Oxera

Updating the WACC for energy networks

Methodology paper

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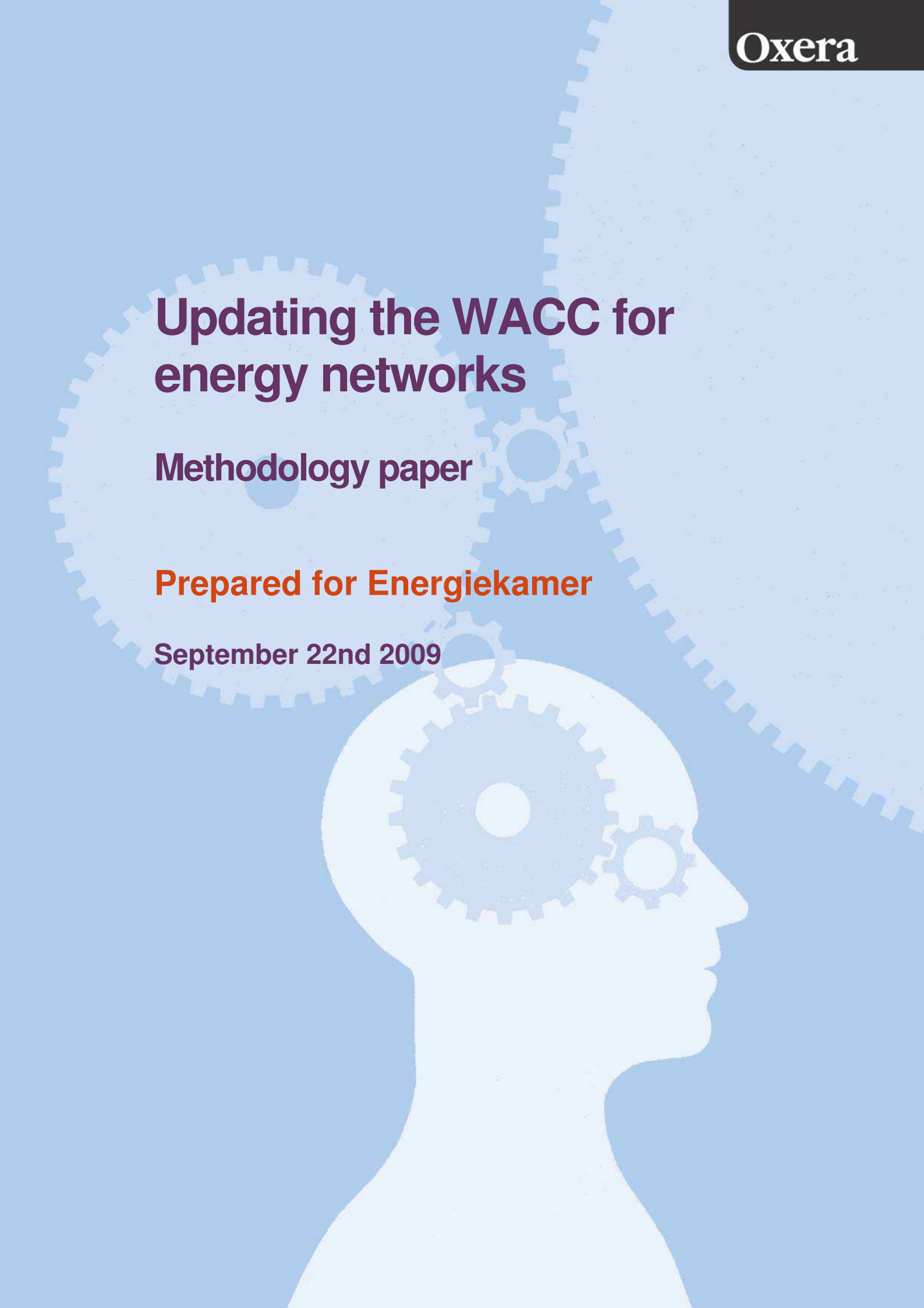

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1 Introduction and summary

Energiekamer has asked Oxera to review the methodology previously applied to estimating the gearing and the expected inflation in the estimation of the WACC for energy networks. This report sets out Oxera's analysis and findings.

The main findings are as follows.

Inflation

– In principle, the inflation assumption used to adjust the WACC should capture the inflation expectations that investors have incorporated into the price of securities used to estimate the different components of the WACC (and notably the risk-free rate).

– Because the WACC is estimated using returns on securities with long maturities (ten years) averaged over several years (two and five years), it is necessary to take a medium- to long-term view on inflation to ensure overall consistency in the estimation exercise.

– In practice, investors form their expectations of inflation on the basis of different observations: outturn inflation observed in previous years; independent forecasts published by monetary authorities or research centres; implied inflation inferred from differences between real and nominal yields; and inflation targets used by monetary authorities.

– Each of these sources of information has its conceptual and practical advantages and disadvantages. In practice, they yield different estimates over the short term, but they tend to converge towards a narrower range when measured over a longer time horizon (around 2%). This result is consistent with the notion that investors formulate rational expectations and that inflation forecasts do not depart significantly from realised inflation, on average.

– Against this backdrop, the proposed approach to inflation for this exercise is to use an average of realised annual inflation rates over the period used to measure the risk free rate and the debt premium (two and five-year) and the forecast inflation rate for the year ahead as estimated by the Centraal Planbureau (Table 1.1).

– The weight placed on realised inflation under this approach ensures transparency and objectivity, while the inclusion of inflation forecasts ensures that current conditions are taken into account. The range produced by this approach, of **1.6 to 1.8%**, is consistent with the observation that over the medium term inflation in the Netherlands has been below, but close to, the ECB's monetary target.

Table 1.1 Inflation range for the assessment of the WACC

	2005 realised	2006 realised	2007 realised	2008 realised	2009 realised	2010 forecast	Average
Two-year estimate				1.8	2.4	1.3	**1.8**
Five-year estimate	1.4	1.5	1.3	1.8	2.4	1.3	**1.6**

Note: realised annual inflation is calculated as the average of monthly year-on-year inflation rates from June to May.
Source: Statistics Netherlands; CPB; Oxera calculations.

Gearing

– In previous decisions, EK adopted a gearing assumption of 60%, based on the observation of gearing levels for comparator companies and regulatory precedent.

– A higher gearing assumption implies a lower pre-tax WACC, but it might also imply a higher level of financial risk, with potential implications for the ability of companies to finance their activities on reasonable terms. In principle, the gearing assumption must reflect a trade-off between these two sets of regulatory objectives.

– The precise optimisation of this trade-off is difficult in both theory and practice. Therefore, a reasonable working objective is to adopt a gearing that would enable Dutch energy networks to achieve and maintain a credit rating comfortably within investment grade, while limiting distortions on tax, given how the networks are remunerated for tax allowances.

– From the empirical perspective, debt markets have undergone considerable turbulence recently, implying some uncertainty in terms of the ability of companies with a credit rating just above the investment-grade level (BBB) to raise finance.

– These market developments, together with an examination of comparators and regulatory precedent, indicate that the appropriate rating reference for this assessment should be in the low 'A' range (A–).

– An examination of comparator companies, recent regulatory decisions and recent corporate transactions indicates that gearing levels of between 50% and 60% would be consistent with a credit rating within the A range. A range of 50–60% can therefore be used for the assessment of WACC.

– It must be emphasised that when performing their assessment of creditworthiness, ratings agencies typically evaluate a wide range of quantitative and qualitative indicators, of which gearing is only one. The range indicated in this study provides a useful initial guide to understanding which gearing policy might be consistent with the reference credit rating, but can only be taken as indicative at this stage.

– The adoption of a range, rather than a point estimate, reflects the notion that there is currently some uncertainty with respect to the financing policies that credit rating agencies would judge consistent with the reference rating in the Netherlands, both because of the general turbulence in the debt markets, and because, to Oxera's knowledge, the credit rating agencies have not yet confirmed their rating of the newly unbundled network companies in the Netherlands.

– Moreover, the range for the notional gearing produced by this approach is consistent with the new financeability framework, and provides energy networks with some

headroom to finance additional CAPEX with debt before hitting the indicative and mandatory caps placed on their indebtedness.

2 Inflation

In previous decisions, EK's inflation assumption was based on forecasts of CPI growth published by the Bureau for Economic Policy Analysis (Centraal Planbureau, CPB). This assumption was chosen owing to its availability over a suitable timeframe and the reputation of the CPB. EK also verified that the resulting estimate of the deflated risk-free rate was consistent with alternative estimates of the real risk-free rate.

EK has asked Oxera to review its treatment of inflation in the estimation of the WACC. In particular, EK is cognisant that its methodology for estimating the parameters of the WACC (notably, the risk-free rate and the debt premium) relies on two- to five-year historical averages. There is, therefore, a presumption that the inflation assumption used to deflate the WACC should be consistent with this aspect of the methodology.

This section starts by outlining possible assessment criteria (section 2.1) before considering options in light of these criteria (section 2.2).

2.1 Assessment criteria

The economic issue underlying the inflation adjustment in the calculation of the WACC can be summarised as follows.

– Most of the market data used to inform the estimation of the WACC is expressed in nominal terms. A proportion of these nominal returns is meant to compensate investors for the effect of inflation on their purchasing power.

– Because the regulatory regime compensates investors for the effect of inflation through other mechanisms (the indexation of allowed revenues and the revaluation of the RAB), it is necessary to strip out the implied inflation assumption from the observed market returns in order to set the allowed WACC.

– To this end, it is necessary to form a view on the inflation expectations that investors have incorporated into their pricing decisions.

This section examines these questions, and draws some conclusions for the appropriate treatment of inflation in the estimation of the WACC.

2.1.1 What are the components of nominal returns?

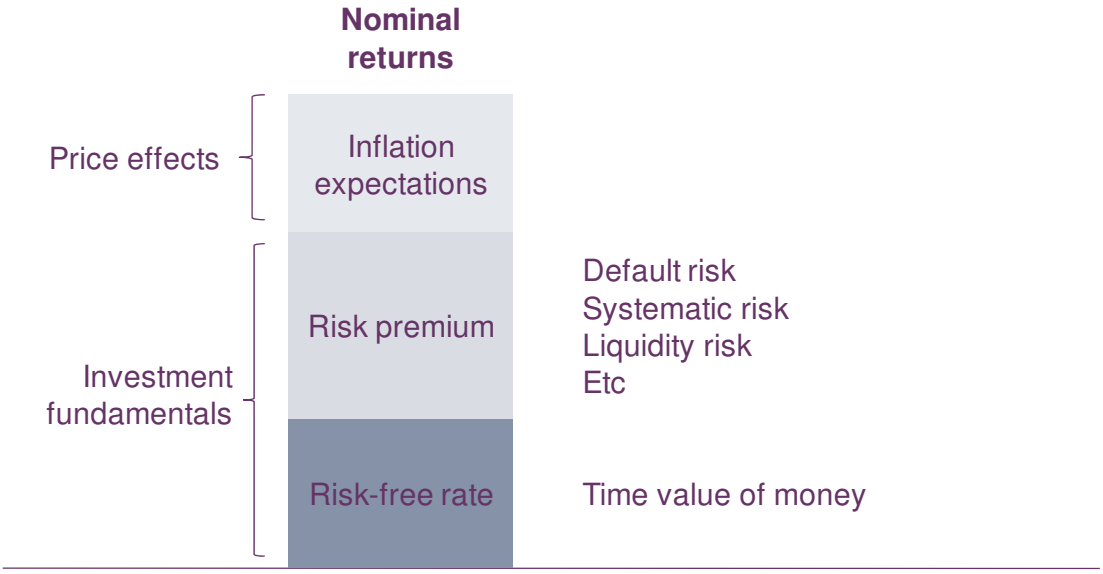
In the methodology employed by EK, the market data that supports the estimation of the WACC (debt yields, equity returns, etc) is expressed in nominal terms. Nominal returns incorporate compensation for:

– **investment 'fundamentals'—**investors expect to be compensated for the time value of money (the risk-free rate), and for the risk undertaken (default risk, systematic risk, liquidity risk, etc);

– **inflation—**investors expect to be compensated for the effect on their purchasing power of changes in the level of prices—ie, expected inflation.

