4 Investment principles

4.1 Learning outcomes

After studying this text the learner should / should be able to:

1. Distinguish the ultimate investments of the financial system and real economy and the investment vehicles which intermediate them and the investors.
2. Define the objective of investment.
3. Explain the investment environment and the research levels.
4. Demonstrate an understanding of, and the relationship between, risk and return.
5. Appreciate the existence of investment theories and the lessons drawn from them that are relevant to investments.
6. Describe the principle underlying the valuation of investments.
7. Explain the essence of portfolio management.
8. Describe asset class allocation of the course of the life-cycle.

4.2 Introduction

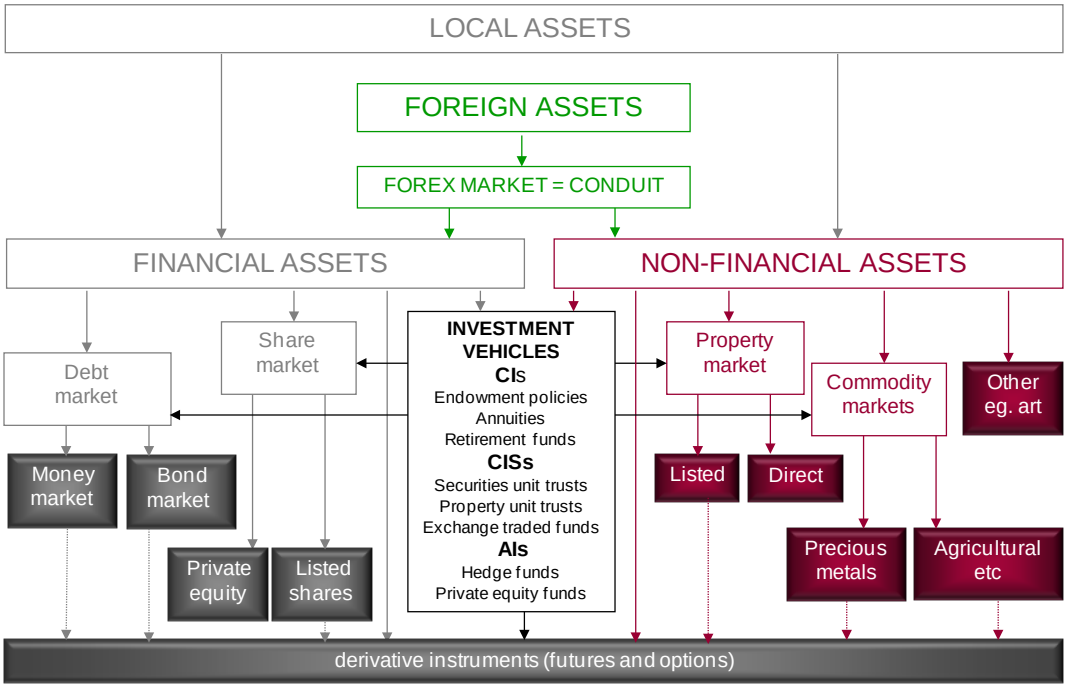

Figure 1: investments

Thus far in this text on lifecycle investing, we have covered prudent lifestyle conduct (in order to reach your FSG as early as is possible), the financial system (from which three of the asset classes spring), the detail of the ultimate financial investments, real investments, and the investment vehicles (which have as assets the two aforementioned), the liabilities of which (PIs) are the main investment form for individuals. A summary of the above is provided in Figure 1.

A reminder of the asset classes, and the extent to which they are held directly or indirectly, is presented in Table 1, for the institutional investors (i.e. the investment vehicles – managed by fund managers) and the individual investors.

Financial assets:	**Institutional investors:**	**Individual investors:**
Shares	Held directly (with some exceptions): • Ordinary shares • Preference shares	Held in directly via CIs & CISs: • As on left Held directly (HNWI) • Ordinary shares
Bonds	Held directly (with some exceptions): • Government bonds • State-owned enterprise (SOE) bonds • Corporate bonds • SPV bonds • Foreign bonds	Held indirectly via CIs and CISs: • As on left Held directly: • Government bonds (retail bonds)

Money market	Held directly (with some exceptions): • Treasury bills • Commercial paper • NCDs & NNCDs	Held in directly via Cis and CISs: • As on left Held directly: • NNCDs
Hedge & private equity funds	Held directly	Not held
Real assets:	**Institutional investors:**	**Individual investors:**
Property	Held directly: • Commercial buildings Held indirectly: • Mainly PUTs	Held in directly via CIs & CISs: • As on left Held directly • Own residential property • PUTs
Commodities	Held directly: • Mainly precious metals Held indirectly: • Commodity ETFs	Held directly: • Precious metals (coins) • Cattle (in some countries)
Other real assets	Not held	Held directly (by HNWI): • Antique furniture • Rare stamps and books • Art, etc

Table 1: Asset classes of institutional investors & individual investors

This main section is concerned with the principles of investments. It is important to have a clear idea of the objective of investment and to differentiate it from speculation and gambling. It is essential to have an understanding of the context / environment of investments: the macroeconomy and its drivers, and the substance of the four levels of research. It is essential to be cognisant of the risk inherent in most investments and appreciate that there is a positive relationship between risk and return.

Because of the significance of investments to all individuals, many theories on and related to investments have been proffered. While not all are of pragmatic employ, many of them extrude useful practical lessons. An important principle is that financial and real asset markets discover prices which do not necessarily align with fair value (given the level of risk-free and other interest rates); thus, it is important to appreciate the principle underlying the valuation of investments. It is also important to understand the essence of portfolio management.

These issues are addressed under the following headings:

- Definition and objective of investment.
- Risk-free rate.
- Investment environment.
- Risk and return.
- Investment theory: practical lessons.
- Valuation of investments.
- Portfolio management.

4.3 Definition and objective of investment

The term *investments* refers to a portfolio of assets purchased with available funds that provides a return in the form of periodic cash flows and/or a gain (or loss) in the amount of the original amount invested (the capital). This tells us that there are two parts (either or both) to a return on an investment:

- a periodic cash flow
- a change in the value of the original investment (capital value), which may be positive or negative.

Flowing from this, the *objective* of investment is to *increase* the amount of the original investment by:

- earning a periodic cash flow and/or
- earning a gain in the value of assets (making a capital gain).

Assets need to be managed. Fund / portfolio management is the practice of asset allocation, i.e. the ongoing decision-making in respect of the allocation of funds between risky and non-risky assets, as well as choosing specific assets within asset classes. It is a balance between risk and return. The asset allocation function is based on in-depth asset market research.

Investment is not gambling. Gambling is a game of chance in which the probability of loss (= risk) is high. With investments the probability of loss can be small because there are methods of investment management to reduce risk and enhance returns.

Investment is also not speculation. Speculation is investing own and/or borrowed funds for short-term periods (often intra-day), and the probability of profit is substantially higher than with a gamble. This is so because it is founded on research (technical and/or fundamental). However, the risk is lower than in gambling and higher than in long-term investing.

4.4 Risk-free rate

The risk-free rate (rfr) is a concept that occupies centre-stage in investments / finance. It is a concept that some scholars have difficulty in defining (some have even said that it does not exist). In our view there is not one rfr, but a series stretching from the one-day treasury bill (TB) rate to the 30-year rate (ytm) on government bonds; "it" is simply the rates on government securities (treasury bills and government bonds), which are available daily (in efficient money and bond markets) and you can choose whichever rate you require as a benchmark for an investment.

What does this mean? It means that the rfr is the lowest rate that can be earned with certainty, and that you (when considering an investment for 5 years, for example) should regard the current 5-year bond rate as the minimum return you are willing to accept. It follows that every non-government, i.e. *risky*, investment should deliver a return [call it your *required rate of return* (rrr)] equal to the rfr plus a risk premium (rp):

$$rrr = rfr + rp.$$

This simple formula should be the starting point when consideration is given to any investment.

What does risk-free mean? It means that if you purchase a government security, the rate at which it is bought is *certain to be earned*, and this is because governments don't default[38] (since they have the authority to borrow and tax in order to repay and service their debt).

Thus, there are two broad investment categories: risk-free and risky assets / investments[39]. *Risk-free* assets are government securities which deliver certain but lower returns. *Risky assets* are non-government securities (shares, corporate bonds, property, etc.) which deliver uncertain but higher returns (depending on the holding period). As we will show later, there is a positive relationship between return and risk.

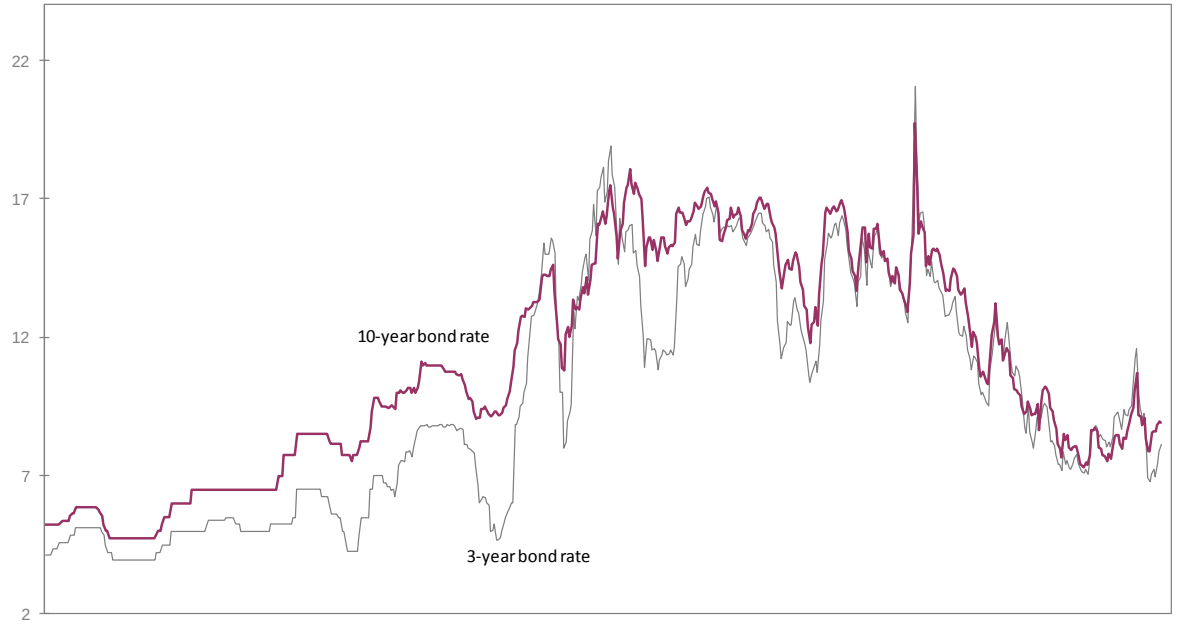

Figure 2: 3-year and 10-year bond rates

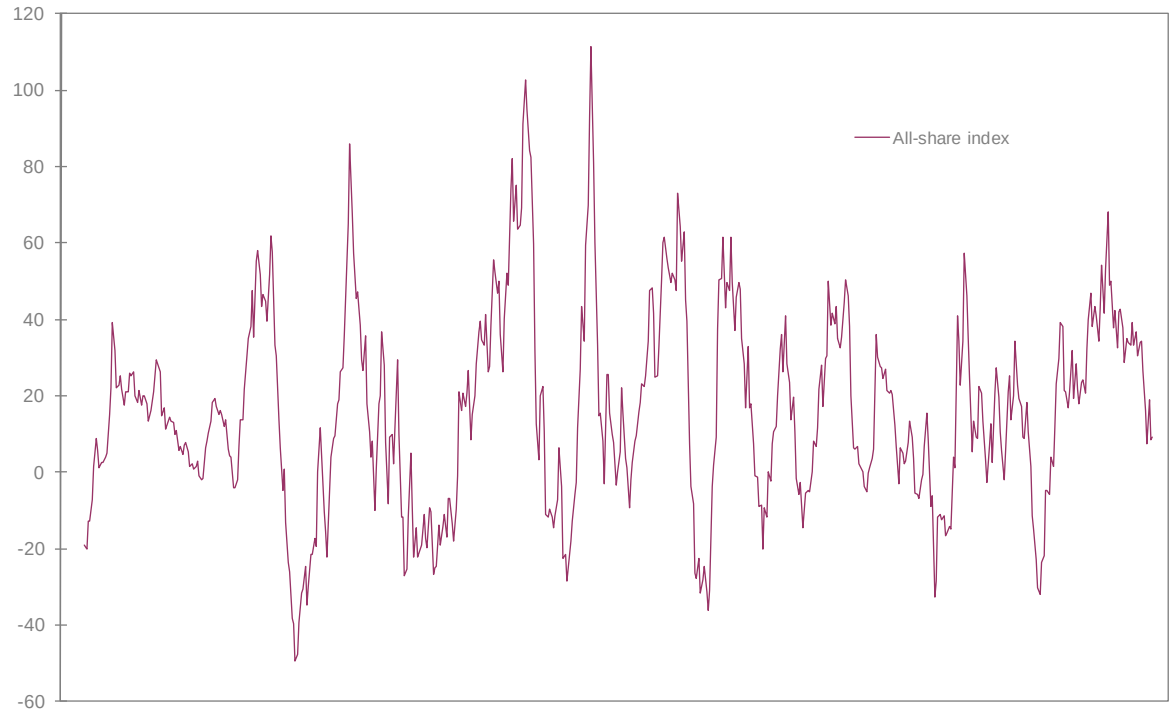

Figure 3: share prices (over 50 years)

However, it is important to mention that risk-free assets are only *credit-risk-free* – as said, because government has the power to tax and borrow funds. They are not *market-risk-free* if they are sold before maturity. What does this mean? It means that the return is only certain if the asset is not traded in the secondary market. Market prices are opposite to market rates, and if the market rate rises to a higher level than the purchase rate, the price will be lower, and a capital loss will be made. However, this is irrelevant in the sense that the rfr just acts as a benchmark return.

