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ASSET ALLOCATION AND THE IMPORTANCE OF ACTIVE INVESTMENT STRATEGIES by Craig MacKinlay¹

1. This article considers [what is more important](#) for investment :
 - (a) the initial choice of assets, or (b) the way the assets are mixed and altered over time? The author debates on [active management](#) to challenge established assumptions.
2. The importance of active strategies in investment process has been debated because it is believed that asset allocation accounts for ninety

¹ Mastering Investment Part Four pages 6 and 7

per cent of an investor's performance. This may have been true twenty years ago but is no longer valid due to the world wide impact of all significant economic changes and FII flow of funds. After the year 2000, active investment strategies can result in significant returns.

3. **'Investment strategy'** refers to the idea that the mix of assets is actively managed with frequent adjustments based on views of future directions of financial market prices. In contrast, the **'Investment policy'** is the idea of long term adherence to a pre-determined weighting among asset classes that result in the ideal choice of assets that are held on a long term basis. The policy idea is **more widely accepted** and has resulted in the belief that investors should concentrate on selecting the right assets on which they should allocate most of their resource, and not on active management of the portfolio.
4. Researches indicate that the existing rationale for a **passive portfolio** is that **correct asset selection** gives 90 per cent of the returns while active investment does not add any value to the portfolio.

The latter is not necessarily true because it has been observed that **active investment can bring returns close to 90 per cent** even **without** the best assets. This has also been confirmed by the fact that several of the passive portfolios under perform against their benchmarks.

The statistical measure R^2 in statistical analysis of the relation between total return and policy return is the cause of the existing confusion because investment policy proponents of a passive portfolio

argue that policy is the primary determinant of return. This is seen to be reflected in higher R² regression of total return. R² is a measure of correlation and can be interpreted as an indicator of the extent to which ‘variability’ in one equity is related to the ‘variability’ in another. In other words, R² is the statistical correlation squared. The high R² in regression analysis indicates the magnitude of the total return as correlated to magnitude of policy returns. The fallacy in this interpretation can be illustrated.

5. **ROLE FOR ACTIVE MANAGEMENT OF PORTFOLIOS:** The transaction costs for passive portfolios make superior performance on average even more difficult. When the total returns of a portfolio are broken in to parts for examining the empirical importance of the difference in the returns arising from various long run asset allocations or policy mix. The total return has three components = Total Returns = Policy return + Return from active asset allocation + Return from asset selection. Here ‘Policy return’ means long term allocation; ‘active asset allocation’ refers to the process of ongoing changes made in the long term assets; ‘asset selection’ refers to selecting individual stocks with in equity classes and bonds with in fixed income classes.

6. The debate is on the first component of ‘policy return’ relative to the remaining two components. Policy mixes comprise of stocks, bonds and Treasury Bills. Over 30 years the average return on equity investments has been 12.6 per cent, and a portfolio containing only equity gave a return of 6.8 per cent. Over the same period a portfolio of 60 per cent and 40 per cent bonds gave a return that was

only 1.2 per cent less than the only equity portfolio. In the decades of 1970s and 1980s the difference between the two was very small. It has become large only between 1991 to 2001 decade due to better performance by equities

7. What is the importance of active strategies? In a five year period the mix portfolio provided an annual average return of 22 per cent. In contrast the pure equity average annual return was 15.3 per cent.

	All equity	All bonds	All Trea sury Bills	Mix of the three		
				80/20/0	64/40/0	40/40/20
Jan '71 to April /2001	12.6	8.8	6.8	12.1	11.4	10.3
Jan'71 to Dec 80	8.4	5.5	6.9	8.0	7.5	7.3
Jan 81 to Dec 90	13.9	13.1	8.8	14.0	13.9	13.0
Jan 91 to March 2001	15.6	8.1	4.9	14.2	12.8	10.6