Figure 2.1 below provides a simplified illustration of these building blocks.

Figure 2.1 Building blocks of nominal returns



Source: Oxera.

The price control regime for Dutch energy networks provides a degree of protection against inflation through:

– the indexation of allowed revenues within price control periods;
– the indexation of companies' asset bases at each price control review.

These two mechanisms provide protection against changes in consumer prices. This implies that the WACC value used in the price control calculations does not need to include compensation for inflation expectations.

2.1.2 What is the appropriate methodology for removing the inflation component in nominal returns?

To strip out the inflation component in nominal returns, it is necessary to form a view on the inflation expectations that investors have incorporated into their pricing of the securities used as references for the assessment of the WACC. In other words, the relevant question is not 'what level inflation can be expected in the next price control period?', but rather 'what level of inflation did investors expect in the past, when they priced and traded securities on capital markets?' This question has two dimensions, as examined below.

Reference index

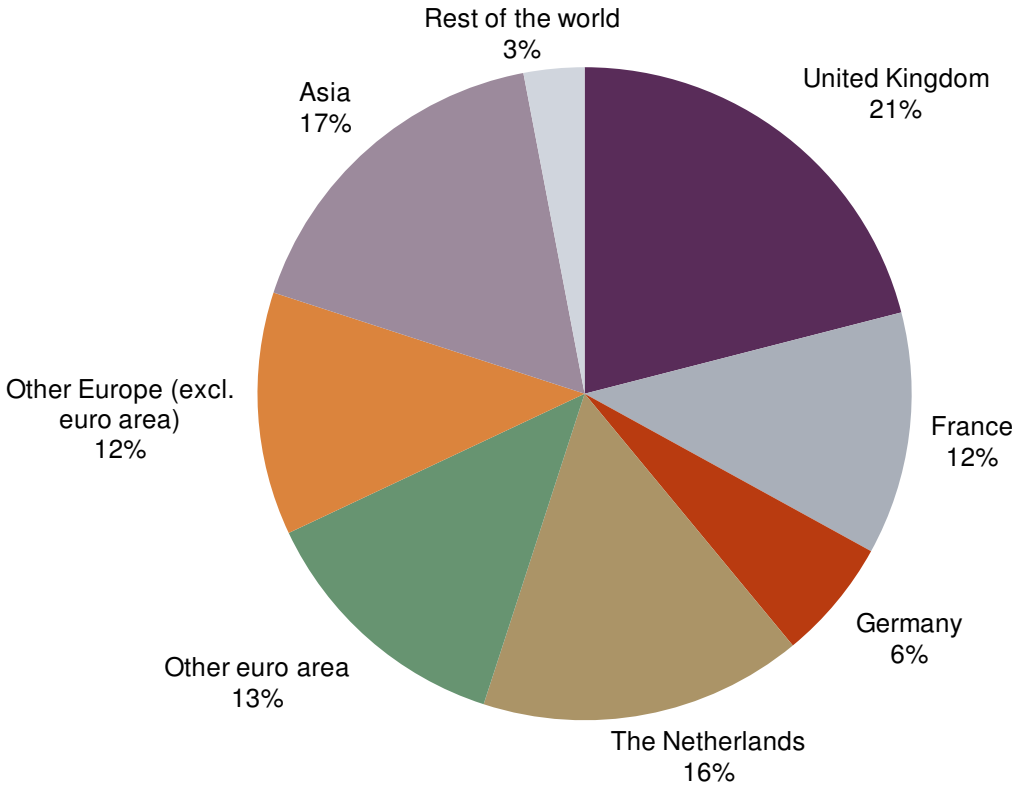
First, it is necessary to choose the relevant reference index. Although consumer price indices (as opposed to producer price indices) are commonly used for this exercise, this may raise a question about the appropriate geographical scope—ie, whether the appropriate assumption should capture inflation expectations for the domestic market (the Netherlands), or for a wider jurisdiction (eg, the Eurozone).

According to the purchasing power parity (PPP) principle, under the assumption of small or negligible transaction costs and import tariffs, the difference in nominal interest rates between two countries would then be equal to the difference in expected inflation. In other words, if there is a positive inflation differential and arbitrage is possible, PPP requires that the nominal interest rates differ by the difference in inflation such that real interest rates in the two countries remain equal. This implies a focus on domestic inflation when deflating the WACC.

Against this backdrop, it is of note that capital markets are increasingly integrated within Europe. Trading patterns in sovereign securities illustrate this point. For example, Figure 2.2

shows that only 16% of those investors that participated in a recent auction of Dutch sovereign bonds were of Dutch nationality.

Figure 2.2 Nationality of investors participating in recent Dutch issuance



Source: Dutch Treasury Agency (2009), '6.2 billion euros issues in new five-year bond', press release, July 7th.

On balance, it seems appropriate to focus on inflation in the Netherlands when deflating the WACC. However, it might be appropriate to place some weight on inflation in the Eurozone to take account of the growing integration of Eurozone economies and capital markets.

Timing

Second, it is necessary to decide on the relevant timing specifications for this assumption, in terms of the point at which inflation expectations are measured, and the time horizon of such expectations. In principle, these specifications should reflect the other parameters of the estimation. If, for example, the purpose of the exercise is to estimate the real risk-free rate embedded in the nominal yields observed five years ago on a ten-year Dutch government bond, then it is necessary to make an assumption about the level of inflation expected by investors five years ago for the next ten years (Figure 2.3). In principle, current inflation forecasts are only relevant when considering spot yields.

Figure 2.3 Inflation expectations and pricing data

Source: Oxera.

Assessment criteria

This analysis suggests two criteria for the adoption of an appropriate inflation assumption.

– First, for the reasons set out above, there should be a legitimate presumption that the assumption reflects the inflation expectations that investors have incorporated into their pricing decisions. In particular, it should reflect inflation in the appropriate geographic zone (the Netherlands and Eurozone) and over the appropriate time horizon (ten years).

– Second, because this assumption is used in an evidence-based regulatory process, the assumption should be as transparent, objective and readily available as possible.

The next section assesses options in terms of these criteria.

2.2 Analysis and market evidence

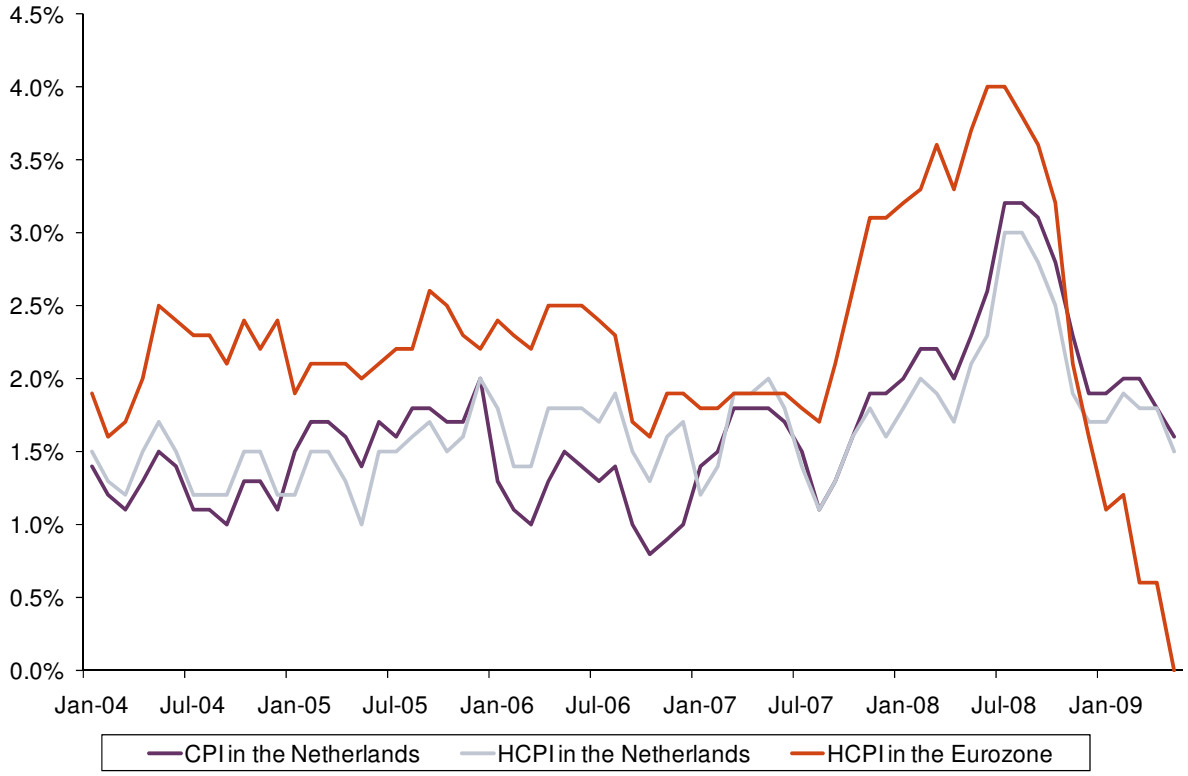
This section reviews four possible sources of inflation assumptions—realised inflation, forecast inflation, implied inflation, and target inflation—and assesses the consistency of these estimates with the two criteria set out above.

2.2.1 Realised inflation

The first option is simply to use realised inflation—ie, the historical level of inflation measured by the relevant authorities.

Figure 2.4 below shows year-on-year growth in the Harmonized Consumer Price Index (HCPI) for the Netherlands, the HCPI for Eurozone, and the Consumer Price Index (CPI) for the Netherlands. It shows that inflation in the Netherlands has been consistently below inflation in the Eurozone, except over the past six months.

Figure 2.4 Inflation in consumer prices in the Eurozone and the Netherlands (year-on-year growth)



Source: Statistics Netherlands, Eurostat.

The main advantage of this option is that the relevant data is readily available, widely understood, and compiled from measurable observations rather than disputable assumptions.

A possible qualification to this option is that it implicitly relies on the notion that investors' expectations of future inflation are based on historical values (which might seem problematic at times of macroeconomic volatility and structural changes in the economy). However, this same notion also underpins the estimation of other WACC parameters. For instance, the use of historical equity returns to calibrate the ERP also relies on the idea that investors' expectations of future market returns are informed by historical levels.

Furthermore, in a regulatory context, the use of realised inflation to deflate the WACC would, to some extent, mirror the adjustment made to the RAB, which is also based on realised inflation. If, for instance, realised inflation drops below investors' initial expectations, the RAB value is lower than expected by investors, but conversely the deflated real WACC could be higher than expected. On balance, this might ensure that investors see less variability in their nominal returns over the lifetime of the assets.

2.2.2 Forecast inflation

The second option is to use independent forecasts of inflation published by government agencies, central banks and research centres.

