
Investment appraisal criteria and the impact of low inflation

By Andrew Wardlow of the Bank's Conjunctural Assessment and Projections Division.

An informal inquiry conducted by the Bank earlier this year suggested that firms were being cautious in the rate at which they were reducing their required returns on investment to reflect lower and more stable inflation. This article considers the impact of a return to low inflation on corporate investment decision-making. It looks at the various appraisal criteria employed by firms—and the role they give them in their decision-making—and assesses the significance of firms' apparent slowness to adjust.

The prospect of sustained lower inflation and lower nominal interest rates has implications for all areas of economic decision-making. This article is concerned with just one area—corporate investment decisions—and focuses in particular on firms' adaptation of the appraisal criteria that they use to guide these decisions to reflect the return to low inflation.

Businesses are obviously concerned with the real returns generated by their investments. But the relationship between real and nominal rates of return is often distorted by volatility and uncertainty—both in periods of significant inflation and in the period of transition to a more stable economic environment. It is appropriate to consider how low and stable inflation might affect investment appraisal criteria.

Investment decisions involve the assessment of a great many interrelated variables—and judgments about the future course of these variables—often many years ahead. The decision-making is complex, both in the assessment of particular projects and in the management of the process; and it is therefore sensible to have rules and systems to guide the process. But a rule about the required rate of return from an investment that is appropriate in a world of unpredictable and significantly positive inflation may not be appropriate in a world where prices are generally stable. Clearly, there is a need for firms to ensure that the systems they use for appraisal are responsive to changes in their economic environment. In considering the process of adjustment to an environment of sustained lower inflation, this article considers the use that firms make of investment appraisal criteria. It draws on an informal inquiry undertaken earlier in the year by the Bank—the box on page 251 summarises its main findings—which offered some preliminary indications and insights into the adjustment process.

Investment and high inflation

By their nature, investment decisions involve uncertainty. In the recent past, however, there has often been the additional

uncertainty stemming from unexpected changes in the general level of prices. High and variable inflation makes it more difficult to determine the discount rate that should be applied in order to calculate expected real returns on investment.⁽¹⁾ If the level of future inflation is likely to be different from that seen in the past, past returns are a less reliable guide to what is currently appropriate, complicating judgments about what level of returns to require. And uncertainty about inflation may affect not only the allocation of investment among different projects, but also the overall level of investment and saving. Savers may require higher average expected real returns. Such a risk premium will affect the real cost of funds, and so affect investment decisions.

Over much of the last three decades, it would have been inappropriate for companies deciding how to allocate their resources to have assumed generally stable prices. Both average inflation and inflation volatility were high in the 1970s and 1980s, much higher than in the 1950s and the early 1960s. Between 1945 and 1965, average annual retail price inflation was around 3.75%. Between 1965 and 1990, it was close to 9% and its variance was about four times higher than in the earlier period. Similarly, the real cost of funds has been more variable in recent decades, adding to the difficulties in making investment calculations. It is not surprising in such an environment that companies—and households—not only try to allow effectively for inflation in their calculations, but require a higher return because of the additional uncertainty and risk that accompanies unpredictable monetary conditions.

A return to low and stable inflation

One benefit of a return to an environment of lower and more stable inflation, in addition to a lower cost of capital, should be that uncertainty about the value and cost of money is a less critical factor in investment decisions. In such circumstances, the assumptions used in past investment decisions may need to be amended. But the process of transition may be problematical if companies have become accustomed to high and variable inflation.

(1) See the box on page 252 for an explanation of the use of discount factors in investment appraisal.

With the benefit of hindsight, it is clear that at times during the 1970s and 1980s it would have been reasonable for companies considering investment projects with five or ten year horizons to have incorporated nominal discount rates of 20% or more into their appraisal criteria. Between 1970 and 1990, the average annual rate of increase in producer prices was just over 9.5%. Taking 3.5% as a *rough* estimate of the required real rate of return on risk-free debt—the real yield on index-linked gilts since the first issue in the early 1980s has usually been between 3% and 4%—and adding a risk premium of about 6% (based on the average excess return on equities over debt) suggests a required real return on a typical project financed by equity of around 10%.⁽¹⁾ So, allowing for inflation at the average rate between 1970 and 1990 produces a required nominal return of around 20% for the period. Making some allowance for tax raises the figure still higher. These rough calculations illustrate that nominal discount rates of 20% would not have been unreasonable in past high inflation years, and explain why companies may have come to use factors of 20% or more to discount future cash flows.

