Oxera

BSkyB's profitability in the context of the Ofcom market investigation

Second report

Prepared for Ofcom

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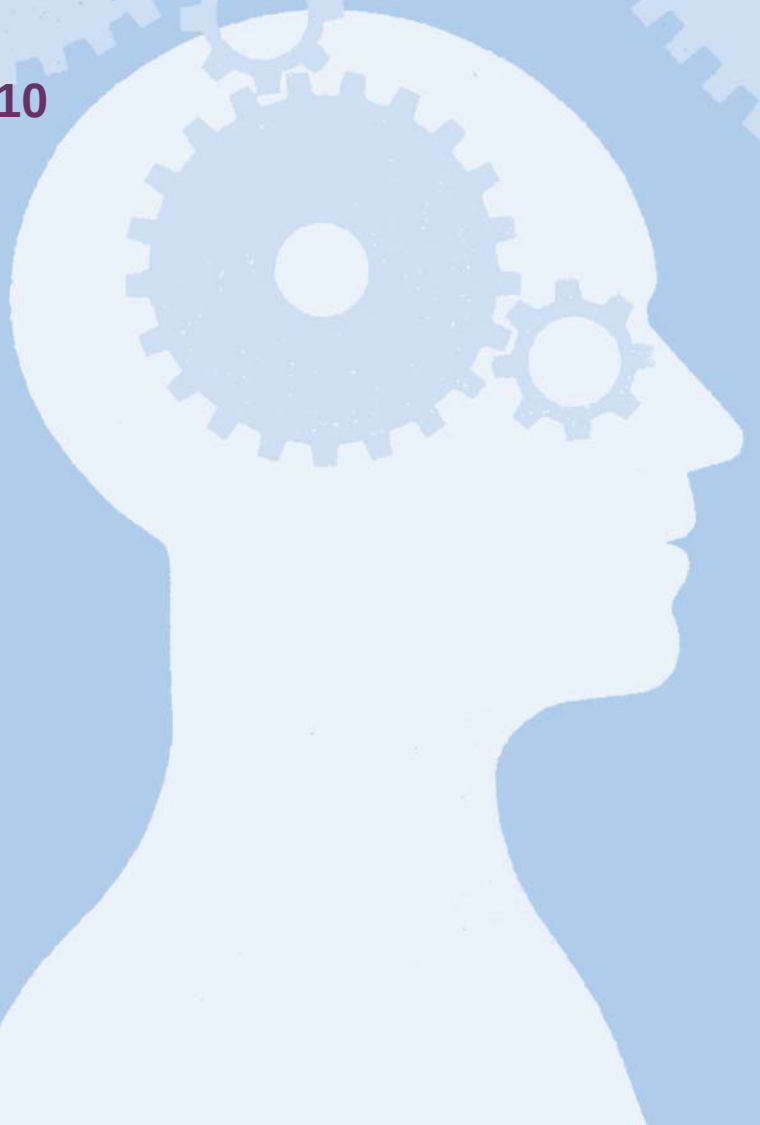

Executive summary

In June 2009 Oxera prepared a report on the range of plausible economic rates of return earned by BSkyB from its pay-TV activities, considering, in particular, the importance of intangible assets. The report estimated returns at the aggregate level, seeking to provide estimates of returns for pay-TV activities that are as accurate and robust as possible. It also presented profitability measures at various levels of disaggregation, including for wholesale and retail activities; basic and premium channels; and premium sports and movies channels.

Since completion of that report, Sky has published its accounts for the latest financial year ending June 2009, making it possible to update the estimates of returns. Ofcom has also received responses to its third consultation, including a response from Sky and its advisers (Professor Paul Grout and PwC), who made a number of comments on Oxera's analysis and Ofcom's interpretation of Oxera's results.

Ofcom asked Oxera to prepare a second report to update the estimates of returns at the aggregate level and to estimate the cost of capital over time. Ofcom also asked Oxera to address the comments raised by Sky and Professor Grout.

This report presents updated estimates of economic rates of return for Sky's pay-TV activities together with estimates of the cost of capital. Estimates are derived under a number of scenarios to ensure that the analysis is robust and understand the sensitivity of the results to key assumptions.

Economic rates of return are measured in this report according to various metrics. Results under the conceptually appropriate metric—the internal rate of return (IRR) based on the depreciated replacement cost (DRC) of assets—suggest that economic rates of return under the base-case scenario for the period 2005–09 were around [✂]%. Over a longer historical time period (ie, since flotation, covering the period 1995–2009), returns are estimated to be higher, at around [✂]%. (In the table below the IRR ranges from 21% to 28%).

Updated estimates of the IRR (pre-tax, nominal, %)

Measure	1995–2009	1998–2009	2005–2009
IRR (DRC: year of investment)	[✂]	[✂]	[✂]
IRR (DRC: annual revaluation)	[✂]	[✂]	[✂]

Note: Oxera's first report describes in detail how these scenarios are calculated.
Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

The conceptually appropriate benchmark against which to assess the level of returns is the cost of capital because, in competitive markets, which are characterised by free entry and exit, companies are expected to make profits in the long run that are broadly in line with the minimum returns required by investors (ie, the cost of capital). Profits above the cost of capital would eventually encourage entry by new competitors, and profits below the cost of capital would induce exit. Hence, returns that are persistently and significantly above the cost of capital are an indication of barriers to entry.

Estimates of the cost of capital (%)

	1995–2009	1998–2009	2005–2009
Pre-tax, nominal (average over the period)	13.2 (11.4–15.0)	13.1 (11.3–14.9)	12.4 (10.7–14.1)

Source: Datastream, OECD, Competition Commission (2008), 'Stansted Airport Ltd - Q5 price control review', October, pp. 1–130, and Oxera calculations.

The difference between estimates of the IRR and the cost of capital provides an estimate of the profitability gap for Sky's pay-TV operating activities. The estimated profitability gap for Sky is [✂]% in the base-case scenario for the period 2005–09. This gap is persistent over time, and is estimated at [✂]% over the longer time period (1995–2009). (In the table below the profitability gap ranges from 8% to 15%).

Estimates of the profitability gap (%)

	1995–2009	1998–2009	2005–2009
Base case: IRR (pre-tax, nominal, based on IRR and average WACC over IRR period)	[✂]	[✂]	[✂]

Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

The profitability gap over the longer time period (from 1995 to 2009) is higher than over the more recent periods. This is consistent with higher customer acquisition costs relative to customer lifetime cash flows in the later years compared with the early years of the pay-TV market. The profitability gap from 1998 to 2009 is low relative to other time periods because BSkyB incurred significant investments over that period in the transition of customers to digital and in expanding the customer base. Hence, the analysis over this period captures significant investments, without capturing in full the future cash flows associated with these investments.

The profitability gap over the last five years is higher than that over the last ten years. Furthermore, inclusion of the most recent financial information in the analysis (ie, the updates introduced in this report) also increases the profitability gap.

The estimates of the profitability gap based on the return on capital employed (ROCE) support the estimates based on the IRR.

In response to Ofcom's third consultation, Professor Grout presented evidence on total shareholder return (TSR), and concluded that it does not support the conclusion that Sky earned high returns.

In the context of analysing economic rates of return in competition policy analysis, evidence from TSR does not provide a meaningful measure of returns. While competition policy analysis seeks to understand the dynamic relationship between prices and costs, the TSR captures the relationship between prices and expectations. Thus, if stock prices at any point in time capture expectations of economic rents, the expected return on the share price will be the cost of capital, yet the firm may well be continuing to earn rents.

This report explores in detail this relationship between the TSR and IRR, given the expectations and market valuation at time of flotation of BSkyB. The main reason why the IRR exceeds the TSR is because the market value of assets used in the TSR analysis significantly exceeds the DRC of assets in the IRR analysis.

Indeed, in 1995, the market value of Sky's assets was approximately six times the DRC. Analysis of lifetime per-subscriber cash flows suggests that this level of market value to replacement cost would be consistent with the economics of Sky's business, where the

incremental per-subscriber cash flows significantly exceed the subscriber acquisition costs. Therefore, it is perfectly plausible that the market value of Sky was at a significant premium to the DRC at flotation. In such context, the TSR information provides no meaningful guide to how prices relate to costs. The analysis is repeated in more recent years to explain how this pattern has been persistent over the period since flotation.

Furthermore, the report explains that even if the TSR had any economic meaning in the context of analysing market power in Sky's pay-TV market, the measure is highly unreliable for a number of reasons (sensitivity to the choice of time period; ability to reflect performance of UK pay-TV activities; choice of benchmark; survivorship bias).

Therefore, the only economically meaningful approach to profitability in this case is to measure returns relative to the DRC of assets, as in the analysis of the IRR, and cross-check using the net present value (NPV) and ROCE indicators.

It should also be noted that TSR, as presented by Professor Grout, is the only measure that suggests low returns since 1995 for Sky's pay-TV activities. In the first report, Oxera considered returns for comparator companies, which provided support for the results of the IRR analysis. In this second report, Oxera has sought, in addition, to look at the profitability gap based on BSkyB's accounting rates of return relative to the accounting profitability gap for FTSE 350 companies (defined as the difference between the ROCE based on book values and the cost of capital). Using this measure, the average gap between Sky's accounting rate of return and the cost of capital is larger than the equivalent gap for 95% of companies in the FTSE 350 for the period 2005–08. If one examines the period from 1995 to 2008 as a whole, only one company in the FTSE 350 has had a larger accounting profitability gap than Sky. This suggests that Sky earned both high absolute returns and high relative returns.

Professor Grout also raised concerns in relation to the value of assets used in the IRR analysis, as well as arguing that the IRR may not be an appropriate measure of returns in competition policy analysis due to reinvestment rate assumptions. However, Oxera could not find evidence to support Professor Grout's arguments. For conceptual and empirical reasons, there is no evidence that Oxera's estimates of Sky's asset values are biased, or that the IRR biases the estimates of returns in this case or in the context of profitability analysis more generally.

In response to Ofcom's third consultation, Sky also suggested that the main factor that explains the profitability gap is its continual successful risk-taking and innovation. To assess whether this is a reasonable interpretation of the profitability gap, this report analyses the economic characteristics of Sky's investments, the persistency of returns over time, and the performance of Sky relative to expectations. The evidence shows that over the last ten years or so Sky's pay-TV activities do not exhibit features that are typical of markets with successful innovations and risk-taking (ie, uncertain demand, long payback periods and large upfront costs being invested). In other words, the profitability gap observed over the period 2005 to 2009 cannot be explained by such factors during this period or during the period since its flotation.

Overall, the significant difference between the economic rates of return that Sky has been earning on its pay-TV activities and the cost of capital provides evidence that is consistent both with prices in the last five years being high relative to costs and with the existence of barriers to entry in the UK pay-TV market.

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1 Introduction

In June 2009 Oxera prepared a report on the range of plausible economic rates of return earned by BSkyB from its pay-TV activities, considering, in particular, the importance of intangible assets.[1] The report estimated returns at the aggregate level, seeking to provide estimates of returns for pay-TV activities that are as accurate and robust as possible. It also presented profitability measures at various levels of disaggregation, including for wholesale and retail activities;[2] basic and premium channels; and premium sports and movies channels.

The objective of the disaggregate-level profitability analysis was to provide, where possible, an indication of the sources of aggregate-level profitability. Therefore, the results of the disaggregate profitability analysis were used to inform the assessment of relative returns between activities, as opposed to the absolute levels of returns.

The analysis of aggregate profitability suggested that, over the five years from 2004 to 2008, the aggregate return on assets under the base-case scenario was around [✂]%. Over the longer term from 1995 to 2008, the return on assets was higher, up to [✂]% on an internal rate of return (IRR) basis.[3] To cross-check the estimates of the IRR, the study also considered estimates of the return on capital employed (ROCE). With assets, and hence capital employed, valued on the basis of book values (an approach typically considered by the UK Competition Commission, CC), the average ROCE over the five-year period (2004–08) was [✂]%; with assets valued on a replacement-cost basis, the average ROCE was [✂]% over the same period.

The key results of the disaggregate analysis were as follows.

– Returns for Sky wholesale activities appear higher than for Sky retail activities. These results seem to hold under a number of cost allocation approaches and sensitivity checks.

– At the retail level, estimates of returns for basic/premium channels do not seem sufficiently robust to draw conclusions on the relative returns. At the wholesale level, returns for premium channels appear higher than for basic channels. However, this should be interpreted with care given the adopted allocation approaches.

– Estimates of returns for sports/movie channels do not seem sufficiently robust to draw conclusions on the profitability of these channels, although the analysis seems to provide some weak evidence that movie channels may have higher margins than sports channels (given the adopted approaches to cost and revenue allocation).

After completion of the report, Sky published its accounts for the latest financial year ending June 2009, making it possible to update the estimates of returns.

[1] Oxera (2009), 'BSkyB's Profitability in the Context of the Ofcom Market Investigation', prepared for Ofcom, June.

[2] For Ofcom's description of the value chain, see Ofcom (2008), 'Profitability and investor returns: Annex 9 to second pay-TV market investigation consultation', September 30th, p. 12; Ofcom (2007), 'Pay TV market overview: Annex 8 to pay-TV market investigation consultation', December 18th, p. 7; Ofcom (2007), 'Pay TV market investigation: Consultation document', December 18th, p. 27.

[3] In its response to Ofcom's consultation, Sky suggested that it would be appropriate to present the estimates of returns as ranges in order to reflect the uncertainty.

Ofcom also received responses to its third consultation, including a response from Sky and its advisers (Professor Paul Grout and PwC), who made a number of comments on Oxera's analysis and Ofcom's interpretation of Oxera's results.

Ofcom asked Oxera to prepare a second report to update the estimates of returns with one additional year of data and to address the comments by Sky and its advisers.

This second report is structured as follows.

– Section 2 compares the estimates of Sky's achieved rates of return on pay-TV activities with the benchmark cost of capital, and presents the comments of Sky and its advisers on what might explain the difference between the returns and the cost of capital.

– Section 3 explains why Professor Grout's analysis of Sky's share price returns is not relevant and presents the results of further Oxera benchmarking of Sky's accounting ratios—a measure which Professor Grout also refers to in his report.

– Section 4 responds to Professor Grout's comments on the use of the IRR to measure the economic profitability of Sky's pay-TV activities.

– In response to Sky's comments, section 5 reviews the evidence on whether continual innovation and successful risk-taking could explain the estimated profitability gap in recent years.

Further supporting evidence, details on the scenarios and the results of the sensitivity analyses are provided in the appendices.

2 Updated estimates of economic profitability

This section presents updated estimates of Sky's economic rates of return and the benchmark cost of capital, and summarises the comments of Sky and its advisers on how the difference between returns and the cost of capital (the profitability gap) observed over the recent period could be interpreted from a competition policy perspective.[4]

2.1 Updated estimates of returns

Oxera's first report, completed in June 2009, estimated Sky's historical returns up to the end of financial year 2008. Since the completion of that first report, Sky has published its financial results for the financial year ending in 2009. This section presents Oxera's updated estimates of returns.

The updated estimates of returns for Sky based on the depreciated replacement cost (DRC) values of assets have increased compared with the levels presented in the first report.[5] The analysis suggests that the IRRs based on the DRC are in the range from [✂]% to [✂]% for the 2005–09 period. The estimates of returns based on the IRR are broadly in line with the estimates of returns based on the ROCE.

Returns can be measured in a number of ways. In the context of economic profitability analysis, the conceptually appropriate approach under several conditions is to use measures of the IRR and net present value (NPV).[6]

The IRR reflects the way in which firms make investment decisions in competitive markets. Specifically, the pattern of cash flows associated with economic activities typically has an initial cash outflow followed by a series of net cash inflows in subsequent periods. Moreover, in addition to the IRR being a theoretically robust method of investment appraisal, it is the one most commonly used in the business world.[7] The IRR and the NPV take into account the inflows and outflows of an activity over time, and reflect the economic principle of the time preference of money.[8]

Therefore, Sky's updated returns are estimated using the IRR, [9] with the ROCE used as a cross-check.[10] The analysis follows the same methodology as applied in the first report.[11]

One of the particular characteristics of Sky's business model that needs to be appropriately reflected in the profitability analysis is the presence of significant intangible assets, the largest of which is the subscriber base. Oxera's first report applied a conceptually appropriate framework for valuing intangible assets and estimating profitability in the context

[4] The analysis is based on the latest full-year results and does not incorporate the interim results for the six months ended December 31st 2009 (released on January 28th 2010).

[5] See Oxera (2009).

[6] See, for example, Oxera (2003), 'Assessing Profitability in Competition Policy Analysis', a report prepared for the Office of Fair Trading; and Morris, D. (2003), 'Dominant Firm Behaviour under UK Competition Law', paper presented to the Fordham Corporate Law Institute, October.

[7] In a survey of 392 chief financial officers of companies in the USA and Canada, Graham and Harvey (2001) found that around 75% always or almost always use the IRR or NPV as their evaluation technique. Graham, J.R. and Harvey, C.R. (2001), 'The Theory and Practice of Corporate Finance: Evidence from the Field', *Journal of Financial Economics*, **60**, 187–243.

[8] Kay, J.A. (1976), 'Accountants Too, Could be Happy in a Golden Age: The Accountant's Rate of Profit and the Internal Rate of Return', *Oxford Economic Papers*, **28**, 447–60; Edwards, J., Kay, J. and Mayer, C. (1987), *The Economic Analysis of Accounting Profitability*, Oxford: Clarendon Press.

[9] See, for example, Oxera (2003), op. cit.; and Morris (2003), op. cit.

[10] These metrics were initially adopted in Oxera (2009), op. cit.

[11] See Oxera (2009), op. cit., sections 2 to 4.

of competition investigations, as set out in the Oxera 2003 report for the Office of Fair Trading (OFT) and previously used by the CC.[12]

The application of the IRR framework requires the assets to be valued at the beginning and end of the period under investigation. This can be done in a number of ways. In the context of economic profitability analysis, the value-to-the-owner principle, as defined by Edwards, Kay and Mayer (1987), provides a basis for choosing between the various approaches to asset valuation.[13] This principle requires assets to be valued at *the minimum loss that a firm would suffer were it deprived of the use of that asset.*[14]

In this report, the value-to-the-owner principle has been applied, which involves estimating the replacement cost value of Sky's assets (as an estimate of the modern equivalent asset (MEA) value) as described in the first report. The estimation of the replacement cost value of assets involved the valuation of Sky's intangible assets. The use of replacement costs in this context is appropriate given the application of the IRR.

Table 2.1 presents the updated estimates of Sky's aggregate profitability (seeking to show returns for pay-TV activities that are as accurate as possible).[15] Profitability estimates in this table are based on a number of asset valuation approaches. As described above, the relevant scenario in this case is the IRR based on the replacement cost asset valuation approach. The IRRs based on other asset valuation approaches are presented for completeness and are not used to interpret the evidence on returns.[16]

Table 2.1 Updated estimates of the IRR (pre-tax, nominal, %)

Measure	1995–2009	1998–2009	2005–2009
IRR (market value)	9.0	6.5	4.7
IRR (DRC: year of investment)	[✂]	[✂]	[✂]
IRR (DRC: annual revaluation)	[✂]	[✂]	[✂]
IRR (DRC opening, MV closing)	[✂]	[✂]	[✂]
IRR (book value)	54.2	27.5	30.1

Note: Oxera's first report describes in detail how these scenarios are calculated.
Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

The updated estimates suggest that over the past five years (2005–09) under the base-case scenario the returns based on replacement costs of assets were around [✂]%. Under

[12] Oxera (2003), op. cit.; Competition Commission (2009), 'Rolling Stock Leasing Market Investigation', Appendix 6.4, paragraph 10, April 7th; Competition Commission (2006), 'Classified Directory Advertising Services', Appendix 7.1, paragraph 15a, December 21st.

[13] Edwards, Kay and Mayer (1987), op. cit.

[14] This requirement is the reason why the CC refers to the value-to-the-owner principle as the 'deprival value' principle.