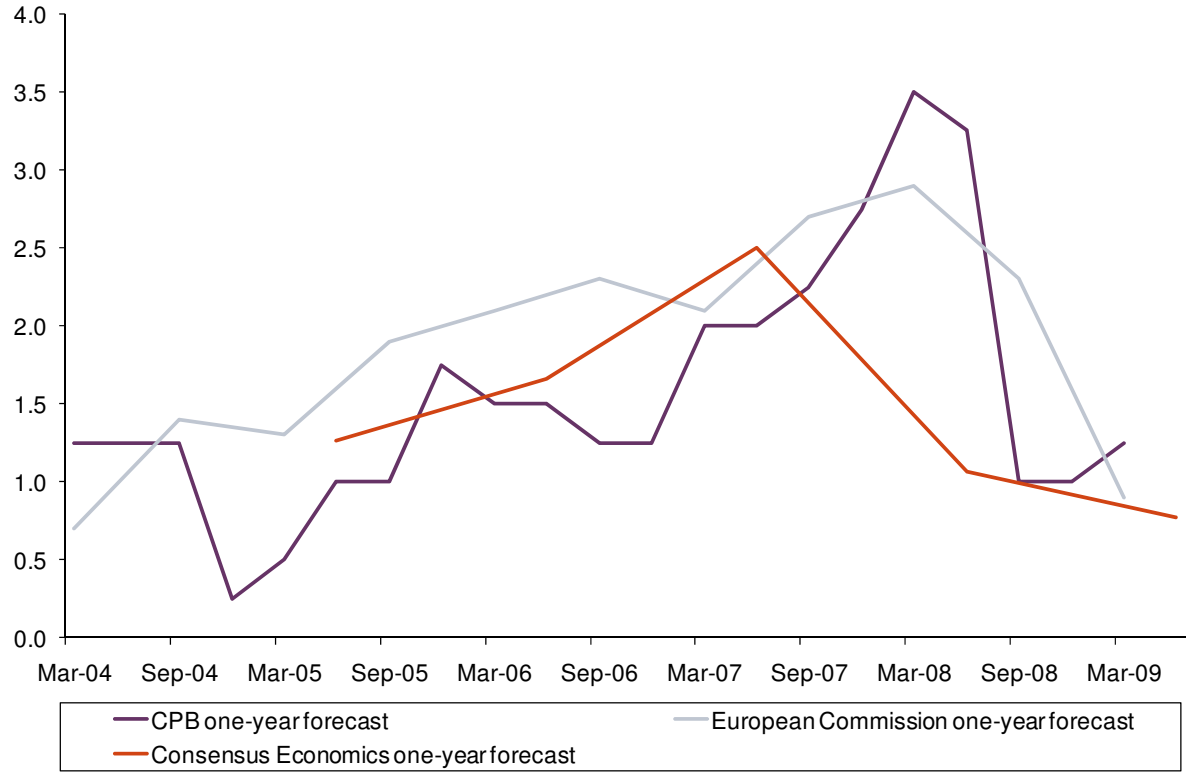
Certain organisations (the CPB, the European Commission, the IMF) produce independent forecasts on the basis of structural models of national economies. Other organisations (the ECB, Consensus Economics) do not produce independent forecasts, but conduct surveys of professional forecasters at regular intervals to arrive at an estimate of the 'market consensus' on inflation. For example, the ECB asks a panel of approximately 75 professional forecasters

on a quarterly basis for their expectations of inflation in the Eurozone, while Consensus Economics surveys nine professional forecasters in the Netherlands.[1]

Figures 2.5 and 2.6 show historical predictions of inflation for the Netherlands and the Eurozone, respectively, and Table 2.1 and Box 2.1 summarise current forecasts.

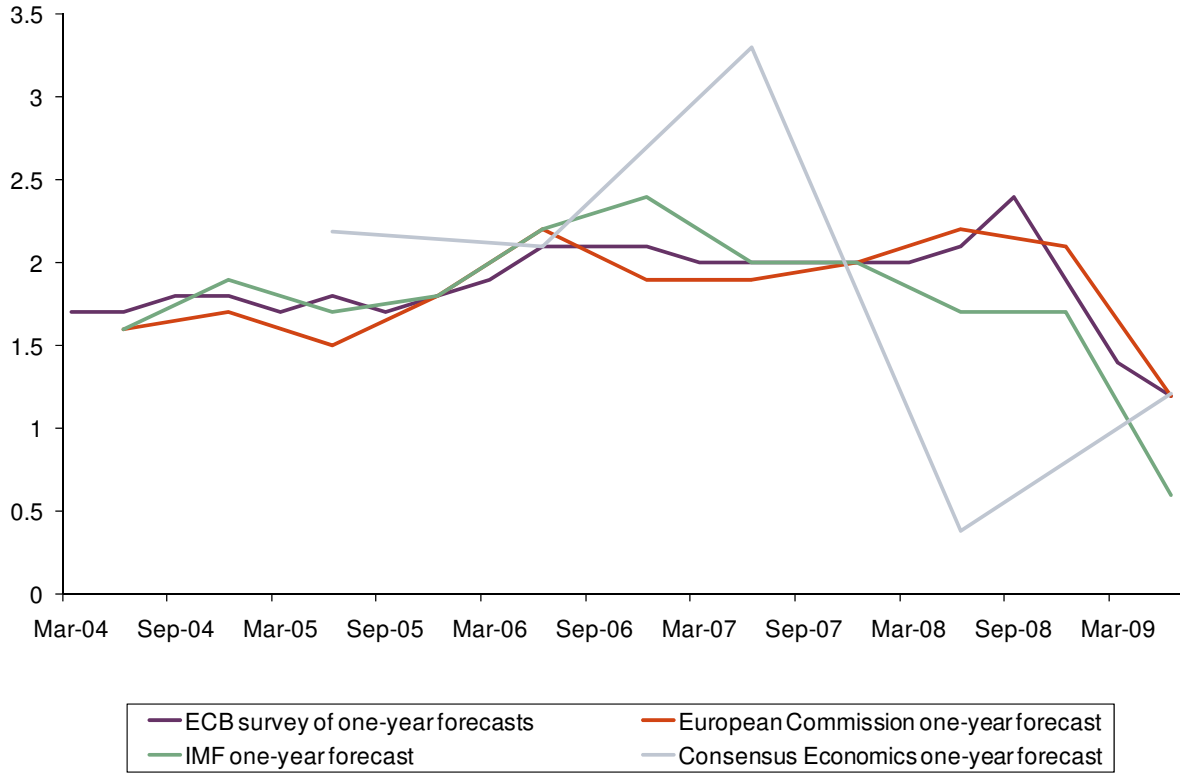
[1] ECB (2007) 'The ECB survey of professional forecasters (SPF) – A review after eight years' experience', Occasional Paper No.59; and Consensus Economics (2008) 'Consensus Forecasts', November. The forecasters surveyed by Consensus Economics are: ING, NIBC, Theodoor Gilissen, ABN AMRO, Economist Intelligence Unit, Fortis Bank, Moody's Economy, Rabobank, Kempen & Co.

Figure 2.5 Historical inflation forecasts for the Dutch CPI/HCPI (%)



Source: European Commission; Central Plaanbureau.

Figure 2.6 Historical inflation forecasts for the Eurozone HCPI (%)



Note: The ECB also publishes a survey of independent forecasts for a five-year time horizon—this is very stable over time (between 1.9 and 2.0% per year)
Source: ECB; European Commission; IMF.

Table 2.1 Current forecasts (%)

Source	One-year forecast	Five-year forecast
Dutch CPI/HCPI		
CPB	1.3	n/a
European Commission	0.9	n/a
Eurozone HCPI		
ECB	1.2	1.9
European Commission	1.2	n/a
IMF	0.6	1.9

Source: Organisations' websites.

Box 2.1 ECB inflation forecasts

> Over the short term, the outlook for annual HICP inflation will continue to be characterised by base effects relating to energy price movements in 2008. For this reason, annual inflation rates are projected to decline further over the coming months, before turning positive again.
>
> Looking further ahead, inflation is expected to remain positive while price and cost developments are expected to remain dampened in the wake of ongoing sluggish demand in the euro area and elsewhere. Indicators of inflation expectations over the medium to longer term remain firmly anchored in line with the Governing Council's aim of keeping inflation rates below, but close to, 2% over the medium term.

Source: *ECB Monthly Bulletin*, July 2009.

The main advantage of this option is that it provides an assumption that is explicitly forward-looking at the point in time at which the price signal is observed—ie, it might provide a legitimate measure of expectations held by investors previously. Where a presumption exists that investors' inflation expectations might depart from realised inflation, this option might be appropriate.

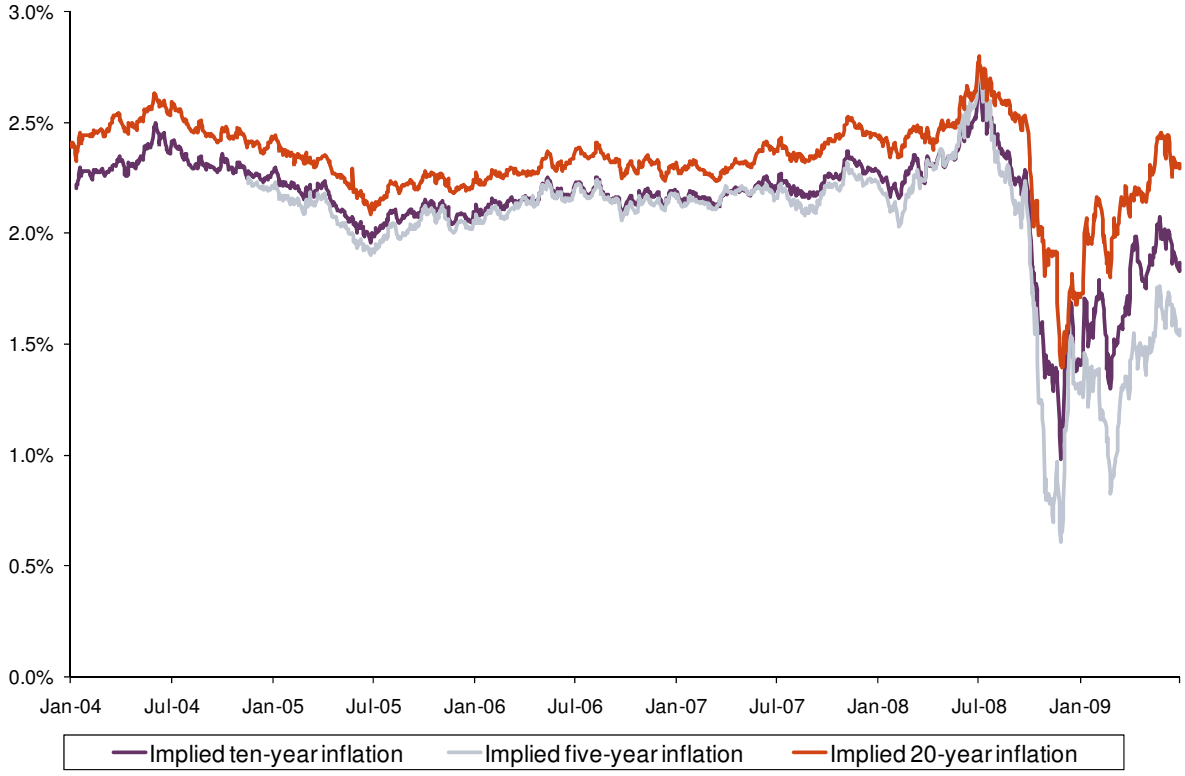
The main disadvantage of this option is that inflation forecasts tend to vary depending on the source used, and the selection of a particular source necessarily involves a degree of judgement. Moreover, inflation forecasts are typically available for short- to medium-term time horizons only (although it can be assumed that longer-term expectations are in line with medium-term forecasts).

