KPN's cost of capital analysis: response to issues raised at the Industry Group meeting and NERA's presentation

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1   Introduction

This note discusses some of the key issues raised at the Industry Group meeting on February 11th 2009 and the initial estimates of KPN's cost of capital.[1] In particular, the note discusses areas in the analysis of KPN's cost of capital that require OPTA's attention and consideration, given the need to address conceptual and empirical issues with the initial cost of capital estimates, as well as their significant implications for the final estimates.

These areas require attention due to the need to adopt an approach that recognises more systematically the current market situation faced by telecoms companies in general, and KPN in particular.

The overall purpose of the note is to inform OPTA's assessment of KPN's cost of capital based on economic theory and up-to-date empirical evidence, recognising the challenges of incorporating the impact of the ongoing financial crisis and the longer-term economic downturn into regulatory allowances.

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[1] NERA (2009), 'The Cost of Capital for KPN's Wholesale Activities: A 3-year Estimate for 2009–2011', January, and NERA (2009), 'The Cost of Capital for KPN's Wholesale Activities: A 1-year Estimate for 2007', January.

Specifically, the note discusses three issues: treatment of inflation, the cost of debt estimates, and the risk-free rate. Details of Oxera's estimates of other parameters (ie, beta, ERP and gearing) are discussed in Oxera's original report and are not repeated here.

There are several reasons for focusing on these specific issues.

– The proposed approach to estimating the cost of debt and the risk-free rate raises conceptual and policy issues, which are particularly acute in the current economic and financial climate; computationally, it does not take into account the current cost of debt, including the significant impact of the financial turmoil and economic downturn, and creates incentives that might not be optimal from the regulatory point of view.

– In relation to the treatment of inflation, the previous application of the real rather than nominal cost of capital in combination with the details of the regulatory regime faced by KPN implies that the company might under-recover on invested capital, which is not compatible with the principles of financial capital maintenance and the nominal returns required by investors.

– The need to address these issues is important, given the need to compensate investors and raise new capital, even if the difference seems small in percentage terms. For example, changing the estimate of the risk-free rate and the cost of debt to the Oxera's estimates while retaining NERA's estimates of other parameters would result in an estimate of the pre-tax nominal cost of capital for 2009–11 of 11.6%, compared with NERA's original estimate of 10.4%.

The remainder of this note is structured as follows.

– Section 2 discusses the appropriate treatment of inflation in the context of KPN's current regulatory regime.

– Section 3 sets out the key issues in the analysis of the cost of debt, including the appropriate basis for estimating the cost of debt allowance, estimates of KPN's actual cost of debt going forward, given the refinancing requirements, and an analysis of KPN's cost of debt at the earlier reviews.

– Section 4 discusses the analysis of the risk-free rate including the choice of the appropriate maturity of proxy instruments, and whether it would be appropriate to rely on yields on government bonds observed after the onset of the market turmoil.

2 Compensation for inflation

Over the lifetime of the investment investors need to expect to recover the nominal required rate of return. Under the current regulatory regime, Oxera stylised model indicates that the expected return to investors is equal to the real allowed cost of capital. This means that the current regulatory regime applied to KPN is likely to set prices that reflect the real cost of capital and therefore does not provide appropriate compensation for inflation.[2] Furthermore, the recovery of the real as opposed to nominal cost of capital is inconsistent with the financial capital maintenance regime which, as Oxera understands, is one of the building blocks of the KPN's regulatory regime.[3]

[2] This is discussed in more detail in Oxera (2008), 'Compensation for Inflation', December 1st.

[3] Under the financial capital maintenance regime investors should expect to recover their original investments and the nominal required return.

The extent to which KPN may under-recover depends on the level of inflation. For example, the stylised model developed in the Oxera report on the compensation for inflation suggests that, under the current regulatory regime, the expected return to KPN under the assumption that the nominal cost of capital is 13% and inflation is 3% would be 10%; this is equivalent to under-recovery of approximately 7% of the original investment—ie, the net present value of allowed cash flows over the lifetime of the stylised asset is 7% lower than the value of the original investment.

The expected return to investors in KPN's regulated activities appears to equal the real cost of capital because of the combination of the real allowed cost of capital *and* the adjustment for holding gains/losses. This is different from regulatory regimes typically applied in the case of telecoms companies such as BT.

– In the case of telecoms companies, inflation is typically recovered through the allowed nominal cost of capital. In order to offset the impact of asset indexation, this regime contains an adjustment for holding gains/losses. Effectively, under the 'telecoms regime' investors recover the inflation assumed in the nominal cost of capital; inflation used to index assets does not affect recovery over the lifetime of the assets.

– In the case of traditional utilities, inflation is typically recovered through the annual indexation of assets, so the cost of capital is allowed in real terms. Importantly, under this regulatory regime, there is typically no adjustment for holding gains/losses. Effectively, under the utilities regime investors recover the inflation used to index assets, which is therefore usually indexed to the CPI or RPI.

As a result, under both regimes the expected return to investors equals the nominal cost of capital.

The differences between the regime currently applied to KPN (as modelled by Oxera) and regimes typically applied to telecoms and utilities companies are illustrated below. Table 2.1 shows the calculations of the allowed cash flows for a stylised asset under the regime applicable to KPN.[4] Table 2.1 assumes a real cost of capital of 8.2%, an inflation rate of 3%, and a nominal cost of capital of 11.4%.

