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Report for the Norwegian Post and Telecommunications Authority (NPT)

Expert opinion on CSMG's calculation of the benefit of lower costs for Tele2 due to the roll-out of a full national network in Norway

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1 Introduction

Tele2 and Network Norway recently appointed the consulting firm CSMG to quantify the socio-economic surplus of having a third network in Norway that provides nationwide coverage as opposed to 75% of the population (which is the level of coverage specified within the existing Ministry decision[1] regarding the joint infrastructure of Tele2 and Network Norway i.e. Mobile Norway). CSMG produced a report entitled *Nationwide Population Coverage for the Third Network in Norway, Socio-Economic Cost Benefit Analysis, March 2012* to which we refer herein.

This quantification puts forward a number of components:

- the benefit of lower costs, at the infrastructure level, from covering the remaining 25% of the Norwegian population and the corresponding effects on the retail market
- the benefit of Tele2 and Network Norway entering the 'high usage' mobile broadband market
- the cost of distortion caused by extended asymmetric mobile termination rates (MTRs) for Tele2 and Network Norway
- the cost of duplicative investment in a third network.

In this context, the Norwegian Post and Telecommunications Authority ('NPT') has appointed Analysys Mason Limited ('Analysys Mason') to provide its expert opinion on parts of this quantification.

The remainder of this expert opinion paper sets out whether the economic benefit of extending Mobile Norway's network nationwide is likely to be NOK15.3 billion.

This paper is **confidential** and can be provided in full only to NPT and the Ministry of Transport and Communications. To protect confidentiality, the whole of Section 2.2 must be redacted from the version of this paper provided to other parties.

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[1]   http://www.npt.no/ikbViewer/Content/129509/SDs%20vedtak%2011-mai-2011.pdf

2 Expert opinion

The CSMG report quantifies the benefit of extending Mobile Norway's network nationwide at NOK15.3 billion, derived from a lower marginal cost for Tele2 and Network Norway when they can operate independently from the existing national roaming agreements. CSMG's calculation is based on a calibrated Cournot economic model of competition and an assumption of the uplift multiplier between the marginal cost faced by the incumbent operators and Tele2 in areas of national roaming.

We have focused on this component of the economic cost–benefit analysis because it is by far the largest component contributing to the conclusion of CSMG that there is a significant net benefit of subsidising the last 25% of population coverage.

We find that:

- the Cournot economic model of competition makes simplifying assumptions which do not reflect the reality of the market, nor the national roaming and coverage extension situation being considered
- the uplift applied by CSMG has been calculated incorrectly, and in fact is much smaller.

Taken together, these two findings mean that the suggested benefit of NOK15.3 billion is based on flawed economic principles, is incorrectly calculated and therefore is significantly overstated.

2.1 The Cournot economic model of competition used does not reflect the reality of the situation being considered

While it is true that Cournot is often used for modelling the competitive impact of changes in market structure, as discussed by CSMG (p.13–15)[2], it is also important to address the impact of key assumptions encompassed in the general Cournot model as well as the CSMG's specific adaptation of the model to the situation at hand. The key interrelated assumptions are: there is no product differentiation; the operators all charge the same market price; and they all face the same marginal costs (except for Tele2 and Network Norway where they have no network in the factual case). This overarching assumption is summarised by CSMG as follows:

"*As the goal of the assessment is to determine the overall impact, we do not account for the balance of market power between the firms. Thus, firms facing the same cost in our Cournot model will face identical outcomes (i.e. same level of profit). Consequently, model outcomes should be interpreted for industry as a whole, not for firms on an individual basis.*" (p.16)

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[2]   The CSMG report indicates that the Cournot model has been used in other jurisdictions such as the UK (by Ofcom) and Ireland (by ComReg). We observe that the application of this model in these two cases is to consider the benefits of a new entrant rather than the extension of an existing operator's coverage. Therefore the factual case in Ofcom's and ComReg's calculations is very different compared to that assumed by CSMG (i.e. in that the operator is not present in the market at all). We would also note that Ofcom constructed an additional seven customised models in order to arrive at its conclusions, with each model contributing inputs to the net benefit calculation.

