



Response to Brattle's Estimates of
the Weighted Average Cost of Capital
for Dutch Network Companies
A report for Netbeheer Nederland

11 January 2013

Author

Graham Shuttleworth

NERA Economic Consulting
15 Stratford Place
London W1C 1BE
United Kingdom
Tel: +44 20 7659 8500
Fax: +44 20 7659 8501
www.nera.com

Contents

1.	Introduction	1
2.	Brattle's Cost of Equity and WACC Lie below Regulatory Precedent	3
2.1.	Brattle Sets a Lower WACC Than Almost All Other Regulators	3
2.2.	Brattle's Estimated Cost of Equity Is Biased Downward By The Use of Inconsistent Parameters	5
2.3.	Conclusion	6
3.	Inconsistent WACC Parameters Bias the Estimated Cost of Capital	7
3.1.	Evidence that Inconsistencies Bias the Estimated Cost of Equity	7
3.2.	Brattle Recommends, But Fails to Adopt, Upward Adjustments to the ERP	9
3.3.	Estimating Beta Over A Short Period Further Biases the Cost of Equity Downwards	10
3.4.	Poor Choice of Comparators Further Biases the Estimated WACC	11
3.5.	Adjustments to the Biases in Brattle's Estimates	12
3.6.	Conclusions	13
4.	Inconsistent Parameters Produce Implausibly Low Estimates of the Cost of Capital	14
4.1.	Brattle's Estimated WACC Does Not Generate Financial Ratios Consistent With Single A Debt Rating	14
4.2.	The Implied Total Market Return in Brattle is Inconsistent with Historic Total Market Returns	14
4.3.	Conclusions	15
	Appendix A. Debt Rating Analysis	17

1. Introduction

Netbeheer Nederland, acting on behalf of Dutch network operators, has asked NERA to examine the estimate of the Weighted Average Cost of Capital (WACC) calculated in recent reports by the Brattle Group for the NMa. Brattle has set out its comments on methodology in a report dated 26 November 2012¹ and its proposed WACC in another report dated 28 November 2012.² The NMa, acting as the Dutch energy sector regulator, proposes to use this WACC when setting the allowed return on capital for the next regulatory period, which runs from 1 January 2014 to a date between 31 December 2016 and 31 December 2018.

Table 1.1 summarizes the key parameter estimates based on which Brattle calculates a real, pre-tax WACC of 3.7%. This WACC estimate incorporates a real post-tax Cost of Equity of only 3.6%, based on a real short-term Risk-free Rate (RfR) of 0.6% combined with a long-term Equity Risk Premium (ERP) of 4.6% and an equity beta of 0.66 (derived from an asset beta of 0.37).

Table 1.1
Summary of Brattle WACC Estimates and Calculations

Fixed Parameters	Tax Rate	Gearing (D/A)	Inflation
	25%	50%	2.00%
WACC Parameters			
	Nominal	Real	
RFR	2.6%	0.6%	
ERP	4.6%	4.6%	
CoE	5.7%	3.6%	
CoD	4.0%	2.0%	
After-tax WACC	4.3%	2.3%	
Pre-Tax WACC	5.8%	3.7%	

This memo is structured as follows:

- Chapter 2 compares Brattle’s estimates with decisions reached by other regulators in recent years and finds that Brattle’s estimate is at the bottom of this range. We identify the reason as a bias implicit in the methodology, which we have noted in other reports.
- Chapter 3 discusses the nature and effect of this downward bias, and other problems with the methodology that Brattle has applied. After correcting this bias by using compatible input data, we find that the real pre-tax WACC rises. After applying two consistent datasets, the real pre-tax WACC falls within the range 5.2%-5.5%. Note that this range only shows the effect of replacing the NMa’s inconsistent dataset with a consistent dataset. It does not take into account the possibility of further methodological changes, such as allowing a premium for regulatory risk or small firm status.

¹ Brattle [1], *Calculating the Equity Risk Premium and the Risk-free Rate*, The Brattle Group, 26 November 2012.

² Brattle [2], *The WACC for the Dutch TSOs, DSOs, water companies and the Dutch Pilotage Organisation*, The Brattle Group, 26 November 2012.

- Chapter 4 examines whether the combination of input assumptions implied by Brattle’s methodology is even feasible and finds, for a plausible model of a regulated company, that it is not. Brattle assumes that the regulated company can attract debt with a “single A” rating, but simple calculations show that a company earning Brattle’s proposed WACC would not be eligible for such highly rated debt.

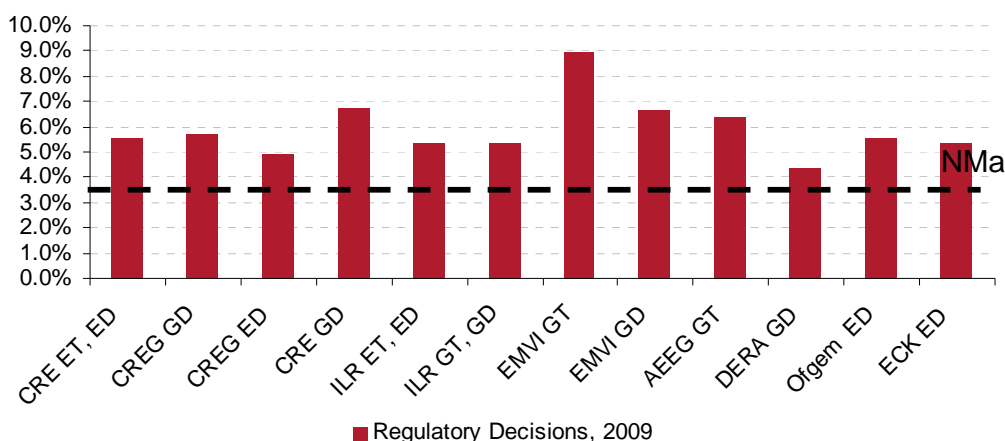
2. Brattle's Cost of Equity and WACC Lie below Regulatory Precedent

2.1. Brattle Sets a Lower WACC Than Almost All Other Regulators

Brattle's estimate of the real, pre-tax WACC of 3.7% is significantly lower than the WACC allowed in most of the recent decisions by European electricity and gas regulators.