4.5 Investment environment

Market prices / rates are volatile and this is the chief risk faced in financial / real asset markets and this takes place in the investment environment. Figure 2 illustrates the 3- and 10-year government bond rates over a 50-year period in a particular country. Figure 3 illustrates the year-on-year changes in share prices over the same period

What is the investment environment? The investment environment is the international economy and the domestic economy, developments in which have an effect on the values (prices) of the assets of the asset classes. It is well known that the prices of financial assets, particularly shares, can be extremely volatile (see Figure 3), and this introduces the element of risk in financial markets. Investment risk is broadly defined as *volatility* in asset prices and it is measured in these terms (see later).

Ultimately, gross domestic product (GDP) growth is the major driver of asset prices, and asset price changes (positive and negative) are often exacerbated by the irrational behaviour of participants in the investment arena (known as the "herd instinct"). GDP is driven by gross domestic expenditure (GDE) and the trade account balance (TAB). GDE is driven by the consumption expenditure (C) and investment expenditure (I) of the private and government sectors, such that C + I = GDE. This is domestic demand. Foreign demand for local products is reflected in exports (X) while imports (M) reflect domestic demand for foreign goods. So, X – M = TAB = *net foreign demand*. The "big picture" (the entire economy) is complete:

C + I = GDE
GDE + TAB = GDP (= the total of expenditure on GDP).

GDP is the total of net domestic production in a year, also called aggregate demand.

Interest rates are a significant factor in the economy (see Figure 4; period of over 50 years) and therefore the financial markets: they are the counterpart of certain asset prices (debt assets) and a significant input into the pricing of dividend-yielding shares (see Figure 5; period of over 50 years) and rent-yielding property. Short term rates (the lower end of the yield curve), as we have seen, are under the "control" of the central bank, the guardian of financial stability. They are the main instrument of central bank monetary policy, and exert a powerful influence on the bank lending rates, and therefore on the borrowing behaviour of the private sector, which drives money creation and GDP (see Figure 6; period of over 50 years).

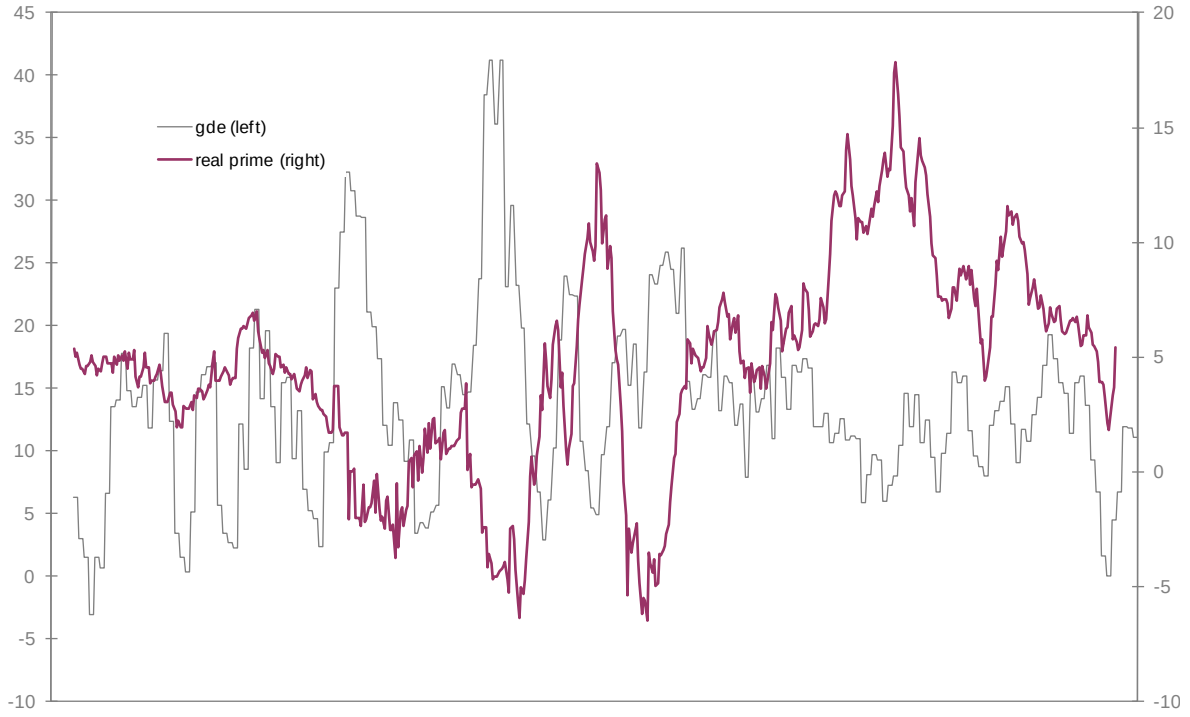

Figure 4: current GDE (yoy %) & real prime (adv 12 months)

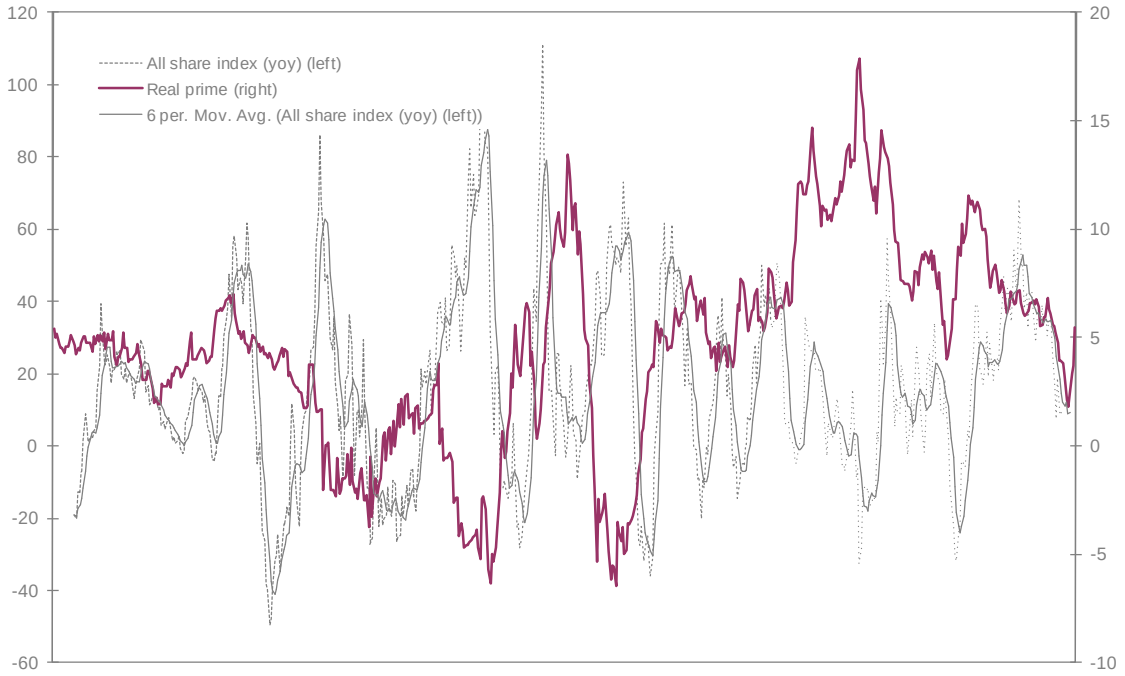

Figure 5: all share index (yoy) & real prime

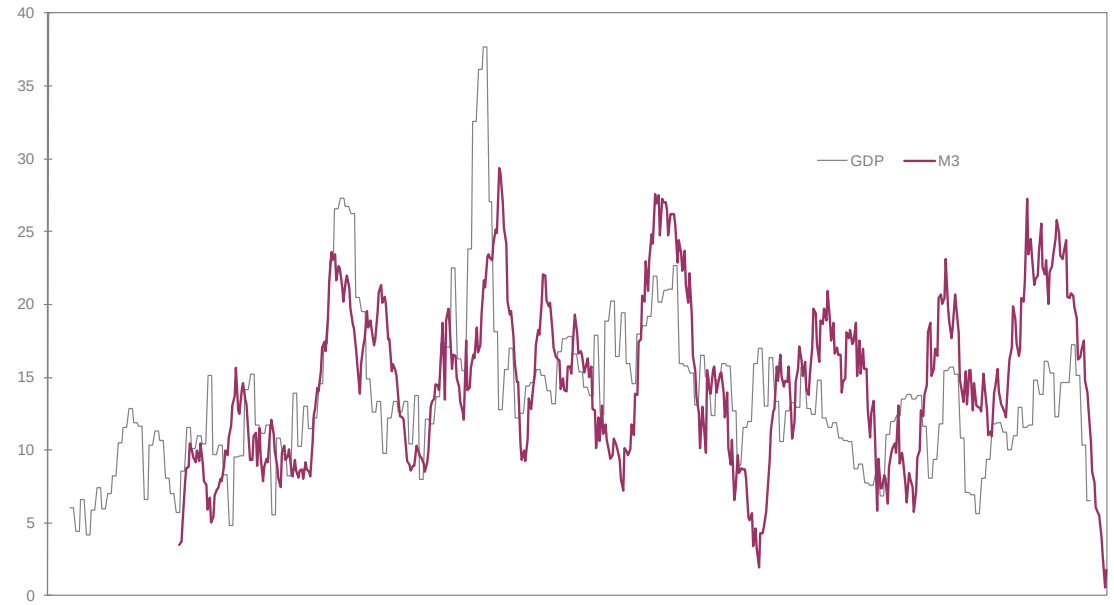

Figure 6: GDP & M3 (yoy %)

Money (M) = bank deposits (in the main; a small part is notes and coins), and changes (which largely are increases) in M (ΔM) are overwhelmingly caused by increases in domestic bank credit (DBC) extended (= the purchase of local financial assets) and the purchase of foreign financial assets (= foreign bank credit extended = FBC). Thus, ΔM is caused by the balance sheet causes of changes (BSCoC) as follows:

$$\Delta M = \Delta DBC + \Delta FBC^{40}.$$

Underlying the BSCoC is a multitude of factors, including the actual demand for credit (DfC), interest rates which affect the DfC, the state of the economy and expectations regarding it, etc.

Money creation ΔM+ is a critical factor in GDP growth (ΔGDP) (Figure 6) and according to the adjusted Fisher quantity theory of money (QTM) [V = velocity of circulation of money (generally a stable number); R = real = adjusted for inflation (P)]:

$$\Delta M + \Delta V = \Delta P + \Delta RGDP.$$

This significance embodied in the QTM is that money growth is an essential ingredient in GDP growth, and that it is maximised if P is kept low (= a low and stable = predictable inflation environment) and this can only be achieved if the change in the demand for goods and services (= the demand side of GDP) (which underlies ΔM) is managed (inter alia by interest rates) at a level that can be satisfied by supply (= the production side of GDP).

So far we have touched upon almost all of the essential elements of the investment environment. To them must be added the financial activities of government (= essentially the budget deficit), which results in borrowing in the financial sector. There are two main sources of funds: the holders of investment money [mainly the "institutions" (= retirement funds, insurers, SUTs and ETFs) and money creation by the banks]. To the extent that the institutions' funds are accessed, the government "crowds out" the private sector, and to the extent that the banks buy government securities, money is created (ΔM+).

In summary, the essential elements of the investment environment = the macroeconomy, are the following:

- Δ(C + I).
- ΔTAB [expanded into the current account of the balance of payments (CaBoP) which includes other flows such as services payments/receipts, and its counterpart, the financial account of the BoP, the FaBoP].
- ΔM.
- Budget deficit.
- Interest rates (dominated by the central bank in the money market).

Why are shares the most volatile of all asset classes? It is because companies take on more risk (versus money market and bonds) in doing business (new projects, they are subject to the business cycle, etc.). Higher risk (measured as higher volatility) equates with higher return in the long term. Therefore history has generated data that demonstrates that shares have outperformed the other asset classes, and that the asset classes have delivered returns in the following (descending) order:

- Shares (including hedge & private equity funds).
- Property.
- Bonds.
- Money market.

For this reason, shares are the most sought-after financial asset, making this asset class subject to intense scrutiny (in the form of industry and company analysis), and susceptible to the herd instinct (captured in the new discipline "behavioural finance"). These influences make shares highly volatile in terms of price changes.

Figure 7 (period = over 50 years) presents the all share index together with GDE in year-on-year growth terms. It will be clear that the share market generally anticipates GDE growth changes, and always overreacts (up and down) to a substantial degree. It is notable that over the period, GDE and the all share index growth rates were similar (1.1% per month). This indicates two main phenomena: the share market is representative of the economy and the share market always reverts to its mean growth rate (= GDE/GDP growth in nominal terms).

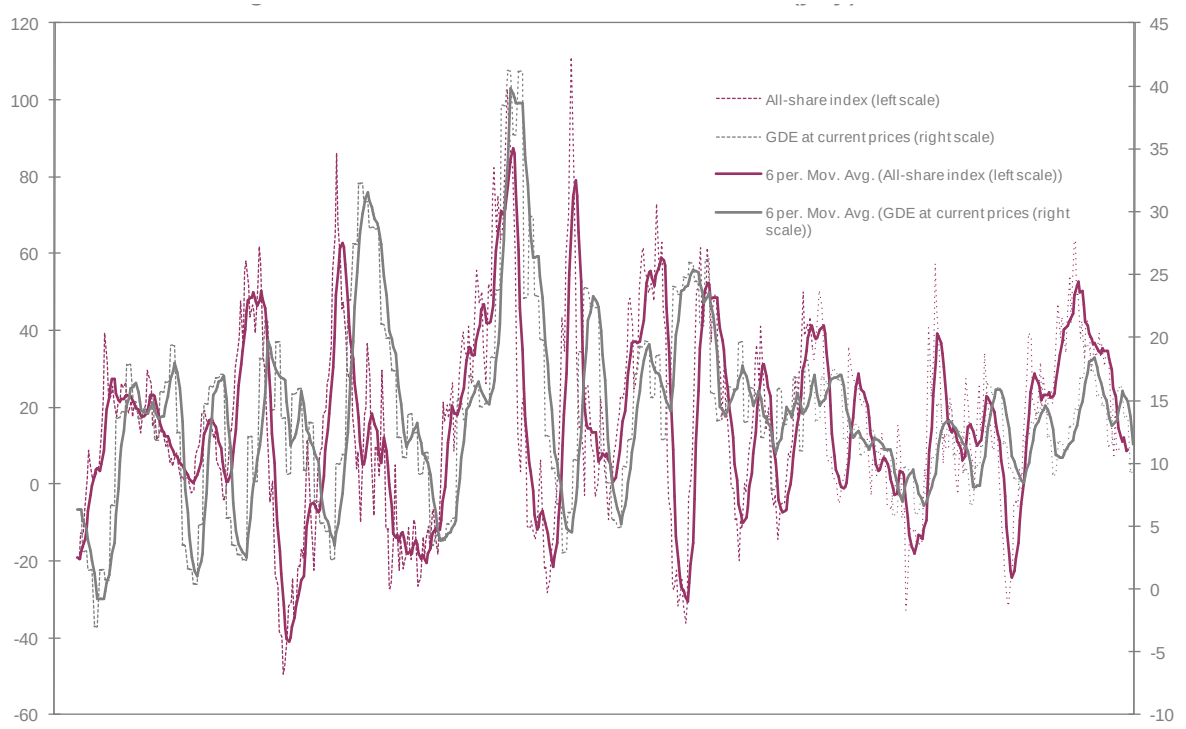

Figure 7: current GDE & all-share index (yoy)

Given asset price volatility, fund managers (or "investment houses") and broker-dealers (who service the fund managers) employ the services of investment analysts and specialist economists to anticipate future asset price developments. The investment analysis process they undertake has four parts, as presented in Figure 8.