Benchmark used is Standard & Poor

3. HOW TO MIX ASSETS TO MATCH NEEDS

Suresh Sudaresan²

1. **The Basic framework:** ‘asset allocation’ has two components (a) the mix of assets such as bonds, stocks, certificates of deposit, and real estate that are held for a period of time (b) the manner in which the mix is varied over time in response to the changes in the economy and investment opportunities as per the target goals. The goals depend on the desired level of risk and return, tax environment, future funding needs.
2. Where regular annual recurring income is needed the mix will have a larger share of high quality bonds that will provide stable income. Also there are tax incentives to promote saving in less risky assets such as bonds. Stocks in portfolio provide for faster growth for future funding needs where recurring annual income is not needed.
3. **Pension funds** of corporations are professionally managed to the regular pension needs of retired employees and the future pension needs of existing employees. Here the mix is of high quality bonds for existing pension payments and equity for future funding needs. However, in companies with significant surplus of assets over projected liabilities the proportion of stocks in the pension funds would be higher than bonds, as they have a finance cushion to absorb the market fluctuations in the value of stocks.

² Mastering Investment Part Four 20th September 2009 pages 2 and 4

4. As such the size of surplus over liabilities is the determinant for the mix in the pension funds of companies. In addition tax incentives on long term savings also influence as a factor. Next, the decision on the location of an asset , whether it is to be held in an open account or a tax deferred account, depends on available tax incentives as open accounts are subject to normal taxation.
5. Money managers make asset allocations on basis of an index of their choice. Their profit depends on their ability to ‘out perform’ the index. A money manager needs to match the performance of an index by a simple strategy of ‘buy and hold’. The Lehman Brothers Index is one of the most popular indices to measure the performance of money managers. Their portfolio may give weight to certain sectors, corporate, agencies or asset backed securities- but the overall interest rate risk, and credit risk will be kept close to the select index. This is necessary as the money manager needs to explain his / her investment decisions to the client investors. Therefore, he cannot deviate too much from the index selected by the investor. The clients may also specify the indices such as small-cap stock index, a high yield bond index, or an emerging market index.
6. [How to build a basic framework for asset allocation?](#) Inter-related three factors involved in the trade off are:
 - a) risk and return
 - b) short term funding priorities and future growth
 - c) liquid versus illiquid investments including tax deferred investments

7. (a) **Risk return trade off** is a critical factor and Modern Portfolio Theory suggest that investors do not expose themselves to risk that can be diversified away. They therefore prefer 'non diversified' broad based stocks that are influenced only by the movement of the market. This is called 'market risk' and is similar to the index funds risk. Therefore, the average risk adverse investor will allocate part of wealth to this diversified stock mix and rest to risk free bonds. In other words investors prefer to maximize the expected return through mean return on the portfolio while keeping risk to the minimum level of their preference. Risk is measured by the variance of returns. The resultant portfolio is called the 'mean variance efficient portfolio' in which the mix of assets that gets the return in the context of the risk preference. As such profession asset allocation companies specialize in selecting mean variance efficient portfolios from an array of assets. This framework that is good to start with for the purpose of investments.
8. However, it is too simplistic and does not factor in the funding needs or liquidity requirements of the investor. It also relies on a static fixed time horizon during which no revision of investment decision is required. In reality the choice of asset allocation is neither a mean variance efficient portfolio nor a liability replication portfolio, but rather an optimal portfolio.
9. **The optimal portfolio** that takes these factors in to consideration differs from this mean variance efficient portfolio. A successful asset allocation strategy makes a difference in overall profitability and involves active portfolio management similar to a

standard index. Creating a surplus of assets over liabilities is the objective of an optimal portfolio.