The figures below show that the WACC estimated by Brattle lies below all regulatory precedent in the period 2009-2011, except for one decision in 2010 relating to a largely state-owned company.³ Thus, the NMa's proposed WACC lies at the bottom end of regulatory precedent.

Figure 2.1
Real, Pre-Tax WACC: Regulatory Decisions 2009

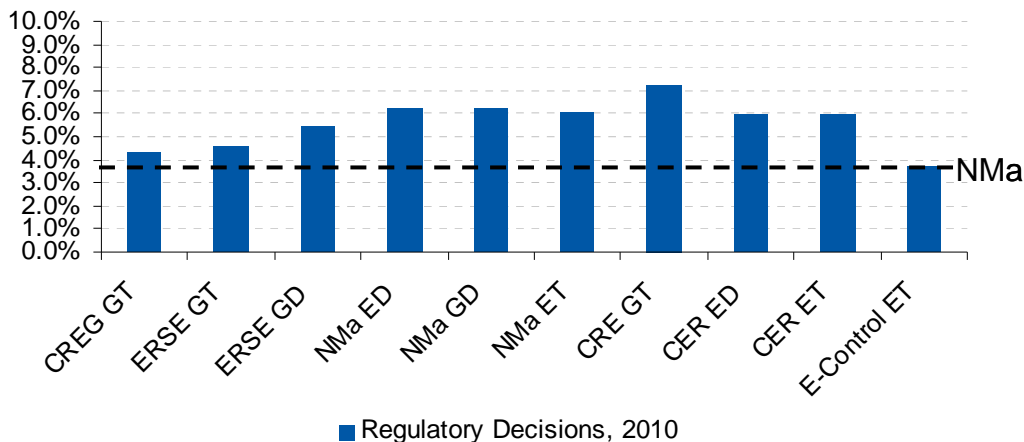


Source: NERA Analysis of Regulatory Decisions.

Note: ET and ED stand for Electricity Transmission and Electricity Distribution respectively, and GT and GD stand for Gas Transmission and Gas Distribution respectively.

³ E-Control, the Austrian energy regulator, also set the pre-tax WACC for electricity transmission equal to 3.7% in 2010. The Austrian electricity transmission network is owned – through Austrian Power Grid AG – by Verbund AG, which is in turn largely owned by public authorities. “The shareholding structure of VERBUND is essentially characterized by the majority shareholding that is held by the Republic of Austria. Under constitutional law, 51% of the share capital of VERBUND AG must remain in the ownership of the Republic of Austria. More than 32% of the share capital is in the ownership of regional energy suppliers. Less than 20% of the share capital is in free float.” See <http://www.verbund.com/cc/en/investor-relations/share-information/shareholding-structure> (downloaded 10 December 2012).

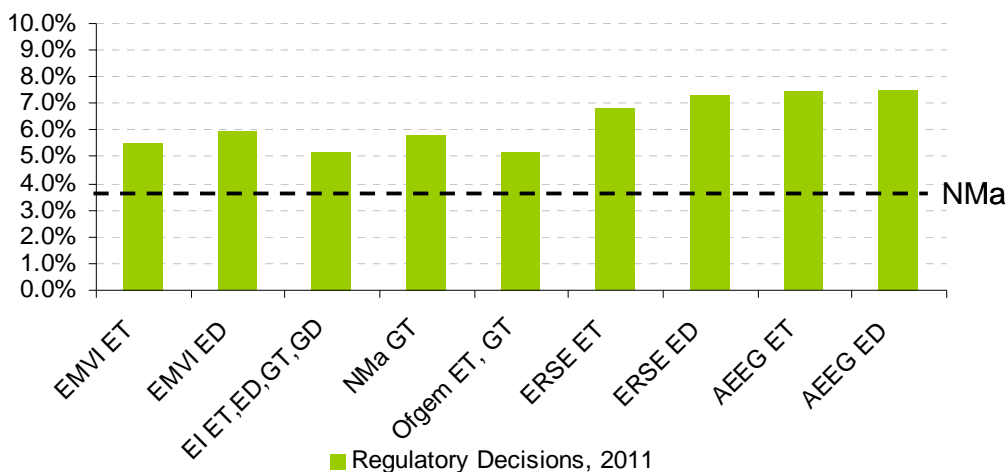
Figure 2.2
Real, Pre-Tax WACC: Regulatory Decisions, 2010



Source: NERA Analysis of Regulatory Decisions.

Note: ET and ED stand for Electricity Transmission and Electricity Distribution respectively, and GT and GD stand for Gas Transmission and Gas Distribution respectively.

Figure 2.3
Real, Pre-Tax WACC: Regulatory Decisions, 2011



Source: NERA Analysis of Regulatory Decisions.

Note: ET and ED stand for Electricity Transmission and Electricity Distribution respectively, and GT and GD stand for Gas Transmission and Gas Distribution respectively.