It is a well know fact that asset class allocation is the most critical decision made in asset management. It is responsible for a significant proportion of asset / portfolio performance (some analysts say up to 80%). Asset class allocation is critically based on macroeconomic (domestic and international) analysis. In this regard we conclude with a relevant view of an asset manager[41]:

"All investment decisions, particularly those relating to asset allocation, implicitly or explicitly rest on some forward-looking macro-economic assumption. Any change to the macro-economic assumption will inevitably influence the intrinsic or fair value of that investment or asset class. For example, a decision to buy long-term government bonds is based on some assumption about future inflation; if the investor assumed low future inflation and the outcome is high inflation, the value of such an investment would turn out to be dramatically lower than anticipated.

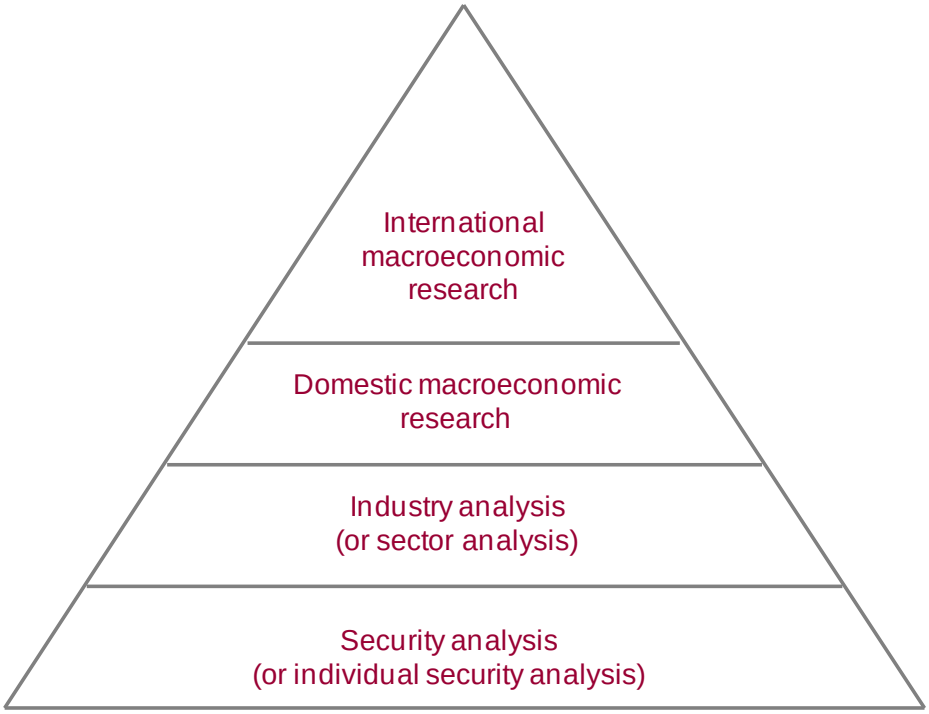

Figure 8: investments analysis: four steps

"One pillar of our investment philosophy is the recognition that the economic future could easily turn out to be very different from the assumptions. Overconfidence in their ability to read the future is a classic mistake made by investors. We guard against this risk by incorporating more than one economic scenario into our investment strategy.

"We consider as wide a range of potential economic scenarios as possible. From these possibilities we typically choose two or three scenarios that we believe cover a significant range of potential outcomes. In this way we acknowledge and mitigate the risk attached to an uncertain, and often unpredictable, future.

"For each economic scenario we make assumptions about short and long-term interest rates, and about economic growth and inflation, both locally and internationally. Using these economic assumptions as our basic input, we estimate the intrinsic or fair value of each asset class that we explore.

"The scenarios have a strong international flavour. In a globalising world, with integrated financial markets, we believe international influences will dominate over time. The scenarios are projected over rolling five-year periods, a time frame typically used by most successful long-term investors.

"We attach probabilities to each scenario. The use of probabilities skews the macro-economic input in the direction that we believe is the most likely outcome. This means that our investment strategy is based on a core macro-economic view, although the element of future surprise is minimised through the incorporation of various scenarios.

"Another pillar of our philosophy is diversification across a range of asset classes. Diversification also hedges our investment strategy against the potential for the future to surprise."

The last mentioned, i.e. diversification, is one of the pillars of asset management; it is given some attention in a later following section.

4.6 Risk and return

4.6.1 What are risk and return?

We like return and dislike risk, but risk is ever-present in all financial markets, and there is a positive relationship between risk and return. In other words risk and return are opposite sides of the same coin.

We know what return is: *capital gains / losses* + *income* (dividends or interest), and it is usually measured as holding period return[42] (HPR):

$$HPR = [(P_1 - P_0) + I] / P_0$$

where: P_0 = buying price; P_1 = selling price; I = income.

If annualised (AHPR):

$$AHPR = (1 + HPR)^{1/n} - 1$$

where: n = years or fractions of a year.

But what is risk? It is the risk of the investment losing value (capital loss) or it not yielding an income or both. This possibility is encapsulated in a measurable concept:

> *The probability of the actual return (HPR) on an investment being different from the expected return (ER).*

There are two broad sources of risk (that contribute to the probability of HPR being different from ER):

- Security-specific risk (aka unsystematic risk).
- Market risk (aka systematic risk).

Security-specific risk arises from the activities of the specific companies, and the industry of which they are a part, and may be seen as the *major factors* that affect the *income flows* of companies. Analysts generally categorise this risk-type into *business risk* (examples: prolonged labour strike, arrival of serious competition from offshore, harmful management decisions, changes in product / service quality); *financial risk* (when debt is utilised as a source of capital, and is used injudiciously by the company); and *liquidity risk* (the risk of the segment of the share market in which the relevant share is being illiquid so that fair market value cannot be obtained).

Market risk is made up of the risks that are inherent in the financial and/or economic *system*. This risk affects all markets and little can be done about it. Examples of this type of risk are: tax changes, upward changes in interest rates (interest rate risk), political instability (country risk), the declaration of a war (country risk), a major change in the exchange rate (exchange rate risk), a change in inflation (inflation risk).

4.6.2 Measuring risk and return

Measuring historical risk and return is straightforward, and it is best elucidated with an example using annual figures. Return over a year is HPR, and risk is the *standard deviation* of returns. This is a measure of the *dispersion around the average return* (= the arithmetic mean) in percentage terms. The formula is:

$$\sigma^2 = \sum_{i=1}^{n} (X - M)^2 / n - 1$$

where

σ^2 = variance of a set of values
X = each value in the set
M = mean (i.e. arithmetic average) of the set (mean return)
n = number in the set
σ = $(\sigma^2)^{1/2}$ (i.e. square root of σ^2) = standard deviation.

Table 2 shows the hypothetical HPR returns on a share for the years 1 to 4, and the relevant calculations.

Year	HPR (%) X	X – M		(X – M)2	
1	25	16.25		264.06	
2	15	6.25		39.06	
3	0	-8.75		76.56	
4	-5	-13.75		189.06	
	M = 8.75		$\Sigma (X - M)^2$ =	568.74	
			σ^2 =	568.74 / 3	= 189.58
			σ =	$(189.58)^{1/2}$	**= 13.77%**

Table 2: Calculation of historical standard deviation

This particular share has a *mean return* (M) of 8.75% and a *standard deviation* (σ) of 13.77%. It will be obvious that the higher the standard deviation, the higher the percentage dispersion around the mean, and therefore the higher the riskiness of this share.

4.6.3 Relationship between risk and return

Figure 9 demonstrates the relationship between risk and return, and it is evident that the relationship is positive, i.e. the return required increases as risk increases. This is so because investors are *risk averse*. The relationship is represented by what is termed the *capital market line* (CML which is used extensively in portfolio literature). If investors were *risk seeking* (which would indicate a mental problem), the CML would be negatively sloped. The slope of the CML depicts the extent of additional return expected / required for additional each unit of risk assumed.

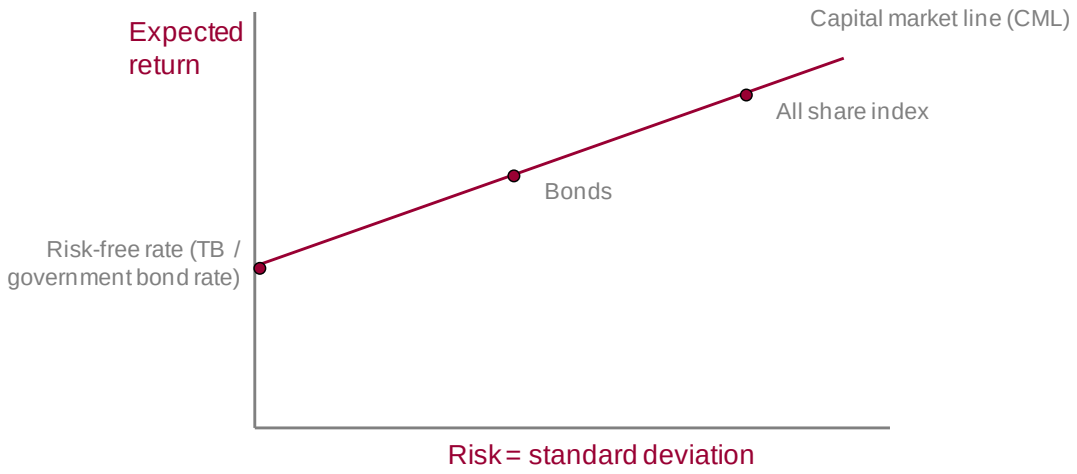

Figure 9: relationship between risk and return

There is ample empirical evidence this relationship: money market at bottom left, bonds in the middle and shares top right. This is covered next.

4.6.4 Risk and return: the record

Fortunately, data is readily available on the risk and return relationship of the three main asset classes: shares, bonds and cash (i.e. money market).[43]

Figure 10 shows the average annual returns and the standard deviations of the asset classes for a period of over 100 years for South Africa. The evidence is indisputable: higher returns are accompanied by higher risk (= dispersion around the mean return).

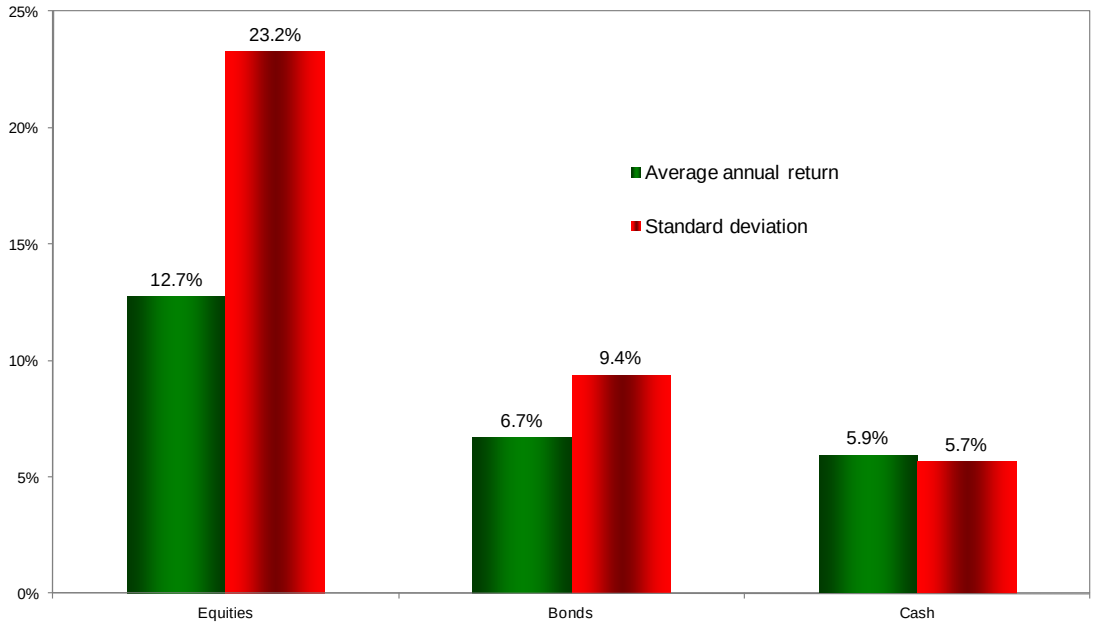

Figure 10: RSA: average annual returns & STD (108 years)

