $\Delta_t = R_{pt} - R_{bt}$; generally, Δ_t is a function of the portfolio weights
- Also, since all the assets (mostly the small ones) may not be included in the managed portfolio, weight (w) = 0 for those assets

$$R_{pt} = \sum_{i=1}^{N} w_i R_{it}$$

$$\Delta_t = R_{pt} - R_{bt}$$

Let us discuss this tracking error. Consider a period T return with n assets or n securities. Since it is a portfolio of n assets, we already seen how to compute its returns that is Wi which is the proportionate amount invested in security i, Ri is the, Rit is the return of security i in the period T and r the total number of assets, so summation i equal to 1 to n, this will give me the portfolio returns. The difference between the period T benchmark

portfolio return RBT and the index return RPT is delta T. This is the deviation or error between actual portfolio performance and benchmark performance.



$$\sigma_\Delta^2 = \frac{\sum_{t=1}^{T}(\Delta_t - \bar{\Delta})^2}{(T-1)}$$

This delta is a function of portfolio weights also. Since in these kind of strategies not all the assets are taken, only a sample of original assets are taken, therefore, especially the small ones, not all the small ones are taken and some of the small ones may not be included. So, for some of these securities the weight may be 0 as well. For a sample period of T return observations, if the sample period is T, the tracking error is nothing but the variance of delta T which can be computed simply as here. So, the tracking error can be in the form of either variance or standard deviation SD which we have seen already, which is one and the same thing, variance is just the square of standard deviation.

The formula is variance or sigma square delta is equal to summation delta T minus delta bar raised to the power 2 upon T minus 1. This T minus 1 reflect the fact that we are working with sample. If you are working with population, which usually you will be working with sample, if you are working with population, then theoretically you use T, but with sample we use T minus 1. Now, this tracking error is often represented in annualized form. So, for example, if you compute this for daily returns, if you have computed this variance or standard deviation for daily return, you multiply the variance with 252 or standard deviation with square root of 252 where 252 are the trading days in a given year.

Similarly, if you are computing this error on monthly period, since there are 12 months in the year, you multiply the tracking error in the variance form by 12 or in a standard deviation form by square root of 10 simply because variance is square of standard deviation. So, to generalize theoretically tracking error annualized form is sigma or the standard deviation multiplied by square root of T where T are the number of return periods in the year like we said, we are talking about monthly returns then square root of 12. If you are talking about daily returns and there are 252 trading days in the year then square root of 252. Let us understand this through a simple numerical example. So, the quarterly returns for 6 periods are provided to us.

So, we have the returns on the portfolio, returns on the benchmark index for quarterly, on quarterly basis. So, we start by calculating the difference between these returns, which is 2.7 minus 2.3, this is 4 percent and then similarly 4.

6 minus 3.6, which is equal to 1 and so on. So, we keep on computing the differences here. For example, the 8th observation minus 0.
8 minus 0.6, which is minus 1.4 and so on. So, once we have these differences or the delta s, delta t s, the differences, we compute their average which is 0.2 percent. Now using this formula delta t minus delta bar, delta bar is 0.2, we can compute the variance of the deviations. The variance is 1 percent, which is a quarterly number, sorry, the standard deviation is 1 percent, the variance is also 1, standard deviation is 1 percent, which is the quarterly figure.

Tracking Error and Index Portfolio Construction

Period	Return on Portfolio (%)	Return on Index (%)	Difference (%)
1	2.3	2.7%	-0.4%
2	-3.6	-4.6	1.0
3	11.2	10.1	1.1
4	1.2	2.2	-1.0
5	1.5	0.4	1.1
6	3.2	2.8	0.4
7	8.9	8.1	0.8
8	-0.8	0.6	-1.4
		Average	0.20%

$\sigma_\Delta^2 = \frac{\sum_{t=1}^{T}(\Delta_t - \bar{\Delta})^2}{(T-1)} = \frac{[(-0.4-0.2)^2+(1.0-.2)^2+\cdots+(-1.4-0.2)^2]}{(8-1)} = 1.0$; $\sigma_\Delta = 1.0\%$ quarterly

TE = $\sigma_\Delta * \sqrt{4} = 2.0\%$

$$\sigma_\Delta^2 = \frac{\sum_{t=1}^{T}(\Delta_t - \bar{\Delta})^2}{(T-1)} = \frac{[(-0.4-0.2)^2+(1.0-.2)^2+\cdots+(-1.4-0.2)^2]}{(8-1)} = 1.0$$

Since there are 4 periods, the standard deviation will be sigma delta into square root of 4, which is nothing but 2 percent. So, this 2 percent becomes our tracking error. To summarize, in this video, we discussed tracking error concept for passive portfolio management. We also saw how to compute tracking error with the help of a simple numerical example. In this video, we will discuss various active investment strategies.