[15] In its response to Ofcom's third consultation, Sky suggests that Oxera is inconsistent in the way it makes adjustments for costs and revenue related to pay-TV activities. Specifically, Sky suggests that Oxera excludes non-UK pay-TV activities recognised as investments in Sky's financial accounts, but has not excluded activities such as broadband, which are integrated into the Group's operating cash flows. Although the costs and revenues attributable to broadband were not excluded (as the relevant data was not available), this is consistent with the overall conservative approach because broadband investments would be expected to be loss-making over the period of the analysis. This is because the analysis covers the period of investment in broadband business, but does not cover the period over which the corresponding future revenues are expected to materialise. In other words, if the cash flows were adjusted to exclude the broadband business, the estimated profitability of Sky's pay-TV business would be likely to have increased. See Sky (2009), 'Response by British Sky Broadcasting Group plc to Ofcom's Consultation Document "Pay TV Phase Three Document: Proposed Remedies" of 26 June 2009', October, p. 54, para 4.24.

[16] Profitability estimates, based on the depreciated replacement cost (DRC) opening and market value (MV) closing asset values capture forward-looking expectations, with respect to Sky's returns.

alternative definitions of capital employed, the IRR based on replacement costs of assets over the period from 2005 to 2009 increases to [✂]%.[17]

Over a longer historical time period (ie, since flotation, covering the period 1995–2009), returns on replacement costs of assets appear higher, at around [✂]%. Under alternative scenarios for capital employed the IRRs increase to [✂]%.[18]

The updated returns over the recent years are higher than the returns presented in the first report. For example, the IRRs based on replacement costs over the five-year period from 2005 to 2009 are about 1.5 percentage points higher than the IRR estimates over the 2004–08 five-year period. This is driven by a combination of strong cash flows and an increase in the replacement cost of the asset value during the financial year 2009.

These estimates of economic rates of return apply to a period when Sky was consistently investing in subscriber acquisition and expanding its subscriber base. Effectively, the time period for the estimation of economic rates of return is truncated—such that it captures all the acquisition costs associated with the subscriber base in 2009, but omits the net cash flows that would be expected over the remaining lifetime of the subscriber base in 2009. The implication is that the lifetime profitability—ie, taking into account the historical as well as the forward-looking periods—would be expected to be higher. To cross-check the IRR estimates, ROCE estimates were also considered. Table 2.2 shows the updated ROCE estimates.

Table 2.2 Updated estimates of the ROCE (pre-tax, real, %)

Measure	1995–2009	1998–2009	2005–2009
ROCE (DRC: year of investment)	[✂]	[✂]	[✂]
ROCE (DRC: annual revaluation)	[✂]	[✂]	[✂]
ROCE (book value)	25.5	16.9	29.8

Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

On a book-value basis (an approach often considered by the CC), the average updated ROCE over the past five years is 30%. On a replacement cost basis, the average ROCE for the past five years is between [✂]% and [✂]%. ROCE estimates on a replacement cost basis should be regarded as conservative because the profits used in the numerator of the ROCE formula do not account for holding gains associated with growth of the asset value (as would be accounted for under the clean surplus accounting relationship). If holding gains were accounted for in profits, the ROCE would be closer to the IRR.

Under alternative definitions of capital employed, the ROCE over the five-year period from 2005 to 2009 based on DRC increases to [✂]%.[19]

As in the case of IRRs, the updated ROCE estimates for 2005 to 2009 are higher than from 2004 to 2008, by approximately 0.5 percentage points.

[17] See Appendix 1, Table A1.1. The estimate of [✂]% over the 2005–09 period corresponds to the scenario in which cash is subtracted from capital employed.

[18] See Appendix 1, Table A1.1. The IRR of [✂]% over the period 1995–2009 corresponds to the scenario in which current liabilities are subtracted from capital employed.

[19] See Appendix 1, Table A1.1. The ROCE estimate of [✂]% over the 2005–09 period corresponds to the scenario in which current liabilities are subtracted from capital employed.

2.2 Estimates of the cost of capital

This section presents the estimates of Sky's cost of capital. The cost of capital is estimated for BSkyB Group and was not disaggregated to estimate separate costs of capital for pay-TV and other activities. The analysis of the cost of capital has been high-level for the purpose of indicating the size of the profitability gap rather than providing a precise estimate.[20] Results have been presented as ranges, both to indicate what a reasonable cost of capital would be and to recognise the degree of uncertainty around these estimates.

The cost of capital represents an appropriate benchmark for returns because, in competitive markets, which are characterised by free entry and exit, companies are expected to make profits in the long run that are broadly in line with the minimum returns required by investors (ie, the cost of capital). Profits above the cost of capital would encourage entry by new competitors, and profits below it would induce exit. Hence, returns that are persistently and significantly above the cost of capital are an indication of barriers to entry.

The cost of capital is used by the CC as a benchmark for assessing profitability, as shown, for example, in its investigation into the Classified Directory Advertising Services market:

> Effective competition should put pressure on the profit levels of these companies so that they move towards their cost of capital in the medium to long run. In comparing profits to the weighted average cost of capital (WACC) we applied two profitability measures; return on capital employed (ROCE) and internal rate of return (IRR).[21]

The cost of capital of BSkyB Group has been measured as the cost of equity and cost of debt, weighted by the value of gearing (the WACC). The results of the analysis are presented in Table 2.3, which shows ranges for Sky's pre-tax, nominal cost of capital estimated for three time periods (1995–2009, 1998–2009 and 2005–09, consistent with the periods over which the IRR has been measured).[22] The detailed methodology used to obtain these results is set out in Appendix 2.

In order to reflect appropriately the impact of the decreasing cost of capital over time, the cost of capital weighted by the investments over the period is estimated. As a sensitivity check, the cost of capital at the start of the period is also presented. In addition, the real cost of capital is presented. This is estimated as the nominal cost of capital deflated at RPI-based inflation[23] using Fisher's equation.[24]

[20] The level of detail in this analysis is high-level relative to that which is often undertaken for the reviews of price controls for regulated utilities. This is because unlike a price control where there is a direct link between the point estimate adopted by the regulator for the cost of capital and the revenue the regulated utility is allowed to earn, the purpose in this case is to provide a robust indication of the size of the profitability gap.

[21] Competition Commission (2006), 'Classified Directory Advertising Services market investigation', December 21st.

[22] The estimates of the cost of capital in the earlier years are more uncertain than in the later years. Therefore, the estimates for earlier years were also cross-checked for consistency with a selected set of regulatory precedents from the late 1990s (as reported in Appendix 2).

[23] In 2009, a low nominal risk-free rate and negative annual inflation are observed. Therefore, to ensure that the profitability gap is not driven by atypically large fluctuations in inflation and depressed yields, in 2009 these two parameters have been consistently estimated with reference to historical data. Specifically, the inflation assumption (2.6%) and the nominal risk-free rate assumption (5.2%) for 2009 are based on three-year historical averages.

[24] While it is conceptually correct to use the real risk-free rate in estimating the real cost of capital, for simplicity the real cost of capital is estimated using Fisher's equation. The real cost of capital is calculated using the following formula:

$$k_r = \frac{(1+k_n)}{(1+\pi)} - 1$$

where k_r is the real cost of capital, k_n is the nominal cost of capital and π is the rate of inflation.

Table 2.3 Estimates of the cost of capital (%)

	1995–2009	1998–2009	2005–2009
Pre-tax, nominal (average over the period)	**13.2** (11.4–15.0)	**13.1** (11.3–14.9)	**12.4** (10.7–14.1)
Pre-tax, nominal (beginning of the period)	**17.1** (16.0–18.1)	**14.0** (13.0–14.9)	**12.9** (11.2–14.7)
Pre-tax, real (average over the period)	**9.9** (8.1–11.6)	**9.7** (8.0–11.4)	**8.5** (6.9–10.2)

Note: The ranges for the WACC are driven by ranges for the equity beta, gearing and the equity risk premium.
Source: Datastream, OECD, Competition Commission (2008), 'Stansted Airport Ltd - Q5 price control review', October, pp. 1–130, and Oxera calculations.

The estimates exhibit a downward trend between 1995 and 2009, primarily driven by the fall in the nominal risk-free rate. This downward trend drives a difference between the pre-tax nominal cost of capital estimated at the beginning of the period and the average over the period.

2.3 Estimates of the profitability gap

This section compares economic rates of return with the benchmark cost of capital and presents estimates of the profitability gap for Sky's pay-TV operating activities. Robust estimation of the profitability gap requires the following two issues to be taken into account appropriately:

– the time period for estimating the cost of capital and comparing it with returns;
– the treatment of tax.

2.3.1 Time period for estimating the cost of capital and comparing it with returns

In analysing profitability, it is appropriate to compare returns with the cost of capital at the time when the investment decision was made (ie, with the ex ante cost of capital). The use of the ex ante cost of capital appropriately reflects the opportunity costs faced by investors when they were committing capital to the investment. Therefore, when assessing the profitability of individual investments, it is appropriate to compare the IRR with the cost of capital at the beginning of the IRR period—ie, when the investment is assumed to have been made.

When applying this principle to profitability analysis at the company level (as opposed to individual investments), it is necessary to recognise that the IRR for a company represents an average of the IRRs of individual investments made at different points in time. Therefore, when assessing profitability at the company level, it is not appropriate to use a single cost of capital at the beginning of the IRR period because changes in the cost of capital over the IRR period would need to be reflected in the benchmark. Put differently, the comparison should be made between the IRR and the cost of capital at the time when the capital was committed to investments, over different investment cycles.

In Sky's case, it is particularly important to ensure that this comparison is accurate. Significant reductions in the cost of capital observed since flotation in 1995 and Sky's continual investments[25] mean that, in this case, the profitability gap could be significantly underestimated if a single cost of capital at the beginning of the IRR period is used.

An appropriate benchmark, which would reflect changes in the cost of capital over time, could be estimated using analysis of the NPV. This would involve estimating the NPV of cash flows using appropriate (different) costs of capital for each year as discount rates and then

[25] Its asset value on a DRC basis grew by approximately 600% between 1995 and 2009 or from £ [✂] billion to £ [✂] billion.

deriving a single discount rate, which would yield the same total NPV. This single discount rate could be used as a benchmark for the IRR. Alternatively, a simple average WACC over the IRR period (ie, which does not take into account the NPV effects) could be used as an approximation.

In this report, an approximation is used based on the average WACC weighted by the annual value of investments. This is also cross-checked for consistency using the NPV analysis (ie, by estimating a single discount rate that will give the same NPV as annual costs of capital). Therefore, the profitability gap of Sky is estimated as the difference between the IRR and the WACC over the IRR period. The profitability gap based on the IRR at the beginning of the IRR period, which would not take into account changes in the cost of capital over time, is reported as a sensitivity check.

2.3.2 The treatment of tax

The second issue to be considered is whether the profitability gap should be estimated on a pre- or post-tax basis.

In general, estimates of economic profitability should not depend on whether the analysis is conducted on a pre- or post-tax basis, provided that tax assumptions in the cost of capital are consistent with the company's actual tax position. If a company is paying on average a statutory tax rate on its profits then a statutory tax rate should be assumed when estimating the tax wedge in the pre-tax cost of capital. If, however, it is paying on average less than a statutory tax rate (eg, due to tax losses) then a lower effective tax rate should be assumed, implying a lower pre-tax cost of capital and a higher profitability gap.

Sky was making accounting losses before flotation; it may also be reasonably expected that Sky was not paying the full statutory tax rate for a number of years after 1995 due to carried-forward tax losses. Thus, for a number of years during the IRR period, Sky's effective tax rate will have been lower than the statutory tax rate, in which case if returns and the cost of capital are compared on a pre-tax basis, an effective tax rate would need to be used when estimating the pre-tax cost of capital. If a (higher) statutory tax rate were used, the cost of capital would be overestimated and the profitability gap underestimated. This is because the benchmark would assume that Sky paid more taxes than it actually did. Alternatively, instead of estimating the effective tax rate, returns and the cost of capital could be compared on a post-tax basis.

In order to simplify the analysis and retain the overall conservative nature of the report, the profitability gap is estimated using the pre-tax cost of capital at the statutory tax rate. Given that this approach may underestimate the 'true' profitability gap, a sensitivity check is also considered where the IRRs are compared with the cost of capital on a post-tax basis.[26]

2.3.3 Profitability gap in the case of Sky

Figure 2.1 below shows how the IRR, cost of capital and profitability gap evolved over the period from 1995 to 2009.

– **Estimates of the IRR**. For every year Figure 2.1 shows the pre-tax IRR for the period from that year to 2009. For example, the IRR in 2001 corresponds to the IRR measured over the period from 2001 to 2009 and the IRR in 2005 corresponds to the IRR measured over the period from 2005 to 2009. The IRR is reported on a nominal, pre-tax basis. The shortest time period considered for the analysis of the IRR is the last five years (ie, from 2005 to 2009); hence, Figure 2.1 does not show the IRR estimates after 2005.

[26] This involves estimating the IRR of post-tax cash flows (ie, pre-tax cash flows less taxes) and comparing with the post-tax cost of capital, estimated as the weighted average of the post-tax cost of equity and pre-tax cost of debt (also known as the 'vanilla' cost of capital).

– **Estimates of the cost of capital**. Figure 2.1 shows two scenarios for the cost of capital. For every year the first scenario (the dark purple line) shows an annual cost of capital estimated using the information available as at that year. For example, under this scenario the cost of capital in 2001 represents an estimate of Sky's cost of capital in 2001.

– For every year, the second scenario (the dark brown line) shows an average of the annual costs of capital over the corresponding IRR period (ie, from that year until 2009), weighted by the amount of investments in every year. For example, under this scenario the cost of capital shown for 2001 corresponds to the average of the annual costs of capital over the period from 2001 to 2009, appropriately weighted. This scenario attributes significant weight to estimates of the cost of capital in 1999 and from 2004–09, and hence is lower than the first scenario for the majority of the years displayed in Figure 2.1. The cost of capital is reported on a nominal, pre-tax basis.

– **Estimates of the profitability gap**. For every year, the profitability gap is estimated as the difference between the IRR from that year until 2009 and the average WACC over the corresponding period.

Figure 2.1 Evolution of the IRR (measured for time periods ending in 2009) and cost of capital (pre-tax, nominal, %)

[✂]

Note: The estimates of the IRR correspond to time periods beginning in various years and ending in 2009. The average annual WACC is calculated by taking an average of the cost of capital estimates in each year, weighted by the capital expenditure made in the same year. The horizon over which the average WACC is estimated reduces over time, and is consistent with the period over which the relevant IRR is estimated.
Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

Overall, the profitability gap, as shown in Figure 2.1, ranges from 5% [✂] to 15% [✂], with an average of around 9%.

Table 2.4 presents estimates of the profitability gap based on the IRR (DRC values of assets) and the nominal cost of capital.

– **Base case**: this scenario estimates the profitability gap as the difference between the IRR and average cost of capital over the IRR period, weighted by the amount of investment in each year. Both the IRR and the cost of capital are expressed on a pre-tax, nominal basis;

– **Sensitivity check**: this considers the impact of using a single cost of capital at the beginning of the period when the IRR is calculated as opposed to using an average over the period. Therefore, the profitability gap is estimated here as the difference between the IRR and the cost of capital observed at the beginning of the IRR period.

The range for the profitability gap is constructed by using ranges around the estimates of returns (driven by two approaches for estimating the replacement costs of assets) and the cost of capital (driven by the equity beta, gearing and ERP).

Table 2.4 Estimates of the profitability gap (based on IRR, %)

	1995–2009	1998–2009	2005–2009
Base case (pre-tax, nominal, based on IRR and average WACC over IRR period; statutory tax rate built into pre-tax WACC)	[✂]	[✂]	[✂]
Sensitivity check (based on the WACC at the beginning of the IRR period; the other parameters are as in the base case)	[✂]	[✂]	[✂]

Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

The analysis shows that, for the period from 1995 to 2009, the profitability gap is around [✂]%, decreasing to around [✂]% in the period from 1998 to 2009, and subsequently increasing to around [✂]% over the period covering the last five years. (In the table above, the profitability gap in the base case ranges from 8% to 15%). The relatively low profitability gap observed over the 1998–2009 period is driven by significant investments incurred by Sky over this period in the transition to digital television and the acquisition of customers. Hence, the returns over this period capture the investments, but do not capture future cash flows in full.

The analysis also shows that if the WACC is estimated at the beginning of the time period, this leads to a lower profitability gap because the WACC was decreasing over time. The profitability gap is around [✂]% in the period from 1995 to 2009, around [✂]% in the 1998–2009 period, and approximately [✂]% in the period from 2005 to 2009. (In the table above, the profitability gap in the sensitivity check scenario ranges from 7% to 11%).

In order to cross-check the results based on the IRR, the report also considers the profitability gap based on the ROCE. Table 2.5 presents estimates of the gap between the ROCE (DRC: annual revaluation) and the real pre-tax WACC.

It is appropriate to use the real cost of capital as a benchmark because the ROCE based on DRC provides an estimate of *real* returns, as the inflation component is captured in the asset value and replacement cost depreciation.

Table 2.5 Estimates of the profitability gap (based on ROCE, %)

	1995–2009	1998–2009	2005–2009
ROCE (pre-tax, real, ROCE based on DRC–annual revaluation and average real pre-tax WACC over the period)	[✂]	[✂]	[✂]

Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

The profitability gap based on the ROCE for the period from 1995 to 2009 is around [✂]%; for the period from 1998 to 2009 it is approximately [✂]%; and over the 2005–09 period it is around [✂]%. Although the estimates based on the ROCE support the IRR, more weight should be placed on the IRR because it is a more conceptually appropriate measure of economic rates of return.

The estimates of the profitability gap reported above are based on the pre-tax WACC estimated at the statutory tax rate. The pre-tax approach based on statutory tax rates is likely to underestimate the 'true' profitability gap because it would be reasonable to expect Sky's effective tax rate to be below the statutory tax rate for at least several years of the IRR period. Therefore, as a sensitivity check on the pre-tax results, the profitability gap was also estimated on a post-tax basis using an estimate of actual taxes paid.

Table 2.6 shows the estimates of the post-tax IRR and post-tax WACC. In order to estimate the post-tax IRR, the amount of tax paid by Sky each year was subtracted from Sky's pre-tax cash flows. The post-tax WACC was estimated as the average of the pre-tax cost of debt and post-tax cost of equity (also known as the 'vanilla' WACC).[27]

[27] The vanilla WACC represents an appropriate benchmark for IRRs calculated using pre-tax cash flows less actual taxes paid.

Table 2.6 Sensitivity check: post-tax estimates of the profitability gap (nominal, based on IRR, %)

	1995–2009	1998–2009	2005–2009
IRR (DRC: year of investment)	[✂]	[✂]	[✂]
IRR (DRC: annual revaluation)	[✂]	[✂]	[✂]
WACC (post-tax, nominal, average over the period when IRR is estimated)	9.5 (8.2–10.8)	9.4 (8.2–10.7)	9.0 (7.8–10.2)
Profitability gap	[✂]	[✂]	[✂]

Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

As shown in Table 2.6, the post-tax profitability gap is higher than the pre-tax profitability gap because Sky's effective tax rates over the IRR period were lower than the statutory tax rates. The extent of the underestimate of the profitability gap based on the pre-tax analysis ranges from around 2% over the period from 1995 to 2009 to 0.5% over the last five years. This is consistent with the evolution of Sky's tax position, because Sky was paying lower tax rates in the earlier years due to historic losses.

2.4 Potential interpretation of results

The analysis suggests that Sky's returns over recent years have been significantly higher than the ex ante cost of capital. Similar results are observed over the longer term: historical returns measured from 1995—the year when Sky was floated—also appear to have been significantly higher than the cost of capital.

As discussed above, in competitive markets, characterised by free entry and exit, companies are expected to make profits in the long run that are broadly in line with the minimum return required by investors (ie, the cost of capital). Profits above the cost of capital would encourage entry by new competitors, and profits below it would induce exit. Hence, returns that are persistently and significantly above the cost of capital are an indication of barriers to entry.

In response to Ofcom's third consultation, Sky raised a number of concerns with the interpretation of the evidence on returns. First, Sky's advisers raised some methodological issues with Oxera's estimates of returns. Second, Sky seems to argue that in this case any potential gap between the returns and cost of capital does not indicate that there are distortions to the competitive process, but rather that it is the result of successful risk-taking and innovation.

2.4.1 Comments by Sky's advisers on the measurement of returns

Sky's advisers (namely Professor Grout) make a number of points about Oxera's estimates of returns. First, Professor Grout argues that Oxera's estimates of the IRR may be biased because the asset value is incorrectly estimated.

