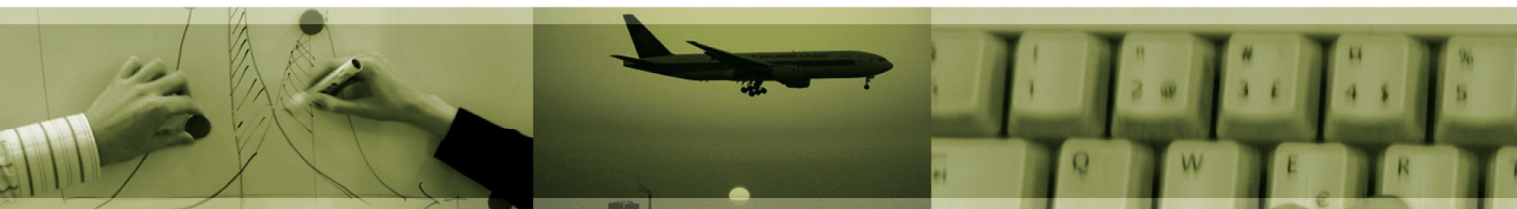

WACC FOR BROADCASTING – TERACOM

|21 FEBRUARY 2007

INFORMED DECISIONS



COPENHAGEN ECONOMICS

| PREFACE

Copenhagen Economics has been commissioned by Post och Telestyrelsen (PTS) to undertake a study on the weighted average cost of capital (WACC) for broadcasting operators in Sweden. PTS has found that TeraCom has significant market power on the broadcasting market in Sweden and has therefore imposed remedies – such as cost based pricing. The cost of capital will be used to determine these prices.

The report from Copenhagen Economics has been prepared by a team consisting of M.Sc. Petter Berg, M.Sc. Henrik Fransson, M.Sc. Marcin Winiarczyk and Ph.D. Henrik Ballebye Olesen. The team leader has been Ph.D. Claus Kastberg Nielsen.

Copenhagen, 21 February 2007

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Chapter 1 MAIN FINDINGS

The Swedish Regulatory Authority (PTS) has found that Teracom holds significant market power in the broadcasting markets and is currently revising Teracom's pricing. In this context, PTS has asked Copenhagen Economics to calculate the WACC (Weighted Average Cost of Capital) on the Swedish broadcasting markets. This estimation should, to the extent possible, follow the methodology developed for WACC calculations on the market for telecommunications networks by AMI (2003).

Copenhagen Economics has followed the developed methodology and proposes that a WACC of 8.37% is used in the Swedish broadcasting markets, se Table 1.1.

Table 1.1: Calculation of WACC - broadcasting

	Low gearing	High gearing
Risk-free rate	3.72%	3.72%
Debt Risk Premium	0.70%	1.70%
Cost of debt	3.2%	3.9%
Risk-free rate	3.72%	3.72%
Equity Risk Premium	4.50%	4.50%
Levered beta	0.72	1.09
Cost of Equity	6.96%	8.63%
Gearing	25%	55%
Tax rate	28%	28%
Post-tax WACC	6.0%	6.0%
Pre-tax WACC	8.36%	8.38%
Mid-point	8.37%	

Note: The difference between the low and high gearing cases is very small.

Source: Copenhagen Economics

It is normally useful to compare the results of a study to previous studies. However, no other national regulatory authority in Europe has yet completed the WACC calculations for the broadcasting industry.

We therefore choose to benchmark our results with a similar industry; fixed net telecommunications. The two sectors are similar in several aspects. They are both network industries where large initial investments are required. In both sectors, there is only one (incumbent) operator which limits competition in the market. All things equal, this leads to lower risk than in related industries such as the mobile telecommunication industry.

We expect that the WACC will be lower for broadcasting operators than for fixed net telecommunication operators because the risk is lower. These expectations are confirmed by academic studies that have shown that the WACC for broadcasting is lower than the WACC for other types of communication equipment and services.¹

Our calculations show that the WACC for broadcasting is lower than the WACC for fixed net telecommunication in Sweden. Our estimated broadcasting WACC is similar to WACC estimated for fixed telecommunication networks in Denmark and Finland. However, the national differences partly depend on national characteristics such as risk-free rate and the equity risk premium, cf. Table 1.2.

Table 1.2 WACC for fixed telecommunication networks

We compare our estimations of the WACC in the broadcasting industry to the WACC in a similar industry, fixed telecommunication networks. As expected, the broadcasting WACC is slightly smaller than the WACC for fixed telecommunication networks.

Country (year)	WACC
Sweden (2006)	10.8%
Denmark (2006)	8.6%
Finland (2006)	8%-10%
United Kingdom (2005)	10.0%

*Note: The above capital costs can be compared to the calculated WACC for the broadcasting industry.
Source: PTS (2006), Ofcom (2005) and ITST (2006), Ficora (2006a)*

¹ See for example Kerins, Kiholm Smith and Smith (2004), page 402.