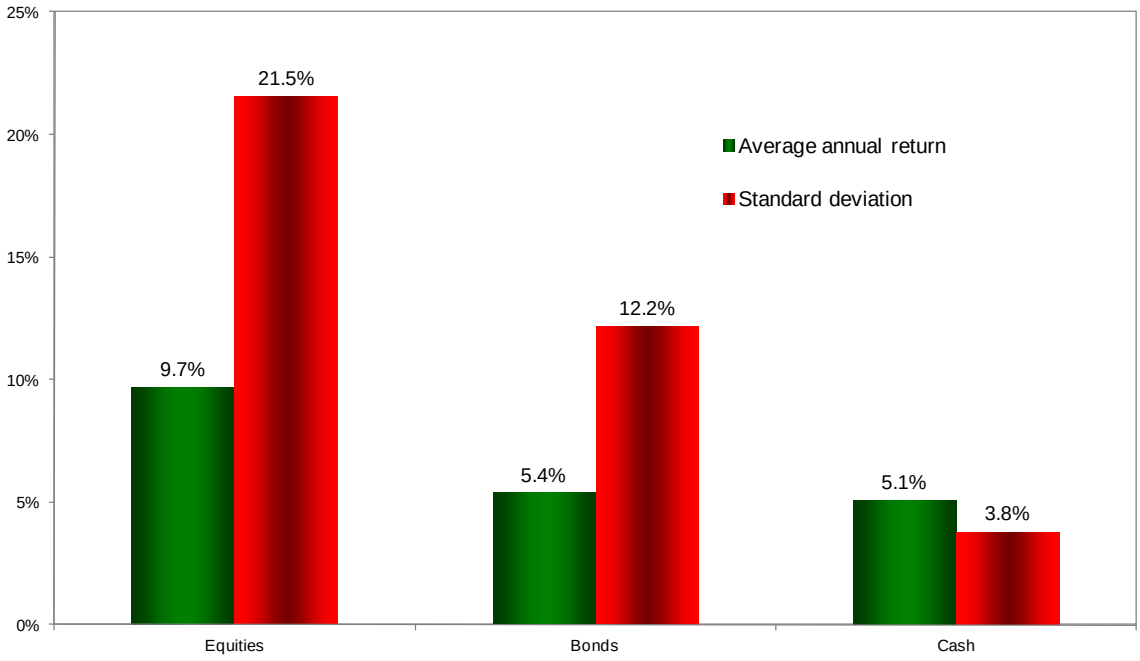

Figure 11: UK: average annual returns & STD (108 years)

Similar numbers are recorded for the UK and the USA (Figure 11 and Figure 12).

It will be understood that when these average numbers are disaggregated into higher frequency numbers the variability of returns (risk) is revealed. Figure 13 shows the annual average returns for shares and Figure 14 shows the same for cash. Note that the scales are the same.

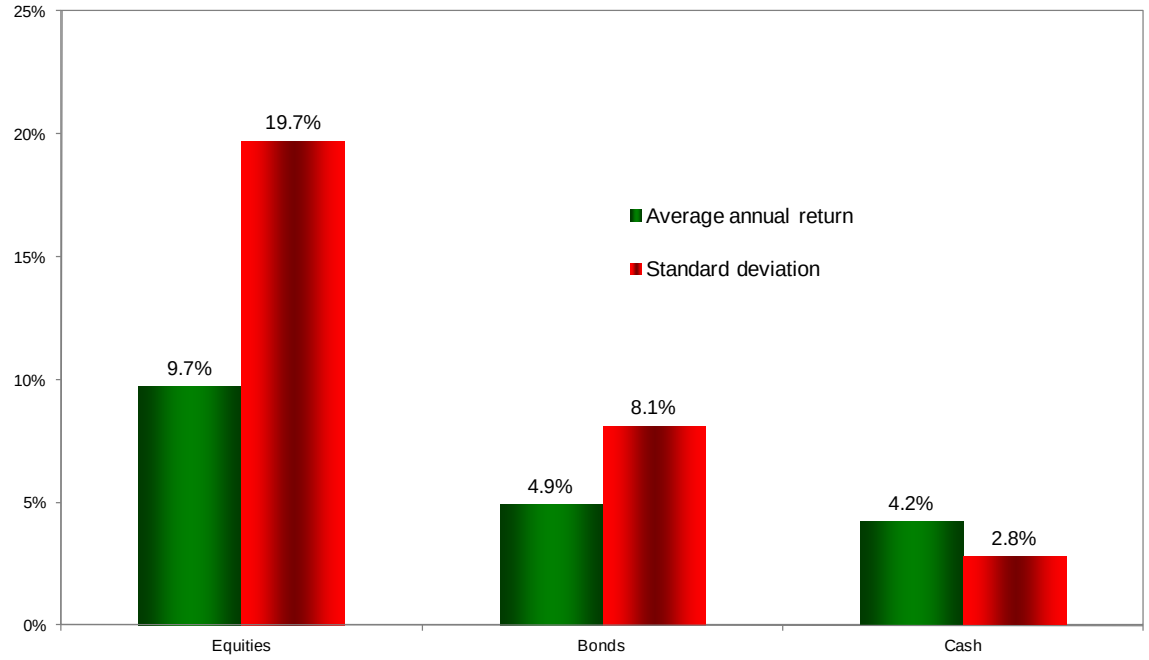

Figure 12: USA: average annual returns & STD (108 years)

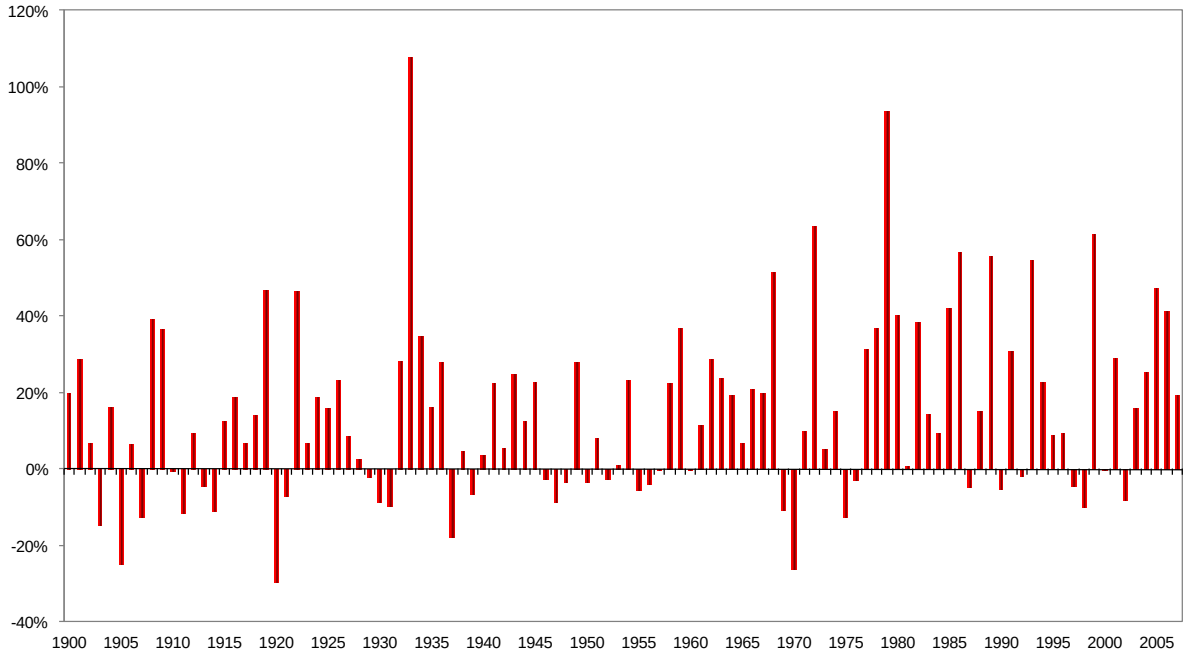

Figure 13: SA shares: annual returns (108 years)

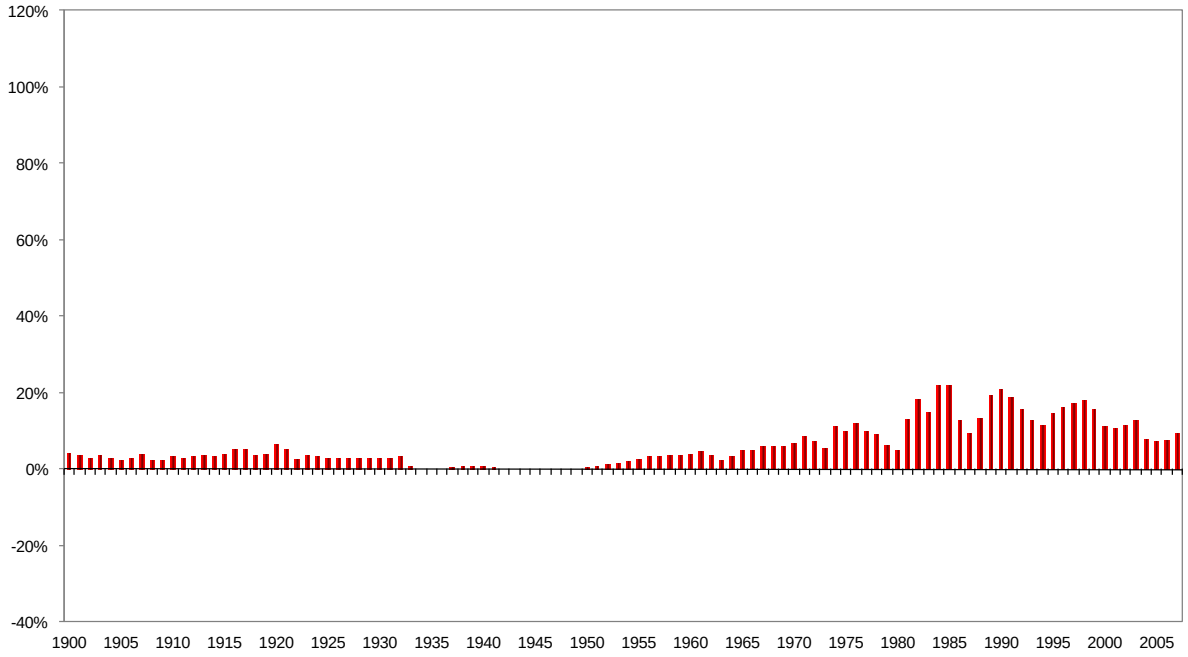

Figure 14: SA crash: annual returns (108 years)

4.7 Investment theories and maxims

4.7.1 Introduction

Individuals have over millennia attempted to improve their wealth and this activity is an innate instinct of humankind. As we have seen, risk is forever inherent in investments, and rational humans endeavour to invest in a manner that maximises return and minimises risk. This desire had given rise to many theories related to investments and maxims (i.e. not quite theories) that revolve around particular investment styles and strategies.

Following is a list of some of the investment-related theories and maxims:

- Top-down investing (the big picture; emphasis on the economy and asset class allocation first and share analysis last).
- Bottom-up investing (share analysis first and de-emphasis of the big picture).
- Value versus growth investing (certain ratios indicate value and growth companies and the former outperform the latter).
- Buy-the-rumour and sell-the-fact (buy shares when positive rumours abound and sell them when the facts are known).
- Castle-in-the-air theory (similar to aforementioned and the opposite of firm foundation theory).
- Fundamental analysis (aka firm foundation theory) (emphasises intrinsic value; similar to bottom-up investing); aka security-valution.

- Cybernetic analysis (mathematically based systems that allegedly predict share price movements).
- Technical analysis (price patterns of the past are detected that foreshadow future price patterns).
- Prospect (or loss-aversion) theory (investors view gains and losses differently and therefore base investment decisions on perceived gains rather than on perceived losses).
- Expectations / market segmentation theories (theories explaining the shape of the yield curve).
- Moral hazard theory (a person insulated from a risk behaves differently than s/he would have being exposed to the risk).
- Principal-agent problem (a special case of moral hazard).
- The 10% rule (do not hold more than 10% in any asset).
- Life-cycle consumption theory (personal financial planning consists of transferring consumption / saving across life-cycle / stages).
- Efficient market hypothesis.
- Markowitz modern portfolio theory.
- Capital asset pricing model.
- Behavioural finance theory.

Some of these theories and maxims deserve more attention. This is provided below. We will not discuss the *life-cycle consumption (and saving) theory* further, as the first main section of this text covered our version of this theory.

4.7.2 Efficient market hypothesis

The *efficient market hypothesis* (EMH) declares that financial markets are *informationally efficient* and this means that investors cannot consistently achieve returns in excess of average market returns, because all investors have and act on the same information.

The EMH is largely ignored in modern investment theory, and its remaining practical usefulness lies therein that the participants in the market who act on new information and expected future information, including the speculators, all contribute to *price discovery* (EPD), and *market liquidity* (ML, which contributes to EPD). ML is important in that investors can buy or sell shares with ease, meaning with no or little effect on market prices.

However, price discovery does not mean *efficient price discovery* in the sense of prices being "correct". There are vast differences at time between value and market prices, as we shall see later. Mr Dave Foord[44], of Foord Asset Management, has the following views on the EMH:

"…we do not believe they are efficient at pricing securities. For evidence of this, look how often the forward interest rate curve is wrong. Also, prices on some multi-billion dollar companies change by more than 5% in a day with little or no material news flow. That is greater than the annual return on US dollar cash in a single day!

"It's important to understand that individual market participants have different time horizons. Probably because of this, they have different valuations. Prices are set by the last seller and buyer. Often their motivations have nothing to do with valuation. In fact, the majority of trade is for speculative purposes and not for investment. Therefore the majority of trade does not take any account of the long-term value of the asset. Why then should the price set by the marginal buyer and seller be correct for all?"