> The general point is that, even if one makes the unrealistic assumption that the market is perfectly competitive and puts to one side the problem of valuing assets that are clearly identified, it should not be surprising to find that the equilibrium required rate of return on physical and financial assets will be persistently above the CAPM derived cost of capital. Obviously this will be more important in some businesses than others. In dynamic markets where there is changing technology and innovation the problem of 'hidden assets' is likely to be significant.[28]

[28] Grout, P.A. (2009), 'A Report on Profitability', September, p. 2.

Second, he suggests that, due to the way in which the IRR is calculated, it can be used only to assess whether returns exceed the cost of capital, but not to ascertain the extent to which this is the case. Therefore, estimates of the IRR cannot be used to assess whether returns **persistently** and **significantly** exceeded the cost of capital.

> The central point is that these results [the NPV/IRR analysis] relate only to whether the IRR or truncated IRR is above the cost of capital. In particular, they do not relate to the extent to which the IRR is above the cost of capital. But, as indicated above, it is this latter relationship that is central to competition policy. Knowing how far the IRR is above the cost of capital is necessary if profitability data is to help decision making.[29]

Third, presenting evidence on Sky's total shareholder return (TSR) and accounting returns in competition policy analysis, Professor Grout argues that the view that Sky's profitability was high is not supported.

In relation to TSR, his analysis shows that the performance of Sky's share price was not out of line with certain benchmarks.

> Overall, the evidence from this detailed analysis of the distribution of returns of companies shows that an extremely significant uplift in the existing stock market returns to Sky shareholders would not have produced a return that looks particularly high relative to other companies in the market. So approaching Sky's profitability through this stock market evidence does not support a case that Sky is abnormally profitable.[30]

In relation to accounting returns, Professor Grout argues that accounting ROCEs in past market investigations where firms were not found to behave against the public interest were higher than the accounting ROCEs estimated for Sky. He concludes that this evidence is relevant in this case, and does not support the view that Sky's profitability is high.[31]

2.4.2 Drivers of the profitability gap

Sky seems to argue that in this case it is not appropriate to interpret the evidence that returns exceed the cost of capital as an indication of distortions to the competitive process because there are other factors that explain the profitability gap.

> Contrary to Ofcom's simplistic analysis, returns in excess of cost of capital are normally regarded as a weak and imperfect indicator of whether competition is effective, due to the fact that such a gap can be caused by a range of factors other than the exercise of market power. It is only possible to conclude that such excess returns are attributable to weak competition if other potential causes of them can be safely ruled out, which is rarely the case – and is certainly not the case in relation to Sky's business.[32]

Sky suggests that the main factor that explains the gap between returns and the cost of capital is Sky's continual successful innovation. Specifically, it states:

> Sky has a strong and consistent track record of being an innovator, and in particular a first mover – identifying opportunities, undertaking large-scale, risky investments to take advantage of such opportunities, and executing well.[33]
>
> In such a context, a finding that Sky has, in the past, earned an aggregate rate of return that exceeds its estimated cost of capital should be entirely unsurprising.[34]

[29] Ibid., p. 8.
[30] Ibid., p. 28.
[31] Ibid., p. 33.
[32] Sky (2009), op. cit., p. 61, para 4.55.
[33] Ibid., p. 63, para 4.60.
[34] Ibid., p. 64, para 4.61.

Sky's argument, therefore, seems to be that it is not unreasonable to expect returns to exceed the cost of capital due to Sky's continual innovation delivering high (and higher than expected) ex post returns.

2.5 Summary and objectives of this report

In summary, Oxera's analysis suggests that Sky's historical returns have been persistently and significantly above the cost of capital. According to economic theory and CC precedent, this evidence could be interpreted as being prima facie evidence consistent with the existence of barriers to entry in the UK pay-TV market.

Sky's advisers suggest that there is no evidence of Sky earning high returns. Specifically, Professor Grout argues that the evidence on TSR and accounting returns in past market investigations is both relevant and does not support a conclusion that there is a distortion to the competitive process. He also argues that Oxera's estimates of returns may be biased due to issues with asset valuation and the IRR as a measure of profitability.

Sky appears to acknowledge that it is reasonable to expect that it has been earning returns in excess of the cost of capital if this profitability gap is a consequence of Sky's successful innovation and risk-taking, as opposed to a distortion to the competitive process.

This report considers these comments from Sky and its advisers. Section 3 reviews the relevance and robustness of Professor Grout's evidence on TSR and accounting returns, as well as its potential interpretation. Section 4 considers Professor Grout's points on the robustness of Oxera's estimates of returns. Section 5 looks at the potential impact of successful innovation on the estimates and interpretation of returns in the recent years.

3 Evidence on total shareholder returns in the economic analysis of profitability in competition policy

Sky commissioned Professor Grout to review Oxera's estimates of Sky's economic profitability. Professor Grout seems to argue that TSR provides a more meaningful measure of Sky's economic profitability for the purpose of competition policy analysis than the IRR, and that TSR does not provide evidence suggesting that Sky's historical returns have been high.

This section demonstrates that, in the context of analysing economic rates of return in competition policy analysis, evidence from total shareholder returns does not provide a meaningful measure of returns. While competition policy analysis seeks to understand the relationship between prices and costs, the TSR captures the relationship between prices and expectations. Thus, if stock prices at any point in time capture expectations of economic rents, the expected return on the share price will be the cost of capital, yet the firm may well continue to earn rents.

This section also shows that, from the practical perspective, TSR provides a significantly less reliable estimate of Sky's returns on its UK pay-TV operations than the IRR because TSR is less robust to the underlying assumptions.

For these two reasons, the use of IRRs, as in Oxera's analysis, is the only economically meaningful approach that could be applied with a sufficient degree of robustness towards estimating the profitability of Sky's UK pay-TV operations in the context of competition policy analysis.

3.1 Reconciliation between total shareholder returns and the IRR

The main reason why the IRR is higher than TSR in this case is because the value of assets used in the TSR analysis significantly exceeds the value of assets in the IRR analysis. The value of assets acts as a 'denominator' in the analysis of returns, with which cash flows are compared. Thus, for the same level of cash flows, the higher the value of assets, the lower the returns.

This 'mechanical' reason why the IRR is higher than TSR reflects the difference in what these two measures seek to capture from the economic perspective. TSR estimates returns to shareholders, and therefore the asset value used in calculating TSR reflects the market value of assets, which reflects the NPV of present and future investments. The IRR estimates returns relative to the costs incurred by Sky in creating the asset value (measured as the DRC).

The market value used in the TSR calculation is a function of expected future cash flows discounted at the cost of capital.[35] Measurement of returns based on market value (whether by the IRR or TSR) is therefore circular, to the extent that if actual cash flows equal expectations, the measured IRR will equal the cost of capital (notwithstanding that cash flows may include significant rents). IRR based on the replacement cost of assets does not suffer from this circularity. In practice, this explains why regulators and competition authorities do not use market values and TSR as the basis for analysing the economic profitability of activities.

[35] This section uses the term 'market value' to reflect the valuation approach (ie, cost-based value versus cash flow-based value) rather than to draw a distinction between market value (of equity) and enterprise value (of assets).

The difference between the market value and DRC value of Sky's assets is, therefore, the main reason why TSR is significantly lower than the IRR.

To illustrate this difference, Figure 3.1 compares the DRC and market value of Sky's assets, and shows that, in each year, the market value has significantly exceeded the replacement cost value. In 1995, the starting year for the analysis of returns, the market value was approximately six times the replacement cost of the opening asset value. In light of this, it is not surprising that TSR (the return relative to the market value of assets) is significantly lower than IRR (the return relative to the replacement cost value of assets).

Figure 3.1 The value of Sky's assets under different valuation approaches (£m)

[✂]
Source: Sky's annual reports, Sky's responses to Ofcom's questionnaires (including, where relevant, additional specific data from Ofcom), and Oxera's analysis.

It is plausible for the IRR relative to the replacement cost value of assets to be over-estimated in comparison to the actual IRR if there is measurement error in the valuation of assets. Section 4.1 considers the potential for measurement error to explain the profitability gap and shows that there seems to be no robust evidence for this.

In fact, the difference between the market and replacement cost value of assets can be understood by reference to the economic characteristics of Sky's investments. For example, the costs to Sky of acquiring additional subscribers are significantly lower than the value of additional cash flows generated by these subscribers over their lifetime. This illustrates the economic reason why the market value of assets (which reflects the value of expected future cash flows) significantly exceeds the replacement cost value of assets (which reflects the costs incurred by Sky in acquiring assets). The difference between the costs of creating assets and the value that these assets generate for the business is entirely consistent with economic profitability being high.

The economic rationale for the observed difference between the market value of Sky's assets at flotation and the costs incurred by Sky to create these assets can be illustrated using a simple model of incremental per-subscriber lifetime cash flows. The model considers the additional costs of acquiring a new subscriber and the additional cash flows over the assumed subscriber's lifetime.

Table 3.1 shows the key assumptions underpinning the model. The model is calibrated on the observed data for three years (1994, 1995 and 1996) to test the sensitivity of results to assumptions.

Table 3.1 Assumptions for the illustrative incremental lifetime per-subscriber cash-flow model

Total for Sky(£m)	1994	1995	1996	Per subscriber (£)	1994	1995	1996
Cash flows				**Additional cash flows**			
Revenue	550	778	1,008	Revenue	217	269	310
Marketing (SAC)	37	59	76	OPEX (excluding SAC)	135	119	190
Other OPEX (excluding SAC[1])	343	474	617	**Additional investments**			
Subscribers				SAC	40	87	109
As at year end ('000)	2,541	2,893	3,247	**Additional annual cash flow (£)**	**81**	**150**	**121**
Gross subscriber additions ('000)	922	675	701	**Pre-tax, nominal WACC (%)**	**17.1**	**17.1**	**17.3**

Note: [1] Subscriber acquisition costs.
Source: BSkyB share prospectus; Sky annual reports; Oxera analysis.

Using the data in Table 3.1, the incremental per-subscriber lifetime cash flows are modelled as Sky's profits in each year (exclusive of marketing costs) divided by the number of subscribers. As the subscriber is assumed to remain with Sky for seven years,[36] cash flows are modelled over a seven-year period. The upfront investment is estimated as the subscriber acquisition costs (SAC).[37] The resulting estimate of annual cash flows per subscriber is approximately £81 and the one-off upfront investment £40, based on data for 1994. Table 3.2 shows the estimates of incremental lifetime per-subscriber cash flows; Table 3.3 shows the corresponding per-subscriber estimates of profitability.

While the estimates may not be precise due to the high-level nature of the analysis, they could reasonably be expected to reflect the scale of upfront investments in new customers relative to additional annual cash flows from new customers.

[36] The seven-year horizon is consistent with the estimates of the expected lifetime of subscribers, given the observed churn rates. See Oxera (2009), section 3.4.1.
[37] This was estimated as the ratio of marketing costs to net subscriber additions in each year.

Table 3.2 Illustrative incremental per-subscriber lifetime cash-flow model (£)

	Year 0 (Investment)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Cash flows (1994)								
Annual cash flows		81	81	81	81	81	81	81
Upfront investment	–40							
Net cash flow	**–40**	**81**	**81**	**81**	**81**	**81**	**81**	**81**
Cash flows (1995)								
Annual cash flows		150	150	150	150	150	150	150
Upfront investment	–87							
Net cash flow	**–87**	**150**	**150**	**150**	**150**	**150**	**150**	**150**
Cash flows (1996)								
Annual cash flows		121	121	121	121	121	121	121
Upfront investment	–109							
Net cash flow	**–109**	**121**	**121**	**121**	**121**	**121**	**121**	**121**

Source: BSkyB share prospectus; Sky annual reports; Oxera analysis.

Table 3.3 Illustrative incremental per-subscriber profitability metrics

Subscriber valuation	**1994**	**1995**	**1996**
Present value of operating cash flows (£) (implied market value of a customer)	319	587	469
Upfront investment (£) (implied DRC value of a customer)	40	87	109
Ratio of present value of cash flows to acquisition costs (implied Tobin's Q for an additional subscriber)	8.0	6.8	4.3
Profitability			
Payback period (years)	<1	<1	<1
NPV @ WACC (£)	279	500	360
IRR (%)	203%	173%	110%
WACC (%)	17.1%	17.1%	17.3%

Note: Tobin's Q measures the ratio of the market value to the cost of assets; in this case, the present value of cash flows divided by the investment.
Source: BSkyB share prospectus; Sky annual reports; and Oxera analysis.

The model shows that the present value of reasonable expectations of incremental lifetime per-subscriber cash flows significantly exceeded the acquisition costs of subscribers.[38] This means that the implied Q ratio (ie, the ratio of the market value to the replacement cost of assets) of additional subscribers is orders of magnitude higher than 1 and is consistent with high profitability of investing in additional subscribers. The model calibrated in different years produces a per-subscriber Q ratio in the range from 4 to 8 and lifetime IRR from 110% to 203%.

[38] Given that the model is structured on an incremental basis (ie, only additional cash flows from new subscribers are considered), it is not possible to reconcile it back directly to the aggregate numbers. For example, it is not possible to derive asset values for pay-TV activities in aggregate by simply scaling the per-subscriber asset values by total subscriber numbers. This is because the model excludes other assets that existed at the time of flotation, and does not incorporate any assumptions about growth in total subscriber numbers.

The high Q ratio of incremental investments in subscribers provides the economic rationale as to why Sky's observed Q ratio at flotation was significantly in excess of one. It is reasonable to expect that the market valuation at flotation incorporated this significant expected difference between the lifetime cash flows of subscribers and their acquisition costs. This pattern of high cash flows relative to costs has persisted throughout the period to 2009 and has been reflected in analysts' forecasts as expectations have been updated over time.[39] This is consistent with the persistently high Q ratio observed throughout the period displayed in Figure 3.1.

The estimates of expected profitability of incremental investments in subscribers reported in Table 3.3 may be conservative because the model assumes that cash flows remain stable over the lifetime of subscribers. In practice, per-subscriber cash flows for existing subscribers may be expected to increase over time because of growth in the ARPU (average revenue per subscriber) and reduction in costs, primarily driven by lower content costs per subscriber (because the number of subscribers grows faster than the content costs). The expected lifetime of subscribers at flotation may also have been higher than seven years.

Although the model could be seen as crude and is used here to illustrate the inappropriateness of using TSR and valuations as the basis for valuing assets in a profitability analysis as opposed to deriving robust estimates of cash flows, its results are not out of line with modelling conducted by equity analysts. For example, in 2005, UBS estimated that the lifetime returns to additional subscribers were approximately 200%, with a payback period of 18 months.[40]

Overall, the high Tobin's Q for Sky at flotation and in subsequent years throughout the period to 2009 is the underlying reason why the measures of TSR are lower than the measures of IRR presented in Table 3.4.

Table 3.4 TSR and IRR (%)

Measure	1995–2009	1998–2009	2005–2009
TSR (post-tax, nominal, return on equity, annualised)	5.1	1.9	–0.9
IRR (DRC: year of investment; pre-tax, nominal, return on assets)	[✂]	[✂]	[✂]
IRR (DRC: annual revaluation; pre-tax, nominal, return on assets)	[✂]	[✂]	[✂]

Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

3.2 Why is TSR not meaningful in competition policy analysis?

As TSR is the return on market value, it captures performance relative to expectations underpinning the market value. As a result, the assumption that Sky would continue generating high returns after flotation (as was demonstrated in the previous sub-section) would automatically imply that TSR would not be expected to be high (as high expectations would already be captured in the market value of assets). Professor Grout's assertion that if Sky was earning excessive returns, this would be expected to be reflected in the TSR, would

[39] As shown in section 5.4, where the expected IRR is estimated based on analysts' forecasts.

[40] UBS (2005), 'Investment research – BSkyB: Focus on consumer', August 17th. It should be noted that the estimates of the lifetime per-subscriber IRR are significantly higher than the aggregate profitability, as captured by the IRR for Sky's pay-TV activities. For example, the lifetime per-subscriber IRR around the time of flotation is around 112%, while the pre-tax IRR for the period 1995–2009 under the base-case scenario is approximately [✂]%. The main driver of this difference is the assumptions about the investment programme. The model of the expected per-subscriber IRR at flotation assumes a single investment at the start of the period, followed by net cash inflows over the entire lifetime of the subscription. In contrast, the IRR estimated for Sky's pay-TV activities is based on Sky's actual investment programme, which has seen consistent cash outflows on subscriber acquisition over the estimation periods. Relative to the per-subscriber lifetime model, the IRR for pay-TV activities is truncated because, although it includes the full value of acquisition costs associated with the subscriber base in 2009, it does not capture all the value of the net cash flows expected over the remaining lifetime of the subscribers.

therefore be correct only if there was no expectation that Sky would continue to generate high returns after flotation.

The evidence that TSR is low is, therefore, entirely consistent with the evidence that Sky's operating cash flow performance over the last ten years seems to have been in line with or below market expectations as reflected in equity analysts' reports. (This evidence is presented in section 5.4.)

Overall, low TSR could only be interpreted as evidence that Sky's actual performance has been lower than market expectations. In competition policy analysis, however, the relevant question is not how Sky's actual cash flows compare with market expectations, but how actual cash flows compare with costs incurred to acquire assets that generate these cash flows.

The analysis of economic profitability in competition policy analysis seeks to provide an indication of how Sky's outturn prices relate to costs incurred in acquiring assets and running the business. The TSR, however, does not provide any indication of the relationship between prices and costs, and hence is not a meaningful measure of returns in this case, given the objectives of profitability analysis in competition policy.

Conceptual flaws of the TSR as a measure of returns in competition policy are widely acknowledged. For example, there was significant discussion of the relevance of the TSR evidence in the context of the Cruickshank report into competition in UK banking, where Barclays and Lloyds highlighted its conceptual flaws. Specifically, Barclays stated:

> Barclays believed that total returns to shareholders (TSRs) were an inappropriate measure of returns for competition policy purposes. TSRs incorporated investor sentiment as well as the underlying change in economic performance from investors' expectations. TSRs did not measure profits, and could not measure excess profits reliably, only a change in expectations about future profits. For example, if a business was expected by investors to make excess profits both at the beginning and the end of any measurement period, then TSRs would not show excess returns over the period. TSRs would show that Amazon.com and many other high-technology companies that had yet to make a profit were in fact excessively profitable.[41]

Similar concerns were raised by Lloyds in its submission to the CC:

> Lloyds TSB told us that it had severe reservations about the use of share price data to make inferences about market power. Lloyds TSB did not believe that such an approach could be supported conceptually.
>
> If a firm had market power and investors were aware of this, its share price would be higher to reflect the higher expected value of future earnings. The actual TSRs received, therefore, would appear to be at a normal level since they would be calculated against this high share price. Therefore, market power would only influence TSRs if the company earned profits from the exercise of market power which were not expected at the beginning of the period in question, or if investors' perceptions of the extent of market power changed (whether or not there was, in fact, a change in the firm's market power). Hence, TSRs should be of extremely limited interest to competition authorities in assessing whether a firm or firms enjoyed market power—they could provide evidence only of a change in market power (or of a change in perceptions of market power), not of its existence.[42]

In light of conceptual flaws with the measure, the CC did not put weight on this measure, for example, when referring to the Cruickshank report:

[41] Competition Commission (2002), 'The supply of banking services by clearing banks to small and medium-sized enterprises: A report on the supply of banking services by clearing banks to small and medium-sized enterprises within the UK', Volume 1 summary and conclusions, March.
[42] Ibid.

> In fact, the Cruickshank report calculated that total returns to banks' shareholders including the gains from increases in share prices over the 12 years to 1999 were excessive, but the banks objected that this measurement method is very sensitive to the time period adopted and, in any event, reflected changes in expectations between the start and end dates. We have not, as a result, used this approach to identify profitability but, by the same token, do not regard it as the correct way to seek to identify the value of intangibles.[43]

In cases where the market value significantly exceeds the replacement costs of assets, the only meaningful approach to profitability is to estimate returns using the DRC value of assets.[44] Returns on replacement cost assess performance relative to the costs of creating assets, rather than the expected value of future net cash flows to these assets, and hence would provide an indication of how prices relate to costs.

