Personal Investment

financial planning in an uncertain world

Mariana Mazzucato, Jonquil Lowe, Alan Shipman and Andrew Trigg

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The Open University

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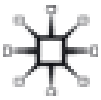

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Introduction

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Introduction

At some point in our lives most of us will save: for retirement, for a deposit on a home, or just for a rainy day. By not spending our money in the present, saving allows us to put aside resources for the future. Countries around the world differ greatly in the extent to which their citizens save. In Italy, for example, people have higher saving rates than in other large European countries, which means that they are less vulnerable to unexpected changes in personal and economic conditions. By contrast, US and British citizens are better known for their indebtedness than their savings, with the average American having 50 per cent more debt than income (Bucks et al., 2009). Those of us who are reluctant or unable to save are often encouraged by government to do so, usually through tax incentives or other subsidies.

Ensuring that savings will be available in future to meet an individual's or household's goals requires strategic planning and decision making. Investing strategically requires knowledge and understanding about the options available, the significance of the context in which choices are made and the implications of those choices. Consider the issue of inflation. Rising price levels damage the real value (buying power) of most investments. Therefore it is essential that investors understand where inflation comes from, how governments may react and the impact on different investments. For example, back in 1948, £60 would have purchased a new motorbike; 60 years later it could barely buy a pair of wing mirrors – a vivid demonstration of the destructive power of inflation. In comparison, £60 invested in the UK stock market in 1948, with income reinvested (ignoring tax), would have been worth over £50,000 by 2009 (based on data from Barclays Capital, 2009) – enough to buy ten motorbikes. Inflation compels investors to make choices to try to protect the future value of their money and to engage with stock markets. Even when savers put money into bank accounts, they usually expect a return that will beat inflation and this is possible only if banks invest the savings in some way.

This book provides an introduction to the main choices available to personal investors. Four types of assets will be considered as possible vehicles for investment: cash (meaning deposits, such as savings accounts), bonds, shares and property. These assets can be chosen directly, for example, by purchasing the shares of a particular company, or indirectly by investing in financial products, such as investment funds. Personal investment, as we broadly define it, looks at the

investment of savings in such assets and their related financial products. (This can be distinguished from real investment, which refers to investment by companies in physical goods such as plant or machinery.)

To make personal investment choices, there are various techniques and tools available to investors. This book explains how these work and, in so doing, introduces you to the academic discipline of finance, a field to which many eminent economists have contributed. Key to this field of study is the lack of certainty about how returns from investment can be predicted. The share price of a particular company, for example, may be based on a calculation of future profits, which depend on a number of unknown factors. These might include the success of its future sales, how well it controls costs, the hiring of a new management team, or the trajectory of economic conditions. You will be introduced to the power of investment tools in turning unknown factors such as these into precise calculations, but also to the limitations of the tools in the face of uncertainty. That is not to say that such tools should be discarded, but their suitability must always be understood in the context in which they will be applied, just as, say, a hand lens would be a poor tool for scanning the horizon.

Table 1 A guide to common personal investment terms*

Term	What it means
Bonds	Investments that are loans to a government, company or other body. Typically, a bond has a set repayment date and, in the meantime, pays interest and can be bought and sold on the stock market.
Saving	The flow of money not used for current consumption and that contributes towards an individual's or household's savings.
Savings	The total value of all financial assets, including investments, that an individual or household has at a particular point in time.
Shares	Also called equities, securities or stocks. These are investments where each holder becomes part-owner of a company. The return may comprise regular dividends (a share of the company's profits) that are not guaranteed and/or a capital gain or loss when the shares are sold. Shares are often, but not always, traded on the stock market.

Investing	Saving is sometimes called ‘investing’, especially when the money is set aside for long-term goals. ‘Investing’ is often used to mean the purchase of financial or physical assets that involve some risk of capital loss. However, there is no set definition and the terms ‘saving’ and ‘investing’ are often used interchangeably.
Investment fund	A financial product that invests in a broad range of different bonds, shares and/or other assets.
Investments	This tends to mean assets that are traded on a stock market or products that invest in such assets. However, there is no set definition and across the financial services sector you will find the term used to mean different things.
Real value	The value or price of something after stripping out any change due to inflation. For example, if £100 is invested and grows to £110 but the general level of prices goes up 10 per cent, the real value of the investment is still only £100.

* These terms generally have different meanings when used by economists and business specialists. This book makes clear when a more specialist meaning is intended.

1 Themes in personal investment

Our intention, in writing this book, is to encourage you to think critically about personal investment. You will be encouraged to make informed decisions, to look at the implications in the small print when considering financial products, to understand how the operation of financial markets impacts on your planning, and to search behind the marketing messages and advice of providers and advisers. The book develops three main themes:

- *Risk and return*. To make a financial return from investments, individuals must take risks. Stocks and shares, for example, are more risky, but over long periods of time typically offer higher returns than bonds and cash. As you will explore in Chapter 1, even savings accounts are not risk free. This theme looks at the relationship between risk and return, and the extent to which investors can increase returns without necessarily incurring extra risk. It also highlights how our understanding of the risk–return relationship rests on some deeply embedded assumptions that we might want to question.
- *Uncertainty and change*. This theme explores the importance to personal investment of unforeseen forces and events. Some events occur suddenly, throwing investment plans into disarray. Other forces, such as population ageing, are more gradual, but generate great uncertainty for personal investment decisions.
- *Regulation and ethics*. Investors need to be assured that financial institutions are sound and that financial product providers and advisers are behaving in an ethical way. This may be achieved through formal regulation and the financial services sector's own ethical codes and practices. Both are forged within the context of government policies that aim to regulate the national and international economy in pursuit of stability and other goals. Ethics may also embrace a concern that the aims and actions of organisations issuing investments are compatible with social, religious, humanitarian and environmental objectives.

The following is a brief introduction to each theme, and why it is important to personal investment. Some key concepts will be introduced as part of this introduction.

1.1 Risk and return

Savers have a diverse choice when looking at ways to set aside resources for future consumption, and the options differ greatly in terms of risk. The least risky for personal investors is generally taken to be savings accounts, since they can easily be cashed in with no loss of the original capital invested (ignoring any erosion due to inflation). In other words, savings accounts have low **liquidity risk** and low **capital risk**.

Liquidity risk
The risk of being unable to cash in an investment rapidly or at an acceptable price.

Risk is related to return because the vast majority of investors must be persuaded to take on extra risk and the persuasion comes in the form of a higher potential return – a **risk premium** (only 'potential' otherwise there would be no risk). Of course, gamblers enjoy and seek out risk – they may be playing the financial markets for their own sake and require no extra reward, but most investors do not fall into this category.

Capital risk
The possibility that investors may lose some or all of their original capital and returns made to date.

The key choice that investors face over the degree of risk and return associated with their investments is illustrated in Figure 1. Risk is plotted along the horizontal axis of the chart and potential return on the vertical axis; the space created by these axes can be thought of as the **risk–return spectrum**. We have placed a number of investments in this space, choosing the position of each one according to the balance of risk and return that we think it offers. For example, we have put savings accounts in the bottom left-hand corner, corresponding to low risk but a potentially low return. Moving upwards and to the right, the investments become progressively more risky – generally because liquidity risk or capital risk or both increase – but the reward for the extra risk is a higher potential return; in other words the *risk premium* increases. Shares are very risky, which is why most people do not buy them individually but instead invest in a broad spread of different shares through an investment fund. On the whole, where we have placed each investment should be fairly uncontroversial. But the investments shown are broad types, and within each type there will be examples of some that are higher risk and some lower risk than the position on the chart suggests. For example, a fund investing in the shares of small, high-growth companies may be more risky than buying shares in a single well-established high-street name.

Risk premium
The extra return that an investor expects as a reward for choosing a risky investment rather than a risk-free one.

Risk–return spectrum
The relationship between the risk of, and return from, investments: usually, lower-risk investments offer lower returns, while investments offering the chance of higher returns involve additional risk.

Don't worry if some of the investments in Figure 1 are unfamiliar to you at present. Chapters 1 to 4 will introduce you to them, explaining how they work and the nature of the risks involved.

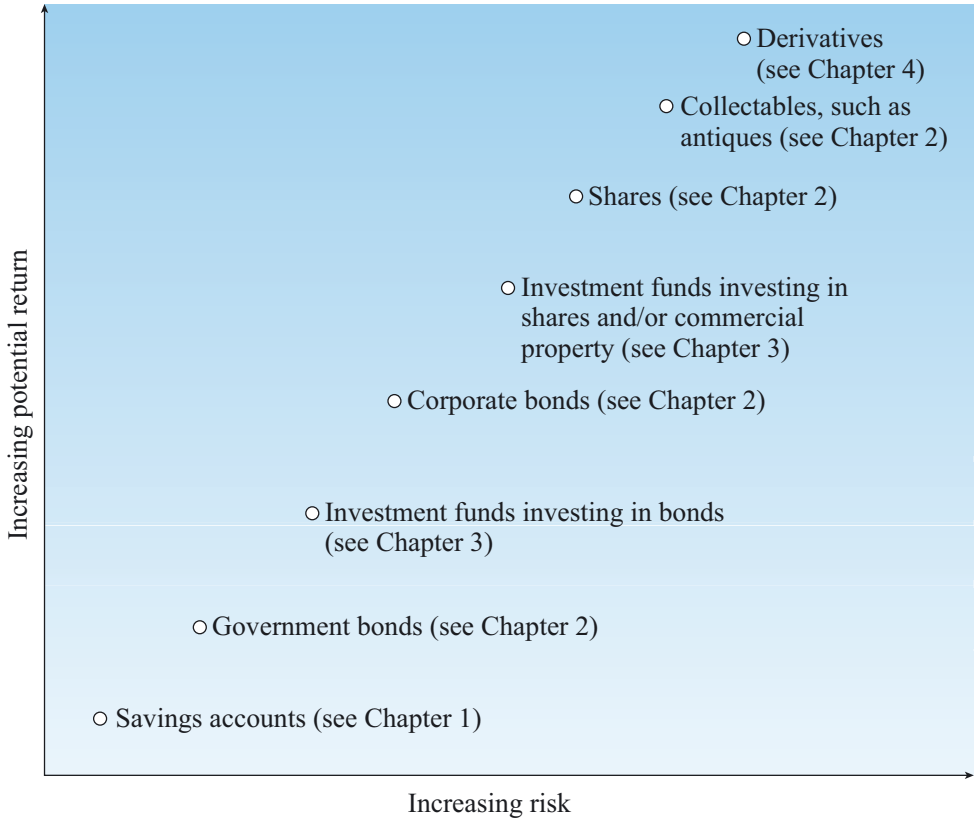

Figure 1 The risk–return spectrum

Activity 1

Many personal investors look on their home – or perhaps a buy-to-let property – as their most important investment and you may have noticed that neither of these is included in Figure 1. Where on the chart would you place them?

Whether or not a home should be viewed as an investment is debatable. Although the property may increase in value, there is the problem of selling it to realise the gain, since the owner will still need somewhere to live. It might be possible to sell and buy somewhere cheaper, but this is not certain. Setting that issue aside, investing in a single asset is always more risky than investing in many. In this case, the single property chosen could be affected by, for example, subsidence, a declining neighbourhood, plans to build a new road, and so on. By contrast, the fate of one property will have only a limited impact on a fund invested in a spread of many properties. However, the biggest impact on risk is the way in which homes and buy-to-let properties are usually bought: with a mortgage. You will explore in Chapter 1 how borrowing to invest (leverage) increases both the risk and potential return considerably. So

there is no single position in Figure 1 where residential property comfortably fits.

The high-risk–high-return nature of shares is illustrated by Figure 2. This is a bar chart showing the annual real return on shares in the UK over the period 1900–2008. Each bar represents whether the return in a particular year was positive or negative. In 1975, for example, there was a real return on shares of 99.6 per cent, as represented by the highest bar in the chart. This contrasts with the real loss of 30.5 per cent in 2008, represented by the bar on the right-hand side showing this as a negative real return. The chart reports similarly big losses of 24.5 per cent in 2002, and 58.1 per cent in 1974. These were very bad years for share investors.

