Oxera

Research on countervailing buyer power for mobile call termination

The Dutch case

Prepared for OPTA

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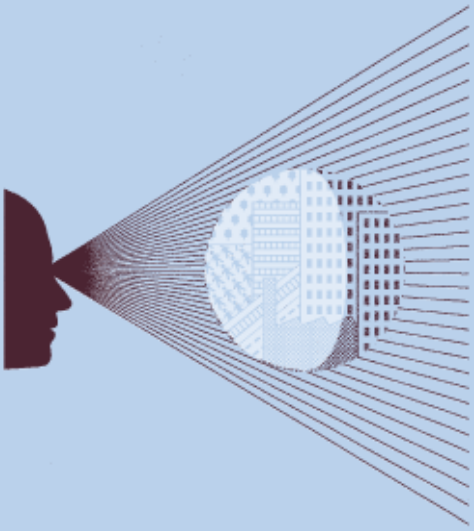

Executive summary

This report presents the results of research undertaken by Oxera for OPTA into countervailing buyer power (CBP) for mobile call termination (MCT) in the Netherlands. OPTA commissioned this research in response to the August 2006 decision by the College van Beroep voor het bedrijfsleven (CBb) to overturn OPTA's November 2005 decision relating to significant market power (SMP) in the markets for mobile voice call termination. In overturning OPTA's decision, the CBb argued that OPTA's SMP finding on the termination market had not sufficiently assessed CBP.

This study provides a detailed economic analysis of the likely outcomes of negotiations over MCT rates in two particular scenarios. The difference between the two scenarios lies in the regulatory treatment of fixed call termination (FCT) rates. In the first scenario, neither fixed nor mobile termination rates would be regulated; in the second, the FCT rates would be regulated but not MCT rates. In both scenarios, general telecommunications law obligations would continue to apply. The focus of the analysis is whether, when the actions of mobile network operators (MNOs) are not fettered as a result of regulation, termination rates would be constrained by CBP held and exerted either by the fixed network operators (FNOs), and in particular by KPN, or by the other MNOs. The main conclusion reached is that CBP is not, and would not be, effective in the absence of ex ante regulation or the threat of such regulation. A further scenario considered by OPTA is one in which, in addition to removing the threat of ex ante regulation, the constraints of the abuse of dominance provisions under competition law are removed.

The analysis presented in this report is based on three main elements of research: a review of the relevant literature and case law in other jurisdictions; an analysis of market developments in the Netherlands; and the collation and analysis of information provided by operators during the course of this research.

The literature review led to the development of a set of hypotheses to be tested covering both the **incentives** that operators face in relation to the level of their termination rates, and the **ability** of the operators to respond to those incentives in the scenarios specified by OPTA. Given the hypothetical nature of the scenarios, the questions related to situations which were outside the boundaries of the operators' experience and hence were difficult for the operators to answer with precision. The responses were therefore explored in greater depth during interviews held in January 2007 with ten fixed and mobile operators.

In light of the conclusions reached on the incentives and ability to raise rates, Oxera has assessed the likely development of MCT rates under each scenario.

Incentives in setting call termination rates

An analysis of the incentives that mobile and fixed operators face in setting call termination rates is a fundamental step in seeking to predict the likely evolution of MCT rates under the scenarios specified by OPTA. This research therefore establishes a set of hypotheses that determine the key metrics required to assess the incentives faced by operators in relation to the level of their termination rates. From the economics literature, it is possible to identify the following issues that drive the termination-related incentives of the different operators and, in particular, determine whether operators face incentives to charge termination rates above, equal to, or below costs:

– the ability to price-discriminate;
– cost differences between operators;

– the balance of traffic;
– the balance of termination payments;
– the strength of the 'waterbed effect';
– consumers' price sensitivity to changes in MCT rates.

In terms of the impact that cost differences have on incentives, operators that have (or are perceived to have) lower costs would have incentives to seek reciprocal rates with higher-cost operators—ie, each operator charging the same absolute level. In contrast, operators that have (or are perceived to have) higher costs would not have the incentives to seek reciprocal rates with lower-cost operators since that would have a significant adverse impact on the net revenues earned by higher-cost operators. This applies as much to the operators using the 1800MHz spectrum band in relation to the GSM900 operators as to MNOs as a whole in relation to the FNOs.

Furthermore, when costs (and termination rates) differ, the balance of traffic can be one way, with the balance of termination payments the other. This is precisely the case with mobile and fixed traffic and revenues. FNOs are net recipients of traffic, but due to the large difference in termination rates, MNOs are net recipients of payments. This provides the FNOs with the ability to withhold payments in a dispute over termination rates—potentially a significant mechanism for exercising CBP—but also provides MNOs with an incentive to seek to maintain the current level of net revenue flows in the scenario where FCT rates could be increased.

Operators' incentives to increase termination rates would remain if rents earned on termination rates could be used to cross-subsidise retail activities, via the waterbed effect. Evidence in support of a fully effective waterbed effect provided to Oxera during the course of this research was limited. In any event, the conclusions reached are not dependent on the existence or otherwise of a fully effective waterbed effect since, even without the incentives to subsidise competitive activities in access and origination markets, the elasticity of demand for MCT is sufficiently low for it to be profitable for an MNO to seek to raise MCT rates.

Taking into account all of these factors, no operator that responded to the questionnaire stated that it would have the incentive to offer a termination rate that was at zero or below cost, even in response to an offer from another operator that was believed to be below cost. Instead, all MNOs claimed that they would offer termination rates that were at or above costs.

The evolution of MCT rates prior to the Covenant supports the conclusion that operators face incentives to charge above-cost termination rates. In particular, KPN Mobile's decision to lower its MCT rate in June 2000 appears to have been largely in anticipation of an SMP designation by the Dutch regulator, and the reduction was not followed by any other MNO. On the contrary, a number of operators subsequently increased their rates, including KPN Mobile, partially reversing its previous reduction. On the basis that the observed increases in termination traffic during the 2000–03 period would have enabled MNOs to achieve cost efficiencies (or, at worst, the unit cost of termination services remaining constant), this leads to the conclusion that, in the absence of SMP regulation (or the threat of such regulation), during that period MNOs had the incentive (and, more importantly, the ability) to charge above-cost termination rates, even when facing the threat of ex post intervention by the NMa. There have been no developments since that time that would have significantly changed the incentives of the operators to charge above-cost termination rates. This conclusion therefore remains valid.

In the scenario in which neither FNOs nor MNOs are regulated, FNOs' incentives are likely to be similar to those faced by MNOs—ie, they would have incentives to set high, above-cost termination rates, or, for those FNOs that currently charge regulated termination rates that are below their costs, to raise their termination rates to a rate that is at least equal to their

costs. Were FNOs to respond to those incentives, the information provided to Oxera during this research indicates that MNOs would have the incentives to respond to significant changes in termination rates, in order to maintain the net revenue flows that currently pass from FNOs to MNOs.

Taking into account the cost differences, current net revenue flows, and the incentives generated under a calling party pays charging regime, the potential for a market-based solution to be reached in which operators charge reciprocal termination rates (potentially even zero, as would be the case in a 'bill-and-keep' arrangement) is very small, since this would conflict with the incentives faced by higher-cost operators.

Countervailing buyer power

The presence of effective CBP would indicate that sellers are unable to act independently of their customers, leading to the conclusion that the seller does not have SMP. Buyer power and relative bargaining positions are affected by many factors, and it is likely that the degree of influence that a buyer can exert over a seller will vary accordingly. For CBP to be considered effective, it must be sufficiently strong that outcomes would emulate those in a competitive market. This definition of CBP is consistent with that used by Ofcom in its recent assessment of the CBP held by BT against H3G.[1] This implies that effective CBP would not only prevent prices rising above cost, but would also ensure that cost reductions would be reflected in MCT rates. If this is the case, although operators appear to have incentives to charge high above-cost MCT rates, CBP would cause tariffs to converge to the competitive level.

The analysis of the existence and the extent of CBP in this research has followed a three-stage approach:

– step 1: measuring the potential for exercising CBP;
– step 2: analysis of the mechanisms through which CBP can be exercised;
– step 3: measurement of the effectiveness of CBP mechanisms in achieving their intended outcome.

The conclusions of the analysis are that in neither scenario is the bargaining power of any of the purchasers of termination services sufficiently strong that it could undermine conclusions that sellers of mobile termination services possess SMP.

A range of potential factors affecting the relative bargaining strength of operators negotiating termination rates have been identified, including, for example: the amount of information available; the ability to refer disputes to OPTA; whether the operator's rates are regulated; the ability to withhold payments; and the ability to transit calls via another operator.

One mechanism identified by operators as a factor that strengthens their relative bargaining position is the potential for referring disputes to OPTA. Evidence from the questionnaires suggests that this is particularly important for MNOs negotiating MCT rates. To a certain extent it is unclear whether this mechanism is specifically related to ex ante regulation, or whether OPTA would have the powers and/or obligations to deal with such disputes in the absence of ex ante regulation.

Withholding net termination revenues (for the difference between what the buyer deems is reasonable and what the seller is requesting) provides the most direct (potential) means of exerting CBP. However, since KPN Carrier Services (KPN CS) is by far the largest net payer of termination revenues to the MNOs, this mechanism could be applied only by KPN CS, and

[1] Ofcom (2006), 'Mobile Call Termination: Proposals for Consultation, September, p. 46.

indeed it has used it in the past to seek to reduce the termination payments to a number of MNOs.

However, withholding payments was not successful in achieving its intended outcome during 2000–06. Based in part on OPTA's 2002 policy rules, KPN CS began to withhold payments of termination revenue for the difference between the MCT rates observed in the market and what OPTA had signalled were maximum allowable reasonable rates. For KPN CS's strategy to be considered effective, the MCT rates could be expected to converge towards the level of MCT rates specified by OPTA. This was not the case. Not only did MCT rates not decline, they actually increased in the case of Orange, Tele2 and KPN Mobile, and remained broadly constant in the case of T-Mobile and Vodafone. This pattern of MCT rates is not consistent with CBP being exercised effectively by KPN CS in the Dutch MCT market.

Furthermore, evidence from market developments in the period between 2000 and 2006 does not support an argument that CBP was effective, or indeed present in the Dutch mobile termination markets. In particular, the MCT rate glide path agreed in the Covenant does not appear to have been a profit-maximising decision that would have been reached in the absence of the threat of regulation. Instead, the main factor resulting in the signing of the Covenant and the agreed glide path was regulatory pressure from the NMa and OPTA, and the pattern of MCT rates prior to the signing of the Covenant were more representative of the behaviour of the MNOs in the absence of ex ante regulation. The fact that no MNO followed KPN Mobile's MCT rate reduction is a clear indication that they have incentives to set high rates when free of SMP regulation (or the threat of such regulation). This leads to the conclusion that, were there to be no threat of ex ante regulation, MNOs would be unlikely to reduce MCT rates in response to any reductions in cost and would be likely to have the incentives and ability to raise them above current levels.

Evolution of termination rates

As a final element of the research, Oxera examined how MCT rates might evolve in the Dutch market in the scenarios specified, in light of the conclusions on the absence of CBP. The conclusions are as follows.

In scenario 2, in which MCT rates are unregulated, the likelihood that rates would increase is considered to be greater than the likelihood that they will remain at current levels. On balance of probability, MCT rates would increase from their current levels. Such increases would not be constrained by CBP, as the analysis in this paper shows that effective CBP does not exist in this (or indeed in other) scenarios. Furthermore, the threat of ex post intervention by the NMa does not appear to represent a fully effective constraint that would prevent MCT rates from increasing.

In scenario 1, in which neither MCT nor FCT rates are regulated, there is a greater probability that MCT rates would increase than in scenario 2, as the freedom for FNOs to increase their termination rates to levels equal to or above cost means that there are more potential triggers for retaliatory MCT rate increases. Significantly, removing FCT regulation does not appear to give any incremental CBP to FNOs. This is because changes in the existing level of FCT rates are likely to be reciprocated by MNOs, resulting in a price war that could affect FNOs more than it would MNOs. This conclusion is reinforced by the fact that MCT rates would have to rise by a much lower percentage than FCT rates in order to maintain the current net revenue flows between fixed and mobile operators. This limits the ability of FNOs to use increases in their rates as a tool to constrain MNOs.

In neither scenario do operators have the incentives to reduce MCTs, unilaterally or collectively across all MNOs, but significant increases would lead to a risk of intervention by the NMa. The precise threshold for intervention would be for the NMa to determine. The top end of the range of tariff increases feasible without triggering an ex post investigation under competition law is considered to be a reversal of the most recent tariff reduction, raising rates

by approximately 18% from current levels. Attempts to increase MCT rates by more than this amount could significantly increase the risks of such ex post intervention.

While dispute resolution mechanisms are considered an important element in strengthening each operator's bargaining strength, in the face of a significant number of complaints about tariff increases, the dispute resolution and appeal procedure (and the criteria applied) appear to be neither sufficiently transparent nor timely to provide an effective constraint on either MCT rates or FCT rates. Furthermore, when the potential financial penalties under competition law are taken into account, it would appear that the threat of ex post intervention is likely to be a more effective constraint on termination rates than dispute resolution. This leads to the conclusion that, in the scenario without competition law, rates could increase to a greater extent than when competition law constraints are present.

In the scenario in which both fixed and mobile operators are unregulated, there are more potential triggers for a price war, and hence a greater likelihood that MCTs and FCTs would increase.

In conclusion, the evidence gathered during the course of this research points towards a very similar outcome for both scenarios. The scenario with no SMP regulation of FNOs or MNOs would be inherently more unstable than when only MNOs are unregulated; therefore, the risk that MCT and FCT rates could increase significantly above current levels cannot be eliminated. Finally, in the absence of competition law constraints, there may be a high probability that rates would rise significantly from their current levels as the threat of penalties following a finding of an abuse of dominance would not exist.

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1 Introduction

This report presents the results of research undertaken for OPTA into countervailing buyer power (CBP) for mobile call termination (MCT) in the Netherlands.

OPTA commissioned this research in response to the decision by the Dutch trade and industry appeals tribunal, College van Beroep voor het bedrijfsleven (CBb), in August 2006, to overturn OPTA's November 2005 decision relating to the market for mobile voice call termination.[2] In that decision, OPTA designated six mobile network operators (MNOs) (KPN Mobile, Vodafone, Tele2, T-Mobile, Orange and Telfort) as holding significant market power (SMP) on the basis that each operator had a 100% market share of call termination on its individual network.[3] In overturning OPTA's decision, the CBb argued that OPTA's SMP finding on the termination market had not sufficiently assessed CBP.

The EU regulatory framework, enacted in the Netherlands by the Telecommunications Act 1998, or Telecommunicatiewet (Tw), requires an assessment of SMP in the absence of ex ante regulation. OPTA commissioned this research to provide a detailed economic analysis of the likely outcomes of negotiations over MCT rates in two particular scenarios, in which the actions of MNOs are not fettered as a result of regulation. OPTA also considers a further scenario in which the constraints of competition law are removed. The difference between the first two scenarios lies in the regulatory treatment of fixed termination rates. In the first scenario, neither fixed nor mobile termination rates would be regulated; in the second, the fixed termination rates would be regulated. In both scenarios, general telecommunications law obligations would continue to apply.

Of particular relevance in this analysis is the identification not only of the incentives that each operator faces in relation to termination rates, but also of those factors that determine the MNOs' relative bargaining strengths, both in relation to each other, and to the fixed network operators (FNOs). In particular, the research has focused on assessing whether each operator's ability to determine termination rates would be constrained by any CBP held and exerted by its negotiating partners.

This report is structured as follows:

– section 2 presents the methodology adopted during the research;
– section 3 summarises the developments that have taken place in the telephony markets (both fixed and mobile) in recent years, with specific focus on the changes to termination rates set by each operator;
– section 4 presents the theoretical arguments that the economics literature provides as regards the incentives faced by termination service providers. It also presents a set of hypotheses developed in light of the theoretical predictions and tested during the course of this research. There are two sets of hypotheses. The first relates to the incentives that operators face as regards the level of termination rates that they would wish to charge, and the second relates to the potential mechanisms for exerting CBP in negotiating termination rates;
– section 5 presents an analysis of the evidence collated during the course of the research on the incentives of FNOs and MNOs in setting their termination rates;

[2] College van Beroep voor het bedrijfsleven (2006), 'LJN: AY7997, College van Beroep voor het bedrijfsleven, AWB 05/903 en 05/921 tot en met 05/931', Uitspraak, August 29th, http://zoeken.rechtspraak.nl/resultpage.aspx?snelzoeken=true&searchtype=ljn&ljn=AY7997&u_ljn=AY7997.