2.2.3 Implied inflation

The third option is to use the inflation expectations implied in the difference between yields on conventional debt and yields on index-linked debt. In the Eurozone, the French government issues sufficient amounts of index-linked debt to provide a basis for this exercise.

Figure 2.7 below shows inflation estimates derived from a comparison of yields on French conventional bonds and yields on French indexed-linked bonds (indexed on the Eurozone HCPI) for different maturities. Since 2004, implied inflation has varied between 2.0% and 2.5%, until the second quarter of 2008 when it dropped to lower levels. While the implied inflation for short maturities (of up to ten years) currently remains at low levels, the implied inflation for longer maturities (of 20 years) has moved back to levels consistent with historical trends.

Figure 2.7 Implied inflation derived from yields on French sovereign bonds



Source: Agence France Trésor; Oxera calculations.

The main attraction of this approach is that it seeks to provide a direct measure of the inflation expectations that investors have incorporated into their pricing decisions (rather than an 'external' measure of inflation expectations that investors may, or may not, have used). Furthermore, implied inflation can be derived from market data in an objective and transparent manner, and is available with a degree of granularity (in terms of frequency of observations and time horizons) that facilitates WACC calculations.

The main qualification to this option is that its validity relies on the efficiency of the underlying price signals. In its previous determinations on the risk-free rate, EK rejected the use of index-linked bonds on the grounds that the market for such securities was immature and illiquid. If the observed yields on these securities do not reflect equilibrium demand and supply then the efficient market principle is violated and the assessment biased.

2.2.4 Target inflation

The fourth option is to use the inflation target used by the monetary authorities. The stated objective of the European Central Bank with respect to price stability is to keep inflation at a level 'below, but close to 2% in the medium term'.[2]

This option provides a legitimate benchmark of investors' expectations in the medium to long term. Realised inflation might be below or above the monetary target over certain periods of time (see Figure 2.4 above), but forecast inflation for medium-term horizons is typically aligned with this target (see Table 2.1 above). Arguably, this option is only valid when applied to long-term estimates of market returns.

2.2.5 Summary of options available

In terms of the methodology, Table 2.2 below summarises the pros and cons of each source of inflation data against the assessment criteria set out in section 2.1.2. To facilitate

[2] ECB institutional presentation, available at: http://www.ecb.int/ecb/educational/facts/monpol/html/mp_001.en.html.

comparison, a mark is assigned to each option and for each criterion, where '++' denotes a criterion that is fully met, and '+' denotes a criterion that is partly met.

Table 2.2 Sources of inflation assumptions

Inflation assumption	Is there a legitimate presumption that this assumption reflects investors' past inflation expectations?	Is this assumption transparent, objective, and readily available?
Realised inflation	**+** Pros: there is a legitimate presumption that, on average, inflation expectations for long time horizons do not depart significantly from historical values measured over the medium term Cons: this presumption might not hold for short time horizons at times of macroeconomic volatility and structural change in the economy	**++** Pros: data is readily available, objective, and widely understood Cons: none
Forecast inflation	**+** Pros: provides an indirect measure of inflation expectations incorporated into asset prices Cons: is only available for short to medium time horizons	**+** Pros: synthetic indicators of 'consensus' forecast available Cons: the selection of a particular source involves a degree of judgement
Implied inflation	**++** Pros: provides a direct measure of inflation expectations incorporated into asset prices Cons: is only available for Eurozone HCPI (and other national indexes)	**+** Pros: can be derived from market data in an objective and transparent manner Cons: may be affected by liquidity issues in indexed-linked debt markets
Target inflation	**+** Pros: there is a legitimate presumption that inflation expectations for long time horizons do not depart significantly from the target pursued by monetary authorities Cons: this presumption might not hold for short time horizons at times of macroeconomic volatility and structural change in the economy; the target concerns Eurozone HCPI	**++** Pros: is readily available and transparent Cons: none

Source: Oxera analysis.

In terms of the quantified estimates, Tables 2.3 and 2.4 summarise possible inflation assumptions for the Netherlands and the Eurozone, and show that:

– current inflation is very low by historical standards;
– current short-term forecasts are also low, albeit they present some dispersion.

This suggests considerable uncertainty regarding short-term inflation estimates, and a degree of divergence between the Netherlands and the rest of the Eurozone.

However, these tables also show that:

– current long-term forecasts and implied inflation are more reflective of historical levels;
– when measured over a two- to five-year period, and excluding outliers, most measures of inflation are within a narrower range, of 1.7–2.3%.

This implies that there is less uncertainty involved in selecting an inflation assumption that reflects longer-term trends (ie, reflecting longer horizons, and measured over longer periods).

Overall, current economic conditions have led to a significant drop in inflation and to considerable uncertainty regarding short-term developments. However, the indicators examined in this section seem to indicate that market participants did not anticipate this development, and that they expect this disruption to be short-term in nature. One explanation of this conundrum is that market participants might be expecting that the current monetary policies geared towards increasing the money supply will lead to higher inflation in the future.

Table 2.3 Inflation estimates for the Netherlands (%)

	Latest	Two-year average	Five-year average
Realised inflation			
Statistics Netherlands (CPI)	1.6	2.1	1.7
Eurostat (HCPI)	1.5	1.9	1.7
Forecast inflation (one-year horizon)			
CPB	1.3	2.1	1.6
European Commission	0.9	2.2	2.0
Consensus Economics	0.8	0.9	1.5

Source: As shown.

Table 2.4 Inflation estimates for the Eurozone (%)

	Latest	Two-year average	Five-year average
Realised inflation			
Realised (Eurostat HCPI)	0.6	2.5	2.3
Forecast inflation (one-year horizon)			
ECB	1.2	2.1	1.6
European Commission	1.2	1.9	1.9
IMF	0.6	1.5	1.8
Consensus Economics	1.2	1.7	1.8
Forecast inflation (five-year horizon)			
ECB	1.9	2.0	1.9
IMF	1.9	1.9	n/a
Implied inflation			
Five years	1.6	1.9	2.0
Ten years	1.9	2.1	2.1
Target inflation			
Target	2.0	2.0	2.0

Note: Consensus Economics' forecasts are available for the period 2006–11 only. The 'latest' figure for realised inflation is that for April 2009, the most recent confirmed by Eurostat. Preliminary figures for May indicate inflation of 0%.
Source: As shown.

2.3 Conclusion

This section has argued that the inflation adjustment in the WACC calculation should seek to capture the inflation expectations that investors have incorporated into the price of securities that are used to estimate the components of the WACC. This general principle gives rise to the following implications for the relevant inflation assumption.

– In terms of geographical scope, inflation in the Netherlands should remain the primary reference. Nevertheless, it might be appropriate to consider inflation in the Eurozone in order to reflect the notion that the capital markets and real economies within the Eurozone are increasingly integrated.

– In terms of the time horizon, the assumption should reflect inflation expectations for the medium to long term (to the extent that it is available). This is because the estimation of the risk-free rate and the debt premium focus on securities with a maturity of ten years.

– In terms of the measurement period, the assumption should reflect expectations held by investors over the past two to five years, the period over which sovereign and corporate yields are measured in the WACC estimation.

Furthermore, Oxera understands that EK is keen to base its inflation assumption on economic data that is transparent and objective, and leaves minimum scope for arbitrary choice.

There are different sources of information on investors' expectations, each with their own conceptual and practical advantages and disadvantages. Given the long-term perspective taken to the assessment of the WACC parameters, and given the importance attached to considerations of transparency and objectivity, it appears reasonable to place some weight on realised inflation in the setting of this assumption. However, it also seems appropriate to place at least some weight on current forecasts to ensure that current conditions are taken into account.

A possible approach to reconciling these different considerations is to combine the two- and five-year averages of realised inflation rates with the most recent forecast of the CPB. The two- and five-year averaging methodology is consistent with the approach taken to estimate the risk-free rate in the WACC, and the incorporation of current forecasts ensures that current economic conditions are taken into account. This gives a range of 1.6% to 1.8% (see Table 2.5).

Table 2.5 Inflation range for the assessment of the WACC

	2005 realised	2006 realised	2007 realised	2008 realised	2009 realised	2010 forecast	Average
Two-year estimate				1.8	2.4	1.3	**1.8**
Five-year estimate	1.4	1.5	1.3	1.8	2.4	1.3	**1.6**

Note: Realised annual inflation is calculated as the average of monthly year-on-year inflation rates from June to May.
Source: Statistics Netherlands; CPB; Oxera calculations.

This assumption is also consistent with historical inflation levels in the Netherlands in the recent past, which have been below, but close to, the European average.

Applied to the updated estimate of the nominal risk-free rate, this assumption would produce estimates of the real risk-free rate that are slightly above the yields on index-linked bonds (see Table 2.6). This is consistent with the notion that yields on indexed-linked bonds have

been depressed by the lack of liquidity and supply in this segment of the debt markets, and provides comfort that the overall result is prudent.

Table 2.6 Cross-check on risk-free rate estimates (%)

Averaging period	Yield on ten-year Dutch sovereign bonds	Inflation assumption	Estimated real risk-free rate	Yield on ten-year French index-linked bonds
Two years	4.1	1.8	2.3	2.1
Five years	3.9	1.6	2.2	1.9

Source: Datastream and Oxera calculations.

3 Gearing

In previous decisions, EK stated that the financing structure assumed in the WACC determination should enable Dutch regulated networks to maintain a healthy financial position, while minimising costs. To determine a gearing assumption that would meet these criteria, EK and their advisers considered three factors:

– consistency with other regulatory decisions;
– consistency with actual gearing levels in comparator companies;
– consistency with investment grade credit rating.

On this basis, EK adopted a gearing assumption of 60%.

EK has asked Oxera to review this parameter of the WACC. Since EK has finalised its price determinations for energy networks, a number of developments have occurred that could affect the gearing assumption.

First, the current financial crisis might have implications for the risks and benefits of different financing policies. In the short term, the drop in equity prices will automatically lead to an increase in observed gearing levels for companies (if equity value is measured at current market prices). In the longer term, however, the experience of multiple failures in the banking sector and the occurrence of repeated disruptions in capital markets might lead companies and regulators to reassess the sustainability of highly leveraged structures, albeit the precise implications of these developments for utilities are as yet unclear.

A difficult exercise in periods of stability, the determination of the gearing assumption is surrounded by considerable uncertainty in the present environment. While current developments will undoubtedly affect the financing choices of companies in the future, it is their medium- to long-term implications, rather than their immediate consequences, that matter for the analysis.

Second, the financeability rules prescribed by the Dutch Unbundling Act (the Act) provide a new framework for the analysis of gearing. Oxera understands that the Act prescribes a maximum gearing level of 60% for energy networks, with the possibility of stretching this limit to 70% to accommodate exceptional investment needs. This legal framework provides upper bounds for the gearing assumption, although it leaves some scope for the interpretation of what constitutes a prudent or efficient level of gearing below these binding caps.

This section examines the suitability of the 60% gearing assumption in light of these new developments. It starts by outlining a possible analytical framework (section 3.1) before applying it to Dutch energy networks (section 3.2).

3.1 Assessment criteria

The purpose of this section is to outline the implications of the gearing assumption for the price control determination and to set out a possible approach for the analysis.