Firms may be cautious about changing their required rates of return, given both the past history of uncertainty and the relatively short period of low and stable inflation to date; it may take a considerable period for them to become confident about making this kind of adjustment. But if inflation is expected to remain lower over a long period, it would be rational for firms to consider lowering their nominal target rates of return. There would also be reason to reconsider their required real rates of return, if the real cost of capital has fallen or if less variable inflation and lower interest rates have reduced the relevant investment risks. Clearly, if firms require excessive rates of return, they are likely to reject good investment opportunities with the consequent risks for their future earnings and competitiveness.

The appraisal criteria used by firms

This section considers some of the underlying practical issues raised by the adjustment of investment criteria. To understand the process of adaptation to an environment of stable prices, it is necessary to consider both the kinds of investment appraisal criteria firms use and the role they give them in their investment decision-making.

Firms use a wide variety of criteria in their appraisal of investment opportunities. The Bank's inquiry revealed significant differences in appraisal techniques and in the rates of return that firms seek. Those using required real rates generally reported targets in the range of 7%–20%, and those using nominal rates targets in the range of 10%–25%. The average among firms targeting a real rate of return was around 15% after tax; nominal targets averaged around 20%. (Given the nature of the inquiry, it would be inappropriate to draw any conclusions from the differential between these average nominal and real target rates of

Summary of the Bank's inquiry

Through its network of regional agents, in early March the Bank of England conducted an informal inquiry involving around 250 of its industrial contacts. The firms contacted were mainly large and medium-sized companies, including a number of large plcs and foreign-owned enterprises, but smaller firms were also represented. Some 65% of respondents were in the manufacturing sector.

Firms were asked to comment on a number of questions concerning the investment appraisal criteria they used, the role given to these criteria in their investment decisions, and the impact of lower inflation and interest rates to date on their use. The Bank is grateful to all the firms that took part in the inquiry and who continue to inform it on a range of issues.

It should be stressed that the inquiry was an informal one; there was no attempt to structure the sample or to trial the questions. The detail of the findings summarised in the table below should therefore be treated with caution, and the results viewed as indicative, rather than representative. The aim was simply to gain some early indications about the process of adjusting investment criteria to the new inflation environment and to deepen our understanding of the way that firms use appraisal criteria in practice, in order to judge the significance of such an adjustment.

Summary of inquiry findings

1 Investment criteria: percentage of firms using:			
Target required real rate of return	Target required nominal rate of return	Payback criterion only	Payback plus a required rate of return
29%	32%	8%	32%
2 Net present value (NPV): percentage of firms:			
Making some use of NPV			
70%			
3 Thresholds: approximate average post-tax threshold rate^(a)			
15% real		20% nominal	
4 Adjustment to date: percentage of firms that had:^(b)			
Reduced required rates of return (or lengthened payback)	Increased required rates of return (or shortened payback)	Left required rates of return (or payback period) unchanged	
26%	2%	72%	

(a) Some firms used more than one threshold rate, depending on the type of investment.
(b) Among firms using *nominal* required rates of return, 27% had lowered their targets. Among firms using *real* required rates of return, 34% had lowered their targets. Among firms using *payback rules and a required return*, 27% had lowered their thresholds.

return.) Larger firms tended generally to employ lower target rates than smaller firms.

Other differences—for example, in the cost of capital faced by large and small firms—may partly explain the width of

(1) In fact, the average real yield on index-linked gilts has been less than 3½%. And the return on a diversified portfolio of UK equities has exceeded the yield on government bonds by about 8%. The latter, however, overestimates the risk premium on an all-equity financed project, because the 8% reflects the risk of claims upon geared corporations. Gearing increases the riskiness of returns to shareholders; shares are more risky than the firm's other liabilities. Making a rough adjustment for the effect of debt suggests an appropriate risk premium for an average all-equity project of about 6%.

these ranges; the ranges may also reflect differences in the nature of the investments that firms tend to undertake. Nevertheless, the wide variance is an area that warrants further investigation. It would be interesting to assess the significance to the threshold level of firm size, status (eg whether the company is public or private) and other variables.

Investment appraisal techniques

The Bank's inquiry confirmed that the main investment appraisal techniques used by companies are:

- *Net present value (NPV)*

The economic value of a project is calculated by estimating its future cash flows over the projected life of the investment, which will depend on a series of assumptions about demand, prices etc. The cash flows are then discounted at a compound rate reflecting the opportunity cost of capital, which—in turn—will reflect the risk and timescale of the investment. The discounted present value of the cash flows compared with the initial cost of the investment.

Financial theory stresses the superiority of the net present value method of investment appraisal and that, as a rule, projects with a positive NPV should be undertaken.

- *Internal rate of return*

Formally, the internal rate of return is that rate at which expected future cash flows must be discounted to equate them with the initial project cost—ie to produce a net present value of zero. Once calculated, the internal rate of return is then compared with a specified threshold rate reflecting the firm's cost of capital. The technique can generate the same decisions as NPV, but has a number of potential pitfalls—for example, when ranking competing projects or accommodating variable rates of risk through the life of a project—which are more easily avoided with the NPV method.