Therefore, in this case, the IRR based on the DRC of assets, and cross-checked by ROCE and NPV, appears to be the only economically meaningful approach to profitability analysis. The evidence that TSRs are low does not appear relevant for assessing returns in competition policy in this case, and hence does not invalidate the conclusions based on the IRR. Instead, it confirms that, at flotation, the market valued the business at a much higher level than the replacement cost of its assets, including intangible assets.

3.3 Unreliability of the TSR as a measure of returns

In addition to the conceptual flaw of using market value rather than replacement costs as the basis for asset valuation in economic profitability analysis, practical limitations suggest that the TSR is not a robust measure of returns in this case either, for the following four reasons:

– sensitivity to the choice of the period;
– ability to reflect performance of UK pay-TV activities;
– the choice of benchmark; and
– survivorship bias.

3.3.1 Sensitivity to the choice of the period

TSR is not robust with respect to the measurement period. This sensitivity arises because TSR is based on the share prices at the start and end of the time period of interest and the dividends paid during this period. In the case of Sky, share price changes are main drivers of the TSR, as dividends have historically been relatively low.[45]

Figure 3.2 indicates how the TSR measure of profitability could lead to inappropriate conclusions about the existence of market power. Measured from flotation to March 6th 2000, abnormal shareholder returns were 647%, whereas from March 6th 2000 to June 30th 2009 abnormal returns were minus 70% (ie, a loss).[46] If TSR had been used to measure profitability for a competition investigation in early 2000, it would seem likely that the impact of market expectations on share prices—and hence on the reliability of TSR as an indicator of market power—would have been clearly recognised.

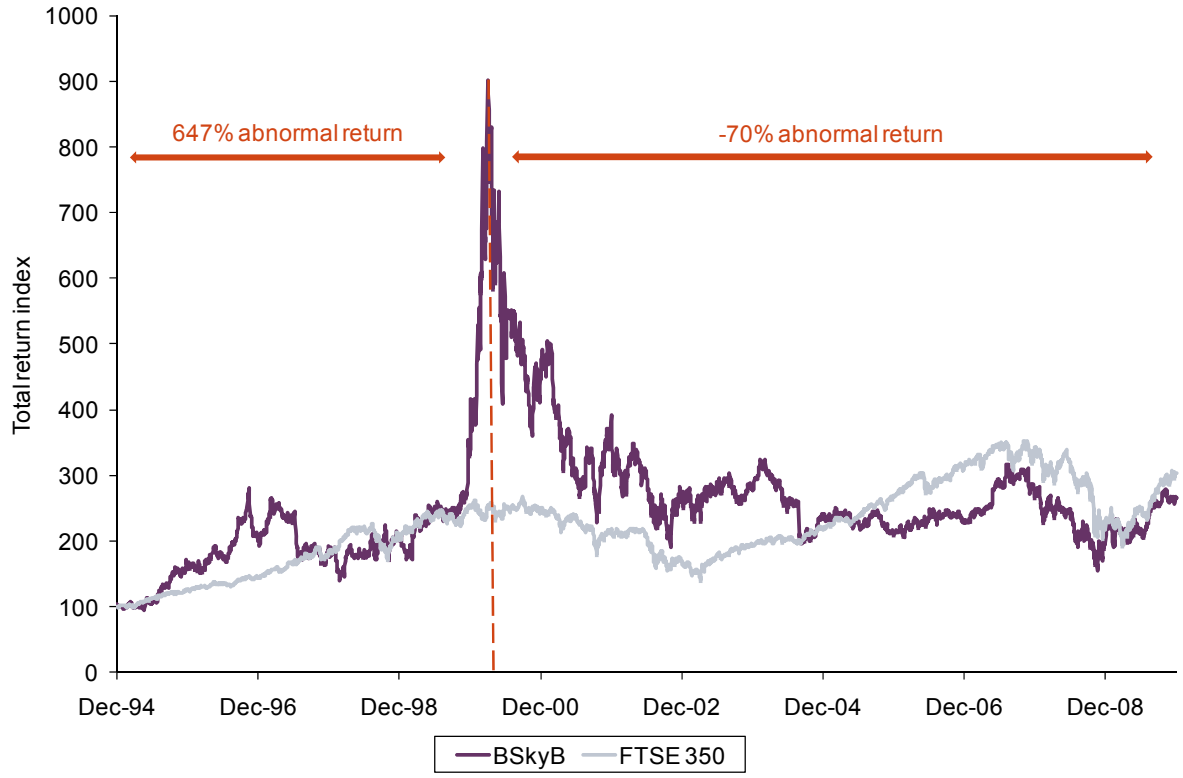
[43] Competition Commission (2002), 'The supply of banking services by clearing banks to small and medium-sized enterprises: A report on the supply of banking services by clearing banks to small and medium-sized enterprises within the UK', Volume 1 summary and conclusions, March.

[44] This is consistent with the value-to-the-owner principle, as defined by Edwards, Kay and Mayer (1987), op. cit. Application of this principle means that assets are valued at the lower of the replacement cost or the economic value. Economic value is the higher of the NPV of future cash flows or the net realisable value from selling the assets. Therefore, if the market value exceeds the replacement cost then it is appropriate to value assets at replacement cost.

[45] Over the period 1995–2009, the average dividend yield on Sky's shares was 1.2%; this compares with 3.2% for the FTSE 100 or FTSE All-share indices.

[46] Abnormal returns are measured as the difference between the TSR for Sky and the TSR for the FTSE 350.

Figure 3.2 BSkyB Group abnormal shareholder returns



Source: Datastream, and Oxera analysis.

Therefore, as TSR is mainly driven by market expectations of future cash flows at two points in time, the TSR measure is highly sensitive to changes in expectations (and the changes in expectations are quite volatile). In contrast, as the IRR takes into account the costs associated with the creation of assets, it is not affected by changes in expectations, and is therefore less sensitive to the choice of time period.

3.3.2 Ability to reflect performance of UK pay-TV activities

The TSR assesses the quoted entity's performance (ie, the performance of the Group); however, in this case, the analysis focuses on Sky's UK pay-TV activities. The IRR, based on detailed cash-flow analysis, is able to proxy the profitability of relevant activities separately—and with a certain degree of accuracy—from that of other activities undertaken by the Group. Therefore, conclusions on profitability drawn from the IRR to UK pay-TV operations would not necessarily be expected to be the same as those based on TSR for the Group.

In the case of Sky, it is possible that the difference in the scope of activities covered by the IRR and TSR measures is significant. Sensitivity to the scope of activities is illustrated with reference to two specific investments not included in the IRR analysis, but which would be expected to have had a negative effect on shareholder value: acquisitions of stakes in Kirch Pay TV and ITV.[47]

Table 3.5 shows Sky's TSR measured on a total returns index, where BSkyB's market value has been adjusted for changes in the fair value of these two investments during the measurement period. This adjustment suggests that Sky has outperformed in all time periods and against all benchmarks considered, once these two investments are excluded.

[47] On April 14th 2000, BSkyB Group acquired a 22% stake in Kirch Pay TV, a German media group, for £1,519.9m. On May 8th 2002, the carrying value of this investment was written down to zero in BSkyB's accounts. On November 17th 2006, BSkyB Group acquired a 17.9% stake in ITV plc, a UK television broadcaster, at a value of £946m. As at June 30th 2009, the fair value of this investment was written down to £235m in BSkyB's accounts.

Table 3.5 BSkyB Group's annual average total shareholder returns (%)

	1995–2009[1]		1998–2009		2005–2009	
	TSR (Group)	TSR (adjusted for unsuccessful investments unrelated to UK pay-TV activities)[2]	TSR (Group)	TSR (adjusted for unsuccessful investments unrelated to UK pay-TV activities)	TSR (Group)	TSR (adjusted for unsuccessful investments unrelated to UK pay-TV activities)
Sky	5.1	6.7	1.9	3.8%	–0.9%	1.3%
	TSR		TSR		TSR	
FTSE 100	5.2		0.3		–0.9	
FTSE 350	5.6		1.0		–0.4	
FTSE All-share	5.5		1.0		–0.5	
FTSE 350 Media	1.0		–2.8		–5.7	
FTSE 350 FL Telecoms	1.0		–6.4		–9.5	

Note: [1] Returns are measured from June 30th in the starting year to June 30th 2009 based on the total returns indices, inclusive of dividends. [2] The adjustment estimates TSR excluding the effects of investments in Kirch Pay TV and ITV.
Source: Datastream, annual reports and Oxera analysis.

Given how sensitive the TSR is to the scope of activities, it is reasonable to conclude that the IRR is a more robust measure of the performance of Sky's UK pay-TV activities.

3.3.3 The choice of benchmark

The interpretation of the TSR depends on the choice of benchmark. This, for example, has been highlighted in one of Sky's annual reports, which does not identify a single benchmark, but rather compares shareholder returns to the FTSE 100, FTSE 350 Media, and NYSE TMT indices:[48]

> This graph shows the growth in the value of a hypothetical £100 holding in the Company's ordinary shares over five years, relative to three indices *[ie, the FTSE 350 Media index, the NYSE TMT index and FTSE 100]*, which are considered to be the most relevant broad equity market indices for this purpose.[49]

More generally, options for the benchmark include the following.

– **The cost of equity**—this benchmark would entail measuring actual returns relative to the ex ante returns required by shareholders in BSkyB Group. As Professor Grout restricted consideration of benchmarks to the actual returns on various equity market indices, the analysis of TSR relative to the cost of equity is not considered further in this report.

– **A risk-adjusted returns index**—this benchmark would measure returns relative to the actual returns on an equity index with similar systematic risk to BSkyB Group. As the equity beta for BSkyB Group relative to the FTSE 350 (and FTSE 100) is close to 1, unadjusted returns for this index could be used a reasonable proxy. Given that Sky's beta relative to the FTSE 250 is different from 1, a direct comparison between BSkyB's TSR and returns for this index does not appear meaningful.

[48] Sky Annual Report 2009, p. 63.
[49] Ibid., p. 63; text in italics added.

– **The returns of comparator companies**—this benchmark would measure returns relative to the actual returns of companies in the same or similar sectors to BSkyB Group. In the case of BSkyB Group, relevant indices are the FTSE 350 Media and FTSE 350 Telecoms.

Table 3.5, which compared shareholder returns with the relevant risk-adjusted returns indices (the FTSE 100, FTSE 350, and FTSE All-share), shows that, on this basis, BSkyB Group has underperformed (if adjustments for unsuccessful investments are not introduced). However, relative to companies operating in the same or similar sectors (FTSE 350 Media and FTSE 350 Fixed-Line Telecoms), Sky has outperformed.

Overall, while the evidence on TSR suggests that the returns to shareholders in BSkyB Group have been lower than returns to shareholders in the FTSE 350 index, BSkyB Group's shareholders have received returns above those of shareholders in media and telecoms companies.

3.3.4 Survivorship bias

Another issue associated with benchmarking TSR is the potential for survivorship bias. Using a particular shareholder return index as the benchmark is likely to entail assessing profitability against a sample of companies that is changing over time. Of the 350 companies in the FTSE 350 index in 1996, only 128 were still in the FTSE 350 in 2009. Therefore, Professor Grout's analysis of TSR benchmarks BSkyB Group against a sample of surviving companies. The interpretation of TSR for BSkyB Group will depend on the extent to which the performance of surviving companies is different from that of the 350 companies in the FTSE 350 index in 1996.

3.4 Benchmarking accounting returns against peers

Shareholder returns are not the only alternative measure of profitability. In this context, it is also relevant to consider the evidence on accounting rates of return, an indicator which Professor Grout examines in his report. (This is further described in section 4 below.)

Table 3.6 considers the evidence on the profitability gap based on the difference between accounting ROCEs and the cost of capital.

Table 3.6 Difference between ROCE (book values of assets, total assets less current liabilities as capital employed) and WACC (nominal, pre-tax), 2004–08

		Sky (%)	Median for the index (%)	Average for the index (%)	Number of companies with profitability gap higher than Sky	Total number of companies in the index	Proportion of companies with profitability gap higher than Sky (%)
Overall market	FTSE 350	32.2	2.2	6.6	6	241	2.5
Media companies	FTSE 350 Media		3.7	4.1	0	11	0.0
Telecoms companies	FTSE 350 Telecoms		–5.3	2.6	0	5	0.0

Note: ROCE measured as EBIT divided by total assets less current liabilities, for all companies including Sky.
Source: Bloomberg, Sky, Datastream, and Oxera calculations.

The analysis shows that the difference between Sky's accounting ROCEs and cost of capital (accounting profitability gap) has been higher than for 95% companies in the FTSE 350.

Repeating this analysis for the period 1995–2008 indicates that this performance has been persistent over time, as only one company had an average accounting profitability gap larger than Sky over this period.

The analysis presented in Table 3.6 calculates the accounting profitability gap with ROCE based on the book value of assets. However, as Sky has intangible assets that are not captured in book values, the ROCE based on book values is likely to overstate economic profitability. Although such potential biases would be expected to be averaged out in a large sample at least to a degree, it is possible that Sky has a systematically higher proportion of intangible assets than comparator companies. Therefore, it is useful to do a similar benchmarking analysis based on the DRC of Sky's assets.

Table 3.7 repeats the analysis of the accounting gap, but this time benchmarking the ROCE for Sky measured relative to the DRC of assets. As this measure of ROCE is based on earnings less depreciation on a DRC basis—and hence is adjusted for the effects of inflation—it is appropriate to benchmark Sky's ROCE against the real WACC.

Table 3.7 Difference between ROCE (DRC for Sky, book values for comparators, total assets less current liabilities as capital employed) and WACC (pre-tax real for Sky, pre-tax nominal for comparators), 2004–08

		Sky (%)	Median for the index (%)	Average for the index (%)	Number of companies with profitability gap higher than Sky	Total number of companies in the index	Proportion of companies with profitability gap higher than Sky (%)
Overall market	FTSE 350		2.2	6.5	50	241	20.7
Media companies	FTSE 350 Media	[✂]	3.7	2.2	1	11	9.0
Telecoms companies	FTSE 350 Telecoms		–5.3	–1.5	0	5	0.0

Note: ROCE measured as EBIT divided by total assets less current liabilities, for all companies excluding Sky. For Sky, ROCEs are measured with total assets valued on a DRC basis, less investments in joint ventures, and the accounting gap is measured relative to the real WACC.
Source: Bloomberg, Sky, Datastream, and Oxera calculations.

Under this scenario, which attributes a large intangible asset value to Sky and no intangible asset values to all other FTSE 350 companies, the accounting profitability gap for Sky is still significantly higher than for a large proportion of the sample. Relative to the constituents of the FTSE 350, Sky is still in the top quintile, whereas relative to FTSE 350 Media and Telecoms companies, Sky is in the top decile. Of the 50 companies in the FTSE 350 identified as having a profitability gap higher than Sky in 2004–08, only 22 still have a higher profitability gap over the longer time period (1995–2008).

Overall, the accounting profitability gap for Sky is at, or near, the top of the distribution when benchmarked against a large sample of companies. This result is robust to alternative approaches to asset valuation, and is persistent over a long time horizon.

Benchmarking of the accounting profitability gap against a broad sample of comparators also addresses the two concerns expressed in Sky's response to Ofcom's third consultation and the accompanying reports by PwC about the benchmarking analysis presented in Oxera's first report:

– the choice of comparators;
– the use of accounting data to measure returns.[50]

In response to the first concern, it is relevant to consider the approaches undertaken by competition authorities, and in particular the CC, when using benchmarking analysis to assess the competitive level of returns.

[50] Sky (2009), op. cit., paras 4.81–4.83.

In general, the CC seems to have set the threshold for a company to qualify as an appropriate benchmark at a lower level than the threshold requested in the PwC benchmarking report.[51] For example, in its investigation into classified directory advertising services, the CC's benchmarking analysis involved comparison of Yell's returns against a large sample of more than 4,000 publicly listed companies, and against smaller sub-sets of companies derived on the basis of similarity in terms of selected quantitative risk metrics (eg, cost structure, revenue volatility, beta) as well as by excluding outlier companies (eg, companies with return on sales (ROS) higher than 100% or negative asset values).[52] This approach is similar to that adopted in Oxera's first report.

The criticisms in the PwC report therefore appear to apply to the benchmarking approaches undertaken by the CC in past investigations, as well as the approach implemented by Oxera. As such, PwC's position appears to challenge the value of benchmarking in general as much as the particular approach adopted by Oxera.

The second concern, regarding the use of accounting data to measure returns, has been addressed by the analysis presented in this section, which benchmarks the accounting profitability gap. Consideration of the gap for Sky with ROCE measured on both a DRC and a book-value basis suggests that the profitability gap for Sky has been near the top end of the distribution for FTSE 350 companies.

Overall, the evidence from benchmarking analysis of the accounting profitability gap is consistent with the profitability gap based on the IRR and contradicts the results based on the TSR.

3.5 Accounting returns in competition investigations

Professor Grout's paper on profitability presents evidence on accounting ROCEs of companies investigated by the CC from 1970 up to 2000. This evidence is used to suggest that the ROCEs presented in Oxera's report do not meet the threshold for intervention as determined by CC precedent, and that there is no relationship between the level of the accounting ROCE and whether the CC found a distortion to the competitive process.

This evidence is not robust. First, Professor Grout has not distinguished between those cases where the CC did and did not place significant weight on ROCE estimates. A high ROCE based on historical cost asset values is not the only indicator that a company may be operating against the public interest. Therefore a strong relationship between the level of ROCE and the conclusions of the CC with respect to profitability would not be expected.

Second, accounting ROCEs are influenced by a range of factors unrelated to the underlying level of economic returns—most importantly, accounting standards and the level of systematic risk. Professor Grout does not seem to have made an attempt to control for these factors.

Third, Professor Grout does not consider whether the approach to estimating the ROCE in the CC analysis is consistent with the ROCEs calculated for Sky and presented in Oxera's first report. As there are a number of different ways to define capital employed, in order to maintain consistency with the overall conservative nature of the report, the ROCE reported in Oxera's first report measures returns relative to total assets.[53] However, an alternative definition of capital employed is total assets net of current liabilities. As current liabilities represent a substantial share of total liabilities on Sky's balance sheet, Sky's ROCE would be

[51] PwC (2009), 'Evaluation of the selection of comparators used in Annex 9 of Ofcom's pay TV phase three document: A report for British Sky Broadcasting Limited', Final Report, September 18th.

[52] Competition Commission (2006), 'Classified Directory Advertising Services market investigation', Appendix 7.1: Assessment of Yell's and Thomson's profitability, December 21st.

[53] As the ROCE was measured for Sky's pay-TV activities, the definition of capital employed also excluded investments in joint ventures.

45% over the period 2004–08 if current liabilities were removed from the definition of capital employed. However, Professor Grout quotes Oxera's estimates where currently liabilities were not excluded (29% ROCE for the period 2004–08; 26% for the longer period 1995–2008). Therefore, it is not possible to have any confidence in this analysis.

Due to the fundamental problems with this analysis, the evidence on ROCEs from market investigations reported by Professor Grout could be seen as misleading.

4 Robustness of the estimates of the IRR

In his report, Professor Grout commented that asset valuation may be challenging in this case—due to the nature of the pay-TV industry—and that the IRR may not be an appropriate measure of returns due to re-investment rate assumptions implied in the calculations of the IRR.[54] Professor Grout then argued that Oxera's estimates of Sky's returns may be biased and unreliable and that it may be more appropriate to consider alternative measures of profitability.

> First, it is extremely hard to provide a clear asset value for the problem at hand and hence very hard to capture an accurate rate of return. The truncated IRR approach is likely to be better than the ROCE but large difficulties remain. For this reason it is attractive to look at stock market information and see what insight this can give.
>
> Second, it is desirable to move away from the simple uninformative benchmark of 'returns greater than the cost of capital' to some indication of what might be deemed more appropriate.[55]

The analysis of stock market information presented by Professor Grout, and why it is largely irrelevant to the analysis of economic profitability analysis in the context of competition policy, was addressed in section 3. In particular, it emphasised why the use of stock market information, as advocated by Professor Grout, is inappropriate from the conceptual perspective (and hence has not been traditionally relied upon by UK competition authorities) and does not provide a robust estimate of the rates of return from Sky's pay-TV activities.

This section responds to Professor Grout's comments on the robustness of the approach adopted by Oxera for measuring returns, and demonstrates that the approach is conceptually appropriate in this context (as well as based on the relevant CC precedent). The section then shows that there is no evidence to expect that Oxera's estimates of Sky's profitability may be biased or not sufficiently robust due to any potential concerns with asset valuation or choice of the measure.