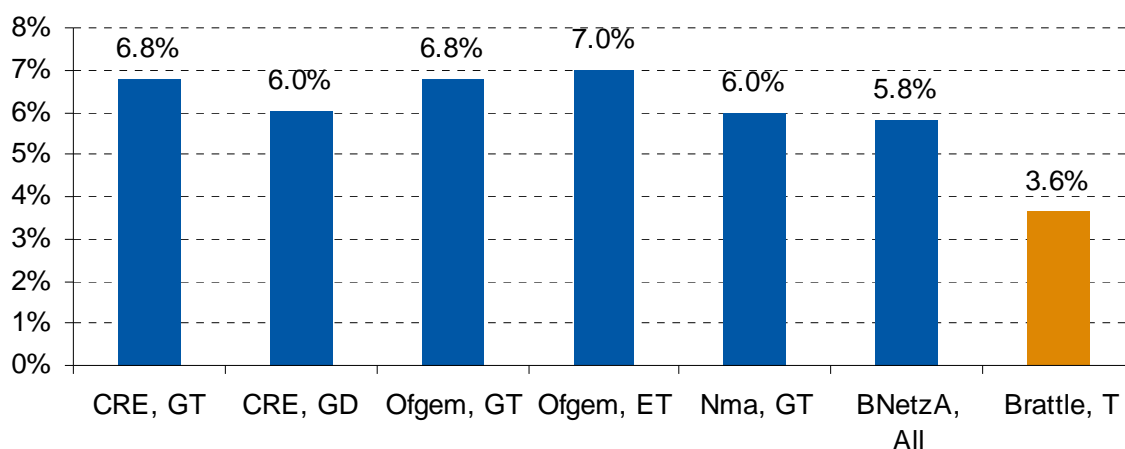
Offering a lower rate of return than that offered by other regulatory regimes can have serious consequences. Any regulated business that offers a lower rate of return than that offered by other regulated businesses (after adjusting for any differences in risk) will be unable to attract sufficient capital to finance its investments.⁴ Investors will be seek out more attractive opportunities in other businesses, or even in other regimes. If a Dutch network business has to curtail investment because it cannot attract capital, there will be a decline in the robustness of the network, and ultimately in the quantity and/or quality of the service provided to Dutch consumers.

2.2. Brattle's Estimated Cost of Equity Is Biased Downward By The Use of Inconsistent Parameters

Brattle's WACC estimate is downward biased due to the fact that it is derived from an inconsistent set of WACC and CAPM parameters – a short-term RfR and beta, combined with a long-term ERP, as we explain below. The resulting Cost of Equity (CoE) lies significantly below that allowed by most other European regulators.

Figure 2.4 compares the real, post-tax Cost of Equity estimated by Brattle with the real post-tax Cost of Equity allowed in other large European markets, including Germany (BNetzA, for the period 2013-2017), France (CRE, Gas Transmission tariff update for the period through to December 2012, and Gas Distribution tariffs for the period 2012-2016) and the UK (RIIO initial proposals for Gas Transmission and Distribution), as well as the Cost of Equity allowed in NMa's own decision of October 2011 for the regulatory period 2010-2013.

Figure 2.4
Real Cost of Equity, Post Tax: Brattle vs. European Regulators



Source: NERA Analysis of Regulatory Decisions.

⁴ Initially, the business may be able to increase its borrowing, but it will only be able to finance the borrowing by continually reducing returns to shareholders and the value of its equity. Such policies are not sustainable.

As Figure 2.4 shows, these other European regulators have allowed a real, post-tax Cost of Equity of between 5.8% and 7.0%. Brattle's current estimate lies significantly below this range, and is 2.4 percentage points lower than the Cost of Equity that the NMa allowed in the previous regulatory period. This significant downward bias in the estimated Cost of Equity is unjustified, in light of the fact that the risks associated with energy transmission and distribution have not undergone any major changes, and the macroeconomic environment is, if anything, more uncertain than ever.

2.3. Conclusion

Brattle has estimated the cost of capital for energy companies using a methodology which is subject to a known downward bias due to the use of incompatible input data. As a result, Brattle's estimates of the WACC fall below the levels adopted by European regulators in the period 2009-2011, with one exception.

We discuss the nature of the downward bias in more detail in the next section.

3. Inconsistent WACC Parameters Bias the Estimated Cost of Capital

3.1. Evidence that Inconsistencies Bias the Estimated Cost of Equity

Brattle combines a short-term data on the RfR, i.e. a 3-year average of the yield on 10-year German and Dutch government bonds, with a long-term data on the historic ERP, i.e. a 111-year average of observed rates in Europe. As we have pointed out many times, the combination of parameters based on inconsistent timeframes can introduce a bias into estimates of the Cost of Equity, due to the inverse relationship between the ERP and the RfR.

Short-run and long-run estimates of these parameters do not bias the CAPM estimates when the short-run average is close to the long-run trend. However, the desire of many investors to reduce their exposure to risk following the Global Financial Crisis has led investors into a “flight to quality”, leading to unprecedentedly low bond yields. This drop in the RfR is accompanied by a rise in the Equity Risk Premium (ERP). As a corollary of the “flight to quality”, investors demand higher returns to bear the extra volatility on the stock market.