3.1.1 How does the gearing assumption affect the price control determination?

Gearing is the ratio of debt to total capital. The gearing assumption is used in two instances in the price control determination: in the determination of the WACC; and in the assessment of financeability.

Gearing and the WACC

The gearing assumption is used in the WACC estimation in two instances: first, when transforming the asset beta into an equity beta; and second, when calculating the capital structure weights in the WACC formula. The gearing assumption might also affect the debt premium, insofar as it determines the level of financial risk to which creditors are exposed.

The pre-tax WACC formula used by EK actually comprises two components: an allowance for the 'vanilla WACC' (ie, the cost of capital excluding tax); and an allowance for corporation tax. The latter is calculated by reference to the share of equity returns in the vanilla WACC.[3]

The impact of gearing on the tax allowance is fairly straightforward: an increase in gearing leads to a reduction in the share of equity returns in the cost of capital and, therefore, to a reduction in tax costs. Hence, the higher the gearing, the lower the tax allowance included in the WACC.

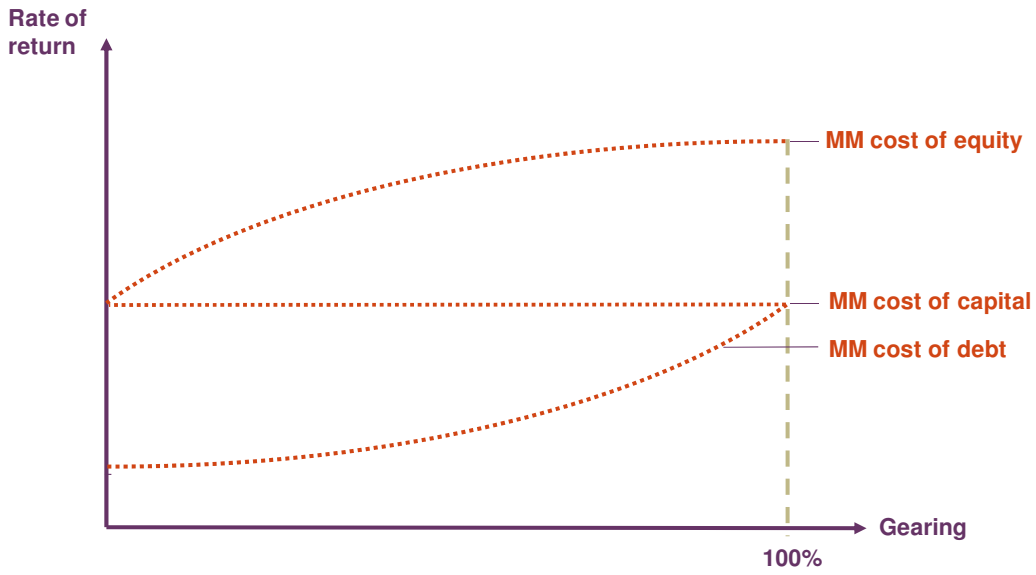
The impact of gearing on the vanilla WACC is perhaps more complex, and deserves further explanation. If a company gears up, two effects are triggered, working in opposite directions:

– on the one hand, a higher gearing augments the proportion of 'cheap' debt relative to 'expensive' equity in the financing structure (which, all else being equal, reduces the WACC);

– on the other hand, a higher gearing also implies a higher level of financial risk and, therefore, a higher cost of debt *and* a higher cost of equity (which, all else being equal, increases the WACC).

If capital markets were 'perfect'—ie, without tax, bankruptcy costs, transaction costs or agency issues—the second effect would offset the first, and the vanilla WACC would be left unchanged. This result is known in corporate finance theory as the Modigliani–Miller theorem (see Figure 3.1).

Figure 3.1 Gearing and the WACC (theoretical relationship)



Source: Oxera.

In the real world, the assumptions underpinning the Modigliani–Miller proposition may not hold, and there might be some scope for companies to optimise their financing structure

[3] The formulae for WACC definitions used in regulatory determinations are: WACC (vanilla) = k(d) x g + k(e) x (1-g); and WACC (pre-tax) = k(d) x g + k(e) x (1-g) / (1-t), where k(d) is the cost of debt, k(e) the cost of equity, g the gearing, and t the tax rate.

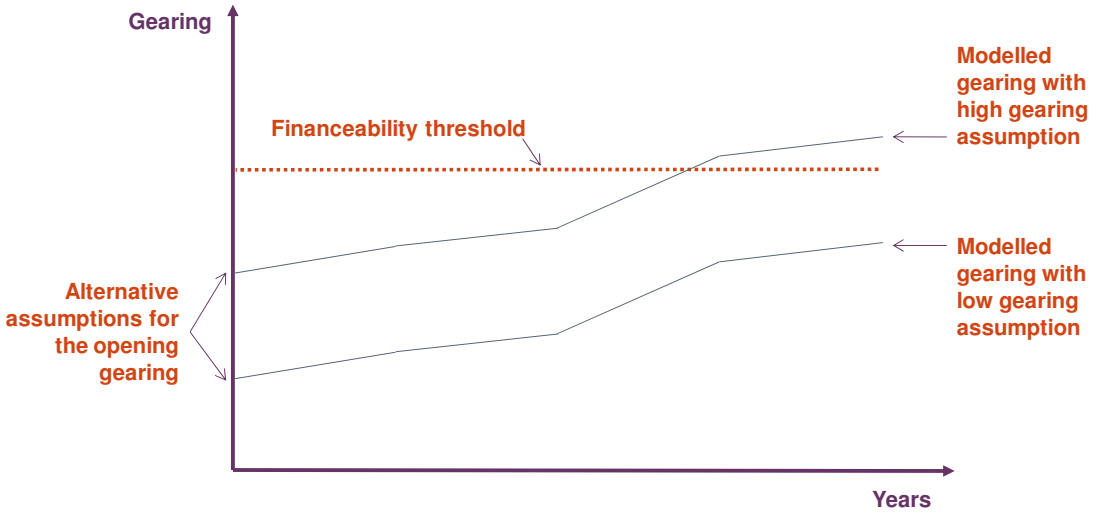
depending on factors such as bankruptcy costs, transaction costs and monitoring costs. There is no completely unified theory on the determinants of optimal capital structures, and the practical significance of these factors is subject to debate. However, most market participants tend to assume that there is an optimal gearing that minimises the WACC.

For these reasons, most regulators do not attempt to second-guess an 'optimal' gearing that would incorporate all possible determinants of financing policies. Instead, they seek to set a 'reasonable' assumption that does not imply an excessive level of financial risk and that is not evidently inefficient, given market conditions.

Gearing and financeability

Oxera understands that, under certain circumstances, EK tests whether its price control determinations enable regulated companies to maintain a financial profile consistent with the financeability thresholds prescribed by Dutch law. Oxera also understands that, in precedent cases, EK has conducted these tests on the basis of a modelling exercise that assumed a notional financial structure for the companies.[4] If the opening gearing in this notional structure reflects the WACC determination, a higher gearing assumption makes it more likely that financeability thresholds will be breached (see Figure 3.2).

Figure 3.2 Gearing and financeability (illustration)



Source: Oxera.

To sum up, a higher gearing assumption might reduce the pre-tax WACC (which, all else being equal, would lead to lower charges), but might also increase the risk that financeability thresholds will be breached (which, all else being equal, might lead to higher charges). Conversely, a lower gearing assumption would increase the pre-tax WACC and increase the possibility of companies being over-compensated for tax purposes (ie, having tax allowances above their true tax payments), but would also reduce the probability that financeability thresholds will be breached.

Incentives to increase gearing in a pre-tax WACC regime

The approach taken to gearing and the cost of capital in the price control decision might also affect the actual financing choices of companies. More specifically, the pre-tax approach to the cost of capital used by EK might generate an incentive to increase gearing for companies. This is because the pre-tax WACC formula provides companies with a tax allowance calculated on the basis of a generic tax wedge, which companies can then under- or over-recover depending on their own gearing.

[4] For example, in Mazars (2008), 'Onderzoek financeability regionale netbeherdeers', April 24th.

If, for example, a company adopts a lower gearing than that assumed in the determination, the value of the tax shield provided by its interest charges will be lower than that implied in the allowed pre-tax WACC. This can happen even if the vanilla WACC of the company is in line with regulatory assumptions (see Table 3.1). Conversely, if a company adopts a higher gearing, it might over-recover its tax costs and outperform the pre-tax WACC assumed in the determination.

Table 3.1 Relationship between gearing and the pre-tax WACC (illustration) (%)

WACC component	WACC assumed in determination	WACC of company with lower gearing	WACC of company with higher gearing
Cost of debt	4.00	3.80	4.20
Cost of equity	6.00	5.80	6.20
Gearing	60	50	70
Tax	30	30	30
Vanilla WACC	4.80	4.80	4.80
Pre-tax WACC	**5.83**	**6.04**	**5.60**

Source: Oxera.

UK regulators have seen this incentive to exceed the gearing assumption as one of the factors driving the generalised increase in debt financing observed in the period following the privatisation of UK utilities. To remedy this issue, the energy regulator, Ofgem, has moved to a 'post-tax approach' to the cost of capital, which includes an allowance for the cost of capital based on the vanilla WACC (ie, excluding tax), and a separate allowance for tax costs. The financial model used to calculate tax costs assumes a specific level of capital allowances for each company (in line with each company's tax liabilities) and a generic level of gearing across the sector (in line with the WACC determination). Ofgem intends to claw back, ex post, any tax benefit that companies might achieve by adopting a level of gearing above the regulatory assumptions.[5]

The water regulator, Ofwat, has also moved to a post-tax approach to the cost of capital, the main difference with Ofgem's methodology being that Ofwat takes into account the actual gearing of each company when calculating the tax allowance. Ofwat justified its policy as follows.

> Our approach assumes that price limits should include only a forecast of companies' expected tax liabilities rather than a notional tax liability linked to our assumptions on capital structure ie customers should only pay in their bills the actual level of tax faced by a company. Generally highly geared companies pay less tax because interest payments are deductible from taxable profits.[6]

Notwithstanding these nuances, the main purpose of the post-tax approach is to mitigate a possible incentive to increase gearing for regulated companies. In addition, the post-tax methodology enables regulators to capture more precisely the tax implications of the specific accounting and depreciation rules applied by the companies. On the downside, the post-tax approach involves complex tax modelling exercises by regulators.

Further research would be necessary to establish the costs and benefits of applying a post-tax approach in the case of the Dutch energy networks. On the one hand, the pre-tax approach used by EK delivers the same incentive to increase gearing and outperform the regulatory tax allowance as did the regulatory regime that existed in the UK before the 2004

[5] Ofgem (2004), 'Electricity distribution price control—final proposal', November.

[6] Ofwat (2004), 'Future Water and Sewerage Charges 2005–10: Final Determinations'.

reforms. On the other hand, the regulatory framework in the Netherlands also provides a cap on the effects of such incentives, in the form of the binding financeability ratios.

3.1.2 What constitutes a prudent and efficient level of gearing?

Because the estimation of an 'optimal' level of gearing is fraught with difficulties (see section 3.1.1), most regulators tend to satisfy themselves that a gearing assumption can be deemed efficient and prudent if it is consistent with a credit rating 'comfortably' within investment grade. The precise interpretation of this requirement has varied, however, and the analysis must address two separate questions:

- what is the appropriate target credit rating?
- what gearing assumption is consistent with this target credit rating?

These two questions are addressed next in light of market evidence and regulatory precedent.

3.2 Analysis and market evidence

3.2.1 What target credit rating is appropriate?

A 'comfortable' or 'solid' credit rating should enable companies to absorb some downside shock and still retain a credit rating within the investment grade category. It should also enable companies to access finance on reasonable terms over a range of market conditions.