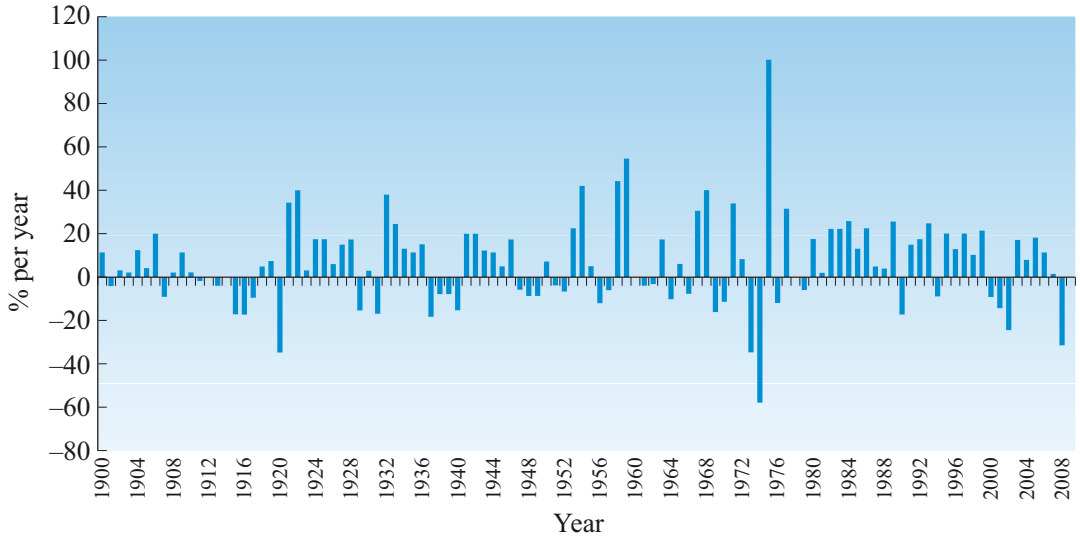

Figure 2 Annual real returns from shares quoted on the UK stock market 1900–2008

(Source: based on data from Barclays Capital, 2009)

One of the ways in which investors assess risk is by analysing information from the past like that in Figure 2. Although you will be looking at more sophisticated measures of risk later in the book, we can use the data in Figure 2 to calculate a simple indicator as follows. The chart shows that there were more years in which shares earned positive rather than negative returns: throughout the 1980s, for example, and most of the 1920s. We can see negative real returns for 39 years compared to 70 years in which investors made a positive real return. Investors made a negative return in 39 out of 109 years – or $(39/109) \times 100 = 36$ per cent of the years reported in Figure 2.

This type of calculation can be used to forecast the probability of making a real loss. An investor in 2009, for example, might say that there is a 36 per cent probability of making a real loss, based on information from the previous 1900–2008 period. As Paul Marsh, emeritus professor of finance at the London Business School, has argued: 'Bearing in mind that nothing can make shares "safe" over any time horizon – there is always going to be risk – the balance of probability and the record of history is on your side' (Wright and Cooper, 2009).

1.2 Uncertainty and change

What does it mean to say, as stated earlier, that risk can be calculated? This essentially means that we can assign probabilities to likely future developments, for example, on the basis of how often outcomes have occurred in the past. So if historically shares have earned higher returns than, say, bonds, we can assume that they also will in the future. A key problem with this type of calculation, however, is the uncertainty generated by major socio-economic change.

Would the 500 years of feudal history up to 1700 have provided much ability to forecast the development of technology in the 100 years of industrial revolution between 1750 and 1850? Or could anyone have predicted the aeroplanes crashing into the twin towers in New York? We now speak of 'the world after 9/11' to convey the idea that the world operates in such a different way after a major event that we can describe the world before and after that event.

These two examples illustrate how some major changes occur gradually, while others occur suddenly. For investors, a sudden tragic event such as 9/11 had an immediate unforeseen impact, for example, on the share values of airline and travel companies. Changes in technology during the industrial revolution – though more gradual – created uncertainty in a different way. Investors did not know the scope of the impact that the changes would have on industry and the economy. There were, for example, several railroad booms in the 1800s in which investors grossly overestimated the impact of new steam engines. Similarly, in 2000, investors overestimated the immediate impact of the internet, which led to a crash in share prices throughout the world.

Hindsight is a great thing. Events that now look as if they were bound to happen cannot always be predicted beforehand. The financial trader and academic Nicholas Taleb, in his book *The Black Swan*, gives the

example of a turkey being fed each day. The turkey expects this to happen, since it has happened each previous day – but then it is Christmas time (Taleb, 2007, p. 40).

The global credit crunch that started in 2007 was not foreseen by most people. One key person was Adam Applegarth, chief executive of Northern Rock, the former building society turned bank. He presided over the first run on a British bank since 1866, but complained: 'I didn't see this coming. I have yet to find someone who did'; and Sir Callum McCarthy, then chairman of the Financial Services Authority (FSA), the regulator of the financial services in the UK, also insisted that the freezing of money markets was unprecedented (*The Economist*, 2007).

Northern Rock, like all other banks, was reviewed by the FSA to examine the risks in its business model, using probabilities of the type introduced earlier. But the FSA assessed Northern Rock as 'low probability' in terms of its risk framework (Financial Services Authority, 2008, p. 4). The problem was that Northern Rock's business model relied on the borrowing of funds from global financial markets, a source that had been readily available in the past. When these markets dried up, it suddenly lost its funding source – as suddenly as the turkey discovered Christmas.

Box 1 How they got it wrong

- 'Go back to Liverpool, Mr Epstein, groups with guitars are out.' Dick Rowe of Decca Records, rejecting the Beatles
- 'Get rid of the lunatic who says he's got a machine for seeing by wireless.' The editor of the *Daily Express* refusing to meet John Logie Baird – the man who invented television
- 'Everything that can be invented has been invented.' Charles H. Duell, commissioner, US Office of Patents, in 1899
- 'This "telephone" has too many shortcomings to be seriously considered as a means of communication. The device is of no value to us.' Western Union internal memo in 1876
- 'Drill for oil? You mean drill into the ground to try and find oil? You're crazy.' Drillers responding to Edwin L. Drake in 1859
- 'The wireless music box has no imaginable commercial value. Who would pay for a message sent to nobody in particular?' A businessman deciding not to invest in radio in the 1920s

- 'Heavier-than-air flying machines are impossible.' Lord Kelvin, president of the Royal Society, in 1895
- 'No flying machine will ever fly from New York to Paris.' Orville Wright

(Symons, 2006, pp. 84–5)

The importance of uncertainty was emphasised by one of the great economists of the twentieth century, John Maynard Keynes, who you will read about in more depth in Chapter 5:

> By uncertain knowledge, let me explain, I do not mean merely to distinguish what is *known* for certain from what is only *probable*. The game of roulette is not subject, in this sense, to uncertainty … The sense in which I am using the term is that in which the prospect of a European war is uncertain, or the price of copper and the rate of interest twenty years hence, or the obsolescence of a new invention … About these matters there is no scientific basis on which to form any calculable probability whatever. We simply do not know!
>
> (Keynes, 1937, pp. 113–14)

Change and uncertainty go together for personal investors. If we believe that there are strong and violent undercurrents of social and economic change, then we may have less confidence in the predictive power of probability calculations. Each time there is a downturn in the stock market, for example, investors are unsure whether this will bring an end to previous returns, or whether the downturn is just a temporary correction. There is always a tension between recurring patterns of history and the enormous change that can be generated by improbable and unforeseen forces and events.

1.3 Regulation and ethics

Faced with this uncertain world, or just lacking the knowledge and tools of analysis, investors often turn to the advice of experts. Advice can help people to choose between the vast and complex range of financial products available.

The main business of the financial services sector is the selling of financial products: savings accounts, unit trusts, life funds and pensions are the main types of product available for private investing. Individuals requiring advice may rely either on providers, such as banks and life companies, and their agents for guidance on a relatively narrow range of products (tied advice), or turn to independent financial advisers, who can in principle recommend from the whole market. Advisers may charge a fee but historically have been paid by commission on products that they sell.

Although advisers are professionally committed to treating clients fairly, there is often a conflict of interest. While the self-interest of a commission-paid or tied adviser is to sell particular financial products, the interest of the client may be to purchase other products or even no products at all. There are numerous examples of products being sold without due care and attention to the needs of clients. In 2002, for example, Royal & Sun Alliance was fined £1.35 million for failing to pay compensation to over 13,000 of its customers who had been mis-sold pensions (Financial Services Authority, 2002). Between 2000 and 2005, nine providers were fined a total of £8 million for mis-selling mortgage-related endowment policies; and over £1 billion in redress was paid to 695,000 customers for whom these stock-market-linked products were unsuitable (Financial Services Authority, 2005). In 2009 John McFall, chairman of the Treasury Select Committee, called for an inquiry into the mis-selling of 'capital secure' savings products to 6000 UK investors (McFall, 2009). These products, in which some had invested all of their life savings, became suddenly worthless when the US investment bank Lehman collapsed in October 2008.

For the adviser–client relationship to work properly, the adviser must give advice that is in the interests of the client. This requires the adviser to have a moral approach, in which the interests of the client are paramount. Such an adviser follows ethics, a set of moral principles or codes that guide conduct. Ethics are a part of our everyday life. Whenever we choose to pay a bit more for fair-trade coffee, refrain from telling lies or give time to a local charity, we behave ethically: in a way that is not necessarily in our own self-interest, but is in the interests of another party or obeys an ingrained sense of what is 'right'.

Even some of the most vehement defenders of individual self-interest have recognised the importance of ethics. Adam Smith, often called the father of economics, famously argued that the reason why free markets work so well is because each individual acts according to their self-interest. But Smith also argued that individuals can trade with each other in a market only if they have a moral sentiment, or ethic, for the interests of others. When two individuals haggle over a price, they have to consider the interests of the other party in order to reach agreement.

But what if professional ethics do not prevail? Governments and other bodies often step in to impose rules and guidelines. We have seen, for example, that advisers face the prospect of fines if they are found guilty of mis-selling. This is an example of external regulation – the setting and implementation of rules and policies by government and other bodies – reinforcing or replacing professional self-regulation.

Regulation frequently transcends national boundaries, requiring international agreements and regulators. Countering this, a key socio-economic change that has characterised the world economy in the 30 years to 2009 has been a move towards liberalisation. Many of the rules that governed the behaviour of banks and stock markets were relaxed in the 1980s and 1990s, criticised as being out of date and inflexible, or just unworkable because of the changes wrought by financial innovation and globalisation. However, Robert Jenkins, chairman of the Investment Management Association, has complained: 'it has been the mantra in the UK that light bank regulation is good and heavy regulation is bad. The result: light touch became soft touch' (Jenkins, 2009). Throughout the book, and particularly in Chapter 7, the theme of regulation, its implementation and the tensions with the free development of markets will be explored.

At a higher level, economic policy can also be viewed as a form of regulation. As you will see in Chapter 5, important ways in which governments regulate the economic and financial system are through the setting of interest rates and taxation. Surprisingly, economic regulation is a relatively recent phenomenon. Before the Second World War, there was much less government involvement than we are used to today. The experience of many economies going into deep **depression** in the 1930's Great Depression convinced many governments that the economy had to be actively managed to keep it on track and prevent further crises. This structural change has had a major impact on personal investment. Investors have learned to anticipate how government intervention can impact on the prospects for economic growth and price inflation. Governments' economic management policies aim both to contain inflation and can be a source of inflation. You have already seen how inflation damages the returns to savers but conversely borrowers benefit (since their debts are reduced in real terms). So there are winners and losers, and this highlights the ethical dimension that is present in all regulation: who benefits and who bears the costs?

Depression
A prolonged period of low economic activity and high unemployment.

During the course of your journey through this book, you will learn how financial products, financial markets and financial regulation are interlinked and constantly changing together. Financial crises prompt the creation of new regulations. The regulatory framework stimulates new products, new markets and new strategies, often as ways to circumvent regulatory constraints. The three themes introduced here will help you

to understand this dynamic tension between innovation and regulation, and its implications for personal investment.

The Great Depression in the 1930s caused a structural change in government economic policies

2 Structure of the book

We have chosen these themes as key dimensions to the understanding of personal investment. Continuing the example of inflation, you will see how understanding inflation is fundamental to thinking about risk and return. Investors may accept higher risk in order to increase their chance of a return that will match or beat inflation. But looking into the future also means that there is uncertainty about what will happen: will investors face low inflation, as in the 1990s, or high inflation, as experienced in the 1970s? Ethics have a key role to play here, with financial advisers having a duty of care that the retirement incomes of customers are not eaten away by rising prices. And governments have to ensure through regulation that inflation is not allowed to get out of control.