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[4] Under the current regime, the allowed return on capital appears to be determined as the real cost of capital applied to indexed assets. This is modelled on the basis of the real cost of capital of 8.2% and shown in row (a). The allowed redemption of capital for the period modelled here is equal to the change in the value of the assets over this period. This means that the redemption of capital is, effectively composed of three elements: (1) historical cost depreciation; (2) depreciation on the revaluation of assets; and (3) holding gain/loss on asset revaluation. This is shown in row (b). The resulting pre-tax cash flows are calculated in row (g). The IRR over the lifetime of the asset under this regime is 8.2%, which is equal to the real pre-tax allowed cost of capital used in row (a).

Table 2.1   Calculation of the allowed cash flows under the regime applied to KPN

		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Allowed return on capital	(a) = real allowed cost of capital * opening indexed asset value		8.2	6.7	5.2	3.6	1.8	25.5
Allowed redemption of capital	(b) = (c + f)		17.6	18.7	19.9	21.2	22.5	100.0
Regulatory depreciation	(c) = (d + e)		20.6	21.2	21.9	22.5	23.2	109.4
Historical cost depreciation	(d)		20.0	20.0	20.0	20.0	20.0	100.0
Indexation of depreciation	(e)		0.6	1.2	1.9	2.5	3.2	9.4
Holding loss/ (gain) adjustment	(f)		(3.0)	(2.5)	(1.9)	(1.3)	(0.7)	(9.4)
Pre-tax cash flow	(g) = (h + i)	(100.0)	25.8	25.5	25.1	24.8	24.3	25.5
CAPEX	(h)	(100.0)	–	–	–	–	–	(100.0)
Allowed revenue	(i) = (a + b)		25.8	25.5	25.1	24.8	24.3	125.5
IRR	(j) = IRR (g)	8.2%						

Note: Assumes general price inflation of 3.0% and asset-specific indexation of 3.0%. The stylised model assumes no outperformance and that the allowed return is estimated on the basis of the opening asset value as in the case of the telecoms companies. If the allowed return were based on the opening assets value plus indexation, KPN would still under-recover, but by a different amount. The details of the calculations in rows (d), (e), (f), and (h) are provided in Oxera's report on compensation for inflation for KPN: Oxera (2008), 'Compensation for Inflation', December 1st.
Source: Oxera calculations.

As shown in Table 2.1, the outturn pre-tax IRR is equal to the *real* allowed cost of capital (8.2%), rather than the corresponding *nominal* cost of capital (11.4%) for the following reasons.

– The repayment of capital allowed in the case of KPN (row (b)) sums to the acquisition value of an asset over its lifetime. This means that it does not contain a compensation for inflation over the lifetime of the asset. This is different from the regime that applies to utilities because in the latter case inflation is compensated for through the redemption of capital.

– The allowed return on capital in the case of KPN (row (a)) is calculated as a real cost of capital applied to the same asset base, to which a nominal cost of capital is applied in the case of typical telecoms companies. Therefore, the allowed return on capital in the case of KPN is lower than in the case of other telecoms companies and does not contain compensation for inflation.

In the event that a nominal cost of capital (11.4% in this example) is applied under the current regime in row (a) in Table 2.1, the lifetime IRR (j) would be equal to the nominal cost of capital. This indicates that the application of the nominal allowed cost of capital under the current regime should allow investors to recover the general level of inflation (3% in this example) as required by investors.

3 Cost of debt

This section discusses issues in the analysis of the cost of debt in the case of KPN. In particular, it focuses on the following.

– **Forward-looking approach to the cost of debt**. The principles of corporate finance require a forward-looking measure of the cost of capital since the rate of return required by investors is determined by current market conditions and future business prospects.

There are also some advantages of estimating the cost of debt on a forward-looking basis from the regulatory perspective: it provides appropriate incentives to the company to reduce its cost of funding, it does not require over- or under-compensation that the regulator may need to apply depending on market conditions, it avoids difficult estimation of a mix of new and old debt, adds transparency to the regulatory framework, and provides correct signals for investment policy.

– **Estimating the actual cost of debt**. Notwithstanding the above, in calculating the cost of embedded debt faced by a company, there are some key practical and computational principles that need to be followed. First, it is important to consider the impact of new debt to be issued during the regulatory period to re-finance maturing debt and fund new CAPEX at market rates, as opposed to using exclusively the rates locked into debt already contracted for in the past. Second, it is important to estimate the costs of embedded debt at issue rather than coupons since the latter does not reflect the true 'all-in' cost of debt by ignoring discounts, transaction costs, or other relevant aspects of each issue that affect the true cost to the company. In this context, transaction costs of issuing debt need to be appropriately estimated. Finally, the costs of all types of financial instrument used by the company need be included in the analysis as opposed to considering listed bonds only, for example.

– **Estimates of KPN's cost of debt in previous reviews**. A comparison of the evolution of the previous estimates of KPN's cost of debt at earlier reviews with the evolution of market yields seems to provide counterintuitive results. More specifically, while average yields on KPN's bonds have *increased* over recent years, the estimates of KPN's cost of debt seemed to have *decreased* over the same period.

3.1 Basis for estimating the cost of debt

The allowed cost of debt could be estimated either on a forward-looking basis, including up-to-date market evidence (as either spot or historical averages if there it is appropriate eg to smooth market volatility), or as the combination of the cost of embedded debt as currently being paid by the company and the current, forward-looking cost of raising debt. From a regulatory policy perspective, there seem to be some important advantages of estimating the cost of debt on a forward-looking basis, especially in the current market circumstances given the significant increase in the cost of debt as a result of the financial turmoil and economic downturn.