Both central banks and academics have observed and noted the negative correlation between the RfR and the ERP. For instance, the European Central Bank stated in 2010 that:

*“short term risk premia have increased significantly during the financial crisis”*⁵

Scruggs (1998) and Bliss & Panigirtzoglou (2004) show the theoretical and empirical foundation for a link between ERP and volatility.⁶ Similarly Cochrane explains in a chapter of the *Handbook of the Equity Risk Premium* that the variables which determine expected market returns “[...] typically have a suggestive business cycle correlation. Expected returns are high in ‘bad times’, when we might well suppose people are less willing to hold risks.”⁷

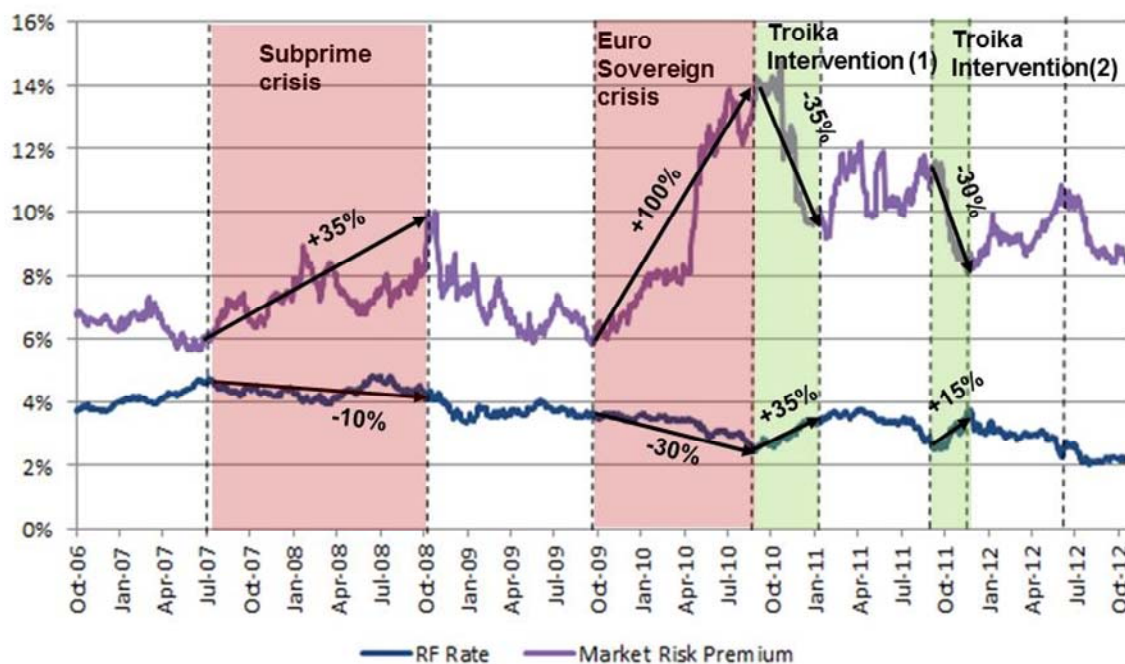
The theoretical links can also be shown empirically, when comparing data on the RfR with estimates of the ERP (published by Bloomberg). In a recent analysis that we conducted of the French market, whose results are shown in Figure 3.1, we observed that the ERP rose sharply during recessions, and was accompanied by lower bond yields. In times of positive news of recovery, the inverse was true. Figure 3.1 highlights periods where these economic trends are readily identifiable, but an inverse relationship is visible outside these periods as well.

⁵ ECB (2010): The term structure of risk premia new evidence from the financial crisis, Working paper series, March 2010.

⁶ Scruggs, J.T. (1998): Resolving the Puzzling Intertemporal Relation Between the Market Risk Premium and the Conditional Market Variance: A two factor approach, *Journal of Finance*
Bliss, R. & Panigirtzoglou, N. (2004): Option-implied Risk Aversion Estimates, *Journal of Finance*.

⁷ “Handbook of the Equity Risk Premium” by Rajnish Mehra, 2008, p. 244.

Figure 3.1
Empirical Co-Movement Between ERP and Risk-Free Rate



Source: Bloomberg, NERA Analysis .Note: The term “Troika” relates to the coordinated action of the European Commission (EC), the International Monetary Fund (IMF), and the European Central Bank (ECB).

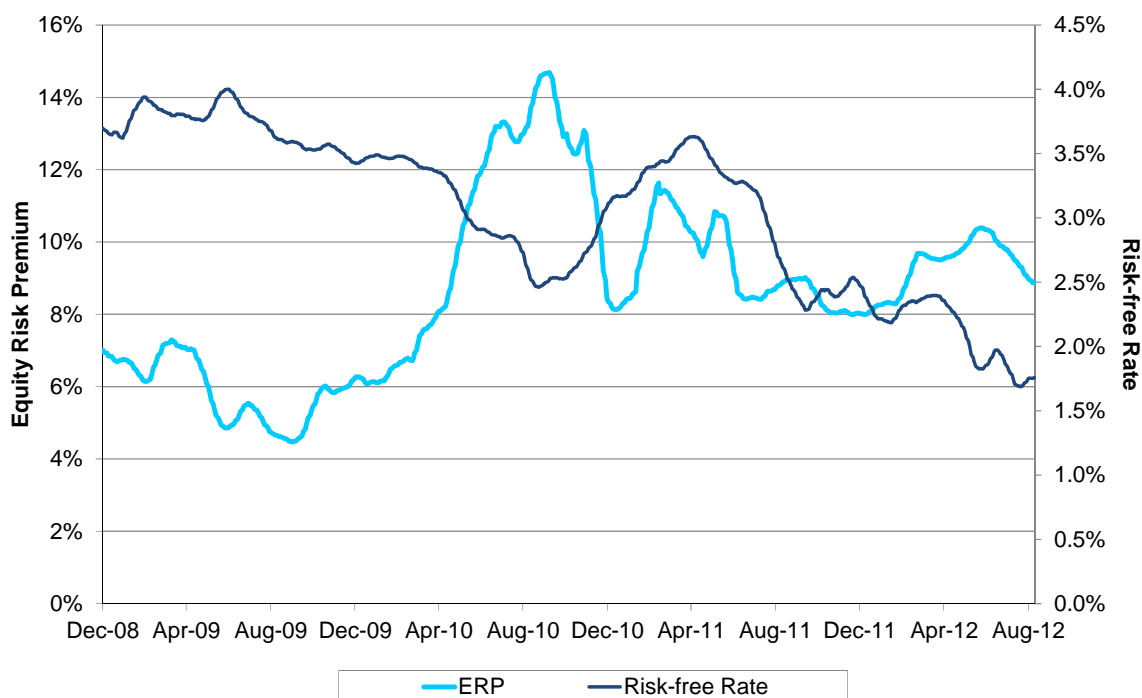
At a more general level, the theoretical link between the ERP and the RfR can also be found by comparing Dutch Risk-free Rates with the ERP estimated by Bloomberg for the Dutch stock market. (See Figure 3.1.)