Chapter 2 METHODOLOGY

In this chapter, we will in brief describe the background and objective for the study. We will also briefly describe how the different elements of the WACC will be estimated and compare the proposed methodology to the methodology developed for telecommunication networks.

BACKGROUND

The Swedish Regulatory Authority (PTS) has defined three relevant broadcasting markets where there is a need for ex ante regulation. Teracom has been found to have significant market power on these markets, and PTS has therefore imposed a series of remedies on the markets such as access obligations and cost based pricing.

PTS is currently revising Teracom's pricing of terrestrial transmission of TV and radio services. The costs of these services should be estimated with a fully distributed cost (FDC) methodology based on historic costs. A central parameter in the calculation of a cost oriented price is the company's cost of capital, WACC (Weighted Average Cost of capital).

2.1. OBJECTIVE

PTS has commissioned Copenhagen Economics to calculate a WACC for the broadcasting market based on the methodology developed in the report "Estimating the cost of capital for fixed and mobile SMP operators in Sweden"². The calculations should, to the extent possible, follow the principles developed for calculations of WACC in telecom networks.

The report should therefore focus on the components of WACC that are business or sector specific. However, the choice to rely on prior calculations should be substantiated. The value of each component should be determined and the choice of methodology should be motivated.

2.2. BROADCASTING WACC

As indicated in the objective, the methodology for assessing broadcasting WACC is based on the previous study on WACC for telecom networks (herein referred to as the AMI report). The WACC consists of two parts; the cost of debt and the cost of equity.

² See AMI (2003).

The WACC is defined as:

$$WACC = g \times (1 - T) \times (DRP + R_f) + (1 - g) \times (R_f + \beta_j ERP)$$

where g is the gearing of the capital structure defined as the ratio between the market value of debt and the market value of debt and equity; T is the tax rate; DRP is the Debt Risk Premium or the interest on a specific debt item above the risk free rate; R_f is the risk free interest rate; ERP is the Equity Risk Premium or the required interest on a relevant market portfolio above the risk free rate; and β_j is the sensitivity of the return on asset j to a market portfolio.

Table 2.1 below provides an overview of how each of these variables were estimated in the previous report and how they will be estimated for the broadcasting market.

Table 2.1 Approach to estimate the elements of the WACC

Variable	Fixed network study (AMI, 2003)	Broadcasting (2007)
Gearing (g)	Benchmark of the gearing levels and credit ratings of different European network operators. A survey among financial analysts on the optimal gearing.	Benchmark of the gearing levels and credit ratings of different operators in the broadcasting sector.
Tax rate (T)	Corporate tax rate	Same approach as in the AMI study
Debt Risk Premium (DRP)	Benchmark analysis of debt premiums for comparable operators	Same approach as in the AMI study.
Risk-free-rate (R_f)	A 6-months moving average of recent 10-year nominal government bond yields.	Same approach as in the AMI study.
Equity Risk Premium (ERP)	Historic market premium and surveys of the current expectations of market participants.	The results from the AMI study.
Levered beta (β)	Beta estimated on the basis of daily observations, for a time period of 1-3 years, using the OMX-index as benchmark. Alternatively a peer group analysis using publicly available beta rates of comparable operators.	Peer group analysis using publicly available beta rates of comparable operators.

Source: Copenhagen Economics and AMI (2003).

The components in the WACC calculation and the estimations of the components will be described in the following chapter.

Chapter 3 ESTIMATIONS

In this chapter we will estimate all the variables in the WACC- equation. For each variable we thoroughly describe the methodology for the estimation.

3.1. FINANCIAL GEARING (G)

Financial gearing describes the relation between the company's debt and equity. It is the share of the assets that are financed by debt and defined as $D/(E+D)$, where D is the debt and E the equity capital³. High gearing means debts are high in relation to equity capital. In this section will we estimate the optimal gearing (also called target gearing), i.e. the gearing level where the financial costs are minimised.

Calculations of the financial gearing should be based on market values as opposed to book values. This is especially important when valuing the equity since the book value underestimates the value of the equity because the market value of the assets', and thereby the equity, is higher than the book value. One reason for this is that the present value of growth opportunities is not included in the book value. Accounting principles can also decrease the usefulness of book values. We base the valuation of equity on market values.

When we calculate the market value of debt we have to value each debt instrument on the balance sheet. It is straightforward to value bond issues, but a firm's balance sheet usually contains many other types of debt instruments which makes market valuation a complex task. Therefore is it common to use the book value of debt as a proxy for the market value.⁴ We base the calculations of debt on book values.