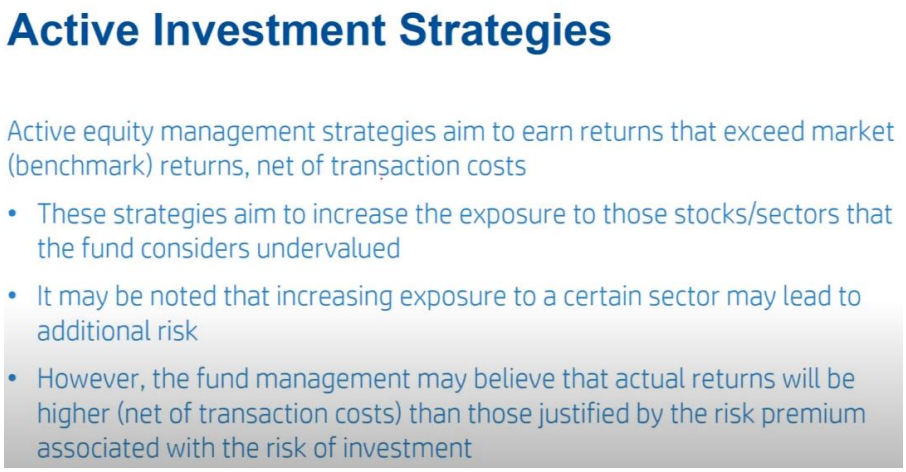
Active Investment Strategies

Active equity management strategies are classified in three buckets: (A) fundamental, (B) technical, and (C) market anomalies and security attributes

(A) Fundamental strategies: The fundamental strategies are of two kinds (a) top-down and (b) bottom-up

- In the top-down investment process, one starts with the broad country level and sector level analysis. Then, move towards asset class to security specific allocation

Active investment strategies involve aiming to earn returns that exceed the benchmark returns, this benchmark can be a market or industry sector benchmark, net of transaction costs. So, excess returns, net of transaction costs, these transaction costs includes transaction costs in buying and selling of securities and also management fees in active management. These strategies try to increase the exposure to those stocks or sectors that the fund considers undervalued based on its analysis of that industry sector. Please note that increasing exposure to any sector or any security involves increasing risk or exposure to that particular risk factor. However, in these cases, the fund management believes that the additional returns or excess returns that will be generated because of this additional exposure or additional holding net of transaction costs, it will be higher than those justified by the risk premium associated with the risk of this additional exposure.



So, they believe that even though they are taking certain extra exposure or taking on certain extra risk, the resulting return will be higher than that justified by that risk premium or extra risk. Active equity and fund management strategies are often classified in three buckets. One is fundamental, second technical and third market anomalies and security attributes. As a part of fundamental strategies, one tries to do some kind of fundamental analysis like cash flow discounting analysis of securities and these approaches are of two kinds, top down and bottom up. In the top down approach, you start with a very broad country level kind of scenario where you examine the entire broad macroeconomic perspective of the market.

Next you move towards industry sector level where you identify, try to identify industry or sectors that you view favorably that are expected to do well and then you tend to select securities in that particular industry that again you view favorably or you expect to do them well. Next approach is bottom up approach. It's exactly opposite to what we discussed in top down approach. Here you identify securities that are undervalued or expected to do well in future. Once you have identified securities, then you analyze the broad industry sector perspective if that particular industry or sector is expected to do well in future and once you have analyzed the industry sector, then you move to the broad market or country wide level of analysis, macroeconomic analysis, broad factors that are working in that market and factor.