	Kinds of assets	Lehman Brothers Index	Optimal portfo lio index
1	Treasury Bills	29.36%	25%
2	Mortgage backed securities	34.28%	30%
3	Corporate	23.53%	24%
4	Agencies and quasi government issues	9.77%	12%
5	Asset backed securities	1.57%	7%
6	Collateralized mortgage obligations	1.49%	2%

10. Surplus is built by raising the level of equity investment because in the long term equity out performs other investments. But too much of equity may leave the portfolio vulnerable to short term fluctuations as well as shortfall in funding requirements. The Standard and Poor Index provided returns from 21 % to 37.5% during 1995-1999, but lost 9.1% in 2000. Bond indices have a more stable performance but rate on return is not as high as equity. For many pension funds the optimal portfolio is a combination of the mean variance efficient portfolio and the liability replicating portfolio, and their ratio is determined by the extent of the current and desired

surplus. Similarly, insurance companies design their portfolio to reflect their liabilities. They may issue annuities that are hedged through high quality bonds of similar duration.

11. **Liquid versus Illiquid** assets indicate how easy it is to buy and sell the constituent assets of a portfolio. A liquid portfolio allows the investor to change the mix very quickly, but illiquid assets can often be more advantageous. For this trade-off is determined by requirements of high growth assets such as stocks in pension plans or in tax deferred accounts. These are illiquid assets and accessing them prematurely involves penalty as well as tax liabilities.

12. This could be viewed as an opportunity cost as through such assets the current tax liability is being reduced. A local municipal body that needs funds for roads etc on an annual basis may have a portfolio of safe bonds that are not liquid but provide the regular annual income with a very low default risk. Its funding costs are also reduced through such illiquid bonds. In contrast a bank often needs funds for open market operations at short notice and therefore needs liquid assets that have a narrow bid-offer spread.

13. As such, where ever fund requirements are **known and periodic**, the optimal portfolio **can be designed** to meet these through asset allocation in safe bonds. But where cash needs cannot be determined before hand, a **liquid securities and short term asset portfolio** is better.

14. **Tax and Accounting factors** also influence the portfolio mix. Government issued bonds, Municipal bonds that are tax exempt are generally held by wealthy households because marginal tax bracket of such households is very high. Inflation protected government bonds are held in tax deferred accounts to minimize current tax liabilities of wealthy families.
15. **Conclusion:** Aversion to risk, funding needs, and liquidity requirements determine asset allocations in a portfolio. Trade off and linkages in these three modify the mean variance efficient portfolio in to an optimal portfolio that factors in the taxation and accounting requirements as well. Time horizon and the stage of life of the investor – working status, maturity cycle etc, play a significant role in asset allocation decisions.

3. INSIGHTS FROM PORTFOLIO THEORY³

- Raman Uppal

1. How should stocks be evaluated? Should the basis of evaluation be only rate of return and risk? How is risk of a particular stock to be measured? How can an optimal portfolio be designed for a given period and for trade-off between risk and return? How does this optimal portfolio differ from one that is optimal when there are several trading opportunities over the investment horizon? All these questions can be explained through the main insights in to portfolio theory.

³ Mastering Investment Part Four 20th September 2002 pages 8 and 9

2. **Return and Risk:** The connection between risk and return of a stock has been studied since 1952. Keynes had propounded that investment theory is all about putting one's money in a few select stock over a long period of time. In 1952 Markowitz argued that it was not sufficient to look at only the expected return form a particular stock but an investor should also consider the risk associated with it. Moreover, by investing in many stocks an investor could diversify the risks. Gains from a diversified portfolio come from the fact that returns from all stocks do not move in the same direction all the time unless they are from the same industry or sector. **As long as the correlation is not 1, diversification will reduce the risk.**
3. If a portfolio comprises of two stocks only and both have the same standard deviation of 35 per cent or 0.35% but have different degrees of correlation the risk can be shown as a function of investment in the first asset. When that total wealth invested in asset A is zero the portfolio volatility is the same as volatility of asset which is 35%. As investment in asset A is increased, the volatility of the portfolio drops until a minimum is attained when equal amounts are invested in both assets. In other words, the volatility of a two asset portfolio return is less than the volatility of a single asset portfolio. The size of the gain from diversification depends on how low is the correlation of the assets. The less they co-vary the higher is the reduction in the risk.
4. This reveals that the **risk** for individual asset has two components: (a) **Systemic risk** which is the market risk that cannot be diversified. (b) **Non systemic risk** which is specific to the asset and

which can be diversified away by increasing the number of assets in a portfolio. Then the correlation between the assets will determine the portfolio risk. For this reason a diversified portfolio is better.

