Appendix E

Apperdix E

Rates and Allowances -Corporation Tax

Corporation tax on profits - £ per year (unless stated)

Rate	2004-05	2005-06
Starting rate: 0%	£0 – £10,000	£0 – £10,000
Marginal relief	£10,001 – £50,000	£10,001 – £50,000
Small companies' rate: 19%	£50,001–£300,000	£50,001–£300,000
Marginal relief	£300,001–£1,500,000	£300,001–£1,500,000
Main rate: 30%	£1,500,001 or more	£1,500,001 or more
Non-corporate distribution rate	19%	19%

Corporation Tax on chargeable gains: Indexation Allowance

These tables are published monthly under Capital Gains

Rates of Interest for Corporation Tax

These are published on the interest rates page.

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Appendix F

I Existing Estimates of The Equity Premium

Cochrane (1997) and Siegel and Thaler (1997) provide comprehensive surveys of the macroeconomics and finance literature about the equity premium *puzzle*—the question as to why stocks have historically performed so well relative to bonds. This section briefly discusses existing methods to estimate the equity premium.

A Equity Premium Measurement Issues

Unfortunately, there is neither a uniformly accepted precise definition nor agreement on how the equity premium should be computed and applied.

First, the *geometric average* is earned by a buy-and-hold investment strategy that is long on stocks and short on interest-bearing securities, while the arithmetic average is earned by a strategy that rebalances investment to a fixed amount each year. Mathematically, the geometric mean is *always* lower than the arithmetic mean. For example, a 50 percent decrease followed by a 100 percent increase leaves an investor with a 0 percent geometric return, although the arithmetic average would suggest a positive 25 percent return. Historically, the 30-year geometric mean equity premium has been about 2 percent lower than the arithmetic mean (see Appendix A for more detail). It is not clear whether the arithmetic or the geometric average should be used in capital budgeting applications using the CAPM (Indro and Lee (1997)).

Second, stocks are long-term investments, and the most common method to compute the equity premium - subtracting a short-term bond return from a long-term equity return – is neither parsimonious nor necessarily a fair investment holding-period comparison.[1] Subtracting off the return to long-term bonds instead of the return to short-term bonds for a 30-year equity premium computation decreases the

long-term equity premium by between 1 percent and 2 percent. Shiller (1989) subtracts a bond index that splices corporate bonds with treasuries. This, too, results in a lower equity premium.

Lacking formal agreement on how the equity premium should be computed and used, even identical views on the implied equity premium can easily lead different individuals to respond with and themselves use different estimates for the same task. This paper describes arithmetic equity premia relative to short-term bills, unless otherwise indicated.

B Historical Average Equity Premia

Insert Table I here

Perhaps the most popular method to obtain an estimate of the equity risk premium is an extrapolation of historically realized equity premia into the future. Table I shows that practitioners can advocate a whole range of estimates as "their" equity premium choice. The use of Ibbotson equity premia estimates seems to particularly widespread. For example, the most popular finance textbook, Brealey and Myers (1996, p.146), recommended 8.2 percent to 8.5 percent in 1996, as sourced from the *Ibbotson 1995 Yearbook*. As of December 1998, Table I shows that the equivalent 1926–1998 Ibbotson historical arithmetic equity premium average has risen to 9.4 percent. Shiller (1989, Chapter 26) has assembled a longer data set, which can justify as low an equity premium average as 4.3 percent, using geometric averages over the entire 129 year history.

Yet, historical averages have limits. Even from a theoretical perspective, an observer could interpret recently high historical stock returns to be indicative of *lower* (not higher) future stock returns. If the true expected rate of return on stocks were to have fallen over the last couple of years because investors were unexpectedly streaming into the stock market and competing away previously higher expected

rate of returns or because investors became less risk-averse or because volatility declined, recent increases in stock prices (high stock returns) would soon be followed by *lower* stock returns in the future. There is also the more mundane non-stationarity problem that 50-year old equity premia may have little relevance to the world today. But stock returns are so volatile that shorter time-series have too high a standard deviation to be useful estimators. For example, a 95 percent confidence interval (plus or minus 2 standard errors) for the *true* equity premium average over the 1994-1998 period ranges from +7.6 percent to +30.4 percent—not a useful range for practical capital budgeting purposes.

C Predictive Regressions

An alternative popular method to estimate future expected returns relies on the observation that, in the very long run, expected corporate payouts and expected investment returns must be equal. The stock price today must be the present value of all future dividend payouts (or earnings). Many researchers (e.g., Campbell and Shiller (1988), Fama and French (1988), Blanchard (1993)) have used this to predict future equity returns and equity premia with dividend-yields (and, to a lesser extent, other variables).[2] As of 1999, a regression of annual data from 1927-1997 yields

$$EQP_y = -11.5\% + 3.95\left(\frac{D_{y-1}}{P_{y-2}}\right) + \text{noise}_y\,. \qquad (1)$$

where EQP_y is the equity premium (here the difference between the return on a value-weighted stock index and short-term treasury investments), in year y, and D_{y-1}/P_{y-2} is the lagged dividend yield. As of 1999, with a dividend yield of below 1.5 percent, this regression predicts one-year ahead forecast of less than -10 percent. (Longer period forecasts converge to the historical average.) Variations of such "conditional models" predict equity premia ranging from about -10 percent to

about 0 percent. These are not comfortable estimates: After all, why would anyone hold equity if stocks did not offer higher expected returns than bills? And, what does this imply for firms' capital budgeting decisions—should firms place a lower hurdle rate on riskier projects?

D Theoretical Arguments

Yet another popular approach to estimating the expected equity premium relies on calculations of what reasonable expected rates of returns are necessary to entice the average investor to be roughly indifferent between investing in stocks and bonds, given historical aggregate volatility and covariances. Assuming reasonable risk aversion for such an investor (and introspection), such estimates typically arrive at estimates of about 1 percent to 3 percent (Mehra and Prescott (1985)).

Unfortunately, these calculation have predicted about 1 percent to 3 percent for decades while the historical 1926-1998 average has increased to an all-time high of 9.4 percent. This puzzle deepens even further if the average investor is not tax-exempt, because equity capital gains face lower effective tax rates than bond interest receipts. Cochrane (1997) and Siegel and Thaler (1997) both conclude that economic theory has great difficulty in explaining such high figures (even with high degrees of risk aversion and all sorts of modifications to standard consumer choice models).[3] Still, they remain skeptical about the continued presence of an equity premium in the (often quoted) 6 to 8 percent range.

E Popular Views

Small investor surveys tend to find equity *premium* expectations between 10 percent and 15 percent per year. On 10/10/1997, *The New York Times* reports that a

Montgomery Asset Management telephone survey found an expected 1-year stock *market return* of 22 percent. On 7/28/1999, *The New York Times* reports that a similar *Paine-Webber* survey found expected stock market returns in excess of 20 percent for both the 1-year and 10-year horizons. On 11/15/1999, the *Financial Times* reports a *Gallup/Paine-Webber* poll which found "only" a 16 percent expected stock market return over both 1 and 10 year horizons.[4]

In contrast, professionals tend to be more conservative. A survey of pension fund executives and other institutional investors by *Pensions and Investments* (1/12/98, page 1) found an expected equity premium of 3 percent, and the 1997 *Greenwich Associates* survey of fund professionals found an expected 5-year equity premium of 4 to 6 percent.[5]

Individual organizations tend to be in line with professional investors. *Financial Engines* appears to use a short-term equity premium of about 6 percent. *McKinsey* seems to recently have standardized on an equity premium arithmetic figure of 5 percent to 5.5 percent for valuation purposes. The *Social Security Administration Office* assumes a 7%−3% = 4% geometric equity premium, based on a dated historical average. Naturally, those arguing that rescuing *Social Security* requires an asset reallocation into equities contend that the 4 percent equity premium is too low, based on observed historical averages; others consider this figure too high (Diamond (1999)).

For a sampling of finance textbooks, Copeland, Koller, and Murrin (1995, p.260) recommends a 5 to 6 percent geometric average. Grinblatt and Titman (1998, p.174) uses 10 percent in an example, but, after giving a discussion, is notably silent on giving any estimate (cf. p. 176). Ross, Westerfield, and Jaffe (1993, p.257) recommends 8.5 percent. Van Horne (1992, p.214) recommends 3 to 7 percent. Weston, Chung, and Siu (1997, p.190) recommends 7.5 percent.

F Summary

In sum, there are wide discrepancies in estimates of the *expected* equity premium, ranging all the way from −10 percent to +20 percent depending on the source of the forecast. Such disagreement about the expected equity premium can lead to absurd consequences in the classroom, courtroom, and boardroom: The same project may require passing a hurdle rate of 10 percent in one company and 20 percent in another; the same investor may receive retirement advice that suggests vastly different retirement ages, saving needs, and investment policies; and politicians may or may not advocate different reforms of the social security system, each based on a different estimate of the equity premium and each backed up by a generally accepted estimation method.

The goal of this survey is to provide a "meta-estimate," i.e., a weighted average of estimates used by financial economists, which could become a focal point different from the aforementioned estimates. Although this consensus has no claim that it offers the correct best ex-ante estimate, it is at least an appropriate "common-practice" estimate among one group of well-informed individuals, usually asked to provide such estimates in their ordinary course of instruction and without financial incentives to radiate biased estimates.

II The Survey Design

This paper summarizes the results of two surveys, henceforth referred to as the first and second survey.

A The First Survey

The first survey is printed in Appendix B. This paper reports statistics for [a] forecasts of the mean and 5 percent and 95 percent confidence interval for the equity risk premium (stocks minus equivalent horizon bonds), for a 1-year, 5-year, 10-year, and 30-year horizon; [b] an estimate of the mean that other academics would provide on this survey; and [c] views regarding nine issues of relevance to the academic finance literature.

It was posted on the author's WWW site (http://linux.agsm.ucla.edu/) in October 1997. In addition, a hardcopy was mailed to finance professors at 11 universities with large finance faculties, associate editors at three major journals, and the author's colleagues at UCLA. Almost all of the responses came from the mailings, not from visitors to the WWW site. There were 114 valid completed forms, the first arriving in October 1997, the last in February 1998.

To correct the major ambiguity in the first survey, whether participants had responded with a geometric or arithmetic average, respondents were contacted by email in October 1998 and asked whether their 30-year answers were arithmetic or geometric averages, and for whether their views on the 30-year equity premium forecast had changed. 85 participants responded to the request for clarification; only 29 did not. Overall figures provided in the tables reflect appropriate adjustments to the first survey estimates, as described in Appendix A, to make them equivalent to answers to the second survey.

B The Second Survey

The second survey is printed in Appendix C. It was shorter and corrected several shortcomings of the first survey. It elicited explicitly both geometric and arithmetic 30-year averages, requested an equity premium defined as the difference between stocks and *short-term* bills, added a question about how an increase in equity prices would influence a researchers' views, added questions on the 100-year equity premium and 30-year inflation, on whether the respondent considered himself an expert or had published on the subject, survey completion time and clarity of the survey. This second version was posted both on the author's aforementioned WWW site and the *Journal of Finance* WWW site, and elicited 112 responses by Ph.D. level financial economists.[6] The first response was received in January 1999, the last in May 1999. Reported figures in the tables break out responses to this second (more accurate) survey.

C Problems

This survey admittedly suffers from a number of problems. First, economists were not properly incentiviced to reveal their best estimate. However, the cost of jotting down a number that all finance professors have to tell students on a daily basis is low. The majority of professors contacted were willing to participate. Even though it is possible that participants represent a biased sample, a visual inspection reveals a fairly large subset of professors at many leading universities. Second, this survey was *not* a controlled experiment, but an attempt to take the pulse of the profession. The survey did not permit anonymous responses, and none was received. I was clearly identified as the person asking the question. Most finance professors would be unlikely to answer a survey sent by someone they do not know. Indeed, most responses were received only after private email reminders. Third, second

survey participants answered one year later—after a significant market rise and after the first writeup of this paper was available. Yet, even if the circulated first draft of the paper had changed some participants' views, this paper would be interested more in their revised than in their original views. Fourth, the presence of the Brealey and Myers historical figures on the right of each question may have induced respondents to anchor on them. In defense, the Ibbotson numbers are familiar to most finance professors, and their presence may have increased the survey response rate by allowing participants to answer without delaying until they could find the time to verify the Ibbotson numbers. (Moreover, these figures were originally intended to clarify whether I was asking for a geometric or arithmetic average.) Fifth, the questions in the first survey were ambiguously phrased and required email clarification and adjustments. Unfortunately, it is not possible to find a fresh set of participants to replenish the pool. Fortunately, clarified *adjusted* answers to the first survey are very close to the answers of the second survey.

III The Academic Equity Premium Consensus

A Long-Horizon Equity Premia

The bottom-right panel of Figure 1 plots the distribution of 226 answers to the 30-year arithmetic forecast for the equity premium using the largest set of answers. Impulse lines within the bars on the 30-year graph plot the distribution of answers to the second survey only.

Insert Figure 1 here

Table II shows that various central statistics (the mean, the 5% and 95% truncated mean, and median) suggest an academic expected arithmetic 30-year equity premium consensus of about 7 percent.[7] Figure 1 shows that the mode response is about 8 percent. Still, only about 20 percent of participants on either the first

Insert Table II here

or the second survey picked an (unadjusted[8]) number between 8 percent and 8.9 percent (8.5 percent being the largest), equal to the historical Ibbotson estimate quoted by the questionaire itself. The historical average does seem to have strong influence, but about 80 percent of participants provided their own estimate instead. The standard deviation of the expected 30-year premium is about 2.0 percent,[9] the first quartile is 6 percent, the third quartile is 8.4 percent. There is a pronounced clustering between 5 percent and 9 percent, but there are more individuals below 5 percent than there are above 9 percent. Remarkably, Figure 1 does not indicate multi-modality—the profession does not divide neatly into two or three camps each of which forecasts its own number. Most individuals choose a convex combination of the above-mentioned forecast methods, with most of the weight on the long-term historical average.

As to differences between the first and second survey, 112 second-survey respondents offered an equity premium estimate of 6.7 to 7.0 percent, depending on the central statistic. Adding in the email-clarified responses (for a total of 197 clear responses), the mean 30-year equity premium forecast rises back to the 7.1 percent, equal to the average of all 226 respondents. The (relatively small) difference of 0.4 percent can thus be mostly attributed to a sampling variation across individuals (perhaps due to increased stock market level by the time the second survey was run; see Section III.E), and only secondarily to remaining miscorrection in the adjustment calculation.

In sum, 6.8 percent to 7.0 percent is a robust estimate for the consensus about the 30 year arithmetic equity premium among financial economists. However, there is considerable disagreement across economists.

Not reported in the table:

Geometric Averages: About half the respondents offered explicitly a geometric 30-year equity premium forecast. *The academic consensus for the geometric 30-year equity premium is around 5.2 percent per year.*

100-Year Equity Premium Forecast: Among 45 responses to the (optional) request for 100-year forecasts on the second survey, the 100-year arithmetic equity-premium forecast mean was 6.5 percent, which was about 1 percent less than the same respondents' 30-year forecast mean.

Stock Market Forecast: Respondents to the second survey offered a 30-year *arithmetic stock market forecast* of 11 percent (standard deviation 2.1 percent).

Recent Updating: Among 85 first-survey respondents contacted by email about a year later, only 9 individuals chose to reduce their estimates, 4 individuals chose to increase their estimates.

B Shorter-Horizon Equity Premia

Table II shows that the largest set of adjusted responses, 170 in total,[10] indicates an arithmetic 10-year equity premium forecast of 7 percent (standard deviation: 2 percent). For the 58 individuals answering this question on the second survey, the average was slightly lower and practically identical to these respondents' 30-year arithmetic equity premium forecast, both 6.8 percent. (The average difference between 10-year and 30-year arithmetic equity premia forecasts when both are available is 0.2 percent.) It is fair to characterize any difference between 10 and 30 year equity premia forecasts as insignificant.

However, the two shorter term arithmetic equity premium forecasts of 1-year and 5-years are lower, both in economic and statistical terms.[11] Relative to the 10-year and 30 year forecasts of about 7.1 percent, the 5-year untruncated forecast mean is

about 0.5 percent lower and the 1-year untruncated mean forecast is about 1 percent lower. (Truncated mean differences are smaller and but the average differences for respondents for which both are available are 0.7 percent and 1.4 percent.) This is primarily due to a more frequent presence of negative forecasts rather than a left shift of the distribution. Twelve (two) respondents recommend an estimate that suggests that they believe treasury bills will outperform stocks over the next year (next five years). Compared to the long-term forecast, there is also considerably more disagreement among economists for what the best short-term equity premium forecast is. The truncated standard deviation *across* financial economists rises from the 1.7 percent for 30-year forecasts to about 2.5 percent on a one-year forecast; the untruncated standard deviation rises even more.

C Optimistic and Pessimistic Scenarios

Respondents were also asked to provide their 5th percentile and 95th percentile scenarios for the equity premium. This was an optional question, so the number of responses to these questions is lower than the number of responses to the earlier question about the 30-year mean forecast. Most finance professors are unlikely to have given much thought to this question, because they do not usually have to provide such figures. Consequently scenario estimates are intrinsically less reliable than economists' own expected forecasts This unreliability is reflected in a much wider dispersion of answers and some inconsistencies.[12] The reader should focus primarily on the more robust statistics based on medians and truncated means and not on the simple means.

Figure 2 graphs the expected, most optimistic, and most pessimistic scenario when individuals are sorted by their 30-year arithmetic forecast. The statistics are provided in Table III. The top half of Table III shows that the most optimistic arithmetic 30-year equity premium scenario consensus is somewhere between 11 per-

Insert Figure 2 here

Insert Table III here

cent and 13 percent per year. (For 56 answers to the second survey, the median and mean is about 11 percent.) Shorter-term optimistic-case scenarios are successively more optimistic, but the magnitude depends strongly on the central statistic used. The 10-year optimistic scenario arithmetic equity premium forecast lies at around 15 percent, the five-year optimistic scenario lies at around 20 percent, and the one-year optimistic scenario lies between 25 and 30 percent. In the minds of many academics, the most recent three years were rather unusual (one in twenty) realizations *each*.

The bottom half of Table III shows that the pessimistic arithmetic 30-year equity premium scenario (at the 5 percent level) consensus is between 2 percent and 3 percent (median) per year. (For 55 answers to the second survey, the median and mean is about 4 percent—*higher* than it is in the overall sample [not lower as is the mean forecast].) Shorter-term pessimistic-case scenarios are successively more pessimistic. The 10-year pessimistic scenario forecast lies around 0 percent, the five-year pessimistic scenario lies around -8 percent, and the one-year pessimistic scenario lies between -20 percent and -25 percent.