The following evidence can inform the choice of an appropriate rating reference.

- **Market data on issuance volumes and costs**—before 2007, the debt market appeared to be liquid for all categories of investment-grade debt (see Figure 3.3), and the spread between BBB- and A-rated debt was relatively modest (see Figure 3.4). Under these circumstances, a credit rating within the BBB category could appear as prudent and efficient. Since the financial crisis began, however, the cost of BBB-rated debt has risen substantially above that of A-rated debt, and the volume of new issuances of BBB- rated debt has decreased significantly over certain periods. In other words, the benefits of 'moving down' the rating scale have decreased, while the risks of doing so have, arguably, increased. Data on utilities issuances also show that the vast majority of new debt issued by energy and utility companies is rated in the A category (see Figure 3.5).

- **Credit ratings of comparator companies**—the proportion of issuer ratings for regulated networks in Europe appears to be evenly distributed across rating categories from BBB to AA (see Figure 3.6). It is of note, however, that only UK companies are rated within the BBB range, and that the increase in leverage for these companies has been a cause of regulatory concern and debate.[7] An examination of rating levels over time does not reveal any clear trend (see Table 3.2). The recent rating downgrades of Energinet, Terna and BordGais are due to the large capital programmes and diversification policies of these companies.

- **Recent regulatory decisions**—few regulators outside the UK (and, indeed, not all regulators in the UK) make their rating reference explicit. Among UK regulators, there is currently no consensus on the impact of the current crisis on what constitutes a 'solid' or 'comfortable' investment grade credit rating (see Table 3.3). On the one hand, the Competition Commission (CC) and the Civil Aviation authority (CAA) have moved from a reference of BBB+ for the price control of Heathrow and Gatwick in 2008 to a reference of A– for the price control of Stansted in 2009 (with corresponding downward pressure on the cost of debt). On the other hand, in its recent draft determination, Ofwat has retained a minimum of BBB+ for its assessment.

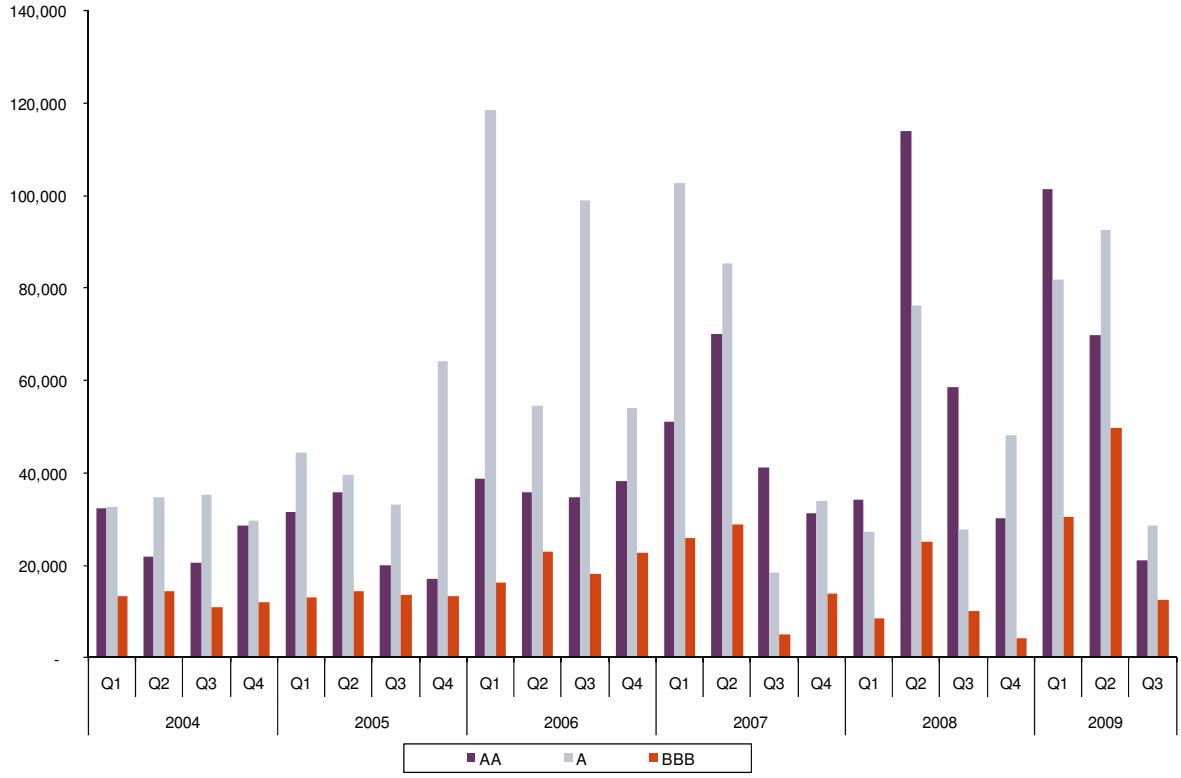
[7] See, for instance, Ofgem and Ofwat (2006), 'Financing Networks: A discussion paper'.

… companies with A category ratings appeared to have been less affected by the credit crunch [than companies with BBB category ratings] and are better placed to raise new capital at a reasonable cost. Given that there was an inevitable degree of uncertainty about the way that debt market conditions will evolve in the coming years, this suggested to us that an efficiently financed company might seek to target an A3/A– rating in the current market climate.[8]

For our draft determinations, at the point at which we consider financeability, we have ensured financial ratios are consistent with, as a minimum a strong BBB+/Baa1 rating, and the majority of companies are above that. We understand investors appear to be less sensitive to the difference between high BBB and low A range ratings where utilities are concerned.[9]

⇒ **These considerations broadly point to an appropriate rating reference towards the low end of the A range (A–).**

Figure 3.3 Bond issuances by European companies by rating, all sectors (€ billion)

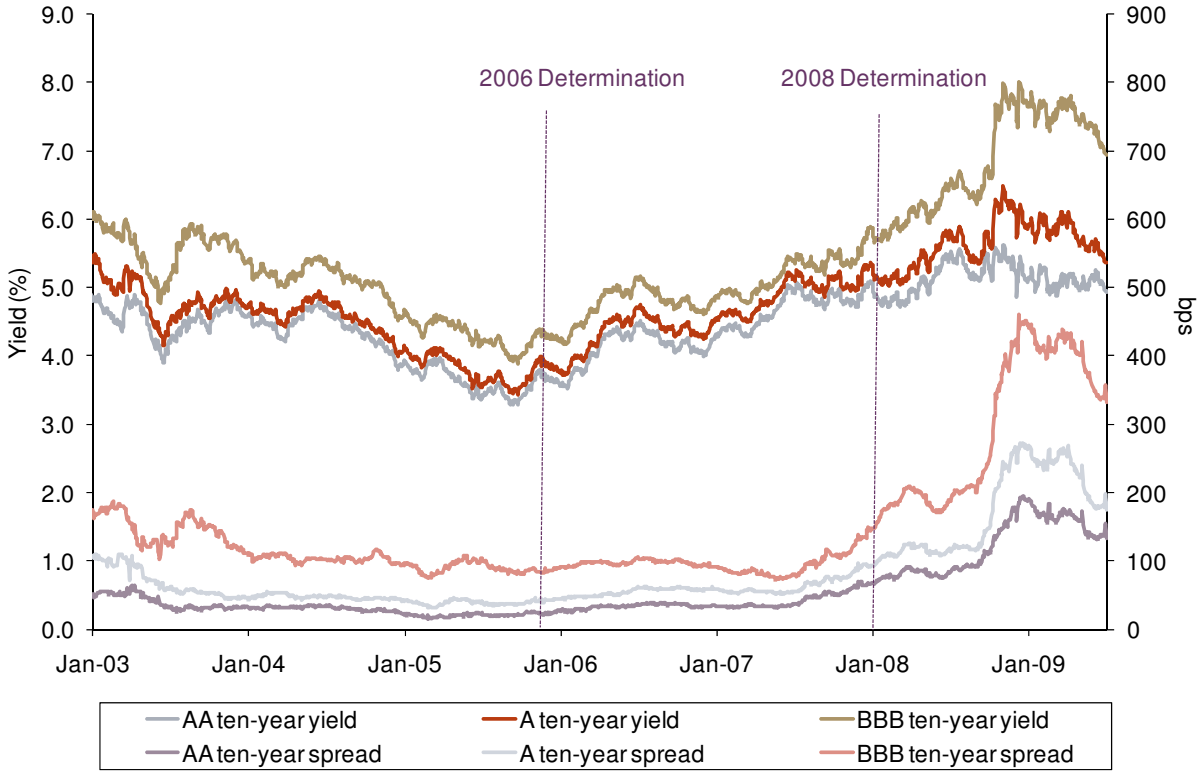


Source: Dealogic.

[8] Competition Commission (2008), 'Stansted Airport Ltd: Q5 price control review', October 23rd, Appendix L.

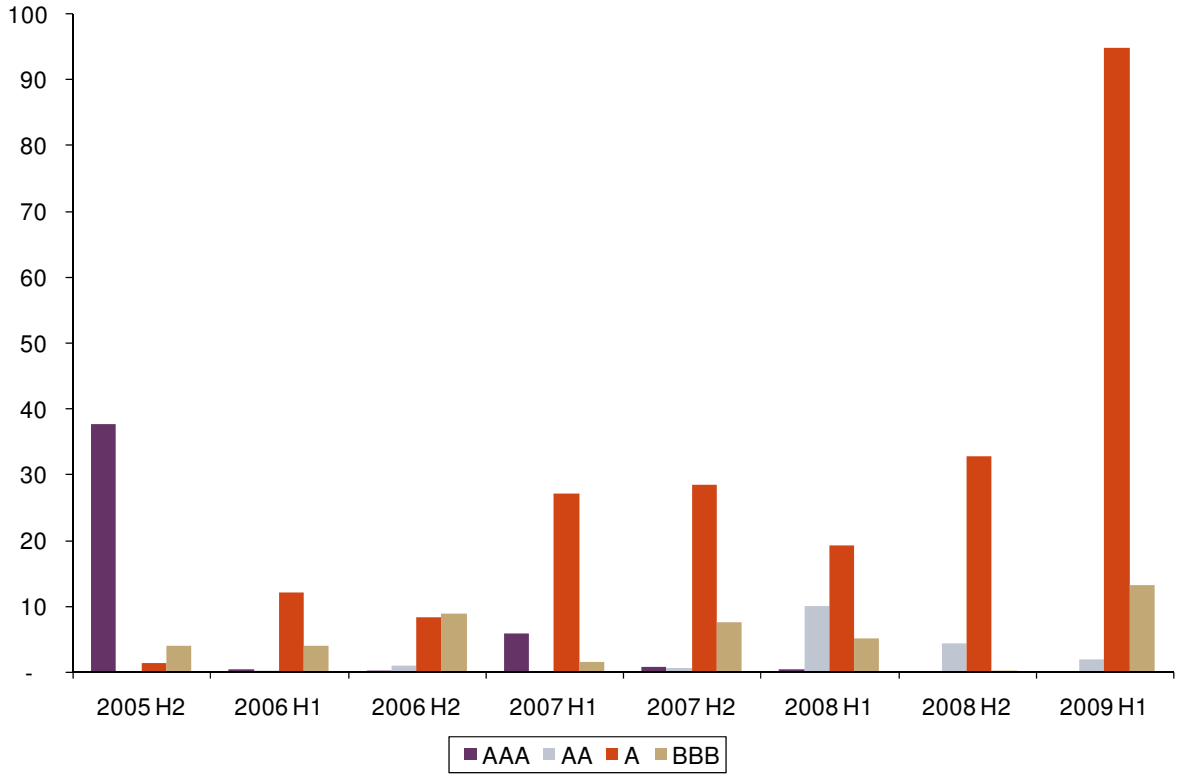
[9] Ofwat (2009), 'Future Water and Sewerage Charges 2010–2015: Draft Determinations', July, p. 114.