3.1.1 Application of the forward-looking cost of debt
The cost of capital is, by nature, a forward-looking measure of future returns required by investors. Therefore, to ensure consistency with the forward-looking nature of the cost of capital analysis, at any point in time, it may be more appropriate to use the forward-looking estimates of individual parameters. In relation to estimating the forward-looking cost of debt and in the absence of obvious market distortions to observed yields, the current yields observed in the market are likely to represent the best estimates of future prices of capital and provide the relevant pricing signal for investment policy.

A regulator might consider adopting a policy based on embedded debt in order to claw back the differences between the allowed and actual cost of debt if it does not want the company to keep the benefits of outperforming the market or where it does not want to incentivise the company to optimise its cost of capital by outperforming the market benchmark. A similar approach might be relevant where the company faces significant historic cost of debt (eg, as a result of the need to finance large CAPEX programme in the past at the time when the cost of debt was significantly higher) and the company might not be able to meet these historical costs if the regulator allowed it a lower cost of debt.

Notwithstanding the above, there are strong arguments for adopting the current cost of debt, which reflects market conditions. This is particularly important in the current market circumstances where the company faces exceptionally difficult conditions in capital markets.

– **Flexibility to reflect changing market conditions**. Unlike forward-looking yields, the use of the cost of embedded debt does not take into account the changing conditions in financial markets. In contrast, the return required by investors reflects the latest market environment. A market-based measure of the cost of debt provides an important input into the cost of capital. The cost of capital provides a crucial signal about the value of investment, and the use of non-market measures may lead to under- or over-investment. This issue is particularly important today given the effects of the ongoing market turmoil and economic downturn.

– **Interference with financing decisions**. Companies are typically better positioned than regulators to determine efficient financing policy. Therefore, from a regulatory policy perspective, it might be more appropriate to leave financing decisions to the companies' discretion, while creating appropriate incentives for them to minimise their cost of funding. A forward-looking approach to estimating the cost of debt limits regulatory interference with financing decisions, as it does not require a judgement by the regulator as to whether a company's existing capital structure is efficient, an issue which may be raised when using exclusively the cost of embedded debt. In addition, the use of the costs of embedded debt may affect a company's re-financing policy and choice of financial instruments, which would represent a form of regulatory interference in financing decisions.

– **Flexibility to reflect changing business conditions**. The cost of embedded debt does not allow for capturing the effects of changing business risk as would be reflected in returns required by investors. In contrast, a forward-looking approach reflects the market risk assessment for a particular asset and credit rating, which include updated expectations of future default and expected recovery rates for the issuing company.

– **Regulatory incentives**. The approach based on the costs of embedded debt removes incentives for the company to raise capital efficiently, since it might effectively face a cost pass-through. If the regulator were to use purely the cost of embedded debt as a measure of the overall cost of debt, the estimated cost of financing would be offset by a cost of debt allowance. This would result in the actual cost of debt being passed through to the allowance, and the company would not be penalised for inefficient financing decisions. A forward-looking approach also adds transparency to the regulatory framework.

– **Symmetry in the treatment of the cost of debt between reviews and regulatory commitment**. At a minimum, the approach based on the costs of embedded debt requires symmetry in the way the regulator sets the cost of debt allowances across economic cycles and regulatory periods. For example, just as a low cost of debt would be allowed in an environment of rising yields, the opposite would need to be the case in an environment of falling yields. This means that at the time when market yields are above the costs of embedded debt, the allowed cost of debt would be below the market

yields. Similarly, when market yields are below the cost of embedded debt, the allowed cost of debt would need to be in excess of market yields.

Regulatory precedents in telecoms in other jurisdictions (eg, in the UK and Irish telecoms industries) support the use of a forward-looking approach, especially in the current market conditions, to reflect the situation in capital markets. In its recent consultation, Ofcom based its estimate of the cost of debt on forward-looking data on yields for BT's recently issued bonds (evidence from primary markets) as well as on secondary market data.[5] ComReg, in its 2008 cost of capital determination for eircom, also took a forward-looking perspective when estimating individual components of the cost of capital, including the cost of debt.[6] The regulator used market evidence for its final decision on the cost of debt since this reflects investors' forward-looking expectations.

3.1.2 The use of spot yields versus historical averages to estimate the market cost of debt

Under the forward-looking approach the cost of debt could be estimated using evidence on current spot yields, which most closely reflects the opportunity cost of capital from the investors' perspective, or using averages over a certain period of time to date.

On the one hand, using longer-term market averages avoids passing through short-term market volatility into consumer prices (to the extent that it can be established that it is indeed short term volatility that is reflected in spot estimates) and avoids allowing companies an inappropriately low cost of debt when market yields drop. On the other hand, spot yields appropriately reflect current market conditions provided that price signals are efficient; hence, they would appropriately reflect the current costs of raising capital. They also avoid arbitrary choice about the length of the averaging period, which might significantly affect the results, as shown below.

Under the current market conditions, recent yields appear to provide a more appropriate basis for setting the cost of debt for the next regulatory period, given the exceptional circumstances and potentially permanent shift in required returns—ie, to the extent they reflect the under-pricing of risk during the period of benign market conditions between 2003 and 2007. This is supported by the consistent evidence from primary and secondary markets, as reviewed in Oxera's cost of capital report.

Although it could be argued that a form of mean reversal might eventually occur in debt markets in the medium to long term (even if it is not currently reflected in the evolution of latest market prices), it does not appear reasonable to expect that the prices would revert back to the benign market conditions that characterised the period immediately prior to the financial turmoil, nor that the method of pricing credit risk will return to the pre-crisis levels, since the previous pricing models have been revealed as unsustainable.[7]

At the very least, market participants might be expected to correct the fundamental mispricing of risks that appear to have characterised prices in debt capital markets prior to the market turmoil. Similarly, the reversion may not be expected in the short term, given the market evidence on forward-looking uncertainty from the derivates markets.