- *Payback period*

The criterion used is the length of the period before the initial investment cost is recovered. Payback rules require that the cost of an investment should be recovered within a specified timescale. Discounted cash flows may be used in the calculation.

- *Accounting rate of return*

Accounting rates of return are based on the average annual forecast profits of a project (after depreciation and tax) divided by the average annual book value of the investment. This ratio may then be compared with the existing book rate of return for either the firm as a whole or, in some cases, an industry average.

Within individual companies, target rates of return varied according to the nature of the investment project: its risk, its necessity for the firm and its size. For example, investment in manufacturing operations—where the returns are largely in the form of known cost savings—attracted lower target rates of return than 'riskier' investment in new product development. The difference in the threshold rates within a single company was as much as 10%. Some multinationals distinguished between investments undertaken in different countries, notably between those in Europe and the United States (where the required rates of return are often lower). In addition, a number of firms noted that a significant part of their recent capital expenditure had been on projects which offered no direct commercial return, such as compliance with environmental, and health and safety legislation.

The Bank's inquiry also showed that many firms used more than one criterion when assessing investment opportunities. The criteria used included: net present values; internal rates of return; accounting rates of return; payback periods and broader measures such as the return on capital employed. Many used accountancy-based measures together with other techniques; this is not surprising given the importance accorded to accountancy practices in many areas of corporate decision-making. It is also not surprising to observe that larger firms tend to employ more sophisticated appraisal and capital-budgeting techniques.

70% of inquiry respondents reported that they made some use of net present values, but other techniques are also common, even in larger firms. Some 40% of firms surveyed used a payback criterion in one form or another; this kind of criterion was used mainly—but not exclusively—by the smaller companies in the sample. It was also notable that many of the firms that used payback criteria alongside other measures stressed the importance of payback rules at that time, ie they sought a target rate of return within a specified period.

The use of payback criteria

The Bank's inquiry drew attention to the prevalence of payback criteria; a number of advantages and limitations of their use can be suggested.

Among the limitations, payback rules give no weight to the timing of cash flows within the period specified; they also do not take account of cash flows beyond the chosen cut-off point. In addition, the payback period that companies use is often short—the inquiry indicated a normal period of around two to three years. And in a period of transition to low inflation, use of a payback criterion may make it more likely that projects will be rejected, if firms do not increase the threshold period: since, when inflation is high, the nominal outlay on a project will be covered more quickly by incoming cash flows.

There are a number of reasons which may explain why firms, particularly smaller firms, feel that the use of payback criteria is justified—or at least that more sophisticated

methods are not appropriate. Future cash flows can only be estimated after assumptions about the productive and market possibilities of an investment have been made; for investments relating to export sales, exchange rate assumptions will in addition be a central consideration. Assumptions about, for example, the benefits of new process technology or larger-scale production will be more important than the choice of appraisal technique. Even with reasonable assumptions, it may be difficult to estimate the cash flows over the life of an investment project, particularly if the way that the new project fits into the existing business is complex. This uncertainty and complexity may encourage smaller firms to adopt simpler investment criteria, and to base their investment decisions on more general considerations, often governed by an assessment of 'what needs to be done'.

But perhaps the main reason, for the widespread use of payback criteria—at least recently—has been the financial constraint that firms have faced or imposed on themselves to improve their financial condition. Credit restrictions clearly make it sensible to be concerned about the time-horizon over which investment projects generate returns. Although in larger companies with fairly unrestricted access to capital markets, financing decisions can be relatively easily separated from investment decisions, in smaller firms managers may have to consider the impact of individual projects on the wider corporate position. The impact of a project on the overall financial condition of the company may be the prime concern, and if capital expenditure is being tightly controlled, investment decisions will have to be made on a priority basis. This is, however, less of a justification if the capital rationing is self-imposed as a means of financial planning and control. It will be interesting to see to what extent this kind of criterion is modified as the corporate sector's financial position continues to improve.

None of these points, however, is an argument against discounted cash flow techniques. If used in an appropriate way, they are widely agreed to offer a better basis for firms to formulate their business plans, though this is not to suggest that such criteria should be used uncritically or in isolation.

The role of appraisal criteria

The Bank's inquiry indicated that appraisal criteria—in the form of threshold rates of return—are a critical hurdle when there are many competing claims on corporate resources, most frequently in larger groups. Formal appraisal criteria act to limit the number of projects that are brought forward—operating as a kind of feasibility test prior to a more qualitative consideration. Large companies often have to decide between a number of competing claims from different business areas or subsidiaries. Although offering the required rate of return may not guarantee a project success, it may be used to rank it among similar projects.