It is remarkable that even at a probability of 1 in 20, financial economists tend not to believe that a meltdown of Japanese style proportion that lasts for 10 to 30 years. Indeed, the confidence of financial economists is remarkable: the typical *pessimistic* 1-in-20 case 30-year scenario foreseen by financial economists is about the equity premium which Mehra and Prescott (1985) consider to be consistent with reasonable risk aversion; which is consistent with the hypothesis that recent high stock returns are simply reflections of lower required future equity returns; and which is predicted by both Siegel (1999) and myself personally.[13]

There is a negative correlation between the optimistic and pessimistic estimates across economists—economists who indicate a more positive optimistic scenario also indicate a more negative pessimistic scenario. Thus, variation in optimistic/pessimistic

scenarios are driven more by differences in confidence than by differences in estimates of the mean. The correlation between the pessimistic and mean equity premium forecast is *positive*—economists with higher equity premium mean forecasts also provided more favorable pessimistic scenarios. Thus, the pessimistic estimates to the survey tend less to reflect disagreement on where the economy lies in terms of the risk-return tradeoff—in which case one would expect individuals indicating a more positive equity premium mean to also indicate a more negative possible outcome—but across-economist views about the attractiveness of the stock market.

The term structure of volatility that can be extracted from these extreme forecasts is roughly consistent with a random walk with a volatility of about 15 percent.

D The Perceived Consensus

What equity premium do financial economists believe their peers are recommending? This is interesting for a number of reasons. Economists are likely to weigh their otherwise private estimates against what they perceive to be a common consensus, and come up with a posterior estimate that averages the two. An incorrect perception of the estimates of others can delay the process of collective adjustment. If one believes everyone else believes the equity premium to be 8 percent, then one may be reluctant to quickly adjust one's view away from 8 percent. In this sense, this survey may aid the profession's aggregation of opinions. Further, the perception might indicate the extent to which this survey is informative to researchers. If economists' personal views and views of the profession's consensus already coincided, this paper would be less informative and economists' estimate could be considered more reliable.

Table IV shows that economists' perceived consensus is not monotonic in the

horizon, although differences are small. The belief is that the 30-year and 5-year equity premium consensus are about 7.5 percent, about 8 percent for the 10-year consensus, and 6 percent for the one-year consensus. Comparing this to the equity premia forecasts themselves (on the left side), the popular view is that their own consensus is between one-half and one percent higher than what it actually is. Except on the 1-year horizon (which has fewer responses and higher standard series deviation), the difference is statistically significant. Note also that economists believe more in their ability to judge the consensus than to judge the equity premium itself, even over 30-years. However, there is still substantial disagreement among economists.

Insert Table V here

The influence of this overestimate is further explored in Table V. The left part of the table provides the univariate means and standard deviations *for the set of researchers with both a forecast and a consensus estimate*. Again, the misperception is between 0.5 to 1.0 percent. However, economists' own estimates need not be influenced by their perceptions of the prevailing consensus—for example, everyone may invariably believe others use the Ibbotson 8 percent figure and have their own equity premium forecast be unaffected thereby. To explore whether there is an "anchoring" effect, i.e., whether economists have a perception of the consensus and shade their own equity premium forecast toward this perception,[14] Table V described the results of a regression with the demeaned consensus on the demeaned forecasts. A coefficient of one indicates perfect shading, a coefficient of zero perfect irrelevance.

The regressions reported on the right side of Table V show that the same economists indicating they believe the professional consensus to be higher also offer a higher equity premium forecast themselves. This is especially pronounced on the 1-year horizon and on the 30-year horizon. It is weaker on the 5-year and 10-year

horizons. Perhaps financial economists often use either short horizon (1-year) or long horizon (30-year) rates, but less often use either 5-year or 10-year rates.

In sum, the regressions are consistent with an attempt by economists to provide a forecast that lies between their personal estimate and their perceived consensus belief. If this is the case, the results of this survey may help economists improve their "anchoring" their own predictions relative to the profession, which would cause a downward revision in the aggregate consensus forecast.

E Other Statistics

The most interesting remaining question concerns the influence of market movements. Almost all finance professors subscribe to the view that markets follow a random walk in the short-run. Updating of equity premia opinions is likely to be a very slow process and changes in opinion are likely to be marginal only. Still, participants on the second survey were also asked to indicate whether they would be positively, negatively, or not at all influenced by stock market movements *on the margin*. Coding this feedback rule as +1, −1, and 0, respectively, the mean response by 112 participants to this question was −0.367, with a standard deviation of 0.5. Thus, the average participant claims that a bull market leads him/her to predict a lower future equity premium.[15]

Finally, the second survey asked whether financial economists considered themselves to be relatively better informed with respect to the equity premium and whether they have published in the area. There were 51 responses indicating no prior relevent publication, 13 of who considered themselves less qualified (mean arithmetic 30-year equity premium: 6.6 percent), 3 of whom considered themselves better qualified (mean: 7.3 percent), and 35 of whom considered themselves equally qualified (mean: 7.3 percent). Of the 17 individuals who indicated a relevant publi-

cation, 6 considered themselves better qualified (mean: 6.4 percent), 11 considered themselves equally qualified (mean: 6.6 percent). Thus, lower forecasts tend to be either by individuals who had published related work or individuals who felt ill qualified to answer the survey.

IV Questions Debated in Academic Finance

The first survey took the opportunity to add a set of questions that asked their views on issues that are commonly debated in the academic literature, and on which most researchers who attend finance conferences and seminars are likely to have an interest in (or at least an opinion on). Answers could range from "1" (strongly disagree) to "3" (neither agree nor disagree) to "5" (strongly agree). Table VI lists both the questions and the received responses.

Insert Table VI here

The first question asked whether the stock market is more likely to follow a random walk or more likely to have long horizon negative autocorrelation. It turns out that more professors have an opinion ("agree" or "disagree") than no opinion ("neither agree nor disagree"), but when they do this opinion is roughly evenly split. The jury is still out.

The second question concerned the use of the capital asset pricing model (CAPM) for capital budgeting purposes. Although a sizeable minority of professors do not believe it is "good enough" to be used for capital budgeting purposes, a majority feels it is.

The third question asked whether size and book/market values are more likely to be characteristics (in the Daniel and Titman (1997) sense) or more likely to be risk factors (in the Fama and French (1993) sense). The respondents mildly favored the view that they are characteristics.

The fourth question asked whether the factors/characteristics (size/book-market/price-earnings/momentum) are likely to be useful for portfolio selection in the future. The profession does not have a strong view on this issue. This ambivalent view is remarkable, given the large number of publications and strong ongoing interest in detecting past "anomalies." Prior to conducting this survey, it had seemed to the author that the common working hypothesis in finance is that at least the major anomalies are universally viewed to represent persistent phenomena. This survey does not confirm this.

The fifth and sixth question asked whether markets are basically efficient and arbitrage-free. There was much agreement here: financial economists feel that, by-and-large, financial markets are efficient. The sixth question asked whether economists believe in arbitrage opportunities—an ability to make money without risk. Apparently, the respondents did pay attention, and also marked a strong view in favor of absence of arbitrage.

The only question that elicited more support than absence of arbitrage was the question about whether governments should intervene more in financial markets. The profession strongly feels that this would be counterproductive.

Finally, two questions related to corporate finance. The eighth question asked whether large Fortune-500 firms have too little debt in the capital structure, and whether share repurchases dominate dividends as a means of payout. The profession has no views on whether large Fortune-500 firms would be better off with more debt in their capital structure. But they perceive dividends to be an unwise mechanism for corporation to disburse funds relative to share repurchases.

In sum, it is remarkable how weak the views of financial economists are, even on issues as absence of arbitrage that are typically seen as relatively uncontroversial. about one quarter of the participants responded with a value between strong disagree and "neither agree nor disagree." On most questions, there was neither strong

agreement nor strong disagreement by many participants, even when central issues in finance and stark positions were concerned.

V Conclusion

This paper presents the results of the first comprehensive survey of financial economists. 226 finance professors shared their forecasts and perspectives on the equity premium and some related issues. The primary findings are:

1. The average arithmetic 30-year equity premium consensus forecast hovers around 7 percent. On the one hand, this is not as high as the current historical 9.4 percent arithmetic average quoted by Ibbotson or even as high as the Brealey and Myers (1996, p.146) quoted average of 8.4 percent per year. Practitioners who would prefer to base their estimates on the perceived academic consensus should thus use a lower 7 percent arithmetic premium instead.

   On the other hand, the 7 percent equity premium consensus forecast seems too high for comfort among macroeconomists who argue that stock prices have risen because rational informed investors now require and expect lower future equity rates of return. These rational informed investors are *not* the finance professors surveyed here. Indeed, the 1 percent to 3 percent theoretical estimate is roughly the academic consensus for a worst-case (1 in 20) 30-year scenario.

2. There is a term-structure of equity premia *forecasts*: short-term forecasts are lower than long-term forecasts. (Unfortunately, this consensus also prevailed on the first survey in early 1998!).

3. There is evidence for a "false consensus effect." On average, finance professors believe that their consensus is about 0.5 to 1 percent higher than it actually

is, especially on shorter horizons; and there is a strong correlation between a researcher's perception of the consensus and his/her own estimate. This is evidence that participants "anchored" their own responses on their perceptions of the professional consensus—and it may indicate that the publication of this paper may shade down the equity premium consensus forecast among financial economists.

4. On average, financial economists claim to revise their forecast down as markets increase ("negative feedback").

5. There is strong agreement among financial economists that the government ought to decrease its intervention and regulation of public securities markets, and that markets are by-and-large efficient and arbitrage-free. They also would mildly recommend to corporations to use more share repurchases and fewer dividends. And they have no strong views, one way or another, whether the stock market follows a random walk, whether firms can reasonably use the CAPM for capital budgeting, whether large firms should use more debt financing, whether size and book/market are risk factors or characteristics, or even whether size and book/market will continue to predict stock returns in the future.

A Adjustments

The first survey considered the request for an average, paired with the well-known Brealey and Myers/Ibbotson 8 percent estimate, to mean "arithmetic," and considered the use of a long-term bond for long-horizon premia (rather than short-term bonds) to be the relevant definition. Because neither is a standard in this literature, this introduced ambiguities in the first (but not second) survey.

Geometric vs. Arithmetic Averages: A Taylor approximation yields

$$\frac{[(1+r)^T - 1] - T \cdot r}{T} \sim \left(\frac{T-1}{2}\right) r^2 + \left[\frac{(T-1)\cdot(T-2)}{6}\right] r^3 + O(r)^4 \qquad (2)$$

which can be used to adjust geometric and arithmetic averages. Because market returns are not perfectly serially uncorrelated (see Roll (1983)), the historical 1926–1997 differences provide a better adjustment:

Number of Holding Years	1	2	3	4	5	10	30
Equity Premium	0.0%	1.0%	1.4%	1.7%	1.8%	1.9%	1.8%

To correct the casual distinction between geometric versus arithmetic averages, I emailed participants of the survey with a request for clarifications of answers received to the first survey. This revealed that about a third of respondents had originally quoted a geometric average. To adjust answers to the first survey, for the 25 individuals who indicated that their answer was for a geometric average (out of 85 who responded to the request for clarification), the historically appropriate adjustment of 1.8 percent (see footnote A) was added to 5-year, 10-year, and 30-year estimates. For the 31 individuals who did not respond to the request for clarification, the following adjustment was computed. Among the 85 received clarification responses, a regression was fitted with the dependent variable being a dummy indicating whether the response was geometric (G_i) and the independent variable being the quoted 30-year forecast (Q_i):

$$G_i = 0.823 - 0.0877 \cdot Q_i + \text{noise}_i \qquad (3)$$

The fitted estimate was used as a "probability" adjustment ($p_g(Q_i) \equiv \hat{G}_i$) to translate the original answers by the 31 participants who had not responded to the request for clarification into arithmetic averages (a_i):

$$a_i = Q_i + p_g(Q_i) \cdot 1.8\% \qquad (4)$$

for 5-year, 10-year, and 30-year forecasts. Of course, no adjustment was necessary for 1-year forecasts.

Bonds Vs. Bills: Historically, over the 1926–1998 period, long-term bonds offered a geometric return of about 5.3 percent (arithmetic: 5.8 percent), whereas short-term bills offered a return of about 3.8 percent. However, these averages can be deceptive. The return on both instruments over the 1926–1981 period was identical; the long-term bond has been a much better performer only since 1981. Over the sampling period (October 1997 to May 1999), the *quoted* yield difference between the short-term and long-term bond was about 1.1 percent. (Other bond features, e.g. the value of a long-term call feature, reduce this figure.)

The first survey asked for the difference between the equity premium and the long bond, whereas the second survey asked for the difference between the equity premium and short-term treasuries. To translate all quoted first survey forecasts into bill-adjusted equity premia, a reasonable adjustment into treasury bill-adjusted rates was added (1 percent for the 5-year, 10-year, and 30-year forecasts, and 0.5 percent for the 1-year forecasts).[16] A reader interested in using an equity premium forecast relative to a bond rather than a bill should subtract about 0.5 percent to

the one-year bill-quoted equity premia, and about 1 percent to the longer-term bill rates. These adjustments were applied to all quoted figures *from the first survey*: long-horizon and short horizon equity premia, optimistic and pessimistic scenarios, and consensus estimates.

Other Adjustments: In addition, there were 5 extreme outliers on the first survey, in which the respondent quoted either 12 percent or 1,500 percent. I sent emails to these respondents to ask them if this was their correct estimate of the per-annum equity premium. All 5 respondents replied that they had misread the survey, either assuming that I had asked for the market expected return (not net of the risk-free rate), or that I had asked for a compound figure. Although it is possible that they meant to say 12 percent and I unduly influenced them, this is unlikely—these particular finance professors happened to have made their relevant views on this issue publicly known in other venues. In 4 cases, the answer in the survey was corrected. In 1 case, the respondent indicated that his numbers were wrong, but that he was too busy to fill out the survey again. This answer has been removed from the survey. The second survey had some automatic checks to alert respondents to extremely large or small estimates, primarily useful for catching individuals quoting total rather than average returns.

Perceived Clarity: The second survey also gathered some descriptive statistics. For 110 responses, the average time spent on the survey was about 3.5 minutes. On a scale of 1 to 10, with 1 indicating perfect clarity and 10 indicating perfect opacity, the mean was 1.8. There was a small negative correlation between perceived clarity and equity premia mean estimates, and a small positive correlation between time spent and equity premia mean estimates. In a regression, the coefficients indicate that an individual who felt one point more confused and an individual who spent about 2 minutes less indicated an arithmetic equity premium mean of about 0.25 percent less.

Other Adjustments: Residual adjustment error is likely to play only a small role. Sampling variation and the bull-market of 1998 probably account for much of the 0.4% difference between the overall survey figures and the second survey figures. This difference is well within the range of disagreement among economists' answers.

B The First Survey

(enclosed)

C The Second Survey

(enclosed)

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Notes

[-1] Contact: ivo.welch@agsm.ucla.edu. (http://linux.agsm.ucla.edu/). This paper was UCLA/Anderson Finance Working Paper 10-98. I am grateful for comments from Shlomo Benartzi, Michael J. Brennan, John Cochrane, David Wessels, Amit Goyal, Mark Grinblatt, Jay Ritter, Robert Shiller, Jeremy Siegel, René Stulz, Richard Thaler, and Fred Weston. I thank Patrick Cunningham for providing information about Greenwich Associates' survey of fund managers.

[1]Abel (1999) decomposes the equity premium into a risk and a term premium. Not surprisingly, the term premium accounts for about 25 percent of the observed equity premium.

[2]"Fortunately," aside from a number of statistical problems, such models have predicted consistently poorly *out-of-sample* at least since 1946. Goyal and Welch (1999) show that this is because simple linear models are unstable—the coefficients have declined over time.

[3]In addition to models based on standard representative agent utility maximization, these summary papers also discuss other, more "radical" explanations, such as behavioral explanations, e.g., as in Benartzi and Thaler (1995), and ex-post survival bias, e.g., as in Jorion and Goetzman (1999).

[4]Not surprisingly, investors have poured into the stock market in unprecedented numbers. On page 130 of the *1996 Mutual Fund Fact Book*, the *Investment Company Institute* reports a strong positive correlation between stock market rallies and mutual fund net inflows. In 1995, investors poured in $164B, e.g., up from $2.8B just after the crash (in 1988), up from a $40B/year average throughout the 1980s, and up from net outflows during the 1970s. (In general, the more aggressive the equity fund investment style, the larger the net fund inflows in the 1990s.) Aggregate net inflows into the three major public equity markets (equity issues minus dividends

and repurchases and bankruptcies) have seen multi-year levels unprecedented since the great depression.

[5]Fund managers predicted the S&P500 stock *index* (i.e., without dividends which account for about 1 to 2 percent per year) to offer a 10.4 percent mean, a 9.8 percent median. A range of 8 percent to 14 percent represents about two-third of the distribution. The survey was taken in September and October 1997, and encompassed 2,309 funds of which about 75 percent responded. It is published in "What Now?," by Greenwich Associates. Prior academic research on investment expectation can be found in Shiller (1999), Kon-Ya, Shiller, and Tsutsui (1996), Kon-Ya, Shiller, and Tsutsui (1991), Pound and Shiller (1989) and Shiller (1987). An update of Kon-Ya, Shiller, and Tsutsui (1996) shows a one-year stock market expectation of 6.6 percent by U.S. respondents, but high year-to-year variability.

[6]14 responses were from individuals who were not financial economists with a Ph.D. (mostly finance Ph.D. students. Their 30-year arithmetic average forecast was 5.3 percent on average, with a median of 5.9 percent).

[7]There is one outlier of 15 percent, which is responsible for an 0.04 percent higher estimate. In correlation and regression computations, this observation was eliminated.

[8]This is the only exception where the frequency of *unadjusted* estimates to the first survey is quoted. This is because the question is how many individuals just copied the provided 8 percent Ibbotson estimate provided by the survey. The median and mean unadjusted response to the first survey was about 6 percent, not 8 percent.

[9]Nordhaus (1994) surveys a set of economic and natural researchers about the potential impact of global warming, and finds remarkably high dispersion in expert

opinion. This equity premium survey mirrors this dispersion in expert opinion in finding high across-expert dispersion.

[10]In the second survey, shorter-term equity premia estimates were optional. There is no real difference between statistics computed over all reported answers, or only for those individuals where both shorter and longer equity premia forecasts were available. See Appendix A for more details.