Figure 3.1 shows the evolution of the cost of raising debt over the long term. The average levels of yields on A rated and BBB rated debt observed over the last half-century were around 8.9% and 9.4% respectively. This is in contrast to much lower levels of yields over

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[5] Ofcom (2008), 'A New Pricing Framework for Openreach', May 30th, pp. 92–93; and Ofcom (2008), 'A New Pricing Framework for Openreach', December 5th.

[6] ComReg (2008), 'eircom's Cost of Capital', response to consultation and decision notice, May 22nd, para 4.3, p. 28.

[7] Risk models that assume a normal distribution for asset returns are subject to tail risk, which stems from the fact that the probability of the occurrence of extreme events in financial assets returns is greater than implied by a normal distribution. It is widely acknowledged that financial markets participants have not appropriately captured the tail risk in their risk pricing models.

recent years. In fact, the cost of debt between 2003 and 2007 has been the lowest over the last 50 years.

Figure 3.1   Cost of debt over the long term (%)
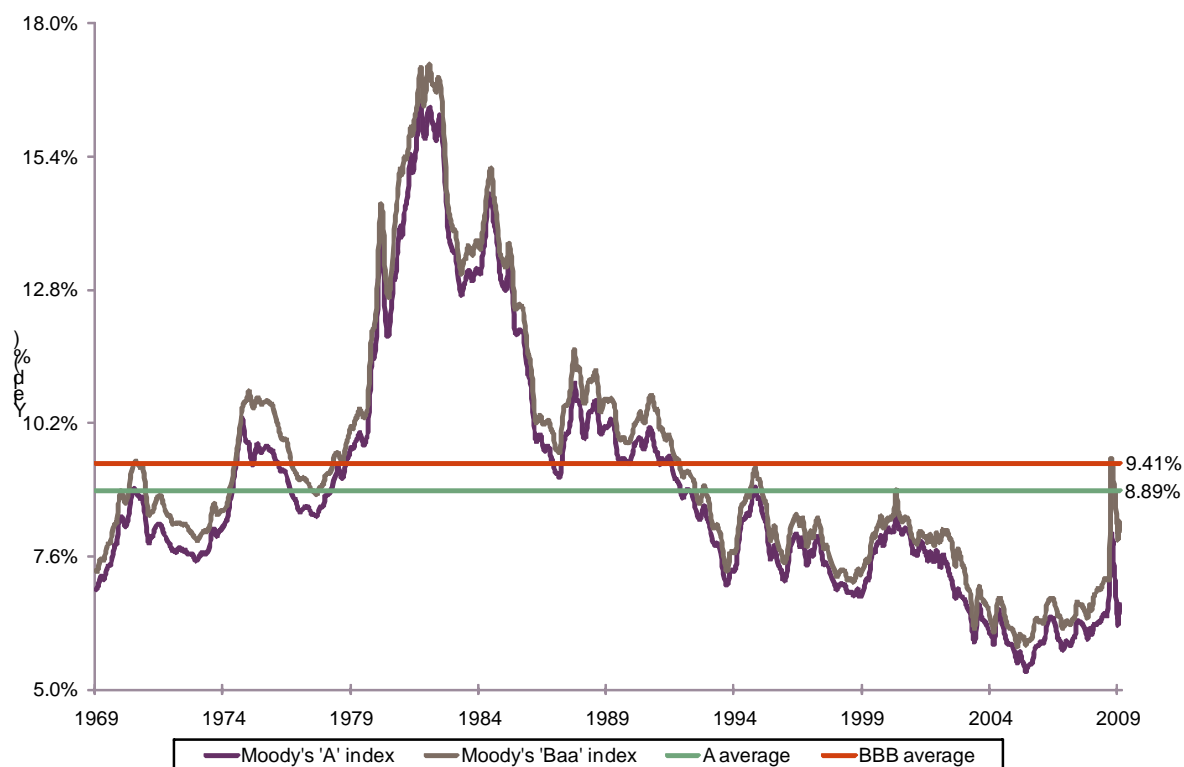
Source: Data provided by KPN.

In this context, the currently observed level of yields on investment-grade corporate debt could be interpreted as being part of an adjustment back towards long-term levels of yields, after the unusually benign capital market conditions of recent years.

3.2   Estimates of KPN's costs of embedded debt

From a conceptual perspective, the cost of debt allowance should be based on forward-looking estimates of the cost of debt, as discussed in section 3.1. Notwithstanding the above, NERA's estimates of the cost of embedded debt appear to be lower than KPN's actual costs of embedded debt for at least two reasons:

–   NERA's estimates do not take into account the impact of yields on new debt that may be issued over the regulatory period; and

–   NERA's approach to estimating the costs of embedded debt seem to provide downward-biased estimates due to considerations about issuance discounts, estimates of transaction costs of debt, and exclusive focus on listed bonds.

This means that NERA's estimate of the cost of debt is unlikely to be sufficient even to allow KPN to recover historical costs of debt raised in the past.

3.2.1   Impact of refinancing on KPN's costs of embedded debt
NERA's approach measures the cost of embedded debt at a given point in time, without taking into account the yields on new debt that KPN may have to raise over the next price control period, both to re-finance maturing debt and to finance CAPEX. Including the new debt in the calculations increases the estimates of the costs of embedded debt.