We calculated the correlation between the Dutch 10-year RfR and the ERP estimates by Bloomberg, over the period December 2008 to August 2012 to be -0.513.⁸ The two series are therefore inversely correlated to a substantial degree.⁹ (See Figure 3.2.)

⁸ A figure of -1 describes perfect inverse correlation, 0 describes the absence of correlation and a figure of +1 describes perfect positive correlation.

⁹ Correlation is not a binary relationship, i.e. there can be inverse correlation between two parameters even if the coefficient does not equal to 1. In that case the relationship is not one of perfect correlation. However, perfect correlation is not required to make it necessary to use consistent time frames, as any form of correlation will only be offset by choosing consistent estimation periods, whilst choosing different periods will lead to biased estimates.

Figure 3.2
Empirical Co-Movement between Dutch ERP and risk-free rate



Source: NERA analysis of Bloomberg data. Bloomberg’s ERP estimate based on multi-stage DGM, rolling monthly averages

The evidence in the figures above shows that in general, when interest rates are *below* their long-term trend values, Equity Risk Premiums lie *above* their long-term trend value. The level of integration of European markets implies that the relationship observed for France and the Netherlands is true for other European countries. Thus, by using a short-term RfR without adjusting the ERP upwards, Brattle introduces a downward bias into its CAPM estimate of the Cost of Equity.

3.2. Brattle Recommends, But Fails to Adopt, Upward Adjustments to the ERP

Brattle acknowledged in its first report the emerging consensus that the financial crisis has increased the ERP:

“Some practitioners have noted the negative correlation between the ERP and the risk-free rate – in other words bond yields.... At the same time, **most people believe that the ERP has risen** due to increased risk-aversion following the crisis.”(emphasis added)¹⁰

Brattle discusses the issue of consistency in the parameter estimates of the CAPM. Brattle *recommends* that the historic ERP measure is adjusted upward, so as to avoid introducing a bias into CAPM estimates:

¹⁰ Brattle [1], 26 November 2012, p. 37.

“...the crisis likely justifies an upward adjustment to the ERP as estimated by the historical data...”¹¹

“Thus, a decline in the government bond yield is likely to lead to an under estimation of the cost of equity using the CAPM, if no change is made to the ERP. This is consistent with our views in section 4, where **we conclude that the ERP should be adjusted upward at times of market stress and volatility**, based on the results of for example dividend growth models” (emphasis added).¹²

However, despite recognising that short-term estimates of the ERP and the RfR both lie outside the range of the long-term trends used in its calculation of the WACC, Brattle does not discuss the need to use consistent timeframes for measuring variables. Instead, Brattle only discusses consistency in the choice of a “correct” duration for measuring data series *other than* ERP, such as the RfR and the debt premium.¹³

We understand that Brattle may have been instructed to apply the “final NMa methodology” to calculate a WACC for the next regulatory period. However, it is unclear why, in its second report, Brattle considered (and rejected) a *downward* adjustment to the ERP,¹⁴ but then failed to consider or adopt an *upward* adjustment to the ERP, despite the recommendation to do so set out in its first report. The resulting inconsistency between input data series leads to a bias in Brattle’s CAPM estimates of the Cost of Equity, as discussed above. Below, we indicate the possible scale of that bias.

3.3. Estimating Beta Over A Short Period Further Biases the Cost of Equity Downwards

Brattle estimates the beta using daily returns over a recent 3-year averaging period. The resulting average value observed over 11 companies is 0.37. The range of values included in this sample, at 0.12-0.60, is very wide. The outliers merit further investigation to check whether they are suitable comparators for Dutch network companies, an exercise that Brattle has not carried out. However, even the values shown as applicable to energy¹⁵ raise concern over the use of data from the last three years

Using this period introduces a bias into the estimated beta, due to inverse correlation between the beta of network companies and the ERP observed during the financial crisis. Since network companies are viewed as relatively “safe”, they attract investors during times of financial crisis. This effect reduces the correlation of their share price with share prices in the rest of the market and depresses their beta. However, this effect is a temporary one. It will cease or be reversed when investors have adjusted their portfolios and/or the financial crisis comes to an end.

¹¹ Brattle [1], 26 November 2012, p. 28.

¹² Brattle [1], 26 November 2012, p. 37.

¹³ Brattle [2], 28 November 2012, p. 10.

¹⁴ See Brattle [2], 28 November 2012, pp. 21-22.

¹⁵ Brattle [2], 28 November 2012, table 12, p. 19.

This reduction in relative risk, i.e. the reduction in network company betas, during the financial crisis is also observed in beta estimates for other classes of infrastructure assets. It represents the fact that while the market as a whole has become more volatile in absolute terms, the cash flow profile of infrastructure assets has been broadly unaffected by the financial crisis in absolute terms. Thus, the *relative risk* of infrastructure investment declines, while the *absolute risk* attached to it remains unchanged.