In our study we use market value for equity and book value for debt. Compared to the approach in the AMI study, only using book values, our proposed methodology will lead to a lower target gearing and, all things being equal, a higher WACC. However we consider this valuation to best reflect the value of equity and debt. This is also confirmed by comparing the calculated gearing with the gearing reported from the companies.⁵

Since a company's gearing may deviate from the long run capital structure (and thus also differ between different operators), we estimate the target gearing. We estimate the target gearing as the best practice of a peer group of five broadcasting operators. The operators in the peer group are all active in the broadcasting sector. As a limited number of European broadcasting operators are publicly listed we also include operators from the US and Australia in our peer group. A detailed description of the companies in the peer group can be found in Appendix I – Company description.

³ Notice that, by definition, assets = D+E.

⁴ Book values are for example used in the AMI report, p. 37 footnote 49.

⁵ For example Macquarie report a gearing of 53 % and our calculations indicate 56%.

We rank the operators in the study by credit rating. The credit rating indicates a company's credit history and measures the default probability of the borrower, and its ability to repay fully and timely its financial debt obligations.

The variation of gearing levels among the broadcasting operators is considerable. The gearing ranges between 7% and 56%. Only one of the surveyed operators, DMT, has a gearing outside of the gearing range 25%-56%, cf. Table 1.1.

Table 3.1: Calculation of target gearing

	Operator	Country	Gearing	Rating
High	National Grid	United Kingdom	53%	A
	Macquarie*	Australia, United Kingdom	56%	A-
	DMT*	Italy	7%	A-
Low	American Tower	United States	28%	BB+
	Crown Castle	United States	25%	BB
Average			33%	

*Note: For the companies marked with * we use an adjusted synthetic rating. For calculations and discussion about the validity of the synthetic rating see Appendix II –Rating. “High” and “Low” refers to the rating. Source: Copenhagen Economics, based on annual reports and information from Datastream and S&P.*

As Teracom is not publicly traded, we do not know its market values. Teracom's gearing in book values (which is higher than market values) is 56%. This is slightly less than the company's book value target gearing of 60%.⁶ Teracom's target gearing is the same as the peer group book value average gearing.⁷ This indicates that the peer group average gearing is a good measure of target gearing for Teracom.

We find that two of the three top rated peers have an average market value gearing level of 55%. The two peers with lowest ratings have an average gearing level of 25%. We propose to use the average gearing of the two broadcasting operators with the top credit rating as the high gearing cut-off point and the average of the two lowest rated operators as the low gearing cut-off.⁸

Our conclusions are that the target gearing is a range between 25% and 55%.

Our estimation of the target gearing is slightly higher than the recent calculations of the gearing in the broadcasting sector by the Finnish Communications Regulatory Authority.

⁶ This is calculated from the target Equity/Asset ratio of 40% stated in the annual report for 2005.

⁷ The average book value gearing for the peer group is 60%. The individual peers book value gearing is: National Grid 87%, Macquarie 71%, DMT 28%, American Tower 48% and Crown Castle 69%.

⁸ In this context we treat the exceptionally low gearing of DMT as an outlier and exempt it from our calculations.

They estimated the gearing to be 30%⁹. Our estimation of the target gearing is in the same range, but slightly higher than the gearing levels for telecommunication network operators, see Box 3.1.

This can be explained by a lower risk in the broadcasting industry than in fixed telecommunications that would enable the broadcasting operators to have a higher gearing. The logic is similar to a Danish fixed net WACC study, where network operators were found to have higher gearing, due to lower risks, than telecommunication operators.¹⁰

Box 3.1 Target gearing for fixed telecom operators

We compare our estimations of gearing in the broadcasting industry to the target gearing in a similar industry, fixed telecommunication networks.

Country	Gearing
Sweden	20-40%
Denmark	35- 50%
United Kingdom	30-35%
Finland	30%

Note: The target gearing levels above apply for fixed SMP operators.

Source: PTS (2006), Ofcom (2005), ITST (2005) and Ficora (2006a)

3.2. TAX RATE (T)

Most of the market information is based on post-tax figures. We will therefore follow the AMI methodology and calculate the post-tax WACC and then convert it to pre-tax WACC.¹¹

However, it is possible to use two different types of tax rates; the effective and the marginal tax rate. The effective tax rate is defined as the taxes due divided by taxable income and the marginal tax rate is defined as the tax rate paid on the marginal income.

We choose to base our calculations on the marginal tax rate because the effective rate will converge with the marginal rate in the long run. This follows the WACC calculation methodology proposed by AMI.¹² The corporate tax rate is also used in WACC calculations for fixed telecommunication operators in the UK, Denmark and Finland.¹³

⁹ See discussions in Ficora (2005b).

¹⁰ Ernst & Young (2005)

¹¹ There is no sector specific taxation that gives reason for alteration of methodology.

¹² AMI refer to the effective rate but in fact uses the marginal tax rate.

¹³ See for example Ofcom (2005), ITST (2005) and Ficora (2006).

The pre-tax WACC will be calculated with the Swedish corporate tax rate which is currently 28%.

3.3. DEBT RISK PREMIUM (DRP)

The Debt Risk Premium is the interest paid on corporate bonds over and above a comparable risk-free bond. We estimate the debt risk premium by following the recommended methodology¹⁴ and conduct a benchmark analysis of the debt risk premiums of broadcasting operators. There are also other ways to assess the debt risk premium. Why these methods are not applicable are described in Box 3.2.

Box 3.2 Alternative methods to estimate Debt Risk Premium

The Debt Risk Premium can be assessed with a variety of methods, such as analysing outstanding bonds, official ratings, synthetic ratings or recent borrowing history. However, there are no industry specific reasons to deviate from the methodology proposed by AMI to use a benchmark. Moreover, none of the alternative approaches are possible to apply as Teracom has no outstanding bonds, is not rated by any credit institution¹⁵, the synthetic credit ratings are unstable¹⁶ and Teracom has a very limited borrowing history¹⁷.

Source: Copenhagen Economics based on Damodaran (2002).

We estimate the debt risk premium from credit ratings¹⁸. The majority of corporate bonds in the AMI study had a maturity of between 7-10 years. Network operators, such as broadcasting operators, are classified as utility providers in rating contexts. We therefore determine the spread for respective rating by the average spread on a 10-year corporate bond in the utilities industry.¹⁹ The relation between credit rating and debt risk premium as defined above is illustrated in Table 3.2.

¹⁴ See AMI (2003), p.15.

¹⁵ No information on Moody's or S&P's webpages. Moreover, Teracom state in their 2004 Annual report that they are not rated by any credit institution.

¹⁶ See Appendix II –Rating, about Teracom's synthetic credit rating.

¹⁷ According to Teracom's 2005 annual report the Teracom Group had SEK 0 in interest bearing loans.

¹⁸ This is also the methodology used by Damodaran and S&P.

¹⁹ This follows the methodology proposed for calculating WACC for fixed network operators in Denmark, Ernst & Young 2005.

Table 3.2 Corporate Spreads for Utilities

Moody's / Standard and Poor's Rating	Spreads for Utility services
Aaa/AAA	28
Aa1/AA+	30
Aa2/AA	38
Aa3/AA-	50
A1/A+	67
A2/A	69
A3/A-	72
Baa1/BBB+	87
Baa2/BBB	112
Baa3/BBB-	128
Ba1/BB+	200
Ba2/BB	145
Ba3/BB-	190
B1/B+	300
B2/B	370
B3/B-	445
Caa/CCC	520

Note: Network operators are categorised as utility companies.

Source: Bondsonline (2006)

Based on the above relation between rating and spread we determine the spread for the operators, and calculate the average spread for the broadcasting operators.

Table 3.3 Debt risk premium for peer group

Operator	Rating	Debt Risk Premium
National Grid	A	0.69%
DMT*	A-	0.72%
Macquarie*	A-	0.72%
American Tower	BB+	2.00%
Crown Castle	BB	1.45%
Average		1.20%

*Note: For the companies market with * we use an adjusted synthetic rating. For calculations and discussion about the validity of the synthetic rating see Appendix II –Rating.*

Source: Copenhagen Economics

The spreads range from 69 to 200 which is a relatively broad span. The average in the peer group is 1.20%. This turns out to be the same debt risk premium that SBC Warburg calculated for A-rated fixed network operators.²⁰

²⁰ See the AMI study, p.41.

In consistency with the AMI methodology we estimate the DRP as a range. We use the same division of companies based on rating as in the assessment of target gearing. According to Table 3.3 the average debt risk premium for an A rated operator is around 0.7% and the average debt risk premium for a B rated operator is around 1.7%. We propose that the debt risk premium should be estimated in an interval with 0.7% as the lower bound and 1.7% as the upper bound.

We propose to use a debt risk premium range of 0.7% in the low gearing case, and 1.7% in the high gearing case, when assessing the cost of debt in the Swedish broadcasting market.

Our suggested debt premium range of 0.7%-1.7% is higher than the debt premium of 0.5% suggested for the Finnish broadcasting market.²¹ It is however similar to the premium for fixed network operators, see Box 3.3.

Box 3.3 Debt risk premium for fixed telecom operators

We compare our estimations of debt risk premium in the broadcasting industry to the debt risk premium in fixed telecommunication networks.

Country	Debt Risk Premium (gearing)
Sweden	1%-1.4% (20%-40%)
Denmark	0.9% (35%-50%)
United Kingdom	1% (30%-35%)
Finland	0.5%-1.5% (30%)

Note: The target gearing levels above apply for fixed SMP operators.

Source: PTS (2006), Ofcom (2005), ITST (2005) and Ficora (2006a)

3.4. RISK-FREE RATE (R_F)

The risk free rate is the expected return on an asset, which bears no risk at all. An asset is risk-free when we know the expected returns with certainty. The only securities that can be seen as being risk free are government securities.²²

The assessment of risk-free rates does not depend on the sector analysed. We therefore use the methodology proposed in the AMI report. The risk-free rate is approximated with the yield on a nominal government bond with a 10-year maturity. We calculate the rate as a 6-month prior moving (arithmetic) average, see Figure 3.1.

²¹ See Ficora (2006b).

²² Not because governments are better run than companies but because they control the printing of currency.

Figure 3.1 Yield on Swedish government bonds with 10-year maturity



Note: Daily observations (1999-01-01 to 2007-01-10)

Source: Riksbanken

The figure illustrates significant variation, and the yield decreased from around 6% in October 1999 to 3.8% in January 2007 with a significant fall commencing around mid 2004. The fall ended in the end of 2005 and the yield has been relatively stable around 3.75% since April 2006. The development is similar to Euro Zone interest rates. Applying the 6-month arithmetic moving average will even out single irregular observations.

We recommend that the risk-free rate for a broadcasting operator in Sweden should be 3.72%.

3.5. EQUITY RISK PREMIUM (EPR)

The Equity Risk Premium is the additional return that a market investor requires in order to accept the systemic risk associated with investing in the market portfolio instead of a risk-free asset.

The equity risk premium relates to the Swedish market as a whole and is the same for all sectors. The proposed methodology is to make use of studies of the historic premium and to survey the current expectations of market participants.

The AMI report contains both on historic and forward looking studies of the equity risk premium. The historic studies covered the time period 1937-1987 and estimated a premium of 5%-5.5%. As the historic studies are based on observations during 50 years they are relatively stable for recent developments. The forward looking studies indicated a premium around 4%-4.5%. There have not been any major changes in the Swedish

economy since 2003 that calls for a change of equity risk premium. We propose to use the same equity risk premium as used by PTS in November 2006 when calculating WACC for fixed telecommunications networks.²³

We set the equity risk premium to 4.5% in the WACC calculation for broadcasting.

3.6. LEVERED BETA (β)

Investments always carry risks. Betas measure the risk of a firm relative to a market index. The more sensitive a business is to market conditions, the higher is the beta. The estimation of a beta is an attempt to examine how the return on the investment co-varies with the return on the market portfolio. The beta typically increases with a company's gearing, since a higher level of gearing implies higher volatility in the returns to shareholders.

The AMI report proposes to estimate the beta values for publicly traded companies, using standard OLS regression analysis. Teracom is not publicly traded, hence we cannot estimate how the return on Teracom co-varies with the average market return. It is thus not possible to estimate a regression beta for the company.

Instead we use the second methodology proposed by AMI, to use bottom-up betas to estimate Teracom's market risk. A bottom-up beta is estimated from the betas of peers in a specified business, thereby addressing problems associated with computing the cost of capital. Most importantly, by eliminating the need for historical stock prices to estimate the firm's beta, the standard error is reduced.²⁴ Overall, bottom-up betas are designed to be a good measure of the market risk associated with the industry or sector of the business.²⁵

The estimation of a bottom-up beta follows a number of steps. First, we need to construct a sample of publicly traded firms within the broadcasting sector. It is problematic to find a group of European comparables as most broadcasting operators in Europe are privately traded or subdivisions of larger companies. We have therefore included Australian and US companies in the peer group. A detailed description of the peer group and the selection criteria can be found in Appendix I – Company description.

²³ PTS (2006) Hybrid model documentation.

²⁴ For more advantages with using bottom-up betas see Beneda (2003) or Damodaran (2002).

²⁵ Besides how sensitive a business is to market conditions, the bottom-up betas also capture the operating and financial risk of a company.

Table 3.4: Description of Teracom and the peer group

Operator	Country	Main business
DMT	Italy	Communication infrastructure and services
American Tower	United States	Communication infrastructure and services
Crown Castle	United States	Communication infrastructure and services
National Grid	United Kingdom	Operations in regulated networks
Macquarie	Australia, United Kingdom	Communication infrastructure and services
Teracom	Sweden	Communication infrastructure and services

Note: Macquarie owns two assets: Broadcast Australia (active in Australia) and Arqiva (active in the UK).

Source: Copenhagen Economics

Once we have defined the peer group we collect the betas for these firms. In principle, we could estimate the beta for each firm against a common equity index. However, we use ready available service betas for each firm. The betas are presented in Table 3.5.

Table 3.5: Beta values for the peer group

Operator	Beta	Adjusted beta
DMT	0.93	0.93
American Tower	1.20	1.13
Crown Castle	1.08	1.05
National Grid	0.57	0.57
Macquarie	0.40	0.40
Average	0.84	0.82

Note: The NYSE betas are adjusted. See Appendix III – Beta adjustments, for further explanation. The industry average beta is similar to the industry beta of 0.9 used in the Finnish broadcasting WACC.