The estimates of rates of return above the cost of capital and low TSR for BSkyB as a whole are not inconsistent because the TSR, which is based on stock market data, provides a downward biased measure of returns when markets expect the company to be highly profitable. For this reason UK competition authorities have not relied on stock market information and have instead sought to obtain relevant insights into the nature of the competitive process from operating profitability.

4.1 Valuation of assets

4.1.1 Professor Grout's comments on Oxera's valuation of Sky's assets

Professor Grout seems to argue that Oxera's estimates of Sky's returns are biased due to issues with asset valuation. Specifically, he states:

> it should not be surprising to find that the equilibrium required rate of return on physical and financial assets will be persistently above the CAPM derived cost of capital.[56]

[54] Professor Grout also presented evidence on other indicators of profitability. Practical and conceptual challenges with relying on this evidence are considered in section 5 of this report.
[55] Grout (2009), op. cit., p. 2.
[56] Grout (2009), op. cit., p. 2.

According to Professor Grout, such biases may arise because Oxera's analysis underestimates the asset value by omitting certain types of asset. The examples of such omitted assets provided by Professor Grout are skills, knowledge and experience acquired by Sky over time.

> As time goes on the company learns how to do things more cheaply and this investment through learning by doing will need reward in the future to justify the effort. Income forgone while learning cheaper, cleverer or more effective ways to do something deserves a reward as does any other investment. There are many types of experiences, activities and rewards for risks taken that create the successful current architecture of the company, all of which are relevant in this context. [57]

Oxera's first report estimated the DRC value of Sky's assets (as a proxy for MEA, modern equivalent asset) using Sky's statutory accounts as a starting point, to which the estimated value of intangible assets was added. According to the value-to-the-owner principle,[58] Sky's intangible assets were valued as capitalised costs.

Given this valuation approach, Professor Grout's comments could be interpreted in two ways. One interpretation may be that Professor Grout is arguing that Oxera's analysis omitted certain specific costs that should have been capitalised. Alternatively, he may be arguing that there are assets that were acquired by Sky without incurring upfront cash costs and that they should be included in the asset value when estimating economic profitability.

This section considers both of these interpretations and shows that there is no evidence that any costs were omitted from the analysis or that a significant part of the profitability gap could be explained by assets that were acquired by Sky without incurring costs.

4.1.2 Cost-oriented valuation of Sky's assets

In the first profitability report, Oxera estimated the DRC value of Sky's assets using the cost-oriented valuation approach in line with the value-to-the-owner principle.[59] As detailed in section 3 of Oxera's first report,[60] this involved identification of the relevant assets (including intangible assets) and capitalisation of costs that were invested to create these assets.

To ensure robustness, Oxera's first report explored a number of scenarios relating to identification of the relevant subscriber acquisition costs that should be capitalised and capitalisation methods. Specifically, two scenarios were used:[61]

- under the **conservative scenario**, subscriber acquisition costs (SAC) were defined as the total marketing and subscriber management costs recorded in the statutory accounts divided by the number of gross subscriber additions in a given year. This provides an upper end of the range because not all such costs would meet the criteria for capitalisation;

- under the **base-case scenario**, the selection of the relevant costs to capitalise followed the three criteria for recognising intangible assets used by the CC:

  - the assets created must be identifiable;
  - the costs must be incurred now for earnings that are to be delivered later;
  - the costs must be additional to the baseline costs of running the business.[62]

[57] Ibid., p. 2.

[58] Edwards, Kay and Mayer (1987), op. cit.

[59] See Oxera (2003), op. cit., pp. 43–46, paras 4.12–4.22.

[60] Oxera (2009), op. cit., sections 2 and 3.

[61] Ibid., section 3.4.

[62] Competition Commission (2002), 'The Supply of Banking Services by Clearing Banks to Small and Medium-sized Enterprises: A Report on the Supply of Banking Services to Small and Medium-sized Enterprises within the UK', March 14th.

Therefore, under this scenario, two changes were made to total marketing and subscriber acquisition costs: costs that do not create an intangible asset were excluded and investment was separated from maintenance costs, based on statutory accounts and management accounting data provided by Sky. The costs not considered as part of SAC include: subscriber management costs, marketing costs that do not create investments in intangible assets, and marketing acquisition costs that are not related to pay-TV.

One potential interpretation of Professor Grout's comments is that Oxera's analysis omitted certain specific cost lines that should have been capitalised and, in doing so, underestimated the opening asset value.

In order for costs to be capitalised, they need to involve an upfront commitment of capital, which over a relatively long term would be at risk of not being recovered. There is no evidence that the estimates of the IRR could be significantly biased due to omitting certain cost lines from the analysis.

– First, a detailed analysis was conducted for the first report to identify relevant costs; several scenarios for capitalising costs were then considered. Professor Grout does not provide any evidence suggesting that this analysis may have omitted any costs (eg, by identifying specific cost lines that should be included in the asset value).

– Second, it is unclear whether inclusion of additional costs would necessarily lower the IRR estimates. This is because increases in the opening asset value driven by capitalisation of additional costs may be offset by increases in the closing asset value and cash flows. The net effect on the IRR would depend on factors such as the useful economic life of the asset being capitalised.

– Third, additional sensitivity analysis demonstrates that the estimates of returns are robust to a number of alternative estimates of Sky's SAC.

To further support the estimates of returns, a number of additional sensitivities are considered below. Sky's largest intangible asset is its subscriber base. The analysis below shows that the value of Sky's subscriber base is robust to alternative SAC definitions. Four alternative scenarios for the SAC are considered.

– **Sensitivity I: SAC based on statutory accounts**. This uses the SAC as calculated by Sky and reported in its statutory accounts. The SAC figures calculated by Sky are available from 1999. Given that the focus of the analysis is profitability in the recent period (2005–09), the results of the sensitivity are presented for the period from 2005 to 2009 only.

– **Sensitivity II: exclusion of upgrade costs**. In this scenario, the costs associated with customer upgrades are excluded from the Oxera estimate of SAC, as they could be argued to represent maintenance costs as opposed to investments. For this analysis, Oxera used data on upgrade costs provided by Sky, available from 2006.[63] Given that the focus of the analysis is profitability in the recent period (2005–09), the results of the sensitivity are presented for the period from 2005 to 2009 only.

– **Sensitivity III: alternative allocation of marketing costs between customer acquisition and maintenance**. In this scenario it is assumed that the subscriber maintenance costs are increasing over time as a share of marketing costs. Therefore,

[63] As mentioned by Sky, the detailed management account that provided a thorough breakdown of marketing costs is available from 2006 only.

the SAC in 1995 are based on 100% of marketing in the year, while in 2009 only 62% of marketing was modelled to represent SAC.[64]

– **Sensitivity IV: alternative treatment of costs associated with the transition to digital**. This scenario tests the impact of including the additional costs associated with transferring subscribers from analogue to digital—ie, the costs associated with replacement of analogue set-top boxes with digital set-top boxes. The analysis involves inclusion of the full amount of marketing costs stated for 1999 and 2000. If the costs associated with transition to digital were included, the SAC in 1999 would increase to £1,420.

Table 4.1 Sensitivity of the IRR to alternative estimation of the SAC, 2005–09 (%)

	Base case	Sensitivity I	Sensitivity II	Sensitivity III	Sensitivity IV
IRR (DRC: year of investment)	[✂]	[✂]	[✂]	[✂]	[✂]
IRR (DRC: annual revaluation)	[✂]	[✂]	[✂]	[✂]	[✂]
IRR (DRC opening, MV closing)	[✂]	[✂]	[✂]	[✂]	[✂]

Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

Table 4.1 shows that the estimates of profitability are robust to alternative scenarios for the SAC.

4.1.3 Assets acquired without incurring costs

Professor Grout's comments could also be interpreted as suggesting that the asset value in the profitability analysis should include assets that were acquired by Sky over time without incurring costs. Professor Grout refers to these as 'hidden assets'.

There seems to be no robust evidence that hidden assets explain a significant part of the profitability gap, for two reasons:

– from the conceptual perspective, it would be reasonable to expect that the benefits of hidden assets would be passed through to consumers in competitive markets over a sufficiently long period of time. Hence, when evaluating returns in competition policy analysis, in general, it would not be appropriate to include them in the asset value since this would be equivalent to assuming that shareholders are entitled to earning a return on something they have not spent capital to acquire.

– the sensitivity analysis demonstrates that a hypothetical hidden asset (including any potential benefits of high efficiency) would need to be implausibly large in order to remove the profitability gap.

The sensitivity analysis (as set out in Table 4.2 below) considers two types of hypothetical hidden assets:

– costs incurred by Sky that were not capitalised in the opening asset value in 1992 (the first year of the asset valuation model). The sensitivity considers how large the increase in the opening asset value would need to be to remove the excess returns modelled since 1992;

– investments made by Sky over time in acquiring skills and experience that may not have been capitalised in Oxera's analysis. The sensitivity considers how large the increase in the opening and closing asset value would need to be to remove excess returns over

[64] The methodology for allocating marketing costs between customer acquisition and maintenance was discussed in Oxera (2009), op. cit. section 3.4.1.

the last five years. This sensitivity would capture any benefits that may be related to Sky's efficiency.

Table 4.2 Sensitivity of the IRR to a hypothetical hidden asset

	Sensitivity to the opening asset value, IRR (1992–2009)		Sensitivity to the opening and closing asset value, IRR (2005–09)	
	Asset value in 1992 (£m)	Increase in asset value required to remove the profitability gap (£m)	Asset value in 2005 (£m)	Increase in asset value required to remove the profitability gap (£m)
IRR (DRC: year of investment)	[✂]	[✂]	[✂]	[✂]
IRR (DRC: annual revaluation)	[✂]	[✂]	[✂]	[✂]
IRR (DRC opening, MV closing)	[✂]	[✂]	[✂]	[✂]

Source: Datastream, Bloomberg, Sky, Ofcom, Oxera calculations.

Table 4.2 shows that the opening asset value would need to increase by around £[✂]m–£[✂]m or more than triple (when the DRC asset value is used) in order to remove the profitability gap. This is equivalent to increasing the SAC in 1992 (the first year of the asset valuation model) from £[✂] per subscriber to £[✂]. Such a high SAC in 1992 is not supported by Sky's marketing costs at the time.[65]

Similarly, the value of potential skills and experiences acquired by Sky over time would need to be significant: the opening and closing asset value would need to increase by £[✂]m–£[✂]m (or more than 50%) in order for returns over the last five years to be in line with the cost of capital.[66]

Overall, for the above conceptual and empirical reasons, there seems to be no robust evidence that hypothetical hidden assets could explain the profitability gap.

4.2 Calculation of the IRR

Sky and Professor Grout seem to suggest that the IRR is not an appropriate measure of returns in competition policy analysis because it does not measure the extent to which the estimated return exceeds the cost of capital.

> IRR is not 'designed for' or well-suited to assessing the question of whether returns persistently and significantly exceed the cost of capital[67]

This section demonstrates that the IRR does not introduce biases in the analysis of returns for conceptual or practical reasons.

Professor Grout's argument is based on a technical feature of the IRR that, for a given investment project with a non-zero NPV, it is theoretically possible to change the profile of cash flows such that the same NPV is retained but the IRR is changed.

> A major problem with using the IRR to provide a precise number to the extent that a company's profitability is above the cost of capital is that two alternative ways of

[65] Past losses were also considered in Oxera's first report.

[66] Intangible assets such as brand, customer relations and corporate reputation are already accounted for in the asset base by capitalising the relevant marketing costs. See Oxera (2009), op. cit., p. 10.

[67] Sky (2009), op. cit., p. 59, para 4.45.

undertaking a project that give identical value to shareholders and have identical present value cost to customers can have very different IRRs.[68]

This technical feature is driven by particular re-investment and borrowing rate assumptions in the IRR.

From the conceptual perspective this technical feature of the IRR does not invalidate the profitability analysis. This is because, as the company would be expected to have already chosen the value-maximising cash-flow profile, the company would not be expected to be able to change the profile of cash flows and retain the same NPV. Therefore, for any given value of the project, there would be one set of cash flows and one IRR, which together reflect the true economic profitability of the project.

Professor Grout provides an example where he suggests that if Sky changes its pricing strategy to charge less upfront for installation of the set top box and more for annual subscription, the per-customer NPV would remain the same but the IRR would decrease. While mathematically this is correct, in practice Sky may not be able to change the pricing policy and retain the same NPV because the new pricing policy may lower the demand (and thereby reduce the cash flows) as well as increase the payback period and hence risks (and thereby increase the discount rate).

Therefore, for any given project, there is likely to be one cash-flow profile corresponding to a given NPV and one IRR reflecting the economic profitability of the project.

From the practical perspective, Professor Grout suggests that this feature of the IRR means that it cannot robustly measure whether the estimated returns exceed the cost of capital *significantly* and *persistently*.

Even assuming that the NPV could be preserved under an alternative cash-flow profile, the *significance* of the observed profitability gap is evident from the consistency of the IRRs with the modified IRR (where a specific assumption about the reinvestment and borrowing rate can be made) as well as with the ROCEs.

Table 4.3 Cross-checking the IRR: modified IRR and ROCE, 2005–09 (%)

	Base case	MIRR	ROCE
DRC: year of investment	[✂]	[✂]	[✂]
DRC: annual revaluation	[✂]	[✂]	[✂]

Note: MIRR refers to the modified IRR. The difference between the MIRR and IRR is the assumed rate of return on re-invested cash flows. Under the IRR approach, all generated cash flows are assumed to be re-invested at a rate equal to the IRR of the project. Under the MIRR, the cash flows are assumed to be re-invested a different rate. In this table, it is assumed that cash flows are re-invested at a rate of 15%.
Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

The *persistency* of the profitability gap could be demonstrated using the NPV cross-check. Figure 4.1 shows the ratio of the NPV of Sky's realised cash flows (including the market value in 2009 as the closing value) to the estimated replacement costs of Sky's assets.

Figure 4.1 Persistency of the profitability gap: ratio of the NPV of cash flows to Sky's estimated replacement costs

[✂]

Source: Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

[68] Grout (2009), op. cit., p. 2.

As seen from Figure 4.1, the stability of the observed market value premium suggests that the observed profitability gap was stable over time. Given that the NPV is used in the numerator of the ratio, any potential biases that, according to Professor Grout, may affect the IRR, would not be present in this case. Overall, there is no evidence to suggest that IRR would provide a biased estimate of returns in the context of the economic profitability analysis in general or in this case.

5 Can Sky's pay-TV profitability gap be explained by Sky's successful innovation and risk-taking?

In response to Ofcom's third consultation, Sky suggested that the main factor that explains the profitability gap is its continual successful risk-taking and innovation. This section starts by reviewing the conceptual aspects of analysing profitability in the context of markets where innovation is a significant driver of returns. It then considers evidence on the extent to which such aspects are relevant to Sky. It shows that there is no conclusive evidence to support the proposition that Sky has the characteristics that would be expected to be observed in the case of companies whose returns are driven by successive innovations and successful risk-taking.

5.1 Interpretation of profitability in innovative industries

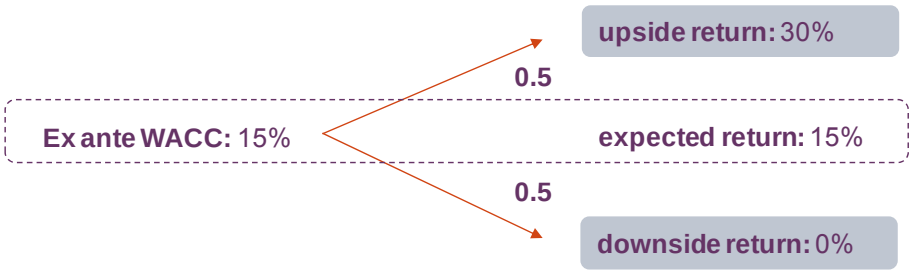
Innovation could lead to high returns (ie, returns significantly above the cost of capital) because successful investments in innovation may generate high returns as compensation for downside risks taken at the time of the investment.

Figure 5.1 illustrates the mechanism through which such successful risk-taking may lead to high returns. It shows a stylised example of a risky investment with the following characteristics:

– in the successful (upside) scenario, the company earns a high return (30%);
– in the unsuccessful (downside) scenario, it earns a low return (0%);
– the expected return (ie, the average of different scenarios) is 15%;
– the expected return is assumed to be in line with the ex ante cost of capital (15%).

If the upside scenario occurred, the ex post profitability analysis of this stylised example would show a significant profitability gap: 15% = 30% (ex post return) – 15% (ex ante WACC). Given that expected returns were in line with the cost of capital, high actual returns in this example provide compensation for bearing risks at the time of the investment.

Figure 5.1 Stylised illustration of a risky investment project



Source: Oxera.

Sky seems to suggest that its returns are driven by investments in such risky projects, which turn out to be successful and therefore provide compensation for risks taken at the time of the investment.

> The reason that successful firms will be observed to earn excess returns is straightforward. Firms' profits are the result of a series of investments over time. Standard investment theory indicates that firms should invest where they identify 'NPV positive' projects – investment opportunities where returns exceed their cost of capital (and, where they have multiple such opportunities but finite resources, firms should

> invest in projects with the highest expected NPV). Furthermore, it is well-known that firms tend to set hurdle rates for investment well above their cost of capital (either explicitly, or implicitly when evaluating investment decisions) to provide a 'margin of error' – i.e. to reflect the risk of project failure, or uncertainty about potential returns.[69]
>
> Accordingly, given that firms' profits are the result of such investments, firms that are faced with a series of NPV-positive projects over time, and execute them successfully (which tends to be the case for firms that remain in the market and so are available for analysis), will be observed to earn returns above their cost of capital.[70]

In order to interpret the results of profitability analysis accurately, it is necessary to identify the differentiating features of two types of company:

– one where the investments turn out to be highly profitable, but where, ex ante, the company was expected to have 'normal' returns. For such companies, high returns could be expected to be generated by successful risk-taking;

– one where investments had high actual returns and these high returns had been expected ex ante. For such companies, successful risk-taking would not be sufficient to explain the profitability gap.

It is possible to identify three key features of businesses where high returns may be expected to be generated by successful risk-taking:

– **nature of investments**: such businesses commit significant amounts of capital upfront against the prospect of uncertain future demand;

– **persistency of high returns**: returns are not persistently high and are expected to converge to the cost of capital in the long term;

– **expected returns**: returns, which are significantly above the cost of capital, are not expected at the onset of the investment, but could be observed ex post due to successful risk-taking.

The first feature is that companies in such markets tend to undertake investments which require a significant upfront commitment of capital for a relatively long time period against the prospect of highly uncertain future demand.

In the event that such investments prove successful and the realised demand is high, ex post returns could significantly exceed the cost of capital. However, if the investment fails, the capital committed upfront could be lost with no returns, or even significant losses. If, however, investments are scalable to changes in demand or demand uncertainty is low, a significant difference between actual returns and the cost of capital would not be expected, even if demand turns out to be high.

These features of investments in innovation have been recognised in the academic literature and by the competition authorities. For example, according to Geroski (1994), investments in innovation are characterised by significant upfront costs, uncertain future revenues and relatively long payback periods:

> many of the costs of producing an innovation are known and incurred upfront, while revenues are generated in the future, often in unexpected ways.
>
> More generally, users of new products and processes often are slow to perceive, and then to learn how to use an innovation, and this also means that the net benefits of a

[69] Sky (2009), op. cit., para 4.50.
[70] Ibid., para 4.51.

> new innovation may accrue for very long periods of time, and in ways impossible to imagine ex ante.[71]

Sky also seems to suggest that one reason why its actual returns are high is because it successfully undertakes large-scale risky investments.

> Sky has a strong and consistent track record of being an innovator, and in particular a first mover – identifying opportunities, undertaking large-scale, risky investments to take advantage of such opportunities, and executing well.[72]

The second feature of businesses whose high returns may be generated by successful risk-taking is that their returns are not expected to be persistently high.

If there is competition at the onset of the investment (which is a feature of a well-functioning market), high returns would not be expected to persist in the long term because the successful innovator would be expected to change over time and different companies would be expected to profitably bring their products to the market. Accordingly, returns persistently in excess of the cost of capital would suggest a deviation from a well-functioning market since it would indicate there may be limited competition at the onset of the investment. For example, CC chairman, Peter Freeman, confirmed in 2004 that persistency of high returns is an appropriate indicator of market power in innovative markets.