[3] Tele2 is a mobile virtual network operator (MVNO), but is treated in the same way as the other MNOs in this research. Subsequent to OPTA's decision, KPN Mobile has acquired Telfort.

– section 6 presents the results of the analysis of the existence of CBP in relation to the scenarios set out by OPTA;
– section 7 concludes.

Oxera is grateful to all the operators that responded to its questionnaire, and to those that provided further input during a series of interviews undertaken as part of the research.[4]

[4] Where appropriate, company names and data have been omitted (indicated by […]) for reasons of confidentiality.

2 Methodology and data sources

The analysis presented in this report has been based on three main elements of research:

– a thorough understanding of both the theoretical models of call termination developed in the economics literature, and the arguments used to examine similar issues in other jurisdictions (most notably the UK in the context of H3G's appeal against Ofcom's SMP determination[5]);
– an understanding of the market developments and events in the Netherlands relating to MCT rates during the period 2000–06;
– analysis of information provided by the operators in response to the questionnaires distributed in December 2006, and in the subsequent interviews held in January 2007.

An understanding of the theoretical underpinnings of the arguments relating to CBP in the context of call termination represented a vital first stage of the research. Prior to receiving the invitation to tender from OPTA, Oxera had examined the underlying theoretical arguments in light of Ofcom's decision to reinstate its SMP finding on H3G.[6] This followed the UK Competition Appeal Tribunal's decision to overturn Ofcom's previous decision, on the basis that the regulator had not adequately assessed the potential for CBP held by BT to constrain H3G's ability to set its MCT rates independently, and hence to possess SMP. In preparing its proposal to OPTA, and after its acceptance, Oxera undertook a thorough literature review to establish an appropriate theoretical framework that could be applied to determine the relative bargaining position of the various operators under the scenarios considered.

The literature review also led to the development of a set of hypotheses to be tested during the course of the research. The hypotheses determined the scope of the information required to provide the assessment of CBP required by OPTA in order to re-analyse the existence of SMP in relation to MCT.

Three main sources of information were subsequently pursued:

– OPTA provided Oxera with information on, and insight into, the sequence of events in the Dutch markets since 2000;
– Oxera developed a questionnaire that was distributed by OPTA to ten FNOs and five MNOs in December 2006;
– Oxera subsequently conducted interviews with ten FNOs and MNOs in order to expand on the written responses provided in the questionnaire, and, in particular, to understand the motivation behind these responses. Interviews were held with T-Mobile, KPN Mobile, Vodafone, Orange, Tele2, and the fixed operators KPN Fixed, Verizon, UPC, Priority Telecom, and Versatel.

An essential element of this research has been to reach a detailed and thorough understanding of the factual developments in the market since 2000. Oxera's understanding of the relevant events is summarised in the following section. This has been based on a combination of desk-based research, discussions held with OPTA representatives, and information provided by the operators in the written questionnaires and interviews.

The questionnaire (a full copy of which is presented in Appendix 1) was designed to collate information on the relevant quantitative factors that were identified as having the potential to

[5] Ofcom (2006), 'Assessment of whether H3G Holds a Position of SMP in the Market for Wholesale Mobile Voice Call Termination on its Network: Consultation Document', September 13th.
[6] See Oxera (2006), 'Call Terminator 3: The Ongoing Debate in Mobile Telephony', *Agenda*, October.

influence relative bargaining positions (eg, traffic and revenue flows and market shares); the operators' incentives as they relate to termination rates; and the factors considered by operators as strengthening or weakening their bargaining positions in relation to the other operators.

As set out in the introduction, OPTA required the examination of two specific scenarios: scenario 1, in which neither FNOs nor MNOs are subject to ex ante regulation; and scenario 2, in which FNOs, but not MNOs, are subject to ex ante regulation. These scenarios were set out in the questionnaire, and specific questions asked in order to establish whether, and if so to what extent, operators' incentives and ability to raise MCT rates would differ between the two scenarios. A further scenario considered by OPTA is one in which, in addition to removing the threat of ex ante regulation, the constraints of the abuse of dominance provisions under competition law are removed. Given the hypothetical nature of the scenarios, the questions related to situations which were outside the boundaries of the operators' experience and hence were difficult to answer with great precision. The responses were explored in greater depth during subsequent interviews with operators.

Following completion of the interviews, Oxera undertook a detailed analysis of the information gathered, drawing conclusions about each hypothesis identified. As far as possible, these conclusions are based on factual evidence provided by the interviewees. Nevertheless, it should be emphasised that, due to the hypothetical nature of the scenarios considered, it has been necessary to exercise a degree of judgement in reviewing and interpreting the responses received. In light of the conclusions reached, Oxera has assessed the likely development of MCT rates under each scenario.

The next section provides a summary of the key developments in the Dutch telephony markets in the period 1999–2006. The absence of regulatory price controls on MCT rates during this period, and the events relating to these rates, provide a particularly rich backdrop for an analysis of the existence of CBP and its potential influence over MCT rates.

3 The Dutch market for mobile call termination

Developments in MCT rates since 1999 provide a rich source of information on, and insight into, the existence of CBP in the Netherlands. This section presents a comprehensive overview of the Dutch market for MCT and fixed call termination (FCT). Key events, which must be taken into consideration when interpreting historical termination rates since 1998, are also outlined.

3.1 Operators and spectrum use

3.1.1 Market players: fixed

The incumbent, KPN Fixed, is the largest operator in the Dutch market for fixed telephony. Table 3.1 shows market share for incumbents in selected EU countries. KPN Fixed's market share (based on national calls) of 75% was higher than incumbent shares in most European countries between 1999 and 2004. Its origination tariffs for fixed-to-fixed calls remained unchanged in 2005, while its tariffs for origination calls from fixed to mobile (F2M) decreased significantly.[7]

Table 3.1 Market share of the incumbent FNO in national calls based on revenue (%)

	1999	2000	2001	2002	2003	2004
France	79	n/a	74	70	69	67
Germany	70	n/a	68	65	62	59
Italy	76	n/a	64	69	72	68
Netherlands	79	n/a	76	75	n/a	75
UK	59	n/a	53	63	61	54

Source: Oxera, based on company reports.

During recent years, other types of connection for fixed telephony have emerged in the market. In particular, demand for fixed telephony services via cable and voice over broadband (VoB) has increased. The main types of connection that compete with KPN Fixed's retail services via public telephone switched networks (PTSN) are as follows.

– **Cable telephony**. The largest providers are UPC, Casema and Multicable. OPTA concluded that competition between FNOs and cable operators has intensified over the past two years.[8]

– **VoB**. Cable operators and KPN Fixed also introduced VoB in 2005. Approximately 4% of Dutch households are estimated to become voice over Internet protocol (VoIP) users by the end of 2005. OPTA has signalled high growth expectations over the next three years in its fixed market review.[9]

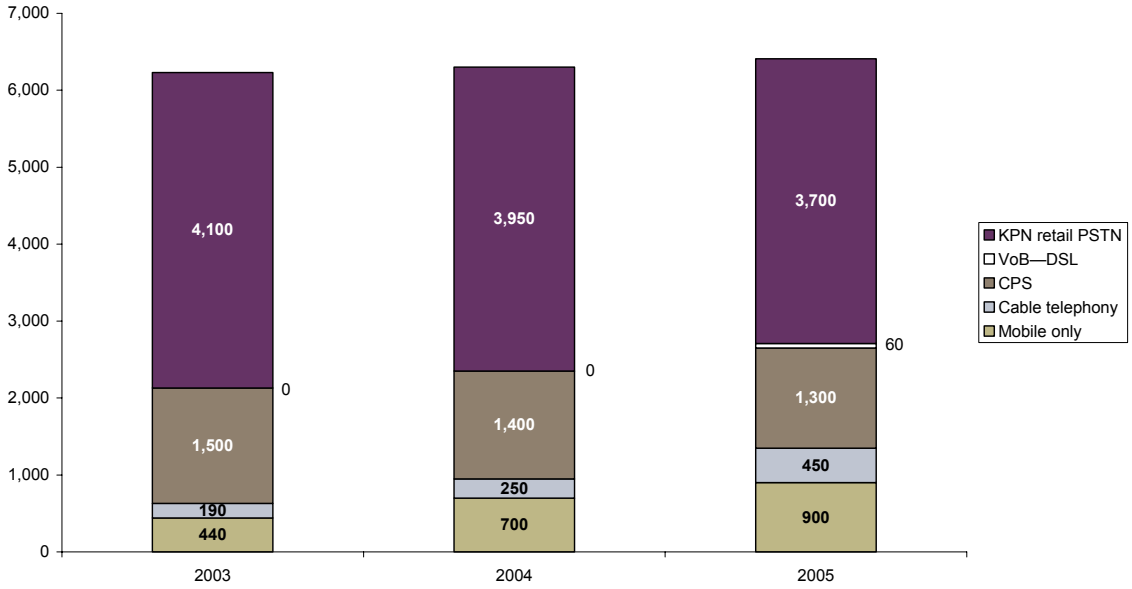
– **Carrier pre-selection (CPS)**. CPS operators use KPN Fixed's connection for their services. Versatel is one of the largest CPS operators in the market.

[7] OPTA (2006), 'OPTA Annual Report and Market Monitor', p. 65.
[8] Ibid.
[9] Ibid.

– **Mobile only**. In its fixed market review, OPTA assumes that households without a fixed telephony connection use their mobile telephone only.[10]

As illustrated in Figure 3.1, the number of households with fixed connections via KPN Fixed and CPS decreased, while the number of households using only mobile phones or connecting via cable or VoB has increased over the last four years. Between 2003 and 2005, the number of fixed line connections declined from 4,100 to 3,700.

Figure 3.1 Number of households per type of connection for fixed telephony ('000s)



Source: OPTA (2006), 'Annual Report and Market Monitor', p. 66.

3.1.2 Market players: mobile

This sub-section discusses the main similarities and differences between the current five suppliers of mobile termination services (KPN Mobile, Vodafone, Orange, T-Mobile and Tele2). KPN Mobile and Telfort are considered together, even though they have continued to operate under their own names following KPN Mobile's acquisition of Telfort in October 2005.

In addition, Tele2 pays a fee for the use of Telfort's network and is the only mobile virtual network operator (MVNO) among the five operators. Tele2 is included in this research because it maintains control over the rate it charges other operators for terminating calls to its own subscribers, and is thus distinguished from most other MVNOs[11] currently active in the Dutch market. The CBb recognised in its decision of August 29th 2006 that Tele2's cost for access and its own network elements might differ to some degree from those of the other operators.[12]

Consideration of market shares reveals large differences between the five operators in the origination market. As shown in Figure 3.2, the two smaller operators—T-Mobile and

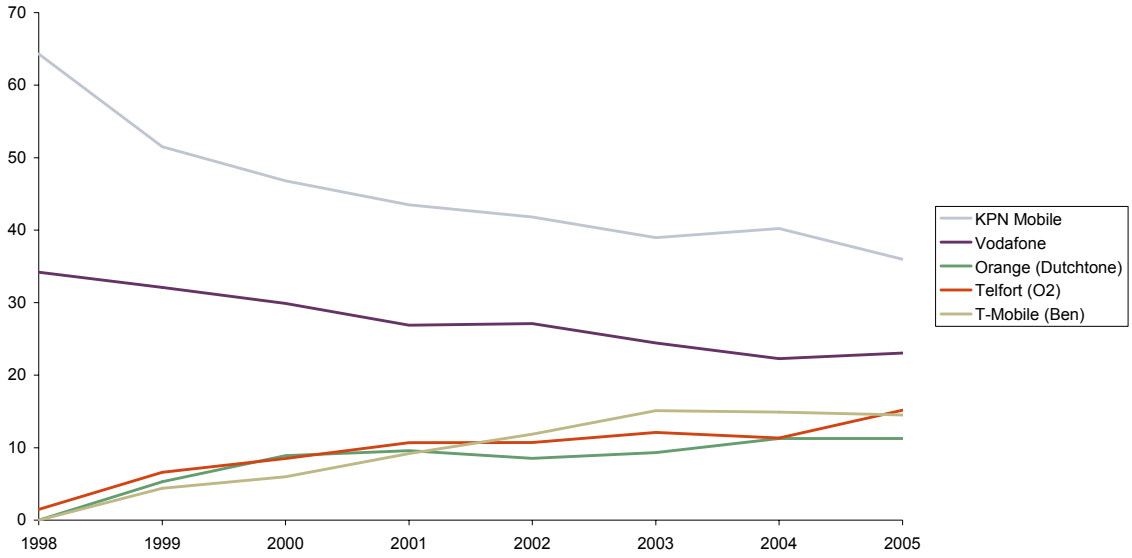
[10] OPTA (2006), 'OPTA Annual Report and Market Monitor', p. 65.

[11] There are more than 40 MVNOs in the Dutch market, including Scarlet and UPC. Among these, a number may also maintain control over the termination rates charged. Tele2 is the most significant MVNO, and was the only MVNO that signed the Covenant addressing mobile termination rates. For this reason, it is the only MVNO from which specific evidence was sought during the course of this research. The CBb recognised in its decision of August 29th 2006 that Tele2 is the only MVNO that can negotiate its own MCT.

[12] College van Beroep voor het bedrijfsleven (2006), 'LJN: AY7997, College van Beroep voor het bedrijfsleven, AWB 05/903 en 05/921 tot en met 05/931', Uitspraak, August 29th, http://zoeken.rechtspraak.nl/resultpage.aspx?snelzoeken=true&searchtype=ljn&ljn=AY7997&u_ljn=AY7997.

Orange—have steadily gained market share since they entered the market in the late 1990s, whereas Vodafone's market share has decreased slightly during the past few years, despite the increase in subscribers (see Table 3.2).

Figure 3.2 Evolution of MNOs' market share in the Dutch market, 1998–2005 (%)



Note: KPN Mobile and Telfort merged in 2005, but are shown separately here.
Source: Oxera calculations based on company accounts.

Table 3.2 provides an overview of the active subscribers among all operators. As this shows, there has been a steady increase in total subscriber numbers over the past few years. In particular, subscriber gains by the smaller operators, Orange, T-Mobile and Telfort, appear to have driven this general trend. Vodafone and KPN Mobile have also had considerable growth in absolute terms.

Table 3.2 Total number of active mobile phone subscribers (m)

	2001	2002	2003	2004	2005
KPN Mobile	5.21	5.04	5.15	6.08	5.70
Vodafone	2.93	3.25	3.27	3.36	3.56
Orange	1.15	1.03	1.33	1.70	1.78
Telfort (KPN) including Tele2	1.28	1.29	1.60	1.71	2.40
T-Mobile	1.1	1.43	2	2.25	2.30
Total	**11.67**	**12.04**	**13.35**	**15.1**	**15.74**

Source: Oxera, based on company reports.

Between 2000 and 2006, total MCT traffic also increased. KPN Mobile terminated approximately […]% of total terminating traffic during the last six years, while Vodafone terminated approximately […]% of all MCT traffic.[13]

Most of the traffic is transited via KPN Carrier Services (KPN CS). This implies that KPN CS transits and terminates the calls on behalf of the originating network. KPN CS thus negotiates the termination rate and passes on this cost—together with the transit tariffs—to the originating MNOs. Alternatively, the originating mobile operator can directly interconnect

[13] Questionnaire, answers to Q35 and Q36.

with the MCT seller and is therefore in a position to negotiate the termination rate directly with the seller. To date, direct interconnection is offered only by Orange.