The book is divided into four parts: 'Products and players', 'Strategies and markets', 'Bubbles and the economy', 'Regulation and the long term'. These parts gradually build from an understanding of the main tools of investment, through to the wider context and a critique of the role of personal investment. Throughout these four parts, the three themes develop, encouraging you to look at the big issues and wider context of personal investment, and providing a framework for considering the concepts, ideas and arguments that you meet.

In Part One, Products and players, we start in the lower left corner of the risk–return spectrum by looking at where most people in the UK put at least some of their money: accounts with banks and building societies. Chapter 1 examines how banks work in order to unravel the risks involved in placing your savings there and asks: are bank accounts really safe? Chapter 2 introduces the other three main assets considered in the book – bonds, shares and property – and demonstrates simple methods for calculating their potential return and inherent risks. The chapter highlights some of the assumptions behind these calculations in relation to uncertainty and change.

As we progress to Part Two, Strategies and markets, Chapter 3 demonstrates how investors can combine the main assets to create a portfolio. You will look at theories for selecting portfolios that suggest how investors can manage risk and improve the balance between the risks and returns that they face. In the process, you will consider whether investors should simply aim to follow the market or gain from actively choosing different companies' shares and timing their

investments. Chapter 4 examines how financial markets work, with particular attention to one of the key socio-economic changes that have taken place in modern times: the growth of complex financial products such as derivatives. Not only has this change altered the economic context for all investing, it is also responsible for the growth of more complicated personal financial products that can leave investors unsure about what they have really invested in and the degree of risk involved.

Part Three, Bubbles and the economy, invites you to consider the context of financial planning in national economies and how these can be affected by financial crises and bubbles. In Chapter 5, you will be introduced to the driving forces of the economic landscape in which investors operate. It looks at key economic indicators that concern investors, such as inflation, economic growth and interest rates, and some of the main theories that have been developed by professional economists to explain their behaviour. Chapter 6 looks in more depth at how judgements are made about putting a value on assets. Of particular importance is the way in which investors behave during 'bubbles' (periods when asset prices rise dramatically without obvious reason). This chapter explores the implications of these financial anomalies for economic theories about investment behaviour and for practical decisions about which products to invest in.

In Part Four, Regulation and the long term, Chapter 7 focuses on the regulation of financial markets, looking at both the UK and the international context. Chapter 8 provides a conclusion, drawing together the main investment tools and theories developed throughout the book. The particular problem of long-term investment for retirement is used to illustrate how these personal investment tools can be applied and the limitations inherent in them. The book closes by raising some challenging questions about the interrelationship between personal investment and the goals of society as a whole.

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Chapter 6
Bubbles and investment behaviour

Mariana Mazzucato

1 Introduction

Learning outcomes

After reading this chapter, you will:

- understand the definition of an asset price bubble, and importance in the history of market economies
- understand why share volatility and share overvaluation raise questions regarding the rationality by which investors approach investment decisions
- understand key insights from behavioural finance theory
- understand the implications of different theories of investment behaviour for personal investment planning.

> When people look back on a bubble, they tend to blame the mess on crookery, greed and the collective insanity of others. What else but madness could explain all those overpriced Dutch tulips? With hindsight, today's mortgage disaster seems ridiculously simple. Wasn't it the fault of barely legal mortgage underwriting, overpaid investment bankers and the intoxication of easy credit? Yet there is an element of the madhouse in that explanation too. Cupidity, fraud and delusion were obviously part of the great bust. But if they are the chief causes of bubbles – which have repeatedly plagued Western finance since its origins in the Italian Renaissance – you have to suppose that civilisation is beset by naivety and manic depression.
>
> (*The Economist*, 2009)

On 24 August 1921 the Dow Jones Industrial Average, the leading index at the time for the New York Stock Exchange, stood at 63.9. By 3 September 1929 it had risen nearly sixfold to 381.2. On 29 October, subsequently known as Black Tuesday, the index fell 38 points to 260, a drop of 12.8 per cent. This spurred a selling spree that, ironically, worsened the problem by clogging the new technologies that stock markets had introduced in the prosperous 'roaring twenties', including the telephone and telegraph. The lack of information led to more panic and selling, with the Dow Jones over two days falling by

23 per cent. It eventually lost 89 per cent of its value between 1929 and 1932 – with the fall encompassing the high-technology, high-growth 'glamour stocks' that had originally got the boom rolling. These price movements are depicted in Figure 1, while the picture on the next page shows the street scenes that resulted in New York.

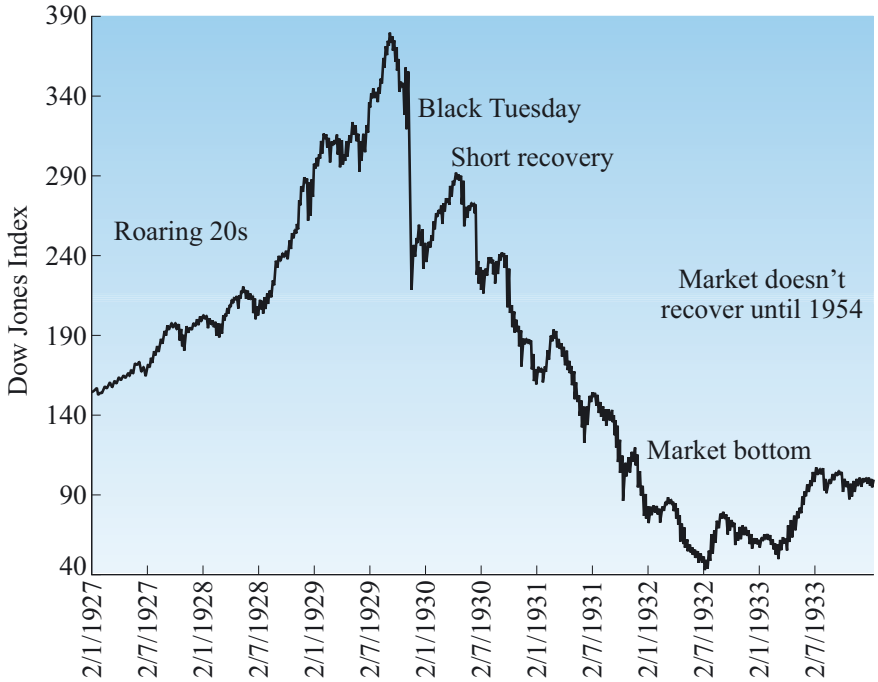


Figure 1 Crash of the Dow Jones Stock Market Index in 1929

(Source: Global Research, 2009)

This chapter asks: what caused this panic selling leading up to the Great Depression – as well as the more recent panic selling and 'madness' in the financial crisis that began in 2007, referenced in the opening quote from *The Economist*? What are the characteristics of investment behaviour, and underlying human behaviour, that can lead to such financial 'anomalies' and take many investors by surprise? And, since they are considered anomalies, what is the normal behaviour that gets contradicted by events such as stock market **bubbles**?

Bubble
The inflation of an asset price, eventually reversed by a sudden burst or a prolonged decline.

Crowds gathered outside the New York Stock Exchange after the 1929 crash

Chapter 5 introduced the demand-side argument that investment under uncertainty is not just mechanically determined by interest rates and the supply of savings. Keynes and his followers argue that investment is governed by 'animal spirits' – the emotion or *affect* which influences human behaviour, especially urging action rather than inaction. This notion of investment behaviour led by animal spirits can help to explain why aggregate business investment (the *I* in the national income equation, which includes spending on physical capital goods) is so volatile. As was discussed in Chapter 5, Keynes used this insight to argue for a greater role for government in the economy, since markets will otherwise generate too little investment when animal spirits are low, leading to periodic economic depressions. Keynes went as far as saying that investment decisions (such as those considered in Chapters 2 to 4) might be better understood through serious examination of such psychological impulses rather than through the sophisticated mathematical models that characterise modern economics.

This insight into psychological aspects driving business investment has also proved very important for understanding fluctuations in financial investment and the periodic build-up and bursting of bubbles, especially in share prices. Research into the psychological foundation of

judgements under uncertainty has led to new theories of behavioural finance, which seek to understand individual and collective investment decisions, especially where these involve risk-taking.

Section 2 gives a brief history of financial asset bubbles, revealing some common trends and notable differences that are assessed in Section 3. Sections 4 and 5 look at the degree to which shares can be overvalued and excessively 'volatile', compared to the predictions of asset price models, even in non-bubble periods. Section 6 asks whether these patterns pose problems for some of the theories presented in previous chapters: to what extent are investors rational (as defined in Chapter 2) and markets efficient (as defined in Chapter 4)? Section 7 looks at what behavioural finance theorists have to say about these questions, drawing on the world of experimental economics. Section 8 considers what such insights imply for long-term personal investment planning, and Section 9 concludes.

2 Bubbles in historical perspective

The data in Figure 1, showing share price movements from 1927 to 1933, illustrate a classic bubble pattern. Share prices rise sharply and persistently until the late 1920s, then come crashing down. This sudden burst, revealing the previous expansion to have been built on air, is what earns the name of bubble. The same pattern has been experienced in different markets over the last 200 years: as well as shares, bubbles have been observed in assets as diverse as tulips, sugar, coins, cotton, wheat and land. Sometimes these are limited to a particular country, such as the Dutch tulip bubble discussed below. At other times they start in one economy but then spread to many others. As businesses, banks, financial markets and economies become increasingly interlinked through globalisation, the possibility of such contagion has increased.

Some early bubbles were documented in Charles Mackay's popular 1841 account *Extraordinary Popular Delusions and the Madness of Crowds*. A famous early example was the tulip bubble (1636–37) in Holland. After tulips were introduced from Turkey in the mid-1500s, Holland became the international centre of tulip cultivation, inventing new varieties. Professional growers and wealthy flower fanatics caused the market for rare bulbs to grow very quickly, with bulbs selling at extraordinarily high prices. In 1637, a *Semper Augustus* bulb (with blood-red flames against white) apparently sold for the same price as a large canal-side house in Amsterdam (Walsh, 2008). This price rise later spread to common bulbs. It lasted until bulbs that had sold for 5000 guilders in January 1637 had fallen to 50 guilders just one month later – from gold to onions!

As with many bubbles, the tulip bubble coincided with the introduction of a financial innovation: in this case an early version of futures contracts called *windhandel* (literally, wind trading), allowing traders to sell rights to bulbs that had yet to be planted. This type of trading increased the level of speculation, exacerbating the bubble, as trade became based not only on physical goods but also on abstract goods (Walsh, 2008, p. 72). The tulip crisis is captured symbolically in the painting overleaf by Hendrik Pot (1640), where the goddess of flowers is shown alongside the vices of drinking and money, all in a cart that will soon disappear into the sea. The damage to local industry, which economists refer to as the 'real' economy (as distinct from the abstract economy of asset values), is symbolised by weavers throwing away their equipment.

The tulip mania: *Floras Mallewagen* (1640) by Hendrick Pot (1585–1657)

The 1840s saw a railway bubble, also called railway 'mania', in Britain. There was a speculative frenzy around rail, with many companies (high-tech at the time!) entering the new industry, driven by optimism and confidence of what rail could do for the economy and for individual company profits. Animal spirits soared again, with investors pouring money into the new technology. This caused a fast rise in rail shares, peaking in 1846, when 272 acts of parliament were passed regarding setting up new railway companies. Yet around a third of the railways authorised were never built. Most companies that entered this new industry either failed due to bad business plans or were bought out by a larger competitor before the promised lines were built. In some cases, the companies turned out to be fraudulent, simply transferring investors' money to another business. The bubble burst after 1846.

The 1920s bubble, depicted in Figure 1, became famous due to the stock-market crash of 1929 that sparked the Great Depression. This, like the railway period, was a time of technological fervour, with animal spirits lifted by investors' expectations of how radical innovations would drastically change the way in which people lived their everyday lives. These innovations, which included radio, automobiles, aviation, electrical power grids and the rapid expansion of mass production, drove rapid growth especially in the USA, with a virtuous circle of rising output, incomes and expenditure earning the post-war decade its 'roaring

twenties' label. The shares of the main companies that pioneered the innovations, such as General Motors (GM) and Radio Corporation of America (RCA), rose inexorably, becoming 'glamour stocks' that crystallised the optimistic expectations for the new era.

As with the tulip bubble, the 1920s share-price bubble was promoted by financial innovations that responded to, and deepened, public infatuation with the stock market. Pooled investment funds, called investment trusts, took off in the USA in the 1920s. The use of leverage through buying 'on margin' – borrowing part of the cost from the broker – also started in this period and magnified both gains and losses (see Chapter 4, Section 3.4). If an investor bought $100 of shares with only $10 of their own capital, borrowing $90 from a broker, then a 10 per cent rise in the value of their holding to $110 brought a return on their equity of 100 per cent.