NERA's estimate of the cost of debt in October 2008 is 5.15%.[8] If the impact of the expected re-financing of maturing bonds were included, the cost of embedded debt would be 5.9% for 2011, or 75bp higher than NERA's estimate for 2009–11, assuming that KPN raises new debt to re-finance debt redemptions at market rates.[9] If debt used to finance future CAPEX (in addition to debt redemptions) issued at higher market rates were included in the analysis, the resulting costs of embedded debt would be higher.

When estimating the cost of embedded debt it is problematic to assume that the company could postpone the issuance of new debt until the end of the regulatory review, and hence only consider costs of embedded debt existing at the start of the regulatory period. If KPN were to postpone debt issuance, it would be implicitly raising equity capital to fund debt redemptions and new CAPEX. Under this assumption the cost of capital would need to be re-estimated at a lower gearing. Furthermore, significant delays in new debt issuances may also lead to additional costs associated with deviations from an efficient target financing structure. Overall, this would be expected to lead to a higher cost of capital.

Section 3.1 discussed estimating the cost of debt on a forward-looking basis. These considerations apply equally when the cost of debt is based on the combination of the future cost of raising debt during the price control and the cost of embedded debt. It seems more appropriate to reflect the changing market and business conditions and estimate the cost of debt on a forward-looking basis, given appropriate incentives to the company to reduce its cost of funding, the absence of the requirement for over- or under-compensation depending on market conditions, the avoidance of difficult estimation of a mix of new and old debt, and transparency of the regulatory framework.

3.2.2 Approach to estimating the cost of embedded debt

There are a number of practical issues that need to be accurately reflected in robust cost of debt estimates in order to avoid potential biases. These include the use of yields to maturity as opposed to coupons, reflection of transaction costs and liquidity facilities, and the completeness of the analysis in terms of the inclusion of all debt-funding instruments as opposed to exclusive focus on traded bonds, for example.

– **The use of yields to maturity as opposed to coupons**. NERA's estimates of the cost of debt are based on coupons for KPN's bonds. The use of coupons creates distortions when estimating the cost of debt because it ignores the actual cost of debt. Adopting yields to maturity rather than coupons would bring the estimates of the cost of embedded debt closer to KPN's actual cost of debt by approximately 20–22bp.[10]

– **Estimates of transaction costs**. NERA included an uplift of 12bp, based on its understanding of the magnitude for an appropriate uplift, to the estimates of the costs of embedded debt based on coupons to incorporate the transaction costs of issuing debt.[11] Oxera's analysis based on the data provided by KPN and further publicly available data from Dealogic demonstrates that, in the case of KPN, the transaction costs of issuing debt are approximately 17bp—ie, 5bp higher than NERA's estimates, which further contributes to the difference between KPN's actual costs of debt and NERA's estimates.

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[8] NERA (2009), 'The Cost of Capital for KPN's Wholesale Activities: A 3-year Estimate for 2009–2011', January.

[9] This calculation includes the 5- and 10-year bonds issued in January 2009 for a total of €1.5 billion at yields of 6.4% and 7.7%.

[10] 20bp is the difference between the weighted average yield to maturity at issue of KPN bonds outstanding in November 2008 and the weighted average coupon on the same bonds, including the effects of the currency swaps on foreign currency bonds. 22bp is the corresponding figure for June 2007. If the effects of currency swaps are excluded, the impact of including the discount is 4–7bp.

[11] According to NERA, the 12bp uplift relates to both transaction costs and issuance discount. Source: NERA (2009), 'The Cost of Capital for KPN's Wholesale Activities: A 3-year Estimate for 2009–2011', January, pp. 30–31; and NERA (2009), 'The Cost of Capital for KPN's Wholesale Activities: A 1-year Estimate for 2007', January, pp. 30–31.

- **Consideration of a comprehensive set of financial instruments**. The estimates of the cost of embedded debt need to reflect the weighted average cost of all funding instruments used by the company in order to avoid potential biases in the estimates. In the case of KPN, it is important to consider the costs of liquidity facilities, for example, which are higher than yields on traded bonds; this would again bring the estimates closer to KPN's true cost of debt.[12] These costs are included in KPN's own estimates.

3.3 Estimates of KPN's cost of debt in previous reviews

NERA's estimates of KPN's cost of debt in October 2008 and January 2007 proposed for this regulatory period are lower than its estimates in December 2005 and January 2004 proposed for the previous regulatory period.[13] This seems counterintuitive given the evidence on the rising cost of debt for European telecoms companies in general during that period, and KPN more specifically (see Table 3.1 and Figure 3.2).

Table 3.1   Changes in NERA's estimates of the cost of debt compared with the evolution of market rates for KPN

Period	Change in NERA estimate (bp)	Change in yield of KPN bonds (bp)
Jan04–Oct08	−15	+235
Dec05–Jan07	−40	+86
Dec05–Oct08	−5	+325

Note: Based on NERA estimates for the cost of debt (nominal, pre-tax) of 5.15% for October 2008, 5.20% in December 2005, 4.80% in January 2007, and 5.30% in January 2004. Change in yield of KPN bond based on weighted average of KPN bonds during each period.
Source: Oxera calculations based on Datastream information; NERA (2009), 'The Cost of Capital for KPN's Wholesale Activities: A 3-year Estimate for 2009–2011', January; NERA (2009), 'The Cost of Capital for KPN's Wholesale Activities: A 1-year Estimate for 2007', January; NERA (2006), 'The Cost of Capital for KPN's Wholesale Activities: A Final Report for OPTA', February 21st; NERA (2005), 'The Cost of Capital for KPN's Wholesale Activities: A Final Report for OPTA', December 16th.