5. **How to identify the best level of diversification** or the optimal diversified portfolio? Markowitz defined a portfolio as efficient if it maximized the expected return for a given level of risk. The set of all efficient portfolios is referred as the Markowitz frontier. Any portfolio that lies on the upper part of the frontier curve is efficient and gives the maximum expected return for a given level of risk.

The efficient frontier for different hypothetical values can then be plotted for two or more assets. As the correlation of stocks falls from the maximum of +1 to a minimum of -1 the upper part of the frontier curve moves in a north westerly direction where risk decreases and return increase.

6. The portfolio frontier for risky assets can be found by solving a non linear optimization problem. Depending on how much risk an investor is willing to take, a portfolio should be chosen on the efficient frontier with the appropriate level of risk. The limitation here is that information on correlation between all risky assets, for each level of risk is needed.
7. **Tobin and CAPM:** This limitation was resolved by James Tobin in 1958. He showed that if investors could invest in **risk free assets** along with **the risky assets**, then the frontier portfolios are a combination of a risk free asset and a portfolio of only risky assets. The efficient portfolio in this case is a straight line going through the tangency portfolio T only as that point only will offer the most returns

for the same risk. As such every investor's portfolio can be constructed by investing in only two assets – one risk less and the other risky at tangent point T. This also implies that all investors hold risky portfolio in that same proportion.

8. The question that remains is **how to identify the constituents** of portfolio T. (i) In equilibrium demand must equal supply. (ii) The supply of all risky assets is the market portfolio, which means that when we consider all assets in the market we get the market portfolio. So the tangency T portfolio is equal to the aggregate supply of all risky assets in the market portfolio denoted by M in figure 6.
9. **How can a dynamically optimal portfolio** be determined? In 1971 and 1973 this problem was solved by Robert Morton who showed how the CAPM could be extended to settings **involving many different factors over different periods of time**. His main insight was that **the initial portfolio must** not only be chosen **from tangent point T** but must **also provide for best hedge** against future changes in the set of investment opportunities.
10. **Conclusions:** The main results of modern portfolio theory can be summarized as follows:
 - a) Diversification reduces risks
 - b) Variance of individual assets contributes little to portfolio risk
 - c) Correlation between assets determines the risk of the portfolio
 - d) A large investor base improves the portfolio frontier

- e) With a risk free asset frontier portfolios are a combination of the risk free asset and the tangency portfolio.
 - f) In equilibrium the tangency portfolio equals the market portfolio
11. Over several investment periods the optimal portfolio has two components (a) one that is optimal for a single period investor and lies on the efficient frontier (b) one that provides the best hedge against future changes in the efficiency frontier. How to account for transaction costs. The systemic risk is measured by the beta measure of the correlation of the security to the market.

Global Investing “An open and shut case for portfolio diversification”⁴

By Ian Cooper

1. Diversification between companies as well as internationally is the best way for equity portfolio optimization. This principle implies that most portfolios handled by professionals would be “highly diversified” which means that it includes international securities. The prime motive is to obtain the benefits from international gains. Diversification comes from holding investments that have unrelated returns. Global diversification results in very low correlations between returns in different countries.

⁴ Mastering Investment Part Ten 1st November 2002

2. However, construction of an international portfolio requires information on expected returns and risk for all assets considered. These are difficult to obtain and are often error ridden as even small errors in input can result in large errors in portfolio construction. Therefore, though the principle of global diversification is well established the degree of safe exposure is still uncertain.

3. Table 1 shows historical average return and risk for various countries between 1970 and 2000. The average risk premium has been computed by subtracting the London inter-bank offered rate (Libor) from average returns. The risk premium for a unit of risk called Sharpe ratio is indicated and a higher Sharpe ratio means a more favourable investment. The countries also have similar Sharpe ratios. Only one portfolio dominates as it has the highest Sharpe ratio. This is the global market portfolio with holdings proportional to the capitalization of different markets. It dominates because international diversification results in a much lower level of risk. The logic for global portfolio is the same as that of using the domestic market indices as benchmark. In case of no information the ‘average’ portfolio is held for domestic markets based on the average of the ‘market index’.

Table 1 Annualized return risk in US 1970- 2000

	Excess return %	Standard deviat ion %	Sharpe rati o
France	7.6	23.0	0.33

Germany	6.7	20.4	0.33
Japan	8.8	22.9	0.38
UK	7.8	23.9	0.33
USA	5.7	15.3	0.37
Global market portfolio	6.0	14.1	0.43

Data: MSCI monthly equity index returns, relative to Libor that is London interbank offered rate

4. Studies have revealed that ‘diversification across countries within an industry is a much more effective tool for risk reduction than industry diversification with a country’. In other words the first and most important dimension of portfolio diversification is global diversification with in the same industry.
5. In Europe the top 15 companies account for 75% of FTSE index. In Australia, UK, USA France and Canada top 15 companies account for 50%. World wide the top 15 account for about 10 percent. Yet even the London based funds invest less than one fifth in global markets. Thus while empirical evidence is strongly for global diversification, the practice is to concentrate in the home market.
6. **The Problems:** identified include currency risk, but this can be hedged at low cost because studies have shown that the extra

- currency fluctuation risk is small for international equity portfolios. Therefore, gains will outweigh currency concerns.
7. Another reason for domestic market concentration is inflation. The domestic equities are believed to be a good hedge against inflation. The Pension Funds in particular have their goal as matching pension liabilities with rise in inflation. Studies have tested this belief of pension funds holding domestic equities that rise with inflation to provide inflation protection. It was found that high inflation is not matched with high equity returns.
 8. A third reason 'whether international portfolio benefits disappear in risky times was also studied. It was found that international markets become more correlated during periods of volatility, and the negatives are small. Therefore an international portfolio should continue to be held through the volatile markets.
 9. The fifth and final argument against global diversification is that foreign markets are intrinsically risky. This is an illusion as two markets of UK and USA for example cannot be risky of investors of the other country as risks of all markets are the same. Each market has its own level of risk and these are taken in to account in Table 1. This concludes that global portfolios are beneficial.
 10. How to diversify? First count out the foreign markets that are illiquid, costly, unfamiliar and generally dangerous to trade in due to poor access to information. Next choose carefully the markets and instruments used keeping in view the objective of diversifying at low cost. Investment in limited number of foreign markets can achieve most of the benefits. Market with transparent structures should be

preferred. With in these instruments chosen should be for the passive portfolio, that are increasingly available as index funds, index futures, passive mutual funds, swaps, index participation products and a variety of other instruments. Active funds such as Hedge Funds also offer a wide range of international strategies. Further efficiency can be gained by concentrating on industries that are less correlated with the domestic market. Industries in which a country is very strong or the strongest should be selected.

11. International Monetary Fund statistics shows that the proportion of US equity market held by foreigners has fallen from just above 7 per cent to just below 7 per cent in a three year period. This is indicative of the 'home bias puzzle' that has no answers. A widely held impression is that the benefits of global investments are overstated. The increasing integration of world economies has reduced the benefits of global diversification. But if this was true it would have been reflected in an increasing correlation between international equity markets. When tested this assumption was found to be untrue as correlations fluctuate over time and no evidence of any trend towards correlation could be found.

12. As such it is likely that the reason for home bias is more institutional as earlier the barriers to international equity investments were high. There were few derivatives to hedge the currency risks, there were restrictions on cross border holdings, poor information flows and limited passive index funds or investment instruments. This had raised the costs of investing in foreign countries. Most of these costs have now been eliminated over the last twenty years through

international capital markets and their governance structures. Yet many funds continue to measure their success against domestic benchmarks, partly because their performance is judged against these benchmarks. Institutional rigidities continue to be the reason for slow global investments in FII. Barrier costs are falling and information flows are easier, trading and issuing systems are converging, tax systems are being harmonized as indicators to the future of global investments.