[11]About 20 percent of survey participants offered an expected premium term structure that was monotonically increasing in horizon; 50 percent had the expected premium term structure monotonically decreasing. This decline in forecast by horizon is comforting in another sense: many financial economists did not just copy the provided Ibbotson estimate, but instead provided their own estimate. The number of unadjusted 8 percent answers drops from the 20 percent for the 30-year estimate to about 15 percent for the 1-year estimate.

[12]There were 4 responses for which the optimistic scenario was not better than the average forecast, and 1 response for which the pessimistic scenario was not worse than the average forecast. These 5 responses were first eliminated.

[13]To avoid economists' 7 percent consensus from becoming the "Welch number," I must take the unusual step of quoting my own personal estimate: 2 to 3 percent arithmetically over 30 years (see also Welch (1999)).

[14]Naturally, economists may settle on their own forecast and believe it is also held by the profession. Ross, Greene, and House (1977, p.280) reported a series of studies, in which subjects show a tendency to "see their own behaviors choices and judgments as relatively common and appropriate to existing circumstances while viewing alternative responses as uncommon, deviant, or inappropriate." Marks and Miller (1987) summarize this literature and describe some explanations. However, in this equity premium survey context (in which there is no temporal precedence),

it is not even clear if there is a philosophical difference between this view (in which own choices influences the consensus perception) and the view stated in the text.

[15]Respondents indicating that they follow a positive feedback rule are also more optimistic about the market. 66 individuals indicate they are not influenced by stock market movements on the margin, and provide 7.3 percent as their equivalent average; 43 individuals follow a negative feedback rule, with 5.7 percent as their equivalent average; and only 2 individuals follow a positive feedback rule (with 4 percent and 8 percent as their average arithmetic 30-year equity premium estimates). The fact that there is a correlation between the indicated feedback rule and the forecast should not be surprising, given the stellar recent stock market performance.

[16]This is lower than the historical 1.5 percent difference because some participants may have assumed a definition of equity premia, without reading the question more carefully. (This adjustment adds 112/226*1.0 percent~0.5 percent to the overall average.) The closeness of first survey and second survey results, especially after adjusting for the rising equity market, further indicates that this issue has been dealt with appropriately.

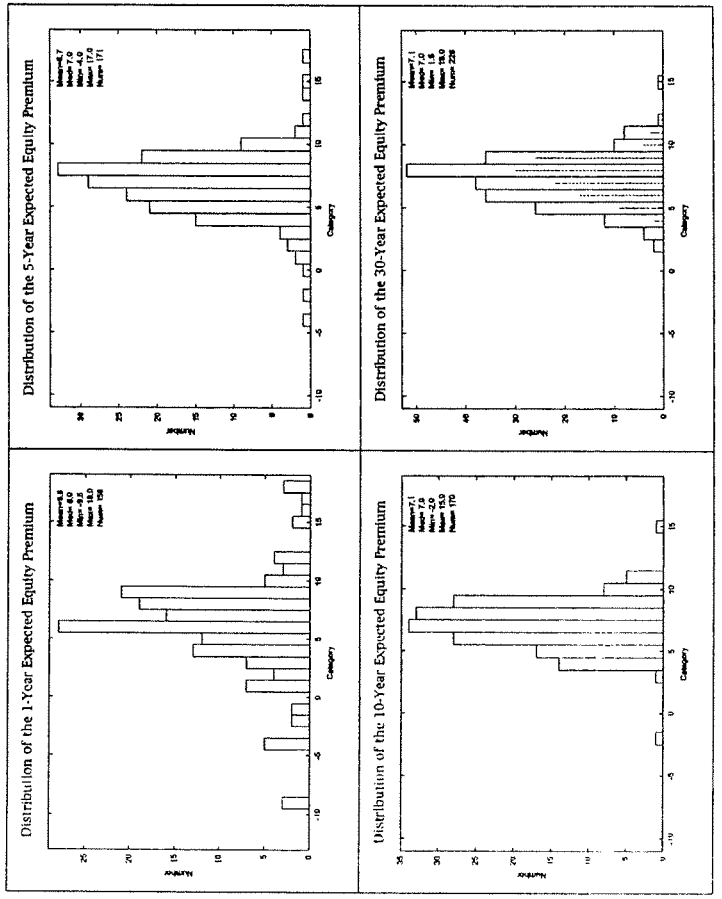


Figure 1. The distribution of arithmetic equity premia forecasts by financial economists. The surveys from which these histograms were computed are reproduced in the Appendix. Statistics are over both the first and second survey (after adjustments to first survey responses explained in Appendix A). The bottom right graph reports responses to the second survey as impulse lines inside the bars.

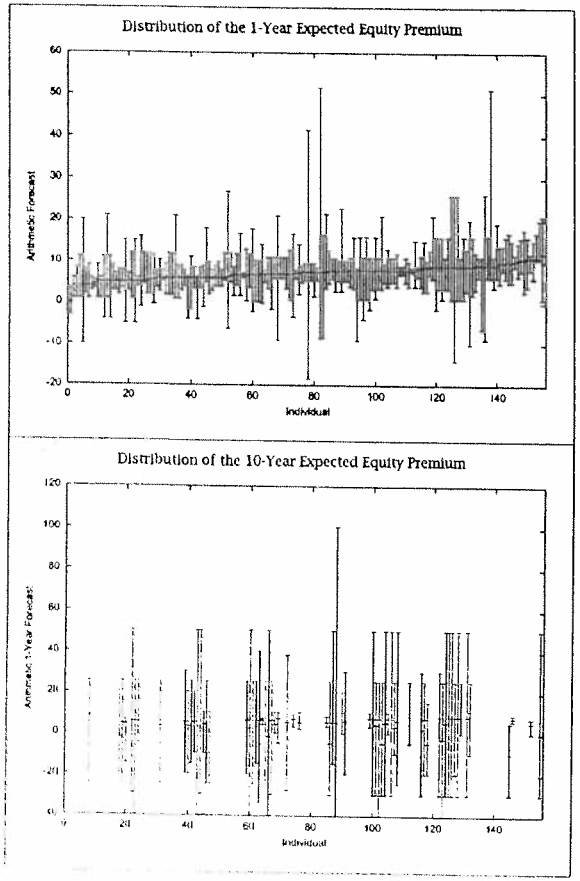


Figure 2. The Pessimistic-Scenario, Average, and Optimistic-Scenario 30-Year Arithmetic Equity Premium Forecast by 226 financial economists. Forecasts from the first survey were adjusted as explained in Appendix A. In both figures, individuals are indexed (lined up) identically, sorted by their mean forecast. Clustering in 1-year responses is induced because of discreteness in 10 year responses and the sorting procedure.

Table I

Historical Stock Market and Equity Premium Performance

Ibbotson estimates are published in the Ibbotson *Year-End Summary Report 1998.* They are based on the S&P500 return with dividends ("large company stocks") and 30-day to maturity treasury bills. Shiller indices are published in Shiller (1989, Chapter 26) and updated on *http://www.econ.yale.edu/~shiller/chapt26.html.* They are based on the dividend-adjusted S&P500 index (formerly called the *S&P composite index*) and a short interest rate *spliced from corporates and treasuries*, and computed from January to January index averages (of the following year), not December to December closing prices. Thus, the last price used in the computations is an average January 1999 index price. The indices differ primarily due to the use of different interest rates.
Geometric means are computed as

$$g_T = \sqrt[T]{\frac{\prod_{y=1}^{T}(1+\mathrm{rm}_y)}{\prod_{y=1}^{T}(1+\mathrm{rf}_y)}},$$

where rm_y is the market return and rf_y is the risk-free rate in year y. Arithmetic statistics are computed from a T-year series of $(\mathrm{rm}_y - \mathrm{rf}_y)$ in a standard fashion.
Unreported: averages computed using the value-weighted stock market index obtained from CRSP have means of about 0.3% more and standard deviations of about 2% more than equivalent S&P returns. Unreported: Inflation from 1926-1997 was about 3.1%.

Table I

Historical Stock Market and Equity Premium Performance (cont'd)

Stock Market Return Historical Averages								
			Geo.	Arithmetic				
Source	Time-Frame	#Years	Mean	Mean	Stddev	Min	Max	Stderr
Shiller	1870-1998	129	9.3%	10.8%	17.8%	-42.9%	54.9%	1.6%
Shiller	1899-1998	100	10.2%	11.9%	18.6%	-42.9%	54.9%	1.9%
Ibbotson	*1926-1998*	*73*	*11.2%*	*13.2%*	*20.3%*	*n/a*		*2.4%*
Shiller	1926-1998	73	11.0%	12.8%	19.3%	-42.9%	55%	2.3%
Shiller	1949-1998	50	13.3%	14.3%	15.1%	-21%	46%	2.1%
Shiller	1974-1998	25	14.8%	15.9%	15.5%	-20.8%	38.6%	3.1%
Shiller	1994-1998	5	23.8%	24.5%	13.4%	0.0%	35.1%	7.4%
Equity Premia Historical Averages								
			Geo.	Arithmetic				
Source	Time-Frame	#Years	Mean	Mean	Stddev	Min	Max	Stderr
Shiller	1870-1998	129	4.3%	6.0%	18.5%	-45.4%	53.4%	1.6%
Shiller	1899-1998	100	5.3%	7.1%	19.1%	-45.4%	53.4%	1.9%
Ibbotson	*1926-1998*	*73*	*7.1%*	*9.4%*		*n/a*		
Shiller	1926-1998	73	6.1%	8.0%	19.8%	-45.4%	53.4%	2.3%
Shiller	1949-1998	50	6.9%	8.2%	16.1%	-31.8%	44.1%	2.3%
Shiller	1974-1998	25	6.5%	7.9%	16.3%	-31.8%	31.3%	3.3%
Shiller	1994-1998	5	18.4%	19.0%	12.7%	-0.0%	28.6%	5.7%

Table II

Univariate Statistics For Arithmetic Equity Premia Forecasts

The table presents the distribution of arithmetic equity premia forecasts by financial economists. The surveys themselves are reproduced in the Appendix. The "S2" line reports only responses to the second survey. Other lines report statistics from both surveys after adjustments to first survey responses, as explained in Appendix A. Mean5 and Stddev5 are the mean and standard deviations after each series is truncated at its 5th and 95th percentile.

Description	Mean5	*Mean*	Stddev5	*Stddev*	Min	Q1	Median	Q3	Max	N
30-Year Forecast	7.1%	*7.2%*	1.7%	*2.0%*	1.5%	6%	7%	8.4%	15%	226
30-Year Forecast (S2)	6.7%	*6.8%*	2.0%	*2.2%*	1.5%	5%	7%	8%	15%	112
10-Year Forecast	7.0%	*7.1%*	1.9%	*2.0%*	-2%	6%	7%	8.4%	15%	170
5-Year Forecast	6.7%	*6.7%*	2.0%	*2.6%*	-4%	5%	7%	8.0%	17%	171
1-Year Forecast	6.5%	*5.8%*	2.4%	*4.5%*	-9.5%	4%	6%	8.5%	18%	158

Table III

Univariate Statistics For Arithmetic Equity Premia Optimistic and Pessimistic Outcome Forecasts

The table presents the distribution of arithmetic equity premia pessimistic and optimistic scenarios (at the 5% level) by financial economists. The surveys themselves are reproduced in the Appendix. The "S2" line reports only responses to the second survey. Other lines report statistics from both surveys after adjustments to first survey responses, as explained in Appendix A. Mean5 and Stddev5 are the mean and standard deviations after each series is truncated at its 5th and 95th percentile.

Description	Mean5	*Mean*	Stddev5	*Stddev*	Min	Q1	Median	Q3	Max	N
Optimistic 30-Year Scenario	12.8%	*13.3%*	4.9%	*6.7%*	3.5%	9%	11.2%	16%	51.5%	158
Optimistic 10-Year Scenario	15.4%	*16.5%*	5.5%	*10.9%*	6%	11%	15.4%	19.1%	101.2%	104
Optimistic 5-Year Scenario	21.2%	*23.1%*	11.5%	*22.3%*	8%	11%	17.8%	26%	201%	101
Optimistic 1-Year Scenario	28.6%	*29.2%*	14.9%	*17.0%*	6%	17%	26%	51%	101%	71
Pessimistic 30-Year Scenario	2.2%	*2.2%*	4.0%	*4.5%*	-18.5%	1%	3.2%	5%	11%	159
Pessimistic 10-Year Scenario	-0.8%	*-1.0%*	5.4%	*6.2%*	-24%	-4%	1%	2.8%	8.9%	106
Pessimistic 5-Year Scenario	-8.3%	*-9.0%*	10.2%	*12.4%*	-59%	-14%	-7.2%	0.3%	8.9%	102
Pessimistic 1-Year Scenario	-19.2%	*-19.6%*	13.5%	*11.9%*	-39%	-29%	-24%	-9%	6.5%	72

Table IV

Univariate Statistics For Economists' Arithmetic Equity Premia Consensus Estimates

The table presents the distribution of economists' perception of the prevailing equity premia forecast. The surveys themselves are reproduced in the Appendix. The "S2" line reports only responses to the second survey. Other lines report statistics from both surveys after adjustments to first survey responses, as explained in Appendix A. Mean5 and Stddev5 are the mean and standard deviations after each series is truncated at its 5th and 95th percentile.

Actual		Perceived									
Mean	Description	Mean5	*Mean*	Stddev5	*Stddev*	Min	Q1	Median	Q3	Max	N
7.1%	Perception 30-Year	7.6%	*7.6%*	1.5%	*1.7%*	1%	6.5%	7.8%	9%	12%	216
6.7%	Perception 30-Year (S2)	7.5%	*7.4%*	1.6%	*1.9%*	1%	6%	7%	9%	12%	112
7.0%	Perception 10-Year	8.1%	*8.2%*	1.3%	*1.4%*	4%	7%	8%	9%	12%	101
6.7%	Perception 5-Year	7.7%	*7.6%*	1.6%	*1.7%*	1%	7%	8%	9%	11%	99
6.5%	Perception 1-Year	6.0%	*6.0%*	2.3%	*2.4%*	0%	6%	7%	8%	12%	69

Table V

Statistics For Economists' Arithmetic Equity Premia Consensus Estimates

The left side of the table presents the mean and standard deviation of economists' arithmetic equity premia forecasts (A_i) and their perceptions of the prevailing equity premia consensus forecast (C_i), provided an individual supplied both an equity premium estimate and a consensus estimate for the same horizon. The right side provides OLS regression output when the demeaned arithmetic forecast ($\hat{A}_i - \bar{\hat{A}}_i$) is regressed on this economist's demeaned perception of the professional consensus about the same-horizon arithmetic forecast ($\hat{C}_i - \bar{\hat{C}}_i$). The surveys themselves are reproduced in the Appendix. The "S2" line reports only responses to the second survey. Other lines report statistics from both surveys after adjustments to first survey responses, as explained in Appendix A.

	Univariate Statistics, Common				$\hat{A}_i - \bar{\hat{A}}_i = \alpha_0 + \alpha_1(\hat{C}_i - \bar{\hat{C}}_i) + e_i$			
Description	Mean_A	Stddev_A	Mean_C	Stddev_C	α_0	α_1	(s.e.(α_1))	N
30-Year	7.1%	1.9%	7.6%	1.7%	0.0	0.62	(0.06)	214
30-Year (S2)	6.7%	2.1%	7.4%	1.9%	0.0	0.73	(0.08)	111
10-Year	7.2%	1.8%	8.2%	1.4%	0.0	0.31	(0.12)	99
5-Year	6.7%	2.3%	7.7%	1.7%	0.0	0.28	(0.14)	97
1-Year	4.7%	4.2%	6.0%	2.4%	0.0	0.79	(0.19)	67

Table VI

Questions on Issues Debated in Academic Finance

		Univariate Statistics		Response Count					
				Disagree				Agree	
	Description	Mean	Stddev	#1	#2	#3	#4	#5	Total
Q1	I believe that the true stock-market index's 3-5-year return autocorrelations are zero (random walk [ala Richardson, choose agree]), rather than negative (ala Fama-French, Shiller, choose disagree).	2.85	1.1	7	42	17	31	5	102
Q2	I believe that the CAPM is good enough an approximation of reality as to deserve use in capital budgeting contexts.	3.41	1.1	5	22	19	51	13	110
Q3	I believe that size/book-market/price-earnings/ momentum power can explain cross-sectional returns primarily because they are **risk** factors (in the Fama-French sense) and not just firm characteristics (in the Daniel-Titman sense).	2.64	1.2	18	33	19	20	7	97
Q4	I believe that size/book-market/price-earnings/ momentum factors are **stationary** enough, so that they will work well in the future in explaining cross-sectional expected return differences.	2.77	1.0	9	37	24	26	3	99

Table VI

Questions on Issues Debated in Academic Finance (cont'd)

Q5	I believe that, by and large, public securities market prices are efficient.	3.84	0.8	1	9	13	71	16	110
Q6	I believe that, by and large, public securities market prices offer arbitrage opportunities.	2.16	0.9	22	60	17	8	2	109
Q7	I believe that, by and large, government regulation and intervention of public securities markets should be increased. (Please select middle if intervention should be held steady, and strongly disagree if intervention should be decreased.)	2.13	0.8	29	39	40	0	1	109
Q8	I believe that Fortune-500 U.S. corporations, by-and-large, have too little debt in their capital structure.	3.09	1.0	4	26	23	30	6	89
Q9	I believe that Fortune-500 U.S. corporations, by-and-large, should use share repurchases instead of dividends as payout means.	3.68	1.0	4	7	21	42	18	92

Figure Captions

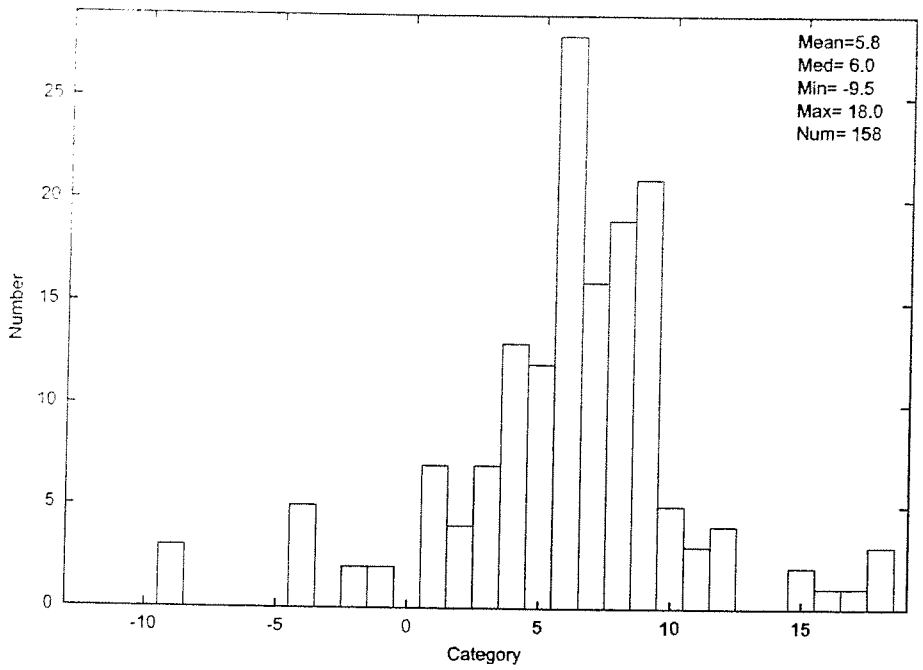
Figure 1: **The distribution of arithmetic equity premia forecasts by financial economists.**

The surveys from which these histograms were computed are reproduced in the Appendix. Statistics are over both the first and second survey (after adjustments to first survey responses explained in Appendix A). The bottom right graph reports responses to the second survey as impulse lines inside the bars.