3.1.3 Spectrum use

'Delta' has been an important element in the latest MCT negotiations. The mobile delta denotes the difference in tariffs between KPN Mobile and Vodafone on the one hand, and Orange, T-Mobile and Telfort on the other hand, based on a reported cost difference due to the variations in available frequencies (ie, 900/1800MHz).[14]

The first licence for the 900MHz spectrum was given to KPN Mobile in 1994. Libertel, a joint venture between Vodafone and the Dutch ING bank at that time, was awarded the second licence as part of a beauty contest in 1994. This licence was also awarded for free, even though the tender document stated that Libertel might be charged ex post for its licence.[15] The DCS1800 spectrum licences were auctioned in February 1998 using a variant of the simultaneous multi-round ascending auction. The outcome of the auction produced three winners: Dutchtone (Orange), Telfort, and Ben (T-Mobile). The two largest lots were acquired by Dutchtone and Telfort, while Ben bought several smaller lots during the auction in addition to spectrum from losing parties after the auction in order to acquire 16.8MHz of spectrum.[16]

The availability of spectrum is a necessary precondition for market entry. As shown in Table 3.3, the two largest operators, KPN Mobile and Vodafone, were the first operators to launch their services, followed by T-Mobile, Orange and Telfort. There is usually a delay between the acquisition of the spectrum licence and the launch of the network. Orange, for example, launched its network nationwide at the end of October 1999.

Table 3.3 Mobile network operators

	KPN Mobile	Vodafone	Orange	T-Mobile	Telfort (including Tele2)
Spectrum frequency	GSM900	GSM900	DCS1800	DCS1800	DCS1800
When were they granted	March 1994	March 1995	February 1998	February 1998	February 1998
How were they granted	Beauty contest	Beauty contest	Auction	Auction	Auction

Source: Van Damme, E. (1999), op. cit., and Van Damme, E. (2001), op. cit.

In view of the expiration date of the GSM900 and DCS1800 licences in 2010 and 2013, the operators are expected to roll out their 3G networks, which are based on the 3G 2100MHz spectrum frequency. All MNOs acquired their licences for the new spectrum in 2004 and 2005.[17] It is expected that there will be smaller cost differences between operators for the 3G 2100MHz licence because operators acquired their licences in a similar manner—as part of an auction—and the cost variations resulting from frequency differences within the 2,100MHz band are less than those between the 900MHz and 1800MHz bands.

[14] European Commission Decision NL/2005/0215: Voice call termination on individual mobile networks Article 7(3) of Directive 2002/21/EC1, August 3rd 2005.

[15] Van Damme, E. (1999), 'The Dutch DCS—1800 Auction', CentER, Tilburg University, p. 3.

[16] Van Damme, E. (2001), 'The Dutch UMTS—Auction', CentER, Tilburg University, p. 5.

[17] The licence was awarded in a high-profile and highly contested auction to KPN Mobile and Vodafone in October and November 2004, while T-Mobile and Orange acquired its licence one year later.
See http://www.gsmworld.com/roaming/gsminfo/cou_nl.shtml.

3.2 Historical termination rates

A detailed understanding of the historical path of mobile and fixed termination rates is essential in identifying evidence that CBP exists, and has been exerted in the period 2000–06. A crucial question is whether changes in termination rates have been influenced by CBP (or the lack of CBP) or other factors such as regulatory uncertainty. The discussion feeds into the analysis of the actual impact of CBP on termination rates at a later stage of this report.

3.2.1 Fixed call termination rates

The termination rates for FNOs are first presented. Figure 3.3 shows the average call termination charge of the incumbent, KPN Fixed, during peak times. As a designated SMP operator, KPN Fixed is subject to cost-based regulated tariffs in the termination market. Its cost-orientated terminating tariffs have not changed since 2003.

To simplify comparisons, the approach taken in the European Commission Recommendation[18] is to examine the interconnection charges to the incumbent's fixed public network under three scenarios:

– **local level**—denoting a call handed over for termination at the local level to which the destination user is connected. It represents the lowest level of interconnection charge available in a given country;

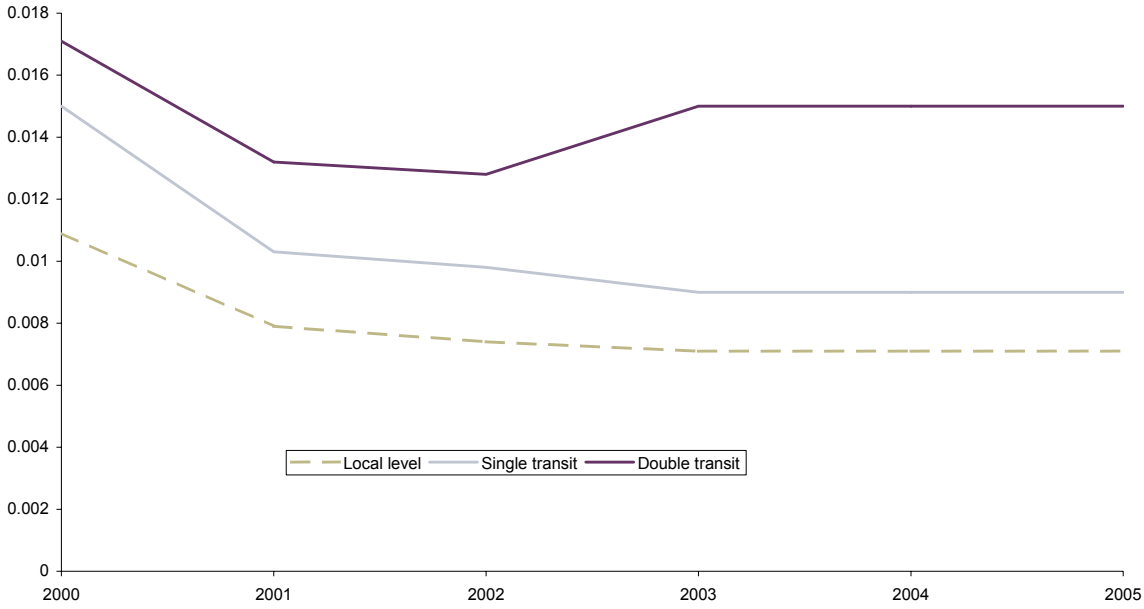
– **single transit**—allows access to all customers in a metropolitan region, such as a large city. It is referred to as ‘regional’ in the Netherlands;

– **double transit**—allows access to all customers on the incumbent’s network (national-level interconnection). A call handed over at this level normally incurs the highest level of interconnection charge.

Since August 2000, the weighted average charge for call termination on fixed networks in the EU has decreased by 39% for single transit and by 32% for local level and double transit. As in the Netherlands, major reductions took place between 2000 and 2002. Between 2003 and 2005, interconnection charges for single transit decreased to a level of €0.009 per minute in the Netherlands, which is, however, still above the EU 15 weighted average of €0.0086.

[18] EC Recommendation C(97) 3148—Part I.

Figure 3.3 KPN Fixed's regulated interconnection charges for call termination on incumbents' fixed networks during peak time (€)



Note: Local and regional tariffs remained at the same level in 2006, and the price ceiling will remain at the same level to the beginning of 2009. The charges include a mark-up for set-up based on a three-minute call duration.
Source: European Commission (2000), 'Sixth Report on the Implementation of the Telecommunications Regulatory Package'; (2001), 'Seventh Report on the Implementation of the Telecommunications Regulatory Package'; (2002);'Eighth Report on the Implementation of the Telecommunications Regulatory Package'; (2003), 'Telecommunications Regulatory Package: VIII Implementation Report', Annex I: Corrigendum; (2004), 'European Electronic Communications Regulation and Markets 2004: 10th Report', Annex 3–34; and (2005), 'European Electronic Communications Regulations and Markets 2005: 11th Report', Annex 2–28.

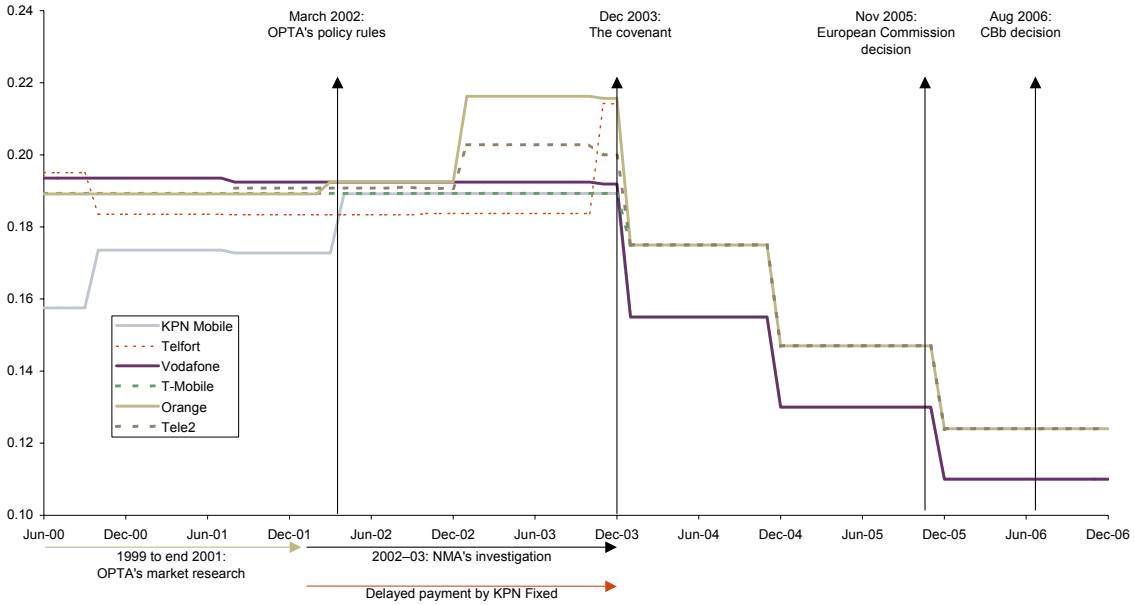
The tariffs of new market entrants are determined with the use of delayed reciprocity, denoting the fact that the new market players are permitted to charge a tariff higher than that of KPN Fixed. New market players can charge a mark-up on KPN Fixed's tariffs that is the difference between its tariff in 1998 and its current tariff divided by the number of years.[19]

3.2.2 Mobile call termination rates

The interpretation of historical MCT rates is more complicated because MNOs have not been subject to SMP regulation, although a 'Covenant' between the operators and the Dutch competition authority (NMa) was in place from December 2003 (see below). The fact that there are many market players complicates the analysis further.

[19] OPTA (2003), 'Consultation Document: The Reasonableness of Fixed Terminating Tariffs', January 13th.

Figure 3.4 Termination rates, 2000–06 (€)



Source: Oxera, based on OPTA.

Figure 3.4 illustrates the termination rates of the main MNOs from June 2000 until December 2006. The evidence suggests that there was a significant upwards trend in MCT prior to the operators signing the Covenant that led to annual tariff reductions from December 2003 until 2005. The motivations underlying this Covenant agreement are explored below.

3.3 Key regulatory events from 1998

This discussion focuses on the key events outlined in Figure 3.4 that correlate with the operators' ability to set MCT rates. The analysis is structured around three time periods: 1998–2001; 2001–03; and 2003–06.

3.3.1 1998–2001

In June 2000, KPN Mobile lowered its MCT tariffs to €[…] per minute, which was on average €0.4 lower than its competitors' rates at that time. The other MNOs, however, did not follow this reduction, and in September 2000, KPN Mobile partially reversed its MCT reduction, raising prices to €[…]. In March 2002, it increased its MCT rate again, such that it was similar to the industry-wide average. Orange, Telfort and Tele2 subsequently raised their MCT rates to a level exceeding €[…] prior to signing the Covenant.

In line with the previous SMP regime, where relevant markets were essentially pre-defined, the 1998 Tw distinguished four markets for finding SMP (mobile, fixed, leased line network and services, and the combined market for both fixed and mobile public telephone services). The Tw did not define interconnection as a separate market. No MNO could therefore be found to have SMP in this market. This implied that OPTA had no legal power to impose an obligation of cost-oriented MCT tariffs associated with an SMP designation on MNOs at that time.[20]

[20] De Bijl, P., Brunekreeft, G., van Damme, E., Larouche, P., Shelkoplyas, N. and Valter S. (2004), 'TILEC Report: Interconnected Networks', report prepared for Netherlands Organisation for Scientific Research (NWO), December, 69–74.

Consequently, KPN Mobile was the only operator threatened with ex ante regulation due to its high market share in the mobile origination market and common ownership of KPN Mobile and KPN Fixed.

– In October 1999, KPN Mobile was designated as having SMP in the origination market by OPTA because its market share exceeded the 25% threshold. However, this finding had no consequences for KPN Mobile's price-setting behaviour in the termination market.

– During the same year, OPTA launched a market inquiry into the combined market of fixed and mobile telephony. It was unclear at that time whether the outcome of market research would have resulted in regulated MCT tariffs.

One possible explanation of why KPN Mobile lowered its termination rates in June 2000, therefore, was that it was responding to OPTA's ongoing market inquiry into combined fixed and mobile telephone services.

Box 3.1 OPTA (2001), 'Market Research SMP 2001: The Combined Market for Fixed and Mobile Telephone Services'

At the end of 2001, OPTA finalised a report, in which It concluded that KPN Mobile had not been able to exert its dominant position in the origination market in order to behave independently of its competitors in the termination market. This finding was justified by the observation that KPN Mobile priced its termination services below average in the Dutch market and that its MCT reduction in 2000 did not induce an industry-wide reduction. KPN Mobile and KPN Fixed were the only operators whose market shares were higher than the allowable threshold at that time.[1]

Source: [1] OPTA (2001), 'Marktonderzoek AMM 2001: de market voor vaste en mobiele openbare tleefondiensten tezamen', EIM, onderzoek voor Bedrijf & Beled for OPTA, December 11th, p. 43.

The regulatory threat partly explains why KPN Mobile reduced its MCT rates in the first place. However, questions remain regarding the operators' ability to set termination rates during this period. Of particular relevance to an assessment of CBP (see section 5) are the following questions:

– why did the other operators not follow KPN Mobile's initial MCT rate decrease in 2000?
– why were Orange, Tele2 and Telfort able to increase their MCT rates above KPN Mobile's level between 2000 and 2003?
– why was KPN Mobile able to increase its MCT rates again between June 2000 and 2003?

3.3.2 2001–03

This sub-section considers the period from 2001 until the agreement to the Covenant, during which time high MCT rates were addressed by OPTA under the dispute resolution mechanism.[21]

OPTA: dispute resolution procedures

A plethora of disputes concerning direct interconnection, special access matters and unreasonably high tariffs arose at this time.[22] KPN Mobile's complaint against Telfort might be worth noting in this context. In June 2001, KPN Mobile asked OPTA to assess the

[21] De Bijl, P., Brunekreeft, G., van Damme, E., Larouche, P., Shelkoplyas, N. and Valter S. (2004), op. cit.

[22] 82 disputes were submitted to OPTA in 2002, 31 in 2003, and 14 in 2005. None of the disputes submitted in 2005 concerned the tariff level of MCT. OPTA (2006), 'Annual Report and Market Monitor 2005', p. 23.

reasonableness of Telfort's MCT tariffs. The dispute was a trigger to a further investigation by OPTA of the reasonableness of MCT tariffs.[23]

OPTA addressed the issue in its policy rules of March 2002.[24] These rules stipulated the procedure when settling disputes about unreasonably high MCT tariffs until OPTA made a decision within the European regulatory framework for new electronic communications markets. OPTA decided on a large number of disputes in the second half of 2002 on the basis of the policy rules.[25] As can be seen in Figure 3.4, there has been no evident reduction in the MCT tariffs as a result of OPTA's decisions during this period.

The market analysis undertaken on the basis of the new European regulatory framework, which was not fully implemented in the Tw until 2004, and the corresponding decision regarding regulatory remedies, were expected to bring MCT tariffs to a more competitive level.

Box 3.2 OPTA (2002), 'Policy Rules Regarding the Regulation of Mobile Termination Tariffs'

Providers of public telecoms services are obliged to interconnect on *reasonable terms*, as defined in Section 6.1 of the Tw. The policy rules set out the maximum level of MCT tariffs that the potential other party cannot be *reasonably* expected to accept as part of the interconnection agreement. (This means, for example, that Vodafone could charge an MCT tariff higher than €0.1839 as per April 1st 2002.)