> We accept that … high profits may be attributable to superior entrepreneurial activity, successful innovation, and more efficient techniques of production and organisation … That is not to say that … high returns necessarily indicate a high level of efficiency or that adequate conditions for competition can always be expected … Each case requires an assessment of the economic circumstances …
>
> In high-tech markets (especially where there are network effects), the situation is potentially much more difficult, not least because the very high ex ante risks of failure arguably mean that the ex post returns to 'winning' firms and technologies should similarly be high. This may in some instances limit the usefulness of using profitability measures in such markets, at least in a short term or static sense. This does not mean that competition authorities should abandon any attempt to look at profitability performance, especially where high profits might be expected to persist over the longer term, but it does mean that facile assumptions should be avoided.[73]

The third feature of companies whose high returns could be generated by successful risk-taking is that their expected returns are in line with a competitive benchmark.

In a well-functioning market, companies do not, ex ante, expect to earn high returns, but may actually earn high returns. As illustrated in Figure 5.1, successful risk-taking would be reflected in actual performance in excess of expectations rather than in an expectation of high returns at the onset. For example, in 2001, John Vickers, at the time chairman of the OFT, confirmed that it is appropriate to consider the evidence on expected returns as an indicator of market power in innovative industries:

> One of the things that competition does is to compete away large expected profits. In some circumstances, therefore, manifest evidence of large profits well in excess of the cost of capital may suggest, albeit tentatively, that competition is perhaps less than fully effective. At least it should raise the question of why the excess profits are apparently not being competed away.

[71] Geroski, P.A. (1994), *Market Structure, Corporate Performance, and Innovation Activity*, Oxford: Oxford University Press.

[72] Sky (2009), op. cit., para 4.63.

[73] UK Competition Commission (2004), 'The Enterprise Act and Innovation', speech by Peter Freeman (then Deputy Chairman), CBI Competition Conference, March 5th.

> In innovative industries, however, expected profits and actual profits can of course be vastly different. (The same is true of buying lottery tickets, and the reasons are not unrelated.)
>
> Innovation is an uncertain business, and if the profits from successful innovation did not exceed the costs, no-one would do it. Ex post 'excess' profits (for the winners) are therefore the norm in innovative industries, and are not in fact excessive if there was effective competition to innovate initially.[74]

Similarly, in academic literature, the importance of expected returns as an indicator of market power was confirmed, for example, by Encaoua and Hollander (2002):

> in markets driven by innovation, high ex post returns on investment do not reveal anything about market power. Indeed, if such returns were unachievable, no one would take part in the race. The relevant criterion is expected return.[75]

Sky also seems to agree that successful risk-taking could be one of the reasons for high actual returns only if it can be observed that returns turn out to be higher than expected returns. For example, in relation to the investment in digital television, Sky acknowledges the relevance of expectations in interpreting the evidence on actual returns. [76]

> For example, in 2001 Zenith Media forecast that Sky's subscriber base would reach 7.7 million by 2010. Similarly, Informa forecast in early 2002 that Sky's subscriber base would reach 7.8 million homes by 2010. Accordingly, Sky has added almost twice as many subscribers in the last 8 or 9 years than was anticipated.

Retail subscriber growth provides only a partial view of Sky's performance. It is more appropriate to consider total cash flows to capture all sources of profitability (including other sources of revenues, as well as, importantly, costs). Section 5.4 contains a comprehensive review of the evidence on Sky's performance relative to expectations.

The rest of this section discusses the evidence to test whether these features are observed in the case of Sky and hence whether its high returns could be expected to be driven by successful risk-taking.

5.2 Economic characteristics of Sky's investments

This section reviews the evidence on whether Sky's investments have the characteristics that would be expected if high returns were being generated by successful risk-taking. The section reviews evidence on the scalability of investments and demand risk.

5.2.1 Scalability of investments (payback period)

The more flexibility a company has over when and how much to invest, the shorter the time period over which its capital is at risk and the lower the potential impact of a demand shock. This is because changes in demand would not be expected to lead to stranding of capital, since the company would be able to scale its investment programme accordingly. Therefore, significant and prolonged differences between ex post returns and the cost of capital would not be expected for companies with scalable investments.

This means that evidence of Sky's investments not being scalable (ie, that the payback periods are long) would be consistent with one of the characteristics of markets where high returns could be generated by successful risk-taking.

[74] OFT (2001), 'Competition Policy and Innovation', speech by John Vickers (then Director General of Fair Trading), International Competition Policy Conference, Oxford, June 27th.
[75] Encaoua, D. and Hollander, A. (2002), 'Competition Policy and Innovation', *Oxford Review of Economic Policy*, **18**:1, 63–79.
[76] Sky (2009), op. cit., para 4.63.

Measures of asset intensity could be used to assess the scalability of Sky's investments. Table 5.1 benchmarks Sky's asset intensity, defined as total assets divided by total operating costs. In general, the less scalable are investments to changes in demand, the higher the ratio of assets to costs.

The evidence shows that Sky's asset intensity is lower than the average (median) for all benchmark samples. For example, Sky has lower asset intensity than 61% of the companies in the FTSE 350 index based on Oxera's estimates of the DRC values of assets. Sky also has lower asset intensity than 85% of companies in the FTSE 350 Media index. This suggests that Sky has a low amount of capital invested relative to the size of operating cash flows and that the payback period on investments is likely to be relatively short.

Table 5.1 Asset intensity (% of companies with asset intensity higher than Sky)

	Overall market	Media companies	Pharma and Biotech	TV and non-TV comparators
	FTSE 350	FTSE 350 Media	FTSE 350 Pharma & Biotech	Selected comparators
Number of companies	339	13	8	53
Book values for Sky	76%	100%	88%	89%
DRC values for Sky	61%	85%	88%	68%

Note: Asset intensity is defined as total assets divided by total operating costs based on data available for 2008. Total operating costs includes the cost of goods sold, depreciation, amortisation, selling, general and administrative, and other operating costs.
Source: Datastream and Oxera analysis.

This evidence is consistent with the market perception of the riskiness of Sky's investments, as reflected in reports by equity analysts. A significant number of reports indicate that the payback period on Sky's investments is relatively short. For example, UBS estimated that the payback period of a subscriber on a basic package was 25 months compared with 18 months for subscribers on average across all basic and premium packages.[77] UBS's analysis of returns of basic and average customers over estimated subscriber lifetimes is shown in Table 5.2, which indicates that the payback period could be seen as short and the IRR as high (it also shows that the payback period for premium subscribers is shorter and the IRR is higher than for basis subscribers).

Table 5.2 Illustrative equity analysts' estimates of subscriber payback periods (2005)

	Basic	Average
ARPU (£)	250	380
SAC (£)	240	250
IRR (%)	**92%**	**224%**
Payback (months)	**25**	**18**
NPV (£)	**595**	**996**

Source: UBS (2005), op. cit., p. 29.

The following description from Robertson Stephens, an investment bank, suggests a pattern where investment in subscribers is largely proportional to demand and the fixed capital commitment is low relative to the total value of invested capital:

[77] UBS (2005), 'Investment research – BSkyB: Focus on the consumer', August 17th, p. 29.

> Satellite is wireless, which means it automatically 'passes' nearly every home without requiring incremental capital spending. In addition, satellite is very good for digital media, with the only required network upgrade taking place at the satellite transponder and customer premise locations (leaving out the need to upgrade an in-the-ground cable network. [78]

Furthermore:

> In order to offer interactive services, Pay- TV companies must spend a lot of money on:
>
> - Digital set-top boxes: £100-200 each
> - Customer service house calls: £75-100 each, often with 2-3 calls per installation
> - Cable operators must also upgrade their network to two-way HFC digital cable, £500-1,000 per subscriber.
>
> We believe it is important to note several factors with regard to Sky's capital costs. With regard to digital set-top boxes, Sky expenses these costs while cable operators capitalize set-top boxes resulting in lower short-term EBITDA levels for Sky. With regard to upgrading their network for digital capability, Sky's platform is already completely digital and essentially passes every home since it is a satellite network. However, we believe Sky must still find a solution for a broadband return path which will require future investment.[79]

In relation to investments in content, ABN AMRO estimated that revenues attributable to Premier League rights for 2008 would equal £1,211m, while the respective direct annual costs were estimated to be £341m.[80]

One of the longest contractual commitments that Sky has with a content provider is the contract with FAPL, which is currently for a period of three years. The nature of its contractual obligations is such that Sky can avoid liabilities for obligations beyond one year in the future. For example, in the event of low demand for certain TV programmes, Sky could decide to breach the contract with FAPL.

This suggests that Sky is not locked into long-term contractual commitments for football rights. Contractual arrangements with film studios also appear to be largely proportional to demand.

> Under our pay television agreements with the US major movie studios, we generally pay a US dollar-denominated licence fee per movie calculated on a per movie customer basis, some of which are subject to minimum guarantees, which were exceeded some time ago.[81]

The nature of Sky's investments in subscriber acquisition also suggests that the amount of Sky's investment is largely variable according to the level of demand, and hence has relatively low exposure to the risk that actual subscriber numbers are lower than forecast.

> Marketing costs increased by 22% to £907 million reflecting the strong demand for Sky+HD throughout the period and our decision to accelerate the take-up of the product through a lower retail box price. Subscriber acquisition cost was £308 reflecting the improvement in premium box mix, with around 90% of new customers in the second half of the financial year joining Sky with either a Sky+ or Sky+HD box, compared with 56% in the comparable period.

[78] Robertson Stephens Inc. (2001), 'BSkyB: Satellite King. Satellite: Blessing or Curse? Initiating Coverage with Long-Term Attractive Rating', February 21st, p. 1.
[79] Ibid, p. 8.
[80] ABN AMRO (2006), 'Game Theory', March 22nd, p. 7.
[81] British Sky Broadcasting Group plc. (2009), 'Annual Review 2009', p. 40.

Similarly, for investments in Sky+ and HD television, Sky recognises that costs are largely proportional to demand. The payback period on these investments also appears, on average, to be short:

> The majority of costs are geared to demand; Sky+HD customer acquisition costs have been incurred in proportion to take-up and will be recovered on average within 18 months.[82]

Overall, the evidence seems to suggest that Sky does not commit large amounts of capital upfront as its investments are characterised by significant scalability to demand and short payback periods. This suggests that the downside risks are relatively low, as Sky would be able to scale back its investments in response to a demand shock. Therefore, a significant deviation between ex post returns in a successful scenario and the cost of capital would not be required to compensate for downside shock.

5.2.2 Uncertainty of demand

The scale of demand uncertainty affects the extent to which ex post returns could be expected to exceed the cost of capital in the event that demand turns out to be high. For a given level of capital intensity, the higher the demand uncertainty, the more likely it is that 'normal' ex ante expected returns could correspond to high ex post returns. Similarly, the lower the demand uncertainty, the lower the potential difference between actual returns and the cost of capital.

Evidence that the demand uncertainty of Sky's investments was high would be consistent with one of the characteristics of markets where high returns could be generated by successful risk-taking.

Sky also refers to uncertainty of its demand when arguing that its high returns have been driven by successful risk-taking. For example, Sky stated that investments in HD TV may not have generated sufficient demand (however, as discussed above, this would not be expected to have led to significant losses because the level of investments would be adjusted to changes in demand):

> There was no certainty when these investments were made that HD would gain sufficient traction with Sky's actual and potential subscribers for this investment to pay-off.[83]

The main objective of the analysis of demand risks is to assess whether Sky's returns in recent years and in the future could be expected to be driven by risks taken in the past. This requires assessing the ex ante demand risk at the time when investments that determine returns in recent years were made.

The analysis therefore focuses on the evidence of demand risks over the last five to ten years, specifically quantitative analysis of ex post demand volatility supplemented by contemporary risk assessments by equity analysts. It would not be expected that investments made more than ten years ago would significantly influence recent returns because the payback period on most of Sky's investments is relatively short (and appears to be shorter than five years). It is possible that demand risks faced by Sky more than ten years ago were higher than those faced recently, but the compensation for any such high risks would be expected to have been already recovered by Sky.

There is no evidence that Sky faced significant demand risks over the last five to ten years.

Table 5.3 compares the volatility of growth in Sky's subscriber numbers with several other industries where sufficient volume data is available. It shows that over the past five years the

[82] British Sky Broadcasting Group plc. (2009), 'Results for the twelve months ended 30 June 2009', p. 8.

[83] Sky (2009), op. cit., para 4.63.

volatility of volume growth for Sky was one of the lowest in the sample, and lower than for some regulated utility companies. Volatility was higher over the past ten years, relative both to most regulated utility companies over this period and to Sky's recent performance, albeit lower than volatility for Stansted Airport and Nokia's handset sales. [84]

Table 5.3 Volatility (standard deviation) of volume growth rates (%)

	1998–2008	2004–2008
Gas[1]	3	3
Electricity[1]	1	1
Airports: Heathrow, Gatwick, Stansted	6, 6, 15	9, 8, 11
Water: Thames Water[2]	4	2
Rail	–	2
Fixed-line and mobile subscriptions: BT	–	2
Pay-TV: Sogecable	–	10
Handsets: Nokia	28	10
Mobile subscriptions: Vodafone	–	5
Letter-post items, domestic service: Royal Mail[3]	3	2
Sky	9	1

Note: Volatility is calculated by measuring the standard deviation on the annual growth rates of the number of subscribers or customers.[1] The gas and electricity data relates to the whole industry. [2] Thames data relates to public water supply measured at point of delivery to premises and includes non-potable water. [3] Data on the number of letters posted is not available for 2001 and 2008, thus the volatility is measured without the data for these periods.
Source: BERR, Energy statistics; BAA airports websites; Department for Environment, Food and Rural Affairs; Department for Transport (2009), 'Public Transport', November, pp. 1–15; Ofcom (2008), 'The Communications Market', Chapter 4: Telecoms, pp. 195–259; OFT and annual reports; Universal Postal Union website.

Table 5.4 benchmarks the volatility of Sky's revenue growth. The figures reported in the table represent the percentage of companies in each sample that had higher volatility of revenue growth than Sky. The volatility of Sky's revenue growth over the last eight years has been lower than at least 73% of other companies across all benchmark samples.

Table 5.4 Volatility (standard deviation) of Sky's revenues, 2000–08 (% of companies with revenue growth volatility higher than that of Sky)

	Overall market	Media companies	Pharma and biotech	TV and non-TV comparators
	FTSE 350	FTSE 350 Media	FTSE 350 Pharma & Biotech	Selected comparators
Number of companies	254	8	4	45
Revenue volatility	89%	75%	75%	73%

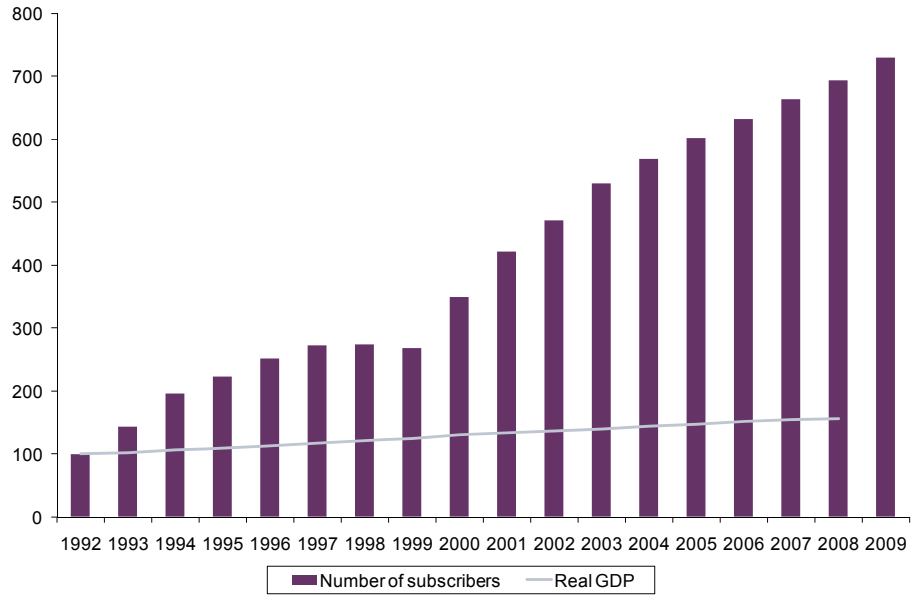
Note: Revenue volatility is calculated using the standard deviation of annual revenue growth rates. Number of companies reflects the count of companies for which data was available for the period in question.
Source: Datastream, annual reports and Oxera analysis.

[84] From the conceptual perspective, it would be appropriate to decompose demand volatility into the systematic and idiosyncratic components because the systematic component would be already captured in the comparison of returns with the cost of capital, while the significance of idiosyncratic component would need to be assessed through comparison with benchmarks identified in Table 5.3. Such an analysis however is likely to be challenging to undertake in practice and may not provide sufficiently robust results as well as would not be expected to materially the conclusions.

Overall, Tables 5.3 and 5.4 show that, over the past ten years, Sky's demand risk does not appear to have been exceptionally high relative to other companies. Furthermore, the demand volatility seems to have decreased and, given the evidence on the growth in subscriber numbers, over the last five years has been lower than for some utility companies.

It is possible for volatility of out-turn revenue and customer numbers to be low, even if ex ante demand uncertainty was high. This is because the out-turn demand data reflects a single realisation of the full spectrum of potential demand outcomes that existed at the time of Sky's investments. However, if significant demand risks were present then, over a ten-year time period, such risks would be expected to be realised and observed as demand shocks. Figure 5.2 shows that Sky's actual subscriber numbers, however, continued to grow steadily over this period (including during the current recession).

Figure 5.2 Evolution of Sky's subscriber base (indexed as at 1992)



Source: Sky's annual reports and Datastream.

Market perception of demand risk, as reflected in reports by equity analysts, seems to confirm this assessment. Over the last five to ten years, analysts seem to have perceived Sky's subscriber base to be increasingly stable. For example, in 2002, BNP Paribas stated that:

> There are little signs of Sky's churn level threatening to increase beyond acceptable levels. The loyalty of Sky's subscriber base has been tested in recent years through two successive yearly price increases of 8% each. In each instance, there was no discernible impact on churn.[85]

Bear Stearns also highlighted relatively low demand risk and suggested that factors that may expose Sky to potential demand shocks were mitigated by Sky's strong market position:

> We certainly are not saying that our forecasts are risk free. Potential risks include regulation, set-top box burn-out/technological obsolescence, sports rights owners disintermediating Sky to create their own channels, and the threat of a major consumer spending downturn.

[85] BNP Paribas (2002), 'The Second Coming', October 14th, p. 25.

> However, we believe that Sky's competitive position is currently so strong – and unlikely to be seriously challenged for many years – that this greatly mitigates against most of the risks (with the possible exception of the regulators).[86]

Equity analysts have recognised a certain degree of demand uncertainty in the earlier years. In general, it appears that analysts were more uncertain about the development of the pay-TV market and demand for digital services in the late 1990s and early 2000s. For example, in 1999 this uncertainty is reflected in an assessment by Flemings Research of the rate of take-up of digital television:

> We have developed our market model with reference to the history of technology adoption and the anticipated market shares of the three players. We recognise that the adoption curve may not work to plan, or the market shares may pan out differently. Should the take-up of digital be slow, we would expect early consolidation among the industry players, with perhaps a single cable company and an alternative DTH/TTV platform. It is, of course, equally possible that the model for adoption will be the S-curve, resulting in a positive surprise.[87]

Overall, the evidence does not seem to suggest that Sky has faced significant demand risk over the past ten years. The level of demand risk also appears to have decreased over time. Therefore, the evidence does not appear to support the argument that high returns in recent years represent compensation for high risk, particularly given the short payback period on investments. Neither does the evidence appear to support an argument that returns going forward need to include a component to compensate Sky for past risks, given that recent investments appear to have been made against a background of demand risk that has decreased over time.

5.3 Persistency of returns

In well-functioning markets with free entry and exit, returns would be expected to converge to the cost of capital in the long run. This also applies to markets characterised by a significant level of innovation. High out-turn returns would not be expected to persist in the long term in innovative markets, as this would provide an incentive for companies to enter the market—if necessary with a competing technology.