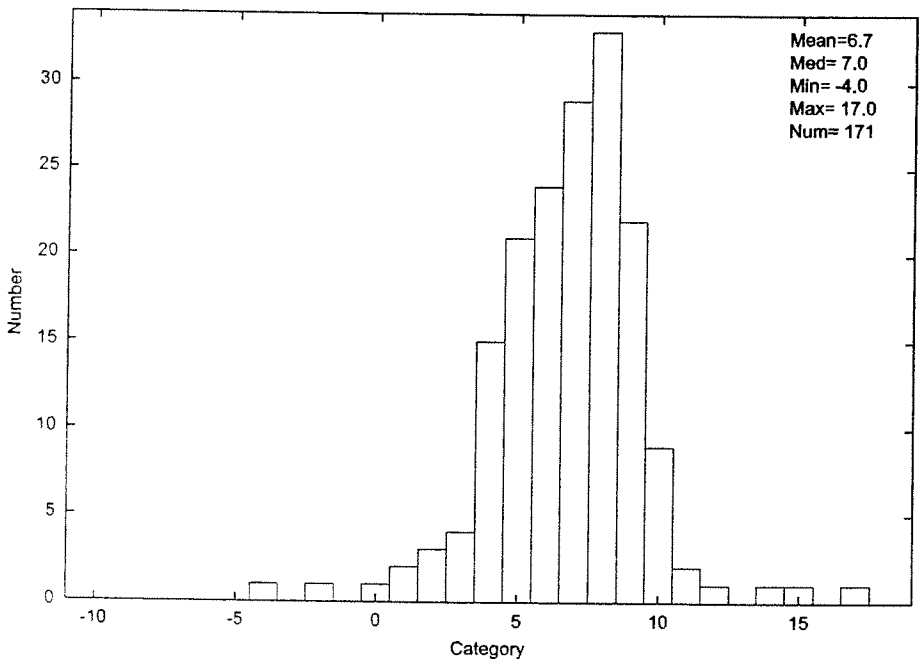
Figure 2: **The Pessimistic-Scenario, Average, and Optimistic-Scenario 30-Year Arithmetic Equity Premium Forecast by 226 financial economists.**

Forecasts from the first survey were adjusted, as explained in Appendix A. In both figures, individuals are indexed (lined up) identically, sorted by their mean forecast. Clustering in 1-year responses is induced because of discreteness in 30-year responses and the sorting procedure.

Typesetter: Larger Repeat 'Distribution of the 5-Year Expected Equity Premium from Fig.1'



Typesetter: Larger Repeat 'Distribution of the 5-Year Expected Equity Premium from Fig.1'



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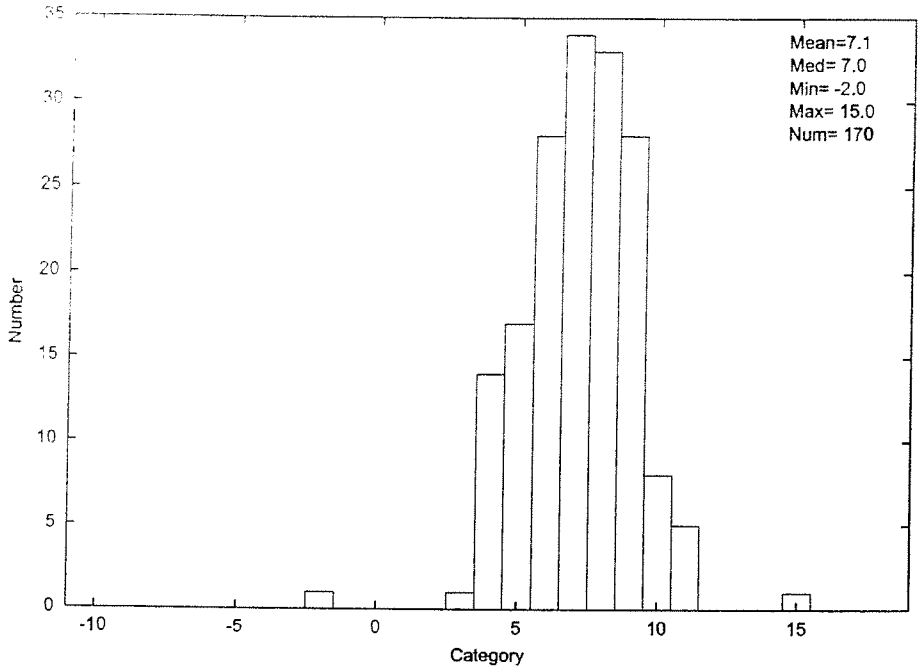

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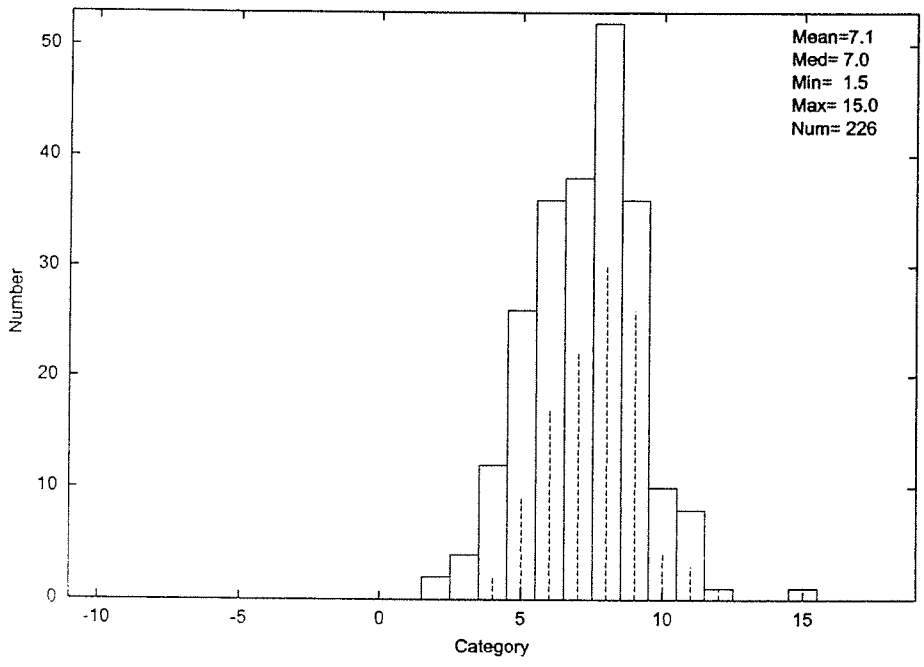

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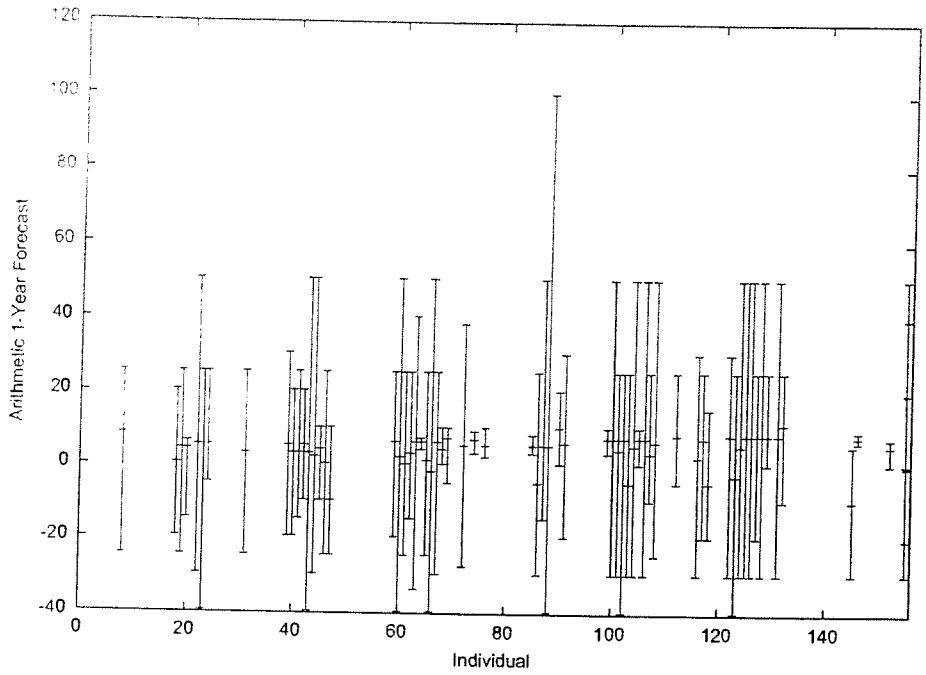

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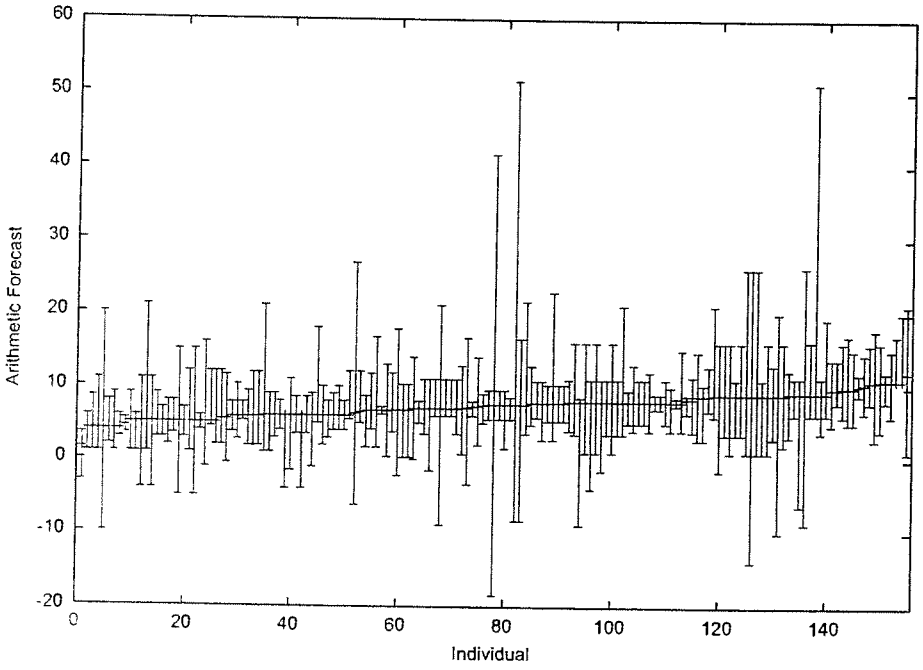

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Appendix H

ANNEX E: FINANCIAL MODELLING

I. Introduction

E.1 As in previous price control reviews, Oftel will base its proposal on each price cap and sub-cap on forecasts of BT's financial performance, which will be generated using a financial model. Into this model will be fed assumptions about a number of key determinants of BT's profitability over the forecast period, and the modelling process will produce a range of price control formulae that should lead to BT earning no more than an acceptable rate of return on each basket or sub-cap by the end of the price control period (subject to views expressed in consultation on this document on the desirability of a one-off adjustment to prices at the start of the period).

E.2 Since the aim of regulation is to mimic the workings of a competitive market, an acceptable rate of return for BT's price-controlled activities would be equal to its cost of capital on those activities. The next section deals with the derivation of the cost of capital for BT, and presents a range of estimates upon which comments are sought. The subsequent sections deal with the appropriate measure of rate of return that the estimated cost of capital should be applied to within the financial model. In the final section, the basic structure of Oftel's proposed model is discussed in some detail.

II. Cost of Capital

E.3 A firm's cost of capital can be defined as the rate ofreturn that could be earned in the capital market on securities of equivalent risk. In general, the higher the riskiness of the firm's activities, the higher its cost of capital, since investors typically require compensation for greater risk.

E.4 In recent price determinations and when setting the standard charges for interconnection to BT's network, Oftel has used a cost of capital of 15%. This rate is in nominal terms, is measured before investors' taxes and has been applied to historic cost asset valuations (or compared to historic cost accounting rates of return).

E.5 As part of the current review, Oftel needs to update its view on the cost of capital that should be used to set the price controls on BT over the following control period. Accordingly, it has sought expert advice on the theoretical foundations of and empirical evidence on the cost of capital, and in particular what this would imply for BT.

E.6 Oftel will announce its conclusions on the cost of capital in the consultative document to be published next March. The following subsections give a brief overview of the general theory behind the calculation of the cost of capital, provide an indicative range of estimates of the cost of capital for BT under various assumptions and suggest how this might differ for those activities which are subject to price control.

Methods of Calculating the Cost of Capital

E.7 For a firm financed by debt and equity such as BT, the cost of capital will be a weighted average of its cost of capital from both sources. In what follows, general techniques used to derive the cost of equity and debt are first discussed; this is followed by indicative estimates of the components of the weighted average cost of capital for BT, leading to an indicative range for BT's pre-tax weighted average cost of capital, on which Oftel seeks views.

Cost of equity

E.8 Two main methods are typically used to establish a firm's cost of equity. The most widely used model for estimating the equity cost of capital is the **Capital Asset Pricing Model (CAPM)**. The basic premise of this model is that investors require a higher expected rate of return on any investment in order to compensate them for a higher risk of returns on that investment (as measured by the variability of those returns).

E.9 Investors are assumed to be able to reduce risks by holding diversified portfolios of equities. However, there is a degree of systematic risk inherent in even the most diversified portfolio of shares, since the value of the whole stock market can rise or fall, reflecting the risk inherent in the general economy.

E.10 This non-diversifiable risk cannot be eliminated by holding shares in a large number of companies, and is therefore a component of the cost of equity. If the risk-free rate is that rate of return which investors would be able to earn with certainty, the market risk premium is that additional return that investors would require in order to compensate them for holding a share whose returns moved in line with those of the stock market as a whole.

E.11 Returns on shares in some companies will fluctuate in step with, but more widely than, returns to the stock market as a whole. Returns on other types of shares will fluctuate in step with, but less widely than, the stock market as a whole. Others still could move against the market. The degree of correlation between returns on shares in one company and returns on the stock market as a whole can be estimated using dividend and share price data and is captured in a coefficient known as the company's Beta. A company showing higher than average non-diversifiable risk will have a Beta coefficient in excess of one, while a company showing lower than average non-diversifiable risk will have a Beta less than one.

E.12 The cost of equity to the firm can then be calculated according to the basic CAPM formula below:

Appendix 4 (iii)

$Re = Rf + Beta.[E(Rm) - Rf],$

where Re is the cost of equity finance, Rf is the risk-free rate of return, Beta is the degree of correlation between returns on the company's shares and returns on the stock market as a whole, E(Rm) is the expected return on the market and E(Rm) - Rf is the expected market risk premium or excess return to equities.

E.13 This calculation can be done in real or nominal terms. The two should have identical implications for measuring the financial performance of the enterprise, provided that the inflation rate assumed in the financial forecasts is the same as that implied by the difference between the estimated real and nominal cost of capital.

E.14 One criticism often levelled at the CAPM is that the calculation of the equity premium is based on historic excess returns on equities rather than the returns that investors expected to achieve. Since investors base their decisions today on expectations of returns and their variability in the future, it would appear preferable to look at expectations directly. This is particularly important in the light of evidence that suggests that the risk premium varies over time, so that estimates of historic excess returns may not be a reliable guide to excess returns required in the near future.

E.15 The main alternative model, the **Dividend Growth Model (DGM)**, attempts to alleviate these problems by using the expectations of investors directly. This model can either be applied to the whole stock market, in order to obtain an estimate of the market equity risk premium to be substituted into the CAPM formula discussed above, or can be used directly to estimate the cost of equity for an individual firm.

E.16 In the firm-specific version of the model, the firm's cost of equity is assumed to be equal to the discount rate which, when applied to the expected future dividends on shares in that company, makes the sum of these dividends equal to the current share price. More simply, if it is assumed that dividends are expected to grow indefinitely at an annual rate g, then the cost of equity to the firm can be shown to be given by:

$Re = Do/Po + g,$

where Do is the dividend paid at time 0 and Po is the share price at time 0.

E.17 The main difficulty with this type of calculation is that it is necessary to form a view about investors' expectations of future dividend growth, and these expectations are usually difficult to elicit with any degree of accuracy. Analysts' forecasts of future dividends on shares in large companies such as BT can be used as an indicator of market expectations of future dividend growth. However, it is questionable whether sufficient independent forecasts are available to provide an accurate estimate of BT's cost of equity. A further problem with this technique is that analysts' forecasts do not typically extend far beyond two years into the future, so that estimates of g are very speculative.

E.18 Nevertheless, since Oftel needs to calculate BT's cost of capital over the next control period, it is important to take account of forward-looking estimates, especially in the light of evidence that the cost of capital tends to change over time. Indicative estimates of BT's cost of equity derived from the DGM are therefore presented alongside CAPM estimates in the following sections.

Cost of debt

E.19 In the absence of specific information on the interest rates being paid by the firm in question, the pre-tax cost of debt is typically calculated by adding a small corporate risk premium to an estimate of the risk-free rate of return, as proxied by the return on government debt used in the CAPM calculation.

Indicative Estimates of Cost of Capital for BT

Post-Tax Cost of Equity

E.20 In this sub-section, historical estimates of the cost of equity to BT are built up from individual components of the CAPM formula explained above, and compared to forward-looking estimates based upon the DGM approach.

Risk-free rate of return

E.21 The nominal risk-free rate of return is typically calculated as the yield on fixed-interest government debt of a certain maturity. The choice of maturity depends upon the time horizon over which the risk-free rate is to be estimated. For Oftel's purposes, this might be the length of the next price control period, ie around 5 years. Gross redemption yields before tax on gilts of this maturity are currently around 7.6% for a zero rate taxpayer. However, from BT's point of view, a more appropriate maturity might be one which corresponds to the average life of its assets. Since this is fairly long, yields on gilts with maturities in excess of 15 years would be an alternative choice for the risk-free rate of return. Gross redemption yields before tax on gilts of this maturity are currently around 8.4% for a zero rate taxpayer.