OPTA states that the nature of the service 'call termination' by MNOs is considered a determinant in defining the upper limits of a reasonable MCT tariff. It explains that the service is considered a bottleneck facility and that each MNO holds a dominant position for terminating traffic.[1] The maximum reasonable MCT tariff is defined on the basis of MNOs with the highest performance level in Europe, which are not subject to cost-orientation requirements.

In assessing maximum reasonable MCT tariffs, OPTA introduced a system that reduced the MCT tariffs in two stages between December 2001 and December 2002. It is indicated that OPTA considered cost-orientated MCT tariffs on the basis of a forward-looking long-run incremental cost (FL-LRIC) model by mid-2003. Differences between 900MHz and 1800MHz operators have been reflected in different maximum reasonable average MCT tariffs for both groups of operator.[2] The tariff reduction set out in the policy rules is shown in Table 3.4.

Table 3.4 Phases of the maximum reasonable average MCT tariff over time

Maximum reasonable average MCT tariff for	Starting point as per April 1st 2002	May 1st 2002	December 1st 2002	July 1st 2003
KPN Mobile, Vodafone	18.39	15.48	12.57	Cost orientation
Ben, Dutchtone, Telfort	20.07	18.11	16.14	Cost orientation

Notes: [1] OPTA (2002), 'Policy Rules Regarding the Regulation of Mobile Termination Tariffs', March 28th, p. 3.
[2] Ibid., p. 7.
Source: Ibid.

[23] Ottow, A. (2003), *Dispute Resolution under the new European Framework*, based partly on the comparative study of the British Institute of International and Comparative Studies (London), 'Effective Access and Procedure in Telecommunications Disputes in Europe', December, www.biicl.org.

[24] OPTA (2002), 'Policy Rules Regarding the Regulation of Mobile Termination Tariffs', March 28th, p. 2.

[25] The decision on the dispute between KPN Mobile and Telfort, which has been the first decision in alliance with the policy rules, has been appealed by the Rotterdam District Court on the basis that OPTA is not considered authorised to rule if the parties are indirectly interconnected. Notification regarding OPTA's policy on mobile termination tariffs, OPTA/IBT/2003/204693, 4 December 2003.

NMa: investigation

According to the Cooperation Protocol OPTA/NMa of December 19th 2000, OPTA and the NMa have committed to aligning their tasks should their regulatory tasks converge. The initiative for further action (to settle disputes) concerning MCT rates was initially left to the sector-specific regulator. However, the NMa has been authorised to take legal action in the event that it finds an abuse of a dominant position as referred to in Section 24 of the Competition Act (1998).[26]

In August 2002, the NMa finalised an in-depth investigation into the level of rates for calls from the fixed network to a mobile number because it considered that the MCT rates were too high.[27] It concluded on the basis of both quantitative and qualitative analysis that each of the five MNOs in the Netherlands had a dominant position on their own mobile network with regard to the termination of calls. At the time, the NMa did not proceed with its inquiry. One likely explanation for this is that OPTA published its policy rules in 2002, which set out a reduction in the maximum reasonable tariffs.[28]

Since several operators increased their termination tariffs in the spring of 2003, the NMa decided to re-open the investigation. Excessive MCT tariffs can constitute an abuse of a dominant position as defined in the Competition Act.[29] It is likely that this regulatory threat induced the Dutch MNOs to lower their MCT tariffs 'voluntarily' at the end of 2003.

Witholding of payments

Between 2002 and 2003, KPN CS delayed its net termination payments to several operators including […] for nearly 18 months. KPN CS refused to pay the incremental amount between the MCT demanded by the operators and the maximum reasonable tariff set out in OPTA's 2002 policy rules. A clause in the termination agreements specified that an operator could demand a bank guarantee in the event of the buyer purchasing an MCT service other than the one agreed in the contract. One MNO requested, for example, a bank guarantee for six monthly forecast MCT payments, which amounted to over €100m.[30]

[…] brought their claims to the court in Den Haag. KPN CS lost the cases and had to pay in full. However, the payments were subject to OPTA's approval of the tariffs, implying that KPN could have recovered some net payments had OPTA decided that the tariffs were unreasonably high.[31] Even though the mobile operators eventually received the net payments, evidence from the interviews and questionnaires suggests that they had cash-flow problems as a result of the delayed payments. This event is crucial to this analysis because it could signal the exercise of CBP by KPN CS.

The Covenant

In December 2003, five MNOs (KPN Mobile, Vodafone, Orange, Telfort, T-Mobile and Tele2) signed the Covenant to voluntarily reduce their MCT rates in three stages (on January 1st 2004, December 1st 2004 and December 1st 2005) by 15% each year. KPN Mobile and Vodafone committed to charging lower MCT rates than Orange, T-Mobile, Telfort and Tele2. This was based on cost differences due to the varied spectrum use (ie, 900/1800MHz), the head start in rolling out their networks, and the advantages of scale.[32] The negotiating parties also agreed on a reduction in delta, which reflects this cost difference. Table 3.5 summarises the proposed adjustment of the MCT charges of each operator.

[26] OPTA (2002), op. cit., p. 4.

[27] Nederlandse Mededingingsautoriteit (2002), 'Rapportage over de Marktdefinitie van het Afwikkelen van Gesprekken op Mobiele Netten', August 1st.

[28] De Bijl, P., Brunekreeft, G., van Damme, E., Larouche, P., Shelkoplyas, N. and Valter S. (2004), op. cit., p. 72.

[29] Ibid.

[30] […], interview.

[31] Aanvullend beroepschrift van Orange Nederland B.V. terzake van het besluit van OPTA inzake de markt door gespreksafgifte of het mobile network van Orange van 14 November 2005.

[32] OPTA (2003), 'Notification Regarding OPTA's Policy on Mobile Termination Tariffs', December 4th, p. 1.

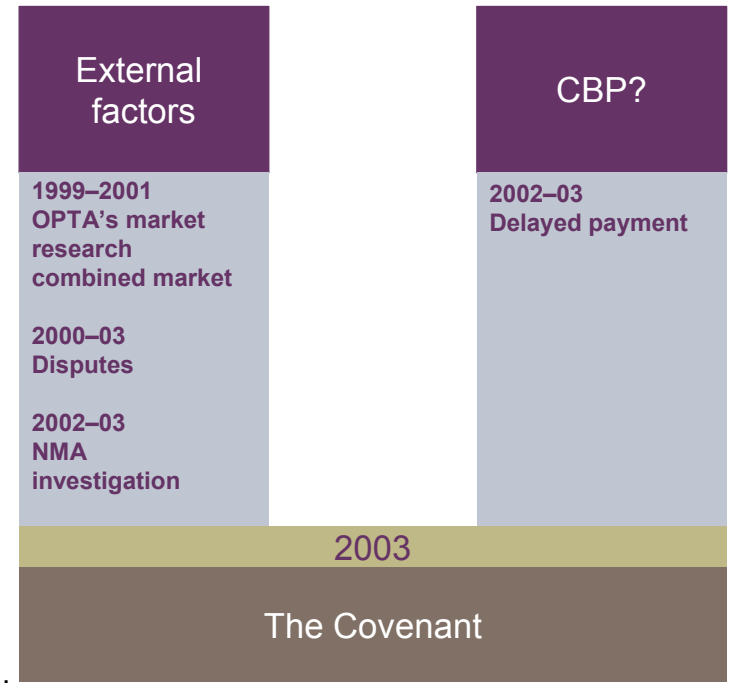
Table 3.5 The Covenant (€/minute)

Operator	January 1st 2004	December 1st 2004	December 1st 2005
KPN Mobile, Vodafone	0.155	0.130	0.11
Orange, Telfort, T-Mobile, and Tele2	0.175	0.147	0.124

Source: OPTA (2003), 'Notification Regarding OPTA's Policy on Mobile Termination Tariffs', December 4th, p. 1.

For the purpose of this study, it is useful to consider whether the voluntary reductions in MCT tariffs reflected a rational response to the profit-maximising incentives faced by the operators, or whether they reflected, for example, the threat of regulatory intervention (see Figure 3.5).

Figure 3.5 Possible MNO incentives to sign the Covenant



Source: Oxera.

3.3.3 2004–06

Thus far, MCT tariffs have not deviated from the levels outlined in the Covenant. A robust understanding of the current regulatory environment is essential in making reliable predictions about MCT developments. The two most notable events since the Covenant are:

- OPTA's decision concerning the market for voice call termination submitted to the European Commission;
- the judgement of the CBb in August 2006 against OPTA's notification.

In November 2005, the European Commission published a decision on the Dutch market for mobile (and fixed) voice call termination as part of the regulatory framework for new electronic markets. OPTA designated SMP to all MNOs, based on 100% market share on their individual networks, and imposed symmetric[33] regulatory remedies on five MNOs.[34] The

[33] Introducing a tariff delta between DCS1800-only operators and operators with GSM900 spectrum was possible when cost differences between both types of network gave reason for this.
[34] KPN Mobile (including Telfort), Vodafone, Tele2, T-Mobile and Orange.

regulator also considered it reasonable to introduce a glide path, which would start in 2005 and end in 2008.[35] The proposed measure represents a reduction of approximately 40%.[36]

In August 2006, the CBb nullified OPTA's contested decisions, such that the markets that it defined are unregulated. The CBb argued that, among other things, OPTA's SMP finding for the termination market was based on an insufficient assessment of CBP. No provisional measures have been implemented to date. It also stated that:

> Furthermore, at the hearing of 14 June 2006 it was stated on behalf of the mobile providers that they will not decide to raise these tariffs later or that they will not do this during the current regulation period, or that a tariff increase is very unlikely.[37]

Following the CBb judgement, it is unclear what will happen to MCT tariffs in the short term.

3.4 Conclusion

Evidence from 1999 until 2006 suggests that developments in MCT rates have been influenced by external factors such as regulatory uncertainty. A clear understanding of the main factors influencing the operators' ability to set MCT rates during this time period is essential in assessing the degree of CBP. The following factors are relevant to the CBP assessment in section 6.

– Why did the MCT rates increase between 1998 and 2003, even though OPTA settled numerous disputes during this period?

– Did the fact that KPN CS withheld MCT payments between 2002 and 2003 imply that KPN CS had CBP?

– It there a strong link between the NMa's investigation into excessive MCT tariffs in 2003 and the voluntary reduction in MCT rates as part of the Covenant? .

[35] EC Decision NL/2005/0215: Voice call termination on individual mobile networks Article 7(3) of Directive 2002/21/EC1, August 3rd 2005.
[36] OPTA (2005), 'De Markt voor Gespreksafgifte op het Mobiele Netwerk van Koninklijke KPN N.V.', Onafhankelijke Post en Telecommunicatie Autoriteit, November 14th, p. 98.
[37] CBb (2006), op. cit.

4 Incentives and CBP: theoretical arguments and mechanisms

This section sets out Oxera's understanding of the economics literature relevant to assessing CBP in relation to setting MCT rates, and identifies the key hypotheses that have been tested in the information-gathering exercise and analysis.

In addition to the hypotheses (set out in section 4.3), the output of this section is a description of the factors and the mechanisms affecting:

– the incentives of MNOs and FNOs to set high (ie, above-cost), low (ie, below-cost) or cost-based call termination rates (section 4.1);
– the CBP that purchasers can exercise as regards the respective sellers of MCT services (section 4.2).

It is important to note that, while OPTA has not explicitly requested an analysis of the incentives that mobile and fixed operators face in setting call termination rates, Oxera considers this a fundamental step in seeking to predict the likely evolution of mobile call termination rates under the scenarios requested by OPTA, as well as in identifying the existence of CBP in the MCT market. There are at least two reasons why this analysis is essential before an assessment of CBP is undertaken.

– The analysis of CBP will become relevant only when the interests of negotiating parties diverge. Under many plausible circumstances, as described in greater detail below, the interests of mobile (and possibly fixed) operators might coincide, and an agreement could be reached with limited bargaining in the negotiation process.

– When negotiating parties have diverging incentives and an assessment of CBP becomes relevant, it is first necessary to make a prediction of the range of possible outcomes—ie, the termination rate that each operator would be asking for and the rate that it would like to pay. This range is likely to depend on a large number of factors such as the balance of traffic between operators, the presence of high F2M substitution, network externalities, cost differentials, the intensity of competition in the retail market, and/or the expectation of ex post regulation or competition law provisions.

4.1 Incentives of fixed and mobile operators in setting MCT charges on their own networks

There is a large body of literature on access pricing in telecoms, in which interconnection agreements are assumed to follow a two-step process.[38] First, operators set the rates for terminating calls on each other's networks and, once the rates have been agreed, they compete for customers by varying the call origination and/or the monthly rental tariffs. The key question these models seek to answer is whether MNOs would have incentives to set cost-based termination rates if they were left to negotiate on their own in a hypothetical market where regulation (or the threat of regulation) did not exist.

4.1.1 Mobile-to-mobile call termination

The results of some of the most representative models of mobile-to-mobile (M2M) access pricing in telecoms have featured prominently in the debate on MCT regulation in the UK and the Netherlands. In the UK, for example, Vodafone suggested that M2M termination rates

[38] A more detailed review of the most representative economic models of call termination can be found in Appendix 2. Here a high-level overview of the main findings of this literature is provided.

should be deregulated since, as stated by economic theory, mobile operators have strong incentives to set low reciprocal call termination rates.[39] More recently in the Netherlands, KPN Mobile stated in its appeal against OPTA's SMP finding to the CBb that:

> in view of the fact that the retail market for mobile telephony is competitive, the providers on this market cannot act independently from one another and can exercise pressure on one another in order to set the tariffs for call termination as low as possible.[40]

In both of these examples, Vodafone and KPN Mobile would appear to be relying on a specific set of results obtained by economic models of M2M interconnection. For example, Gans and King (2001) develop a model in which MNOs would have incentives to agree on low reciprocal MCT rates, possibly even 'bill-and-keep' arrangements (ie, where termination rates are zero), in order to dampen the intensity of downstream retail competition between them.[41] Similarly, Carter and Wright (2003) conclude that networks with a large market share would prefer to set cost-based termination rates, although the mechanism through which this result is obtained is different from that of Gans and King.[42]

Because of the sensitivity of the model's results to changes in the underlying assumptions, it is important to understand the different mechanisms that lead to a particular result, and to test for the presence of such mechanisms with factual evidence. Some of the assumptions underlying the models of M2M interconnection (analysed in greater detail with factual evidence from the Dutch market in section 5) are as follows.

– **The 'waterbed effect'**. The Gans and King (2001) result described above is primarily driven by the tendency for changes in call termination rates that are passed on to call origination, rental and/or handset prices (ie, the 'waterbed effect') to be 'at least' 100% effective.[43] When this is the case, operators could be incentivised to agree on low reciprocal termination rates as an instrument of collusion in the retail market.

– **Traffic balance**. Most of these models start by making the assumption that consumers on each network are identical and make on-/off-net calls in proportion to each network's market shares and, hence that traffic between firms is balanced.[44] This leads to operators being more likely to agree on a common reciprocal termination rate that is in the interest of both parties.

  In practice, traffic is likely to be out of balance even if access charges are set at cost, particularly if networks have users with different calling profiles—eg, some networks may have a higher proportion of pre-paid customers which tend to be net receivers of calls. All else being equal, net call receivers would have an unambiguous incentive to set (reciprocal or non-reciprocal) call termination rates above cost, provided that the rate increase does not tip the balance of traffic the other way (and provided this does not increase the intensity of competition to excessively high levels from the network's perspective).

[39] Oftel (2003), 'Wholesale Mobile Voice Call Termination Consultation: Proposals for the Identification and Analysis of Markets, Determination of Market Power and Setting of SMP Conditions', December, p. 65, para. 5.64.

[40] CBb (2006), 'Tw: Imposition of obligation under chapter 6A, section 4.1.

[41] Gans, J.S. and King, S.P. (2001), 'Using "bill and keep" Interconnect Arrangements to Soften Price Competition', *Economic Letters*, **71**:3, 413–20.

[42] Carter, M. and Wright, J. (2003), 'Asymmetric Network Interconnection', *Review of Industrial Organization*, **22**, 27–46. See Appendix 2 for a more detailed description of this model.

[43] In other words, that at least 100% of the net incremental revenues obtained from higher MCT rates are passed on to retail customers.