This effect is both temporary and limited to periods of financial crisis. Investors' expectations of the future beta will be unaffected by such factors. Thus, *ceteris paribus*, the temporarily lower estimates of beta bias downwards the estimated Cost of Equity relative to its expected level.

3.4. Poor Choice of Comparators Further Biases the Estimated WACC

We understand that Brattle's choice of comparators is constrained by NMa's methodology, which requires at least 10 comparators, the intention being to include a diversity of regulatory regimes in the beta estimate.¹⁶ This rationale is unjustified from an economic standpoint, given that the return on equity must attract capital from investors (i.e. encourage them to hold the equity of that company) and should therefore reflect the risks associated with the regulatory regime of the company concerned, not the regulatory regime of other companies.

Brattle seems to make little or no effort to select companies whose regulation resembles the regulatory environment in the Netherlands, or companies that face similar risks to those faced by regulated Dutch companies. In particular, relevant comparators would have to meet several criteria, including the following:

- The potential comparator's financial statements and the breakdown of its revenue/income should show that it obtains most of its revenues/income from the same activity as the company in question; and
- A review of the regulatory regime within which the potential comparator operates should show that the risks associated with that regime are similar to those faced by the company in question.

By not giving due regard to the risks facing the comparator companies, Brattle include non-comparable companies whose exposure to risk differs from that facing regulated Dutch companies. As a result, Brattle's estimated betas for the chosen comparator companies vary *significantly*, i.e. over the range 0.12–0.60 for asset betas¹⁷ and 0.25–1.00 for equity betas.

Moreover, there is already independent evidence that Brattle should have excluded from its sample a company with one of the lowest betas. Elia, a comparator included in Brattle's estimate of beta, was denoted an "outlier", and thus excluded from the analysis for the German networks review, in a recent report to the German regulator by Frontier Economics.¹⁸

¹⁶ Brattle [2], 28 November, 2012, p. 3.

¹⁷ See Table 11, pg. 18.

¹⁸ Frontier Economics (2011), *Wissenschaftliches Gutachten zur Ermittlung des Zuschlages zur Abdeckung netzbetriebspezifischer unternehmerischer Wagnisse im Bereich Gas, Gutachten im Auftrag der Bundesnetzagentur* (A report for BNetzA), September 2011.

Frontier Economics gave several reasons for excluding Elia, which are equally valid in the Dutch case:

“Elia has continually exhibited very low betas (<0.1) and is therefore an outlier compared with all the other companies analysed in the sample. The reason lies in the special characteristics of the regulation for Elia, which is explicitly based on securing a low cost of capital:

- Elia is subject to "Secured Revenue" regulation with pass-through of the cost of debt.
- The key parameters are set by law (beta coefficient ≥ 0.3 , Market risk premium of 3.5%).
- Possible volume risks are neutralized by an ex-post adjustment.
- Thus the achievement of the X-factor remains as the only significant risk, which is however diversifiable and therefore has no effect on the cost of capital.

The financial market therefore rates Elia as equivalent to an index-linked bond, which explains the low beta factor – this assessment being also confirmed by Elia. Elia is therefore not suitable as a reference for determining the normal market cost of capital, and is therefore not included henceforth in the narrow sample.”¹⁹

Excluding Elia from Brattle’s sample would increase the asset beta from 0.37 to 0.40 and the equity beta from 0.66 to 0.70, which adds about 10 basis points (0.1%) to the WACC.

Finally, we note not only that the US companies are non-comparable, in that they do not face similar risks, but also that the inclusion of US betas introduces a minor inconsistency with the ERP, which is constructed by reference to different geographic markets. However, we would not expect this inconsistency to have a major impact on the results, given that the European and US markets are very highly correlated.

3.5. Adjustments to the Biases in Brattle’s Estimates

Figure 3.1 shows that a long-term estimate of the ERP may be around Brattle’s figure, but that a long-term (10-year) estimate of the risk-free rate, at 3.67%, would be substantially higher than Brattle’s Risk-free Rate of 2.63%. At the moment (i.e. as reflected in a 1-year estimate), the Risk-free Rate is indeed rather low – only 2.27% – but the corresponding (1-

¹⁹ Ibid., pg. 45-46. Translated from original:

“Elia weist kontinuierlich sehr niedrige Betas ($<0,1$) auf und ist damit im Vergleich zu allen anderen analysierten Stichprobenunternehmen ein Ausreißer. Dies liegt in der besonderen Ausgestaltung der Regulierung für Elia begründet, die explizit auf eine Sicherstellung niedriger Kapitalkosten ausgerichtet ist:

- Elia unterliegt einer „Secured Revenue“-Regulierung mit Durchreichung von Fremdkapitalkosten.
- Die Kernparameter sind per Gesetz festgelegt (Beta-Faktor $\geq 0,3$, Marktrisikoprämie 3,5%).
- Mögliche Volumenrisiken werden durch eine ex-post Anpassung neutralisiert.
- Somit verbleibt die Erreichung des X-Faktors als alleiniges signifikantes Risiko, das jedoch diversifizierbar ist und damit keine Auswirkungen auf die Kapitalkosten besitzt.

Der Finanzmarkt bewertet Elia daher wie eine indexierte Anleihe, wodurch der niedrige Beta-Faktor erklärt wird - diese Einschätzung wurde auch seitens Elia bestätigt. Elia ist daher als Referenz zur Bestimmung marktüblicher Kapitalkosten nicht geeignet, und wird daher in der engeren Stichprobe nicht weiter herangezogen.”

year) ERP is 9.0%, almost double Brattle’s estimate of 4.6%. Despite these large differences between 1-year and 10-year values of RfR and ERP, the inverse relationship between them produces a relatively stable estimate of the real pre-tax WACC, namely 5.2% to 5.5%, for 10-year data and 1-year data respectively, as shown in Table 3.1.