Broader observation suggests, however, that rate of return criteria tend to be used in a flexible way, depending on wider

commercial considerations. Although important, a rate of return criterion appears rarely to be the sole determinant of investment decisions. Many firms in the Bank's inquiry underlined the importance of overall corporate strategy and of 'strategic fit' in investment decision-taking. In some cases, lower target rates of return are applied to projects considered important (or essential) for corporate strategy than to more marginal operational investment decisions. In the case of acquisitions in particular, the usual criteria may be overlooked or relaxed.

These findings might be seen as more coherent with the tenets of strategic analysis than with financial theory. Of course, it is possible that investments that fit well within a company's overall strategy—and so concentrate on areas where the company has a relative expertise or competitive advantage—are more likely to be profitable. But what such observations emphasise is that firms do not tend to use formal appraisal techniques in an uncritical or mechanical fashion.

The short-run impact of lower inflation

Having considered both the nature and the role of rates of return criteria, this section looks at the adjustment of them that firms have so far made in the light of lower inflation and interest rates.

Responses to the Bank's inquiry in March showed that over 70% of firms questioned had yet to adjust their target rates of return, around a quarter had already made a reduction and a number said that they were currently considering revising their criteria.

Of those firms that employed a target real rate of return, around a third reported that they had reduced their threshold rate; this may have reflected either a lower cost of capital or a reduction in the risk premium being included as a result of lower inflation and interest rate expectations. Just over a quarter of respondents using nominal required rates had made an adjustment by the time of the survey.

Firms reported that their current tendency was to leave their target rates of return—and nominal discount rates—unchanged over long periods. Their arguments for this were usually that investments are affected by longer-term considerations and that there was little reason yet to adjust their longer-term expectations of inflation rates and the cost of capital.

Overall, the findings in this area suggested that, by March, the process of adjustment was not very advanced. The transition to an environment of stable prices is, however, unlikely to be rapid or smooth, particularly if many firms continue to face fairly difficult trading conditions. The findings in relation to firms using nominal required rates of return would, though, be of some concern if they persisted over a longer period. And it would be of particular concern if firms had implicitly reduced their expectations of inflation in their expected future nominal revenue streams, but had not similarly reduced their nominal discount rates.

One important question arising from the inquiry's results is whether the lack of adjustment by March had had significant impact on investment decisions. Growth in investment has played only a small part in the economic recovery to date: investment has risen by less in this recovery than it did between 1982–84 (though its share of GDP remained higher throughout the last recession and it may now be picking up). By the time of the survey, however, firms' slowness to adjust their investment criteria may not have implied that they were failing to identify profitable investment opportunities. It has been suggested above that formal appraisal criteria are often given a flexible role in companies' investment decisions; firms may have considered other factors to have been more central to their decisions at the time.

Many firms have suggested, for example, that they will not consider new investment without more evidence of an increase in demand. In addition, overcapacity has remained a real issue in a number of sectors. There has also clearly been some continued caution among companies about their financial position, with firms continuing to restructure their balance sheets to reduce the high levels of debt taken on in the late 1980s.

Finally, some firms have even suggested that lower inflation may have a negative impact on investment, arguing that higher inflation makes it easier to widen margins slightly following investment, for example, to improve product quality. Inflation's impact on the real burden of debt and on the real value of assets placed as security have also been cited. But although such considerations need to be borne in mind, the notion that inflation is good for investment needs firmly to be refuted. First, higher inflation and nominal

interest rates reduce the income available for investment. In 1993, lower interest rates reduced industrial and commercial companies' interest payments by £11 billion compared with a year earlier; to the extent that cash flow is important as a determinant of investment, lower nominal interest rates will have a positive impact on investment.

More fundamentally, as suggested above, higher inflation is correlated with greater inflation volatility and so greater uncertainty. A stable monetary environment allows investment decisions to be taken more efficiently, on the basis of real returns.

Summary

The Bank's inquiry in March emphasised the extent to which many companies remained to be convinced that inflation and interest rates would remain low and stable over the long term. Many firms continued to seek rates of return which partly reflected past higher and more variable inflation and interest rates. In view of the role that many firms seem to give to formal appraisal criteria, this slowness to adjust may not at that stage have been critical to investment. Other factors, such as cash flow and expectations of demand, are likely to have been more important. But, if excessively high target rates of return continue to be used as the recovery progresses and as the financial constraints on investment are further relaxed, there is a risk that they will limit the level and type of investment undertaken by UK firms.

A further period of monetary stability may, however, be needed before a more fundamental adjustment in behaviour becomes widespread. The Bank's inquiry has offered some useful insights into the process of adjustment, but it is an issue that clearly warrants further investigation.⁽¹⁾

(1) A recent survey of manufacturing companies by the CBI offers more precise indications about the nature of appraisal criteria and the extent of the adjustment to date.