[44] Consider two networks, A and B, with 70% and 30% market share, respectively. If the total identical customers are making calls in proportion to each network's market share, 21% of calls would originate on network A and would terminate on network B (30% of 70%). Conversely, 21% of calls would originate on network B and would terminate on network A (70% of 30%).

– **Cost differences**. These models also assume that negotiating parties have the same cost structure, which facilitates an agreement on a common reciprocal termination rate. Nevertheless, relaxing the assumption of equal cost structures could invalidate this conclusion.

  For example, suppose that there are two MNOs (operator H—high termination cost; and operator L—low termination cost), which are currently charging a termination rate of MCT_H and MCT_L, respectively. If it is assumed that traffic between them is balanced, operator L is a net payer of termination services to H due to the fact that $MCT_H > MCT_L$. Clearly, operator L has the incentive to increase its termination rate in order to avoid making net payments to H (or conversely, it has an incentive to try to reduce operator H's termination rate). Similar arguments would apply to a scenario between a mobile and a fixed operator, given the differences in the underlying network costs.

– **Balance of termination payments**. The simple example described above also illustrates how the existing balance of call termination payments can make reaching an agreement over reciprocal termination rates difficult and affect the incentives of operators. In particular, the larger the imbalance in current net payments, the less likely it is that negotiations would lead to low reciprocal termination rates, particularly if the imbalance of payments is caused by differences in the cost structure of firms.

  In the example above, in a bid to maintain the existing balance of payments in which it is a net receiver of termination revenues, operator H is unlikely to agree to a reduction in its termination rate. At the same time, it is likely to increase its termination rate if operator L attempted to reduce the imbalance of payments by increasing its termination rate (MCT_L) up to the level of that of operator H, MCT_H.

4.1.2 Fixed-to-mobile call termination

A separate class of economic models analyses the incentives of mobile operators to set call termination rates for F2M calls when the FCT is regulated (scenario 2 of this research). In this scenario, models by Wright (2002)[45] and Gans and King (2000)[46] conclude that mobile networks will always have the incentive to set MCT rates at (or above) the monopoly level. As the FCT rate is regulated, the problem is that of a classic monopoly provider (the mobile network) maximising profits by raising its price (the termination rate).

These studies highlight a number of factors that might exacerbate this result. For example, if an F2M caller cannot identify the mobile network it is calling (a situation that has been referred to in the literature as 'customer ignorance'), fixed customers make call decisions based on the *average* cost of F2M calls. Thus, a mobile operator that increases its termination rate would affect the volume of F2M calls terminating on *all* mobile networks and not only its own—and such an increase would be profitable. This effect could arise with mobile number portability or could also be present when FNOs do not differentiate the prices of F2M calls by MNO for either technical, commercial or regulatory reasons.

Oxera is not aware of formal models dealing with the determination of F2M and mobile to fixed (M2F) call termination rates where the fixed operator's rate is unregulated—ie, under scenario 1 of this research. The reason for this apparent gap in the literature is that, historically, fixed call termination rates tend to be regulated, so this case would have little practical relevance.

Nevertheless, the results obtained from the literature on reciprocal M2M termination rates, which show that, under some circumstances, firms may have incentives to set cost-based or

[45] Wright, J. (2002), 'Access Pricing under Competition: An Application to Cellular Networks', *The Journal of Industrial Economics*, **50**, 289–315.
[46] Gans, J. and King, S. (2000), 'Mobile Network Competition: Customer Ignorance and Fixed-to-Mobile Call Prices', *Information Economics and Policy,* **12**:**4**, 301–28.

even bill-and-keep arrangements, have led some authors to suggest the possibility of deregulating FCT rates and oblige fixed and mobile operators to negotiate reciprocal termination rates on their networks.

Wright (2002), for example, suggests that, 'as long as the firms' (fixed and mobile operators) bargaining power is roughly balanced, the tendency for cellular firms to set high termination charges may be alleviated.'[47] Similarly, Valletti and Houpis (2005) propose a similar solution, but warn that this remedy (reciprocal MCT and FCT rates) may be inappropriate in the case of asymmetric networks (eg, traffic flows and cost structures are not balanced).[48]

In terms of the incentives faced by MNOs when FCT rates are unregulated, the key question is whether the threat of an increase in FCT rates would constrain MCT rates, and if so to what extent. This question is closely linked to the issue of whether unregulated FCT rates give CBP to fixed operators, which is discussed in more detail below.

If MNOs are net receivers of termination revenue—which is likely to be the case when FCT rates are regulated at (or close to) cost and MCT rates are significantly higher[49]—they are likely to have the incentive to at least maintain the existing balance of payments from the FNOs. This would mean that MNOs would have an incentive to increase their MCT rates in response to an increase in FCT rates. Whether they are actually able to do this will in turn depend on the ability of FNOs to exercise CBP and/or whether increasing MCT rates from current levels is a credible strategy from an individual MNO's perspective.

4.2 Countervailing buyer power in the mobile call termination market

4.2.1 Definition and assessment

In assessing CBP this study uses the definition adopted by Ofcom when it assessed the extent to which BT had CBP as a purchaser of MCT on H3G's network:

> Countervailing buyer power (CBP) exists when a particular purchaser (or group of purchasers) of a good or service is sufficiently important to its supplier to influence the price charged for that good or service.[50]

Ofcom's definition emphasises the point that CBP is not an absolute, but a relative, concept and, therefore, when considering assessing whether an operator has SMP:

> it is not sufficient just for the buyer to have some CBP but, rather, it is necessary that the buyer can exert sufficient CBP such that the prices charged by the seller are constrained to the competitive level. Any rate above that level would imply that the buyer's CBP is not sufficient and would therefore imply that that the seller has SMP.[51]

A central implication of this definition is that, for CBP to be considered effective, it must not simply constrain prices at, say, the current level, but should also ensure that prices respond to changes in the underlying costs over time, and that, for example, when costs fall, MCT rates should fall accordingly. With this definition in mind, the analysis considers CBP in the market for MCT in three steps.

– **Step 1: measuring buyer concentration**. The potential for exercising CBP, as well as the effectiveness of CBP mechanisms, will be greater the more concentrated the buying side of the market. Preliminary indications of the potential for exercising CBP can be

[47] Wright J. (2002), op. cit., 313–14.

[48] Valletti, T. and Houpis, G. (2005), 'Mobile Termination: What is the "Right" Charge?', mimeo.

[49] For example, in the Dutch market in 2006, the MCT rate of 900MHz MNOs was €0.11 per minute (for 1800MHz MNOs it was €0.124), while the FCT rate of KPN Fixed was €0.09.

[50] Ofcom (2006), 'Mobile Call Termination: Proposals for Consultation, September, p. 46.

[51] Ibid.

obtained from measures such as the Herfindahl–Hirschmann index (HHI) of buyer concentration and/or buyer concentration ratios such as the market share of the largest 'n' buyers.

– **Step 2: analysis of the mechanisms through which CBP can be exercised**. A review of the ways in which buyers can in reality seek to influence the price and other terms and conditions established by each seller of MCT traffic.

– **Step 3: measurement of the effectiveness of CBP mechanisms in achieving their intended outcome**. An attempt to measure how effective buyers have been in exercising CBP in the market for MCT on each individual network. Some key measures of CBP effectiveness would be, for example:

  – the difference between actual MCT rates and the competitive MCT rate, both in terms of level and the extent to which cost efficiencies are passed on to MCT rates, as would be expected in a competitive market;

  – the difference between the MCT rate that the buyer would like to pay and what it ultimately pays (or conversely, the difference between what the seller would like to charge and what it actually ends up charging).

Each of these steps is described in further detail below.

4.2.2 Step 1: measuring buyer concentration

The first step in assessing the existence of sufficient CBP in the Dutch MCT market is to estimate measures of buyer concentration as an indication of the likelihood for CBP to be exercised. Buyer power is more likely to arise when a few firms or buyer groups purchase a large proportion of a seller's output. The larger the proportion of purchases and/or the fewer the firms or buyer groups responsible for a given proportion of purchases, the more likely it is that CBP can, in principle, be exercised.

Using information provided by MNOs and FNOs during the course of this research, it has been be possible in most cases to estimate measures of buyer concentration on each mobile network for the period 2003–06. This has been complemented with information provided by OPTA to Oxera for the period 2000–02.

The measures of buyer concentration are the following.

– **Gross HHI index**. Estimated as the sum of squared market shares of FNO and MNO traffic, or revenue terminating on a particular mobile network (this excludes on-net traffic of the particular network for which the HHI buyer concentration index is being calculated).

– **Net HHI index**. Estimated as above, but using the net monetary flows to calculate market shares.

– **Gross buyer concentration ratios**. Estimated as the sum of market shares of the largest 'n' buyers of termination traffic on a particular mobile network

– **Net buyer concentration ratios**. Estimated as above, but using the net monetary flows to calculate market shares.

4.2.3 Step 2: mechanisms through which CBP can be exercised in the MCT market

The factors that are expected to influence the CBP of MCT purchasers can be classified in two categories depending on whether they are:

– **internal to the negotiating parties**—includes factors that are under the control of, or are intrinsic to, the operators, which are expected to influence the buyer's bargaining position in a negotiation;

– **external to the negotiating parties**—includes factors such as OPTA's dispute resolution procedure in the event that parties cannot reach an agreement; the end-to-end interoperability obligations of the Dutch Telecommunications Law; and whether the fixed termination rate is regulated (ie, the distinction between scenarios 1 and 2).

Internal factors influencing CBP

This section reviews a number of factors intrinsic to the market and the negotiating parties, which are expected to influence the CBP of MCT purchasers. These factors are based on recommendations from the European Regulators Group (ERG),[52] guidelines from the UK's Office of Fair Trading (OFT),[53] and the knowledge gained by Oxera in reviewing the responses to the questionnaire and undertaking the in-depth interviews.

The factors reviewed are the following:

– the importance of originating MNOs as outlets for the sellers (ie, terminating MNOs);
– alternative sources of supply;
– the option not to purchase or delay reaching an agreement;
– the option to withhold payments;
– price sensitivity of the MCT traffic buyer;
– transparency of information;
– reciprocity of trade;
– multi-market contact;
– existence and importance of transit service providers.

The importance of originating MNOs as outlets for the sellers

As mentioned above in Step 1, a purchaser of call termination should be expected to have a higher CBP (and therefore a greater likelihood of affecting the seller's terms of trade) the more important it is as a customer to the seller. Indeed, according to the ERG, CBP is expected to be greater 'the higher the amount of purchase of services by customers or the higher the proportion of the producer's total output that is bought by a certain customer'.[54]

In terms of the MCT market(s), it is to be expected that, all else being equal, an originating operator (operator A) whose calls represented the largest proportion of calls terminating on a particular mobile operator's network (operator B) will have higher CBP relative to all other originating operators in their negotiations with operator B.

In this context, it is important to note that the existence of transit services providers—typically the FNO which routes calls originating on one mobile network and carries the traffic to another mobile network, thus eliminating the need for these two mobile networks to interconnect directly—might have a significant influence on the range of MCT rates that would be agreed through negotiation. If most traffic were routed through the fixed operator in its capacity of transit service provider, this operator would represent the most important customer for each terminating mobile operator. This and other implications of transit services for the assessment of CBP are discussed in further detail below.

[52] See ERG (2004), 'Revised ERG Working Group Paper on the SMP Concept for the New Regulatory Framework', October, para 11. Available at: http://erg.eu.int/doc/publications/public_hearing_concept_smp/erg0309rev1_smp_working_doc.pdf.
[53] OFT (2004), 'Assessment of Market Power, Understanding Competition Law', available at: http://www.oft.gov.uk/NR/rdonlyres/A92F91BC-B556-4724-8D2B-7002F6CDEA65/0/oft415.pdf.
[54] ERG (2004), op. cit.

Alternative sources of supply

The ERG highlights that an additional factor that is expected to increase the CBP of purchasers and give them the ability constrain the seller's price effectively is the extent to which they can:

– credibly threaten to switch to alternative suppliers;
– self-provide the service in question; and/or
– induce competition among several suppliers.

The nature of the MCT market is such that there is no effective physical substitute for terminating calls on a particular network. This would automatically rule out the possibility of originating operators credibly threatening to switch to another seller or self-provide the MCT service. Moreover, this should also rule out the possibility of inducing competition between terminating networks (through, for example, auction mechanisms) since the MCT service of one network is, in essence, completely independent of that of another network.

It should be noted, however, that in the presence of a transit service provider that had already reached an agreement on MCT rates with the seller, the purchaser could credibly threaten to route its calls through the transit provider, thus possibly enhancing its CBP.

Option not to purchase or delay reaching an agreement

As argued above, in the MCT market it is not possible for the purchaser to affect the terms of trade offered by the seller by inducing direct competition among several suppliers. However, an indirect way of inducing some sort of 'benchmark' competition between sellers could arise if the purchaser can effectively refuse to purchase, reduce the amount it purchases, or delay reaching an agreement if the terms of trade offered differ significantly from those received by the purchaser in its negotiations with other terminating operators, or if they differ significantly from the terms of trade offered by this particular seller to other purchasers of MCT.

The effectiveness of the threat depends to a large degree on the ability of the purchaser to credibly refuse to purchase or to delay reaching an agreement. Factors that are expected to influence the credibility of this threat are:

– the importance to the purchaser of reaching an interconnection agreement with the seller—ie, whether the demand for the purchaser's services would be significantly affected by its subscribers not being able to make calls to the seller's subscribers;

– whether the MCT contracts require parties to observe minimum notice periods, buy a minimum quantity of termination rates, and interconnect their customers to the seller's network;

– whether operators are under an obligation to provide end-to-end connectivity to their customers—as is the case under the Dutch Telecommunications Law—in which case the option not to purchase by threatening to stop calls from reaching their intended destination cannot be exercised unless the buyer believes the terms offered by the seller are unreasonable;

– the expected outcome of OPTA's dispute resolution procedure should the purchaser exercise the threat of refusing or delaying to reach an agreement with the seller if it considers the terms it is being offered as unreasonable (this is discussed in further detail below).

Option to withhold payments

When the buyer cannot exercise the option not to purchase call termination services due to, for example, an end-to-end connectivity obligation, it could still attempt to affect the terms of trade by unilaterally deciding to withhold payments of termination revenues. The payments

withheld could be the total amount due or, more likely and as was the case in the Netherlands in 2002–03 (see section 3), the difference between what the buyer would like to pay and what the seller is requesting.

The effectiveness of this CBP mechanism is likely to depend on:

– **whether the buyer is a net payer of call termination revenues**—withholding payments can only be a credible strategy if the buyer is a net payer of termination revenues, otherwise there would be no payments to withhold;

– **the seller's expectation of the likely outcome of a legal or regulatory dispute over non-payment of termination revenues**—if the seller believes that, in the event of a non-payment dispute with a buyer of call termination services, the regulator or the civil courts would rule that the non-payment strategy is illegal, it is unlikely to agree to a reduction in MCT rates.

Price sensitivity of the buyer

Price-sensitive buyers are more likely to reduce demand in response to an increase in price and, as a consequence, are more likely to improve the terms of trade in their favour.

In the MCT market buyers cannot directly control the quantity of MCT traffic demanded since this depends on the calling pattern of their retail customers. However, buyers can indirectly influence the quantity of MCT traffic demanded by adjusting the retail price for off-net M2M calls (in the case of mobile networks) and F2M calls (in the case of fixed networks) in response to changes in the MCT rate.

In that sense, the price sensitivity of the buyers of MCT is likely to be greater when MCT rate increases are passed on in full to retail prices, as well as when MCT rates represent a large proportion of the cost structure of retail prices (such that when MCT rates change, call origination prices also change significantly).

However, it should be noted that, even when MCT rates are fully passed on in retail prices, the fact that they represent a fraction of the total cost of F2M or M2M retail prices will mean that the responsiveness of demand to a change in MCT rates (the MCT rate elasticity) will be lower than the underlying retail F2M or M2M responsiveness of demand by end-consumers.

This can be illustrated with the following hypothetical example, as shown in Table 4.1. Assume that the total MCT traffic on a network is 200m minutes, of which 100 are F2M calls (priced at €0.25/minute), and the other 100 are off-net M2M calls (priced to the end-consumer at €0.50/minute). The MCT rate of this particular network is €0.15/minute, which represents 60% and 30% of the F2M and M2M retail prices, respectively. Therefore, if the pass-through of MCT rates to retail call prices is 100%, a 10% increase in MCT rates will result in a 6% and 3% increase in F2M and M2M retail prices, respectively.