E.22 The real risk-free rate of return which is consistent with the nominal rate can be estimated from the yields on index-linked gilts of similar maturity. The implied inflation rate expected by investors over the period can then be calculated as the proportionate difference between the two.

E.23 A further complication is that the estimated post-tax risk-free rate and the implied inflation forecast depend upon the tax rate that is assumed for the marginal investor, since the gilt which offers the higher post-tax yield will be different for zero rate taxpayers then for basic rate taxpayers, for example.

E.24 Table E.1 gives an indicative range of the nominal and real risk-free rates of return for gilts of different maturities, together with the implied inflation rate, based on different assumptions about tax rates.

Table E.1 Risk-Free Rates of Return: Indicative Ranges

Inflatio rate*			Nominal		Real	
n						
year	5 year	15 year	Period:	5 year	15 year	5 year	15
		% per annum				
Before inflation risk adjustment						
4.2	4.5	0% taxpayer		7.6	8.4	3.3	3.7
3.2	3.5	25% taxpayer		8.0	8.8	3.6	4.0
After inflation risk adjustment							
3.7	3.6	0% taxpayer		7.1	7.4	3.3	3.7
2.8	2.8	25% taxpayer		7.5	7.8	3.6	4.0

Note: (1) The implied inflation rates are calculated by dividing (1 + nominal %) by (1 + real %), where real and nominal rates are net of tax - as opposed to the rates shown above for the 25% taxpayer, which are gross of tax.

E.25 It is possible that medium- and long-term nominal giltyields incorporate a risk premium over and above short-term yields in order to compensate investors for uncertainty about inflation. In the bottom half of Table E.1, the risk premium has been assumed to be 0.5% for five-year gilts and 1.0% for fifteen-year gilts. Nominal gilt yields and implied inflation rates have been adjusted accordingly, and it has been assumed that the inflation risk premium is negligible for index-linked stock.

E.26 The overall range for the real risk-free rate of return of 3.3% to 4.0% compares with a range of 3.5% to 3.8% used by the Monopolies and Mergers Commission (MMC) in its report on Scottish Hydro-Electric plc (SHE) published in May 1995.

Equity risk premium

E.27 The market risk premium can be estimated in two main ways, as discussed in the previous sub-section. The standard CAPM approach is to calculate the total return on equities over and above returns on gilts for a given past period. The alternative approach is to use forecasts of investors' required rates of return on equities, as calculated using the DGM. Each of these methods of estimation can give very different answers depending on the period over which the calculations are performed, and depending on whether average excess returns over time are calculated as an arithmetic (simple) or geometric mean.

E.28 Estimates of historic excess returns on equity from the UK, US and Japan range between 8.0% and 9.4%. Estimates calculated over shorter and more recent periods, using the DGM for the US, give a slightly lower range of estimates (6.5% to 7.5%). Equivalent estimates using the DGM for the UK stock market do not exist. Two recent surveys of fund managers in the UK suggest that the risk premium required on equities may be as low as 2.5% to 3.0%. However, these surveys were based upon relatively small smaple sizes, and may not be reliable. The weight of evidence from academic studies at this stage suggests that the market risk premium lies above 4% but below 8%.

E.29 Several recent academic studies suggest that the current size of the equity premium may be lower than that implied by historical estimates from stock market data. Risk premia as high as 8% or 9% do not appear to be consistent with investors' levels of risk aversion, as measured by alternative methods. There is also some evidence to suggest that risk premia vary over time; forecasts of required returns on equities which relate returns on equities to other observable series, such as returns on other types of security, provide estimates towards the bottom end of the 4% to 8% range.

E.30 In price control reviews over the last three years, OFWAT and OFFER have used a market risk premium in the range of 3% to 4%. The MMC used a range of 3.5% to 4.5% in the SHE report. Oftel's initial view is that it would not be justified in considering a market risk premium greater than 6%. In the estimates of BT's cost of capital that follow, a range of 4% to 6% is used.

Equity Beta

E.31 The value of BT's equity Beta measures the volatility of returns on BT's shares compared to returns on the stock market as a whole. It will rise with BT's debt/ equity ratio, since a higher level of gearing implies that a given change in profits will have a greater impact on the returns to holders of equity.

E.32 The estimated value of BT's Beta varies depending on the time period over which it is measured and on whether monthly or daily share price information is used. It can also be significantly biased if 'events' produce major changes in Beta which violate the assumptions upon which the CAPM methodology is founded. Examples of such events might be the stock market crash of 1987 and the general elections of 1987 and 1992.

E.33 OXERA and LBS Risk Management Service estimates of BT's equity Beta, using monthly data for the five-year period ending in May and June 1995 respectively, are 0.83 and 0.80. These appear to be robust to the omission of the 1992 general election.

E.34 These estimates of equity Beta relate to BT Group. In the past an estimate of Beta for BT Group has been used as a reasonable proxy for the Beta for the price-controlled activities. However, BT's Beta has risen since the time of the last price control review, probably mainly as a result of the expansion of its non-regulated business. This is likely to be more risky than its price-controlled activities, for two main reasons. Firstly, services in which BT still has a degree of market power will tend to be less risky than services where competition is better developed, since profits from this source will tend to be less volatile. Secondly, basic telephony services are more likely to be 'essential', implying that demand for them is likely to fluctuate by less than average over the cycle.

E.35 This suggests that services that remain outside a tariff basket will tend to be more risky than those within a basket. It is therefore likely that the implicit Beta for BT's price-controlled activities will be lower than that of BT Group. Oftel intends to use a Beta of 0.80 in its estimate of the overall cost of capital for BT Group, but will consider the effect of reducing this in modelling the price controls.

E.36 As an illustrative example, the effect of reducing the value of Beta to 0.60 on the cost of equity is shown in the tables which follow. This figure is within the range of 0.50 to 0.65 used by the MMC for the equity Beta of SHE's electricity distribution business, typically viewed as being of low risk. The true Beta of BT's price-controlled activities is likely to fall somewhere in between 0.60 and 0.80.

Tax Advantages to Debt

E.37 The estimate of the post-tax cost of equity depends on the view taken on the size of any tax advantages to debt to be obtained by offsetting interest payments against corporation tax. Under the UK imputation system with advance corporation tax (ACT), the tax shield afforded by debt is significantly reduced compared to the US, for example. It is also possible that any remaining tax advantage to debt is captured by lenders in the form of higher interest rates.

E.38 In Table E.2, the range of estimates of the post-tax cost of equity includes scenarios in which it is assumed that there is a tax advantage to debt and scenarios where is it assumed that any tax advantage is captured by lenders. The estimates derived from the CAPM for each combination of equity risk premium and equity Beta also reflect the full range of real and nominal risk-free rates (ie with and without an inflation risk adjustment).

Table E.2 BT's Post-Tax Cost of Equity: Indicative Ranges

		CAPM				DGM
	Equity premium	4	4	6	6	
	Equity Beta	0.6	0.8	0.6	0.8	
% per annum						
Nominal	Low	7.1	7.9	8.3	9.5	7.3
	High	9.4	10.2	10.6	11.8	10.9
Real	Low	4.6	5.4	5.8	7.0	

High	5.6	6.4	6.8	8.0

E.39 In the table, estimates of BT's cost of equity which have been derived directly from the DGM are shown as a comparison to those built up from the various components of the CAPM discussed above. The range of estimates from the DGM reflects forecasts of annual dividend growth rates from brokers' reports in the range of 3% to 6%, applied to BT's net dividend yield (4.3% to 4.9%) calculated at various points in time.

Post-Tax Cost of Debt

E.40 Historical evidence suggests that 'blue chip' corporate debt commands a risk premium of approximately one half to one per cent higher than the risk-free rate. In the SHE report, the MMC used a range of 0.3 to 0.7% for the premium. In the indicative estimates of BT's weighted average cost of capital that follow, a 0.5% corporate risk premium has been used. In order to convert the resultant pre-tax cost of debt into a post-tax rate, corporation tax at 33% has been subtracted.

Post-Tax Weighted Average Cost of Capital (WACC)

E.41 In the calculation of the post-tax weighted average cost of capital, weights equal to the proportion of debt and equity finance are applied to the post-tax cost of debt and equity in turn. It is usual to use market values of debt and equity in this calculation.

Adjustments for desirable gearing

E.42 In those scenarios where it is assumed that there is a tax advantage to debt, it may be argued that BT could reduce its cost of capital by increasing its gearing. BT's current gearing ratio is around 15%. Oftel intends to consider whether BT's weighted average cost of capital should be adjusted downwards to reflect the fact that it may be under-geared. However, initial estimates suggest that even a large increase in gearing from current levels to 50% would decrease the post-tax WACC by at most 0.5 percentage points in real terms and 0.7 percentage points in nominal terms.

E.43 A potentially more important issue is if BT significantly increased its gearing beyond that which might be considered prudent. In such circumstances, any tax advantages from higher gearing might be outweighed by the higher risk premium charged by lenders and a higher cost of equity. Oftel would not allow any increase in the cost of capital as a result of this kind of financial restructuring to affect this or any future price control regime.

E.44 Table E.3 gives an indicative range for BT's post-tax WACC. Again the ranges for each value of Beta and equity risk premium reflect different assumptions about the tax advantages of debt, different risk-free rates, as well as adjustments for higher gearing levels.

Table E.3: BT's Post-Tax WACC: Indicative Estimates

		CAPM				DGM
	Equity premium	4	4	6	6	
	Equity Beta	0.6	0.8	0.6	0.8	
% per annum						
Nominal	Low	6.8	7.5	7.9	8.9	6.2
	High	9.0	9.6	10.0	11.0	10.2
Real	Low	4.3	5.0	5.3	6.3	
	High	5.2	5.9	6.2	7.3	

E.45 The indicative range of estimates of the post-tax WACC for BT Group using the CAPM with a Beta coefficient of 0.8 is **7.5% to 11.0% in nominal terms** and **5.0% to 7.3% in real terms**. This range may need to be adjusted downwards to give a cost of capital for the price-controlled activities. As an illustrative example, the lower end of the range would fall to **6.8% in nominal terms** and **4.3% in real terms** if a Beta coefficient of 0.6 were used for the price-controlled activities.

Pre-Tax Weighted Average Cost of Capital (WACC)

E.46 The estimates of the cost of capital presented above incorporate the returns after tax which are required by investors to induce them to buy or retain shares in BT or to lend the company money. Oftel needs to have a cost of capital estimate that can be compared to pre-tax rates of return in the financial modelling.

E.47 There is no direct method of deriving the company's pre-tax cost of capital for the next price control period from the post-tax estimates presented above, in the absence of information on future cashflows. A standard simplification that can be used to derive an estimate of the pre-tax WACC, which Oftel has used in the past, is to multiply the post-tax cost of equity by

(1 - ACT)/(1 - Tc)

where ACT = marginal rate of advance corporation tax (currently 20%) and Tc = marginal rate of corporation tax (currently 33%). The adjusted pre-tax cost of equity can then be combined with the pre-tax cost of debt using the gearing weights to give an estimate of the pre-tax WACC.

E.48 This adjustment is based upon a number of simplifying assumptions, eg that all profits are paid out as dividends. The correct adjustment will depend on BT's cash flow profile over the forecast period, amongst other things.

E.49 Table E.4 shows a range of estimates for BT's pre-tax cost of capital for an illustrative case using the simplified formula above. It is important to note that the range is only given for a gearing ratio of 15% and does **not** incorporate the adjustments for desirable gearing that are shown in the previous table. BT's actual pre-tax WACC may be lower or higher than this range, depending upon adjustments for desirable gearing and the cashflow forecasts generated from the financial model.

Table E.4: BT's Pre-Tax WACC: Illustrative Case For 15% Gearing Using Standard Formula (1)

		CAPM		DGM	
	Equity premium	4	4	6	6
	Equity Beta	0.6	0.8	0.6	0.8
% per annum					
Nominal	Low	8.4	9.2	9.6	10.8	8.6
	High	11.0	11.8	12.2	13.4	12.4
Real	Low	5.2	6.1	6.5	7.7	
	High	6.4	7.2	7.6	8.8	

Table note: (1) See paras. E.47 to E.49 for a discussion of the simplifying assumptions used.

E.50 Under these simplifying assumptions, an indicative range for the pre-tax cost of capital for BT Group (using a Beta coefficent of 0.8) for the next price control period would be **9.2% to 13.4% in nominal terms** and **6.1% to 8.8% in real terms**. Again, as an illustrative example, the lower end of the range would fall to **8.4% in nominal terms** and **5.2% in real terms** if a Beta coefficient of 0.6 were used for the price-controlled activities.

E.51 A breakdown of the components of the range of cost of capital estimates for BT is compared with those used by the MMC for Scottish Hydro-Electric's distribution business in Table E.5. It is important to note that the two businesses would not be expected to have the same cost of capital since they have different risk characteristics and gearing ratios. Oftel's wider range also reflects uncertainty at this stage over the size of the equity risk premium, the level of desirable gearing, and the size of the tax adjustment necessary to derive a pre-tax WACC. Oftel hopes to receive submissions on the indicative range for the pre-tax WACC and its components as a result of this consultation exercise.

Table E.5 Oftel Indicative Ranges for Components of Real Pre-Tax WACC: Comparison With MMC View In SHE Report (1)

	Oftel		MMC	
	Low	High	Low	High
Real risk-free	3.3%	4.0%	3.5%	3.8%
Equity risk premium	4.0%	6.0%	3.5%	4.5%
Equity Beta	0.6%	0.8%	0.5%	0.65%
Post-tax cost of equity	4.6%	8.0%	5.2%	6.7%
Gearing	15.0%	50.0%	8.0%	8.0%
Dewbt premium	0.5%	0.5%	0.3%	0.7%
Post-tax cost of debt(2)	2.5%	3.0%	3.8%	4.5%
Real Post-Tax WACC	4.3%	7.3%	5.1%	6.5%
Real Pre-Tax WACC(3)	5.2%	8.8%	6.1%	7.8%

Notes: (1) Oftel's estimates of the ranges for the post-tax and pre-tax WACC cannot be derived directly from the high and low values of the components, due to different tax and gearing adjustments.

(2) The MMC range for the cost of debt does not distinguish post-tax from pre-tax rates.

(3) Oftel's range of pre-tax WACC estimates depends upon the simplifying assumptions in the text, and does not incorporate the full range of gearing shown in the table.

III. Appropriate Measures of Rate of Return

E.52 There are two main options as to the measure of the rate of return to be used in the financial modelling process: economic or accounting rates of return.

Economic Rates of Return

E.53 Rates of return on an investment project are typically calculated as the internal rate of return (IRR). This is the discount rate which equates the revenue streams of a project with the costs of the project. This measure requires an initial and terminal economic value of the asset base (at the start and end of the period) as well as the free cashflows in each year of the period. Rates of return calculated on this basis are directly comparable with the returns required by investors and lenders in order to induce them to supply the necessary funds. Economic rates of return therefore benefit from being directly comparable with BT's cost of capital, as calculated by any of the methods discussed in the previous section.

E.54 Measuring economic rates of return would, however, raise a number of practical difficulties. Firstly, economic rates of return can be very sensitive to the profiles of cashflows, such as the timing of capital expenditure, which it is difficult to forecast with any accuracy. Secondly, the estimate of the terminal value of the asset base in the IRR calculation is fraught with difficulties and is highly subjective. Finally, and perhaps most importantly, price controls should be based upon measures of financial performance which are transparent and understood by BT, its competitors and the wider community. There could be significant potential for confusion if Oftel were to set a price control based upon one measure of profitability (economic rates of return) when BT reports to its shareholders on the basis of another measure (historic cost accounting rates of return on capital employed).

E.55 The alternative to an economic rate of return, measuring profitability as an accounting rate of return, would not however be free from difficulties. Although Oftel would use a definition of the accounting rate of return which would better reflect the economic rate of return than would rates of return on an HCA basis (for reasons discussed below), any differences would in principle require an adjustment to the cost of capital to ensure comparability. But, in making the adjustments to the cost of capital, difficulties would arise, which are similar to those set out above for measuring economic rates of return. Oftel will continue to explore this issue during the price control review.

Accounting rates of return

E.56 Accounting rates of return express the ratio of accounting profit to the contemporaneous value of capital. Both numerator and denominator vary between firms depending on the accounting conventions adopted, including the choice of Current Cost Accounting (CCA) or Historic Cost Accounting (HCA). The main differences relate to the treatment of fixed assets in the balance sheet and the depreciation charge to the profit and loss account. There are three main forms of bias which can prevent an accounting rate of return from being directly comparable to the cost of capital discussed in the section above. These occur when assets are not valued in Modern Equivalent Asset (MEA) terms, when profits are not measured as a 'clean surplus', and when depreciation policies and asset lives used in the balance sheet do not reflect underlying economic values.

Accounting valuations of assets

E.57 BT uses the conventional HCA basis of accounting, where fixed assets are valued at original purchase cost net of cumulative depreciation. This has the merit that most of its competitors use the same method of asset valuation. However, HCA rates of return are not directly comparable with estimates of BT's cost of capital. The explanation for this is that the net book value of fixed assets in historic cost terms will not in general be equal to the economic value of capital employed. HCA net book values take no account of general price inflation or changes in the relative price of specific assets over the period since they were purchased, and so do not properly measure the cost of the resources employed.

E.58 CCA asset valuations attempt to correct for this effect by valuing fixed assets at the net replacement cost of a Modern Equivalent Asset of the same service capability, allowing for the remaining useful asset life. Since this valuation uses current fixed asset prices, it takes into account general inflation and specific asset price changes that have taken place since the asset was purchased. The CCA rate of return would therefore provide a better approximation to the economic rate of return than would the HCA rate of return.

E.59 When changing the basis of the measurement of rate of return from HCA to CCA, it will be necessary to ensure that the revaluation of assets does not result in windfall gains or losses accruing to the shareholders of BT. For a discussion of this issue in the context of the network charge cap, see Chapter 5. The avoidance of windfall gains or losses would require that profit were measured as a 'clean surplus', ie the revaluation surplus (or deficit) should be reflected in the profit and loss account. The concept of 'clean surplus' is discussed further below.

Depreciation policies in the balance sheet

E.60 In a company balance sheet, depreciation charges represent the charge to profits necessary to recover the loss of asset value which arises as the asset is consumed over its life. For practical reasons, this will typically be on a straight-line depreciation basis, where an equal proportion of the gross book value of the asset is written down in each year of the asset's life.