4.7.3 Modern portfolio theory

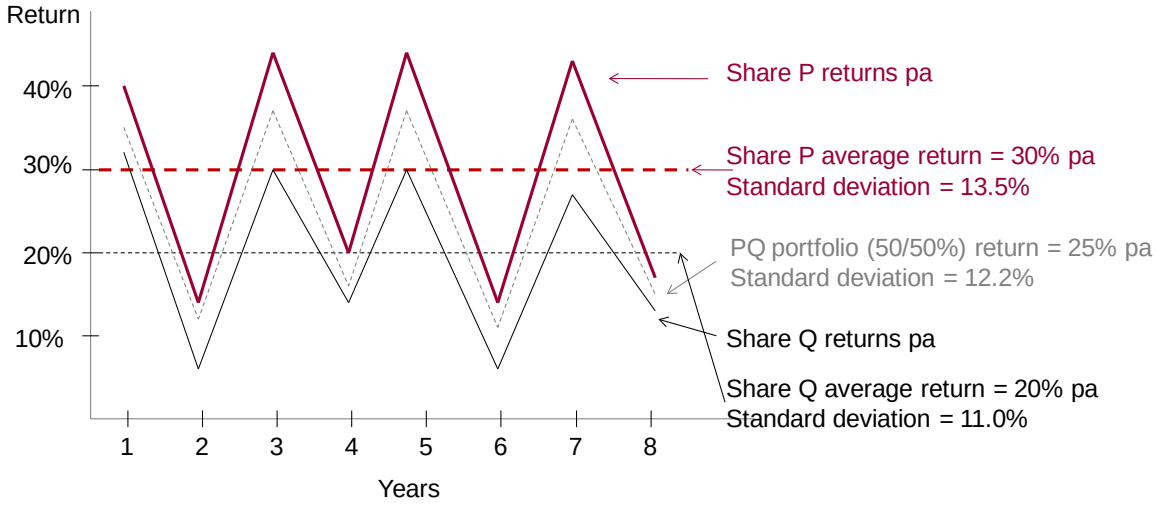

Figure 15: two-asset portfolio: near perfect positive correlation: COR = + 0.98

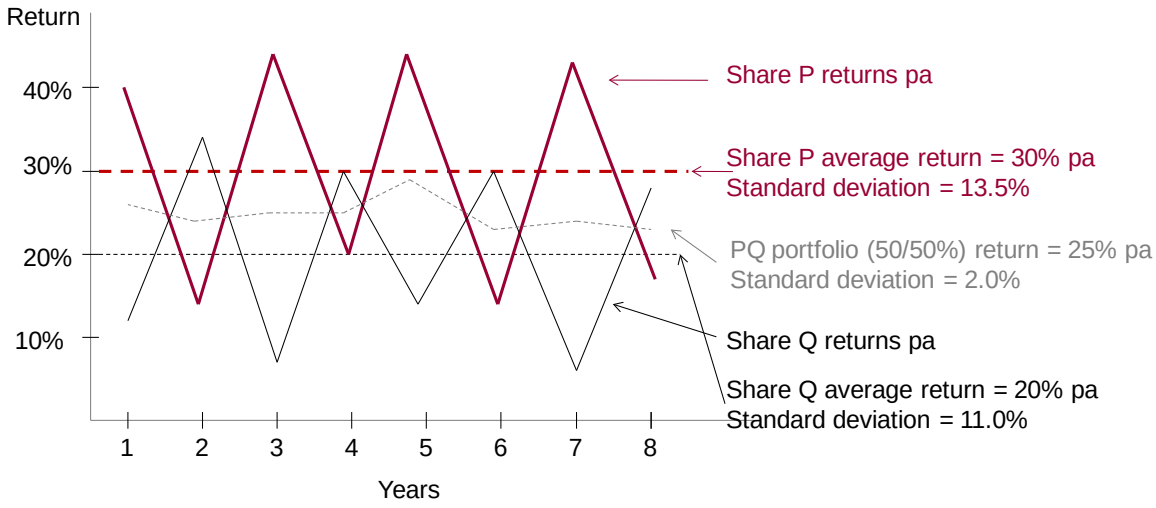

Figure 16: two-asset portfolio: near perfect negative correlation: COR = -0.97

Modern portfolio theory (MPT) was presented by Prof Harry Markowitz in a paper of 1952 and it remains relevant. In a nutshell it postulates that each share has an expected return and risk (measured by standard deviation), and by investing in a number of shares the investor can garner the benefit of diversification, and the benefit is a reduction in the riskiness (standard deviation) of the *portfolio*. MPT measures the benefit of diversification in the form of a lower standard deviation for the portfolio than the average for the shares that make up the portfolio. The benefit of diversification rests on the *relatedness* of the returns of the shares (i.e. the correlations).

Figures 15 and 16 demonstrate the principle. We have a two-asset portfolio made up of Share P and Share Q. In Figure 15 their returns are positively correlated (correlation coefficient – COR = +0.98). The average return is 25% pa and the standard deviation (STD) of the portfolio is 12.2%. In Figure 16 the shares' returns are negatively correlated (COR = -0.97). Note that the average return remains at 25% pa, but the STD is now 2.0%. This is because the volatility of the average return around the mean return (25% pa) is lower.

According to the MPT it is possible to construct an *efficient frontier* of optimal portfolios that offer the maximum possible expected return for a given level of risk, or the least risk for a given level of return. The benefit of diversification is intuitive and is known in general parlance as "not putting all your eggs into one basket". This is a significant principle in investments.

4.7.4 Capital asset pricing model

The *capital asset pricing model* (CAPM) is an extension of MPT. It is a model that describes the relationship between risk and expected return (positive as we have seen) and is used in the pricing of risky securities. It says that investors in risky assets need to be compensated by two components (the total of which is called the *required rate of return* – rrr): the time value of money in the form of the risk-free rate (rfr) and a premium for risk (rp). The latter is calculated by a risk measure [beta, which is a measure of how the share has performed relative to the return in the market (rm) of which it is a part] times the rp:

$$\begin{aligned} rrr &= rfr + rp \\ &= rfr + \beta(rm - rfr). \end{aligned}$$

As we have said (and will further elucidate later), the CAPM formula is used in the valuation of shares (i.e. risky assets).

4.7.5 Behavioural finance theory

Behavioural finance theory (BFT) proposes psychology-based influences to explain share market incongruity [divergence between fair value prices (FVP) and market prices]. Conventional theories such as EMH and CAPM assume that investors behave rationally, and emotions and other exogenous influences do not influence investors. In other words, the conventional theories can explain rational behavior in the financial markets, but the real world proves to be one in which participants often behave irrationally and unpredictably.

BFT fills the gap, and it assumes that, in addition to market information, the personal characteristics of participants (investors, speculators and arbitrageurs) influence their investment decisions and therefore market outcomes – which cannot be explained by the EMH and CAPM. A manifestation of BFT is the expression "herd behavior".

4.7.6 Fundamental analysis (aka firm foundation theory) (security valuation)

4.7.6.1 Introduction

Fundamental analysis (aka the *firm foundation theory*[45]) was mentioned earlier, and it postulates that investment assets have an *intrinsic value* (i.e. a *fair value price* – FVP) which is founded on the time value of money (TVM) concept (i.e. interest rates, which is encapsulated in the PV-FV concept).

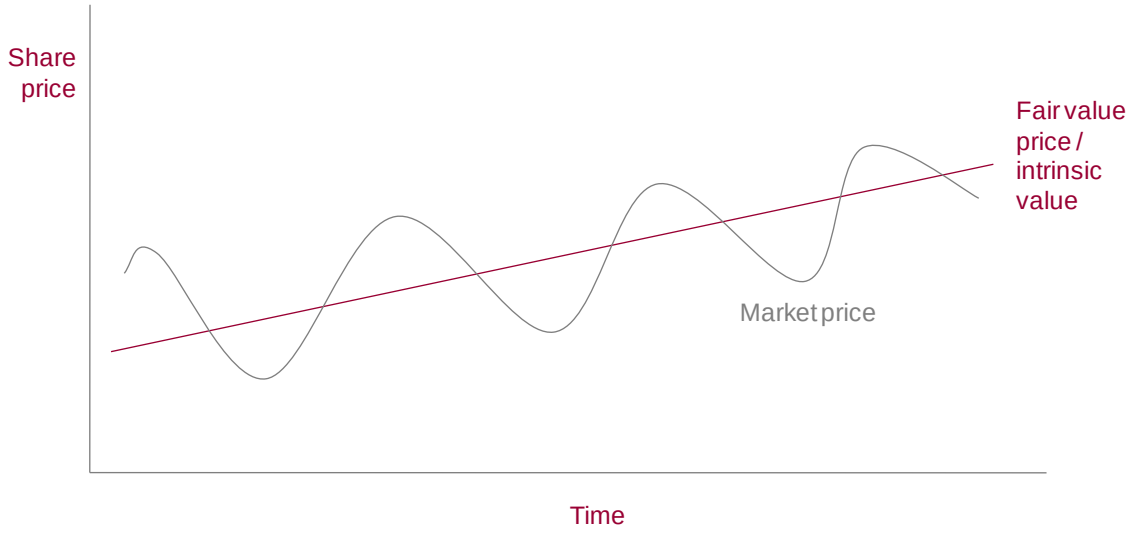

Figure 17: market price (MP) versus fair value price (FVP)

Figure 17 portrays the real world in respect of the asset markets: the market prices of assets (and this applies especially to shares) much of the time are not equal to their FVP, but are related to this underpinning factor, and generally reflect FVP on average over time. As we saw there are a number of theories that describe this phenomenon of deviation from FVP, including the castle-in-the-air theory and behavioural finance theory (BFT).

As said, the principle underlying asset valuation is the familiar FV-PV concept. A reminder is presented in Figure 17. The asset has a cash flow in the future (FV) and is discounted to PV, which is the value of the security now. The figure indicates just one interest payment in the future. When more are involved, compounding enters the picture, and the formula changes slightly to [cp = compounding periods pa (annually = 1, semi-annually = 2); y = number of years]:

$$PV = FV / (1 + ir/cp)^{y.cp}$$

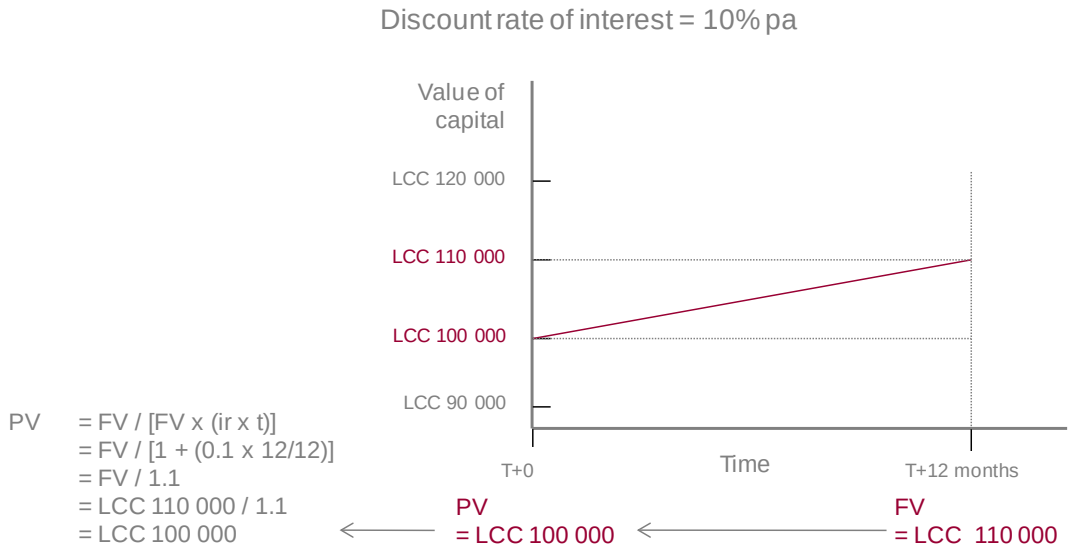

Figure 18: time value of money (FV to PV)

In this section we cover:

- Valuation of shares.
- Valuation of fixed-interest securities.
- Valuation of futures and options.
- Valuation of income-producing property.
- Valuation of commodities.
- Valuation of other real assets.
- Valuation of participation interests.

4.7.6.2 Valuation of shares

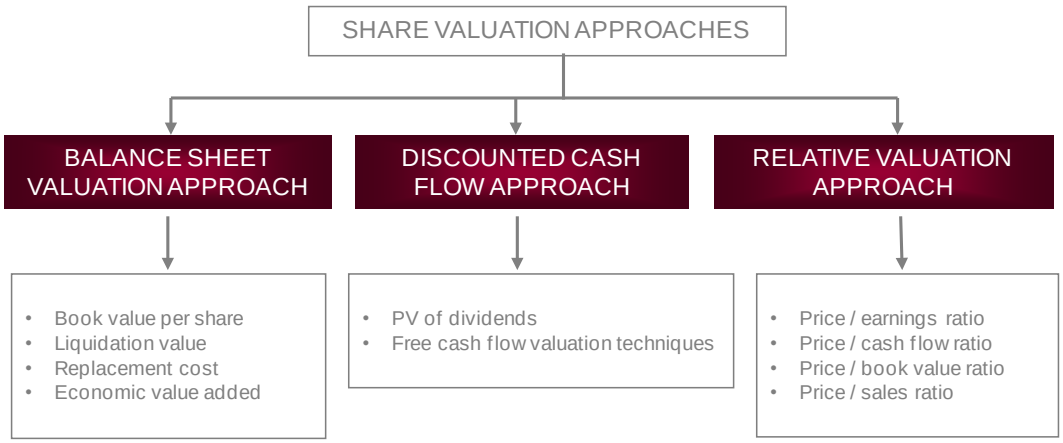

Figure 19: approaches to share valuation

There are a number of valuation techniques for shares, as indicated in Figure 19. The *balance sheet valuation* methods provide information on the *replacement / liquidation value* of a company, and the *relative valuation* methods are used for comparisons, but they do not provide the FVP of shares (except to the extent that comparisons can be made). This is left to the discounted cash flow methods. In these the futures cash flows (dividends and free cash flows, which are recurring = FVs) are discounted to PV using appropriate discount rates.