The evidence presented in section 2 suggests that the gap between returns and the cost of capital has been significant and persistent over time. The presence of this profitability gap over a 14-year period suggests that there would have been a strong incentive for companies to innovate and enter the market with a competing service offering. Indeed, a number of companies have attempted to enter the market, with varying degrees of success, but as there has not been a significant effect on the returns of Sky, this appears to be inconsistent with what would be expected in a well-functioning innovative market.

To put it differently, there is no evidence that the significant profitability gap from 2005 to 2009 represents a short-term deviation from a long-term equilibrium where returns are in line with the cost of capital.

5.4 Performance relative to expectations

This section reviews the evidence on expectations of Sky's performance. As discussed in section 5.1, the third feature of businesses where high returns are generated by successful risk-taking is that their expected returns are in line with the cost of capital. Therefore, evidence that Sky's expected returns were in line with the cost of capital would be consistent

[86] Bear Stearns (2002), 'Marching to its own beta' August 29th, pp. 8–9.

[87] Flemings Research (1999), 'BSkyB', March 30th, p. 22.

with the argument that Sky's high actual returns have, indeed, been driven by successful risk-taking.

To test this hypothesis, analysis is conducted based on market expectations of Sky's performance as reflected in reports by equity analysts. While individual reports would be expected to vary in their access to information, and hence the quality of their forecasts, the impact of such variability can be mitigated by considering a large sample of reports.[88]

5.4.1 Estimates of the IRR based on expected cash flows

Table 5.5 shows estimates of the IRR based on projections of Sky's performance by a number of analysts who systematically followed Sky. It should be noted that sufficiently detailed projections of Sky's performance are available only in the reports published from 1998 onwards.

Based on the IRR model developed in Oxera's first report, Table 5.5 compares profitability estimates based on Sky's actual cash flows with estimates based on analysts' expectations in 1998, 2000, 2001 and 2004 of cash flows in future time periods.[89] This shows that Sky's actual returns have been consistently lower than forecast by analysts. For example, the IRR for the period 1998–2003 implied by analysts' forecasts made in 1998 was [✂]% compared with an IRR based on actual cash flows of [✂]%. The gap between expectations and actual performance appears to have been particularly large for forecasts made in 2000.

Table 5.5 IRR based on expected cash flows (%)

Measure	1995–2009	1998–2003	2000–2009	2001–2009	2004–2009
No. of analysts' reports used to estimate the IRR		2	1	3	6
Base case[1] (churn)	[✂]	[✂]	[✂]	[✂]	[✂]
Expectations in 1998		[✂]	n/a	n/a	n/a
Expectations in 2000			[✂]	[✂]	[✂]
Expectations in 2001				[✂]	[✂]
Expectations in 2004					[✂]

Note: These estimates are based on the average observed across the parameters in the analysts' reports. [1] As described in Oxera (2009), p. 15.
Source: Sky, Ofcom, analysts' reports, and Oxera calculations.

Data on expected cash flows for the years before 1998 was not available in sufficient detail to estimate the IRR. However, a high-level comparison of profits (EBITDA) shows that actual profits in 1997 and 1998 were broadly in line with (or slightly below) expectations of these profits in 1996 (Table 5.6).

Table 5.6 Actual versus expected EBITDA in 1997 and 1998 (£m)

	1997	1998
Expectations in 1996	375	421
Actual	379	357

Source: Sky, Ofcom, analysts' reports, and Oxera calculations.

[88] The analysis of market perceptions of the riskiness of Sky's business has been informed exclusively by reports with direct investor implications, where assessments of Sky's business risk feed into performance projections, and further to recommendations for investors.

[89] The analysts' reports provide projections of Sky's financial statements and operational metrics, including subscriber numbers and churn rates. These projections are used as inputs for the IRR model developed as part of Oxera's first report, yielding estimates of the IRR expected by analysts.

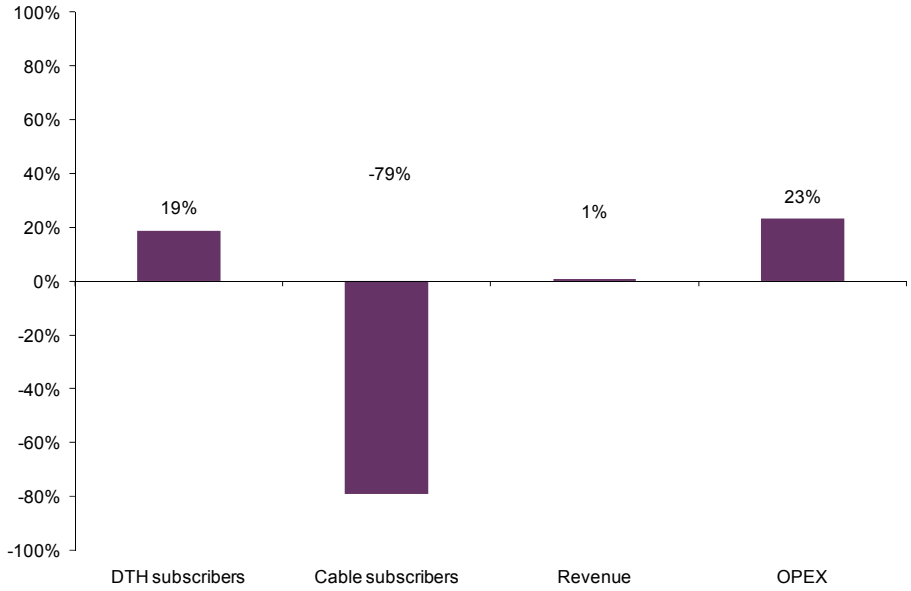
It seems that on average realised cash flows have been in line with—or slightly below—analysts' forecasts over the last 10–15 years. As a result, as shown in Table 5.5, Sky's realised returns were in line or slightly below expected returns. Although there is no sufficiently robust data on cash flows for earlier years, investments made more than 10–15 years ago would not be expected to have a significant influence on recent returns and future expected returns because the payback period on most of Sky's investments is relatively short.

It seems that the main driver of the difference between expected and outturn performance is costs. It appears that the market significantly underestimated the level of future operating costs (ie, outturn costs exceeded expectations), while realised revenues have been broadly in line with expectations.

This is contrary to the perspective of performance relative to expected demand presented in Sky's response. Referring to a report from Zenith Media, Sky stated that the company has outperformed market expectations in terms of subscriber numbers for its DTH platform. Actually, while performance has been better relative to expectations with respect to Sky's retail (DTH) subscribers, this has been more than offset by worse performance relative to expectations for cable subscribers.[90] Compared with forecasts of approximately 13.5m total subscribers (DTH and cable), Sky has achieved approximately 10m subscribers.

Figure 5.3 compares Sky's actual subscriber numbers (DTH and cable), revenues and operating costs of 2008 to analysts' projections made in 2001 for 2008.

Figure 5.3 Sky's actual subscribers, revenue and operating costs in 2008 compared with analysts' projections for 2008 developed in 2001 (% difference)



Note: The projections are averages across four analysts' reports available for 2001.
Source: Morgan Stanley (2001), 'Back to the Future?' April 4th; ABN AMRO (2001), 'Weighing Up the Risks', August; BNP Paribus (2001), 'Running to Stand Still', May 2nd; Nomura (2001), 'Thinking Inside the Box', June 18th; BSkyB Annual report 2008.

The combination of actual total subscriber numbers being lower than forecast and actual operating costs being higher than forecast appear to have led to actual returns being lower than forecast.

[90] The Zenith Media projections seem to be broadly consistent with the analysts' reports reviewed in this analysis.

5.4.2 Economic and business context for analysts' expectations

This section reviews the reasons provided by analysts to support their expectations. These reasons provide the context for Sky's expected performance.

A qualitative review of analysts' perceptions of Sky's risks and earnings prospects has been structured around three periods:

– from stock market listing until the introduction of digital television (1995–99);
– from the migration of subscribers to digital television until diversification from the core television offering (2000–03);
– recent years (2004 onwards).

Before the introduction of digital TV (1995–99)

The sample of analysts' reports available for the pre-digital time period is mostly limited to reports from Merrill Lynch. Although these reports do not contain the detailed projections for operational metrics, such as the subscriber base, that are available from more recent reports, the EBITDA forecasts for the time period following the start of the programme of subsidising reception equipment were consistently in excess of actual EBITDA. These forecasts were justified by the analysts' perception that Sky held a strong position in content acquisition, and would benefit from its large subscriber base. As suggested by Merrill Lynch in 1995:

> we believe that the likelihood of any programming wars in the U.K. has been reduced. The cable companies appear to be focused on telephony and video distribution, leaving pay programming to BSkyB. Competition in regard to basic channels will probably increase, but the stakes are not nearly as high. We believe BSkyB is an excellent way for investors to participate in the growth of U.K. multi-channel television as it benefits from both the growth of cable as the dominant programmer and dish distribution as both the programmer and distributor.[91]

and further:

> In addition to program contracts BSkyB has the largest base of subscribers. Therefore, any entity whether a new satellite competitor or even cable operators will be unable to pay what BSkyB can on an economic basis.[92]

A view consistent with the above was reiterated in Merrill Lynch reports published in 1996 and 1997.

Before and during the introduction of digital reception equipment, the expectation was that Sky would be exposed to competition from the cable TV operators. At the time, equity analysts expected the pay-TV market to be divided between the three main platforms, as set out by Flemings Research:

> The UK will have three players providing digital TV services: the three cable TV companies, digital terrestrial TV (OnDigital), and BSkyB, via satellite. We estimate the long-term market shares of the three to be 45% satellite, 40% cable and 15% terrestrial TV.[93]

In terms of the transition to digital, while Flemings Research identified risk drivers to which Sky was exposed, the expectation was that Sky's overall position was sufficiently established to mitigate risks of any significant downside scenario.

> Our investment case is based on the fact that the digital TV industry will be very successful in the UK, and that BSkyB, as the leader in analogue, will have first mover

[91] Merrill Lynch (1995), 'Daily Research Analysis - BSY Media', July 6th.
[92] Merrill Lynch (1995), 'Daily Research Analysis - BSY Media', March 2nd.
[93] Flemings Research (1999), 'Seeing the New Picture', March, p. 1.

> advantages, and an installed base that will give it leverage to take a leading position in digital TV.[94]

This suggests that, although during this period there was the expectation that Sky would be facing a competitive digital television market and there would be risks associated with the transition of its existing subscriber base to digital, Sky was expected to maintain its market-leading position and status as a profitable company.

After successful migration of customers to DTH platform (2000–03)

After the introduction of digital TV, analysts appear to have perceived Sky's market position as having been maintained or even strengthened. High expectations for Sky's future cash flows were generally based on the perceived strength of Sky's subscriber acquisition model combined with significant content holdings:

> We believe BSkyB is well positioned strategically due to a demonstrated ability to rapidly gain new satellite subscription customers, and a powerhouse content business that should provide incredible stability to the model.[95]

Many analysts noted that Sky's competitive position strengthened when ITV Digital went bankrupt, and cable companies NTL and Telewest experienced financial difficulties:

> We are not surprised that BSkyB managed to sustain a linear growth path in terms of net subscriber additions over this period. It effectively had no competition.[96]

Consistent with this, according to Deutsche Bank:

> There is the concern that as Sky approaches a more mature phase in its growth profile, it will be branded a utility.[97]

Thus, a perception of relatively limited competition, and the strengths of an established business model, fed into analysts' EBITDA projections, which generally exceeded those realised in the subsequent years.

Maturing and stable subscriber base and diversification of product offering (2004 onwards)

Since 2004, analysts have suggested that, having established its position as the leading pay-TV provider, Sky has focused on diversification of its product offering, while maintaining its content holdings to retain its position in the television market. As noted by Cazenove:

> the growth potential of the industry should not be underestimated (45% pay-TV and 50% broadband penetration) whilst Sky retains significant competitive advantages and product differentiation.[98]

However, while Sky's competitive position has generally been considered relatively robust, some analysts have noted risks from expected technological developments. For example, Daniel Stewart & Company quotes a study from Analysys Mason to emphasise the role of emerging, IP-based, platforms as drivers of competition.

> At the same time, Ethernet connectivity and web service technologies based on open standards are being built into both set-top boxes and TVs. These elements are the building blocks of an 'open TV' content distribution environment, where the consumer is

[94] Ibid., p. 20.

[95] Robertson Stephens Inc. (2001), 'BSkyB: Satellite King. Satellite: Blessing or Curse? Initiating Coverage with Long-Term Attractive Rating', February 21st, p. 1.

[96] ABN AMRO (2004), 'Move to Reduce (from Hold)', November 11th, p. 2.

[97] Deutsche Bank (2004), '90% of the iceberg', September 6th, p. 10.

[98] Cazenove (2007), 'Company memo: BSkyB', April 19th, p. 1.

> no longer reliant on a platform operator to dictate and control the nature and the quality of the service.[99]

As might be expected, given the shorter forecast horizon, analysts have forecast Sky's overall revenues and subscriber base somewhat more accurately since 2005 than since 1995. Sky's SAC during recent years have continued to exceed analysts' projections, as reflected in realised EBITDA still being lower than expected. Furthermore, with the more diversified business model, discrepancies between analysts' forecasts and realised results are increasingly driven by uncertainties over the revenues and costs associated with the HD and broadband roll-outs rather than the core television offering.

5.5 Summary

Innovation can lead to high returns as compensation for downside risks taken at the time of the investment. In a well-functioning market, such businesses exhibit a number of characteristics that can lead to returns being significantly above expectations.

Companies in innovative and risky markets commit significant amounts of capital upfront when demand forecasts are highly uncertain. Sky's investments appear to have a short payback period and to be significantly scalable to demand, suggesting that Sky has relatively low levels of capital committed and exposure to downside shocks. Moreover, Sky does not appear to have faced significant demand risk over the past ten years, and the level of demand risk appears to have decreased over time. This evidence does not suggest that high actual returns over recent years represent compensation for past risks or that future returns need a significant component to compensate Sky for risk-taking.

It is possible for returns to deviate in the short term from the cost of capital. However, in the long term, returns in a well-functioning market would be expected to converge to the cost of capital, even in innovative markets. As returns for Sky have been persistently above the cost of capital over a 14-year time horizon, there is no evidence to suggest that the significant profitability gap during 2005–09 represents such a short-term deviation.

The risks in well-functioning innovative markets mean that expected returns will be in line with the cost of capital. Quantitative and qualitative evidence on expectations for Sky's business, based on analysts' forecasts, suggests that Sky's actual cash flows and returns have been consistently lower than expectations. This evidence is not consistent with a scenario where actual performance is better than expected and could therefore represent appropriate compensation for successful risk-taking.

Therefore, there is no conclusive evidence to support the proposition that Sky has characteristics that would be expected to be observed in the case of companies whose returns are driven by successful innovations and risk-taking.

[99] Daniel Stewart & Company (2009), 'British Sky Broadcasting – The importance of HD', 27th October, p. 5.

A1 Alternative scenarios for the IRR and ROCE

Table A1.1 Sensitivities with respect to the definition of capital employed (%)

	1995–2009	1998–2009	2005–2009
IRR			
IRR (DRC (year of investment) – cash)	[✂]	[✂]	[✂]
IRR (DRC (year of investment) – current liabilities)	[✂]	[✂]	[✂]
ROCE			
ROCE (DRC (year of investment) – cash)	[✂]	[✂]	[✂]
ROCE (DRC (year of investment) – current liabilities)	[✂]	[✂]	[✂]

Source: Datastream, Bloomberg, Sky, Ofcom, and Oxera calculations.

A2 Evidence supporting the cost of capital analysis

The cost of capital for Sky has been calculated using a weighted average of the cost of debt and the cost of equity.

The cost of equity has been estimated using the capital asset pricing model (CAPM). The formula for estimating the cost of equity k_e under the CAPM is:

$$k_e = r_f + ERP \times \beta$$

where:

– r_f is the risk-free rate;
– ERP is the equity risk premium for the whole equity market;
– β is the risk measure of a particular asset relative to the market.

The individual parameters of the CAPM formula have been estimated as follows.

– **The nominal risk-free rate** has been estimated using the spot yield to maturity on a UK gilt index with maturity equal to five years. This approach results in an estimate of 4.1% for the risk-free rate in 2005.[100]

– **The equity beta** has been estimated from a regression of the daily returns to Sky's equity on the daily returns on the FTSE All-share index. A one-year estimation period has been used for the equity beta. Since beta estimation is dependent on the time period selected, the betas are supplemented with estimates based on a five-year estimation period.[101] The equity betas have been de-geared at average gearing over the estimation period and re-geared at spot gearing.[102] Estimates represent the equity beta for Sky Group and have not been broken down into separate betas for pay-TV and non-pay-TV activities.

– **The equity risk premium** has been estimated using a range of 3.5–5.0%, consistent with Oxera's advice to rolling stock companies.[103] ERP is generally measured over a long period of time because it is difficult to measure, with sufficient degree of robustness, variations in ERP over relatively short periods. Therefore, the same range is used for the period between 1995 and 2007. However, in order to reflect the uncertainty of the recent financial crisis in the ERP estimate, a range of 3.5–5.5% is used for 2008 and 2009.

To estimate the WACC, the analysis also requires the cost of debt and gearing.

[100] In 2009, there was a significant reduction in gilt yields compared with the previous year. In the context of profitability analysis, it is not appropriate to allow the gap between returns and the WACC to be driven by uncertainty in the government bond markets. Thus, the three-year average gilt yield is used to estimate the 2009 cost of capital. Changing the maturity of the risk-free rate from five to 10, 15, 20 or 30 years results in a change (increase or decrease) in the WACC estimate of a maximum of 100bp.
[101] In 1995, the one-year beta is calculated as at December 8th 1995 to allow for one year of data in the estimation. From 1996 onwards, one-year betas are estimated as at June 30th of each year. For periods before 2000, the five-year equity beta is estimated based on the period from December 8th 1994 to December 8th 1999.
[102] For example, in 2005, gearing of 3.6% (1-year average) and 6.9% (5-year average) is used to de-gear the raw betas and a spot gearing of 3.7% is used to re-gear the resulting beta estimates.
[103] In the same inquiry, the CC used a point estimate of 3.5%. This would lower the high end of the pre-tax WACC range by 1.7–2.7%. See Competition Commission (2009), 'Rolling Stock Leasing Market Investigation', Appendix 6.6, April 7th.

– **The cost of debt** for the period 1999–2009 has been based on the yield to maturity on Sky's sterling-denominated bonds.[104] For example, in 2005, the spot yield of 5.8% on Sky's bond maturing in 2017 is used as an estimate for the cost of debt. Due to the lack of availability of sufficient information on corporate bonds with a similar credit rating to Sky, in the period prior to 1999 the cost of debt has been estimated as the sum of the contemporary risk-free rate and the spread between the yield on Sky's sterling-denominated bond issued in 1999 and the risk-free benchmark rate as at 1999.

– **Gearing** as at the estimation dates has been used to weight the cost of equity and the cost of debt to estimate the WACC.

Table A2.1 summarises the parameters used in estimating the cost of capital for the three periods.

Table A2.1 Estimates of the WACC parameters

	1995		1998		2005	
	Low	High	Low	High	Low	High
Risk-free rate (nominal, %)	8.2	8.2	6.3	6.3	4.1	4.1
Cost of debt (%)	10.8	10.8	9.0	9.0	5.8	5.8
ERP (%)	3.5	5.0	3.5	5.0	3.5	5.0
Raw equity beta	0.81	0.94	0.81	0.86	1.11	1.33
Equity beta	0.89	0.94	0.82	0.85	1.11	1.29
Cost of equity (%)	11.3	12.9	9.2	10.6	8.0	10.5
Historical gearing (%)	5.4	13.7	5.4	7.1	3.6	6.9
Spot gearing (%)	13.7	13.7	6.5	6.5	3.7	3.7
Tax rate (%)	33	33	31	31	30	30
Assumed inflation (%)	3.5	3.5	3.7	3.7	2.9	2.9

Source: Datastream, OECD, ONS, Competition Commission (2008), 'Stansted Airport Ltd - Q5 price control review', October, pp. 1–130, and Oxera calculations.

Table A2.2 presents some of the regulatory precedents on the cost of capital in the 1990s. Where necessary, the reported costs of capital have also been expressed in pre-tax, nominal terms to aid comparison with the estimates for Sky.