E.61 However, when using net book values as the denominator in a rate of return calculation, there would be a closer reflection of economic rates of return if the asset lives and depreciation profiles were chosen so as to correspond to the true economic lives and the rate at which the asset is used up over its life. In other words, CCA accounting rates of return would better approximate to economic rates of return if accounting depreciation were more closely aligned to economic depreciation. Since there could be practical difficulties in implementing this adjustment, it is an issue that will be explored further during the price control review.

Accounting measures of profit

E.62 Another possible source of bias may be introduced by the accounting measure of profit used in the accounting rate of return calculation and, in particular, the depreciation charge to the profit and loss account. Under CCA procedures, there are two main alternative principles which may be followed: these are operating capability maintenance (OCM) and financial capital maintenance (FCM).

E.63 Under OCM, the HCA depreciation charge is adjusted to take into account changes in the MEA valuation of the asset since the start of the accounting period. Barring unexpected events, this will enable sufficient funds to be put aside before the distribution of profit in each year for the asset to be replaced at the end of its life. In a world where asset prices are rising, an OCM depreciation charge to the profit and loss account will be higher than the corresponding HCA depreciation charge.

E.64 Whilst an OCM approach to depreciation will, as its name suggests, enable a firm to maintain its operating capability, it will not in general give a measure of profit and hence rate of return that is comparable to the firm's cost of capital, even when assets are valued in CCA terms. This is because it neglects the fact that a change in the MEA value of the firm's assets from one year to the next represents a change in the wealth of its shareholders.

E.65 An FCM deprecation charge to the profit and loss account therefore includes an additional holding gain or loss equal to the change in the MEA value of the firm's assets between periods. The resulting profit is sometimes described as a 'clean surplus'. This represents the amount that can be distributed after maintaining the nominal value of the firm's financial capital. Provided the depreciation policy used in the balance sheet is economically justified, and subject to certain other restrictive assumptions, CCA rates of return calculated on this basis can be comparable with the firm's nominal cost of capital.

E.66 A further adjustment is possible to put the calculation into real terms. In order to maintain the real value of shareholders' funds, profits must additionally be reduced by a further 'shareholder adjustment' equal to the rate of inflation over the period multiplied by the value of shareholders' funds at the start of the period. No adjustment is necessary to maintain the real value of debt, since lenders receive a nominal interest rate which already reflects their expectations of inflation.

Conclusion

E.67 In theory, it would be desirable to use economic rates of return in the financial modelling, since these are directly comparable to the cost of capital that was discussed in the previous section of this Annex. However, there are merits in a modelling approach based upon accounting rates of return. If an accounting rate of return were used, it should be measured using CCA conventions (on an FCM basis) rather than HCA, in order to reflect more closely the nature of forward-looking costs. Oftel will need to ensure that the implications of its chosen approach for the HCA rates of return reported in BT's accounts are fully explained, since these are the only measures of BT's financial performance available to and understood by a wider audience.

IV. Structure of Financial Model

E.68 The expected future financial performance of BT will be assessed using a financial model. The model will be used to project forward BT's costs, revenues and capital employed for the services within each tariff basket. In general, the more disaggregated a model, the more realistic it is. For this review, where it is proposed that a network price cap will exist side by side with a retail price cap, it is particularly important to model BT's financial performance at the network and retail level.

E.69 Because a large proportion of BT's costs and fixed assets are shared between activities inside and outside the proposed price control baskets, it is essential to expand the coverage of the model to include all those activities where there is the potential for costs or assets to be shared. This might include BT's non-regulated activities as well as non-price-controlled services.

E.70 Based upon the forecasts derived from the model, a range of values of X will be chosen for each price control so as to allow BT to earn an expected rate of return which Oftel regards as acceptable by the end of the control period (subject to the caveat in the introduction to this Annex). This in turn depends upon the view that Oftel takes upon BT's cost of capital for those services and upon the calculation of the rate of return earned on them, as discussed in the previous sections.

E.71 In the March consultative document, Oftel intends to publish the details of the range of X for each tariff basket and sub-cap that it proposes as a result of its financial modelling. At the same time, it will explain the assumptions and parameters underlying the range of price controls, as well as the forecasts of the financial performance that BT is expected to achieve in the activities within each price cap or sub-cap.

V. Assumptions Underlying Financial Forecast

E.72 In order to model BT's financial performance, it is necessary to take a view on a number of different variables and parameters. The most important of these are the following:

- the potential growth in demand for each service offered by BT (including non-regulated services) - this can be broken down further into the growth in the total market for each service (supplied by whichever company) and BT's share of each service market
- the relationship between BT's costs and the volumes of outputs produced
- the scope for improvements in BT's productivity (ie the volume of output which BT produces per unit of capital, labour and other inputs)
- the future movements in BT's input prices (eg wages, capital equipment)
- the allocation of overheads and fixed assets (including new capital expenditure) to the price-controlled business, after taking into account expansion of BT's non-price-controlled activities.

E.73 Each of the main model input assumptions is discussed in more detail below.

Market Growth

E.74 Market growth is one of the most important determinants of BT's financial performance over the next control period. A given change in the volume of output of a particular service can have a significant effect on profitability if economies of scale are important (see discussion in para. 4.21 of Chapter 4). This is likely to be the case for many of the services supplied over BT's network since, in the short run, the marginal cost of supplying an additional telephone call is negligible. This means that an increase in call revenues may lead to an almost one to one increase in measured profits.

E.75 This makes it crucially important that volume growth assumptions for each service market incorporate the full range of possible outcomes. Preferably, demand growth forecasts should be related in an objective way to the underlying determinants of demand for each product (eg by applying statistical techniques to historical data). These would typically include the market price, the price of substitute and complementary products, an income variable (eg GDP) and any others (which might be captured by a time trend). Depending on the market in question, the market price, which in the past has effectively been that set by BT subject to the constraint imposed by its price cap, will increasingly be determined by the extent of actual or potential competition in the market (see the discussion of Effective Competition in Chapter 3).

E.76 In practice, the main determinants of the strong growth in demand for basic telephony since privatisation (as displayed in Tables 7.4 and 7.5 of Chapter 7) have been, in rough order of importance, rising real incomes, technological innovation (eg the falling price of fax machines) and falling real call prices (as a result of price cap regulation and increasing competition). The assumptions made about these influences will have the biggest impact on forecasts of demand over the next forecast period.

Market Shares

E.77 Alongside a forecast of the total market demand for a given product, a view needs to be taken on what share of that demand will be supplied by BT's network or retail operations. In general, this requires assumptions on the price BT will charge for each product over the price control period (within the constraint imposed by any basket price cap or sub-cap), the prices its competitors charge, and the propensity for consumers to switch supplier for a given price differential.

E.78 Table 7.6 in Chapter 7 shows how BT's market shares in the supply of exchange line connections, inland and international calls have fallen since 1991/2. When considering the factors that have contributed to the loss of market share by BT recorded so far, and projecting this forward into the next price control period, it is useful to draw a distinction between direct and indirect market share loss by BT.

E.79 BT's directly-connected customers will, by definition, obtain their exchange line connection from BT's retail operations. In the absence of additional benefits from cable TV connection or access to broadband services, they will only tend to switch to a different access supplier if they expect their total bill (access and call charges) to fall, given their pattern of calls. Hence, market share loss forecasts for directly connected customers will depend mainly upon the relative price of an average basket of services for customers with different demand profiles purchased from BT Retail, compared to an equivalent basket bought directly from an alternative access supplier.

E.80 This requires a view to be taken on BT's and competitors' pricing strategies and on how quickly different groups of consumers (eg residential and business customers with different demand profiles) will switch access supplier in response to a given expected saving on their average bill. This will change with the advent of number portability.

E.81 In addition to direct market share loss as an access provider and supplier of retail telephony, BT Retail is vulnerable to indirect market share loss in inland and international calls to competing trunk operators (eg Mercury, Energis, ISR operators) which interconnect with BT Network. It would be expected that the loss of market share by BT Retail to indirect competitors would be more closely related to the relative price of BT Retail for the service in question. Assumptions regarding indirect market share loss will therefore depend upon assumptions about BT Retail prices for individual services (subject to the level of the retail price cap), as well as competitors' prices and the propensity to switch for a given price differential. It might be expected that a given price differential would induce higher indirect than direct market share loss, because of customer inertia and the risk involved in switching access providers.

E.82 Once a customer has switched access supplier to another licensed operator (eg a cable company, Mercury), their custom will be lost to BT's retail operations. However the access supplier will still need to purchase access to BT's network for the majority of calls, either through an existing interconnect agreement with BT, by purchasing interconnect components at BT's network component tariff, or by purchasing long-distance conveyance from another operator who in turn pays BT for interconnect at the terminating end.

E.83 Demand for BT Network's interconnect services will then depend on:

(a) BT's share of directly-connected customers; and

(b) BT's market share in the supply of different network components.

The latter will in turn depend upon the tightness of the network price cap and sub-cap on call terminations, the network tariff structure that BT adopts given that constraint and the pricing strategies of competing suppliers of trunk conveyance, amongst other things.

Costs and Efficiency

E.84 As well as revenues derived from the demand model discussed above, the financial model needs to be able to forecast in some detail the costs incurred by BT. These will be driven by three main factors. Firstly, higher demand for one or more of BT's services will, in the absence of offsetting efficiency gains, lead to higher derived demand for one or more factor inputs (eg labour, capital). Secondly, the volumes of output produced per unit of input may increase as BT becomes more efficient due to the incentives given by price cap regulation and emerging competition, or because of general industry developments. Thirdly, the prices of factor inputs may change, either due to downward pressure being placed on suppliers' prices by BT or because of technical change or other factors out of BT's control.

E.85 The first of these determinants of costs requires estimates of the relationship between different components of BT's costs and the volumes of different services supplied. These should preferably be broken down by factor inputs, eg switching capacity, numbers of person-hours.

E.86 BT's efficiency has already been discussed in relation to the assessment of BT's relative efficiency at the start of the next control period. What is required is an estimate of how BT's productivity is likely to improve over the next control period in the key service areas in which it operates. The standard measure of efficiency that has been calculated for BT by Oftel in the past is an index of real unit costs, which measures the total cost incurred by BT per unit of output.

E.87 This measure of efficiency has the property that it combines factor price changes with reductions in the volumes of factor inputs consumed. Hence, a tight price control based upon expected real unit cost reductions could be met either by increasing the amount of output produced per unit of factor input, or by exerting downward pressure on the prices paid for inputs to the extent that these are not already sourced from the cheapest suppliers.

E.88 Since privatisation, BT's real unit costs have fallen by around 3.5% per annum on average for a set of services which broadly corresponds to those currently in the PSTN tariff basket. One problem with basing assumptions about productivity gains for the next control period on those achieved historically is that the past may not be a good guide to the future. The potential for further efficiency gains may be less than before if the firm has already implemented 'best practice'. Alternatively, future technological developments may make possible far greater efficiency gains than could have been achieved in the past.

E.89 Comparisons of BT's efficiency with key domestic competitors or comparable overseas operators can help address the first of these problems, by showing the extent that BT still lags behind. As discussed in Chapter 5 and Chapter 7, preliminary results from benchmarking studies suggest that BT's efficiency across its combined Access, Network and Retail Systems businesses may be up to 10% worse than that of the best-performing comparable competitors.

Overheads, Fixed Assets and Capital Expenditure

E.90 As referred to above, a large proportion of BT's costs and fixed assets are shared between regulated and non-regulated activities. At a review, there is an incentive on BT to understate its true profitability by allocating an excessive proportion of fixed costs and assets to those activities which are price-controlled.

E.91 To some extent this problem has been alleviated by the implementation of Accounting Separation, which has set out a clear basis upon which joint and common costs should be allocated to Access, Network and Retail businesses. However, in modelling BT's financial performance one important area of concern is in ensuring that new capital expenditure proposed by BT for its price-controlled business over the next control period is, firstly, efficiently incurred and, secondly, is allocated appropriately to BT's price-controlled activities.

E.92 One way of checking that BT's investment proposals incorporate an appropriate allocation across services is to project forward capital expenditure for those activities within a price control basket on a CCA basis. After taking into account the effect of volume growth on demand for new fixed assets (using the cost/ volume relationships discussed above), gross capital expenditure should be equal to depreciation, when this is measured on a CCA basis. This is an additional benefit of forecasting on a CCA basis.

E.93 Oftel intends to explain its proposed treatment of BT's capital expenditure programme over the next control period, as well as other aspects of overhead and fixed asset allocation, in the March consultative document.

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Appendix I

Hi Iain here are the cost to Security for the Railway Station

		Hours	Cost per hour / Month	Total Cost per Hour	Cost per Year
Trainning	30 min per member of staff 51 members of staff =	25.5 hours	£6.57	£167.35	£167.35
Periodic Checks	1 hour per day over 7 days = 7 hours per week	7 hours	£6.57	£45.99	£2,391.48
Disturbances and removing youths approx 3 hours per week		3 Hours	£6.57	£19.71	£1,024.92
Audits		2 Hours per month	£12.00		£288.00
Saftey Meetings		2 Hours per month	£12.00		£288.00
CCTV Monitaring	this is done as part of the duties within CP2				
Fire Alarms as as when they are activated					
Evacuations as and when required					

Total Yearly cost Security at the railway station **£4,159.75**

Add ?

GPIA Project Job Number Report

Job Number M6004

form_number:

Department: Property Management

Description: Lifts / Escalators

Scheduled Start:

Scheduled End:

Job Started: No

Job Completed: No

Action:

	Budget	Actual	Difference
Labour	£0.00	£2,875.62	-£2,875.62
Material	£0.00	£19,977.86	-£19,977.86
Total	**£0.00**	**£22,853.48**	**-£22,853.48**

Total Cost: £0.00

FY:

Material

committed:	£0.00
Spent:	£19,977.86
Total:	£19,977.86

Month	Code	value
01/05/1999	M6004	£5.82
01/06/1999	M6004	£16.33
01/08/1999	M6004	£10.87
01/10/1999	M6004	£5.65
01/11/1999	M6004	£57.00
01/12/1999	M6004	£28.59
01/04/1999	M6004	£0.00
01/07/2000	M6004	£28.91
01/08/2000	M6004	£88.46
01/10/2000	M6004	£43.36
01/09/2000	M6004	£29.76
01/01/2000	M6004	£49.64
01/02/2000	M6004	£66.29
01/03/2000	M6004	£11.47
01/04/2000	M6004	£62.48
01/05/2000	M6004	£28.25

01/06/2000	M6004	£23.13
01/12/2000	M6004	£17.34
01/05/2001	M6004	£40.98
01/04/2001	M6004	£66.49
01/06/2001	M6004	£57.82
01/07/2001	M6004	£59.01
01/08/2001	M6004	£101.18
01/01/2001	M6004	£134.17
01/02/2001	M6004	£34.86
01/03/2001	M6004	£5.78
01/09/2001	M6004	£82.48
01/10/2001	M6004	£46.25
01/11/2001	M6004	£29.59
01/12/2001	M6004	£35.20
01/01/2002	M6004	£41.33
01/02/2002	M6004	£92.85
01/04/2002	M6004	£67.06
01/06/2002	M6004	£54.23
01/07/2002	M6004	£344.90
01/08/2002	M6004	£116.16
01/09/2002	M6004	£89.82
01/03/2002	M6004	£113.68
01/05/2002	M6004	£97.17
01/10/2002	M6004	£84.17
01/11/2002	M6004	£116.16
01/01/2003	M6004	£30.79
01/12/2002	M6004	£41.91
01/02/2003	M6004	£49.10
01/03/2003	M6004	£18.13
01/04/2004	M6004	£18.48
01/05/2004	M6004	£159.28
01/06/2003	M6004	£73.22

01/06/2000	M6004	£23.13
01/12/2000	M6004	£17.34
01/05/2001	M6004	£40.98
01/04/2001	M6004	£66.49
01/06/2001	M6004	£57.82
01/07/2001	M6004	£59.01
01/08/2001	M6004	£101.18
01/01/2001	M6004	£134.17
01/02/2001	M6004	£34.86
01/03/2001	M6004	£5.78
01/09/2001	M6004	£82.48
01/10/2001	M6004	£46.25
01/11/2001	M6004	£29.59
01/12/2001	M6004	£35.20
01/01/2002	M6004	£41.33
01/02/2002	M6004	£92.85
01/04/2002	M6004	£67.06
01/06/2002	M6004	£54.23
01/07/2002	M6004	£344.90
01/08/2002	M6004	£116.16
01/09/2002	M6004	£89.82
01/03/2002	M6004	£113.68
01/05/2002	M6004	£97.17
01/10/2002	M6004	£84.17
01/11/2002	M6004	£116.16
01/01/2003	M6004	£30.79
01/12/2002	M6004	£41.91
01/02/2003	M6004	£49.10
01/03/2003	M6004	£18.13
01/04/2004	M6004	£18.48
01/05/2004	M6004	£159.28
01/06/2003	M6004	£73.22

Item	Part No	Description	Qty	Price	Cost	Order No	Goods In	Part Details
1		Repair to Escalator at platform no.1 Damaged by trolley	1	£3,706.00	£3,706.00	PIK/04/01/654	☑	
			Job Number: M6004		Acc. Code: 8343004		Capex No:	
1		For services of escalator engineer for insurance inspections of escalators	1	£426.00	£426.00	PIK/04/02/124	☑	
			Job Number: M6004		Acc. Code: 8343004		Capex No:	
1		In response to a call recorded at Otisline from Mr R Kennedy, an engineer attended your location and found a problem with the car.As a result the Car operation panel button required repairing. The equipment was checked, tested and returned to normal service.	1	£120.00	£120.00	PIK/04/02/125	☑	
			Job Number: M6004		Acc. Code: 8343004		Capex No:	
2		In response to a call recorded at Otisline from Jim, an engineer attended your location and found a problem with the Hoistway material. The pit equipment required replacing, it was checked, tested and returned to normal services	1	£100.00	£100.00	PIK/04/02/125	☑	
			Job Number: M6004		Acc. Code: 8343004		Capex No:	
1		Repair to down cab button on lift at down line platform	1	£173.25	£173.25	PIK/04/02/131	☑	
			Job Number: M6004		Acc. Code: 8343004		Capex No:	
1		Engineer found problem with the landing doors 23.05.01 @ 10.53, as a result the landing door guide shoes required replacing due to mis-use. Equipment checked, tested and return to normal service	1	£95.00	£95.00	PIK/04/02/356	☑	
			Job Number: M6004		Acc. Code: 8343004		Capex No:	
1		Call out charge to damaged buttons. Repaired, checked and tested	1	£120.00	£120.00	PIK/04/02/565	☑	
			Job Number: M6004		Acc. Code: 8343004		Capex No:	
1	56413.0	Electrical Switchboard Matting	1	£264.30	£264.30	PIK/04/02/806	☑	
			Job Number: M6004		Acc. Code: 8343004		Capex No:	
1		In response to a call out on 13/03/02 @ 15:00 for works not covered by our contract. Problem found with the position reference system, which was unit out of order. As a result the selector / inductor switch required repairing. Equipment checked, tested and returned to normal service. Invoice number 2-78TCDW16Y.	1	£126.00	£126.00	PIK/04/03/090	☑	
			Job Number: M6004		Acc. Code: 8343004		Capex No:	
2		In response to a call out on 25/11/02 @ 16:45 for works not covered by our contract. Problem with the machine, which was juddering	1	£385.00	£385.00	PIK/04/03/090	☑	
			Job Number: M6004		Acc. Code: 8343004		Capex No:	