Activity 1

What happens if the price in the above example falls by 10 per cent? Or 20 per cent?

In contrast, if the price fell by 10 per cent to $90, the investor lost 100 per cent of their own investment. If the price fell by 20 per cent to $80, the investor not only lost their entire capital ($10), but was now in debt, owing $10 to the broker. Putting some zeros after these figures shows just how serious the bursting of the bubble could become when investors were highly leveraged, with even small price changes potentially leading to bankruptcy.

More recently, the dot-com bubble (1995–2001) was also driven by rapid changes in technology. The internet, and related fields in information technology (IT), saw the rise of many online companies, referred to as dot-coms due to the last letters in their US website addresses. Many of these companies were listed on New York's NASDAQ exchange of shares in technology companies, whose index rose from around 500 to just over 5000 between 1991 and 2000. Figure 2 shows the NASDAQ index as it peaked at 5048 in March 2000, before entering a crash that began on 10 March.

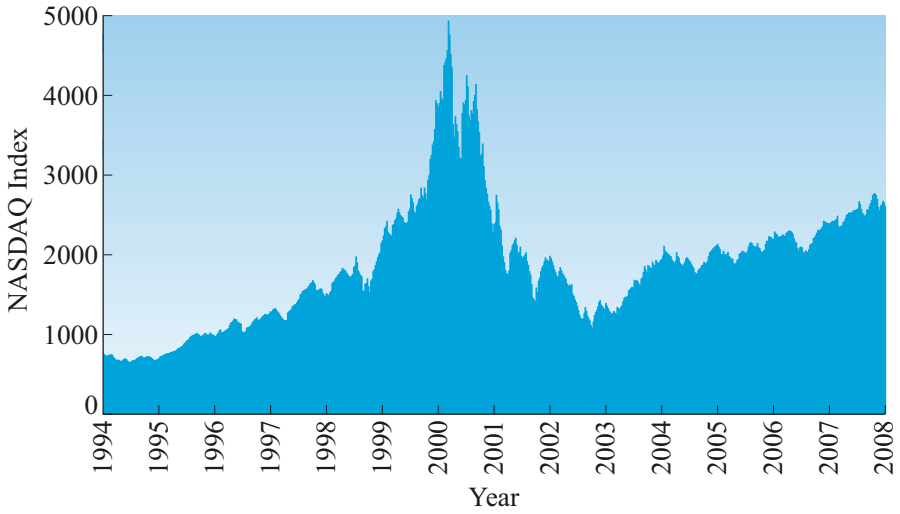


Figure 2 NASDAQ index, 1994–2008

(Source: NASDAQ Composite (^IXIC) Historical series, 1994–2008)

The dot-com bubble exemplifies the effect of animal spirits on financial markets. It is commonly interpreted as having arisen from high expectations about the future growth of the internet, optimism concerning its effect on the firms introducing and using it, and exaggerated expectations about the economic growth that would be enabled by new internet technology. This caused individual and institutional investors to rush to invest in IT-related sectors (manic buying), driving share prices to record high levels – only to come crashing down later (panic selling). The article in Box 1 describes animal spirits at work during this dot-com period and will be referred to again when we delve deeper into the psychological foundations of bubbles in Section 7.

Box 1 Dotcombustion

Twelve months ago, dotcom mania was at its peak. And nowhere was it more obvious than in the panelled rooms of one City investment house. Sitting across the table from two dotcom entrepreneurs, an experienced investment banker was struck by the hideous realisation that the men facing him were trying to float nothing more than an idea for more than £100m. And they had no relevant experience.

'You don't understand,' the ebullient chief executive said. 'This is not about performance, it is about a concept. If we started executing the plan it would lose its purity and investors wouldn't be interested.' The discussion was short and the company never

reached the stock market. But, for a few months at the beginning of last year, investors' seemingly insatiable appetite for dotcom companies put normal business rules on hold.

…

Michael Ross, chief executive of Figleaves.com, which sells lingerie online, says: 'You had to be pretty stubborn to sit on the sidelines and predict doom instead of getting involved. People were making real money and many of those who did take the risk still have the fortunes to prove it.' Everybody had a dotcom idea to discuss in the pub. Most never came near fruition. Instead, people ranging from the Queen – who invested in Getmapping.com, an internet mapping company – to housewives, professionals, manual workers and students got involved by investing in dotcoms listed on the seemingly unstoppable stock markets, where demand far outstripped the supply of shares.

…

Michael Jackson, chairman of Elderstreet, the venture capitalist, remains philosophical about the whole experience: 'We all invested in a few [dotcoms]. You look at it now and think you must have been a bit crackers,' he says. 'But at the end of the day you are not paid to sit on your hands while others are making money.'

(Barker, 2001, p. 16)

The railway bubble, 1920s bubble and dot-com bubble illustrate how anticipations about future price increases may be linked to belief in a 'technological revolution', which gives investors exaggerated expectations about how the new technology can create instant fortunes for new businesses and those who back them. These expectations help to mobilise the cheap finance that allows these new technologies to be quickly diffused through the economy. The winners, such as Intel (which supplied key hardware for the internet) and Amazon (which traded successfully through it), owe their survival and much of their growth to these exaggerated expectations, which gave them access to abundant cheap capital. In fact, bubbles often leave a positive legacy in the form of installed technologies that remain after the bubble has burst: the railways and roads that did get built, the high-speed internet. These technologies allow increases in the profitability of current and future firms (through new products and more efficient processes), and in the quality of life (as with the advent of electricity, cheap transport

and the internet). Such improvements in the economy's underlying infrastructure and productivity may continue to have positive effects on the stock market in the years after the bubble.

But not everyone can become a millionaire. In fact, most of the firms that are associated with new technologies end up failing very soon. For example, in both the early automobile industry and the early computer industry, almost two-thirds of the hundreds of newly created firms were forced out within the first twenty years, despite a rapidly growing market (Mazzucato, 2002). This is because faith in the profit-making power of these new technologies and industries causes overinvestment in the related firms and infrastructures. Many more automobile and computer companies were launched than could hope to survive, at a cost-effective scale, even if the market fulfilled the brightest growth forecasts. However, as it is impossible to predict which firms will survive, the high failure rate means that many investors will get burned.

In fact, periods associated with major new technologies are often characterised by 'new era' thinking – highly optimistic ideas, so that the period in question represents a turning point for the economy and society. For example, the 1990s dot-com boom was often termed the 'new economy' – suggesting a new era in which intangible knowledge capital (such as software and programming skills) was more important than tangible physical capital and the skills needed to make things. Many researchers believed that the 'new economy' would allow productivity and growth to increase indefinitely, with the business cycle giving way to continuous expansion. This over-optimism was far from new. At the start of the twentieth century, the technological change that led up to the roaring twenties was considered by many to be ushering in a new era of unprecedented growth, as revealed in this quote from the beginning of the century:

> There is nothing now to be foreseen which can prevent the United States from enjoying an era of business prosperity which is entirely without equal in the pages of trade history.
>
> (Sutliff, 1925, p. 3)

Activity 2

Can you think of another major technological change that has produced similar euphoria and overinvestment?

More recently, investors' belief in a 'biotech revolution' has led to similar pronouncements about a possible new era of prosperity, strengthened especially after 2003 by announcements from the Human Genome Project, an international, publicly sponsored programme to map the human genetic code. Box 2 suggests that this led to a bubble in biotechnology, with massive investments in firms, many of which had not yet developed any products and would go out of business very soon. There is a risk that the more recent interest in 'green technologies', designed to reduce and remedy damage to the environment, might see a similar boom–bust cycle, delivering some beneficial innovations but not always rewarding the investors who pour money into them.

Box 2 Is biotech flaming out?

After months of scorching returns, biotechnology investors have been badly burned …

Biotech stocks have been as hot – and volatile – in recent months as Internet stocks. From last July to February 2000, the American Stock Exchange biotech index soared 220 per cent. Protein Design Labs leaped 700 per cent in the three months following Thanksgiving. Cell Therapeutics, trading at $2.75 last September, rocketed to $47 in March of this year – a 1,600 per cent rise.

Investors gleefully piled in. But in March the sector swooned, with stocks like Protein Design Labs, Human Genome Sciences and Millennium Pharmaceuticals losing more than half of their value. The biotech index plunged 35 per cent in just two weeks. The sector had become so speculative that one trigger for this carnage was a relatively innocuous announcement by President Clinton and British Prime Minister Tony Blair that data about human genes 'should be made freely available to scientists everywhere.'

The question for investors now: Is the biotech boom over or is there still serious money to be made here? Some seasoned biotech watchers are clearly sceptical, having previously witnessed the sector's tendency to boom, then bust. In '91 and '92 the biotech

> index soared 320 per cent, but most biotech stocks went nowhere in the years that followed. By March '99 the index had returned a grand total of just 10 per cent in 6.5 years. Mort Cohen, CEO of Clarion Partners and a long time biotech follower, warns: 'Old biotech investors like myself know it won't be good forever.'
>
> (Moskowitz, 2000)

Some bubbles, like the tulip bubble, involve speculation that may be unconnected with any underlying technological change. The financial crisis that began in 2007 could be traced to a bubble in the US housing market whose impact spread internationally. It had less to do with *technological* innovation than with *financial* innovation, particularly the structured products described in Chapter 3, Section 5.2, and the derivatives outlined in Chapter 4, Section 3.

Similarly, the property bubble in Japan, which saw the residential real estate price index increase by 400 per cent between 1980 and 1989, appears related to neither technological nor financial innovations. The highest peak prices were in Tokyo's Ginza district, with the most valuable properties reaching 100 million yen (approximately £6 million) per square metre in 1989. While the tulip bubble came down with a crash, the Japanese property bubble simply stopped inflating. However, since investors had been speculating on further house price increases, and using inflated property values as security for loans, the end of price rises caused a major crisis in the Japanese banking system. The banks took almost a decade to recover, and Japan had still not regained its buoyant pre-bubble economic growth rates even in 2009. Fears of repeating this experience were one motive for other governments' unusually rapid and extensive fiscal and monetary loosening in response to the bursting of the US housing bubble in 2008, which caused a general stock market crash and international financial crisis.

Given that some bubbles can be traced to major technological changes, and others to pure speculation around the property market with no technological basis, the question arises: what features do bubbles have in common besides the rise and fall of the prices of the assets in question?

3 Categorising asset bubbles

In his book *Manias, Panics, and Crashes*, Kindleberger (1989) defines different stages of bubbles, triggered by a major change (technological or institutional) in the economic system that brings about new hopes for profit opportunities, and how the bubble develops after that. The different phases are illustrated in Figure 3:

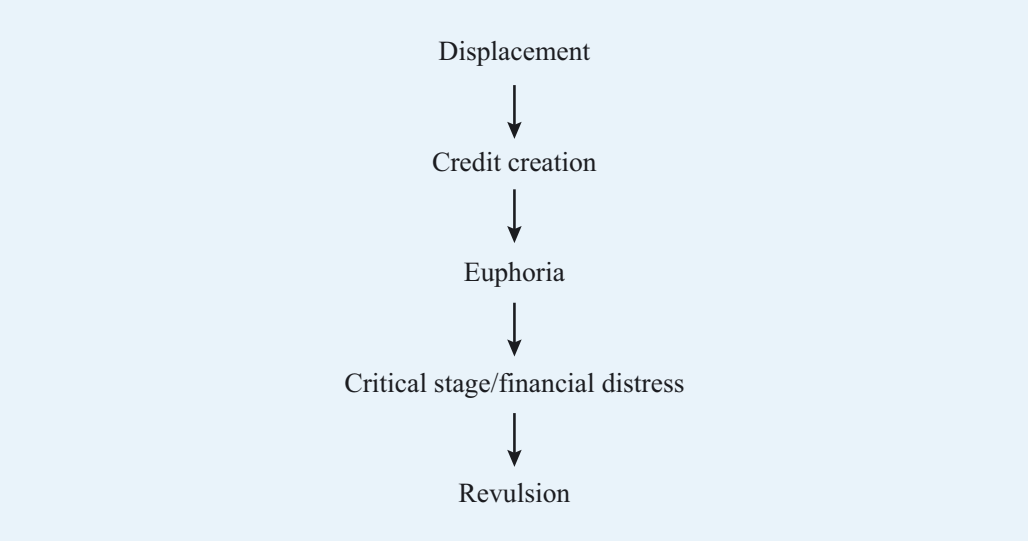


Figure 3 Stages of a bubble

Displacement occurs after an exogenous shock introduces new profit opportunities in a particular sector or in the entire economy. An example is the advent of the internet. Displacement could also be triggered by a new institutional structure, such as monetary policy that suddenly introduces (eases) money into the system. Such relaxed monetary policy is often accused of triggering both the Japanese land and equity bubble in the 1980s and the US housing bubble in 2008. These new profit opportunities cause animal spirits to rise, inducing an increase in both financial and physical investment – potentially leading to an economic boom.