In both these approaches, the end objective is to identify securities that are undervalued based on their fundamentals, for example, cash flow discounting analysis and so on. In nutshell, as a part of fundamental strategy, fund manager may identify assets that are undervalued or an asset class itself like stock, bond or government securities. When they find such undervalued securities, they will increase their exposure to these asset classes as a whole. Also, as a part of fundamental strategy, the fund manager may identify certain industry sectors that are undervalued or expected to do well, so they can increase their exposure to these industry sectors. They can also find certain investment styles which are viewed favorably by the market.

These styles include large cap versus small cap, value versus growth and so on. So, fund

can take a certain style, certain view on a given style. Finally, funds identify and add depending upon their view on the industry sector and investment styles, they identify undervalued stocks that are expected to do well in future and add these stocks to their portfolios. Another similar strategy based on this kind of analysis is called 130-30, 130 by 30 strategy, where the fund manager takes position about 130 percent that is if the capital is 100 percent then 130 percent position is taken. This is on account of the fact that they also take short positions about 30 percent of their original capital.

The idea is to benefit from overvalued stocks, so they may identify certain excessively

overvalued stocks on which they would like to leverage by shorting them and this additional capital that they generate of 30 percent that can be further invested in the undervalued stock. Next strategy is called technical strategies. Technical strategies rely on two basic fundamental aspects of past price performance. One that past trends will continue and past trends will reverse.

So, these are the two key aspects. To start with, a very basic form of technical strategy is contrarian strategy. That contrarian strategy suggests that the best time to buy a stock when everybody is acting bearish. So, it takes an opposite view of the market. The strategy

relies on the overreaction hypothesis that is investors are often sentiment driven and they tend to overreact to the information leading to excessive movements in prices. And therefore, it is expected that when such excessive movements have taken place, in short to medium terms in future, prices will correct or reverse.

So, there will be a reversal. For example, a contrarian investor will purchase a stock when the prices are low and falling and he would believe that currently there is an excessive movement on the downside and therefore prices may correct and rise in short to medium term. So, therefore, he will buy the stock when the prices are falling and once he believes that now the prices have risen sufficiently, he will sell them before they start falling. Another form of technical strategy is momentum trading strategy. The momentum trading strategy believes that the current momentum in prices will continue. The strategy relies on the hypothesis called underreaction hypothesis.

As a part of underreaction hypothesis, the theory suggests that investors have limited capacity to absorb information and therefore they process and absorb information in piecemeal manner over a certain horizon, not immediately. And therefore, as the information arrives in the market, investors gradually absorb this information over a period in a gradual manner. And therefore, investor following the momentum strategy buys their stock when prices are rising. So, they buy winning stocks where prices are rising and they expect these rising prices to rise further in future. They hold these stocks for a certain time and then sell when they feel that the peak has been achieved and vice versa for falling stocks.

Another very important and often followed strategy is anomalies and attributes. It has been observed that financial markets are not always efficient and there are certain anomalies and attributes that are favored by market and sometimes there are opposite anomalies and attributes that are favored by market. For example, it has been observed that firms with small market capitalization produce larger risk adjusted returns as compared to large market capitalizations. Similarly, firms with low PE and low price to book value, low price to earning and low price to book ratios produce higher risk adjusted return than as compared to those stocks with higher PE price to earning or higher price to book value levels. This, it appears that markets at certain time favor certain attributes more than others.

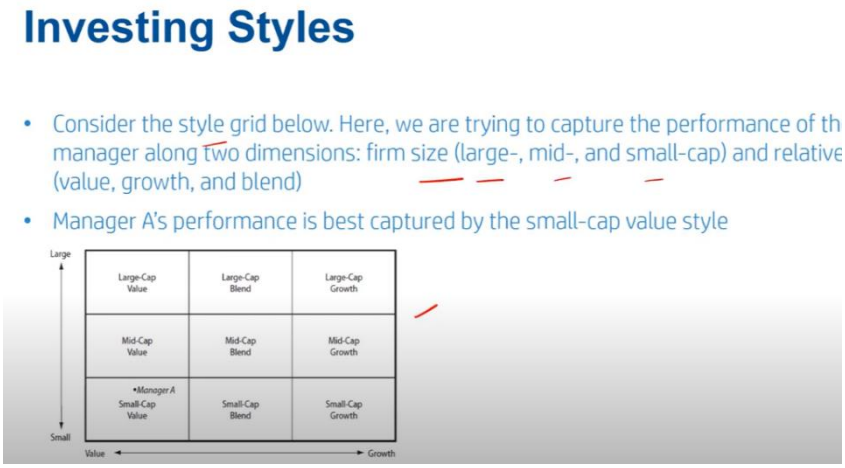
And this, this quantum of this difference at certain times, this difference or quantum at certain times is higher and certain times it is lower. In this background, there is a strategy of sector rotation which involves increasing the weight of certain stocks, for example, increasing the weight of small stocks in your portfolio and when the benefit has been accrued, then equalizing that. The idea is to benefit from those attributes that market favors, increasing their weights and decreasing the weights of stocks with opposite attributes. So, this kind of sector rotation strategy, for example, involves buying stocks, let us say, if market favors a lot small capitalization stock, then buying small cap stocks and selling large cap stocks, decreasing the weight of large cap stocks. And when the market, this kind of difference is lower and the market is not that much biased, then going back to the original position.