Under the assumption that the retail call price elasticity is –1 for both F2M and M2M calls, it can be shown that the wholesale MCT rate elasticity of demand is only –0.45 in absolute terms, significantly below the retail call price elasticity.

Table 4.1 Hypothetical example of the MCT rate responsiveness of demand

	F2M traffic	M2M traffic	Total traffic
MCT traffic (million)	**100**	**100**	**200**
Call price (€/min)	0.25	0.50	
Call price elasticity	**–1**	**–1**	
MCT rate (€/min)	0.15	0.15	
% of call price	60	30.	
MCT rate increase (%)	10	10	
MCT rate pass-through (%)	**100**	**100**	
New call price (€/min)	0.27	0.52	
% change in call price	6	3	
New MCT traffic (million)	**94**	**97**	**191**
Fall in total MCT traffic (%)	–6	–3	–4.5
MCT rate elasticity			**–0.45**

Source: Oxera.

The implication of this example for the scope for exercising CBP is that the lower the MCT rate pass-through and/or the smaller the percentage of the retail call price explained by MCT rates, the lower the relevant elasticity measure will be, and therefore, the less likely it is that a buyer will be able to (indirectly) reduce demand in response to an increase in MCT rates.

This example also shows that the same factors that diminish the scope for CBP to be exercised by reducing demand will affect the incentives of operators to set high, above-cost MCT rates. This follows from the economic theory finding that a profit-maximising firm which has control over the price(s) it charges will have incentives to apply higher mark-ups above cost on those services with the lowest elasticity of demand, since the fall in the quantity demanded as a result of the mark-up is likely to be small and would be more than compensated by the increase in price.

Transparency of information

Well-informed buyers are more likely to switch to alternative suppliers or credibly demand better terms of trade. In the context of purchasers of MCT, their CBP is likely to be enhanced by their knowledge and ability to use information about:

– the seller's operation and negotiation strategy;
– different MCT charges across the industry, which allows the buyer to make price comparisons across MNOs;
– details on the different interconnection agreements reached among operators in the industry;
– the cost structure of their negotiating party.

It should be noted, however, that transparency of information works both ways, enhancing not only the negotiating position of the buyer but also that of the seller. In other words, a well-informed buyer is more likely to be able to use its knowledge and information to influence the terms of trade only if it holds better or more accurate information than the seller—ie, if the transparency of information is asymmetric.

Reciprocity of trade

The issue of reciprocity of trade refers to the fact that when telecoms operators negotiate termination charges with each other, both their termination rates are at stake in the negotiations (ie, the termination rate from A to B, and the termination rate from B to A). In that sense, reciprocity of trade should not be confused with reciprocal termination rates discussed above (ie, when the termination rate from A to B is the same as that from B to A). In other words, a negotiation over termination rates involves reciprocity of trade but the outcome of this negotiation will not necessarily be a reciprocal termination rate.

All else being equal, trade reciprocity means that the CBP of bargaining parties will be roughly balanced. The important point to note is therefore that trade reciprocity between all operators is a feature of negotiations under scenario 2 (where the termination rates of fixed and mobile operators are free from regulation). In this scenario, the insights from the literature on M2M call termination are particularly relevant to assessing whether, in response to an increase in the call termination rate of a rival operator, an MNO has the credible incentive to respond by increasing its own termination rate.

Scenario 2, however, will only involve trade reciprocity between MNOs because the FCT rate will be determined by regulation (the implications of this *external* factor for the CBP of FNOs are discussed below).

CPS service providers also have no scope for negotiating on the basis of trade reciprocity in relation to termination rates, since they do not sell termination services, but only purchase them. This significantly limits their bargaining position.

Multi-market contacts

When fixed and mobile operators meet in a large number of markets and need to reach agreements over the terms of trade in these markets, it might be possible for an operator to exercise CBP in the MCT market by trading 'losses' in one market against 'gains' in the MCT market in the form of lower MCT rates.

If price discrimination in termination rates is not possible, this strategy of trading 'losses' in one market against 'gains' in the MCT market could be difficult to implement in practice, since the MCT seller would need to be sure that, overall, the 'gains' it is achieving in the other market in relation to a single operator are sufficient to compensate a reduction in the MCT rates it would have to extend to *all* other operators.

Alternatively, a somewhat more aggressive strategy that some MCT buyers could adopt is to threaten to affect the terms of trade of the MCT seller in another market if it does not reduce its MCT rate. For example, a buyer of MCT traffic could threaten to increase the cost of setting up direct interconnection agreements unless it can achieve lower MCT rates. Similarly, a dominant transit service provider could threaten to increase the tariffs for the transit services provided to an MNO unless it can achieve more favourable MCT rates for its customers.

The effectiveness of such a threat will depend on its credibility. For example, is the transit service provider regulated and therefore prevented from increasing its rates? Can the seller refer a dispute to the regulator in the event of changes in the terms of trade in related markets? How has the regulator resolved similar disputes in the past?

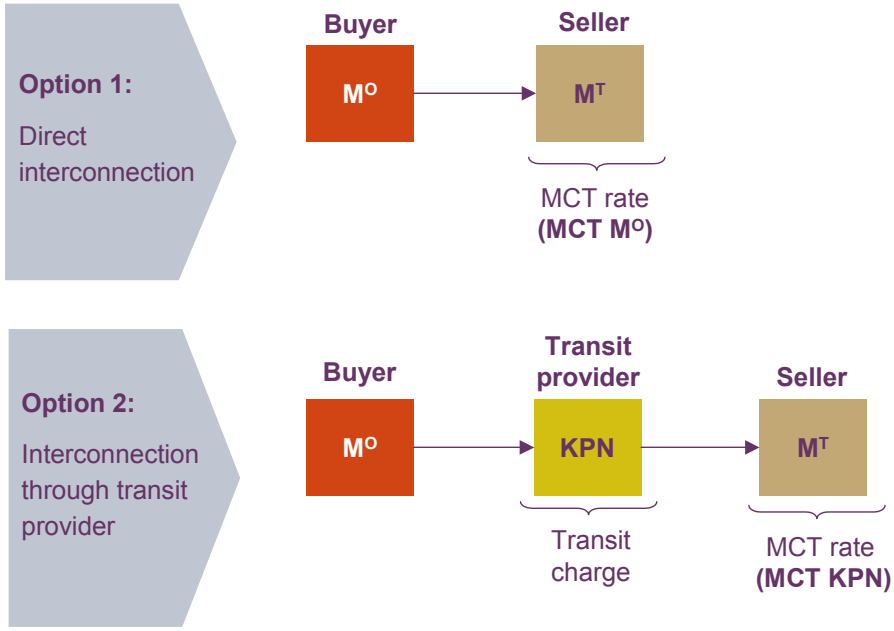
Transit services

As highlighted above, a thorough understanding of how the outcome of any bargaining situation would be influenced by existing transit services is a fundamental element of the research on CBP. In this context, a brief overview of the expected impact of transit services on CBP is provided below. During the course of the research, Oxera has explored the features of transit service provision in the Dutch market with evidence collected through the

questionnaire and the in-depth follow-up interviews. This is reported in further detail in sections 5 and 6.

Figure 4.1 outlines two options, in which buyers can purchase termination.

Figure 4.1 Transit services



Notes: M^O, originating MNO. M^T, terminating MNO.
Source: Oxera.

In the first option, the originating MNO has a direct interconnection agreement with the MCT seller, and is therefore in a position to negotiate the termination rate directly with the seller. In the second option, the originating party interconnects at an earlier stage with a transit provider (which in Figure 4.1 is assumed to be the FNO, KPN). This implies that the originating MNO hands over to the transit provider all of its outgoing calls destined for this particular MCT seller and therefore cannot negotiate directly the termination rate. In this case it is the transit provider that negotiates the termination rate and passes on this cost—together with the transit tariffs—to the originating MNOs.

Transit services could therefore influence the CBP of the originating MNO in the following ways.

– They would improve CBP if the seller intended to negotiate termination rates that are higher than those paid by KPN. In this case, the buyer could trade the option to transit its traffic for a lower price via KPN than interconnecting directly. The MCT rate negotiated by the transit provider would therefore act as a price ceiling for the termination rates that the buyer would be willing to pay.

– They would reduce CBP if the buyer intended to negotiate lower termination rates than those paid by KPN. The seller could refuse direct interconnection and force the buyer to transit its traffic via KPN. The transit service would therefore also act as a floor to the termination rate on which the terminating operator would agree.

The buyer's willingness to pay is therefore indirectly influenced by the negotiated termination rate of the transit operator. Moreover, if the transit service provider is the largest buyer of termination traffic on each individual mobile network, the CBP of the transit provider is expected to be greater than that enjoyed by any buyer in the MCT market. The relevant question for the analysis would therefore be whether the transit service provider has

sufficient CBP to influence the price it pays—if it does not, the likelihood that other, smaller buyers have sufficient CBP would be significantly reduced.

External factors influencing CBP

End-to-end interoperability obligation

The obligation to provide end-to-end communications has the potential to limit the CBP of purchasers of MCT traffic. This obligation would essentially eliminate the possibility of buyers refusing to purchase MCT traffic from a particular network since this would imply that the buyer's customers would be unable to make calls to this particular network's customers—ie, breaching the end-to-end obligation.

However, this obligation is not absolute in the Dutch market since, according to Article 6.1 of the Tw, interconnections between networks must be concluded on reasonable terms. If one of the parties believes the terms of interconnection are not reasonable, end-to-end interconnections could be suspended.

Dispute resolution procedures

In considering possible mechanisms for exercising CBP, it is important to examine the institutional context in which it is appropriate to assess CBP. In particular, the existence and the nature of any dispute resolution procedure might influence the outcome of negotiations on termination rates in this respect. The dispute resolution procedure can be expected to influence the outcomes of a negotiation and hence the ability of an operator to exert CBP through a concept referred to in the game theory literature as backward induction. Essentially, the outcomes reached at early stages of a negotiation would be influenced by the negotiating parties' expectations of outcomes in the final stage of the negotiation. In the event that failure to reach an agreement (or an agreement that is satisfactory to the regulator) triggers dispute resolution, the expected outcomes of the resulting final resolution would determine the range of outcomes that could be reached in the early stages of negotiation.

If the MNOs cannot reach an agreement on the terms and conditions of termination rates, the dispute may be referred to OPTA or an independent arbiter. Each operator would have the incentive to refer a dispute to the regulator if it expected the dispute resolution outcome to be more favourable than the outcome of the agreement. The operators' expectation of the specific outcome of the dispute therefore indirectly influences their likelihood of agreeing on charges. Hence, the ability to exercise CBP depends on the effectiveness of the constraint from potential dispute resolution. If an operator expects the regulator to set cost-oriented termination rates, it would be more likely to agree on termination rates below profit-maximising monopoly levels during negotiations.

Indeed, in the appeals procedure against Ofcom's SMP finding, H3G submitted a paper by Binmore and Harbord (2005),[55] which made the crucial assumption that if a fixed and mobile operator were unable to agree on the MCT rate and the regulator had to intervene (through, for example, a dispute resolution procedure), the most likely outcome of such an intervention would be a cost-based MCT rate. In Binmore and Harbord's model, this assumption gave strong incentives to the fixed operator to delay reaching an agreement indefinitely, thus forcing the MNO to offer a cost-based MCT rate.

To that end, it is important to understand which factors influence the operators' expectation of the dispute settlement procedure.

[55] Binmore and Harbord (2005), 'Bargaining over Fixed-to-Mobile Termination Rates: Countervailing Buyer Power as a Constraint on Monopoly Power, *Journal of Competition Law and Economics*, **1**:3, 449–72.

Reciprocity of trade and regulation of fixed termination rates

When FCT rates are not regulated, the CBP of the FNOs is likely to improve significantly since the FNO can now use its FCT rate as an additional bargaining tool in the negotiations. If Oxera's research and analysis concludes that, in scenario 2, the interests of fixed and mobile operators are likely to diverge (eg, both want a high termination rate for incoming calls but a low one for outgoing calls), it can be expected that, compared to scenario 2 (where the FCT rate is regulated):

– the negotiated MCT rate is likely to be lower;
– the negotiated FCT rate is likely be higher (provided that the regulated FCT rate in scenario 2 is cost-based).

4.2.4 Step 3: measuring the effectiveness of CBP in the MCT market

Given the structural indicators of SMP identified by OPTA in its analysis of the wholesale market for mobile call termination (ie, 100% market shares, and an absence of potential competition due to the impossibility of market entry), the conclusion that each MNO has SMP in the provision of MCT traffic on its own network will depend on the extent to which any CBP held by MCT buyers is sufficient to constrain the sellers from exercising their SMP.

As defined above, CBP is a relative concept and therefore a finding that a buyer has some CBP and/or that it has used its CBP via any of the mechanisms described above in Step 2 (section 4.2.3) cannot be taken as conclusive evidence that the prima facie evidence of SMP must be overturned. The important question is whether CBP is strong enough to constrain the MCT rate down to the competitive level—a rate above this level would mean that any existing CBP is not sufficient to overturn the prima facie evidence of SMP.

What is the competitive MCT level? In industries where the cost structure of firms exhibits high fixed costs and relatively low, constant marginal costs—such as the mobile industry—the competitive price cannot be equal to the marginal cost since firms would be unable to recover the fixed costs of production. In these industries a widely used estimate of prices consistent with a competitive market is the average long-run incremental cost (LRIC) of production.[56] This competitive price (p^c) can be found at the point where the demand curve meets the LRIC+ curve, which is the average LRIC cost curve including a reasonable rate of return on capital and, possibly, a mark-up for the recovery of common costs attributable to the MCT service (see Figure 4.2).

An unregulated firm with a dominant position in the market would have the incentives and ability to charge a price such as p^m, producing (selling) at the point where the marginal revenue curve (MR) meets the marginal cost curve (MC). This would be the expected behaviour of an unregulated monopolist that faced no or totally ineffective CBP from its buyers.[57]

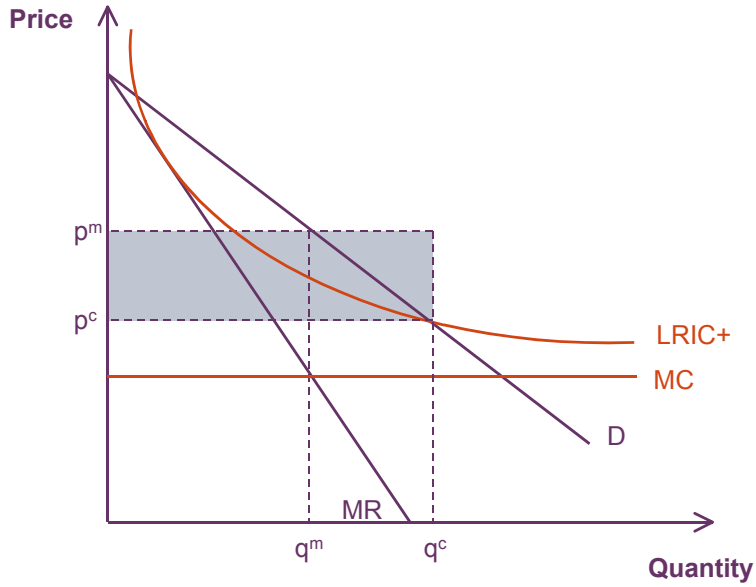
For the structural indicators of SMP to be rejected, the existence of CBP should be such that the actual price paid by the buyer is equal to, or very close to, the competitive price (p^c). As stated by Ofcom, any level significantly above this (the shaded area in Figure 4.2) would be evidence that CBP is not sufficient to prevent the seller from exercising SMP.[58]

[56] LRIC is an estimate of the incremental average cost of providing a particular good or service—in this case, the mobile termination service.

[57] This discussion explicitly ignores the possibility that unregulated or unconstrained MCT providers would not have incentives to price at the monopoly level. For the purposes of this study, the profit-maximising MCT rate is assumed to lie above the competitive MCT rate.

[58] Ofcom (2006), op. cit., p. 46.