Table 3.1
Revised WACC Estimates Based on Consistent Parameters

	Brattle	1-Year Est.	10-Year Est.
Input Data - Financial Markets			
RFR	2.63%	2.27%	3.67%
ERP	4.6%	9.0%	5.0%
A-rated Debt Premium	1.4%	1.34%	1.50%
Input Data - Company			
Equity Beta	0.66	0.71	0.76
Tax Rate	25.0%	25.0%	25.0%
Gearing (D/(D+E))	0.50	0.50	0.55
Nominal Results			
Cost of Equity (CoE)	5.7%	8.7%	7.5%
Cost of Debt (CoD)	4.0%	3.6%	5.2%
After Tax WACC	4.3%	5.7%	5.5%
Pre-Tax WACC	5.8%	7.6%	7.3%
Real Results			
Inflation allowance	2.0%	2.0%	2.0%
After Tax WACC	2.3%	3.6%	3.4%
Pre-Tax WACC	3.7%	5.5%	5.2%

Source: Brattle and NERA Analysis

This range of 5.2%-5.5% lies well above Brattle’s estimate of 3.7%, but even this result only shows the effect of replacing the NMa’s inconsistent input data with consistent input data. It does not take into account the possibility of further increases due to methodological changes such as allowing a premium for regulatory risk or small firm status.

3.6. Conclusions

Despite expressing reservations about the methodology used in the NMa’s previous estimates of the WACC, Brattle applied a similar methodology. Brattle’s estimate of the WACC was therefore affected by the same downward bias, due to the use of inconsistent periods and incompatible input data.

After correcting this bias by using data for either a 1-year period or a 10-year period, the real pre-tax WACC rises. Estimates on this basis fall within a relatively narrow range of 5.2%-5.5%.

4. Inconsistent Parameters Produce Implausibly Low Estimates of the Cost of Capital

4.1. Brattle's Estimated WACC Does Not Generate Financial Ratios Consistent With Single A Debt Rating

The WACC calculated by Brattle using the NMa's current methodology is inconsistent with NMa's own assumptions about credit rating. Using a stylized example, it can be shown that the combined returns on equity and debt do not generate financial ratios, such as the "Adjusted ICR", that are consistent with the assumption of a single A debt rating, which Brattle used to calculate the Cost of Debt. The combination of input assumptions behind Brattle's estimate of the WACC is therefore demonstrably infeasible.

Credit rating agencies use several metrics to assess a company's ability to meet debt service payments, including:

1. FFO Interest Cover, or the adjusted Interest Cover Ratio (Adjusted ICR);
2. the 3-year Net Debt/Regulatory Asset Value;
3. FFO/Net Debt; and
4. Regulatory Depreciation/Capex.

The first measure, the "Adjusted ICR", calculates the ratio between the company's "Funds From Operations" (FFO) and its debt interest, after adjusting the FFO by adding back depreciation, so that the resulting ratio is closer to the concept of "EBIT Coverage".²⁰ A key requirement for a single A debt rating is that the Adjusted ICR exceeds 2. However, as discussed in Appendix A, a simple, stylized example shows that a company achieving the rates of return suggested by Brattle would not meet this condition. Some other interest ratios are not met either. Therefore, the allowed return on debt and equity are not sufficient to generate the single A debt rating that Brattle assumes when estimating the Cost of Debt and the WACC.

The actual companies regulated by Brattle may achieve better ratios by some or all of the following measures: by cutting Gross New Capex below regulatory depreciation; by achieving lower interest payments in the past; by issuing index-linked bonds which pay only "real" interest; or by cutting dividends below the cost of equity. However, the adjustments achieved this way would have to be substantial and cannot easily be imposed *ex post* or for long periods.

4.2. The Implied Total Market Return in Brattle is Inconsistent with Historic Total Market Returns

The CAPM model can produce a range of estimates of the cost of equity, due to the variation in the possible input parameters. It is therefore important that the choice of CAPM

²⁰ Moody's Rating Methodology, p. 18

parameters produces a cost of equity that is consistent with other market evidence on the return required to persuade investors to hold equity.

Brattle’s estimates of the Risk-free Rate (RfR) and the Cost of Equity (CoE) imply a total market return that is inconsistent with long-term estimates on the total market return shown in DMS. Table 4.1 shows that Brattle’s estimates imply a real, total market return of 5.19% (row [5], column [A]). This figure results from combining the real Risk-free Rate (row [4]), with the Equity Risk Premium (row [2]).²¹ However, DMS (2012) show that the arithmetic mean real return on equity in Europe, which is the best unbiased estimate of the long term market return, stands at 6.70% (row [5], column B) or 1.51 percentage points above the total market return implied by Brattle (row [6]). Thus, Brattle’s estimate of the CoE is inconsistent with evidence on the long-term return on equity in Europe.

**Table 4.1
Comparison of Brattle’s Implied Market Return (real, Europe) and
DMS Actual Market Return (real, Europe)**

		A	B
		Brattle	DMS
[1]	Risk-Free Rate, nominal	2.60%	
[2]	Equity Risk Premium	4.60%	
[3]	Inflation	2.00%	
[4] = [1+1]/[1+[3]]-1	Risk-free Rate, real	0.59%	
[5]=[2]+[4]	Implied Market Return, real	5.19%	6.70%
[6]	Difference (DMS - Brattle)		1.51%

Source: NERA Analysis of Brattle Figures; DMS, 2012²²

4.3. Conclusions

There are a number of problems with the estimated cost of equity, debt and capital presented by Brattle. In particular, the estimates are too low to achieve the financial ratios needed to support one of the input assumptions in the calculation, namely that the company can attract debt with a single A rating. Brattle’s estimates of equity market parameters are also inconsistent with (i.e. produce total returns lower than) long-run evidence on the real total return that investors have demanded in equity markets. These inconsistencies show that Brattle’s estimates are implausibly low.