		/jerking/vibrating. As a result the brake linin required repairing. Equipment was checked, tested and returned to normal service. Against invoice number 2-78TCCQ28B						
1		To fit guards around access ladders at wxb and control tower lifts	1	£379.00	£379.00	PIK/04/03/168 ☑		
			Job Number: M6004			Acc. Code: 8343004	Capex No:	
1		As per your quotation dated 13th June 2002 addressed to Steve Thomson please proceed with replacing the broken combs and steps at the top of Ayr platform escalator.	1	£4,000.00	£4,000.00	PIK/04/03/432 ☑		
			Job Number: M6004			Acc. Code: FY 8343004	Capex No:	
1		CARRY OUT REPAIR AND SERVICE TO HANDI-LIFT.	1	£268.61	£268.61	PIK/04/03/561 ☑		
			Job Number: M6004			Acc. Code: 8343004	Capex No:	
1		As per your repair no. CCQ91C - in response to a call out for works not covered by our contract and therefore chargebale. Problem with the car, which was noisey. As a result the ropes traction required repairing. The equipment was checked, tested and returned to normal service. This cost was agreed at a meeting with ST & OTIS on 17.10.02.	1	£1,020.00	£1,020.00	PIK/04/03/894 ☑		
			Job Number: M6004			Acc. Code: 8343004	Capex No:	
2		As per your repair no. CEW69U - in response to a call out regarding the escalaotr/travolator. This call is charrgable because the cause of this problem was broken comb plate teethm which is not covered by our contract. As a result the floor plate comb required checking. The equipment was checked, tested and returned to normal service.	1	£485.00	£485.00	PIK/04/03/894 ☑		
			Job Number: M6004			Acc. Code: 8343004	Capex No:	
1		Supply and install 3 (three) new escalator steps	3	£2,192.92	£6,578.76	PIK/04/04/106 ☑		
			Job Number: M6004			Acc. Code: 8343004	Capex No:	
1		for repairs carried out to damaged Combs on railway station escalator	1	£695.00	£695.00	PIK/04/04/148 ☑		
			Job Number: M6004			Acc. Code: 8343004	Capex No:	
1		Services of engineer to attened to works in association with insurance inspection	1	£656.00	£656.00	PIK/04/04/739 ☑		
			Job Number: M6004			Acc. Code: 8343004	Capex No:	
2		Ply Wood, Temp Board	1	£109.94	£109.94	PIK/04/04/966 ☑		
			Job Number: M6004			Acc. Code: 8343004	Capex No:	

1	Supply and fit access ladders to pit shafts fo and concourse lifts	b	1	£270.00	£270.00	PIK/04/	127	☑

Job Number: M6004 Acc. Code: 8343004 Capex No:

GPIA Project Job Number Report

Job Number M9004
form_number:
Department Property Management
Description Railway Station

Scheduled Start
Scheduled End
Job Started No
Job Completed No

Action:

	Budget	Actual	Difference
Labour	£0.00	£30,625.75	-£30,625.75
Material	£0.00	£45,528.91	-£45,528.91
Total	**£0.00**	**£76,154.66**	**-£76,154.66**

Total Cost £0.00
FY:

Material

committed:	£823.62
Spent:	£44,705.29
Total:	£45,528.91

Month	Code	value
01/05/1999	M9004	£425.91
01/06/1999	M9004	£184.87
01/07/1999	M9004	£16.43
01/08/1999	M9004	£84.91
01/09/1999	M9004	£449.36
01/10/1999	M9004	£497.91
01/11/1999	M9004	£443.88
01/12/1999	M9004	£630.61
01/04/1999	M9004	£0.00
01/06/2000	M9004	£574.80
01/07/2000	M9004	£575.67
01/08/2000	M9004	£684.02
01/10/2000	M9004	£615.15
01/09/2000	M9004	£620.48
01/11/2000	M9004	£457.30
01/01/2000	M9004	£694.96

01/02/2000	M9004	£616.24
01/03/2000	M9004	£595.46
01/04/2000	M9004	£600.34
01/05/2000	M9004	£1,431.97
01/12/2000	M9004	£537.71
01/02/2001	M9004	£601.34
01/05/2001	M9004	£545.51
01/06/2001	M9004	£516.12
01/07/2001	M9004	£535.59
01/01/2001	M9004	£556.68
01/03/2001	M9004	£668.84
01/04/2001	M9004	£485.65
01/08/2001	M9004	£816.54
01/09/2001	M9004	£792.12
01/10/2001	M9004	£527.81
01/11/2001	M9004	£723.08
01/12/2001	M9004	£554.56
01/01/2002	M9004	£732.17
01/02/2002	M9004	£403.38
01/06/2002	M9004	£595.70
01/07/2002	M9004	£565.25
01/08/2002	M9004	£825.48
01/03/2002	M9004	£657.53
01/04/2002	M9004	£541.81
01/05/2002	M9004	£701.26
01/09/2002	M9004	£560.97
01/10/2002	M9004	£404.66
01/11/2002	M9004	£481.35
01/01/2003	M9004	£712.40
01/12/2002	M9004	£1,194.86
01/02/2003	M9004	£519.43
01/03/2003	M9004	£676.63

01/04/2004	M9004	£700.05
01/05/2004	M9004	£1,785.64
01/06/2003	M9004	£505.37

Item	Part No	Description	Qty	Price	Cost	Order No	Goods In	Part Details
1		Replace broken panel indoor at platform 2	1	£103.87	£103.87	PIK/04/00/100	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		Repairs to fence at Railway Station	1	£160.50	£160.50	PIK/04/00/115	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		Preparation of Rapid Response Procedure for railway station arising out of Railtrack Complainance Audit May 1999.	1	£660.00	£660.00	PIK/04/00/129	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
2		Amendments to Railway Safety Case and other preparatory work for Railtrack Compliance Audit May 2000	1	£880.00	£880.00	PIK/04/00/129	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		To repair broken glass on door at railway station.	1	£75.61	£75.61	PIK/04/00/131	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		125mmm trolley wheels	100	£5.00	£500.00	PIK/04/00/135	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		To replace damaged step on escalator at platform 2	1	£2,106.00	£2,106.00	PIK/04/00/135	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		Hire of narrow gauge access tower for repairs to rail station stair lighting.	1	£90.00	£90.00	PIK/04/00/137	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		Station footbridge and ramp: structural examination All as per your quote dated 05.09.99, ref COM/040/99/190/1B/01	1	£350.00	£350.00	PIK/04/00/488	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
2		Possession of the line (2 days @ £930 per day) All as per your quote dated 05.10.99	2	£930.00	£1,860.00	PIK/04/00/627	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		Repair cladding to beach side roof cladding inclusive of internal panels.	1	£9,865.00	£9,865.00	PIK/04/00/627	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		To supply and fit child deflector on escalator at Platform 1	1	£35.00	£35.00	PIK/04/00/768	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				

1		To repair door Ayr Platform - Rail Station	1	£267.48	£267.48	PIK/04 /869	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		4.80w starters	75	£0.20	£15.00	PIK/04/00/888	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
2		5ft slimline flu tubes	50	£0.85	£42.50	PIK/04/00/888	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		150w lamps	10	£8.50	£85.00	PIK/04/00/900	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
2		PAE 400 Ignitors	5	£14.50	£72.50	PIK/04/00/900	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
3		Ballast	5	£15.79	£78.95	PIK/04/00/900	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		Carry out repairs to door for platform 2	1	£329.66	£329.66	PIK/04/00/972	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		Repairs to rail station automatic doors.	1	£200.15	£200.15	PIK/04/00/991	☑	Call-out (incl. 1st hour), Photocell
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		FI Tubes/Starters	1	£102.00	£102.00	PIK/04/01/004	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		Flu fittings/diffusers	1	£236.68	£236.68	PIK/04/01/025	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		Glass repair to door at railway station	1	£70.16	£70.16	PIK/04/01/058	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		Manufacture and fit child guard to platform 1 escalator	1	£40.00	£40.00	PIK/04/01/065	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		Independent investigation into escalator failure on platform 2 on 14th March. Works to commence 15th March at a cost of £560.00 (per day).	2	£560.00	£1,120.00	PIK/04/01/104	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		To replace 2nd broken door glass panels Glasgow Platform Rail Station	1	£180.86	£180.86	PIK/04/01/107	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				
1		Replace Glass on Automatic Door at Railway Station	1	£82.16	£82.16	PIK/04/01/268	☑	
		Job Number: M9004	Acc. Code: 8343004	Capex No:				

3		Slip Bolt Keeper	1	£6.85	£6.85	PIK/04/ 324	☑			
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
1		Replacement toilet door lock for toilets at escalator to rail station	1	£6.72	£6.72	PIK/04/01/379	☑			
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
1		White croft 5ft double diffuser	1	£21.47	£21.47	PIK/04/01/543	☑			
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
1		Projecting arm keeper	1	£6.85	£6.85	PIK/04/01/636	☑	GOODS RETURNED		
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
1		Damage repair to escalator	1	£221.50	£221.50	PIK/04/01/798	☑			
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
1		Called out to re-pair broken door glass at Rail Station	1	£88.00	£88.00	PIK/04/01/835	☑			
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
1	366-338	24v Relays	4	£2.72	£10.88	PIK/04/01/883	☑			
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
2	205-124	Relay Bases	4	£3.18	£12.72	PIK/04/01/883	☑			
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
1		Glass repair to railway station door	1	£88.00	£88.00	PIK/04/01/930	☑			
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
1		Deglaze doors on the North bound platform @ the Railway Station and make them safe & secure. Reglaze same and fix till they get fixed	1	£80.00	£80.00	PIK/04/02/071	☑			
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
1		To provide assistance in carrying out of Insurance Inspection of Railway Station Natl bound Platform Escalator on Tuesday 29th May 2001.	1	£0.00	£0.00	PIK/04/02/090	☑			
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
1		Cleaning of railway station (internal works) both platforms to be done during weekend. Method Statement & Risk Assessments to be issued to Steve Thomson before works are carried out.	1	£280.00	£280.00	PIK/04/02/126	☑			
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
1		Replace broken glass panel at rail station	1	£134.02	£134.02	PIK/04/02/135	☑			
			Job Number: M9004		Acc. Code: 8343004		Capex No:			
1		Replace broken glass on door at platform 1	1	£105.96	£105.96	PIK/04/02/428	☑			

			Job Number:	M9004	Acc. Code	8343004	Capex No:			
1		Alumase condutor pipe (76mm) Alumase pipe brackets	1	£263.70	£263.70	PIK/04/02/437	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			
1		Magneter ignitors Rail Station Lights	5	£16.10	£80.50	PIK/04/02/459	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			
1		Railway Station Lifts repairs to call buttons	1	£512.00	£512.00	PIK/04/02/498	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			
1		To provide assistance of 2 qualified maintenance personnel to carry out an Insurance Inspection on Railway Station Escalator (Northbound platform) on the morning Wednesday 5th September.	1	£504.00	£504.00	PIK/04/02/558	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			
1		Supply 6mm perspex cut to template for child deflectors escalators	1	£37.24	£37.24	PIK/04/02/635	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			
1		0.7mm Thick Double Sided plastisol poppy red 95mm square downpipe. 6m Length 95mm 3m length 95mm jointing collars 95mm Fixing Brackets Delivery Charge	1	£184.24	£184.24	PIK/04/03/014	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			
3	264-913	Fuses	10	£0.19	£1.85	PIK/04/03/053	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			
2	415-058	Fuse Holder	5	£1.39	£6.97	PIK/04/03/053	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			
1	415-042	Fuse Holder	5	£1.39	£6.97	PIK/04/03/053	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			
1		To replace broken glass at Railway Station	1	£108.06	£108.06	PIK/04/03/130	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			
1		Skirting Door Stops Rail Station Skywalk Fire Doors	2	£1.34	£2.68	PIK/04/03/132	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			
5		Works carried out week ending 07.02.03	2	£12.00	£24.00	PIK/04/03/143	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			
1		DOWN PIPES	1	£184.24	£184.24	PIK/04/03/144	☑			
			Job Number:	M9004	Acc. Code:	8343004	Capex No:			

5		12" SAA Pull Handles 12" push plates Rail Station Door Upgrade	1	£14.50	£14.50	PIK/04/ 152	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
1		GLASS REPAIR TO DOOR AT RAILWAY STATION.	1	£98.34	£98.34	PIK/04/03/196	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
1		REPAIRS TO RAILWAY STATION AUTOMATIC DOORS	1	£856.48	£856.48	PIK/04/03/291	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
1		REPLACE SLABS AND KERBING FOOT PATH AT MAIN TERNIMAL.	1	£577.00	£577.00	PIK/04/03/326	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
1		CHILD DEFLECTOR FOR UPLINE ESCALATOR	1	£40.00	£40.00	PIK/04/03/329	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
1		TROLLEY WHEELS	1	£500.00	£500.00	PIK/04/03/394	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
1		Re-programme auto dialler RA711 @ GPIA Railway Station.	1	£133.62	£133.62	PIK/04/03/435	☐			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
1		As per your quotation dated 23rd July addressed to Susan Lynn please proceed to lift old damaged carpet from railway station skywalk and supply and stick down 4m wide velour carpet (1 panel). Date & time to be arranged.	1	£195.00	£195.00	PIK/04/03/491	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
1	DAC/VR	Supply of Gai-Tronics Sentinel Handsfree f/plate (VR1 Unit)	1	£398.67	£398.67	PIK/04/03/499	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
2	DAC/on	Supply of backplate for above unit	1	£66.22	£66.22	PIK/04/03/499	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
3		Carriage & Packing	1	£6.50	£6.50	PIK/04/03/499	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
1		GLASS REPAIR TO RAILWAY STATION DOOR.	1	£99.22	£99.22	PIK/04/03/538	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
3		Works carried out during w/e 2nd August 2002	1	£12.00	£12.00	PIK/04/03/609	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	
1		Repair to smoke ventilation system at Rail Station	1	£380.00	£380.00	PIK/04/03/739	☑			
			Job Number:	M9004		Acc. Code:	8343004		Capex No:	

1		CARRY OUT REPAIRS TO COLT VENTILATOR AT RAIL STATION AS PER YOUR QUOTE REF. PRE07/708525.	1	£755.00	£755.00	PIK/04/03/772 ☑			
			Job Number: M9004			Acc. Code: 8343004		Capex No:	
2		DOOR LOCKS	1	£3.98	£3.98	PIK/04/03/775 ☑			
			Job Number: M9004			Acc. Code: 8343004		Capex No:	
1		Repairs to railway station auto doors	1	£203.47	£203.47	PIK/04/03/997 ☑			
			Job Number: M9004			Acc. Code: 8343004		Capex No:	
1		Repair to Railway Station Auto Door	1	£53.03	£53.03	PIK/04/04/103 ☑			
			Job Number: M9004			Acc. Code: 8343004		Capex No:	
1		Glass Repair on door at Down Platform	1	£102.02	£102.02	PIK/04/04/119 ☑			
			Job Number: M9004			Acc. Code: 8343004		Capex No:	
1		Repairs to glass door panel at rail station	1	£112.40	£112.40	PIK/04/04/122 ☑			
			Job Number: M9004			Acc. Code: 8343004		Capex No:	
1		Repair Automatic doors at railway station	1	£470.86	£470.86	PIK/04/04/124 ☑			
			Job Number: M9004			Acc. Code: 8343004		Capex No:	
1		Repair to Escalator V5543 at railway station, broken comb	1	£278.00	£278.00	PIK/04/04/124 ☑			
			Job Number: M9004			Acc. Code: 8343004		Capex No:	
1		Supply and Install Lighting in storerooms Rail Station	1	£713.67	£713.67	PIK/04/04/127 ☑			
			Job Number: M9004			Acc. Code: 8343004		Capex No:	
1		Glass repair to door at railway station	1	£115.99	£115.99	PIK/04/04/129 ☑			
			Job Number: M9004			Acc. Code: 8343004		Capex No:	
1		Supply labour + materials + plant to repair: Emergency Lighting Lighting Emergency exit signs Rail Station Platform 1-2 walkway concourse	1	£3,737.00	£3,737.00	PIK/04/04/145 ☑			
			Job Number: M9004			Acc. Code: 8343004		Capex No:	
1		Fitzgerald Double 5ft Flu Fittings Fitzgerald Emergency Packs Fitzgerald 5ft diffusers Fitzgerald 4ft Double flu fittings Fitzgerald 4ft Diffusers	1	£628.30	£628.30	PIK/04/04/148 ☑			
			Job Number: M9004			Acc. Code: 8343004		Capex No:	

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1		Supply labour + materials + plant to repair: Emergency lighting Lighting Emergency exit signs Rail Station Platform 1 & 2 walkway concourse	1	£3,737.00	£3,737.00	PIK/04/ 148	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Removing Rubbish from under platforms Rail Station - Monday 05.05.03	1	£220.00	£220.00	PIK/04/04/212	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Repair Fence Rear off Rail Station Leading to Prestwick Golf Course Tuesday 17.06.03 Wednesday 18.06.03	1	£740.00	£740.00	PIK/04/04/279	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Repairs to Signage at Railway Station	1	£25.00	£25.00	PIK/04/04/323	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Cylinder / Lock's	1	£59.71	£59.71	PIK/04/04/552	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Emergengy Light Fitting	1	£74.52	£74.52	PIK/04/04/762	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
2		Repair To Glazing On Door At Railway Station PL1	1	£102.02	£102.02	PIK/04/04/939	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Replace u/s Motor on smoke ventilator at Railway Station	1	£690.00	£690.00	PIK/04/05/000	☐		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		For services of engineer during insurance inspection of escalators by Allianz Cornhill	1	£486.50	£486.50	PIK/04/05/017	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Trolley Wheels	50	£3.00	£150.00	PIK/04/05/097	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Fitzgerald / Diffusers	1	£1,014.72	£1,014.72	PIK/04/05/131	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Re-Lamping and Re-Placing Ligh Fittings	1	£1,022.40	£1,022.40	PIK/04/05/131	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Fitzgerald, Emergency Flu Fitting	1	£64.86	£64.86	PIK/04/05/183	☑		