This phase is followed by a credit creation phase, which releases money to finance the investment that is needed to fuel the boom. This part of the bubble is characterised by increased bank lending and the creation of new lending institutions. Increased lending triggers increased investment and income. Figure 4 shows how monetary creation in this period caused household debt, shown as a percentage of household income, to reach record levels during the dot-com boom.

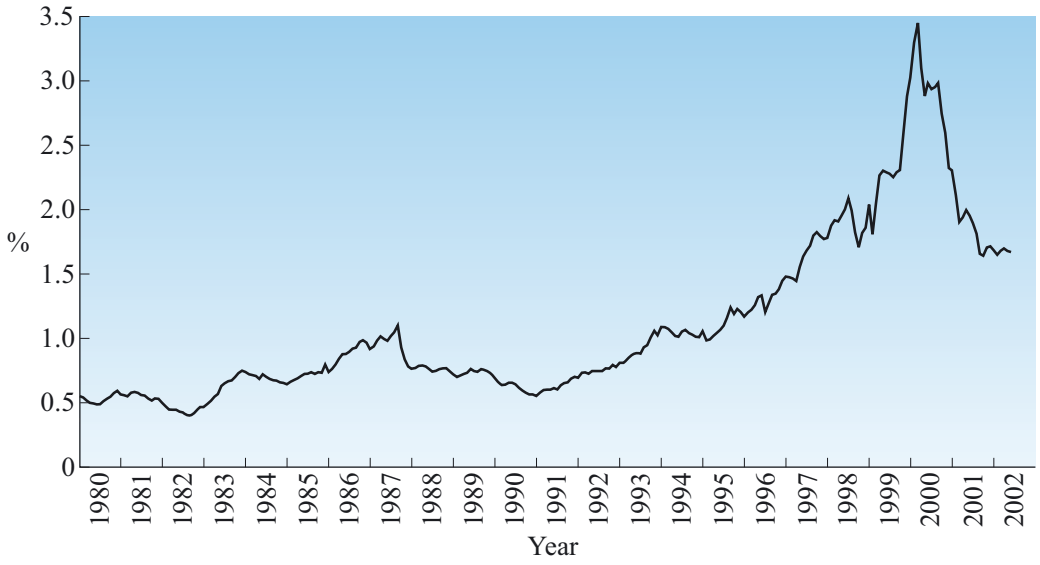


Figure 4 US margin debt as a percentage of household personal income, 1980–2002

(Source: Montier, 2007, Table 38.2)

Overtrading
Moving too frequently between one share or fund and another.

The next phase is one of euphoria, a phase of speculation and **overtrading**. This denotes the placing of excessive bets made on the basis of exaggerated expectations about the future growth potential of particular shares. It is in this phase that the bubble reaches its peak. Euphoria reflects over-optimism about prospective returns, underestimation of the risk (reflected in loans to individuals and companies with inadequate guarantees or collateral), and overconfidence about being able to control the situation (Montier, 2007). The dynamics of overconfidence are further explored in Section 7.

The euphoria phase is characterised by momentum trading (see Chapter 4), where investors try to extrapolate past high rates of growth (past momentum) into the future (future momentum). Fund managers can be drawn into exacerbating the bubble by their need to outperform their peers and their worry about being left behind. Financial investors and company managers are persuaded by 'new era' thinking, often engaging in excessive leveraging, and putting too much faith in mergers and acquisitions to solve structural problems.

The most critical stage in the bubble begins when well-informed 'insiders' start to get worried about the future and decide to cash in their investments before it is too late. Their move out of assets into cash puts downward pressure on asset prices and sends a signal that eventually induces investors as a whole to rush for liquidity. The 'real' economy is doubly hit, by a jump in the cost of debt and equity finance

and a fall in sales, as faster-moving investors sit on their cash piles while slower-moving investors absorb their losses. This leads to a period of financial distress when companies begin to default on their liabilities and possibly go bankrupt. Revelation of a 'swindle' or fraud often worsens the loss of confidence (Montier, 2007). Deceits that accompanied the financial crisis that began in 2007 included the concealment of toxic debts at Lehman Brothers investment bank until shortly before its collapse, and exposure of the largest ever US investment fraud by previously respected fund manager Bernard Madoff.

The revulsion phase begins as this process spirals downwards, with banks becoming very cautious, restraining credit even after they regain liquidity. This unwillingness to lend can then lead to a major recession as firms have to cut back production (hence employment) due to their inability to get loans. This may also involve consumers finding it more difficult to borrow.

All this sounds quite negative, but the degree to which, after they burst, bubbles are associated with any positive legacy depends on whether buying behaviour was motivated by fundamentals as opposed to pure speculation. Referring to the dot-com bubble, former US Undersecretary of Commerce Robert Shapiro argued that:

> The American bubble represented an excess of something that in itself has real value for the economy – information technologies. The bubble began in overinvestment in IT and spread to much of the stock market; but at its core, much of the IT was economically sound and efficient. Further, these dynamics also played a role in the capital spending boom of the 1990s, and much of that capital spending translated into permanently higher productivity. The result is that the American bubble should not do lasting damage to the American economy.
>
> (Shapiro, 2002)

The same argument could be made about the railway bubble: a total of 10,010 km of railway line were built in Britain as a result of projects authorised between 1844 and 1846. Only another 8000 km have been built in the century and a half since then. But bubbles that began with other types of shocks, such as financial liberalisation that unleashes cheap credit used in speculation, can exhibit very similar dynamics of overinvestment and rising asset prices without any lastingly positive

effects. Once tulips were back to the price of onions, Holland was not measurably better off in terms of national income and productivity. Beneficial legacies from the 1980s Japanese and 2000s US property bubbles may prove equally hard to find.

The time taken for an economy to recover after a bubble bursts might also be related to the source of the initial shock. Bubbles rooted in productive technology appear to allow faster recovery than those with no clear path to the higher returns implied by rising asset prices. Financial regulations, introduced by politicians reacting to bubbles, may also affect this recovery process, as was seen in Chapter 5.

4 Overvalued compared to what?

So far we have referred to the sustained rapid rise and eventual fall of asset prices that define bubbles. These are said to burst because the companies involved are overvalued. But the use of this term suggests that we have some notion of the underlying correct value – with the size of the bubble measuring the distance from that underlying value. So the identification of bubbles must be linked to a theory of asset price determination. Accusations of 'madness' on the part of investors, as in the opening quote from *The Economist*, imply a model of what should be happening when investors are sane. So what is normal investment behaviour that makes stock market bubbles appear abnormal?

Traditional finance theorists, who espouse the efficient markets hypothesis discussed in Chapter 4, offer one definition of the bubble and what it is departing from. Their assessment has been challenged more recently by behavioural finance theorists. The remainder of this chapter is aimed at helping you to understand the ongoing debate among finance theorists about what determines asset prices. For this, we must start by questioning some of the assumptions that have been made up to now about what constitutes a fair price for an asset.

4.1 Bubbles and asset valuation

In any bubble, buying driven by anticipation of future price increases leads to shares or other assets becoming overvalued. In a stock market bubble, excessive demand raises most or all share prices until they bear little relation to the underlying intrinsic value of the share. Recall from Chapter 2, Section 4, that intrinsic value can be calculated through a present value formula, the dividend valuation model (DVM), which links the price of an asset to the present discounted value of its expected future dividends, with a given level of risk. Hence a share is overvalued if its market price exceeds the present value of the future income that would be received by buying and holding it (the intrinsic value). If an asset is overvalued, then investors have inserted cash flow forecasts into this model that are too optimistic and/or excessively weighted future earnings by applying too low a discount rate. This was the case before 2001 with the majority of dot-com companies, which never generated earnings to justify their high stock prices before the crash.

Thus a stock market bubble can be defined more precisely as a type of economic bubble taking place when the price of shares rises to become overvalued when compared to those shares' intrinsic value, based on asset valuation models. Since bubbles can also occur with other types of assets, a similar definition can be applied to these.

Bubbles gain momentum when overvaluation breeds more overvaluation, or undervaluation breeds more undervaluation, with expectations prompting buying or selling decisions that make them self-fulfilling. This momentum may be sector-specific (as when tied to railways, IT or biotech) or index-specific (as with NASDAQ). While some shares are overvalued, others can be undervalued, especially when funds are pulled out of some sectors to pile into others. For example, in the dot-com boom, technology-related shares were overvalued while low-growth, low-risk companies such as breweries were undervalued.

Most of the new internet-based companies in the dot-com boom experienced very large increases in their share prices, based on future cash flow expectations, including now-famous ones like Amazon and eBay. Since most of the highly-valued companies were based on ideas that never came to fruition, such overvaluations are described as a 'madhouse' in accounts such as the opening quote of this chapter or the article in Box 1. In hindsight, Amazon and eBay shares were not necessarily overvalued back in 1999, since they later generated a high stream of cash flows, and many original shareholders became millionaires. But the majority of the other dot-com shares proved to be overvalued, since these companies ultimately earned little or nothing. Those who backed Amazon and made millions may have been unusually far-sighted, or they may just have been luckier than those who bet on equally innovative firms that then went bust. During the railway mania of the 1840s it was common for managers to issue shares in a company, watch them rise, and then sell out before the company had even started to produce, let alone earned any profit. In the end, lines did get built and some railway companies made profit, but most failed to justify their optimistic early valuations.

The biotechnology industry, featured in Box 2, is another example of high expectations about future cash flows leading to overvalued stocks. In 1991–92 the biotech index, which tracks shares in this sector, soared 320 per cent. But most of the companies were virtually just research and development (R&D) labs, without any products destined for the market. Even 15 years later, only around 20 per cent of all publicly held biotech companies had any products on the market or were earning

royalties based on products commercialised by partners (Pisano, 2006). However, as with dot-com, some of these companies (like Genentech) did turn out to be highly profitable. It is high expectations around a specific sector, combined with the inability to predict which of the companies will become market leaders, that makes investment in a bubble so risky.

4.2 Detecting a bubble

Overvaluation is easier to detect in hindsight, after a bubble has burst. But there are also various indicators that may signal that an asset is becoming overvalued. Most such indicators compare the price of a share to the underlying intrinsic value of the firm, linked to fundamentals such as its reported earnings and profits. For example, the price–earnings (P/E) ratio will be relatively high when a firm is overvalued. Yet, as discussed in Chapter 2 (Section 4.3), the high P/E ratio may also be a reflection of well-founded investor expectations that a company's earnings will rise significantly, perhaps due to its potential leadership in the use of a new technology. If a high P/E ratio company does become a market leader, it will turn out not to have been overvalued. A high P/E ratio may suggest that investors are expecting higher earnings growth for this company than for others with a lower P/E ratio. In fact, the P/E ratio is relevant only as a relative measure, comparing firms to other firms in a given industry.

Activity 3

Consider why a firm might have a high P/E ratio even though it is not a high technology firm with high expected growth.

Companies that use more traditional technologies may exhibit a high P/E ratio because of unusually low earnings, rather than a high share price. Earnings (E), the denominator of the P/E ratio, may be depressed because the firm has had a recent run of unusually low earnings, or because it has just made some large physical investments, which reduce earnings by increasing depreciation. Another possibility is that a fall in interest rates has lowered the required rate of return on the share and so raised its price, leading to a higher P/E ratio.

5 Volatility and animal spirits

Bubbles are often characterised not only by overvaluation of shares, but also by very volatile share prices. Volatility seems to be a characteristic of stock markets, even in non-bubble times, but it can gain more relevance and impact during bubbles. Here too we must ask: very volatile compared to what? The comparison is with the volatility of underlying fundamentals that prices are, in theory, related to. **Excess volatility** is a specific measure of volatility, showing the degree to which the standard deviation of share prices over time is higher than the standard deviation of the underlying earnings or dividends over time.

Excess volatility
The degree to which share prices are more volatile than the underlying earnings (or other fundamentals).