As shown in Table 3.1, NERA's estimates have decreased in periods where the yields on KPN bonds have increased substantially. Similar to KPN's yields, yields for other European telecoms companies have also increased since late 2004, as illustrated in Figure 3.2. This increase has a significant impact on KPN's cost of capital.

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[12] Oxera's analysis of KPN's cost of debt does not include the cost of liquidity facilities as it is based on the forward-looking approach.
[13] NERA (2009), 'The Cost of Capital for KPN's Wholesale Activities: A 3-year Estimate for 2009–2011', January; NERA (2009), 'The Cost of Capital for KPN's Wholesale Activities: A 1-year Estimate for 2007', January; NERA (2005) 'The Cost of Capital for KPN's Wholesale Activities: A Final Report for OPTA', December 16th.

Figure 3.2   Rising cost of debt for European telecoms companies
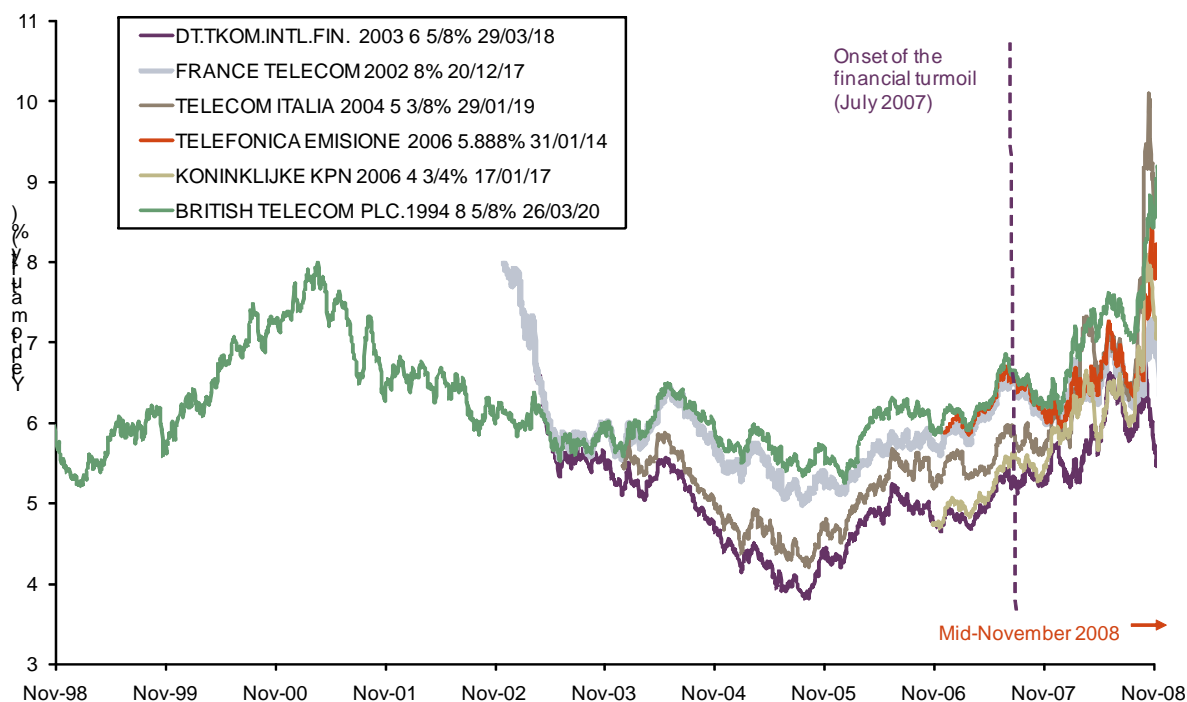
Source: Datastream and Oxera analysis.

4   Risk-free rate

This section discusses the key issues in the analysis of the risk-free rate, focusing on the following specific considerations.

– **Choice of maturity**. In theory, the choice of maturity of instruments used for the risk-free rate should reflect the life of the company's assets, and the maturity or duration of its liabilities. Other choices of maturity—periods shorter than the length of the full regulatory period in particular—may not be appropriate for a number of reasons.

Regulatory precedents from the UK suggest that regulators are typically guided by either the life of assets, or a combination of the life of assets and maturity of liabilities, and the length of the regulatory period. In particular, regulators tend to discourage investors from 'short-termism' and quickly liquidating their investments, and encourage a long-term, investment perspective not limited to a single regulatory review. More generally, reliance on shorter maturities in markets characterised by steep upward-sloping yield curves typically creates a downward bias in the estimates of the risk-free rate. The same point applies to using very long term maturities when the yield curve is not flat.

– **Relevance of the most recent market evidence**. When estimating the risk-free rate, it might be more appropriate to focus on yields on government bonds prior to the onset of the financial turmoil since yields after the onset of the turmoil might be biased due to market inefficiencies. It should be noted this problem does not seem to apply to the cost of debt because recent issuance activity in corporate debt markets indicates that current prices are a more accurate reflection of economic fundamentals for these securities. In particular, demand factors that depress yields in the government debt market (eg, large movements of capital or flight to quality) do not appear to have such an effect in corporate debt markets.

4.1   Appropriate maturity of instruments

For the purposes of estimating the risk-free rate, the choice of maturity is important whenever the yield curve is not flat. The current shape of the yield curve implies that government bonds with shorter maturities have considerably lower yields than bonds with longer maturities.