Figure 3.4 Yields and spreads on bond indices, BBB to AA ratings, ten-year maturity



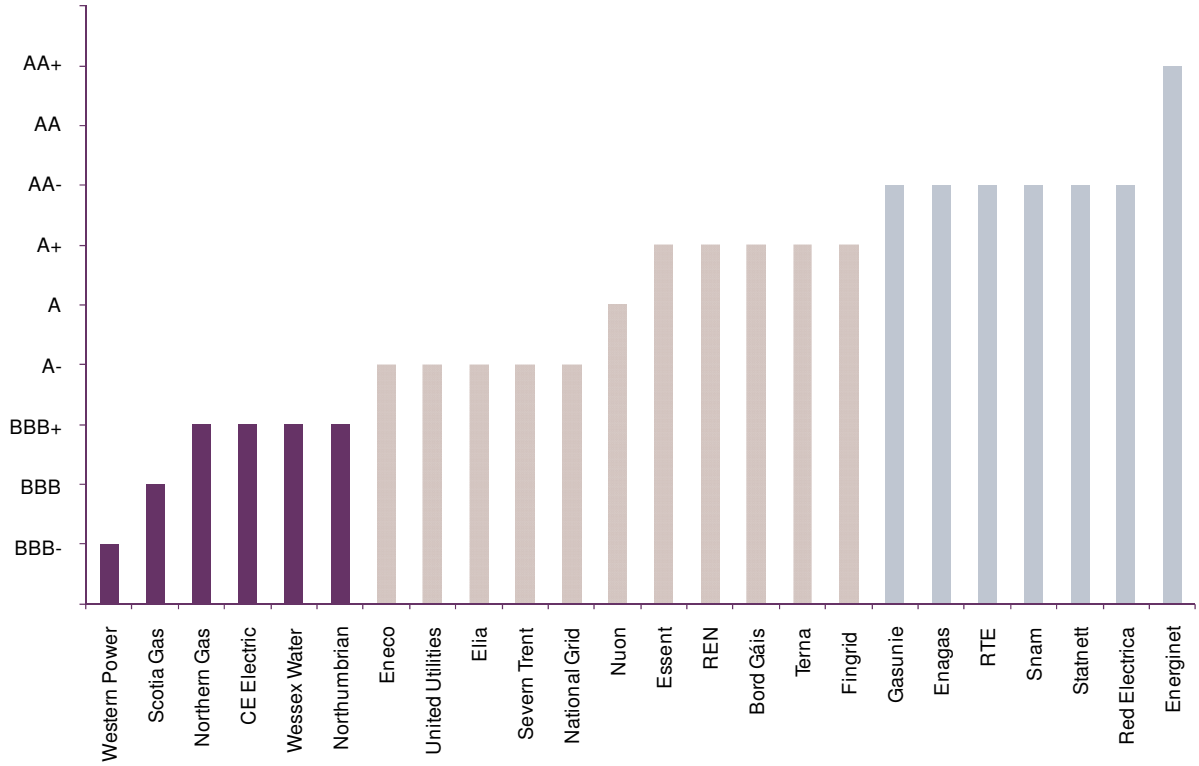
Source: Bloomberg and Oxera calculations.

Figure 3.5 Bond issuances by European companies by rating, energy and utilities (€ billion)



Source: Datastream and Oxera analysis.

Figure 3.6 S&P issuer rating of comparable network companies



Note: This sample is made up of companies that S&P presents as 'peers' in the energy network sector, and the three largest Dutch utilities. S&P has not yet confirmed the ratings of Stedin, Alliander and Enexis, and the ratings reported here reflect the integrated businesses.
Source: S&P reports, Oxera analysis.

Table 3.2 S&P issuer rating of comparable network companies—history

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Fingrid Oyj								A+	A+	A+
National Grid	A+	A	A	A	A	A	A	A–	A–	A–
Bord Gais Eireann			A-	A–	A–	A–	A–	A–	A+	A
REN									A+	A+
Severn Trent	A+	A+	A+	A	A	A	A	A	A–	A–
Elia					A–	A–	A–	A–	A–	A–
United Utilities	A–	A–	A-	A–	A–	A–	A–	A–	A–	A–
Terna					AA–	AA–	AA–	AA–	AA–	A+
CE Electric				BBB-	BBB–	BBB–	BBB–	BBB-	BBB+	BBB+
Wessex Water	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+	BBB+
Northern Gas Networks						BBB+	BBB+	BBB+	BBB+	BBB+
Northumbrian Water			A-	BBB	BBB	BBB+	BBB+	BBB+	BBB+	BBB+
Scotia Gas						BBB	BBB	BBB	BBB	BBB
Western Power				BBB–	BBB–	BBB–	BBB–	BBB–	BBB–	BBB–
Nuon		AA–	AA-	A+	A+	A+	A+	A+	A+	A
Essent		A+	A+	A+	A+	A+	A+	A+	A+	A+
Eneco			A+	A+	A+	A	A	A	A	A–
Median	**A**	**A+**	**A**	**A–**	**A–**	**A–**	**A–**	**A–**	**A–**	**A–**

Source: Bloomberg, S&P and Oxera analysis.

Table 3.3 Summary of regulatory precedent: gearing

Review	Year	Stated rating reference
Ofgem Electricity Transmission Price Control Review (UK—transmission)	2006	BBB+
CC/CAA (UK—Gatwick and Heathrow)	2008	BBB+
Ofcom (UK—telecoms)	2008	BBB+
ORR (UK—rail)	2008	A–
CC/CAA (UK—Stansted Airport)	2009	A–
Ofwat (UK—water)	2009	BBB+

Source: Indicated in Appendix 1.

3.2.2 What gearing level is consistent with the target credit rating?

The following evidence can inform the choice of a gearing assumption consistent with the rating reference.[10]

- **Observed gearing for rated companies (book value)—**the average gearing of European network companies rated in the A category is 63% when measured on the book value of their assets (see Figure 3.7). However, because most companies report their asset values at historical costs (or only revalue their assets at infrequent intervals), this measure of gearing might overstate the underlying gearing based on market value.

- **Observed gearing for rated companies (market value)**—it is possible to obtain a measure of gearing based on the market value of equity for the sample of companies used for the estimation of beta (see Figure 3.8).[11] The average gearing of the

[10] It is important to note that gearing does not determine the credit rating of companies in a mechanistic way—ratings will also be affected by other financial ratios as well as by qualitative considerations.

[11] Because the market value of debt is difficult to observe or measure when it is not traded, the gearing estimates provided in this section combine the market value of equity and the book value of debt.

companies rated in the A category is 48%, and the average gearing of the companies rated BBB is 53%. The average gearing of these companies has increased over 2008 due to the drop in equity prices (see Figure 3.9). This measure of gearing might provide a better estimate of the economic gearing of the companies, although it varies with short-term movements in equity prices.

– **Observed gearing for rated companies (RAB)**—it is possible to obtain a measure of gearing based on the RAB for companies that focus exclusively on regulated activities and for which the quality and frequency of regulatory disclosure is sufficient (Table 3.4). In this sample, the average gearing of the companies rated in the A category is 47%, and the average gearing of the companies rated BBB is 64%.

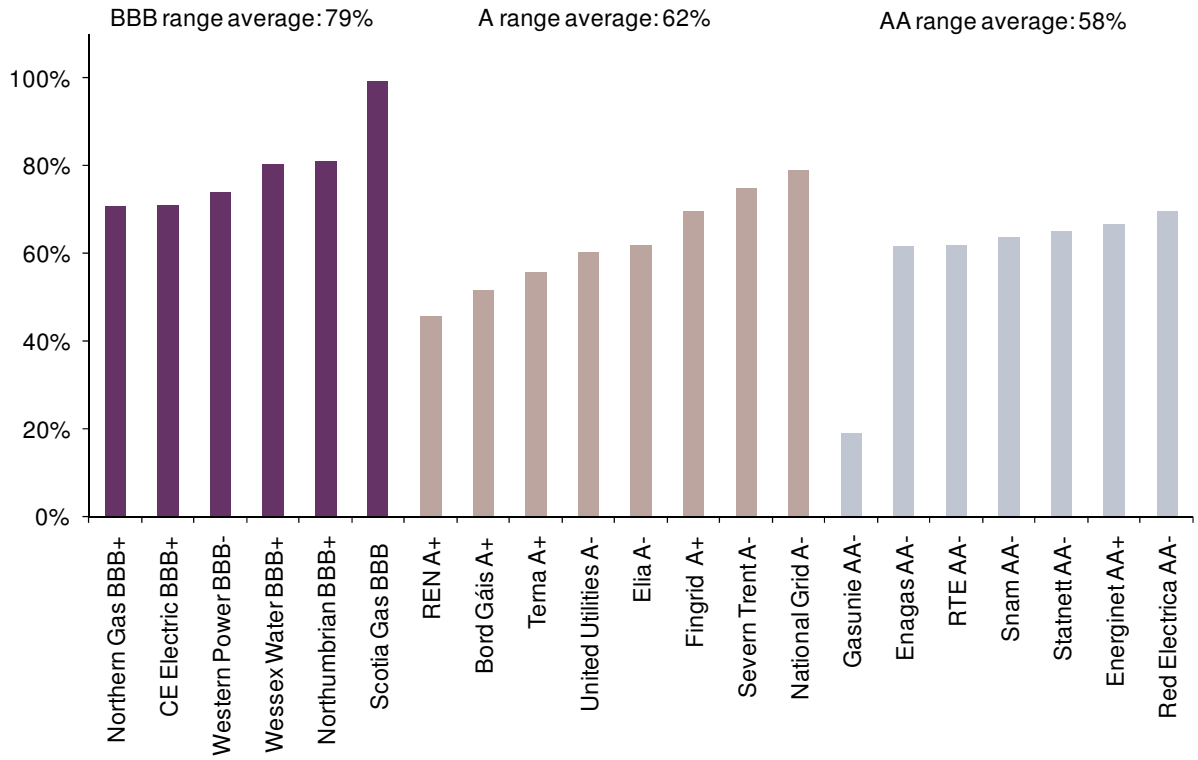
– **Observed gearing of Alliander and Enexis**—Oxera understands that the two Dutch energy networks that have recently been unbundled from the integrated group (Alliander and Enexis) have stated their intention to adopt a gearing of 60%.

– **Regulatory precedent**—most European regulators have adopted gearing assumptions between 50 and 60% in recent years (see Table 3.5). Ofwat has recently proposed adopting a gearing assumption of 57.5% for its next determination, up from 55% in its last determination.

– **Financing policy**—the examination of recent corporate transactions in the utilities sector does not reveal any major shift in financing policies, but it is of note that several utilities have chosen to issue additional equity to finance transactions or to repay some of their debt (Table 3.6).