In an influential article entitled 'Do stock prices move too much to be justified by subsequent changes in dividends?', Robert Shiller (1981) finds that the volatility of share prices is much too high, even in non-bubble periods, to be justified by the volatility of the underlying dividends or earnings. The data in Figure 5, taken from Shiller's (2000) influential book *Irrational Exuberance* illustrate that, over the last 150 years, a main index of US shares (the S&P500) has always been more volatile than the index of underlying earnings of the companies that it represents. This figure reveals that, not surprisingly, the degree of excess volatility is especially high in the periods characterised by technological revolutions, such as in the 1920s and 1990s as discussed earlier.

Another way to look at these data is to compare the actual share price index with the prices that would theoretically emerge if share prices had been driven by the dividend valuation model (DVM, introduced in Chapter 2, Section 4.3); this is done in Figure 6. The flatter line shows the prices that would have occurred between 1871 and 2000 if they had been derived by discounting the historical series of dividends, which we now know. (To derive this, Shiller uses a constant discount rate equal to the historical average real monthly return on the market from January 1871 to June 1999, or 0.6 per cent a month; but this assumption is not key to the results.) By using the *actual* dividend series, which we can now find out, rather than the *expected* ones required by the DVM, we can work out how prices would have moved if investors used this model and knew the entire real series in the future. This is an assumption of perfect foresight, often used in economic models.

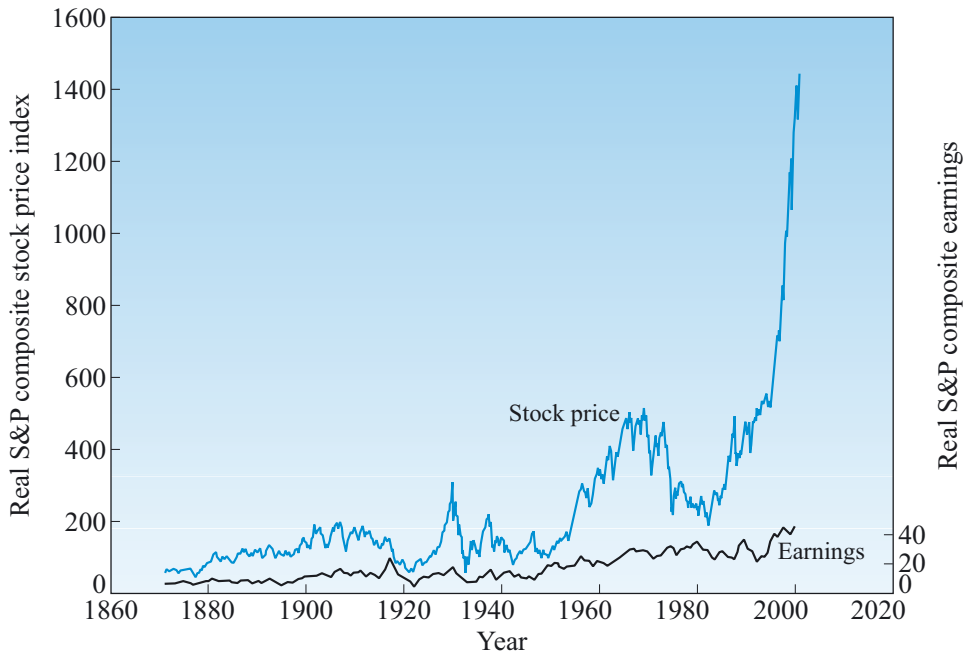


Figure 5 US stock prices and earnings, 1871–2000

(Source: Shiller, 2000, p. 6, Figure 1.1)

Note: Upper series is real (inflation-corrected) S&P Composite Stock Price Index, monthly, January 1871 to January 2000. Lower series shows real S&P composite earnings, January 1871 to September 1999, calculated by Shiller using: S&P Statistical Service; US Bureau of Labor Statistics; Cowles and associates, Common Stock Indexes, and Warren and Pearson, Gold and Prices.

Figure 6 shows that the DVM consistently underestimates the volatility of stock prices. That is, *actual* share prices are consistently more volatile than the theoretical share prices that would emerge using the DVM, if investors had perfect foresight. Although this difference is evident from the figure, the difference in volatility can be more formally measured by comparing the standard deviation of both series over time. When plotted in log-scale (as you learned in Chapter 2, Section 2.1), real stock prices are seen to be on average 2.7 times higher than the intrinsic fundamental share value that emerges from the dividend valuation model (Montier, 2007).

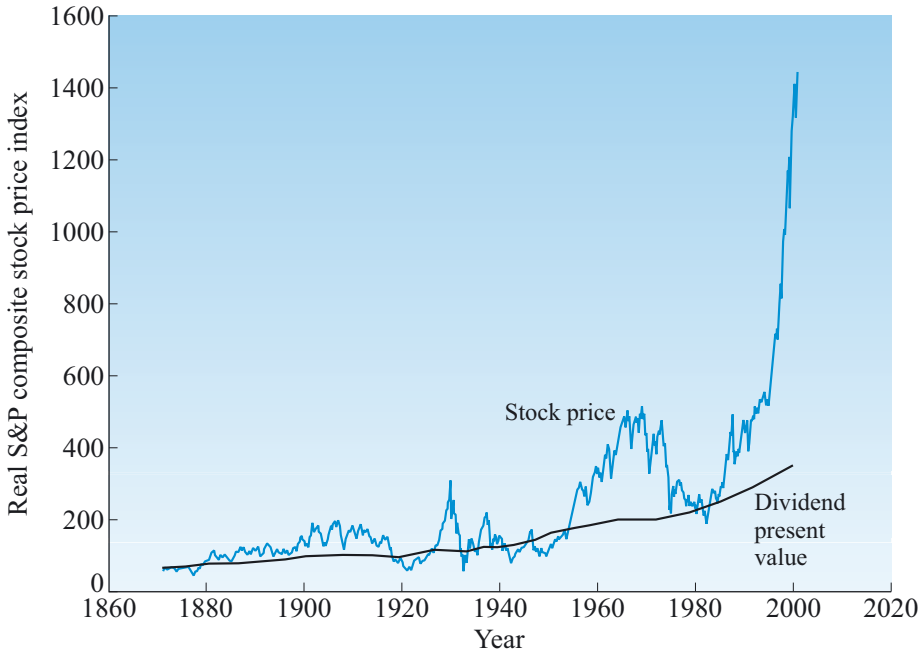


Figure 6 US stock prices and dividend present value, 1871–2000

(Source: Shiller, 2000, p. 186)

Excess volatility suggests that the problem with bubbles is not just one of share price overvaluation. It also means that shares can swing from being highly overvalued to highly undervalued, with the changes having little relationship to changes in the 'fundamentals'. The problem is related to share markets' overreaction to good and bad news, which is examined more deeply in the next section.

6 Efficiency or madness of crowds?

In Section 4 we saw that overvaluation seems to breed more overvaluation. Far from being self-correcting, markets can sometimes swing away from fundamental values as past movement incites expectation of further movement. This also appears in the volatility data of Figures 5 and 6. The high volatility of shares, and its lack of correlation with the volatility of underlying fundamentals, does not appear to decrease over time towards some 'average' level. This not only causes problems for the dividend valuation model set out in Chapter 2, but also challenges the assumptions behind the efficient markets hypothesis (EMH) discussed in Chapter 4.

Recall that the EMH says that financial prices accurately reflect the available data on fundamentals. So prices are the best available forecasts of those variables. Any changes in those prices can only be due to unpredictable news. This is why the EMH holds that share prices will follow an unpredictable, random walk. The random walk means that there are no identifiable structural aspects to price determination that would enable future prices to be predicted from past price data. There is no correlation between past and current prices.

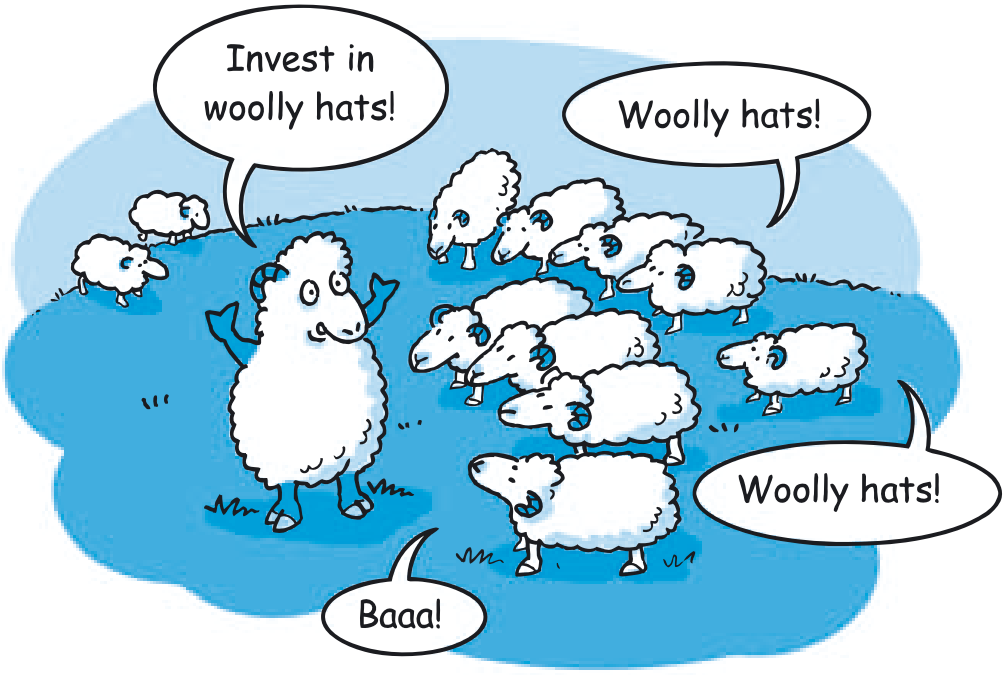
According to the EMH, any mistakes in calculating price are soon corrected by the market. For example, if high-tech shares tend to be overvalued, due to over-optimism about the future growth of high-tech companies, then according to the EMH, investors will over time learn to adjust these share prices downwards. So this information should eventually be incorporated in the correct price. In statistics this is referred to as 'reversion to the mean': overshooting will result in prices falling back towards the mean, undershooting will result in prices rising back towards the mean.

If, on the other hand, higher than average returns this year cause higher than average returns next year, there is a **positive feedback** mechanism at work, resulting in some share prices being persistently 'high'. Positive feedback means that there are reinforcement mechanisms that drive a system increasingly faster in the direction in which it is already going. This could be towards the equilibrium, as assumed by advocates of free markets, but could also be away from it: there is no automatic reversion to the mean. The dot-com bubble is an example of the second case, a 'vicious circle' moving prices away from equilibrium rather than a 'virtuous circle' moving them towards it. The eventual crash could be

Positive feedback
A process through which a shock to a system generates further movement in the same direction; also called 'cumulative causation' or 'reinforcement mechanism'.

interpreted as the market correcting itself, but since it took many years to recover, it is hard to justify this with a theory of 'efficiency'.

Investors caught out by phases of positive feedback are not necessarily irrational or 'mad', as implied in our opening quote from *The Economist*. Insights from psychology do not imply that most investors are blindly following the herd, with no minds of their own (though this is sometimes the case). The more usual case is that they are constrained in their rationality. Understanding the form of such constraints brings us into the world of behavioural finance.



7 Behavioural finance

The analysis of share investment in Chapter 2 assumes rational choices, with risk-averse investors seeking the best returns by maximising the net present value of future dividends. The finding that share price movements are not 'justified', when compared to movements in the underlying fundamentals, suggests that other factors may be helping to determine investment behaviour. Do animal spirits have an identifiable psychological foundation when considered in relation to financial investment?

Recent advances in behavioural finance have tried to answer this provocative question, taking issue with the concept of rationality used by economists and finance theorists. **Behavioural finance** applies psychological research on decision making to investment decisions. A core element concerns how investors in the 'real world' form their expectations and beliefs, and hence their valuations (for example of a company's future earnings or the risk-adjusted interest rate).

Behavioural finance An approach to investor behaviour that takes account of departures from 'rational' decision making and their impact on financial markets.

7.1 Bounded rationality

As you learned in Chapter 2, Section 2.2, the word 'rationality' is used in economic theory to mean that economic agents (consumers, business managers, financial investors) pursue goals in the most efficient way possible. Firms try to maximise their profits and investors their returns. In the preceding chapters, we have assumed that investors have a model through which they can calculate the expected price of a bond or share, and that their decisions on whether (or how much) to invest in a particular asset are based on that model. There may of course be a variety of models, with varying degrees of complexity, but we have assumed that through rational analysis investors can forecast the price of a security, and hence its rate of return, which then guides their investment behaviour. Given a person's level of risk-aversion (recognising, for example, that an old-age pensioner may be more risk-averse than a 20-year-old), they will choose a particular product based on its risk–return relationship, aiming to maximise the return for a particular level of risk.

Rather than assuming rational behaviour from the start, behavioural finance theory asks: 'What do we know about financial decision making from experiment and observation?' Using this approach, behavioural finance researchers have discovered that investors – even professional

ones – do not base their decisions about bonds, shares, property and other asset allocations on the exact calculations required for maximisation. In so doing, behavioural economics challenges the concepts of rationality at the centre of traditional economics (often called **neoclassical economics**) and portfolio theory, as introduced in Chapter 3.

Neoclassical economics
A development of classical economics that recognises some demand-side problems but still traces them to price and wage inflexibility, and assumes that decisions are taken as if individuals have full information that they process rationally.

Behavioural finance theorists often talk about **bounded rationality**. The main idea is that even though investors try to maximise their returns, their ability to do so is greatly constrained by access to information, time and computational ability. Rather than maximising behaviour, they focus on **satisficing**, getting a good-enough result that takes them above a minimum target. Because they don't have the time or ability to find the most optimal (efficient) solution, they simplify their choices by following a set rules. Examples of this in economics include managers who fix a product's price as a conventional mark-up over costs, even though the profit-maximising price might vary over time, and consumers who go to the store that they consider the cheapest overall rather than shopping around for each item.

Bounded rationality
The idea that individuals' rationality is limited by the information that they have access to, available time and cognitive (brain power) limitations.

7.2 Herd behaviour

A core finding of behavioural finance is that when investors are predicting stock prices, they try to anticipate not the fundamental value but *what others think the fundamental value might be*. It could be argued that this is just another type of rationality, but it is not well explained by the definition that economists normally use. Keynes, whose challenge to traditional macroeconomics was reviewed in Chapter 5, described this sort of alternative investment behaviour when he likened investment choices to an old-style beauty contest, where beauty is not in the eyes of the beholder but in the eyes of those who most closely second-guess all the other beholders:

Satisficing
Looking for a satisfactory, sufficient solution rather than the most efficient one.

> Professional investment may be likened to those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick, not those faces which he himself finds prettiest, but those which he thinks likeliest to catch the fancy of the other competitors, all of whom are looking at the problem from the same point of view. It is not a case of choosing

> those which, to the best of one's judgment, are really the prettiest, or even those which average opinion genuinely, thinks the prettiest. We have reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be. And there are some, I believe, who practise the fourth, fifth, and higher degrees.
>
> (Keynes, 1936, p. 156)

One of the main insights of behavioural economists is that people who communicate regularly with one another start to think in similar ways – sometimes referred to as herd behaviour or following the herd. This contrasts with the assumption in the efficient markets hypothesis that investors' decisions are independent of one another, so there is no correlation between two people's decisions, or even between one person's decisions today and tomorrow.

Herd effects may occur due to peer pressure or to individuals assuming that because a lot of people are doing something it must be right. Classroom experiments, which behavioural finance theorists use extensively, have shown that pressure of numbers can convince people of choices that would otherwise seem completely wrong. In one well-tried experiment, individuals are shown two lines, one long and one short, and asked which is the longer. If they are told that before them everyone has chosen the shorter one, they tend to choose that one too – apparently changing their perception, convincing themselves that it really is longer. They are not necessarily acting irrationally – just reasoning, from experience, that if so many people made that decision *then it must be right*.

Activity 4

Re-read Box 1. How might this support the idea that investors follow 'herd behaviour'?

The quote in Box 1 by Michael Jackson, the chairman of a venture capital firm, highlights how investment managers tried to rationalise their late 1990s decisions on dot-com firms by citing exactly this type of herd behaviour: 'at the end of the day you are not paid to sit on your hands while others are making money'. These investors may now seem irrational, but their actions at the time reflected a very reasonable fear of being left behind. Shiller (2000) points out that if a fund manager

had acted on the 'irrational exuberance' warning issued by Alan Greenspan (then chairman of the Federal Reserve Board) in December 1996, drawing attention to an impending bubble, then he or she would have missed out on another 40 per cent appreciation in high-tech stocks by not holding on until 2001. Fund investors are judged on how well they perform compared to their competitors: so they can escape blame if they stay on a bandwagon that loses money for everyone, while being condemned if they jump off one that others go on to make more money with. Hence to maximise profits, investors should in fact act in this seemingly irrational way – as long as they get out in time.

Herd behaviour can develop when information is passed between individuals so that an initial decision by one person leads to everyone doing the same. An example, based on observation, is the choice of which restaurant to go to. If one person by chance chooses a particular restaurant, a passer-by undecided in their choice may compare the one next door (still empty) to this one, and assume that the one that someone else has entered must be better. If the same reasoning is followed by all those passing by in search of a restaurant, the first restaurant will soon fill up, while the other stays empty: not because the first restaurant is necessarily better, but simply because the first individual decided to go there, even if they did so randomly. The way in which information is created and diffused, leading to what might be an arbitrary initial decision becoming self-reinforcing, is referred to as an **information cascade**. These cascades can lead to many following the same behaviour even if it goes against what might appear (for example to economists) as rational. However, it is not correct to say that information cascades have to be an outcome of irrational behaviour – the agent may be rationally thinking that if many others have made that decision, then it must be right. This is an example of bounded rationality, defined earlier.

Information cascade
The process of people ignoring their own private information and basing a decision on what others have decided to do (e.g. invest in certain stocks). It can lead to herd behaviour, where many people do the same thing, ignoring a logical course of action.

Many have highlighted the role of the media in creating information cascades, by not just reporting events but also creating them. In their search for viewers, listeners and readers, the media may encourage herd behaviour by, for example, blowing out of proportion the significance of market rallies and declines. The short-term focus of many stock-market investors (which may reflect other behavioural biases, as detailed shortly) means that expectations are very sensitive to new information, and media reporting may induce an exaggerated response to this, so that price movements overshoot.

7.3 Prospect theory

In 2002, cognitive psychologist Daniel Kahneman received the Nobel Prize for Economics for radical discoveries using classroom experiments, many conducted with Amos Tversky, to study economic decision making under risk and uncertainty (Kahneman and Tversky, 1979). These revealed two aspects of human behaviour that do not conform to the assumptions of rationality discussed earlier. First, emotions often work against the type of self-control that is required for rational decision making. Second, people often do not understand the choices that they are given, so that even if they think that they are acting rationally, they will make choices that suggest otherwise. These 'cognitive difficulties' are the reason why behavioural theory relies on bounded rationality, not the full rationality that economists traditionally assume.

Kahneman and Tversky devised an approach called prospect theory to account for the observed strong asymmetry between the way in which we make decisions involving gains and the way in which we make decisions involving losses. This describes how people make choices, including financial decisions, featuring alternatives that involve risk. It is called *prospect* theory because of the way in which people view their prospects of winning or losing. Behavioural research revealed that choices using the same information can vary with the way it is presented or 'framed'. In particular, people will generally exhibit risk-aversion when a choice is framed one way and risk-seeking behaviour when the same choice is re-framed another way. This framing effect means that decisions on an investment opportunity will depend on whether the opportunity is framed in terms of a loss or in terms of a gain – even if the underlying information is exactly the same. This challenges the conventional assumption, used in Chapter 2, that investors have a given level of risk-aversion when seeking to maximise returns. An individual's degree of risk-aversion changes depending on how a situation is presented. Box 3 looks at different classroom experiments that Kahneman and Tversky made to illustrate the framing effect.

Box 3 Are you risk-averse?

The asymmetry between the way in which we make decisions involving gains and decisions involving losses is one of the most striking findings of prospect theory. It is also one of the most useful for understanding investment. Where significant sums are involved, most people will reject a fair gamble in favour of a certain gain: getting $100,000 for certain is preferred to a 50–50 possibility of getting $200,000 or nothing. When the options are framed as gains, people are risk-averse. But what about losses? Kahneman and Tversky's first (1979) paper on prospect theory described an experiment showing that our choices between negative outcomes are mirror images of our choices between positive outcomes. In one of their experiments they first asked the subjects to choose between (a) an 80 per cent chance of winning $4000 and a 20 per cent chance of winning nothing, and (b) a 100 per cent chance of receiving $3000. Even though the risky choice (a) has a higher mathematical expectation (expected return), $3200, it was found that 80 per cent of the subjects chose (b), the certainty of $3000. Under this framing they were risk-averse.

Then Kahneman and Tversky offered a choice between (a) the risk of an 80 per cent chance of losing $4000 and a 20 per cent chance of breaking even, and (b) a 100 per cent chance of losing $3000. Now 92 per cent of the respondents chose (a), the gamble, even though its mathematically expected loss of $3200 was again larger than the certain loss in (b) of $3000. When the choice is re-framed to involve losses, people are risk-seekers, not risk-averse.

(Adapted from Bernstein, 1998, p. 272)

Some other general features of 'irrational' investment behaviour, highlighted by behavioural finance, are listed here. As you read them, consider how each poses problems for the assumptions of informational efficiency in the EMH, as well as the assumptions of investor rationality made in portfolio theory.

- *Retrievability.* Investors often give too much weight to the most recent events. Headlines on a recent fall in the stock market will provoke a large reaction, which should not happen if people adopt a longer time horizon. Shiller (2000) even claims that the rise of speculative bubbles, with the 1630s tulip mania, began with the rise of newspapers. The media help to make information publicly available,

but they can also cause large groups of people to think in similar ways, creating information cascades that lead to self-fulfilling prophecy. Reports of financial disaster can *become* a disaster due to reactions to the reports.

- *Excessive discounting*. Closely related to the overweighting of current or immediately past events is a tendency to attach little weight to events that occur some time in the future. This often seems to make sense, when the future is very uncertain. But it means that many investors, if they make present-value calculations at all, do so with a higher discount rate than is featured in the valuation models of Chapter 2. This excessive discounting, assigning the future a low weight compared with the present, could account for the many surveys suggesting that people are on average not saving enough for their retirement, even if they are competently handling their money from day to day (see Chapter 8).
- *Loss-aversion*. Investors tend (as recounted in Box 3) to react more to the possibility of a loss than to the possibility of a gain; laboratory tests suggest 2 to 2.5 times as much. This can give rise to panic-selling behaviour and overreaction to stock market volatility.
- *Representativeness*. Investors may wrongly believe certain events to be interdependent, so that the recent sequence of outcomes gives a basis for predicting the next one. Supporters of the EMH argue that this is what afflicts investors when they try using charts or technical analysis to predict share price movements using past price data, not realising that (according to the hypothesis) prices move at random. Two opposite tendencies have been observed in relation to random, unconnected events. Some investors may start to believe that a long run of a particular outcome makes that outcome more likely next time (the 'hot hand fallacy'), others that the long sequence makes a *different* outcome more likely next time (the 'gambler's fallacy'). Investors committing both types of error may be present in the market, but there is no guarantee that their effects will cancel out.
- *Narrow framing*. Also related to representativeness, investors tend to focus on the short term even when their investments are long term. Someone who is 30 years old should not worry too much about how short-term price movements affect their pension plan, but evidence suggests that they often do. Daily and monthly volatility figures are given more importance than annual volatility figures, even when the latter are simple averages of the former (presenting the same data in a different way). This suggests that many people do not understand **time diversification** as a rational investor should.

Time diversification The practice of investing and/or cashing in investments in a series of lump sums spread over time, in order to remove the risk of choosing a bad time to invest (when prices are high) or disinvest (when prices are low).

Investors who don't understand this may react to short-term losses, taking money out of the stock market during bad times, and so miss out on longer-term gains. Many people fear investing in shares due to their higher volatility (compared to bonds), even though their long-run returns have historically been higher.

- *Overconfidence*. Investors, especially those who believe in active management, are often unjustifiably overconfident in their own abilities to pick winners. They reinforce this by ascribing gains to their own expertise and talent, while blaming losses on the economy, bad luck or someone else. This has the effect of encouraging too much investment during good times (since rising asset values are viewed as a product of personal skill, not benign conditions), and too little in bad times (which are linked to malign conditions beyond the individual's control). Overconfidence has been used to explain why some people hold portfolios that seem far from rational, for example not well diversified. It can also explain irrational acts, such as frequent trading, whose gains are wiped out by transaction costs. And it can help to account for the 'greater fool hypothesis', followed by some traders, who believe that it is always possible to resell an asset at profit, even if bought when already overvalued, because there will always be a greater fool who is willing to pay the higher price.