In the case of the discounting of dividends (ordinary shares), the pricing formula may be written as (D = dividend):

$$PV = [D / (1 + rrr)^1] + [D / (1 + rrr)^2] + [D / (1 + rrr)^3] + \ldots \infty$$

Because the dividend flows are perpetual, the formula simplifies to [recall that rrr is the required rate of return from the CAPM: $rrr = rfr + \beta(mr - rfr)$]:

$$PV = D / rrr.$$

The shares that have a constant annual rate of growth in dividends (D_g) are the easiest to value and the formula becomes:

$$PV = D / (rrr - D_g).$$

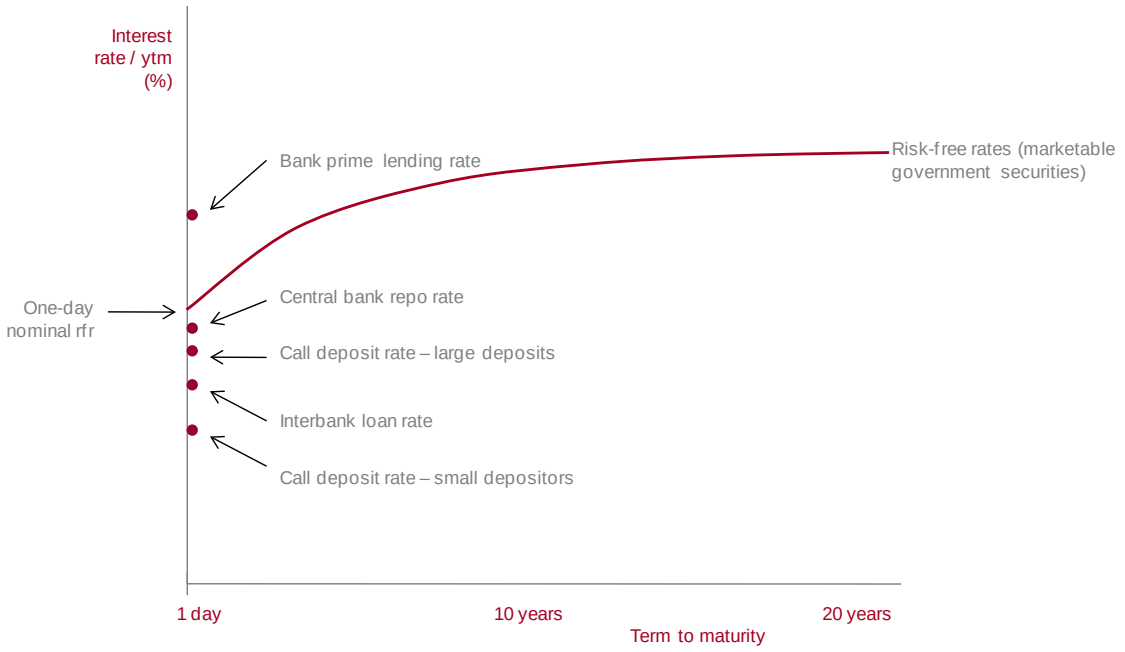

Figure 20: short-term banking rates & yield curve government securities

In the case of fee cash flow (FCF), assuming a constant growth rate in FCF (FCF_g) the formula is (WACC = weighted average cost of capital):

$$PV = FCF \times (1 + FCF_g) / (WACC - FCF_g).$$

Note the significance of the money market in the valuation of shares: the rfr. Figure 20 provides the context of the rfr: it is all the points of the curve and the curve (called the *yield curve* and the *term structure of interest rates*) is a representation of the relationship between the many rfr on the curve and term to maturity at a specific time (i.e. it is like a snapshot). In the valuation of shares the 3-month rfr is usually used.

4.7.6.3 Valuation of fixed-interest securities

Money market assets have less than a year to maturity and one interest payment. In this case the well known formula applies (assumptions: t = 91 days to maturity, ir = 8.0% pa) (price per unit of 1.0):

$$\begin{aligned} PV &= FV / [1 + (ir \times t / 365)] \\ &= 1.0 / (1 + (0.08 \times 91 / 365) \\ &= 1.0 / 1.0199452 \\ &= 0.9804448. \end{aligned}$$

As we saw above, when we have periods of a year and more than a year (and multiple interest payments apply), compounding interest comes into play. The formula for each cash flow is [cp = compounding period (annually = 1, semi-annually = 2); y = number of years]:

$$PV = FV / (1 + 0.08/cp)^{y.cp}$$

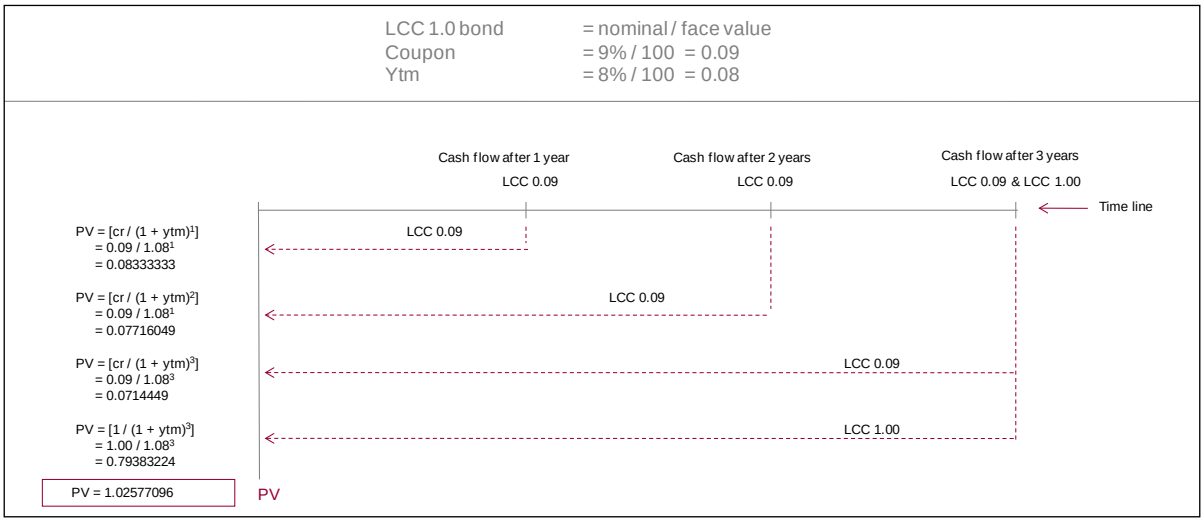

Figure 21: valuation of fixed-interest securities (FV to PV): multiple periods: fixed-rate bond

For a 3-year bond (coupon payment = 1 = compounding period) the calculation is (coupon rate = cr = 9.0% pa; market rate = ytm = 8.0% pa) (price per unit of 1.0):

$$\begin{aligned} PV &= [cr / (1 + ytm)^1] + [cr / (1 + ytm)^2] + [cr / (1 + ytm)^3] + [1 / (1 + ytm)^3] \\ &= (0.09 / 1.08) + (0.09 / 1.166400) + (0.09 / 1.259712) + (1 / 1.259712) \\ &= 0.08333333 + 0.07716049 + 0.0714449 + 0.79383224 \\ &= 1.02577096. \end{aligned}$$

This is illustrated in Figure 21 (keep in mind that ytm = yield to maturity = the correct name for the market rate in the case of bonds).

4.7.6.4 Valuation of futures and options

The TVM also applies in the case of futures. The FVP of a futures contract is equal to the spot price (SP) of the underlying asset, plus the cost-of-carry or carry cost [financing cost (usually the risk free rate[46] is used here) plus other costs (OC) such as insurance and storage] (CC) less any income earned (I) (CC – I = net carry cost, NCC) expressed as a proportion of the SP. This may be written as follows (t = remaining term of contract in days / 365):

$$\begin{aligned} FVP &= SP + \{SP \times [(CC - I) \times t]\} \\ &= SP + [SP \times (NCC \times t)] \\ &= SP \times [1 + (NCC \times t)]. \end{aligned}$$

Options pricing is more involved [because of the rights of the option holder (and no obligation), and the term to expiry date] but one of the main inputs is the TVM.

4.7.6.5 Valuation of income-producing property

In the case of rental property, rental income after tax (FV) is discounted to PV at the so-called capitalisation rate. The latter = rfr + an appropriate risk premium.

4.7.6.6 Valuation of commodities

Because commodities do not have a recurring income (FVs), valuation is irrelevant. Their value is the market prices at which they trade, and these are available at all times in the case of most commodities.

4.7.6.7 Valuation of other real assets

It will be recalled that "other real assets" includes real assets other than property and commodities, for example antique furniture, rare stamps, rare books and art. The above comments apply, except that it is not easy to establish prices, and this is so because the markets for them are not efficient, i.e. price discovery is inefficient. The prices for these assets are usually established at auctions.

4.7.6.8 Valuation of participation interests

As discussed, most individuals hold a large proportion of their assets in the form of their dwellings and PIs in retirement funds (an investment vehicle). To the extent that they hold other financial investments, these are usually in the form of the other investment vehicles, such as SUTs and ETFs. It will be recalled that investment vehicles hold assets in the form of the ultimate investments: shares, bonds, money market and real assets, and they issue PIs which are held by individuals in the main. The valuation of PIs reflects the market prices of the ultimate investments mentioned. As these are usually available at all times, the valuation of PIs are available at all times. Good examples are SUTs and ETFs.

4.8 Lessons from the theories and maxims

4.8.1 Introduction

The plethora of investment-related theories and maxims is evidence of the importance attached by scholars to investments. While some of the theories have little empirical relevance, many of them have elements that do. The following sections cover the useful elements of the theories and maxims (in our view):

- There is no simple formula to make you wealthy.
- Top-down investing is wise.
- Diversification is critical.
- Base investment decisions on their FVP.
- Never fall in love with an investment.
- Do not be led by technical analysis.
- Be cognisant of behavioural finance (the psychology of the market).
- Appreciate market liquidity.
- Appreciate the life-cycle consumption theory.
- Appreciate the significance of the risk-free rate.
- Be aware of the principal-agent dilemma.
- Leave investing to the professionals.
- Understand macroeconomics and mean reversion.

4.8.2 There is no simple formula to make you wealthy

The only way to reach one's FSG at a desired age is to ensure that I > E, i.e. to save and to invest wisely over a long period. Dave Foord in this regard states: "To be successful at [investing] you need patience and a long time horizon. And few investors have either."

There are many examples of people investing in one company's share based on the "hot tip" of another person and its price falling sharply or to zero. Investing in one company is only wise if the company is your company and you manage the company successfully over a long period, or if you are an employee of a company which you believe utterly will succeed in the long-term. For the employee without a share incentive scheme, the first paragraph applies.

Mr Warren Buffett is often cited as "the world's most successful investor". This is so because managing investments is his full-time occupation. He only invests in businesses that he has a deep understanding of and can analyse and value. He is a *value* investor (seeks value in the long-term, i.e. healthy future cash / dividend flows and discounts them at the rfr – as described above) as opposed to a *growth* investor (past high returns will continue in the future). In the early history of Berkshire-Hathaway Mr Buffett managed the invested-in companies either directly or indirectly.

In this regard Dave Foord[47] states: "The first lesson that all prospective investors should learn is that there is no simple formula to make you rich. The markets certainly do not exist to make you rich. On the contrary, there is a friction, a cost or vigorish[48] against you."

4.8.3 Top-down investing is wise

Many fund managers are of the opinion that if you get the "big picture" right, i.e. accurately analyse and forecast the international and domestic economic situation, and allocate funds to the asset classes in appropriate slices, overall performance will be higher than the market average return.

A number of fund managers are of the opinion that up to 80% of performance is forthcoming from accurate asset allocation. The proviso is that prime assets that offer value are bought.

4.8.4 Diversification is critical

As we have seen, appropriate diversification reduces risk. Diversify locally and internationally with the emphasis on local. The reason for only allocating a small proportion (say 10–20%) to foreign investments is that one's liabilities are in the local currency. In this statement we assume a sound local currency.

In this regard Dave Foord[49] states: "Diversification means reducing risk of loss by investing in a variety of assets. A diversified portfolio as a whole will often display less risk than the least risky of the component investments. Diversification is the only 'free lunch' available to investors. It is critically important in risk reduction. Use it as often as possible, but not as much as possible, because too much diversification reduces return ("diworsification"). Note that the more conviction you have, the less diversification you need. Again, it comes down to one's judgement of when and how much diversification to use."

4.8.5 Base investment decisions on their FVP

Continually do your homework on the FVP of shares, buy the fairly-priced and underpriced assets and sell the overpriced assets in the portfolio. Buy value shares as opposed to growth shares. *Earnings* are the most significant element in investments: a number of the valuation techniques take earnings into account.

In this regard Dave Foord[50] states: "All the valuation methods are good and should be used. They provide a one dimensional number or valuation that can then be compared to the market price and a ranking table of alternative investments. But this is not nearly enough. Two crucial aspects must be taken into consideration. First, the quality of the business and its life expectancy should be used to judge the quality of earnings. Second, the ability of management should not be overlooked. The range of management ability is wider than most people think and these people are the custodians of the wealth of those who invest in the company. Management needs to be trustworthy and capable of handling the risks and identifying and acting on opportunities. Good judgment is required to make good investment decisions."

4.8.6 Never fall in love with an investment

Allied to the aforementioned is the important maxim "never fall in love with an investment". If an investment is performing poorly, sell it, and remember the well-used maxim: "the first loss is the best loss".

According to Dave Foord[51]: "We all make mistakes. Investment mistakes are expensive. Stubbornness is not a good personality trait in this situation. In investing, the errors come fast and furiously, which is strange, really, in a binary environment (there is only buy or sell and up or down). So you need to be able to recognise mistakes early and then act to limit the damage. 'Pay and the pain goes away' is a good motto that has often worked for us in these situations. We believe that a major part of Foord's success has come from risk management and, in particular, managing the risk of being wrong. How you manage your mistakes will have a big impact on your investment result."

4.8.7 Do not be led by technical analysis

Successful long-term investors do not rely on technical analysis (TA) as an analysis tool. TA can be relied on for short-term gain only, because in the long-term intrinsic value (FVP) counts. TA only works because of the existence of other technical analysts, who generally come to the same conclusions and act on them. It is self-fulfilling in the short-term.

4.8.8 Be cognisant of behavioural finance (the psychology of the market)

Be cognisant of the fact that markets over-react and under-react to FVP (mean reversion: see below). This can be taken advantage of, and is by the investments professionals. Individual investors should only take advantage of this phenomenon if they are full-time investors. Full-time investors develop a "feel" for the psychology of the market.