[104] For the period 1999–2004, this is based on the bond maturing in July 2009, and in July 2017 for the period 2005–09. The cost of debt as at 2005 is estimated from the spot yield on October 14th 2005, the first trading day of the bond maturing in July 2017. All cost of debt estimates thereafter are based on spot yields as at June 30th of each year.

Table A2.2 Cost of capital precedents in the 1990s

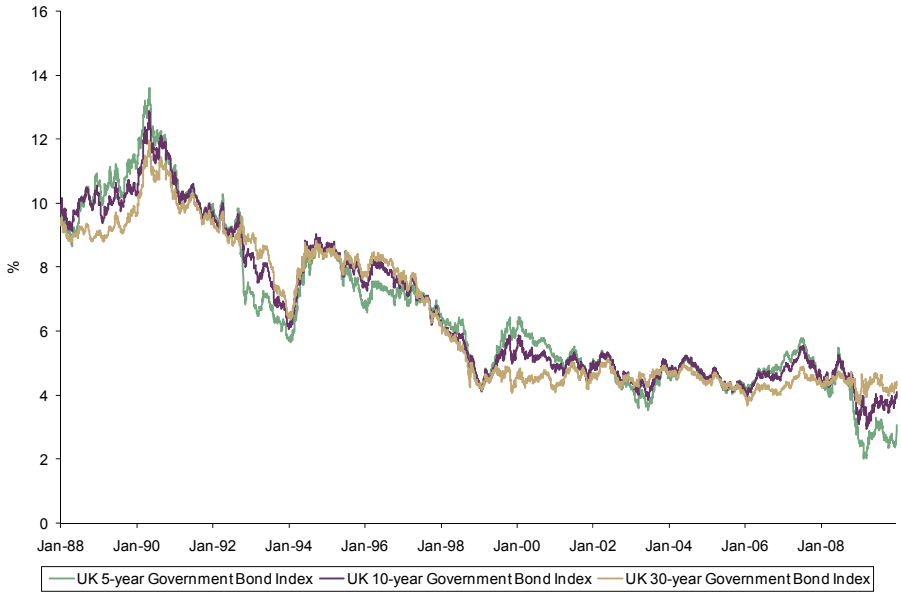
Regulator	Cost of capital (%)	Year	Description	Adjusted cost of capital (nominal, pre-tax, %)[1]
CAA—south-east airports	8	1991	Real, pre-tax	14
Oftel—BT	17–20	1992	Nominal, pre-tax	17–20
Ofwat	5–6	1994	Real, post-tax	12–13
Oftel —BT	12.5	1996	Nominal, pre-tax	12.5
CAA—BAA London Airports	6.4–8.3	1996	Real. pre-tax	9–11
Ofgas—electricity distribution	5.0–7.1	1999	Real, pre-tax	6–8

Note: [1]Adjustments are made on the final estimates using inflation and tax assumptions adopted to estimate Sky's real, post-tax cost of capital. RPI-based inflation is used converting estimates from real into nominal terms.
Source: Oftel (1992), 'BT's Cost of Capital: A Consultative document issued by the Director General of Telecommunications', January; Competition Commission (1991), 'BAA plc: A report on the economic regulation of the South-East airports companies (Heathrow Airport Ltd, Gatwick Airport Ltd and Stansted Airport Ltd); Ofgas (1999), 'Review of Public Electricity Suppliers 1998–2000, Distribution Price Control Review: Consultation Paper', May; Oftel (1996), 'Pricing of Telecommunications Services from 1997: Oftel's Proposals for Price Control and Fair Trading'; Ofwat (1994), 'Future Charges for Water and Sewerage Services: The outcome of the periodic review'; Competition Commission (1996), 'BAA Plc: A report on the economic regulation of the London airports companies (Heathrow Airport Ltd, Gatwick Airport Ltd and Stansted Airport Ltd)', OECD and ONS.

Although the number of precedents available for the 1990s is limited, they nevertheless provide a relevant cross-check for Sky's cost of capital. For example, the determinations by Ofwat, Oftel and CAA in the period between 1994 and 1996 were approximately equivalent to setting the nominal pre-tax cost of capital in a range of 9–13%, lower than the 13.2% weighted average estimated for Sky over the period 1995–2009, and significantly lower than the 17.1% at the start of this period.

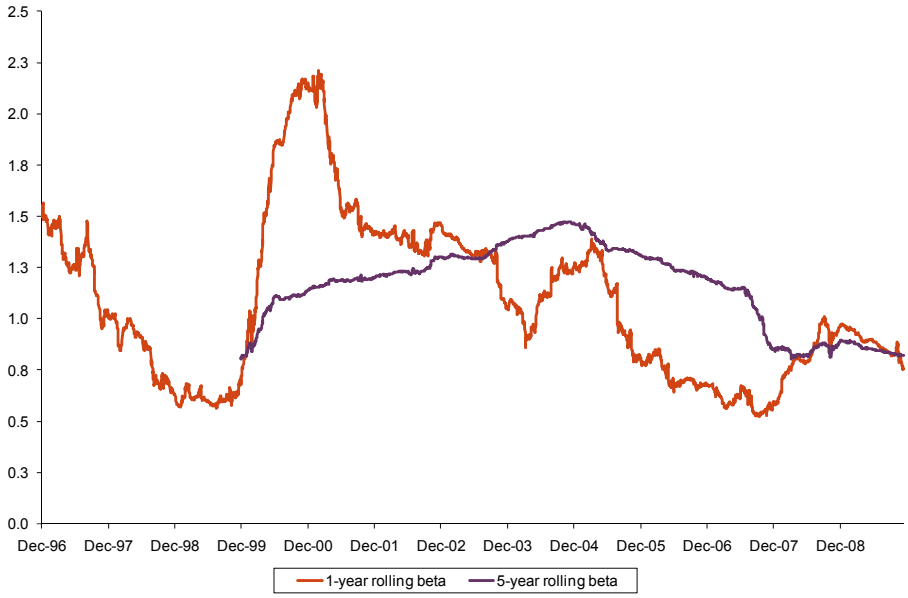
Figure A2.1 illustrates the evolution of yields on government bond indices that have been used as the basis for the risk-free rate in the estimation of the cost of capital. Figure A2.2 presents estimates of the one- and five-year rolling equity betas, and Figures A2.3 and A2.4 present yields and spreads on the bonds used to estimate the cost of debt.

Figure A2.1 Evolution of yields of UK 5-, 10- and 30-year government bond index (%)



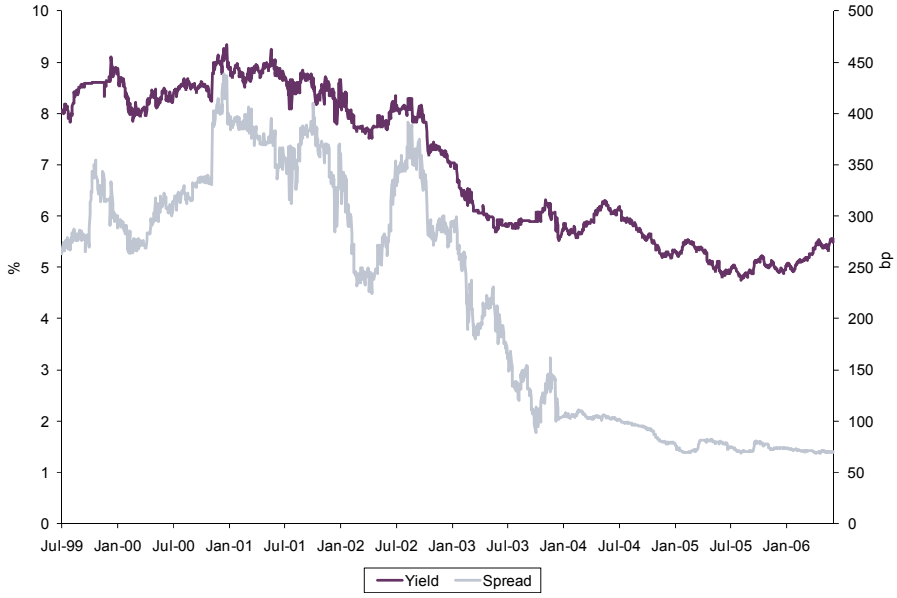
Source: Datastream.

Figure A2.2 BSkyB Group's one-year and five-year rolling equity betas



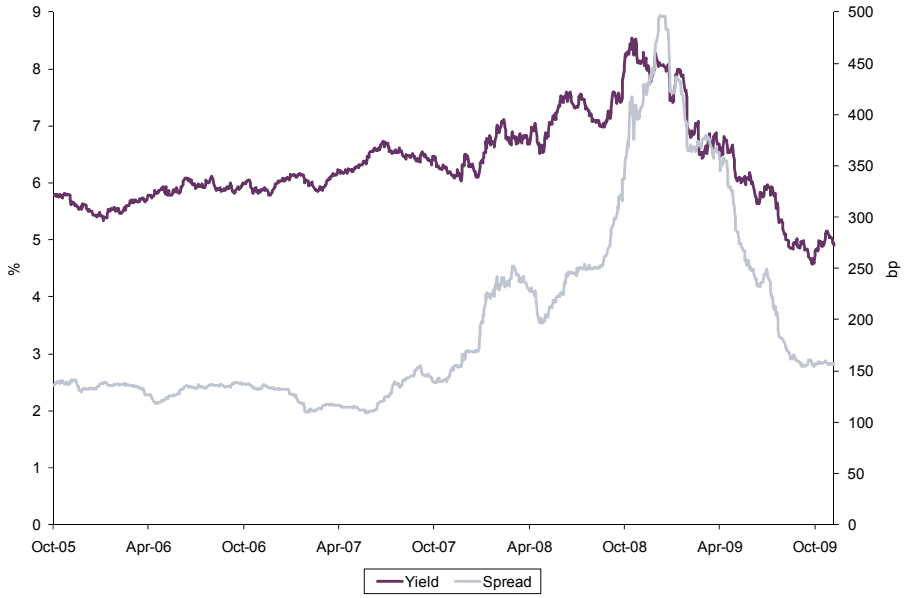
Source: Datastream, and Oxera calculations.

Figure A2.3 Yields (%) and spreads (bp) on BSkyB Group's bond issued in 1999 and maturing in 2009



Source: Datastream, and Oxera calculations.

Figure A2.4 Yields (%) and spreads (bp) on Sky's bond issued in 2005 and maturing in 2017



Source: Datastream, and Oxera calculations.

A3 Alternative time period for the gap between ROCE and WACC

Table A3.1 Difference between ROCE (book values of assets, total assets less current liabilities as capital employed) and WACC (nominal, pre-tax), 1995–2008

		Sky (%)	Median for the index (%)	Average for the index (%)	Number of companies with profitability gap higher than Sky	Total number of companies in the index	Proportion of companies with profitability gap higher than Sky (%)
Overall market	FTSE 350		2.3	5.4	1	143	0.7
Media companies	FTSE 350 Media	87.5	–1.4	7.2	0	8	0.0
Telecoms companies	FTSE 350 Telecoms		3.4	27.7	0	3	0.0

Note: ROCE measured as EBIT divided by total assets less current liabilities, for all companies including Sky.
Source: Bloomberg, Sky, Datastream, and Oxera calculations.

Table A3.2 Difference between ROCE (DRC for Sky, book values for comparators, total assets less current liabilities as capital employed) and WACC (pre-tax real for Sky and pre-tax nominal for comparators), 1995–2008

		Sky (%)	Median for the index (%)	Average for the index (%)	Number of companies with profitability gap higher than Sky	Total number of companies in the index	Proportion of companies with profitability gap higher than Sky (%)
Overall market	FTSE 350		2.3	4.8	42	143	29.4
Media companies	FTSE 350 Media	[✂]	–1.4	–2.8	0	8	0.0
Telecoms companies	FTSE 350 Telecoms		3.4	1.1	0	3	0.0

Note: ROCE measured as EBIT divided by total assets less current liabilities, for all companies excluding Sky. For Sky, ROCEs are measured with total assets valued on a DRC basis, less investments in joint ventures, and the accounting gap is measured relative to the real WACC.
Source: Bloomberg, Sky, Datastream, and Oxera calculations.

A4 High-level review of selected CC and OFT precedents

A selected sample of CC precedents was reviewed to explore the CC's approach to interpretation of observed returns and estimates of competitive benchmark (eg, cost of capital), and the weight given to these measures in the final determination. Furthermore, the reviewed precedents include, to a variable extent, discussion on the interpretation of the derived estimates, and the factors, such as innovation, that may contribute to the gap between returns and the cost of capital.

The specific CC precedents reviewed include the following inquiries/market investigations:

– classified directory advertising services;
– personal current account banking services in Northern Ireland;
– banking services to SMEs;
– home credit;
– video games;
– newspapers;
– tampons;
– photocopiers;
– online database services.

Furthermore, the OFT's review of BSkyB in 1996 has been reviewed to provide further insight into competition authorities' approach to the interpretation of returns and estimates of competitive level of returns.

A4.1 The role of profitability analysis in competition investigations

Some of the precedents reviewed have involved explicit comparison of returns against the cost of capital, while others have based the profitability analysis on a comparison of accounting ratios against industry benchmarks. Examples of cases involving analysis of the profitability gap include classified directory advertising services, banking services to SMEs, home credit, and the OFT's 1996 assessment of BSkyB.

– In the classified directory advertising services market inquiry, the CC estimated Yell's returns using a truncated IRR and ROCE based on turnover, costs and EBITDA measures. In addition, the CC compared Yell's ROS with selected comparators. The profitability gap was estimated to be in the range of –2% to 12%, based on a comparison of truncated IRRs and ROCEs to the WACC. While the CC did not state explicitly how much weight it placed on various types of measures, it acknowledged its preference for truncated IRR and recognised the limitation of the EBITDA-based measures.[105] The following was concluded by the CC:

  > Because of the issues we faced in asset valuation, our preferred measure for this investigation is the truncated IRR which gives less weight to asset valuations than ROCE. From the above results, we conclude, based on the truncated IRR estimates, that Yell's profits were high over the five years to 31 March 2006 and in excess of its WACC. This view is supported by the benchmarking we have done comparing Yell's ROS with various comparators.
  >
  > While our preferred measure here is the truncated IRR over the five years, this measure does not show the trends over the period, nor is it suitable for focusing on the results of a particular year. For this, we need to consider our estimates of ROCE. Our range of

[105] Competition Commission (2006), 'Classified Directory Advertising Services market investigation', December 21st.

> estimates of Yell's ROCE calculated using turnover and cost multiples for each of the five years overlaps with our estimated range of WACC for the period and trends down over the five years.
>
> It is therefore not possible to conclude from the available evidence that Yell's profits at the end of the period were in excess of its WACC, although a number of factors suggest that they may have continued to be so. These include the fact that while our estimated ROCE figures were declining over the period, so was our estimate of the WACC, and the likelihood that the measures we have used will have tended to overstate the value of Yell's assets, and hence understated its profitability.[106]

– Similarly, in the CC's inquiry into the supply of banking services to SMEs, the cost of equity was considered the appropriate measure of profitability due to the nature of the industry. A profitability gap of 9%, 10% and 12% in 1998, 1999 and 2000 respectively between the returns on equity and cost of equity of the four largest clearing groups was considered to indicate excessive profitability.[107]

– A further example is the home credit market investigation in which the CC concluded that the 5–13% profitability gap between the ROCE of S&U and Provident respectively and the cost of capital of other typical large home lenders partly reflected prices that were higher than they would be in a competitive market.[108]

– In the OFT's 1996 assessment of BSkyB's profitability, the IRR was compared with the cost of capital, and the 'excess return' of 10.3% was considered high and, according to OFT, could not be sustained in a competitive market.[109]

The CC has also undertaken benchmarking analyses to supplement its profitability assessments. Examples of its benchmarking analyses are summarised below.

– In the classified directory advertising services investigation, the CC compared Yell's ROS against 4,000 other companies in the UK, Continental Europe and the USA. Furthermore, it compared Yell's UK ROS to that of its business in the USA. The CC tested several scenarios, including comparing Yell's returns to companies with similar risk profiles as indicated by turnover volatility, EBITDA volatility and betas. The CC found that Yell's ROS was always in, or above, the eighth decile of the whole sample and sub-samples with similar risk characteristics.[110]

– Similarly, in the investigation into the UK video games industry, the ROS and gross margins of a sample of comparators with risk exposure similar to that of Nintendo and Sega were used. Specific characteristics mentioned were strong brand name, heavy promotion among young consumers, and rapid changes in fashion and technology. Further comparisons were conducted for companies with activities in the video games value chain.[111]

– Another example of the use of comparators is the investigation of the tampons industry of the UK, in which ROCE was compared against a sample of companies in the health

[106] Competition Commission (2006), 'Classified Directory Advertising Services market investigation', December 21st, paragraphs 7.110 - 7112.
[107] Competition Commission (2002), op. cit.
[108] Competition Commission (2006), 'Home credit market investigation', November 30th.
[109] Office of Fair Trading (1996), 'The Director General's review of BSkyB's Position in the Wholesale Pay TV Market', December.
[110] Competition Commission (2006), 'Classified Directory Advertising Services market investigation', December 21st.
[111] Monopolies and Mergers Commission (1995), 'Video Games – A report on the supply of video games in the UK', March.

sector. However, there was no explicit indication of whether these were the competitive benchmarks.[112]

A4.2 Assessment of the impact of innovation

The CC precedents include, to a variable extent, discussion on the interpretation of the derived estimates, and the factors that might contribute to the gap between IRR and cost of capital—innovation being the relevant factor in this context. In the reviewed determinations, the CC has concluded the following.

– Having undertaken a qualitative assessment of Yell's innovation, specifically in colour advertising, the CC concluded that colour advertising was not a significant innovation to the extent it could enable Yell to continue to earn substantial returns in a competitive market.[113]

– In both the home credit market and the Northern Ireland banking investigation, the CC recognised that in the short term actual returns might deviate from expected returns on capital due to innovation, but that, in the medium to long run, these should converge.[114]

– Furthermore, in the tampons market investigation, the MMC recognised that high profits may be reasoned by innovativeness and entrepreneurial ability, but it did not make any adjustments for this in the analysis.[115]

An example where the MMC explicitly discusses the case for innovation in the form of high-risk investments is the investigation into indirect electrostatic photocopiers in the UK. It recognised the high innovativeness of Rank Xerox in the interpretation of profitability analysis:

> At the time when Rank Xerox began to market plain paper copiers in this country, the Xerox group had already undertaken a great deal of costly research and development which had been by no means assured of success; and even when a commercially marketable machine had been developed there was no certainty that it would be commercially and technically successful. In its early days the production and marketing of plain paper copiers must therefore be regarded as having been a high risk industry. On this account alone relative high profits could be justified for a period to allow adequate reward for the risks accepted. However, Rank Xerox has now become firmly established and, although new techniques and new machines are still being developed, the period of particularly high risk and the need to compensate for such risk have in our view passed. In making this point we do not imply that the industry is now free from risk. An example of continuing risk is the fact that a recently introduced machine has not achieved the targets set for it. There must also be some risk involved in the launching of the company's latest machine, the 9200. But such risks are in our view not risks of the severity involved in the original development and marketing of plain paper copiers.[116]

Thus, the MMC suggested that the risk of investments made more recently was not sufficient to explain the high returns.

Furthermore, it is noted that OFT undertook sensitivity checks to establish what the probability of failure of the investment would have to be in order to eliminate the excess

[112] Monopolies and Mergers Commission (1986), 'Tampons – A Report on the supply in the United Kingdom of Tampons', January.
[113] Competition Commission (2006), 'Classified Directory Advertising Services market investigation', December 21st.
[114] Competition Commission (2006), 'Home credit market investigation', November 30th.
[115] Monopolies and Mergers Commission (1986), 'Tampons – A Report on the Supply in the United Kingdom of Tampons', January.
[116] Monopolies and Mergers Commission (1976), 'Indirect electrostatic reprographic equipment–A report on the supply of indirect electrostatic reprographic equipment', December.

return. The OFT estimated that the prior probability of failure would have had to have been 41.1% and concluded that such a high level of risk seemed implausible.[117]

[117] Office of Fair Trading (1996), 'The Director General's review of BSkyB's Position in the Wholesale Pay TV Market', December.

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