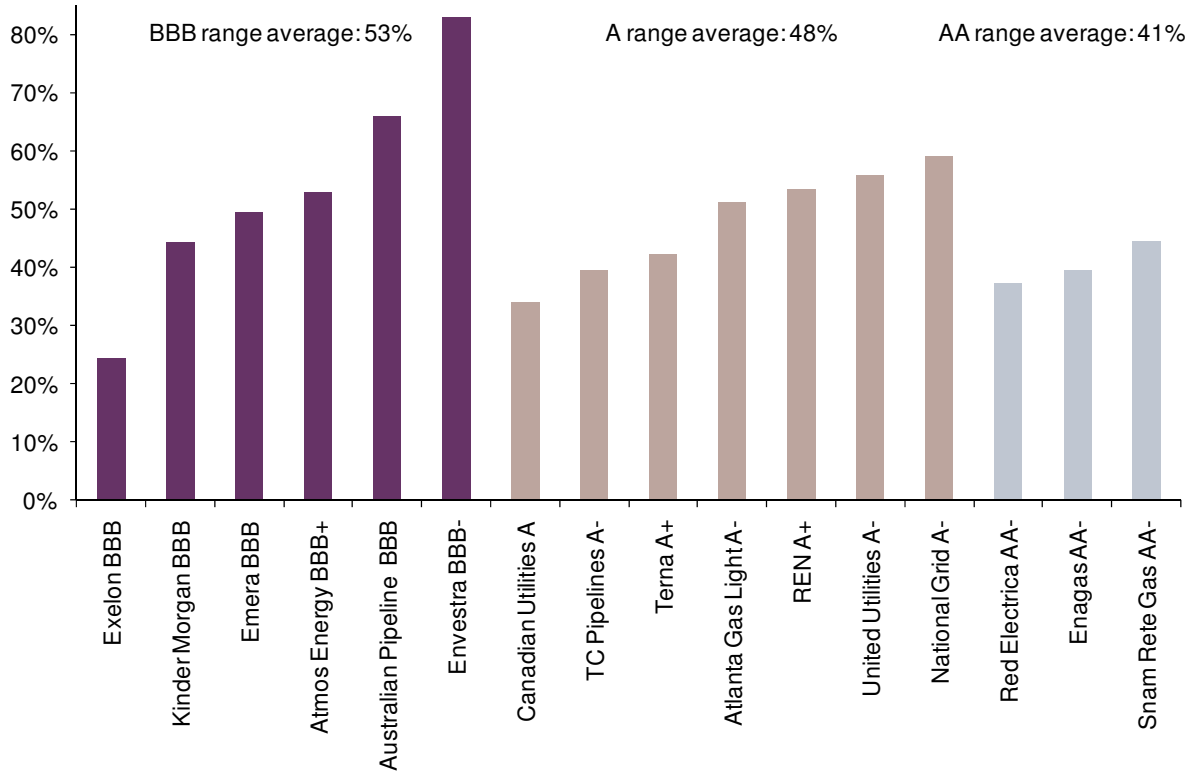
⇒ These considerations broadly point to an appropriate gearing reference of 50–60%.

Figure 3.7 Gearing levels for rated companies in the utilities sector—book value (2008)



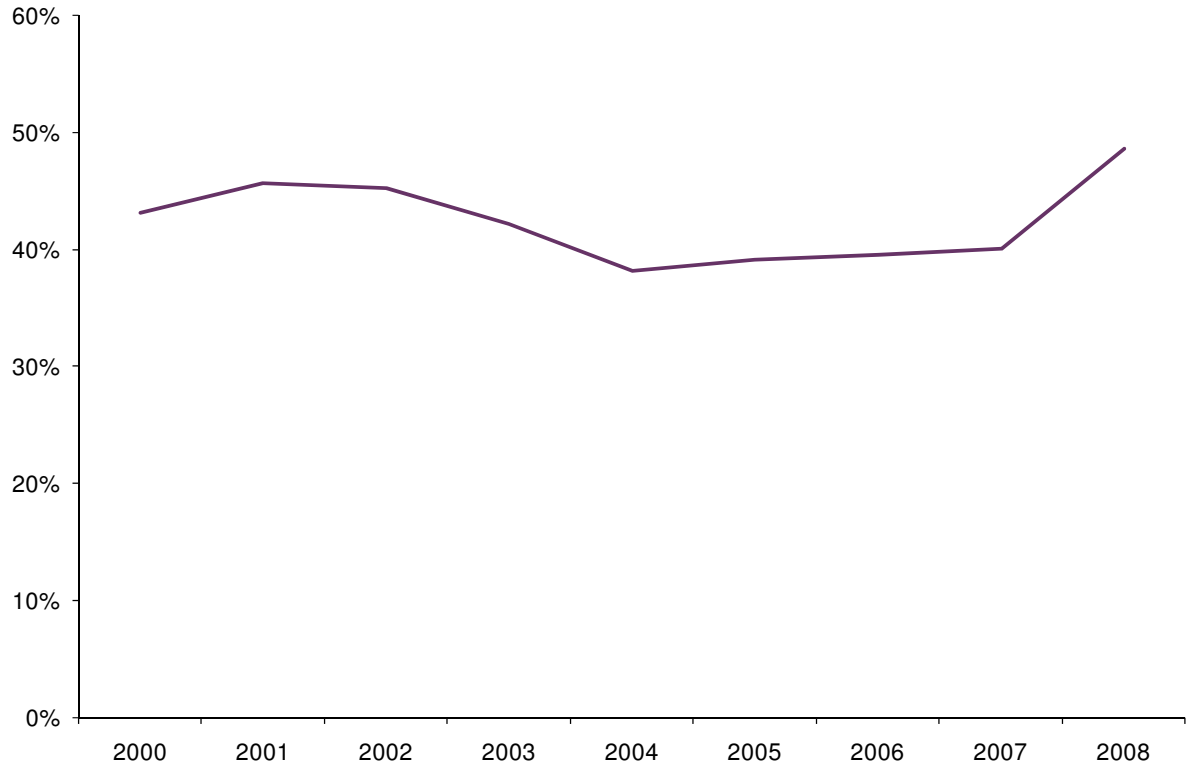
Source: S&P reports, Oxera analysis.

Figure 3.8 Gearing levels for rated companies in the utilities sector—market value (2008)



Source: S&P report, Bloomberg, Oxera analysis.

Figure 3.9 Gearing levels for rated companies in the utilities sector—market value (2000–09)



Note: The companies included in this sample are those listed in Figure 3.8 above.
Source: S&P report; Bloomberg; Oxera analysis.

Table 3.4 Debt/RAB of comparators

Company	Sector	Rating	Debt/RAB (%)
REN	Energy	A+	70
National Grid	Energy	A–	49
United Utilities	Water	A–	53
Severn Trent	Water	A–	58
Terna	Energy	A+	54
Northumbrian Water	Water	BBB+	58
Wessex Water	Water	BBB+	64
Northern Gas Networks	Energy	BBB+	67
Scotia Gas Networks	Energy	BBB	68

Note: All estimates for debt/RAB are for 2007–08, with the exception of Snam Rete Gas, which is reported as of December 2007. The debt/RAB ratio for Scotia Gas Networks is estimated using the sum of net debt and RAB values for Southern and Scotland Gas Networks.
Source: Annual accounts; investor day presentations; company websites and company press releases; Ofwat (2008), 'Financial performance and expenditure of the water companies in England and Wales 2007–08'.

Table 3.5 Summary of regulatory precedent: gearing

Review	Year	Gearing (%)
Ofgem Fourth Electricity Distribution Review (UK—electricity distribution)	2004	57.5
Ofgem Fourth Electricity Transmission Review (UK—transmission)	2006	60
AEEG (Italy—energy networks)	2007	44–47
CER (Ireland—gas transmission and distribution)	2007	55
Ofgem Gas Distribution Price Control Review (UK—gas distribution)	2007	62.5
ComReg (Ireland—telecoms)	2008	40
CRE (France—electricity transmission and distribution)	2009	60

Source: Indicated in Appendix A1.

Table 3.6 Equity issuances by utilities

Company	Date	Amount (m)	Stated purpose
Centrica	Dec 2008	€2,251	Funding of acquisitions
Envestra	Feb 2009	€87	Debt consolidation
Emera	Jul 2009	€141	Debt consolidation
Snam	May 2009	€3,470	Funding of acquisitions (Stogit, Italgas)
Scottish and Southern	Jan 2009	£479	Funding of CAPEX programme
Enel	March 2009	€8,000	Maintain credit rating

Source: Company websites and news announcements.

3.3 Conclusion

In previous determinations, EK has sought to set the gearing assumption so as to reflect a financing policy that could be considered both prudent and efficient. A reasonable working definition of this objective is the adoption of a gearing assumption that is consistent with a credit rating comfortably within investment grade. In the current market context, this can be taken to mean the low end of the 'A' range.

Energy network companies rated within the A range exhibit different levels of gearing, depending on the sample considered and the measurement standard adopted: Table 3.7 below summarises the evidence on gearing gathered in this section. While there is no automatic relationship between gearing and credit rating, taken together this evidence suggests that a gearing of 50% to 60% could be consistent with a credit rating within the 'A' range.

Table 3.7 Source of evidence on gearing

Company	Average	Min	Max
Book value gearing for A-rated network companies	62%	46%	79%
Market value gearing for A-rated network companies	48%	34%	59%
RAB value gearing for A-rated network companies	57%	49%	70%
Assumptions adopted at regulatory reviews	54%	40%	62%

Source: As stated in section 3.2.

The adoption of a range, rather than a point estimate, reflects the general difficulty involved in associating a gearing assumption with a particular credit rating, as well as the added uncertainty created by the current market context and its implications for the newly unbundled network operators in the Netherlands. The mid-point of this range, 55%, is five percentage points below the previous assumption.

This range is also consistent with the new financeability framework, and provides energy networks with some headroom to finance additional CAPEX with debt before hitting the indicative and mandatory caps placed on their indebtedness. The adoption of this notional assumption would not preclude companies from choosing their own optimal structure.

Table 3.8 illustrates the sensitivity of the pre-tax WACC to the gearing assumption, using the mid-point estimates of the risk-free rate, the ERP, the asset beta developed in the 'quantitative analysis' report by Oxera, and the mid-point estimates of the inflation assumption developed in this report. To illustrate the theoretical linkage between gearing and the cost of debt, this simulation assumes a variation of 10 basis points on the debt spread around the mid-point, depending on the gearing assumption. If this adjustment is taken into account, the impact of the gearing assumption on the pre-tax WACC within this range is not material.

Table 3.8 Pre-tax WACC estimates for different gearing assumptions

	50% gearing	55% gearing	60% gearing
RFR (nominal) (%)	4.1	4.1	4.1
Debt premium (%)	1.15	1.25	1.35
Cost of debt (%)	5.2	5.3	5.4
ERP (%)	5.0	5.0	5.0
Asset beta	0.43	0.43	0.43
Equity beta	0.74	0.81	0.90
Cost of equity (%)	7.8	8.1	8.5
Gearing (%)	50	55	60
Tax rate (%)	25.5	25.5	25.5
Pre-tax WACC (nominal) (%)	7.8	7.8	7.8
Inflation (%)	1.7	1.7	1.7
Pre-tax WACC (real) (%)	**6.0**	**6.0**	**6.0**

Source: EK decisions, Oxera analysis.

A1 Sources

This appendix provides the references of the regulatory decisions used for the study of regulatory precedent.

- AEEG (2007), 'Tariffe per l'erogazione dei servizi di transmission, distribuzione e misura dell'energie electtrica per il period 2008-2011—Orientamenti finali'.
- Civil Aviation Authority (2009), 'Economic Regulation of Stansted Airport, 2009–14'.
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