To summarize, in this video, we discussed three very important active investment strategies. First fundamental strategies, which relies upon fundamental analysis like cash flow discounting, we discussed two fundamental strategies, one is top down and bottom up approaches. The second strategy, the second strategy we discussed was technical analysis. We discussed two technical strategies, one is contrarian strategy and momentum strategy. Third, we discussed anomalies and attributes wherein we discussed that there are certain anomalies and attributes that are favored at certain times favored more by market and at certain times favored less by market.

So, depending upon the current market view, one can rotate their position called sector rotation by over weighing those styles or attributes that are favored more and then going back to the original position when this kind of favor or bias is less. Investing styles. In this video, we will examine various investing styles in the context of portfolio analysis. In modern financial markets, various investment styles are available to investors. For example, these include forming portfolios with stock characteristics such as market capitalization, leverage, industry sector, relative valuation or value versus growth.

One simple example would be market capitalization based like large cap versus small cap styles. Essentially, this style analysis includes defining benchmark portfolios or indices that follow or represent certain characteristics such as value versus growth or large cap, small cap. Then securities are chosen depending upon their sensitivity to this portfolio.

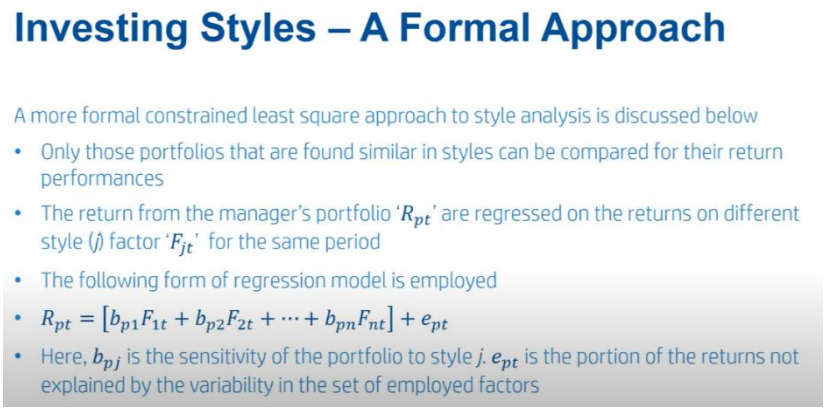
For any given fund, the relationship between that fund and these style indices or these style portfolios is examined and evaluated. The higher the correlation of a given fund with these style portfolios or a certain style portfolio with certain characteristic, it is said that that portfolio manager gives a higher weight to that particular investment style.



Let us examine this idea for a simple example based on the style grid as shown here. Consider that we are trying to examine various investment managers and their performances across two styles. One is size which has three dimensions, large, mid cap and small cap and relative value dimension which has value, growth and blip. So, it is a sort of 3 cross 3 portfolio and the style grid would look something like this, 3 cross 3 style grid. In this 3 cross 3 style grid, we have size dimension from small to large and value versus growth dimension from one extreme and value, other extreme is growth, in between there is a blend.