Activity 5

Re-read Box 1 on Dotcombustion, and use the article to provide examples of the behavioural biases outlined here.

The description of dot-com investors in Box 1 shows them committing an error of representativeness: many thought that the boom would go on forever, causing them to ignore their own normal ways of conducting business. Dot-com entrepreneurs, many of whom had no relevant experience, were also overconfident of their likelihood of success, and managed to transmit this overconfidence to many of their investors.

The behavioural finance critique of efficient markets is thus based less on the availability of information than on how that information is interpreted and applied. Lack of access to information can inhibit market efficiency, and give rise to the mis-selling of financial products discussed in Chapter 7. But the behavioural approach reveals problems

even when information is perfect and complete, due to the different ways in which people understand and process it. This is why behavioural economists often do experiments in a closed environment where relevant information can be specified fully. For example, role-playing investors are shown fundamental data on a company, and asked to decide whether to invest in its shares. Sometimes real-world conditions come close to a controlled experimental environment, as when investors are asked to value a security (such as a government bond) with very little uncertainty, whose fundamental value is actually observable. Experiments suggest that even in these 'controlled' environments, investment behaviour can be quite irrational, showing biases like overconfidence and representativeness that work against maximisation.

7.4 Back to fat tails?

Another critique of the EMH has arisen not from classroom experiments on investor behaviour, but from studying the statistical distributions of investment returns. Here, empirical evidence is used to question the assumption that returns follow a normal distribution, with major implications for finance theory when this assumption is dropped (Mandelbrot and Taleb, 2005). Remember that a basic implication of the Capital Asset Pricing Model (CAPM), introduced in Chapter 3, is that only systematic risk (beta) can bring increased return, because all unsystematic risk can in theory be diversified away. As the standard deviation of returns is used to proxy the degree of risk, this theory relies on a particular distribution of returns, based on the normal distribution (also referred to as the bell curve) introduced in Chapter 2, Section 4.4. If the mean is the expected value, then the standard deviation from that mean is taken to be the risk of the investment, showing the probability of returns differing by a particular amount from the expected value. In a normal distribution, most events cluster around the mean, so that those that lie 2.5 (or more) standard deviations from the mean are essentially ignored. Such events are deemed almost impossible, or so rare that they don't matter.

Critics of this assumption draw attention to the role of **high sigma events**, which have proved to be much less rare than the bell curve assumes – such as the sudden fall of major stock markets on 'Black Monday', 19 October 1987. They argue that the actual distribution of returns appears to be much 'fatter' than the normal distribution implies. A distribution with fat tails (as in Chapter 2, Figure 15) means that high

High sigma event
An event that, if normally distributed, should be very unlikely, as shown by its large standard deviation (sigma) from the mean.

sigma events are not so unusual, and have a higher probability of occurring than the normal distribution allows.

The implication is that investors not only have cognitive limitations as revealed by behavioural finance, but also have been wrongly trained to disregard large market moves as near impossible. In a provocative *Fortune* magazine article called 'How the finance gurus get risk all wrong', Mandelbrot and Taleb (2005) claim that while the bell curve works well for the study of physical variables like height and weight, it works terribly for finance:

> Your mutual fund's annual report, for example, may contain a measure of risk (usually something called beta). It would indeed be useful to know just how risky your fund is, but this number won't tell you. Nor will any of the other quantities spewed out by the pseudoscience of finance: standard deviation, the Sharpe ratio, variance, correlation, alpha, value at risk, even the Black–Scholes option pricing model. The problem with all these measures is that they are built upon the statistical device known as the bell curve. This means they disregard big market moves: they focus on the grass and miss out on the (gigantic) trees. Rare and unpredictably large deviations like the collapse of Enron's stock price in 2001 or the spectacular rise of Cisco's in the 1990s have a dramatic impact on long-term returns – but 'risk' and 'variance' disregard them. … The German mark's move from four per dollar to four trillion per dollar after World War I should have taught economists to beware the bell curve.
>
> (Mandelbrot and Taleb, 2005, p. 99)

While the EMH assumes that share prices follow a random walk, making unpredictable and uncorrelated steps, these authors argue that it ignores giant leaps (high sigma events), which are far from rare, are often correlated with one another, and have major effects on market outcomes. Mandelbrot and Taleb interpret different types of financial crises, including the crash of 1929 and the more recent crisis that began in 2007, as direct results of investors assuming that the risk of market returns is the same as that in lottery-type games, whose outcomes do approximate to a normal probability distribution. If these critics are right, the assumption of normally distributed returns undermines the conventional analysis of risk, leaving it unable to account for major events such as the collapse of Lehman Brothers in 2008.

This emphasis on the 'non-normal distribution' of investment returns complements the findings of behavioural finance. This is because one of the main reasons that 'extreme' events occur quite regularly is the occurrence of positive feedback, also central to the behavioural approach. Where, for example, one person's decision influences another person's decisions, any error by the first person will cause correlated errors by the second. Average returns are important only in situations where the dynamic is one of reversion to the mean with no positive feedback. Positive feedback can cause the types of important, and less rare, events that constitute fat tails.

8 Implications for personal investment strategies

You may rightly be asking yourself what the implications are of all these different theories of investment behaviour for your personal investment decisions. The answer is not so simple.

In Chapter 4, Section 4, you saw that the EMH argues against active management, which attempts to 'beat the market' by selecting undervalued stocks and timing their purchase. This is because if markets are informationally efficient, there should be no opportunity for bargain deals. Although assets will be priced differently, with different rates of return, these differences will be solely due to differences in risk, not any failure to capture the potential future gains. So if the EMH is correct, it is impossible to gain excess returns through arbitrage that is based on seeking differences between a security's price and its intrinsic value.

Behavioural finance, with its focus on the impact of emotions, cognitive errors, irrational preferences and group dynamics, leading to predictable patterns (such as buying shares when prices have already risen), is more compatible with active management. This is why some argue that behavioural finance is the theoretical foundation to technical analysis (see Chapter 4), which focuses on discovering arbitrage opportunities by studying past market trends (on prices and trading volume). From this perspective, the repetition of cognitive errors, because of the persistent biases revealed by prospect theory, may give rise to market inefficiencies that allow arbitrage opportunities.

The only way in which one can make more money, according to the EMH, is by taking on more risk, since there are no bargain deals. Hence evidence that some fund managers are in fact able consistently to 'pick winners' would be possible evidence against the EMH. As noted in Chapter 4, it appears that the long-run returns on most index funds are no worse than those on actively managed ones, once adjustment is made for active managers' higher fees. This result provides some support for the EMH. In the UK, investor returns from index funds tended to be in the top quartile of unit trusts ranked by return in the ten years to 2008 (Howells and Bain, 2008, p. 577). Yet even though index funds perform well, many investors still use actively managed ones or run their own portfolio – doubtless due to a belief that they

can do a better job, but possibly reflecting irrational biases in their behaviour.

Even though active investment might be driven by fad and hence exacerbate a bubble, due to the presence of information cascades, index tracker funds might also reinforce fads and aggravate the market's tendency to overshoot or undershoot. This is because if a share is popular amongst investors, it becomes a bigger percentage of the index, whose 'trackers' must then buy more of it (see Chapter 4). Fund managers, whose main objective is to outperform their peers (as reputation and bonuses depend on relative performance rather than absolute performance), may in many cases amplify rather than correct irrational behaviour in the market. It is for this reason that technical analysis, by focusing on past trends and using these to predict future movements, can be responsible for momentum trading where fund managers ride the trend rather than counteracting it.

The fact that index funds are subject to informational cascades was one of the reasons why John Maynard Keynes became a 'value' investor. His stock-picking method was similar to that used, in the present day, by Warren Buffett, who became one of the world's most successful and famous investors with a strategy based on selecting only value shares. These are identified when their price becomes very different from the fundamental value, precisely due to the trend behaviour of investors, who may be buying and selling based on informational cascades even when there are no visible bubbles in the market. Keynes described his investment strategy as one that:

> assumes the ability to pick specialties which have, on the average, prospects of rising enormously more than an index of market leaders … It is largely the fluctuations which throw up the bargains and the uncertainty due to fluctuations which prevents other people from taking advantage of them.
>
> (Keynes, cited in Walsh, 2008, p. 80)

The value-based approaches of Keynes and Buffett assume that most investors have little knowledge about the companies whose shares they are buying or selling and so are susceptible to information cascades. Buffett has made his millions by focusing on shares in companies of which he has good knowledge, often acquired by holding sizeable stakes for long periods.

Even though most of us do not have the time to find value shares through stock selection, some simple rules when choosing funds or buying shares directly can help avoid, and even exploit, the pitfalls revealed by behavioural theory (Malkiel, 2007, pp. 239–42):

Avoid herd behaviour

Given the feedback effects that arise from herd behaviour and media hype, often prompting investors to buy when prices are already high and sell after they fall, one logical prescription is to beware of all boom–bust pronouncements. This was in fact Keynes' strategy.

Avoid overtrading

Due to overconfidence, many investors tend to trade too much, moving frequently from one share or fund to another, and so incurring high transaction costs. Buffett's credo 'Lethargy bordering on sloth remains the best investment style' is appropriate, and favours buying to hold long-term. As men appear more routinely overconfident than women in this respect, it is best to ask women for trading advice!

If you do trade, sell losers not winners

Due to loss-aversion, investors are more risk-averse with gains than with losses. This has led to the strange behaviour where investors are less willing to sell losers (admitting their losses), than winners (to cash in on gains). Such a tendency leads to lower returns than when selling losers.

These suggestions from behavioural finance stand in contrast to suggestions from those who highlight the existence of 'fat tail' distributions, even though both groups are critical of the mainstream approach. While the mainstream EMH and CAPM imply that the only smart strategy is to diversify widely via index funds, and behavioural finance suggests that the irrationality of investors allows opportunities for arbitrage, 'fat tail' theorists believe that the frequency of high-impact, unpredictable events means that the only way to protect against them is to diversify as widely as possible. Their prescription is thus similar to the EMH and CAPM theorists, but for very different reasons:

> Diversify as broadly as you can – far more than the supposed experts tell you … Long-run market returns are dominated by a small number of investments, hence the risk of missing them must be mitigated by investing as broadly as possible. Passive indexing is far more effective than active selection – but you need to go well

> beyond an S&P 500 fund to do yourself much good. And wherever you put your money, understand that conventional measures of risk severely underestimate potential losses – and gains. For better or for worse, your exposure is larger than you think.
>
> (Mandelbrot and Taleb, 2005, p. 100)

The fact that different theories reach very different prescriptions and conflict over reasons, even where they agree on conclusions, shows that knowing 'what to do' can be less important than understanding *why*. It is essential, in making investment decisions, to understand the assumptions underlying different theories of investment behaviour. Armed with this understanding, you can decide whether you agree with the assumptions underpinning these theories.

9 Conclusion

You have started this chapter by examining the recurrence of financial bubbles over the last 200 years, and seen how different theories have interpreted them. You were then encouraged to question the concepts of normal or rational behaviour that underlie conventional theory, which have led to bubble episodes being classed as anomalies. Do investors behave in a calculating manner, well described by the assumptions of optimisation/maximisation in economics? Why is it that, notwithstanding the existence of very sophisticated investment models, investors often seem simply to follow the crowd? Does this mean that they are 'irrational'? Finally, the chapter ended by considering how alternative theories, which have different answers to these questions, also have different implications for how you might approach your own long-term investments.

Underlying this discussion has been the degree to which investors can make rational 'calculations' about the risk–return relationship, one of the core themes developed in the book. Knight (1921) argued that the use of probability distributions is only pertinent when the underlying phenomenon is not one of 'true uncertainty'. You have seen that periods of technological change are often characterised by such true uncertainty, since its commercial impact and the firms that will profit from it are wholly unpredictable. Taleb and others have emphasised that even when probability distributions are relevant, their form should not be restricted to that assumed by the normal curve. High sigma events are less rare than this curve assumes and so should stay on the investor's radar.

Institutional change has also been increasingly emphasised by economists and financial theorists. Financial regulations are a major institutional enablement and constraint for investment behaviour. Financial crises, which are usually accompanied by financial innovations, tend to be followed by the imposition of new regulations designed to contain their effects. The dynamic tension between these changes, and emergent developments in the regulatory environment, are a further source of uncertainty, which you will consider in the next chapter.

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