What goes up …

What are the connections between stock market valuations of firms and business investment? Stephen R. Bond, of the Institute for Fiscal Studies and Nuffield College, Oxford, investigates.

The behaviour of share prices in recent years has been rather remarkable. An unusually long boom period of rapidly rising prices has been followed by sharp price falls in recent months. Conventional indicators like price-earnings ratios – the ratio of a firm's share price to its earnings per share – and q ratios – the ratio of a firm's market capitalisation to the book value of its assets – had reached extraordinarily high levels towards the end of the long bull market, and still look uncomfortably high in relation to their historical norms. Volatility, or the size of day to day fluctuations in share prices, has also been unusually high during this period.

What does all this mean, and how does it relate to developments in the real economy?

Traditional finance theory maintains that the value of any asset should equal the present discounted value of the stream of future income payments to which the owner of the asset is entitled.

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Suppose you own a National Savings Certificate. The value to you of this financial asset is not just the capital sum, but also the future income that you will receive from holding the asset. But you will not receive that income until the future, so it is worth less to you today and must be "discounted" to give us the equivalent "present value". When you evaluate the present value of an asset, you need to take into account both the expected future income and the discount rate that expresses your preference between cash today and income tomorrow.

Where those future payments are uncertain, as is the case for the owners of shares, current expectations of future income payments will be discounted at a rate which reflects this risk. The stock market value of a company should reflect the present value of expected future dividend payments to shareholders, discounted at the appropriate risk-adjusted interest rate.

According to this theory, fluctuations in share prices should reflect one of two things. Either new information which leads investors to revise their expectations about the firm's future profits, from which those dividends will be paid. Or an unanticipated change in the risk-adjusted interest rate at which expected future dividends are discounted.

The idea that stock market valuations should equal firms' 'fundamental values', i.e. the present discounted value of expected future dividends, is often confused with another proposition in finance theory, known as the Efficient Markets Hypothesis. This is the idea that anyone trading on the basis of publicly available information cannot 'beat the market', or earn a risk-adjusted return in excess of that available by simply tracking the overall return on the stock market as a whole.

In fact, as former US Treasury Secretary Larry Summers among others has argued persuasively, there is no necessary connection between these two propositions. Suppose we start from a world in which share prices rationally reflect fundamental values, and share price changes reflect only new information about expected profits or discount rates. Then changes in share prices are not forecastable from publicly available information, and traders cannot beat the market unless they have some inside information. But suppose we take the share prices implied by this scenario, and add on another component, changes in which are equally unforecastable. It remains the case that traders cannot beat the market, but now the level of stock market valuations can evolve quite separately from the level of firms' fundamental values. Clearly the extensive statistical evidence which is used to support the Efficient Markets Hypothesis does not establish that stock market values must equal the present discounted value of expected future dividends.

This insight is reflected in at least two formal models of asset pricing. The 'rational bubbles' literature assumes that share prices contain this second bubble component, and asks whether the bubble will be eliminated if all investors form expectations rationally and have access to the same information. In this case the conditions required for the bubble to survive are quite restrictive. The 'noise trader' literature has a more behavioural flavour. This literature asks how share prices will behave if the vast majority of investors – the 'smart money' – act rationally, but know that a small minority of investors – the 'noise traders' – do not. In this case stock market values can deviate substantially from fundamental values for long periods of time, without violating the Efficient Markets Hypothesis. Smart investors will be perfectly rational in holding assets that they know to be overvalued relative to fundamentals, so long as they expect to be able to sell those assets at a higher price in the future. Thus the existence of just a small group of investors who do not trade in a fully rational way can, at least in theory, sustain the presence of significant 'bubbles' in share prices. The 'noise traders' do not need to be 'irrational' in any deep sense – their transactions could simply be influenced by liquidity constraints.

This approach allows the possibility that there can be sharp swings in share prices that have little or nothing to do with informed assessments of expected future profits or discount rates. It certainly matters whether share price fluctuations can have a life of their own in this way. Arguably the 'Lawson boom' of the late 1980s was fuelled by an inappropriate loosening of monetary and fiscal policies in response to the 25 per cent stock market crash of October 1987, amid fears that this predicted a slump in company profits, despite any other obvious indications of a coming downturn in economic activity. If share price movements can be affected by 'irrational exuberance', as US Fed Chairman Alan Greenspan has himself suggested in the past, then policymakers and economic forecasters alike would do well to be wary of reading too much into stock market trends that are not accompanied by more material evidence of a changing outlook for business profitability.

Can we then go beyond the theoretical possibility of 'bubbles' in share prices to infer anything from the empirical evidence about their importance in reality? Yale economist Robert Shiller has long argued that there is too much volatility in share prices to be consistent with actual fluctuations in corporate

dividend payouts and interest rates. This has led to a rather inconclusive debate about whether changes in the risk premium component of discount rates can account for the 'excess' volatility in share prices.

A more promising approach is to consider the relationship between stock market valuations and business spending on investment. An overlooked feature of the long stock market boom was that it was not accompanied by a remotely comparable boom in investment spending. The standard economic model of investment suggests that investment decisions are driven by the same factors – expectations of future profitability and discount rates – that traditional finance theory uses to rationalise stock market valuations. So if the stock market boom only reflected better expectations of future profitability or lower discount rates, why did we not see a similar expansion in corporate investment?

In fact economists working on company investment have known for a long time that the relationship between share prices and investment levels is extremely weak. What has been less clear is whether this reflects anomalous fluctuations in share prices, or a failure of the orthodox economic models of company investment.

Recent research by myself and Jason Cummins sheds some new light on this question.* Using data on the profit forecasts for individual US firms made by analysts on Wall Street and collected by I/B/E/S International Inc., we show that in fact there is a very close association between firms' investment spending and expected future profits, as the standard theory of investment predicts. The weak association between investment spending and share prices can then be attributed to the weak relationship between stock market valuations and informed expectations of future profits.

One serious caveat concerns the growing importance of investment in 'intangible assets', such as advertising, marketing and R&D, which are not recorded in the conventional figures for tangible investment in plant, machinery, vehicles and buildings. One possibility is that the stock market boom was associated with a similar boom in investment, but much of this took the form of intangible investment. For firms in advertising-intensive and R&D-intensive sectors, we certainly find evidence that an increase in expected future profits will be reflected in increases in advertising and R&D expenditures, as well as in tangible investment. But even allowing for this, the relationship between investment and share prices remains much weaker than the relationship between investment and expected future profits. Moreover there are many firms with little or no recorded spending on advertising or R&D, who experienced huge growth in their share prices during the 1990s with no comparable increase in their investment spending.

We conclude that stock market valuations actually do deviate significantly from well-informed assessments of the present discounted value of expected future dividends. Rises and falls in share prices do not, in themselves, predict similar fluctuations in business spending on investment. Sadly this knowledge does not imply that you can make a fortune by beating the stock market – as emphasised above, the presence of 'bubbles' in share prices is entirely consistent with the Efficient Markets Hypothesis. It does suggest that you should look hard for other evidence of a downturn in expected corporate

profitability before concluding that the recent falls in the stock market herald a major downturn in business investment.

*Stephen R. Bond and Jason G. Cummins, 'The Stock Market and Investment in the New Economy: Some Tangible Facts and Intangible Fictions', *Brookings Papers on Economic Activity*, Issue 2000:1.