Now, any given manager, let us say manager A can be classified across these two dimensions on any particular cell. So, for example, manager A lies in this small cap value cell. Now, in order to compute or analyze the performance and compare the performances of different managers, it is a necessary requirement that they should lie in a given cell. Only those managers that follow or fall in a particular cell, their performance can be compared because in that case only we would say that they follow similar styles and

therefore, for example, manager A follows small cap value style and therefore, all those managers that only follow small cap value style, their performances can be compared with that of manager A. This kind of style grid analysis is often employed to classify funds, indices and various other portfolios, so that once they are classified and aggregated into different buckets, their performances can be compared to each other.



$$R_{pt} = [b_{p1}F_{1t} + b_{p2}F_{2t} + \cdots + b_{pn}F_{nt}] + e_{pt}$$

Also, in order to compare these performances, there is a proper formal approach, mathematical approach of least square method that can classify portfolios in different styles. Here, we follow a simple OLS regression method, ordinary least square OLS method, where returns on portfolio RPT are regressed on various styles such as F1T, F2T, FNT. These FNTs are style factors and BP1, BP2 and so on are the sensitivities of the portfolio to these factors. If it is the error or residual term which is part of the return of portfolio which is not related to any of these styles and not explained by any of these factors. In a conventional OLS regression model, R square is the measure which represents how much of the variable, dependent variable is explained by the model.

Same as the case here, here R square measures the amount of variation explained by this, these style factors or the entire model. That is the percentage of variability in portfolio return explained by this type. The remaining part 1 minus R square is ascribed to manager's

selection capabilities, his ability to select stocks that are undervalued. Now, these styles are measured to benchmark portfolio that proxy F1, F2 and FNT these factors.

Investing Styles – A Formal Approach

$$R_{pt} = [b_{p1}F_{1t} + b_{p2}F_{2t} + \cdots + b_{pn}F_{nt}] + e_{pt}$$

- The regression R^2 is interpreted as the percentage of return variability due to style
- The rest $(1 - R^2)$ is ascribed to the manager's selection skills
- The styles are measured through benchmark portfolios
- No intercept term is specified, the coefficients must sum to one, and all the coefficients are non-negative
- Here, $R^2 = 1 - [\frac{\sigma^2(e_p)}{\sigma^2(R_p)}]$

$$R^2 = 1 - [\frac{\sigma^2(e_p)}{\sigma^2(R_p)}$$

Please note in this model, there is no intercept term. Also, we are only long in styles, the way this model is designed, they are only long in these styles. We are not anyway short in any of these styles and therefore, all the coefficients BP1, BP2 and so on, these are sensitivities, must be positive. Also, they should add up to 1. The R square measure here is simple. In conventional R square 1 minus residual square RSS upon total sum of square, which translate in this case to RSS is residual sum of square, which is variance of this EPT divided by total portfolio variance, return variance, total portfolio return variance.

The benefit behind this kind of analysis is that often portfolio managers may claim to follow a certain more conservative or a style which is different from the style they actually pursue. And therefore, this kind of analysis can bring out very clear picture about what kind of style, investing style the fund manager is solving. So, it brings us with the true picture. And even sometimes there is a drift in the style from the historical style, investing style, that is also brought out or highlighted by this kind of analysis.

Investing Styles – A Formal Approach

$$R_{pt} = [b_{p1}F_{1t} + b_{p2}F_{2t} + \cdots + b_{pn}F_{nt}] + e_{pt}$$

- It may often be the case that a fund manager may profess a different style while following another style
- This analysis clearly brings forth the true picture
- The analysis also helps in finding out if there has been a style drift.

To summarize, in this video, we discussed various investing styles. We also examined various approaches to examine the styles of portfolio managers. These included style grade analysis and a formal mathematical regression model approach to understand the style of a given portfolio. Such analysis helps in bringing out if the manager is following the same style, which he claims to as per the portfolio mandate. Value versus growth investing. In this video, we will introduce a very important debate in the context of investing styles, that is value versus growth.

Value vs. Growth Investing

We often hear investment management firms define themselves as value vs. growth firms

- For example, growth firms focus on the earnings (EPS) part of the P/E ratio
- They expect the earnings to grow which will lead prices to rise
- Growth stocks are not necessarily cheap based on the current earnings levels; in fact, they may be costly
- But the investor believes that the earnings will rise significantly and lead to a price rise in the near future

We often hear investment management firms define themselves as value versus growth firms or value versus growth style investing firms. For example, growth firms focus on earnings part of the P ratio, which is price to earnings ratio, and they focus on earnings part. Growth style depends or relies on earnings to grow and therefore expect prices to rise. Most often these growth stocks are not cheap based on the current valuations.