In this regard Dave Foord[52] states: "Long before it became in vogue, it was evident to us that human behavior made markets irrational and inefficient. If more than 75% of people believe they are above average at a particular task, then a third of those people are wrong. So study human behaviour. Change is a constant in the markets and people resist change; the older people get, the more they resist change. One path to success is to be ahead of the curve of change. This is often a solo achievement as teams and committees tend to resist change.

4.8.9 Appreciate market liquidity

Market liquidity refers to the extent of turnover in a share (or a market), i.e. the extent of buy and sell orders in a share, and price discovery is linked to it. Never invest in a market or share that has low liquidity, i.e. poor price discovery, because of the lack of ease of buying and selling when desired. Small deals can have major price-effects in low liquidity markets. There is a reason for a share having low liquidity: the share does not have the attention of the professional investors.

4.8.10 Appreciate the life-cycle consumption theory

Be cognisant of the life-cycle consumption (and saving) theory, because reaching your FSG at a desired age depends on adhering to the codes / rules of the four phases. As you are aware, this was given much deserved attention in the first main section. It is mentioned here again because it is so significant (and for the sake of completeness).

4.8.11 Appreciate the significance of the risk-free rate

An investment in government securities presents you with a return that is certain[53] (the rfr). It is not wise to accept a return on a risky asset that is equal to or lower than the rfr. Your required rate of return (rrr) on a risky investment should be (rp = risk premium):

$$rrr = rfr + rp.$$

You need to decide on the rp, and it depends on the perceived risk.

4.8.12 Be aware of the principal-agent dilemma

Any institution that has a portfolio (i.e. a principal) cannot offer objective advice, because its advice is coloured by its portfolio. There are a number of examples of investment banks that sold shares to individuals from their own portfolios, based on recommendations by them, because they wanted to disinvest from them. In at least one case a class action against the bank was undertaken and won, leading to reimbursement.

Thus, a bank or an insurer, for example, cannot give objective advice. The same applies to a broker-dealer which has a portfolio, unless the broker-dealer is acting as an agent or is undertaking transactions itself (dealing as a principal) that are proposed to you, and you are advised of this. Fund managers generally do not hold their own assets, and if they do, they are prohibited from transacting in these assets with clients.

4.8.13 Leave investing to the professionals

Successful investing requires in-depth research, which is undertaken in-house by fund managers or provided to them by broker-dealers in exchange for business (buy and sell deals for commission). Individuals rarely have the resources to undertake the research.

If one does decide to invest oneself, it should be a full-time occupation, and deals should be conducted through a broker that provides good research. The individual should also have a deep understanding of macroeconomics and research this area of economics continually (see next section). There are many individuals who are successful investors; all of them have a long-term investment horizon and undertake in-depth research.

There are also many individuals who are content to "earn the market", premised on the fact that few fund managers are able to outperform what the overall market delivers in returns. Individuals can do so by investing in investment vehicles, specifically ETFs which track the all-share (or similar) index.

4.8.14 Understand macroeconomics and mean reversion

As said in the preceding section, if one undertakes investing oneself, security analysis and a deep study of macroeconomics are important. We do not have the space to discuss macroeconomics here, and present instead the essence of macroeconomics (elucidation of the acronyms was presented earlier):

- C + I = GDE
- GDE + X – M = GDP (expenditure on).
- X – M = TAB = part of current account of BoP (CA-BoP).
- Counterpart of CaBoP ≈ financial account of BoP (FaBoP).
- Forces of CaBoP and FaBoP = Δexchange rate.
- ΔMV = ΔP × ΔRGDP.
- ΔM = ΔDBC + ΔFBC.
- Government expenditure > revenue = deficit (to be financed).
- Δnominal GDP ≈ Δcompany profits ≈ ΔFVP.
- Monetary policy and interest rates, which reflect and cause cycles.

Macroeconomics teaches us that there are economic cycles; they are innate and therefore inevitable. They are caused by the interplay of the above-mentioned. On cycles Dave Foord[54] offers: "You should be aware that cycles do exist – they are a natural part of life, like the seasons, like the tides and like breathing in and out. Economic cycles also exist and it is important that you recognise this as fact. We find it surprising how many people still deny this. Standing in the way of market cycles, you will not only suffer the ignominy of a King Canute but you will do yourself serious financial harm. Market cycles are driven by interest rate cycles (valuation impact) and the business cycle (earnings impact). These two cycles are interconnected, but not exclusively so."

The cycles are anticipated by markets, and markets over-react and under-react, depending on many factors already mentioned, including human behaviour (mentioned before under the section on behavioural finance), as shown in Figure 22. The cycles in the share market are clear, as is the fact that share prices are extremely volatile in relation to nominal GDP. Notable in this chart is the average growth pa line: it is the average growth in *both* GDP and the all share index. This indicates what is called *mean-reversion*: in the long-term investment returns are linked to GDP growth (in nominal terms).

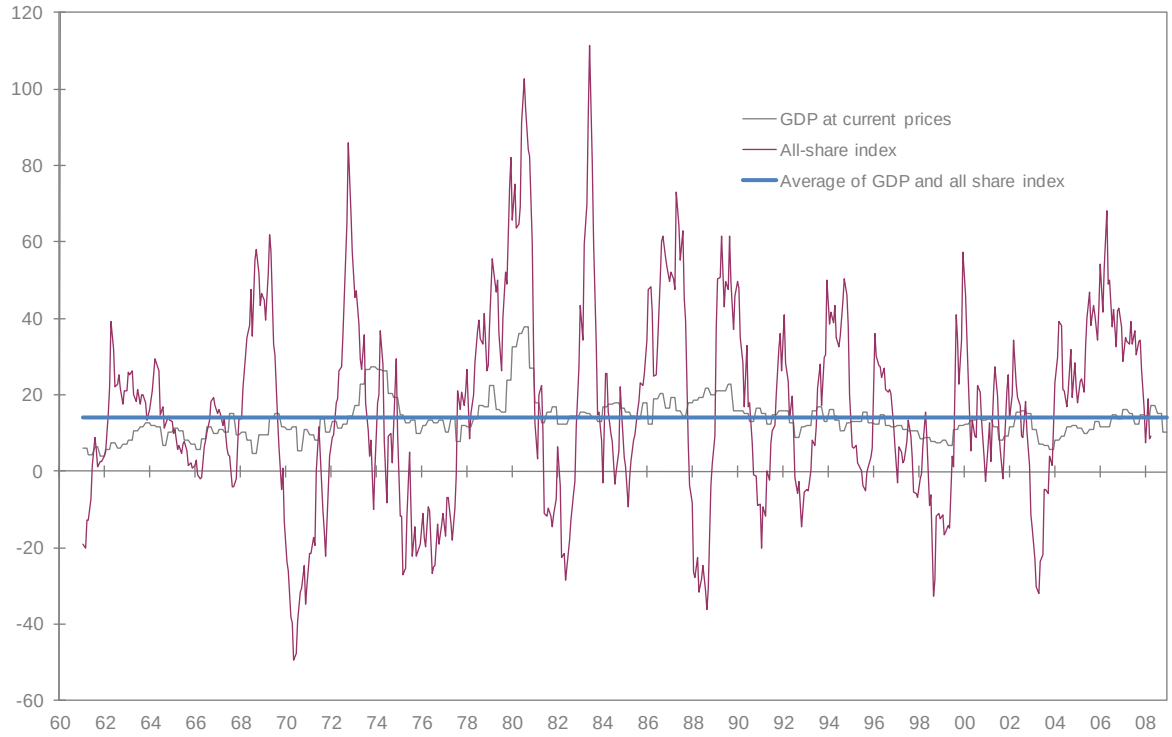

Figure 22: current GDP & all-share index (yoy)

Dave Foord[55] in this regard says: "All investors should understand the concept of mean reversion…it refers to the assumption that both the high and low points in a variable's time series are temporary and that the variable will tend to move towards the long run average over time. Mean reversion is not only mathematically true (it has to be, in fact) but it can be used to good effect by investors. Because variables often take a long time to revert, it provides time and opportunity to take advantage of mispricing evident in the market."

4.9 Portfolio management

There are many different types of portfolios / funds, some with legal constraints (such as the requirements of the statute applying to retirement funds) and some without, and each requires a different style of management. Examples are:

- Liability and asset portfolios
  - Banks
  - Insurers
  - Hedge funds
- Liability portfolios
  - Government
  - Company (when borrowing)
- Asset portfolios
  - Securities unit trusts
    - Money market funds
    - Bond funds
    - Share funds (various)
  - Property unit trusts
  - Retirement funds
  - Individuals.

As we know, in the case of financial asset portfolios, the asset classes are money market, bonds and shares. There are various strategies that can be employed in the three markets, as indicated in figures 23–25. (Unfortunately we do not have the space to detail them.)

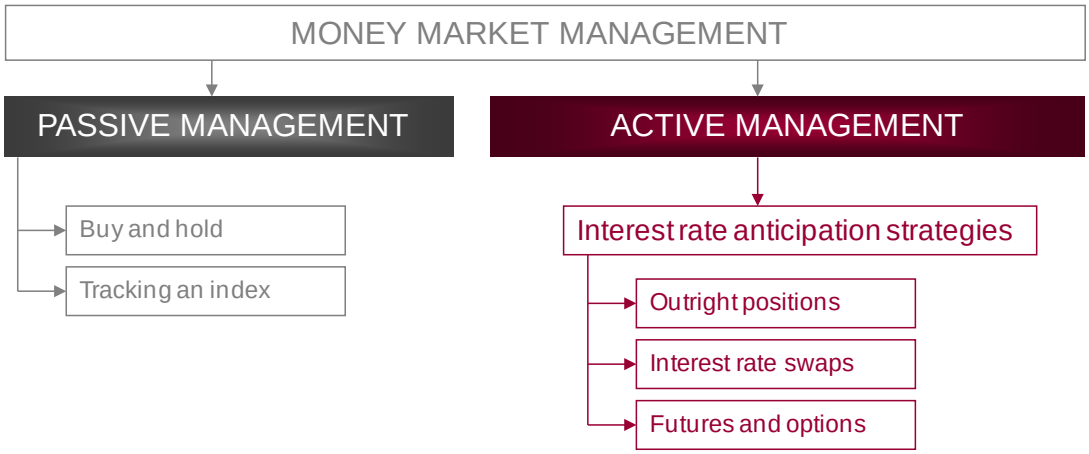

Figure 23: portfolio management: money market

However, they can all be summarised into a choice of three strategies, and this also applies to individuals:

- Passive management.
- Active management (undertake self or outsource to a fund manager).
- Hybrid management.

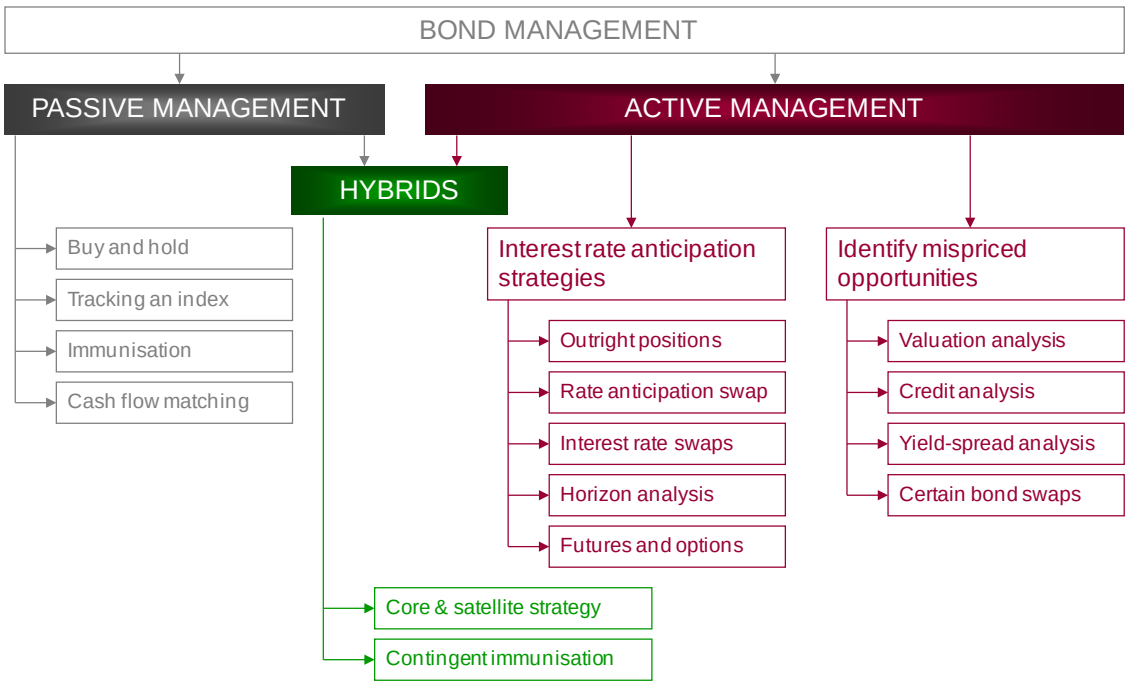

Figure 24: portfolio management: bonds

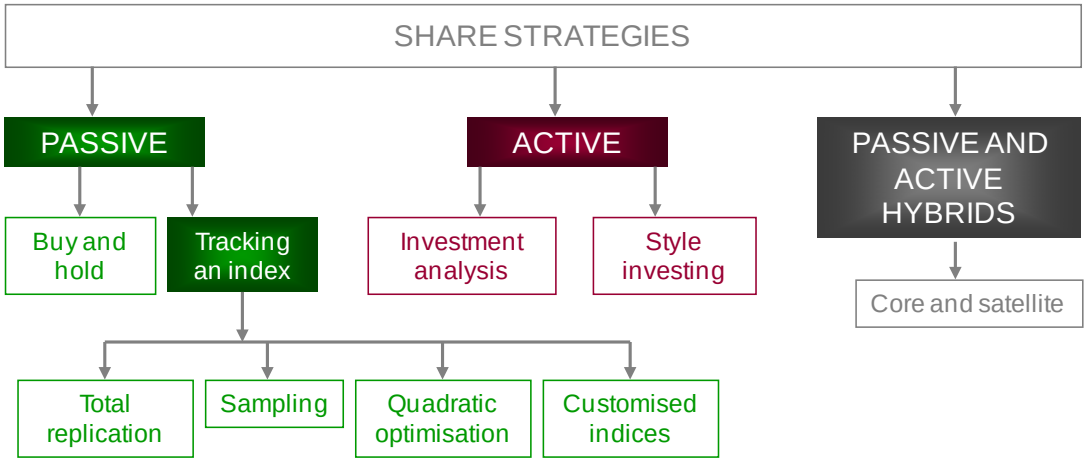

Figure 25: portfolio management: shares

Passive management involves one or both of two management styles:

- Buy and hold. This is a style that involves buying chosen securities when funds are available and holding them throughout bull and bear markets.
- Track an index. This amounts to buying ETFs and holding them, and is founded on the premise that "the market knows better" or "I will not do better than the market".