Figure 4.2 The competitive MCT price level



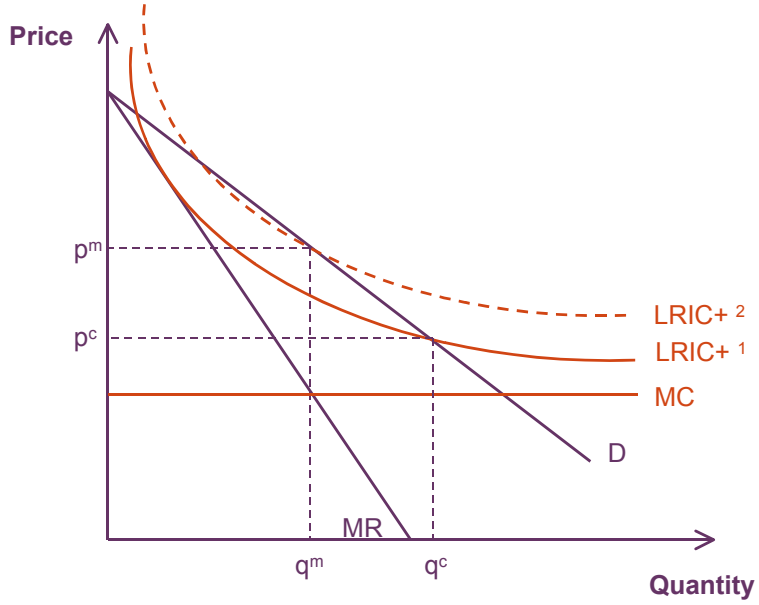
Source: Oxera.

This discussion suggests that a key measure of CBP effectiveness would be the mark-up above the competitive price (measured, for example, as a % of the competitive price). While this is a simple and intuitive measure, it may not be straightforward to estimate in practice because of the difficulty in obtaining reliable estimates of the LRIC+ of call termination on each mobile network. Moreover, even if estimates were available, there can be significant discrepancies between what each firm believes is a reasonable rate of return or an allowable mark-up above LRIC, and what the regulator, and indeed other MNOs, believe the plus (+) element of the LRIC estimate should be. If the location of the actual cost curve is unknown, any observed MCT rate could, in principle, be consistent with either a competitive or a monopolistic outcome. In particular, there is scope for extensive debate over the proportion of common costs that can justifiably be allocated to termination services, and in particular whether Ramsey pricing principles should be applied.[59] However, it is beyond the scope of this research to address these issues.

This point is illustrated in Figure 4.3, where the price level p^m can be made consistent with the monopoly price if the reported cost curve is LRIC+[1], or with the competitive price if the reported cost curve is LRIC+[2].

[59] Ramsey pricing principles require that a larger proportion of common costs be attributed to those services with lower price elasticity of demand.

Figure 4.3 Difficulties in estimating the competitive price level

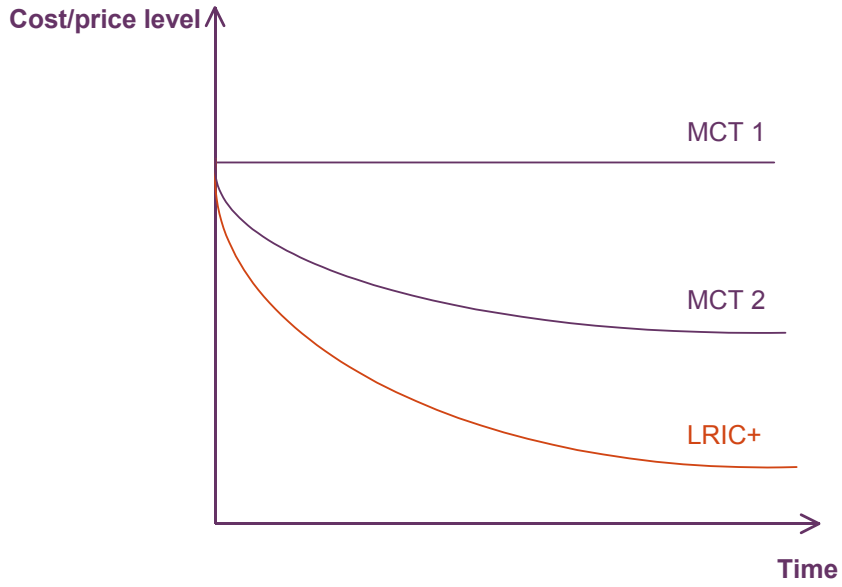


Source: Oxera.

Because of this problem, an alternative measure to indirectly estimate the effectiveness of CBP mechanisms in the MCT market would be to look at the evolution of MCT rates compared with the evolution of underlying LRIC costs over time. In a competitive market or, potentially in this case, a market where CBP is effective, the changes in MCT rates can be expected to closely track changes in underlying costs. Evidence to the contrary would point towards the ineffectiveness of CBP in lowering the MCT rates down to the competitive price. The main advantage of this approach is that there is no need to estimate the actual level of costs but only to make plausible inferences about the likely evolution of costs over time.

The basic idea is illustrated in Figure 4.4. Assuming that it could be estimated or inferred that the LRIC+ of MCT has experienced a downward trend such as the one shown, an evolution of MCT rates as depicted by MCT 1 or MCT 2 would not be consistent with a situation in which CBP is being exercised effectively. If CBP were effective in constraining MCT rates, their evolution would more closely match the rate of change in underlying costs.

Figure 4.4 Measuring the effectiveness of CBP through changes in MCT rates and LRIC costs across time



Source: Oxera.

Finally, a third indirect measure of the effectiveness of CBP could be obtained by observing the actual level of the MCT rate, and where it is located in the negotiation range—ie, closer to what the seller asked for or closer to what that the buyer would have liked to pay (if these values are known). This indirect measure would give a preliminary indication of whether buyers have been able to exercise CBP by moving the MCT rate closer to their preferred level.

Were the analysis to find that the agreed level of the MCT rate is closer to the buyer's preferred position, this measure would still not answer the question of whether CBP is sufficient to overturn the prima facie evidence of SMP since this would require making the assumption that the buyer's preferred position is indeed the competitive MCT rate.

4.3 Hypotheses to be explored

In this section, a number of specific hypotheses derived from the discussion in sections 4.1 and 4.2 are established, with the aim of testing their validity in the Dutch market in sections 5 and 6.

The hypotheses have been grouped into two categories according to whether they refer to (a) the incentives of operators for setting call termination rates, or (b) the scope for exercising CBP in the MCT market.

4.3.1 Exploring the incentives for setting call termination charges

Hypothesis 1 deals with the question of whether reciprocal termination rates are likely to arise in negotiations. This hypothesis would apply equally to scenario 2 (SMP regulation of FCT rates) and scenario 1 (*no* SMP regulation of FCT rates).

Hypotheses 2 and 3 deal with the incentives of MNOs in setting the actual level of MCT rate when price discrimination is possible. Hypothesis 4 also refers to the incentives of MNOs in determining the level of MCT rate, but where price discrimination is *not* possible. Hypotheses 2, 3 and 4 would be valid only under scenario 2 since they assume that FCT rates are regulated.

Hypothesis 5 refers to the incentives that KPN Group may have as a company active in both the fixed and mobile markets. This hypothesis would be valid under scenario 2 only.

Finally, hypotheses 6 and 7 refer to the incentives of fixed and mobile operators to set the level of their respective termination rates in scenario 1.

– **Hypothesis 1**. *In scenarios 1 and 2, if there are significant cost differences between negotiating parties, and/or the existing balance of termination payments is skewed, high-cost networks are unlikely to have incentives to agree on reciprocal termination rates.*

  If one party has (or perceives that it has) higher call termination costs than its negotiating party, it will have strong incentives to compensate for this cost differential through higher termination rates for calls terminating on its network. The low-cost network would have strong incentives to minimise the termination rate differential and agree on reciprocal termination rates, particularly if the existing differential means that it is a net payer of termination revenue to the high-cost network. These incentives will be even stronger if there are imbalances of payments between networks.

  These principles are likely to apply equally to negotiations between mobile networks with different cost structures and between mobile and fixed networks.

– **Hypothesis 2**. *In scenario 2, if price discrimination in MCT rates is possible, MNOs will have incentives to charge high (above-cost) MCT rates to FNOs*.

  As mentioned in section 4.1, when the FCT rate is regulated, mobile operators would behave as a classic monopoly provider, maximising termination profits by raising the F2M MCT rate. Factors that would exacerbate the result are 'customer ignorance' effects arising from the absence of F2M retail price discrimination and/or mobile number portability.

  An additional factor that would affect MNOs' incentives is the waterbed effect. In principle, if the waterbed effect for F2M termination profits were 100% effective—ie, if all excess profits from an F2M MCT rate increase were used to compete in the retail market—an MCT rate increase would have a neutral impact on profits and operators would, in principle, be indifferent to the level of MCT rates charged in the market. In practice, however, an individual MNO is likely continue to have incentives to charge an above-cost MCT rate in order to be able to use the additional rents to compete more effectively in the retail market by attracting customers from rival fixed and mobile networks.

  On the other hand, with a waterbed effect of less than 100%, MNOs would have clear incentives to increase F2M MCT rates above cost.

– **Hypothesis 3**. *In scenario 2, if price discrimination in MCT rates is possible, traffic and payments between MNOs are balanced, and cost structures are similar, operators would have incentives to agree on a reciprocal M2M MCT rate but would be indifferent to the precise level of this rate*.

  When traffic between MNOs is balanced and operators agree on a reciprocal termination rate, the net payment between MNOs will be zero. Therefore, provided that the level of the reciprocal termination rate does not tip the balance of traffic one way or the other, MNOs would be indifferent to the precise level of the M2M MCT rate and could possibly agree on a bill-and-keep arrangement to avoid unnecessary transaction costs involved with recording and settling traffic flows.

  As regards the incentives to move towards a bill-and-keep arrangement, it is important to note that MCT rates affect off-net call prices and therefore, even when traffic is balanced and no net payments are made between operators, MCT rates still play the

role of signalling the perceived marginal cost of an off-net call—operators may therefore not want to agree on a bill-and-keep arrangement in order to avoid distorting price signals.

In addition, a bill-and-keep arrangement would require an industry-wide cooperative effort to move away from the current system and keep at bay the unilateral incentives that individual networks have to charge high above-cost rates in 'calling party pays' (CPP) systems.[60]

– **Hypothesis 4**. *In scenario 2, if price discrimination in MCT rates is not possible, MNOs will have incentives to charge high (above-cost) MCT rates to fixed and other mobile operators.*

When price discrimination in MCT rates is not possible, MNOs must charge a unique MCT rate for all calls terminating on their networks regardless of whether the originating network is a fixed or mobile one. In this case, MNOs must trade off the incentives to set high MCT rates to FNOs (hypothesis 2) against the potential incentives to set low, possibly even zero, MCT rates that might exist between MNOs when all termination profits are used to subsidise retail competition—ie, when the waterbed effect is at least 100% effective.

As argued above, even when the waterbed effect is 100% effective, each individual MNO would still be likely to have incentives to set high, above-cost MCT rates because of the enhanced ability to compete more effectively in the retail market brought about by these additional termination revenues.

When the waterbed effect is less than 100% effective, MNOs' incentives to set above-cost rates are even stronger. Whether they have incentives to set rates at the monopoly level, as some economic models of mobile termination have argued, is less clear. As argued by Hausman and Wright (2006),[61] the profit-maximising level of MCT rates might lie below the monopoly level if high MCT rates generate too much substitution from profitable F2M calls to less profitable M2M calls. For the purposes of this study, however, it is sufficient to understand whether mobile networks have incentives to set above-cost MCT rates (where the definition of cost reflects a reasonable return on capital), rather than to determine whether this level lies at or below the monopoly level.

– **Hypothesis 5**. *In scenario 2, the fact that KPN is present in both the fixed and mobile markets may give KPN Mobile incentives to negotiate low reciprocal rates across all MNOs to the benefit of KPN Group as whole.*

From KPN Group's perspective, high MCT rates lead to a situation where, even though KPN Mobile benefits from additional MCT revenues, these are to a large extent financed internally from KPN Fixed (via F2M traffic). Moreover, if high MCT rates lead to an increase in the level of competition in the retail mobile market, this could accelerate the rate of F2M substitution to the detriment of KPN Group. Hence, from KPN Group's perspective, low MCT rates could be profit-maximising.

– **Hypothesis 6**. *In scenario 1, FNOs would have incentives to set high, above-cost FCT rates to other fixed and mobile operators.*

Given that MCT rates are higher than FCT rates (see Figures 3.3 and 3.4), which leads to FNOs being net payers of call termination revenue to the MNOs, the removal of

[60] The model by Gans and King (2001) discussed above argues that the presence of on-/off-net price differentials can dramatically intensify retail competition, leading operators to prefer a bill-and-keep arrangement. It should be noted, however, that the mechanism through which the bill-and-keep arrangement emerges in Gans and King's model would require on-net retail prices to be higher than off-net prices, an outcome which does not appear to be realistic.

[61] Hausman, J. and Wright, J. (2006), 'Two Sided Markets with Substitution: Mobile Termination Revisited', mimeo.

regulation on the FCT rate would lead to a situation in which FNOs would want to increase the FCT rate to the profit-maximising level in order to minimise these net payments.

These incentives will be stronger if FNOs can be sure that MNOs will not have the ability or incentives to respond by raising their MCT rates; otherwise, FNOs might be discouraged from raising their FCT rates if the ensuing price war leaves them in a worse position.

– **Hypothesis 7**. *In scenario 1, MNOs would have incentives to set high, above-cost MCT rates to other fixed and mobile operators.*

The incentives that MNOs would face in this scenario are the same as those faced in hypothesis 4, except for the possibility of FCT rates being used as a bargaining tool in negotiations over termination rates. The important point is that the economic incentives for MNOs to charge high MCT rates are the same, although the potential gains from doing so will be smaller given that FNOs could retaliate with increases in FCT rates.

4.3.2 Factors influencing CBP

– **Hypothesis 8**. *For the buyer to be able to affect the seller's MCT rates, it must be an important client for the seller in terms of traffic and net payments.*

If the originating operator (A) is an important outlet in terms of traffic for the terminating operator (B), as measured by the percentage of total traffic terminated on B and/or net payments received by B, it is more likely to be in a position to exercise CBP.

– **Hypothesis 9**. *In terms of assessing CBP, the largest net buyer of termination on a particular mobile network can be expected to have more CBP than any other buyer of call termination on this particular network*.

The CBP mechanisms employed by the largest net buyer of call termination would be more likely to influence the terms of trade than similar CBP mechanisms employed by smaller buyers. The largest net buyer threatening to stop purchasing or to withhold termination payments is more likely to induce a reduction in MCT rates than if a smaller buyer threatened to do the same.

The only exception to this rule could be the use of multi-market contacts by smaller buyers as a way of influencing the terms of trade in the MCT market. A small buyer could potentially have more CBP than the largest buyer of call termination on a particular mobile network if it can significantly affect the terms of trade of the MCT seller in another market (eg, the transit market), which is valuable for the MCT seller (perhaps even more valuable than the MCT market itself).

– **Hypothesis 10**. *CBP may be stronger if there is clear and transparent information on the price and quality of call termination services*.

As mentioned above, buyers with access to clear and transparent information on the price and quality of termination services offered by alternative operators, as well as the underlying costs of providing these services, would be more likely to threaten to stop buying termination services from the suppliers or to delay negotiations, which would give them more credibility when demanding improved terms of trade.

– **Hypothesis 11**. *The existence of a dominant transit service provider may mean that the only CBP that matters is that held by this dominant provider*.

Since most operators would be transiting their calls through the dominant transit service provider, this provider would be the largest net buyer of call termination services for

every single mobile network. It should therefore be expected to have the largest CBP against each seller; furthermore, the termination rates it is able to obtain are likely to be lower than those that any other buyer would be able to negotiate.

– **Hypothesis 12**. *CBP will be greater the more price-sensitive the MCT demand*.

  As discussed in section 4.2, the scope for exercising CBP will be greater when MCT demand is more elastic, which implies that increases in MCT rates would be less profitable from the seller's perspective. MCT demand elasticity will be greater the higher the MCT rate pass-through to retail prices and the larger the proportion of the retail call price explained by MCT rates.