The major problem we have identified in Brattle’s estimates – one that follows from the NMa’s methodology, which pre-dates Brattle’s report – is the use of inconsistent datasets,

²¹ The beta of the market portfolio is 1.

²² DMS (2012), Credit Suisse Global Investment Returns Sourcebook 2012, Table 77, p. 187.

collected over different time periods, for setting the input parameters in calculating the cost of capital.

We showed in Table 3.1 the effect of adjusting Brattle's estimate of the WACC onto a consistent basis, using input data for either a 1-year period, or a 10-year period, but not mixing the periods over which input data is collected. As Table 3.1 shows, the Risk-free Rate has been even lower than Brattle's estimate over the last year, at 2.27% for a 1-year bond, but was much higher over the last 10 years, at 3.67% for a 10-year bond. Conversely, Bloomberg's (forward-looking) DGM estimates of the short-run ERP have been very high over the last year, at 9.0%, although the 10-year average, at 5.0%, is closer to long-run (backwards-looking) estimates. As explained above, using consistent datasets results in WACC estimates that lie in the range 5.2% to 5.5%.

Appendix A. Debt Rating Analysis

Table A.1 shows the balance sheet (assets and liabilities) and financial cash flows (return, interest, dividends) arising from that balance sheet, for a typical company with the characteristics assumed in Brattle’s analysis. The opening RAB of €1,000 represents half the Gross Asset Value of the company’s assets, on the grounds that the assets are on average half-way through their depreciation lives. Gross new capex is set equal to current cost depreciation, which is one fortieth of the implied Gross Asset Value, based on an average asset life of forty years. Asset values are inflated each year by 2% inflation. Other rows apply the rates of return on debt and equity proposed by Brattle. (Interest is calculated at the nominal cost of debt, dividends at the real cost of equity.)

Table A.1
Balance Sheet and Cash Flows, as per Brattle/NMa Assumptions

Year	1	2	3	4	5	6
Net Asset Value (NAV)						
Opening RAB (NAV)	1000	1020	1040	1061	1082	1104
Gross New Capex	50	51	52	53	54	55
Current Cost Depreciation (CCD)	-50	-51	-52	-53	-54	-55
Net New Capex	0	0	0	0	0	0
Closing RAB (NAV)	1000	1020	1040	1061	1082	1104
Average Opening RAB (NAV)	1010	1030	1051	1072	1093	
Average Liabilities						
Debt	505	515	525	536	547	
Equity	505	515	525	536	547	
Cash Flows						
Return on Capital (Real After-Tax WACC)	23	24	24	25	25	
Interest (on Debt Portion of RAB)	-20	-21	-21	-22	-22	
Return on Capital (after debt service)	3	3	3	3	3	
Dividends (at Real Cost of Equity)	-18	-19	-19	-19	-20	
Return on Capital (after debt service & dividends)	-15	-16	-16	-16	-17	

The combination of nominal interest payments and a real rate of return on capital causes a number of problems for this company. Table A.2 shows the key financial ratios used by Moody’s to decide a company’s debt rating, and the values required to achieve a rating of “single A”. The company just passes the test for the FFO Interest Cover, the ratio of returns and depreciation to interest payments. However, investors know that regulated companies have investment obligations, so Moody’s applies an “Adjusted FFO Interest Cover”, which assumes that the depreciation allowance is needed to finance capex obligations. By this measure, the company’s ratio of 1.1 falls well below the required standard, a multiple of 2.0-4.0. The company also fails the tests for FFO/Net Debt and RCF/Net Debt.

On this basis, the company would not achieve the single A rating that is a necessary condition for the cost of capital that Brattle assigns to it.

Table A.2
Financial Ratios Resulting from Return on Debt and Equity in Brattle Report

Year	1	2	3	4	5	Moody's Ratios	
						Min	Max
FFO Interest Cover							
= (Return on Capital in Revenue + CCD) / Interest	3.6	3.6	3.6	3.6	3.6	3.5	5
Adjusted FFO Interest Cover							
= Return on Capital in Revenue / Interest	1.1	1.1	1.1	1.1	1.1	2.0	4.0
FFO/Net Debt							
= (Return on Capital in Revenue + CCD - Interest) / Net Debt	10%	10%	10%	10%	10%	12%	20%
Net Debt/RAB							
= Net Debt / Average Opening RAB	50%	50%	50%	50%	50%	45%	60%
RCF/Debt							
= (FFO - Dividends) / Net Debt	0.1	0.1	0.1	0.1	0.1	1.5	2.5

These results depend on some key assumptions. The company's ratios would be improved if:

- Gross New Capex were less than Current Cost Depreciation (and ratings agencies recognised the difference when calculating financial ratios);
- interest payments were less than the current cost of debt (e.g. due to the use of indexed bonds which incur a real rate of interest plus a capital gain in the principle at redemption);
or
- dividends were less than the cost of equity.

However, in each case, a substantial adjustment would be required to meet Moody's minimum ratios.

NERA

ECONOMIC CONSULTING

NERA Economic Consulting
15 Stratford Place
London W1C 1BE
United Kingdom
Tel: +44 20 7659 8500
Fax: +44 20 7659 8501
www.nera.com