One approach could be to use the length of the regulatory review period in the Netherlands to set the maturity of instruments given that the cost of capital is re-set at every regulatory review.[14] Although the allowed returns may be re-set in line with market evidence at the regulatory review, not all allowed cash flows are re-set (eg, cash flows implicit in the terminal value are not re-set). Therefore, given that there is a terminal value at the end of the regulatory review period, from an NPV-neutrality perspective it seems more appropriate to base maturity of the risk free rate on maturity of assets or duration of regulatory revenues. Furthermore, an approach based on very short-term maturity, eg shorter than the current regulatory review period would be inconsistent with the regulator's objective of encouraging a longer-term investment perspective.

It should be noted that the regulatory precedent suggests that in the UK regulators have not been guided solely by the length of the regulatory period and have typically considered a range of maturities when setting the risk-free rate, typically between 5 and 10 years.

Table 4.1 reviews precedents from UK regulators on the choice of maturities when estimating the risk-free rate. As the table indicates, UK regulators have tended to base the choice of maturities of bonds used in the risk-free rate assessment on several factors, including the investment horizon, maturity of outstanding debt and liabilities, and length of the regulatory period. The resulting choice of maturities ranges from three to 20 years, while the corresponding regulatory periods typically have a length of three to five years.

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[14] It is also important to ensure consistency between the maturity used for estimating the risk free rate in the cost of equity and the equity risk premium.

Table 4.1   UK regulators' approaches to the choice of maturities

Regulator	Choice of maturities	Comments
Competition Commission (CC) and CAA, Heathrow and Gatwick Airports inquiry (2007 and 2008)	5- and 10-year	Government IL gilts with maturities of 5 and 10 years which, in the CC's opinion, best reflected the level of risk-free rate
CC and CAA, Stansted Airport inquiry (2008)	3-, 5- and 10-year	Government IL gilts with maturities of 3, 5 and 10 years, applying more weight on shorter-term maturities as longer- term maturities might have been affected by the market inefficiency
ComReg (2008)	5-, 10- and 15-year	Short-, medium- and long-term maturities were used in order to explore full breadth of evidence
Ofcom, BT's copper access (2005)	5-year	Ofcom took a balanced view on two arguments: length of the control period and length of the investment horizon
Ofcom, Openreach (2008)	5-year	Consistent with previous approach: Ofcom took a balanced view on two arguments: length of the control period and length of the investment horizon
Ofgem, DPCR4 (2004)	5-, 10- and 20-year	Short-, medium- and long-term maturities were used in order to explore full breadth of evidence
Ofgem, TPCR4 (2006)	10-year	10-year maturity government bonds to reflect maturity of the company's outstanding debt
Ofgem, GDPCR5 (2007)	10-year	10-year maturity government bonds to reflect maturity of the company's outstanding debt
Ofwat, water price control (2004)	Medium-term (10-year and above)	In line with regulatory precedents and closely match companies' liabilities

Source: Regulatory documents: Competition Commission (2007), 'BAA Ltd: A Report on the Economic Regulation of the London Airports Companies (Heathrow Airports Ltd and Gatwick Airports Ltd)', September 28th; Civil Aviation Authority (2008), 'Economic Regulation of Heathrow and Gatwick Airports 2008–2013: CAA Decision', March 11th; Competition Commission (2008), 'Stansted Airport Ltd: Q5 Price Control Review', October 23rd; Civil Aviation Authority (2008), 'Stansted Airport: CAA Price Control Proposal', December; ComReg (2008), 'eircom's Cost of Capital', response to consultation and decision notice, May 22nd; Ofcom (2005), 'Ofcom's Approach to Risk in the Assessment of the Cost of Capital', August 18th; Ofcom (2008), 'A New Pricing Framework for Openreach', May 30th; Ofcom (2008), 'A New Pricing Framework for Openreach', December 5th; Ofgem (2004) 'Electricity Distribution Price Control Review: Final Proposals', November; Ofgem (2006) 'Transmission Price Control Review: Initial Proposals', June 26th; Ofgem (2007) 'Gas Distribution Price Control Review: Initial Proposals Document', May 29th; Ofwat (2004) 'Future Water and Sewage Charges: Final Determinations'.

There are a number of reasons for why in the context of the cost of capital analysis, it would be appropriate to consider maturities beyond the length of the regulatory period as well as the asset life.

–   **Length of investment horizon**. To support the correct choice of maturity, consideration needs to be given to the framework in which the risk-free rate parameter will be used (ie, the cost of capital determination). As a forward-looking measure, the cost of capital reflects the return required by investors to finance the asset base necessary to generate future cash flows over its lifetime rather than the return over the regulatory period.

–   **Risk exposure beyond the regulatory period**. The use of maturity shorter than the regulatory period would imply that no reinvestment is assumed and that there is no risk exposure beyond the cash flows in a single regulatory period. The life of KPN's assets is longer than the regulatory period, and hence investors would be exposed to risk after the end of the regulatory period through the terminal value, even if they sell their investments. It may be more appropriate to use a short-term rate set with reference to the length of the regulatory period for setting the allowed return (a rate shorter than the

life of the assets) if the allowed depreciation is based upon market values rather than at historic cost.

– **Regulator's influence on company's corporate financial management**. Setting the risk-free rate with reference to the asset life or duration of regulatory revenues implies that the company can adopt some form of asset-liability-matching. It also allows for the profile of allowed revenues to be linked to the life of the underlying assets. A choice of substantially shorter or longer maturities might affect companies' independence in the choice of the capital structure and sources of funding. Hence, it may significantly affect a company's ability to efficiently finance its operational and capital investment activity.