Diversification : ‘Why Managers hold on to risk’⁵

By Charles Himmelberg and Glenn Hubbard

On page 10 Fig 1 Equity held by inside investors

	0	20	40	60	80
UK	> 5%				
USA	> 5%				
Taiwan	15%				
South Korea		22%			
Ireland		22%			
Japan			3		
			2		
			%		

⁵ Mastering Investment Part Ten

Canada		3 8 %				
Brazil			43%			
India			45 %			
Malaysia			45 %			
Belgium				60%		
Chile				60%		
Italy				61%		
Indonesia				70%		
Turkey				75%		
Peru					82%	

6. Portfolio Management : ‘A MODEL APPROACH TO USING TECHNOLOGY’⁶ Terry Marsh and Paul Pfliederer

1. Fundamentally what is required for creating a hedge fund portfolio is the aggregate long side of the portfolio should be “paired” with the aggregate short side so that portfolio as a whole is market neutral. The first pairing is generally from the same industry. But industry grouping of stocks is not the best way of controlling risk as sub-activities may vary widely. For example pairing Nokia with Ericsson listed in the same industry does not recognize the internal difference between handset company Nokia and networking company Ericsson. Portfolio pairing should contain systematic but unintended exposure such as a tilt towards value and small cap stocks.

⁶ Mastering Investment Part Six 4th October 2002 pages 9 and 10

Estimated sensitivity (beta) to industry returns

	Industry	Index beta - industry returns	Portfolio beta
1	Aerospace and Defence	0.45	0.45
2	Auto- manufacturers and part makers	0.60	0.60
3	Banks	0.86	0.86
4	Building material and components	0.55	0.55
5	Business and public services	0.67	0.67
6	Chemicals	0.77	0.77
7	Cosmetics and personal care	0.87	0.87
8	Electrical utilities	0.96	0.97 (0.01) difference
9	Energy sources	0.69	0.69
10	Entertainment and leisure	0.70	0.70

11	Fixed line communications	0.51	0.51
12	Food and beverage makers	0.76	0.76
13	Forest products and paper	0.40	0.40
14	Home construction and furnishings	0.43	0.43
15	Industrial transportation	0.25	0.25
16	Insurance	0.71	0.71
17	Machinery and Engineering	0.81	0.81
18	Media	0.59	0.59
19	Mining and metals	0.30	0.30
20	Oil and gas	0.29	0.29
21	Real estate	0.45	0.45
22	Retailers	1.10	1.10 (0.01)
23	Technology	0.30	0.30

	hardware and equipment		
24	Textile and apparel	0.27	0.27
25	Travel	0.32	0.32

2. The table indicates that for identical returns from industry and portfolio, the securities from the select industries identified for exclusion should not be included.
3. In a table of 100 stocks randomly assign ‘over performing’ and ‘underperforming’ alphas. Note the volatility of Standard and Poor at the time of constructing the portfolio – example 23 per cent. For this 12 per cent return is needed to create the information neutral expected return. With random marking of 100 alpha we get 54 long and 48 short with a predicted volatility of about 5.6 per cent to be caused by company specific events and a predicted beta of -0.0014 . This has a zero net exposure to systemic risks.
4. If such a model is used complications arise when market makes large moves as then risk exposure will not remain constant. Secondly if the predicted equity risks remain constant, the long short strategy pay-off unevenly across market scenario.
5. Risk models are therefore to be used. Risk is a key ingredient in the investment technology used to construct portfolios. Structural and random form models exist. Yet they do not improve upon a

performance because stocks of a highly leveraged company would have option like payoffs as a function of the company's earnings and dividends streams. This may be so even when the dividend stream was linear with respect to common factors across the stocks. Therefore it is difficult to predict day to day movements or weekly re-balance intervals because even a non linear model would become linear for such short periods.