Active management involves the undertaking of the three levels of research, as indicated in Figure 26, and allocating funds, and buying and selling securities, according to the outcomes of the research. This can be done by oneself or outsourced to a fund manager.

Hybrid management, also known as the "core and satellite" approach, involves the belief that "the market knows better" for most of the time and therefore buying an overall market index (e.g. an all share index ETF) with say 80% of funds, and allocating 20% oneself.

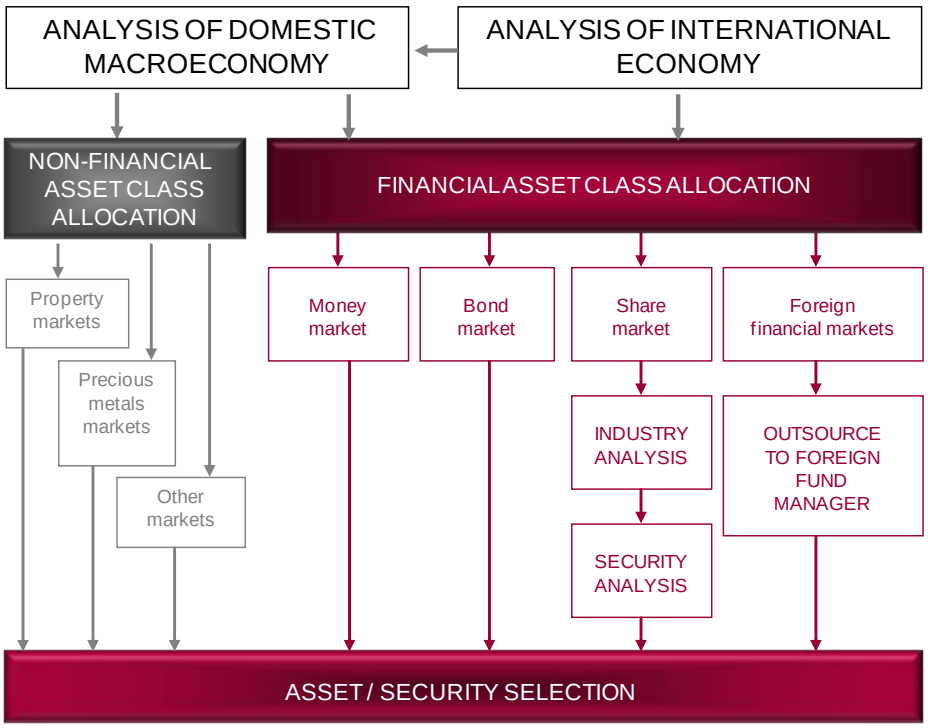

Figure 26: investment analysis

A final word: the objective of investing is to achieve one's FSG as soon as possible, and this entails much more than just investing soundly. It involves conducting one's life with recognition of the rules / codes that apply to the four phases of the life-cycle., and allocating assets wisely over the life-cycle.

4.10 Asset allocation over the life-cycle

4.10.1 Introduction

There is a body of literature called *life-cycle investing*. It holds that asset allocation should reflect one's age, i.e. that one should assume more risk at a young age (because risky assets furnish the highest returns, and one has time to recover from poor decisions), and reduce risk as one ages. There is much truth in this, but one should keep in mind that the time after reaching your FSG can be long indeed. Below we present our views on asset allocation over the four phases of the life-cycle (assumption: the individual is a successful employee or has a successful small business, and follows the rules expounded earlier). We present Figure 27 as a reminder of the trends in income, expenditure, saving and debt over the life-cycle.

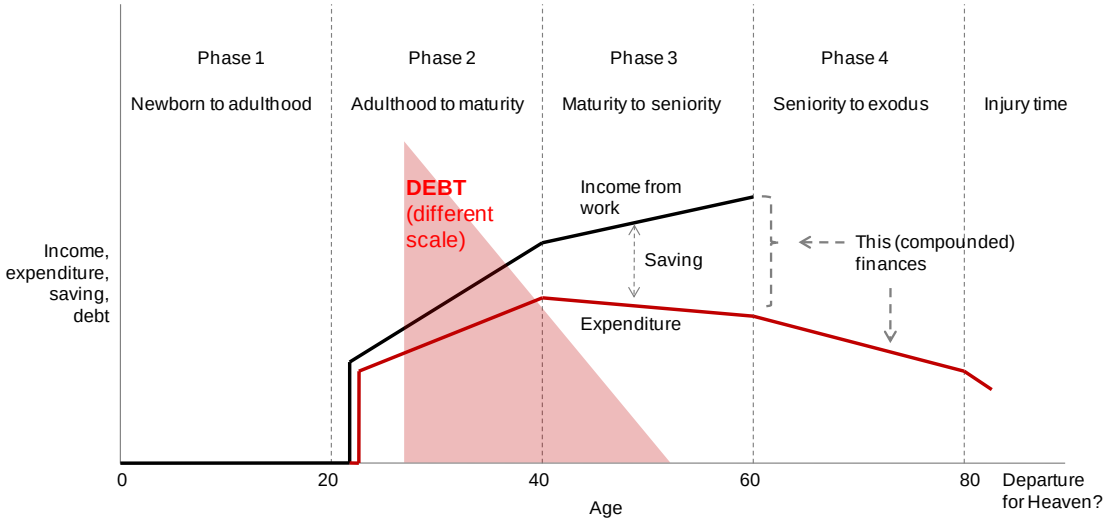

Figure 27: four phases of life-cycle

4.10.2 Phase 1: 0–20

In phase 1 the individual will usually have zero investment assets, except perhaps a bank account (money market) in the latter part of this phase with minimal funds. Parents may have purchased a motor vehicle for the individual, but this not an investment asset; it is a necessary lifestyle asset.

4.10.3 Phase 2: 20–40

Early in this phase the individual will be expelled from the nest, be employed, and income will rise vertically from zero, reflecting the first salary. Expenditure will also rise vertically, but by less than income, reflecting the contribution to a retirement fund (usually a defined contribution fund; not a defined benefit fund). The contributions to these funds are tax deductable in most countries, and are taxed on receipt of income upon retirement.

As the individual progresses through the phase:

- Income will rise sharply.
- S/he will be married and have children.
- If both partners employed, income will rise to a higher level.
- Debt will be incurred for the purchase of a dwelling (a mortgage bond), which is the largest debt the individual / family will incur.
- Expenditure (including debt service) will also rise, but less so, reflecting the contribution to the retirement fund, as well as additional savings later on in the phase.

The additional savings may be invested as follows:

- In the asset class that delivers the highest return: shares. Risk is higher, but one has time on one's side: volatility is inversely proportional to the investment horizon (and the horizon is long).
- To accelerate repayment of the mortgage (assuming the mortgage agreement permits): it will reduce the period of the mortgage. This is a particularly wise investment when interest rates are high and share returns are low (taxation laws may influence the decision).
- In one's own business, but only if one is a true entrepreneur. One has time to recover from mistakes, which does not apply in the subsequent phases.

Asset class	Indirectly via retirement fund (% allocation)	Own investment / debt	Notes on own investment / debt
FINANCIAL ASSETS			
Shares	75%	10%	Indirect: ETFs and / or SUTs
Bonds	10%	0%	Zero in this phase
Money market	8%	4%	Direct: funds in bank account
REAL ASSETS			
Property	5%	85%	Direct: own dwelling
Commodities	2%	0%	Zero in this phase
Other real assets	0%	1%	Direct; small in this phase
DEBT	Zero	Large	± 60% of value of dwelling
NET ASSETS	Positive	Positive	

Table 3: Example of portfolios: end of phase 2

Table 3 presents the approximate state of the portfolio of the individual at the close of Phase 1. Note the following:

- The asset allocation of the retirement fund: this represents their approximate norm. The proportional allocations are amended at times, depending on market views, albeit marginally.
- The family's investment in shares: they do not have the time to analyse shares and rely on the expertise of the fund managers of the SUTs and / or ETFs.
- The dwelling: some scholars are of the opinion that the dwelling should not be part of investment assets, because one needs a dwelling throughout life. This is partly true. To a degree it represents an investment, because it can be disposed of in Phase 4 in favour of a smaller dwelling, thus releasing funds for investment.

4.10.4 Phase 3: 40–60

In Phase 3 income continues to rise, but it does so at a lower rate. Expenditure reduces mainly because in this phase:

- The children leave the nest.
- The mortgage debt is repaid.

Consequently, the savings gap (I > E = S) widens sharply, allowing for a substantially higher level of own (non-retirement fund) investment. At the end of Phase 3, the approximate portfolio of the family could be as indicated in Table 4.

Asset class	Indirectly via retirement fund (% allocation)	Own investment / debt	Notes on own investment / debt
FINANCIAL ASSETS			
Shares	75%	40%	Indirect: ETFs and / or SUTs
Bonds	10%	5%	Indirect: bond SUTs
Money market	8%	5%	Direct: funds in bank account Indirect: money market SUTs
REAL ASSETS			
Property	5%	40%	Direct: own dwelling
Commodities	2%	5%	Direct: gold coins
Other real assets	0%	5%	Direct: antique furniture, art, rare books & stamps
DEBT	Zero	Zero	Zero
NET ASSETS	Positive	Positive	

Table 4: Example of portfolios: end of phase 3

Note the following:

- The asset allocation of the retirement fund is unchanged.
- The family has diversified its own investments between asset classes to a degree, but the majority of financial assets are in shares. This is because the family continues to have a long investment horizon.
- The proportion of property in the own portfolio, although still high, has fallen sharply, a result of the allocation of savings to the other asset classes.
- The family's investment in financial assets (exception = bank account): as in Phase 2, they do not have the time to analyse shares and rely on the expertise of the fund managers of the SUTs and ETFs.

4.10.5 Phase 4: 60–80+

We assume that the two breadwinners decide to cease their active occupations at the start of Phase 4 and to pursue other interests, without income from these interests. They base this on having achieved their FSG. This in turn is based on an analysis of their total portfolio, as indicated in Table 5. Here we assume that the value their participation interest (PI) in the retirement fund is LCC 5 million and that the value of their own portfolio is also LCC 5 million. Given these numbers, their total portfolio's asset allocation is as shown in the last column (ignore the bracketed figures).

Asset class	Indirectly via retirement fund (% allocation)	Own investments	TOTAL
FINANCIAL ASSETS			
Shares	75%	40% (60%)	57.5% (67.5%)
Bonds	10%	5%	7.5%
Money market	8%	5%	6.5%
REAL ASSETS			
Property	5%	40% (20%)	22.5% (12.5%)
Commodities	2%	5%	3.5%
Other real assets	0%	5%	2.5%
TOTAL	**100%**	**100%**	**100%**

Table 5: Example of total portfolio: start of phase 4

According to the retirement fund statute, they are obliged to purchase an annuity from a life assurer. There are two main types: the traditional *guaranteed annuity* (which guarantees an income for life, but has zero value at death) and the *living annuity* (which is subject to the vagaries of the markets, but has a value at death which can be passed on to the children). As they have substantial assets, and wish the children to inherit assets, they choose the living annuity. The statute obliges the annuitant to accept a minimum annual income rate of 2.5% and a maximum rate of 17.5%. They choose 5%, because at this rate, assuming a return on the portfolio of 10% pa, the income will only start reducing after 33 years. They expect to live for another 25 years (to age 85), so they have a margin of safety. The living annuity provides a taxable annual income of LCC 350 000 (assume LCC 245 000 after tax).

Age	Annual annuity dividend	Implied yield (annuity / LCC 5 million × 100)
60	LCC 479 940	9.60%
70	LCC 553 440	11.07%
80	LCC 634 140	12.68%
85	LCC 675 080	13.5%

Table 6: Annual guaranteed annuity dividends and implied yield at various ages

They also find comfort from being able to switch to a *guaranteed annuity*, which generates a higher income as one gets older (because life-expectancy falls, as indicated in the numbers provided by the life assurer (see Table 6[56]).

What decisions do they need to make in respect of their own private portfolio? Firstly, as their dwelling, valued at LCC 2 million, is now too large for them, they sell it and purchase a smaller dwelling for LCC 1 million. Secondly, the saving of LCC 1 million is allocated to the share market, bringing about a change in the asset allocation as indicated in brackets in Table 5.

The question arises: why did they allocate the LCC 1 million to the share market when they already had almost 58% in this market. The answer is straightforward: 25 years is the investment horizon, and it is a long period over which to be denied the higher return on shares.

If the average return on their own portfolio is a conservative 7% pa (assuming no dividend or capital gains tax and a low tax rate on interest), the income is approximately LCC 320 000 pa. This amount together with the annuity income gives a total annual income of about LCC 565 000. Given annual expenditure of approximately LCC 480 000 (LCC 40 000 per month), the financial situation is comfortable, without impairing capital (depending on inflation). If inflation is high or rises, there is comfort in the availability of the capital.

However, the closer one gets to exodus, asset allocation shifting and timing become important. For example, if one has 5–10 years to exodus, and the share market has had a good run for a few years, it may be wise to shift the portfolio in the direction of low risk assets (bonds and money market assets). Alternatively, if the share market has been low for an extended period (and one did not make a portfolio shift before this period), it may be wise to keep the portfolio as is. It is a personal choice, and it makes pertinent the study of macroeconomics, especially the interest rate cycle. The money market interest rate is the denominator in security valuation calculations.

4.11 Bibliography

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