We believe that there are both general and specific flaws in this approach. We believe that the goal of the assessment should be focused on the impact on each firm individually of one firm expanding its network. However, CSMG's approach oversimplifies the goal of the assessment, and in so doing biases the result. More specifically, the model makes the simplifying assumption that there is only one difference between the three operators – the lack of a national network – and that removing that difference will equalise the firms and lead to socio-economic benefits. However, there may be other sources of asymmetry that are not considered.

The Cournot model, as applied by CSMG, would imply that Telenor and NetCom have the same market share today, given the assumption that their products are homogeneous and the two operators have the same marginal costs. Further, it implies that Tele2 and Network Norway would have a lower market share than Telenor and NetCom, because of the higher cost of national roaming. As a result, the model does not explain the current differences in market share – which are provided in the report and are shown below in Figure 2.1 – nor does it explain why the market share differs depending on whether it measures traffic or retail market share:

Operator	Traffic market share (p.30)	Retail market share (p.39)
Telenor	54%	51.7%
NetCom	36%	33.3%
Tele2/Network Norway	11%	15%

Figure 2.1: Operator market share [Source: CSMG, 2012]

These current differences in the share of network voice traffic are persistent, as shown in Figure 2.2.
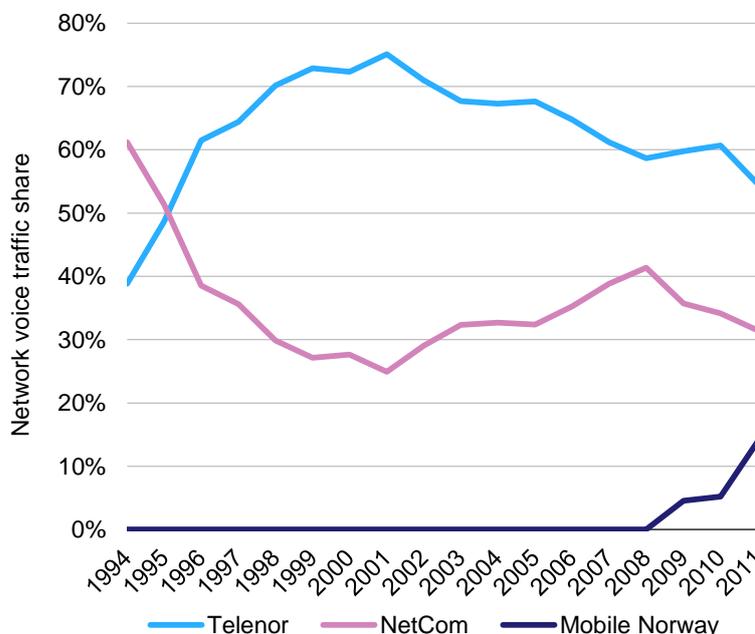

Figure 2.2: Historical share of network voice traffic [Source: Analysys Mason based on NPT market information, 2012]

Figure 2.2 shows that Telenor has had a market share above 50–60% since 1996. Not calibrating the model for the current market situation has an impact on the results of the model. In particular, the Cournot model assumes that the build-out of the Mobile Norway network will result in a fall in the

market price, and that output will increase as the operators' market shares equalise. Thus, it implicitly assumes that both Tele2 and NetCom will take market share from Telenor subsequent to the build-out.

There can be many sources of the current and historical asymmetric situation:

- first, there may be actual or perceived differences in the services provided by the three operators, implying that the assumption of homogenous products is incorrect
second, there may be differences in the marginal costs of the firms, for instance with Telenor enjoying economies of scale that are not available to NetCom or the entrant (the extent to which this difference may be valid can be observed in

- , which shows the unit costs calculated by our mobile cost model for NPT)
- third, the different market shares may be caused by, or persist in the face of, differences in the prices charged by the three operators.

None of these differences has been explored or accounted for by CSMG.

The simplified model used by CSMG assumes that equal marginal costs across the operators will imply equal market shares. However, this may not be the case since, for example, the market products are not homogenous across the operators. For instance, if Telenor provides higher-quality products at a lower price, then the expanded operator may still not be able to take significant market share away from Telenor, and the investment will have little impact on the market as assumed by CSMG.[3] Thus, it is possible that even with the new network and the resulting lower marginal cost, Tele2 and Network Norway are still not able to compete with Telenor and/or NetCom, and as a result much or all of the socio-economic benefits will not materialise.