Considering a combination of maturities equal to the regulatory as well as longer maturities eg equal to the asset life seems to be particularly important in the current market conditions, given an upward sloping yield curve. This approach has the additional advantage of not requiring the company to raise capital on the short-term basis, which might imply additional refinancing risk and transaction costs.

4.2 Relevance of recent market evidence on yields on government bonds

When estimating the risk-free rate it may not be appropriate to rely on recent evidence on yields on government bonds due to significant distortions in the market. Given these distortions, the analysis may need to focus on yields observed before the onset of the turmoil.

There are two specific reasons for why the evidence on yields after the onset of the turmoil may not provide an appropriate basis for setting the risk-free rate:

– yields on European government bonds may deviate from economic fundamentals due to imbalances between supply and demand in the government debt market and large capital movements;

– the volatility of yields increased significantly since the onset of the turmoil, reflecting considerable uncertainty associated with point estimates.

In efficient capital markets prices are driven only by fundamental factors and not driven by the evolution of supply and demand for particular instruments. The decreases in nominal yields on government bonds observed since the onset of the turmoil have been associated with market distortions due to significant supply and demand effects. Therefore, to the extent that government yields have been affected by changes in the allocation of capital across asset classes (eg, government bonds have acted as a 'safe haven' for investors concerned about credit exposure), and hence by investor demand, the price signal associated with changes in yields might partly reflect temporary behavioural effects rather than the true risk-free rate.

The impact of the financial turmoil on the market for government bonds is also reflected in the higher volatility of Dutch nominal yields, which have increased by more than 100% since June 30th 2007 for bonds with a maturity of five–seven years, and lower bid–ask spreads (a proxy measure for liquidity) that have more than tripled over the same period.

Figure 4.1 Volatility of changes in yields on Dutch government bonds (indexed as at July 2007, the approximate onset of the turmoil)

The volatility of daily changes in yields on Dutch government bonds with maturity from 6 to 7 years has increased from 0.48 to 0.97
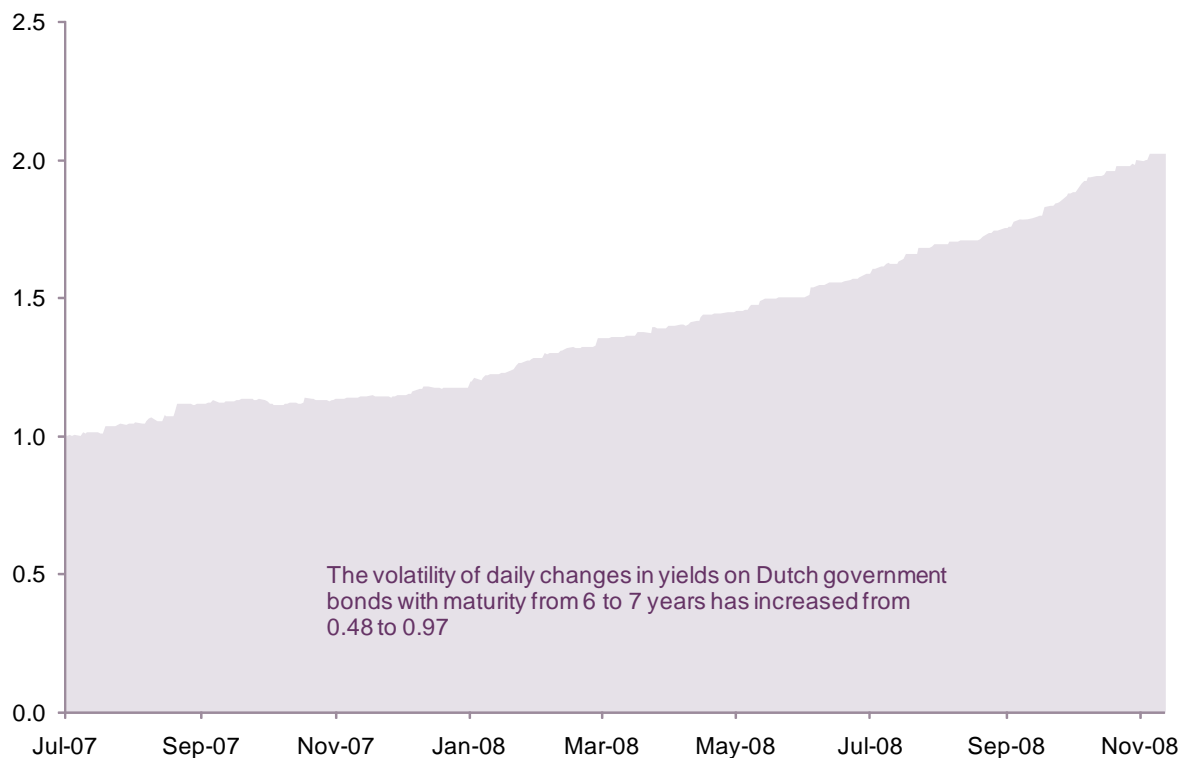
Source: Datastream and Oxera calculations.

As shown in Figure 4.1, volatility of daily changes in the yields on Dutch gilts more than doubled from 0.48 to 0.97. Such an increase in volatility substantially lowers the accuracy of estimating the risk-free rate. Higher volatility reflects higher forward-looking uncertainty.

Overall, the recent evidence on government yields suggests that they may not provide an appropriate robust basis for estimating the risk-free rate. Therefore, it may be more appropriate to use the evidence before the onset of the turmoil when estimating the risk-free rate.