Source: Bloomberg and NYSE.

The betas for the US companies are collected from NYSE and Bloomberg betas are used for the non-US companies. To eliminate a comparison problem when comparing betas from the two sources we adjust the raw betas collected from NYSE.²⁶

The adjusted betas in the table above are levered and depend on the gearing of each individual company. As the companies' gearings are not the same as the target gearing range, we have to adjust the betas for differences in gearing.

Second, we calculate the average unlevered beta for the broadcasting business. This is done by unlevering the average beta of the industry by the industry's average D/E ratio (Debt Equity).²⁷ This method is sometimes referred to as the Modigliani-Miller formula.

²⁶ For further information see Appendix III – Beta adjustments.

$$\beta_{Unlevered} = \frac{\beta_{Average}}{1 + (1 - Tax) \times D / E_{Average}}$$

We choose this method of unlevering to reduce the possibilities of error.²⁸ The industry average D/E is 0.64.²⁹ Our calculations yield an unlevered beta for the peer group of 0.60.

The third and last step is to calculate the beta adjusted for Teracom's target gearing level. As we know that Teracom's capital structure is similar to the average capital structure of the peer group we lever the beta with the gearing range 25%-55%.

We (re)lever the beta³⁰ for the high and low gearing cases and get a beta of 1,09 with a high gearing of 55% and a beta of 0,72 in the low gearing situation of 25%.

The leveraged beta in our calculations is slightly lower than the betas used in WACC calculations for fixed telecommunication operators, see Table 3.6. The reason for this could be that the broadcasting industry is less risky than fixed telecommunication industry – due to the fact that customers have no or limited alternative options and the operators have long contracts with the customers, which in turn generates stable and predictable cash flows over the long term.

Table 3.6 Betas used in WACC for fixed telecommunication networks

We compare our estimations of the betas in the broadcasting industry to betas used for calculating the WACC for fixed telecommunication networks.

Sample betas	Leveraged Beta (gearing)
14 largest European incumbents (2005)	0.9 (35%)
United Kingdom (2005)	0.8-0.9 (30%-35%)
Sweden (2006)	1.18 – 1.48 (20%-40%)
Finland (2006)	0.93-1.14 (30%)
Denmark (2005)	1.11 – 1.38 (35%-50%)

Note: The target gearing levels above apply for fixed SMP operators.

Source: PTS (2006), Ofcom (2005), Ficora (2006) and ITST (2005).

²⁸ See for example Damodaran (2002).

²⁹ This can be calculated from Table 3.1 as D/E is defined as $D/E = g(1-g)$.

³⁰ $\beta_{Levered} = \beta_{Unlevered} \times (1 + (1 - Tax) * D / E)$

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APPENDIX I – COMPANY DESCRIPTION

We use a peer group approach for assessing target gearing, debt risk premium and leveraged beta. In order to get estimations that are relevant for the Swedish broadcasting market and for Teracom it is important that the peer group represents the relevant industry.

We will in this appendix give a short description of Teracom, present the criteria used for selecting a peer group and the selected peers.

Teracom

Country: Sweden

Business area: Communication infrastructures products and services to radio-television network operators, municipalities, broadcasting and broadband operators.

Short description: Teracom is the largest media operator in Sweden that transmits audio and video to TV, radio, computers and mobile terminals through various technical platforms. It is the Incumbent broadcasting transmission operator in Sweden.

Teracom is divided in four business areas:

- Media, Radio and TV broadcasting (incl. digital broadcasting)
- Pay TV, Pay TV operations conducted by the subsidiary Boxer
- Telecom, Maintenance, Broadband networks, Telecom connections
- Other, Sale of components to broadcasting.

The broadcasting division is the largest division of the company.

The broadcasting market in Sweden: The only operator active on the Swedish market is the incumbent Teracom who has a monopoly on the Swedish market for analogue and digital terrestrial broadcasting services.

It is the broadcasting market that is to be regulated. The peer group should therefore have a strong presence on this market and we use four selection criteria to choose the peers.

The peers should:

1. be active in the broadcasting transmission sector.
2. be publicly listed companies (there are no market values for private companies such as Teracom).
3. have a significant part of the operations in the broadcasting transmission sector (and similar operations).
4. have similar business areas to Teracom.

There are no peers in Sweden as Teracom is the only broadcasting operator in the country. In Europe many of the member states have a market structure similar to the Swedish one, i.e. one government owned incumbent broadcasting transmission operator. This is manifested by the fact that all the ten regulatory authorities, which have made market analyses of wholesale terrestrial transmission services, have found that there is one (or several) operator with significant market power. As most of the operators in

Europe are private or non-profit organisations, they do not fulfil the second criteria and can thus not be used as peers in this study.

There is also a number of broadcasting transmission operators in Europe whose main business is not broadcasting transmission and whose business is very different from Teracom's business. Two examples are Italian RAI (main business TV-production) and Portugal Telecom (main business telecom services). These companies do not fulfil criteria three and four.

Due to the structure of the national markets for broadcasting transmission in Europe, we widen the geographical scope to also include non-European companies.

Based on the above selection criteria, we have selected a peer group of five companies. Our selected peer group is similar to both recent public and private analyses of broadcasting transmission services. Two examples of similar peer groups are the group used in Ficora's, the Finnish NRA, calculations of WACC for the Finnish broadcasting transmission market, and the Ernst& Young expert report regarding Macquarie's acquisition of Arqiva.

Below you will find the peer group and a short description of the peers.

DMT Group

Country: Italy

Business area: Communication infrastructure products and services, assisted and integrated, to radio-television network operators and wireless operators.

Short description: The DMT Group is active in two areas

- Technology: production of television transmission systems, both digital and analogue, and supply of individual components and integration of "turn-key" complete systems. DMT are active both in Italy and internationally.

- Towers: services connected to the operation of broadcasting or wireless sites, and hosting on sites belonging to the group of sites managed by the Company. The tower business is focused on the Italian market and where it owns 100 broadcasting sites. DMT is currently the biggest independent tower operator in Italy, with all mobile telephony companies, national broadcasters and major local networks in its customer portfolio.

Italian market: In November 2005 there were 6 operators in the Italian market with 12 national analogue networks/channels. The main operators are RAI (the public broadcaster), RTI (Mediaset) and Telecom Italia. Every broadcaster owns self-supplying infrastructure (including masts, sites, buildings, transmitters, feeders and antennae systems). The Italian market for analogue terrestrial television broadcasting services is therefore characterized by vertical integration, where the same operator owns the frequency, the transmission network and provides contents over its own network. The national regulatory authority intends to designate RAI and RTI as having collective dominance in the national analogue terrestrial television market.

American Tower Corporation

Country: United States, Mexico

Business area: Operator of communications sites for the wireless and broadcast industries.

Short description: American Tower owns, operates, and develops wireless communications and broadcast towers in the United States.

American Tower is one of the largest tower companies in the US. It operates in three main business segments:

- Broadcast Communications Towers. They are one of the largest independent owners and operators of broadcast towers in the United States and Mexico. They own approximately 220 broadcast towers in the United States and have exclusive rights to approximately 190 in Mexico and lease antenna space primarily to radio and television broadcast companies.
- Wireless Communications Towers. They own and operate a large independent portfolio of wireless communications towers in the United States, Mexico and Brazil. The network in the United States includes approximately 19,300 owned wireless communications towers.
- In-Building Neutral Host Distributed Antenna Systems. They are a leading provider in the United States of in-building neutral host distributed antenna systems and have approximately 100 in-building systems in operation in retail shopping malls and casino/hotel resorts.

The broadcasting market in the United States: Unlike many other national markets, the US market is categorised by a large number of broadcasting transmission operators. There are both national and regional tower companies, such as American Tower, Crown Castle and SBA Communications, wireless carriers and broadcasters that own and operate their own tower networks and lease tower space to third parties, numerous independent tower owners and the owners of non-communications tower sites, including rooftops, utility towers, water towers and other alternative structures.

Crown Castle International Corp

Country: United States, Australia

Business area: Owning and operating technologically advanced shared wireless infrastructure.

Short description: Crown Castle offers wireless communications coverage to 91 of the top 100 US markets and to substantially all of the Australian population. After the acquisition of Global Signal, Crown Castle is the largest independent operator of wireless tower assets in the United States with approximately 23,000 sites in the U.S. & 1,400 in Australia.

The broadcasting market in United States: See description in American Tower.

Macquarie Communications Infrastructure Group

Country: United Kingdom and Australia

Business area: Communications infrastructure such as broadcast transmission towers, wireless communication towers and satellite infrastructure.

Short description: Macquarie is an investment company with two assets, Broadcast Australia and Arqiva.

- Broadcast Australia: is Australia's leading independent broadcast transmission provider. Its core business is the provision of infrastructure for the transmission of television and radio broadcasts to audiences across Australia. Broadcast Australia owns and operates the most extensive broadcast transmission infrastructure network in Australia. It provides transmission services from approximately 600 transmission sites across metropolitan, regional and rural Australia and reaches over 99% of the country's population. Broadcast Australia's tower network is also available for co-hosting of third party equipment, and is useful for telecommunications and radio communications applications, including emergency service organisations.
- Arqiva: is the UK's leading provider of transmission services for broadcasters. Its network of 1154 sites covers 98.5% of the UK population. It has five operating divisions; terrestrial, satellite, mobile and wireless

media solutions and public safety.

The broadcasting market in the United Kingdom: For UK television, terrestrial broadcasting transmission services are accessed through the masts and sites of the terrestrial transmission network. This network is currently operated by two companies, Arqiva and National Grid, who operate a service split across the UK. They each have around half the sites, with no practical overlap between any of the sites with each other. The NRA, Ofcom, has therefore appointed SMP status to the two operators on several of the identified relevant markets.

National Grid

Country: United Kingdom

Business area: Operations in regulated networks

Short description: National Grid's main businesses comprise the transmission and distribution of electricity and gas and the provision of network infrastructure to the broadcast and telecommunications industries.

In the UK it is the leading independent provider of network infrastructure to mobile network operators and one of two providers of transmission networks for analogue and digital television and radio broadcasters.

The broadcast transmission business is a network of transmission towers and broadcast equipment. It has contracts to transmit analogue and digital radio and television signals for reception by the public. They own around 750 broadcast towers and associated transmission equipment. They also hold licences for two digital television multiplexes utilised by broadcasters to broadcast eleven digital channels in the UK.

The broadcasting market in the United Kingdom: See description for Macquarie.

APPENDIX II – RATINGS (OFFICIAL AND SYNTHETIC)

The credit rating of a company is vital information when assessing a WACC as it reflects the company's capacity (or history) of debt repayment. These ratings are based on various factors such as payment history, current debts, debt mix and industry sector. Credit rating is not an exact science and different producers of credit ratings can end up with different results for the same company.

Three of the peers in our study are rated by Standard & Poor's. For these companies we use the S&P rating.

Table AII. 1 Peers with ratings

Operator	Rating
American Tower	BB+
Crown Castle	BB
National Grid	A

Source: Standards & Poor's.

When a company does not have a rating from a credit institution, we can create a synthetic credit rating based on fundamentals. The best indicator to use is often thought to be the interest coverage ratio.³¹ This is partly due to the fact that there is a significant correlation between the interest coverage ratio and the credit rating. Standard & Poor's lists the interest coverage ratio first among the ratios that they use in their ratings.

We use the following definition for our synthetic ratings:

$$\text{Interest Coverage Ratio} = \text{EBIT} / \text{Interest Expenses}$$

In some cases we make adjustments to the synthetic ratings due to company specific factors. These corrections are explained in Table AII.2 below.

³¹ See for example Damodaran (2002).

Table AII.2 Synthetic ratings

Operator	Assigned rating	Synthetic Rating	Interest coverage ratio	Comment
DMT	A-	A-	3,8	-
Macquarie	BBB	BB(+)	2,2	Macquarie owns two assets: Broadcast Australia (rated BBB/Baa2) and Arqiva (not rated). Our analysis of the operators with credit ratings indicates that synthetic ratings undervalue the creditworthiness of the operators in the industry. We therefore assign an A- rating.
Teracom	Not used	AAA	71,95	Teracom has a very high interest coverage ratio. It has however been very unstable (but increasing since 2002). Due to the instability it should be degraded.

Note: The synthetic ratings are based on Table AII. 3.

Source: Copenhagen Economics based on the companies annual reports, financial statements and comments from the companies.

Table AII. 3 Interest Coverage Ratio - Rating

Interest Coverage Ratio		Rating
>	≤ to	
-100,000	0.199	D
0.2	0.649	C
0.65	0.799	CC
0.8	1.249	CCC
1.25	1.499	B-
1.5	1.749	B
1.75	1.999	B+
2	2.2499	BB
2.25	2.499	BB+
2.5	2.999	BBB
3	4.249	A-
4.25	5.499	A
5.5	6.499	A+
6.5	8.499	AA
8.5	100,000	AAA

Source: Damodaran online (2006)

APPENDIX III – BETA ADJUSTMENTS

The raw betas used in section 3.6 originate from two different sources, Bloomberg and NYSE. The two suppliers use slightly different methodologies for calculating the raw betas. We will, to the extent possible, make corrections for the differences.

There are two kinds of differences; time period and adjustment. Bloomberg uses two years of data in their calculations and NYSE uses three years. This time period mismatch is hard to correct.

The second difference is that Bloomberg adjusts the raw beta with the Bayesian adjustment principle before publishing the beta. NYSE does not calculate adjusted betas. The adjustment effectively pushes all regression beta estimates closer to one. This methodology draws on empirical evidence that suggests that the beta for most companies, over time, tend to move toward the average beta, which is one. This may be explained by the fact that firms' product mix and client base becomes more diversified as they get larger.

We address this difference by adjusting the raw betas from NYSE with the methodology employed by Bloomberg.³² This makes the information from the two sources comparable. It should be pointed out that the adjusted betas resemble the raw betas as the raw betas are close to one.

³² The adjustment formula used by Bloomberg is: Adjusted beta = 0,67 * raw beta + 0,33 * 1, 0.