Furthermore, the focus on the market outcome glosses over another significant question that is important from the point of view of public policy – the impact on the individual operators. The Cournot model focuses on the outputs that each firm individually produces based on a situation where marginal revenue equals marginal cost. However, this is a short-term decision and does not consider whether production is profitable in the long run, based on fixed as well as marginal costs.

The first question is whether the model shows a business case for investment on the part of Tele2 and Network Norway, even with the subsidy from asymmetric termination rates. In spite of the subsidy, the model indicates that Tele2 and Network Norway would need to make a significant investment in

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[3] There is merit in exploring the other economic models put forward but then dismissed by CSMG. One example is the Stackelberg model. As a variant of the Cournot model, it simulates dominant "firms taking the lead on production decisions" and "less dominant forms optimising on the basis of committed decision by dominant firms" (CSMG, page 14). The fact that Telenor has a persistent high market share and took the decision (in the past) to have the highest level of coverage, as well as that NetCom has a lower market share and took the decision (in the past) to have a high level of coverage but lower than Telenor, can be seen as production decisions by the (dominant) incumbent firms, befitting the Stackelberg model.

CSMG claims that there is no evidence of Tele2 and Network Norway production decisions being significantly dependent on Telenor and NetCom. However, access to national roaming on both of these operators' networks under regulatory obligation and separately by commercial negotiation suggests the opposite. CSMG does not explain this existing market relationship, nor does it explain whether the alternative Stackelberg model also gives rise to significant welfare gains from the full national coverage in the counterfactual.

capital and operating expenditure (capex and opex) in order to deploy, operate and maintain their network to the rest of the country, which would in turn result in yet lower prices.

From the needed investment, there can be three possible outcomes for Tele2 and Network Norway:

- the investment has positive returns even without the asymmetric termination[4] rate subsidy
- the investment only has positive returns with the subsidy, or
- the investment does not have positive returns regardless of the subsidy.

The request for subsidy implies the middle case, but the others should be explored. In particular, if the investment brings positive returns without the subsidy, then what is the socio-economic cost of continuing the subsidy and its corresponding distortions?[5] Conversely, if the investment cannot bring positive returns, then what happens to the socio-economic impact if, for instance, the build-out stops without a full coverage?

The additional question is the long-run impact on Telenor and NetCom, whose customers effectively pay a subsidy in order to promote the entry of a third national operator, which in turn lowers the market price and market share for Telenor, and possibly NetCom. Again, we believe that it is well within the remit of public policy to not just consider the market impact, as done by CSMG, but also to consider the impact on each operator individually.

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[4] The issue of asymmetric MTRs has been discussed extensively throughout Europe in recent years. Of relevance to this discussion is the EFTA Surveillance Authority Recommendation of 13 April 2011 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EFTA States, which was based on the European Commission's similar recommendation (dated 7 May 2009). The EFTA Recommendation states, in paragraph 16, that "*any deviation from a single efficient cost level should be based on objective cost differences outside the control of operators*" and in paragraph 17 that "*New entrants in mobile markets may also be subject to higher unit costs for a transitional period before having reached the minimum efficient scale. In such situations, NRAs may allow them, after having determined that there are impediments on the retail market to market entry and expansion, to recoup their higher incremental costs*". The application of regulation to mobile termination rates in Europe can be argued as best-practice, and increasingly conforms to the above two paragraphs on asymmetric termination rates. In particular, they are justified on the basis of (higher or uncontrollably higher) efficient costs. The justification of asymmetric termination rates by CSMG is not based on Tele2's higher actual costs.

[5] The middle case which is implied can be explored in more detail. It requires a NOK2 billion continued asymmetry in MTRs. This continued asymmetry causes a calculated distortion in the market of NOK1.6 billion over the same period (a net *excluding distortion* of NOK0.4 billion). This NOK2 billion pays the initial build capex, but stimulates Tele2 to spend a further NOK9.8 billion (i.e. NOK11.8 billion in total, as stated in Figure 20 of the CSMG report) on maintenance, additional switching, opex and replacements for the larger network over 20 years. Subsequently, NOK15.3 billion of benefit from lower network cost is claimed to materialise. The NOK2 billion is a small proportion of the overall NOK11.8 billion of cash costs required by Tele2 to develop its national network from 75% to full coverage, and is accompanied by NOK1.6 billion of market distortion.