			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Replace damaged combs on escalator at railway station	1	£174.00	£174.00	PIK/04/05/282	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Colt ventilator not closing colt engineers checked out, Motor v/s disconnected and closed manually	1	£380.00	£380.00	PIK/04/05/293	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Glass Repair to door at railway station	1	£85.25	£85.25	PIK/04/05/299	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
2		Derailing roller	1	£5.24	£5.24	PIK/04/05/459	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Call-out for Automatic door No.2	1	£100.00	£100.00	PIK/04/05/459	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
3		Working Hours for calls	1	£56.25	£56.25	PIK/04/05/459	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Connect up supply for Cola machine at Railway Station	1	£91.89	£91.89	PIK/04/05/615	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Replace missing sealant in windows at railway station	1	£36.80	£36.80	PIK/04/05/643	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		To replace u/s Motor on smoke ventilator at railway station	1	£690.00	£690.00	PIK/04/05/668	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Repairs to Railway Station Automatic Door	1	£75.00	£75.00	PIK/04/05/679	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Replace broken glass at Platform 2	1	£148.09	£148.09	PIK/04/05/728	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		for works carried out in conjunction with insurance inspection on escalators	1	£556.00	£556.00	PIK/04/05/773	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Rail Station door Platform 1 Glass Repair	1	£85.24	£85.24	PIK/04/05/775	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		Concrete repair, Railway Station	1	£220.00	£220.00	PIK/04/05/788	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1		As per your letter addressed to Steve Thomson dated 22nd September 2004, please proceed with the following works:	1	£600.00	£600.00	PIK/04/05/801	☑		
			Job Number:	M9004	Acc. Code:	8343004	Capex No:		

	Carry out a visual inspection of the railway station and elevated footbridge at Glasgow Prestwick International Airport Inclusive of: Preparation of a work method statement Visual inspection of the structures Preparation of an inspection report in accordance with Network Rail Line Standards							
1	Re-pair broken glass panel door ayr platform railway station	1	£99.25	£99.25	PIK/04/05/876	☑		
		Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1	Repair damaged light at walkway and relamping lights at railway staion	1	£333.00	£333.00	PIK/04/06/026	☑		
		Job Number:	M9004	Acc. Code:	8343004	Capex No:		
1	To relamp and repair all station and walkway lighting	1	£266.40	£266.40	PIK/04/06/309	☑		
		Job Number:	M9004	Acc. Code:	8343004	Capex No:		

GPIA Project Job Number Report

Job Number E0321
form_number: 2002/110
Department: Engineering
Description: Railway Station Plant Rooms - Swipe Access

Scheduled Start:
Scheduled End:
Job Started: Yes
Job Completed: Yes

	Budget	Actual	Difference
Labour	£0.00	£0.00	£0.00
Material	£0.00	£1,225.13	-£1,225.13
Total	**£0.00**	**£1,225.13**	**-£1,225.13**

Total Cost: £0.00
FY: 3

Action:
08/04/03 - Works complete.
21/02/03 - Project raised to reduce time by calling Johnstone to stop line traffic.

Material

committed:	£0.00
Spent:	£1,225.13
Total:	£1,225.13

Item	Part No	Description	Qty	Price	Cost	Order No	Goods In	Part Details
2		Labour cost	1	£640.00	£640.00	PIK/04/03/142	☑	
		Job Number: E0321	Acc. Code: 8343004		Capex No:			
1		As per your quotation dated 04/02/03 please proceed with the supply, wire and connect from medical cupboard to railway station plant rooms for emergency phone access. 2 x CAT 5 FTP cables 1 x 20 core multi cable	1	£549.90	£549.90	PIK/04/03/142	☑	
		Job Number: E0321	Acc. Code: 8343004		Capex No:			
4	333-158	Flush Door Contact	10	£1.54	£15.40	PIK/04/03/158	☑	
		Job Number: E0321	Acc. Code: 8343004		Capex No:			
3	333-192	Proximity Switch	10	£1.39	£13.90	PIK/04/03/158	☑	

GPIA Project [illegible] Number Report

Job Number E0326 | Scheduled Start | Job Started Yes

form_number: 2002/118 | Scheduled End | Job Completed Yes

Department: Engineering

Description: Railway Station Platform Door Repair Works - Phase II

	Budget	Actual	Difference
Labour	£0.00	£0.00	£0.00
Material	£0.00	£2,885.06	-£2,885.06
Total	**£0.00**	**£2,885.06**	**-£2,885.06**

Total Cost: £0.00

FY: 3

Action:

06/06/03 - All works complete.
08/04/03 - Start date 10/04/03.
04/03/03 - Project form raised to track costs for south bound & north bound platform doors to be renewed.

Material

committed: £0.00

Spent: £2,885.06

Total: £2,885.06

Item	Part No	Description	Qty	Price	Cost	Order No	Goods In	Part Details
2		North Bound Platform Left hand double doors require new doors, all as per North Middle and South Bound right hand side.	1	£1,442.53	£1,442.53	PIK/04/03/158	☑	
		Job Number: E0326	Acc. Code: 8343004		Capex No:			
1		As per your quotation dated 27th February addressed to S Thomson please proceed with the renewal of doors at the Railway Station South Bound Platform Right hand side from the inside requires 1 set of new doors. New doors polyester powder coated in a standard BS or RAL colour to match existing and fitted in between existing door frame.	1	£1,442.53	£1,442.53	PIK/04/03/158	☑	
		Job Number: E0326	Acc. Code: 8343004		Capex No:			

GPIA Project [illegible] Number Report

Job Number E0336

form_number: 2002/119

Department: Engineering

Description: Railway Station Mandatory Detailed Structural Examination

Scheduled Start:

Scheduled End:

Job Started: Yes

Job Completed: Yes

	Budget	Actual	Difference
Labour	£0.00	£0.00	£0.00
Material	£9,775.00	£11,985.00	-£2,210.00
Total	**£9,775.00**	**£11,985.00**	**-£2,210.00**

Total Cost: £9,775.00

FY: 3

Action:

18/03/04 - Project completed, remedial works to be raised on another E cde.
10/02/04 - Report rec'd. Problems regarding sheeting studs/bolts not properly sealed against rust. Remedial works required to make good.
05/11/03 - SL to chase Duncan McKillop (1st Enginnering).
21/08/03 - Waiting report
11/07/03 - Phase #1 inspection of bridge - complete. Report will be received when all works completed.
06/06/03 - Possession taking place end of July. Painting of white lines on platform to be done when date and length of time of closure has been arranged. Painting of skywalk to be done by contractor.
08/04/03 - Order placed with First Engineering for a detailed structural examination of the railway station. ST meeting with Duncan McKillop 10/04/03.

Material	
committed:	£0.00
Spent:	£11,985.00
Total:	£11,985.00

Item	Part No	Description	Qty	Price	Cost	Order No	Goods In	Part Details
1		Detailed structural examination of Glasgow Prestwick International Airport railway station. Please acknowledge receipt of this order by fax to 01292 511120 or calling 01292 511012.	1	£9,775.00	£9,775.00	PIK/04/03/163	☑	
			Job Number:	E0336	Acc. Code:	8343004	Capex No:	
1		Detailed structural inspection of railway statement and overbridge	1	£2,000.00	£2,000.00	PIK/04/04/062	☑	
			Job Number:	E0336	Acc. Code:	8343004	Capex No:	
1		Clean both sides of all glass at the railway station outwith normal hours	1	£210.00	£210.00	PIK/04/04/633	☑	
			Job Number:	E0336	Acc. Code:	8343004	Capex No:	

GPIA Project Job Number Report

Job Number E0396
form_number: 2003/107
Department: Engineering
Description: Railway Station Escalator damage 27th Oct 03 - Consequential Repair Costs

Scheduled Start:
Scheduled End:
Job Started: Yes
Job Completed: Yes

	Budget	Actual	Difference
Labour	£0.00	£0.00	£0.00
Material	£11,955.00	£11,955.00	£0.00
Total	**£11,955.00**	**£11,955.00**	**£0.00**

Total Cost: £11,955.00
FY: 4

Action:
10/02/04 - All works complete.
11/11/03 - Railway Staion Escalator Reapir Due To Damage On The Evening Of 27th October 2003

Material
committed: £0.00
Spent: £11,955.00
Total: £11,955.00

Item	Part No	Description	Qty	Price	Cost	Order No	Goods In	Part Details
1		Authorisation to carry out work on Escalator V5543 (UP) ONLY as per you quotation	1	11,955.00	£11,955.00	PIK/04/04/892	☑	

Job Number: E0396 Acc. Code: 8428004 Capex No:

GPIA Project Job Number Report

Job Number E0419C
form_number: 2003/149
Department: Engineering
Description: Customer Information Service - Railway Station (Phase I)

Scheduled Start:
Scheduled End:
Job Started: Yes
Job Completed: Yes

	Budget	Actual	Difference
Labour	£0.00	£0.00	£0.00
Material	£52,000.00	£53,550.97	-£1,550.97
Total	**£52,000.00**	**£53,550.97**	**-£1,550.97**

Total Cost: £52,000.00
FY: 4

Material
committed: £0.00
Spent: £53,550.97
Total: £53,550.97

Action:
27/08/04 - Complete - System up & running, snagging to take place 27/08/04, monitors to be raised.
03/06/04 - VO confident that it the system should be installed before the Open Golf.
18/03/04 - GPIA rent land from Scotrail. VO to give JD copy of plan of monitors, works should be completed in time for the Open Golf.
10/02/04 - JD to check consent of land owner. Completion date of 31/03/04.
11/02/04 - Purchase order raised against PIK/04/04/1374 to Scotrail (£50,000.00 South Ayrshire Council Funded)

Item	Part No	Description	Qty	Price	Cost	Order No	Goods In	Part Details
1		Installation of Customer information service to railway station: CIS Supply, Install & Commission 7Year capitalised maintenance Provision of spares Installation of transmission line Connection charge Safety And project management	1	52,714.00	£52,714.00	PIK/04/04/137	☑	
			Job Number: E0419C		Acc. Code: 10110		Capex No:	
1		Provide Planning supervisor service for: Proposed Installation of Customer Information Systems at GPIA Rail Station	1	£500.00	£500.00	PIK/04/04/150	☑	
			Job Number: E0419C		Acc. Code: 10110		Capex No:	

1		To install Railway monitors at top of escalat concourse	in	1	£336.97	£336.97	PIK/04	/237	☑	
				Job Number:	E0419C		Acc. Code:	10110	Capex No:	

GPIA Project ... Number Report

Job Number E0527

form_number: 2004/143

Department: Property Management

Description: Railway Station Annual Inspection Oct 04 - Consequential Works Recommendations

Scheduled Start:

Scheduled End:

Job Started: Yes

Job Completed: No

	Budget	Actual	Difference
Labour	£0.00	£0.00	£0.00
Material	£2,478.00	£2,478.00	£0.00
Total	**£2,478.00**	**£2,478.00**	**£0.00**

Total Cost: £0.00

FY: 5

Action:

29/04/05 - Removing of scaffolding to take place, works on going.
04/02/05 - Works extended due to storm damage.

Material

committed: £0.00

Spent: £2,478.00

Total: £2,478.00

Item	Part No	Description	Qty	Price	Cost	Order No	Goods In	Part Details
5		Preperation of Method Statement	1	£150.00	£150.00	PIK/04/05/104	☑	
		Job Number: E0527	Acc. Code: 8343104	Capex No:				
4		To load scaffolding from Prestwick GC	1	£500.00	£500.00	PIK/04/05/104	☑	
		Job Number: E0527	Acc. Code: 8343104	Capex No:				
3		To provide W G Walker labour to monitor the above works (W Findlay and operative)	1	£366.50	£366.50	PIK/04/05/104	☑	
		Job Number: E0527	Acc. Code: 8343104	Capex No:				
2		To supply and fix loose flashing on verge and eaves strip fitted between each panel on seaward side of curve	1	£476.50	£476.50	PIK/04/05/104	☑	
		Job Number: E0527	Acc. Code: 8343104	Capex No:				
1		To supply, erect and dismantle scaffolding to allow access for the follwing works	1	£985.00	£985.00	PIK/04/05/104	☑	
		Job Number: E0527	Acc. Code: 8343104	Capex No:				

GPIA Project Job Number Report

Job Number E0531
form_number: 2004/096
Department: Property Management
Description: Alterations to Railway Station - Development works

Scheduled Start:
Scheduled End:
Job Started: Yes
Job Completed: No

	Budget	Actual	Difference
Labour	£485.00	£0.00	£485.00
Material	£540.00	£485.00	£55.00
Total	**£1,025.00**	**£485.00**	**£540.00**

Total Cost: £1,025.00
FY: 5

Action:

29/04/05 - Blacks to clean gulleys, works to progress, VO to chase.
04/02/05 - Project signed off, passed to VO to progress.
10/01/05 - Project raised to carry out minor improvements to railway station premises to safety in line with the Railway Safety Case Development Plan. These works do not address the main issues raised by the First Engineering report.

Material

committed: £485.00
Spent: £0.00

Total: £485.00

Item	Part No	Description	Qty	Price	Cost	Order No	Goods In	Part Details
1		Clean out drainage channels on both station platforms and reset any loose gratings	1	£485.00	£485.00	PIK/04/05/135	☐	

Job Number: E0531 Acc. Code: 8343104 Capex No:

GPIA Project Job Number Report

Job Number E0532

form_number: 2004/169

Department: Property Management

Description: Storm Damage December 2004 - January 2005

Scheduled Start:

Scheduled End:

Job Started: Yes

Job Completed: Yes

	Budget	Actual	Difference
Labour	£0.00	£0.00	£0.00
Material	£0.00	£35,108.15	-£35,108.15
Total	**£0.00**	**£35,108.15**	**-£35,108.15**

Total Cost: £0.00

FY: 5

Action:

29/04/05 - All purchase orders raised, works complete.
04/02/05 - Costs & photo evidence to gather for insurance purposes.
14/01/05 - Job number raised to track costs associated with the inclement weather (high winds) during this period.

Material

committed: £0.00

Spent: £35,108.15

Total: £35,108.15

Item	Part No	Description	Qty	Price	Cost	Order No	Goods In	Part Details	Job Number	Acc. Code	Capex No
1		Glass repair to door at rail station platform 2	1	£86.02	£86.02	PIK/04/05/110	☑		E0532	8343004	
1		Glass repair to emergency door at west end of concourse	1	£81.57	£81.57	PIK/04/05/110	☑		E0532	8343004	
1		Glass repair to emergency door at front of concourse	1	£117.26	£117.26	PIK/04/05/111	☑		E0532	8343004	
1		Repairs to roller shutter door at shed 28	1	£446.80	£446.80	PIK/04/05/111	☑		E0532	8343004	
1		Glass repair to door at gate 4	1	£74.18	£74.18	PIK/04/05/111	☑		E0532	8343004	

1		Repairs to apron Bravo roller shutter door at shed 1A	1	£364.80	£364.80	PIK/04/05/112	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Glass and door repair to automatic door number 4	1	£184.16	£184.16	PIK/04/05/112	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Repair to window in switch room for rail station at concourse	1	£90.56	£90.56	PIK/04/05/112	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Repairs to roller shutter door apron Brave Shed 2A	1	£1,111.95	£1,111.95	PIK/04/05/112	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
3		Delivery and Petrol	1	£140.00	£140.00	PIK/04/05/112	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Hire of 500 Diesel Scissor Lift from 10/01/05 - 31/01/05	1	£1,160.00	£1,160.00	PIK/04/05/112	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
2		Hire of 500 Diesel Scissor Lift from 31/01/05 - 28/02/05	1	£1,400.00	£1,400.00	PIK/04/05/112	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Glass repairs to concourse front emergency door	1	£126.86	£126.86	PIK/04/05/112	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Glass repairs to door in departures	1	£136.60	£136.60	PIK/04/05/113	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Repairs to roller door Apron Bravo	1	£763.60	£763.60	PIK/04/05/113	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Glass repair Debsmith warehouse roof and leak in office	1	£325.97	£325.97	PIK/04/05/114	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Glass repair to window in ladies toilet top floor	1	£83.01	£83.01	PIK/04/05/115	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Glass repair to doors at gates 1 and 9	1	£195.62	£195.62	PIK/04/05/115	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Glass repair on roof at border inspection post	1	£812.73	£812.73	PIK/04/05/115	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Replace broken glass on door at gate 5	1	£108.68	£108.68	PIK/04/05/116	☑			
			Job Number:	E0532	Acc. Code:	8343004	Capex No:			
1		Install covers for roof Deb smith area	1	£509.00	£509.00	PIK/04/05/117	☑			

		Job Number: E0532			Acc. Code: 8343004		Capex No:	
1	Supply labour for railway station scaffolding	1	£720.00	£720.00	PIK/04/05/118	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	
1	To repair fencing Car Park 5	1	£1,285.00	£1,285.00	PIK/04/05/119	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	
1	Glass repair at Whitley House	1	£423.04	£423.04	PIK/04/05/119	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	
1	Sheet, 307, 308, 313	1	£1,548.71	£1,548.71	PIK/04/05/125	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	
1	Glass repair to forward finger area	1	£1,363.87	£1,363.87	PIK/04/05/125	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	
1	Repairs to damaged windows at Debsmith top level	1	£2,222.42	£2,222.42	PIK/04/05/125	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	
1	Repairs to damaged windows at Debsmith lower level	1	£2,082.16	£2,082.16	PIK/04/05/126	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	
1	Glass repair to door at Gat 4	1	£104.35	£104.35	PIK/04/05/126	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	
1	Emergency light fittings - Fire escape west x block	3	£42.50	£127.50	PIK/04/05/127	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	
1	To temp repair fence fire station - Sandyford Gate	1	£840.00	£840.00	PIK/04/05/128	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	
1	Storm Damage to Rail Station North Bound Escalator Roof: To supply, erect and dismantle scaffolding to allow access for the follwing works To supply and fix loose flashing on verge and eaves strip fitted between each panel on seaward side of curve	1	15,747.55	£15,747.55	PIK/04/05/138	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	
1	Glass repair at front of concourse	1	£244.18	£244.18	PIK/04/05/995	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	
2	Replace seal in double glazed unit a Debsmith office	1	£32.00	£32.00	PIK/04/05/996	☑		
		Job Number: E0532			Acc. Code: 8343004		Capex No:	

1	Repairs to double glazing seals at Debsmith	1	£48.00	£48.00	PIK/04/05/996	☑

Job Number: E0532 Acc. Code: 8343004 Capex No: