Summary of Investment Theories

Temple Bar
Independent Financial Advice Ltd.

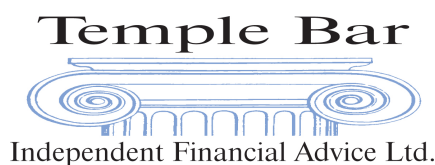**Temple Bar guide objectives:**

Temple Bar IFA Ltd hopes to demonstrate:

◆ correlation of asset classes;

◆ diversification;

◆ hedging;

◆ the main investment theories;

◆ the basics of behavioural finance;

◆ portfolio theory;

◆ pricing;

◆ fair value.

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1 Introduction

Investment experts expound numerous theories aimed at maximising returns and reducing risk in relation to investment portfolios. Modern investment theories focus on statistics and statistical models – essentially reducing a large amount of information to small amounts that will help the analyst to focus on key details. This topic will consider the main theories. Before looking at the theories, however, we need to understand a number of key concepts that are essential facets of investment theory.

2 Diversification

In simple terms, diversification is the spreading of risk by putting the capital into a number of investments and asset classes – not putting 'all of the eggs in one basket'. This is a sensible approach because the impact of one investment failing will be reduced if it is one of a number of investments that react differently to external factors.

3   Correlation between asset classes

Correlation looks at the linear relationship between two types of asset in terms of performance, measured in numbers from +1 to -1: the extent to which asset classes tend to rise and fall together.

◆ A correlation **above 0** is said to be a **positive correlation**, getting stronger the nearer it gets to +1.

◆ A correlation

below 0 is said to be a

negative correlation, getting stronger the nearer it gets to -1.

◆ A correlation of **+1** will be **a perfect positive correlation**, while a correlation of **-1** will be a **perfect negative correlation**.

◆ A correlation of **0** would indicate **no correlation** between the assets. They would move up or down independently of each other.

In asset terms, this means that two assets with a correlation of +1 are likely to rise and fall in the markets at the same time and by the same relative amount; the same external factors are likely to affect them. Two assets with a correlation of -1 are likely to behave in exactly opposite ways – as one rises, so the other falls, etc. This means that external factors are likely to affect them in different ways.

The correlation coefficients are worked out by looking at the historical performance of the asset classes.

A high positive correlation between the asset classes in a portfolio will increase the risk because, if one falls, so will the others. For this reason, in most portfolios, it is sensible to balance the risk by including <u>asset classes with a low or even negative correlation</u> where possible, although those willing to take higher risks may choose to ignore this principle in the pursuit of gain. <u>There is little benefit in selecting assets with a perfect negative correlation, because negative movement in one will totally cancel out positive movement in the other and vice versa,</u> effectively producing a totally neutral result. The ideal portfolio would look for low correlation between assets.

Gold is traditionally seen as a safe haven when stock markets have problems, because it has low correlation with other assets. The World Gold Council publishes correlation statistics on a quarterly basis, and it would be interesting to look at the findings from the Q4 2009 analysis (see Table 1).

As we can see, there is a strong correlation between shares worldwide, but a very weak correlation between gold and most other assets listed – generally hovering around zero. The correlation between bonds and shares is also generally weak. This explains why most managed funds include both equities and bonds in the portfolio.

4   Asset allocation

An important aspect of diversification is asset allocation, whereby the investor selects the type of assets to include and in what proportion. Asset classes can be categorised broadly as:

◆ cash;

◆ fixed-interest securities (gilts and bonds);

Table 1 Asset correlation

Asset	Gold	FTSE 100	FTSE AIM	MSCI	BC GT	BC G HY	BC G EM
Gold(1)	x						
FTSE 100 (2)	-0.20	x					
FTSE AIM (3)	-0.07	0.70	x				
MSCI World (exc UK)(4)	-0.25	0.93	0.74	x			
BC Global Treasuries (5)	0.05	0.14	-0.09	0.07	x		
BC Global High Yield Bonds(6)	0.14	0.05	0.27	0.01	0.41	x	
BC Global Emerging Markets Bonds(7)	0.23	-0.06	0.10	-0.11	0.42	0.75	x

(1) *The London Gold Fix (Sterling)* – the daily gold price set by the London market.
(2) *FTSE 100* – the UK's top 100 companies by market capitalisation.
(3) *FTSE Aim Index* – an index comprising all the companies eligible to join the AIM.
(4) *MSCI World* (exc UK) – an index of selected shares from 23 countries, excluding the UK.
(5) *Barclays Capital Global Treasuries* – an index of selected government bonds from around the world.
(6) *Barclays Capital Global High Yield Bonds* – an index of selected high-yielding investment grade bonds.
(7) *Barclays Capital Emerging Markets Bond* – an index of selected bonds from emerging markets.

◆ equities;

◆ property.

Investment professionals usually drill into the broad asset classes shown above, often working with between 9 and 15 asset classes. The additional 'sub classes' can include shares in different indices (FTSE 100/250/All Share), shares by market capital (large and small companies), shares in different countries, and so on.

The investor's (or manager's) objectives will dictate which of the classes are appropriate for them. For example, if the need is for income, a significant part of the investment will probably be in cash and fixed-interest securities. Some of the portfolio should be held in income-producing shares or collectives in order to provide the potential for capital growth. If an income portfolio does not benefit from capital growth, the income will remain static and inflation will reduce its value. Allocating the assets in the right proportion will help the investor to meet their objectives.

At the opposite end of the spectrum, a portfolio with a capital growth objective will hold very little in cash and fixed-interest securities – they do not provide significant capital growth.

When allocating assets within a portfolio, it is also important to look at the types of vehicle within each class. An investor wanting capital growth would be well advised to invest in overseas equities as well as those of the UK. The exact allocation of each will depend on their precise objective, their timescale and their attitude to risk.

Table 2 provides some examples of typical asset allocation for different investors, taken from genuine portfolio types.

Table 2   Asset allocation

Asset type	Growth	Balanced	Cautious	Monthly income
UK equities	50%	35%	20%	0
US equities	10%	7%	0	0
European equities	10%	7%	0	0
Japanese equities	5%	4%	0	0
Far East equities	5%	2%	0	0
UK bonds	20%	45%	80%	100%

Once the asset allocation has been decided, it is important to check on a regular basis to make sure that the balance is maintained. Assets within the portfolio will grow or fall at different rates and it is easy for one type of asset to form a larger or smaller proportion to that originally intended.

4.1 Further diversification

As we have seen, the theory of diversification is quite simple; its practical application is more complex. The best way to diversify is to select assets with perfect negative correlation but, as we saw from the Gold Council's figures, that is often easier said than done. In addition, as we saw earlier, assets with perfect negative correlation will cancel each other out, resulting in neither growth nor loss. The investor (or manager) will have to decide on a level of correlation that meets the needs of the portfolio, probably accepting relatively low correlation, or no correlation, as an acceptable compromise.

One way to achieve diversification is to select a range of shares rather than investing in just one or two companies. Ideally the shares should be in companies from different market sectors, which will protect the investor from certain factors that are likely to affect a whole sector. If this is not possible, or desirable, selecting shares from the same sector will achieve some degree of diversification. Think back to the dot.com boom of the late 1990s and the collapse of the sector a few years later. More recently the banking sector suffered major losses, and those whose funds were heavily invested in banks suffered badly, while those with limited exposure weathered the storm with limited damage.

As we have seen from the recent global recession, the economies of different countries do not always move together and may be at different stages of the economic cycle. For example, it was generally recognised that the UK economy emerged later from recession than most of its European neighbours. For this

reason, another way to achieve diversification is to select shares from overseas companies, although investing overseas may, in itself, be seen as riskier than investing in the UK.

There is no agreed 'perfect' number of shares to achieve diversification in a portfolio. However, most experts agree that a portfolio of **30 shares will give a high level of protection**; increasing the portfolio beyond 30 will not provide significant additional protection. For example, a portfolio of 100 shares will not provide a proportional increase in the benefit of diversification but could weaken the portfolio performance.

It is also possible to diversify geographically. A spread of shares or collectives invested in the UK, Europe and worldwide is a good example of this.

5   Hedging

Hedging is simple concept and is often used in everyday life. For example, placing a bet on a horse to finish in the first three places in a race, known as an 'each way' bet, is hedging. Although confident that the horse will perform well, the punter is not confident that the horse will actually win, and decides to protect their money by ensuring that they will still win something if the horse finishes second or third. In return for the improved chance of winning something, the gambler accepts that they will win less if the horse actually wins the race.

In investment terms, an investor will hedge by selecting a share (or another asset) that they think will increase in value. At the same time they arrange another investment, usually a derivative, to reduce the potential downside of a reduction in the share price. For example, by using a put option on the same share, they could make a profit if the share price fell, giving themselves the equivalent of an 'each way bet' – if the shares increase in value they will profit from buying them, but if the shares fall they will also profit by exercising the option. Of course, buying the put options will reduce the amount they can invest in the shares and so the potential return if they do increase, just as an each way bet on a horse will reduce the potential return if the horse wins. (Derivatives were covered in detail in Topic 5.)

6   Modern portfolio theory

The modern portfolio theory (MPT) resulted from the work of Harry Markowitz, a US economist and academic, who published the theory as an article in *The Journal of Finance* in 1952. Modern portfolio theory is based on simple principles, although the theory itself and its application are more complex. We will look at the basics of the theory rather than the fine detail. The underlying principles of the theory are as follows.

◆ Beating the stock market by selecting specific shares (stock picking) is very hard.

◆ Achieving such an outcome involves taking an above-average degree of risk.

◆ Taking the additional risk would result in higher losses if the market were to fall.

◆ Even a share offering long-term growth potential could be in danger from volatility, particularly where the investor's investment objective has a relatively short time span.

◆ Volatility can be reduced effectively through diversification.

◆ The total volatility of a diversified portfolio of shares will be lower than the average volatility of the individual shares in it.

Until Markowitz's theory became widely accepted, experts felt that the best way to build a portfolio was to assess the potential risk and reward of individual securities and include those offering the highest potential for gains with the lowest risk. In many cases this led to a portfolio diversified in terms of shares but not sectors. If an investor felt banks offered good growth prospects with acceptable risk, they would focus the portfolio on bank shares rather than on a number of sectors. Markowitz's findings really confirmed most experts' unstated concerns – that such an approach was flawed.

The MPT asserts that investment decisions should be based on the investor's **overall attitude to risk and reward** rather than on selecting individual shares or assets that might be attractive in terms of risk and reward. As long as there is no direct correlation between the risks of the individual assets, then the overall risk of a diversified portfolio will be lower than the individual assets within it. We can look at a simple example here. Buying shares in one company that manufactures umbrellas and another that makes beachwear will give the investor the potential to profit come rain or shine. Buying shares in just one company will mean returns are dependent on the weather.

MPT identifies two elements of risk relating to individual shares – systemic and unsystemic risk, factors that we looked at in Topic 7. A brief reminder:

◆ **systemic risk (market risk)** is the risk that news or events will affect the financial system and markets as a whole. It cannot be reduced by diversification;

◆ **non-systemic risk (specific risk)** is the risk specific to a particular company or sector, and can be reduced by diversification.

6.1 The efficient frontier

The 'efficient frontier' is an essential part of Markowitz's modern portfolio theory and helps to identify the optimum level of diversification in a portfolio. It considers the expected values, standard deviations and correlations of assets in the portfolio in order to calculate the portfolio's expected return and volatility of a portfolio.

We considered earlier the risk–reward relationship, whereby low-risk assets tend to produce steady returns but relative safety, whereas high-risk assets tend to produce higher potential returns but with a higher potential risk to the capital. The perfect investment portfolio would combine assets so that individual asset volatility is balanced out, and the total package has a lower standard deviation than its individual components.

Assume an investor has decided to build a portfolio of four shares; the shares do not have to be held in equal amounts. They could choose to invest 50 per cent in one share, 20 per cent in another and 15 per cent in the other two, and so on. Each combination – and even with just four shares there will be thousands – will present a different potential risk and reward profile. There are two ways of looking at the outcomes.

◆ For each level of return the investor aims to achieve from the combination of four shares, there will be a number of potential portfolios, each one carrying a

different **level of risk**. The perfect portfolio would be the one that carries the lowest level of risk for the return they require.

◆ Alternatively, for each level of risk the investor is prepared to take with the four-share combination, there will be a number of potential portfolios, each one offering a different **level of potential return**. The perfect portfolio is the one that offers the highest potential return.

Whether looked at from the perspective of return or risk, this provides the basis to put together a portfolio to meet the investor's profile. We have referred to shares so far, but we could equally build the portfolio from a range of asset classes to achieve the same results.

We can take this a stage further and look at a more likely example. An investor has decided to put together a portfolio from the shares contained in the FT 30 index, which is a very long running and stable index of 30 of the UK's leading and most traded shares. The efficient frontier will enable the investor to put the shares into the best combination to meet their risk and reward profile. A computer program will collect data about the expected returns, volatility (standard deviations) and correlation of the component shares and plot a scattergram showing all the potential portfolios that could be constructed from the 30 shares, representing each one as a mark on the scattergram.

The top line of dots on the scattergram will form a line showing an upward curve; it is this line that Markowitz referred to as the 'efficient frontier'. An example is shown in Figure 1.

Figure 1 The efficient frontier
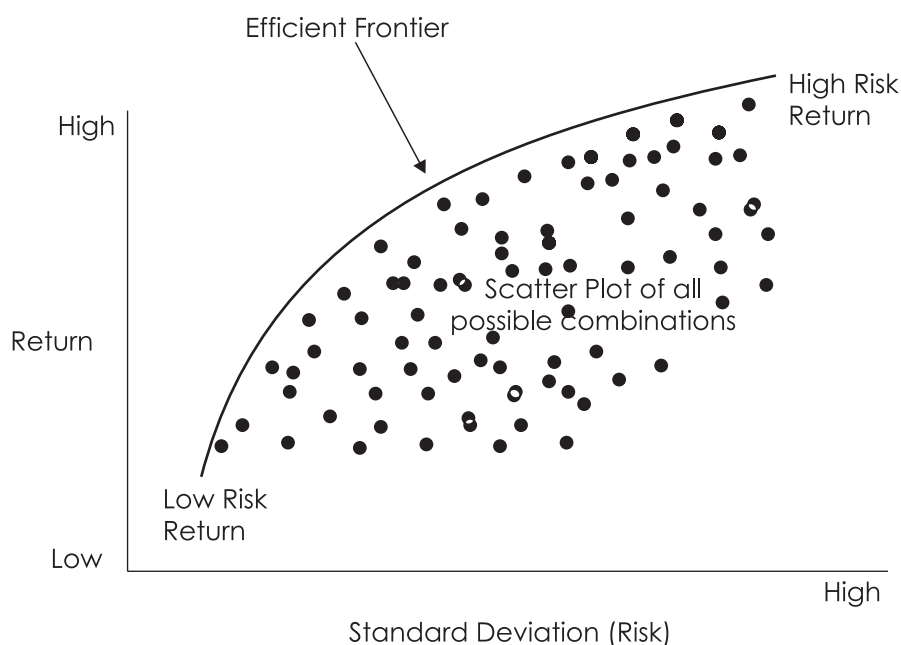
The portfolios on the lower left of the graph are those offering the highest returns from the lowest risk, while the portfolios on the upper right represent those offering the highest returns for the highest risk. The dots on the outer edge of the frontier represent those combinations offering the best returns for a given level of risk and vice versa. For the purposes of this text you do not need to understand

the mathematics behind the result, just the fact that it allows the investor to select the portfolio that will give them the best potential return in line with the risk they are prepared to take.

7 The efficient market hypothesis

According to the efficient market hypothesis (EMH), it is impossible to outperform the market because all the relevant information required to analyse shares is in the public domain and is reflected in the prices. As result, shares always trade at a realistic and fair value, which makes it impossible to buy undervalued shares or sell at inflated prices. In addition, it should not be possible to outperform the market through expert stock picking or market timing. The investor would have to buy higher-risk investments to gain higher returns. One implication of the hypothesis is that it should be almost impossible for a fund manager to beat the market by stock selection; **a simple tracker fund would produce similar results at much lower cost.**

There are three 'versions' of the hypothesis.

◆ The **weak** version assumes that prices on the markets reflect all past publicly available information including past volume and price data. Basing decisions on past performance will not earn additional returns, and that technical analysis is of little use.

◆ The **semi-strong** version assumes that prices reflect all publicly available information and instantly change to reflect new information. Everybody involved in the market has access to this information, so making decisions based on, for example, earnings and dividend declarations, financial statements and economic data is unlikely to result in consistent outperformance. Evidence indicates that markets are semi-strong for most types of information.

◆ The **strong** version assumes that not even those with access to 'insider information' can 'beat the market'. Strong form EMH will not exist in an economy such as the UK or USA where there are laws to prevent insider dealing, unless everyone ignores the law.

NB: There is a significant body of opinion against the efficient market hypothesis, which cites <u>substantial evidence of investors beating the market by careful analysis and stock selection.</u> In addition, various stock market surges and crashes have resulted in share prices that do not appear to represent fair value – the 1987 stock market crash being just one example, and the dot.com boom another. Therefore Temple Bar generally do not use tracker funds.
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8 Behavioural finance

Quantitative investment models make no allowance for the effect of human behaviour on financial markets; they are totally theoretical and based on empirical evidence.

Behavioural finance considers the influence of psychology on the behaviour of those operating in the financial markets and how it impacts on the markets. It considers the role of social, cognitive and emotional factors in the economic decisions of investors, and the effect they have on market prices, returns and the allocation of resources. It particularly focuses on how investors interpret and act on information to make 'informed' investment decisions, which can often result in market anomalies.

There are three main aspects to behavioural finance.

◆ **Heuristics** – people make investment decisions using a general rule of thumb rather than a thorough analysis of all the relevant factors. This can include such phenomena as:

  – cognitive bias – where the individual makes errors of judgement because they filter information in line with their own beliefs or experiences rather than taking information at face value;

  – the herd mentality;

  – confirmation bias, where people tend to be biased in favour of the point they are trying to prove. If they think a share is unlikely to perform well, they will unconsciously seek evidence to prove it rather than disprove it.

◆ **Framing** – people react differently and reach different conclusions according to how a problem is expressed.

◆ **Market inefficiency** – investors and the market ignore the expertise and opinions of expert economists, resulting in outcomes that are contrary to rational expectations and market efficiency.

Contrarian investors are those who believe in going against the crowd. For example, if the market feels that a stock is a poor performer, the price could be driven so low that that it exaggerates the risks and understates the potential rewards when it recovers. A contrarian will look to buy the share and sell it when it recovers, on the basis that all available information is available but the market has mispriced it. On the other hand, if a stock is buoyed by market optimism, it may be overpriced, leading to unrealistically high valuations that will eventually prove unsustainable when expectations are not met. The contrarian will go against the flow and sell the share to consolidate the gains before sentiment changes.

Topic summary

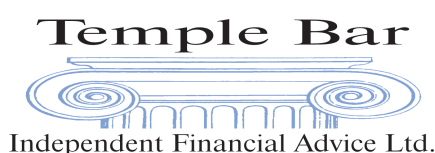We hope the client obtains the following:

The client should understand some of the basic principles, such as asset allocation, correlation and the need for diversification, but they need not become too involved in the detailed technical theories. Temple Bar follows Modern Portfolio Theory.

◆ In this article we looked at:

– correlation of asset classes;

– diversification;

– hedging;

– the main investment theories;

– the basics of behavioural finance;

The Temple Bar approach to investments is based on Modern Portfolio Theory, which shows that by far the dominant contributor to total portfolio returns is the asset allocation (that is the proportion held in shares, property, bonds and cash) of that investment portfolio. Furthermore asset allocation, on average, has been shown to account for **91.5%** of the variation of portfolio returns over time.

Myners 2001 & Sandler 2002 , the two major regulatory reviews into institutional investment drew much of their research from Modern Portfolio Theory. Both highlighted the importance of asset allocation and stated that strategic asset allocation should receive a level of attention (and, where relevant, advisory or management fees) that fully reflect the contribution they make towards achieving the fund's investment objective.

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