This leads us to two conclusions:

1. The middle case of 'the investment only has a positive return with the subsidy' is an unlikely case. If there are sufficiently large welfare gains to be realised, as claimed by CSMG, then it is highly likely that the first case holds: that the total investment of NOK11.8 billion has positive returns regardless of the small proportion of subsidy.

2. From a public policy perspective, there may be more effective ways of achieving the claimed outcome, i.e. not passing a NOK2 billion asymmetric termination subsidy from other operators to Tele2, which is accompanied by a direct NOK1.6 billion detriment to the consumers or shareholders of other operators.

2.2 The uplift has been calculated incorrectly and is much smaller

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2.3 Authors

This expert opinion paper has been co-authored by Dr Michael Kende (Partner at Analysys Mason), Ian Streule (Partner at Analysys Mason) and Matthew Starling (Manager at Analysys Mason):

Dr Michael Kende is the co-Head of the Regulatory Sector at Analysys Mason. He is an economist by training, with a Ph.D. from the Massachusetts Institute of Technology (MIT).

After MIT, he spent five years as a professor of Economics at INSEAD, a business school near Paris, before joining the US Federal Communications Commission (FCC). At the FCC, Michael was the Director of Internet Policy Analysis, where he was responsible for managing a wide range of policy analyses and regulatory decisions on Internet policy (including interconnection), broadband deployment, and mergers.

At Analysys Mason, Michael has worked with operators and regulators in six continents, providing advice on a variety of Internet issues. He has worked on projects relating to Internet backbone interconnection, spectrum assignments, broadband deployment, voice over IP (VoIP) and IPTV. His clients have included the World Bank, the IDA in Singapore, OSIPTEL in Peru, AT&T and the European Commission.

Ian Streule joined Analysys Mason in 1997, and has executed, managed and directed a comprehensive range of costing, regulation and spectrum consultancy projects:

- is responsible for a significant proportion of Analysys Mason's work in the area of mobile termination regulation and the application of long-run incremental cost modelling to mobile services
- has been leading our regulatory costing work in the postal sector, providing advice to the UK postal services regulator on Royal Mail's cost modelling, cost transparency, compliance of the costing system, and accounting separation
- has assisted leading regulators with mobile and/or fixed service regulation, including Ofcom (UK), the ACCC (Australia) and OPTA (the Netherlands)
- led three long-term projects in Sweden, Denmark and Norway to undertake detailed mobile termination cost modelling; these projects included regular interaction with industry parties, multiple rounds of consultation on principles and draft models, bespoke national-specific 2G and 3G network design algorithms, and ultimately advice to these regulators on understanding and interpreting the output of the models for setting regulated prices

- has directed or advised projects on mobile termination regulation for ARCEP (France), BIPT (Belgium) and the EETT (Greece)
- has provided expert witness testimony during a mobile termination dispute arbitration
- has held workshops and presentations at leading industry conferences.

Alongside his work for regulatory bodies, Ian has also directed and managed similar projects for mobile operators. In particular, he has advised the project teams developing 2G and 3G LRIC models for a number of mobile operators in various regions of the world, including Europe, Africa, Asia, South Korea and South America.

In the field of spectrum support, Ian advised a Western European regulator on the value of different 900MHz and 1800MHz re-farming options, and led a high-profile project on the cost of ownership of 2G and 3G mobile-to-mobile (M2M) modules – also taking into account future spectrum re-farming issues. Ian's project experience also extends to related economic issues such as network externalities and international roaming.

Ian holds an M.Phys. in Physics from the University of Oxford, UK.

Matthew Starling is a Manager and a member of the Regulation Sector in Analysys Mason's Cambridge office (UK). Matthew joined Analysys Mason in 2005 and his primary area of expertise is in the cost modelling of telecoms networks (both mobile and fixed). He has worked on such projects in both Europe and in other jurisdictions worldwide. He also has significant experience in the use of geographical information system (GIS) software packages for detailed analysis.

Matthew has a Master of Mathematics (MMath. First-Class Honours) from the University of Warwick in the UK.