In fact, they are sold at a premium based on their current earning levels. They may be costly as well. However, investors or those following growth styles, they believe that the current earnings will rise significantly and that will lead to considerable price rise in future. In contrast to these growth stocks, value style investor believes or relies on the price component of P ratio. Value investor believes that at the current level of earnings, prices are cheap or low and therefore some kind of correction is pending. As compared to the current peers or stocks in the same industry with similar risk profile, these stocks are supposed to be cheaper or depressed in terms of their current prices.

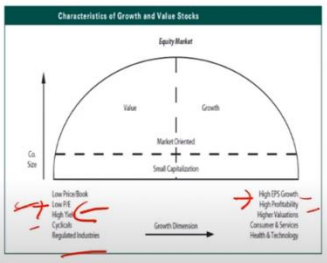
Their P levels that is price to earnings levels at current earnings are lower as compared to the peers or benchmarks against which they are compared. And therefore, it is expected that their prices, market prices will correct in the short to medium term. And therefore, prices will rise thus value stocks are cheap at their current valuations and their current earnings levels and they are expected to improve and do well in the near future. To summarize, in this video, we discussed that growth style investor focuses on the current and future economic story of the firm with less regard to current share valuation. In fact, based on current valuations or for example, current earning levels, the prices of these growth stocks may be costly or at premium.

In contrast, we discussed that value investor or value style investor focuses on the share prices that are depressed as per current valuations and therefore anticipate a sort of market correction that is increase in prices in short to medium term, probably on account of

improving company fundamentals or rectification in some kind of policy measures and therefore better performance in near future. Let us understand this value versus growth investing through style grid analysis. On the style grid on one extreme end, we have value stock and on the other extreme end, we have growth stocks. Notice the key parameters, low price to book ratio, low p ratio, high yields, cyclicals, regulated industries on value side, while on growth side, high EPS growth, high profitability, high valuations, industries like consumer and services and health and technology. These value stocks are cheap, for example, in terms of their price to book, their price to low price to earning, yields are higher, cyclical, they are cyclicals, regulated industries, while in contrast, growth stocks represent high profitability measures, they are expensive.

Value vs. Growth Investing

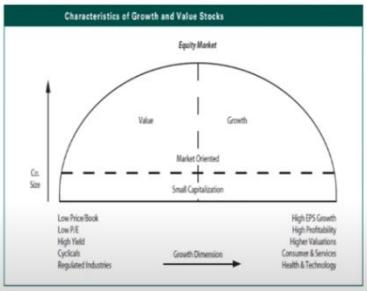
- Notice the characteristics of the value and growth stocks shown in the figure
- The figure shows one approach to classify securities according to style and market capitalization



For example, they have high EPS growth, they have high profitability, they have high valuations as per their current valuations. These are health, technology and consumer services stocks. They are expensive at current prices, which reflects their high future earning potential. Looking at these parameters, one can say that value style appears to be more tempting and more assuring than growth. And it has been indeed found that and research has shown that value style indeed over long horizons and on average offers higher average returns than growth style.

Value vs. Growth Investing

- Value style appears to be more tempting than growth, and in fact, studies show that value style indeed produces higher average returns than growth investing
- However, both strategies have their clientele



However, both of these styles have their critical. To summarize, in this video, we discussed the contrast between value and growth investing and how they differ from each other. To summarize this lesson, there are broadly two kinds of portfolio management strategies. First, active management and second passive management. Passive management strategies include full replication, sampling and quadratic programming.

Value vs. Growth Investing

- To summarize, growth investor focuses on the current and future economic "story" of the firm, with less regard to share valuation
- The value investor focuses on share prices in anticipation of a market correction, possibly on account of improving company fundamentals

Passive management strategies aim to replicate the performance of some benchmark index. Passive management strategies aspire to minimize the tracking error. Active management strategies aspire to generate higher returns. Active investment strategies are of three kinds. First fundamental, second technical and third market anomalies and security attributes. Passive management strategies have low transaction costs, whereas active management may require additional transaction costs.

Fund managers often follow one of the two main investing styles that is value versus growth investing. Growth stocks sell at premium in anticipation of higher future growth, while value stock are cheap at their current valuations. A more formal approach employs regression modeling to examine what factors or styles are being followed by a fund manager. .