– **Hypothesis 13**. *The existence of an end-to-end connectivity obligation significantly reduces the CBP of MCT purchasers.*

  When an originating operator sends a call to a terminating operator, it is essentially agreeing to purchase MCT services at whatever rate has been (or will be) agreed with the terminating operator. Thus, an end-to-end interoperability obligation has the effect of eliminating the possibility of exercising CBP by no longer purchasing MCT traffic since operators are under the obligation to guarantee that all calls must reach their intended destination.

– **Hypothesis 14**. *The existence of dispute resolution powers may enhance a buyer's CBP*.

  The fact that an originating operator threatens a terminating operator with the referral of a dispute on the level of MCT rates to OPTA or an independent arbiter may enhance the originating operator's CBP, potentially to the point where it counteracts the effect of the end-to-end connectivity obligation if, for example, the originating operator refuses to purchase MCT traffic (either by stopping calls from reaching their destination or withholding all termination payments) and refers the matter to OPTA for resolution on the grounds that the terms offered by the seller are unreasonable.

  The effectiveness of the threat of dispute resolution procedures as a mechanism for enhancing CBP will be constrained by the expected outcome of the dispute settlement. If the seller has reasonable grounds to believe that the outcome of the dispute will be positive, it is unlikely to agree to a reduction in MCT rates in order to avoid the dispute in the first place.

– **Hypothesis 15**. *Reciprocity of trade (ie, the ability of an operator to respond to an increase in the rates of another operator) may affect CBP.*

  In the absence of regulation (ie, scenario 1), an originating operator that has to pay a high termination rate may threaten to charge a relatively high termination rate if its negotiating party does not lower its termination rate—eg, an FNO whose FCT rate has been deregulated in its negotiations with MNOs.

  The effectiveness of this CBP mechanism will depend on the credibility of the threat. If FNOs increased their FCT rates, mobile networks could respond by increasing their MCT rates in order to maintain the existing net balance of payments—and an 'upwards' price war could ensue. The question is whether FNOs would benefit from such a price war.

5 Incentives in setting termination rates

A fundamental first step in determining how termination rates will evolve in each of the scenarios requested by OPTA is to analyse the incentives of mobile and fixed operators in setting their termination rates. Section 4.3 above set out a number of hypotheses on the incentives that mobile and fixed operators have when determining termination rates. These hypotheses highlighted key issues that affect operators' incentives, which can be summarised in the following three key questions.

1) Is price discrimination in termination rates possible? If it is not, fixed and mobile operators will charge the same termination rates across the board—ie, to other mobile providers as well as FNOs.

2) In terms of the degree of reciprocity that MNOs would be willing to agree on, do they have incentives to charge reciprocal rates (ie, offer rates equal to those they are offered by other networks)? Do these incentives change depending on the network they are negotiating with?

3) As for the levels of rates, do operators have incentives to set termination rates below, equal to, or above costs? Do these incentives change depending on the network they are negotiating with?

This section explores each of these three questions under scenarios 1 and 2 in light of the hypotheses set out in section 4. Evidence collected from the responses to the questionnaire and the follow-up interviews, and from publicly available sources, is used to draw conclusions regarding the three questions above. This section focuses on the incentives of operators set specific rates. The fact that operators have incentives to charge a particular MCT rate does not mean that this will be the observed outcome in the market since it would also depend on operators' ability to enforce this rate. Their ability to set rates would depend crucially on the existence of CBP, which is examined in section 6.

5.1 Is price discrimination in termination rates possible?

The analysis of the operators' responses to the questionnaire and interviews conducted by Oxera suggests that, in the absence SMP regulation, MNOs would charge the same MCT rate to both fixed and mobile operators.

From a commercial perspective, if a network attempted to price-discriminate by increasing the termination rates offered to one group of customers, these customers would have the option to route their traffic through operators that were still being offered the low MCT rates. As one operator noted:

> Differential tariffs to different [mobile] operators would lead to bypassing [and] re-routing … therefore [the terminating network] is unlikely to differentiate.[62]

Consequently, as a result of arbitrage, operators are unlikely to have incentives to price-discriminate.

Furthermore, from a technical perspective, price discrimination would be possible only if the terminating network has a direct interconnection agreement with the originating networks. Otherwise it would be difficult (if not impossible) to identify the network from which calls

[62] […], questionnaire, Q5.

originate, as several operators noted.[63] As Table 5.1 shows, most operators have relatively few direct interconnection agreements in place—ie, between one and three, with the exception of Orange, which has signed direct interconnection agreements with […] of the 15 mobile and fixed operators to which it provides the call termination service.

Table 5.1 Interconnection arrangements for termination on mobile networks[1]

Which type of interconnection agreement for call termination does your company have with each network?	Direct interconnection agreements for calls terminated on the MNO's network (either one- or two-way)	There is no direct interconnection agreement for calls terminated on the MNO's network (ie, calls are transited)
KPN Mobile	[…]	[…]
Vodafone	[…]	[…]
T-Mobile	[…]	[…]
Orange	[…]	[…]
Tele2	[…]	[…]

Note: Each MNO was asked to provide information for the following networks: KPN Mobile, Telfort, Vodafone, T-Mobile, Orange, Tele2, UPC, Casema, Essent and 'other'. Most MNOs provided information on the interconnection agreements for the first nine networks. Only […] specified the operators and interconnection agreements in the 'other' category, and these results are included in the table.
Source: Questionnaire, Q21.

Table 5.1 highlights the fact that most operators use KPN CS transit services to terminate their calls, making it the largest single purchaser of termination services in the market (see section 6.1). This has significant implications for the incentives to price-discriminate. If a mobile network were to attempt to price-discriminate, KPN CS would be the most likely to achieve the lowest prices. Therefore, in the event of another network being offered an MCT rate above that offered to KPN CS, such a network would prefer to transit its traffic via KPN CS rather than terminate calls using the direct interconnection route. As one operator noted, 'traffic always flows to the lowest level'.[64]

In this context, it is interesting to note that FNOs (except KPN) have been free to charge a different FCT rate to MNOs prior to the analysis of market 9—call termination on individual PSTNs on a fixed location—conducted by OPTA in the end of 2005. However as OPTA has indicated to Oxera, price discrimination did not take place. During the interviews, one FNO stated that one of the reasons for this was the absence of reliable call identification records from KPN CS, an essential technical prerequisite for price discrimination.[65]

Given the above, operators are unlikely to have the incentives or ability to charge different MCT rates in the scenarios proposed by OPTA, and are therefore likely to charge the same MCT rate across the board to both fixed and mobile networks. This would essentially rule out hypotheses 2 and 3, addressing the incentives of MNOs in a world in which price discrimination in MCT rates is possible.

5.2 Do operators have incentives to charge reciprocal or non-reciprocal rates?

Section 5.1 concludes that neither fixed nor mobile operators are likely to price-discriminate. The next step is an analysis of whether they have incentives to set:

[63] […], interviews. In addition, […] noted that when there is no direct interconnection, there is no billing relationship between MNOs as payments are made through the transit provider.
[64] […], questionnaire, Q2.
[65] […], interview.

– **a reciprocal MCT rate**—in this case, if the MNO is offered a termination rate of, for example, €0.10, it would have the incentives to offer the *same rate across the board*; or

– **a non-reciprocal MCT rate**—if the MNO is offered a termination rate of €0.10, it would have the incentives to offer a *different rate across the board* (eg, €0.15 to all fixed and mobile operators).

As discussed below, evidence from the questionnaires and follow-up interviews suggests that there are at least three key elements affecting the degree of reciprocity that an operator would be willing to seek when negotiating call termination charges:

– cost differences—driven by, for example, the type of services provided (fixed versus mobile), economies of scale, and the way in which spectrum has been allocated;
– balance of termination traffic;
– balance of termination payments.

In line with hypothesis 1, the evidence collected by Oxera suggests that when there are significant cost differences between networks, high-cost networks are unlikely to have incentives to agree on reciprocal termination rates. These incentives are even stronger if there are imbalances of termination traffic and, more importantly, termination payments, since the terminating network would always try to seek at least to cover its costs and to obtain a margin equal to that earned by its negotiating party. These incentives apply to both mobile networks in relation to fixed networks, and DCS1800 in relation to GSM900 networks in both scenarios 1 and 2.

This sub-section first analyses the degree of reciprocity that MNOs might be willing to agree with FNOs in a negotiation over F2M termination, and then explores the analysis of reciprocity in the context of M2M termination rates. It should be borne in mind that, regardless of the degree of reciprocity that an operator might be willing to agree on, in line with the findings of section 5.1 the level of F2M and M2M termination rates will be the same.

5.2.1 Reciprocity in F2M termination rates

Question 6 of the questionnaire asked MNOs to specify which rates they would charge if they were offered zero, below-cost but above-zero, or above-cost termination rates by an FNO. Respondents were asked to specify whether their answers would change if there was: (a) SMP regulation on the FNO (scenario 2); or (b) no SMP regulation on the FNO (scenario 1). A number of operators stated that they would not agree on reciprocal rates with FNOs in either scenario.[66]

Furthermore, question 12 asked which termination rate each operator would expect to obtain in the absence of SMP regulation on fixed and mobile networks (scenario 1). Most respondents expect F2M termination rates to be significantly higher than M2F termination rates (as they are now—see Figures 3.3 and 3.4), which suggests that scenario 1 is not likely to result in reciprocal rates between fixed and mobile operators.

According to the responses to the questionnaires, the difference in the levels of costs between fixed and mobile operators is one of the main reasons for the lack of incentives to agree on reciprocal termination rates. This is because, in the presence of cost differences, were the high-cost network to agree reciprocal rates with the low-cost network, it would be at a competitive disadvantage—the margin on call termination services would be lower for the high-cost network under a reciprocal arrangement. Factors driving the cost differences between fixed and mobile networks include the fact that, on mobile networks, the location of the receiving party is changing all the time, which makes it necessary to invest in extra network elements, including the Home Location Register, and Visiting Location

[66] […], questionnaire, Q6. This was also suggested by […] during the interviews.

Register/Radio Control Point. Moreover, the subscriber will often be moving during the call. As a result, the handover of calls from one base transceiver station (BTS) to another, from one base station controller (BSC) to another, or from one mobile switching centre (MSC) to another might be required, increasing the costs of providing the mobile service.[67]

In addition to cost differences, the fact that MNOs are net receivers of payments from FNOs would strengthen their incentives to offer non-reciprocal (and high) F2M termination rates. This is because MNOs are likely to have strong incentives to maintain the imbalance of payments in which they are net receivers of termination revenues from FNOs by not agreeing to a reduction of MCT rates to the level of FCT rates.

An example can help to illustrate this point. Suppose that:

– M2F traffic is 100m minutes per year, and that F2M traffic is approximately 140m—ie, F2M traffic is 1.4 times higher than M2F traffic;
– F2M termination rates are €0.11/minute and M2F termination rates are €0.009/minute—ie, F2M termination rates are around 12 times higher than M2F termination rates.

As a result, F2M termination payments would be €15.4m (140m minutes x €0.11/minute) while M2F payments would be €0.9m (100m per minute x €0.009 per minute)—ie, MNOs would be receiving net revenues of €14.5m (€15.4m – €0.9 m). If MNOs were to charge reciprocal termination rates to FNOs and decrease MCTs to €0.009, the only way in which their net flow of revenues could be maintained is if F2M traffic increased by around 12 times from 140m minutes to 1,711m minutes. This seems highly unlikely given the relatively low elasticity of demand of fixed call origination in relation MCT rates. A study commissioned by a group of MNOs indicates that such elasticity would be of around –0.22 in the medium term,[68] which implies that a decrease in MCT rates of 10% would lead to an increase in the demand for call origination of just 2.2%. Hence, given the existing imbalance of termination payments, MNOs are unlikely to agree on reciprocal rates with FNOs.

To highlight the magnitude of current net payments, Table 5.2 presents the relevant information for the period 2004–06 for […]. As the table shows, […] received termination payments from FNOs of around […]/year during this period—ie, around ten times higher than the payments made by […] to them. Furthermore, FNOs have been the only source of termination revenues for […]. Other MNOs did not provide Oxera with quantitative data to make similar calculations, but during the course of the interviews, several confirmed that they are net receivers of payments from FNOs.[69]

[67] […], questionnaire, Q8.

[68] NERA Economic Consulting (2005), 'Price Elasticities in the Mobile Sector: A Study for a Consortium of Mobile Network Operators', October 10th.

[69] […], interview transcript, p. 10. Operators did not provide detailed quantitative data.

Table 5.2 Net payments received by […] from fixed and other mobile networks, 2004–06[1]

	2004	2005	2006
Net F2M termination payments	**[…]**	**[…]**	**[…]**
Payments received from FNOs	[…]	[…]	[…]
Payments made to FNOs	[…]	[…]	[…]
Net M2M termination payments	**[…]**	**[…]**	**[…]**
Payments received from other MNOs	[…]	[…]	[…]
Payments made to other MNOs	[…]	[…]	[…]

Note: [1] Net payments are calculated as the difference between the payments received by the MNO from call termination on its network from fixed or mobile operators and those made by the same MNO for terminating calls on fixed or mobile networks. A negative net payment of, for example, –€100m means that […] paid that network €100m, while a positive net payment of €100m means that […] received €100m from that network.
Source: Oxera calculations based on […], questionnaire, Q36.

In summary, it is likely that, if an MNO were offered an M2F termination rate of, for example, €0.10, it would not reciprocate the charge but would set F2M termination rates at a level that would maintain this balance of payments. The issue of whether FNOs could use the threat of raising their termination rates to constrain MCT levels in scenario 2 is examined in section 6.2.3 below.

As noted in section 4, the waterbed effect may provide certain incentives for operators to maximise termination revenues in order to subsidise activities in the retail markets for access and call origination. Were the current net payments to an MNO to be eliminated as a result of agreeing reciprocal termination rates with FNOs, the MNO's ability to subsidise its retail activities would also be reduced. Any individual operator would therefore be competitively disadvantaged in the retail market and hence would not have incentives (unilaterally) to agree to reciprocity. Reciprocity could only be achieved if all MNOs collectively agreed to reciprocity with FNOs. Such a change would also represent a significant change to conditions of competition in the retail market. Without regulatory intervention, this outcome appears unlikely.

For reasons similar to those discussed above, MNOs would be unlikely to agree to move to a bill-and-keep arrangement, in which termination rates of both fixed and mobile networks are zero. This would be a special case of reciprocity and implies the complete loss of any termination revenues. As described above, such losses would need to be recovered from other markets (eg, reduction in handset subsidies in the retail market or increase in origination tariffs), which would be a significant change to the way in which competition currently operates in the retail mobile market. This appears unlikely in the absence of regulatory intervention.

Asked whether a bill-and-keep arrangement could potentially arise in a hypothetical scenario in which traffic and payments were balanced, one MNO stated that:

> Then you move more into a pairing kind of scenario where you have an arrangement where traffic is balanced, there is no payment involved. This could have been working if you agreed to do so from the start, back in the old days when interconnection started developing. **I think it will be impossible today to come through such a model where we as [operator] would be asked to remove enormous values of revenue from our books** … (emphasis added) [70]

[70] […], interview transcript, pp. 9–10.

Another operator stated that it would only adopt bill-and-keep if it was imposed by the regulatory authority on *all* operators since, in effect, such an arrangement would lead to an important reduction of termination.[71]

For the reasons outlined above, MNOs face strong incentives not to agree on reciprocal M2F and F2M termination rates.

5.2.2 Reciprocity in M2M termination rates

Question 5 of the questionnaire asked MNOs to specify which rates they would charge if they were offered zero, below-cost but above-zero, or above-cost termination rates by another MNO. In line with hypothesis 1, lower-cost GSM900 operators suggested that they would be willing to agree on reciprocal rates with DCS1800 MNOs—ie, in effect, eliminating the existing mobile delta agreed in the Covenant, in which MCT rates of DCS1800 operators are higher than the corresponding GS900 rates.[72]

DCS1800 providers, on the other hand, indicated that they *would not* be willing to agree on reciprocal rates with GSM900 operators, but they *would* be willing to agree on a reciprocal rate with other DCS1800 providers. This is because DCS1800 operators would be like to seek to maintain the delta reflecting the differences in the cost per call between users of the 900Mhz and 1800Mhz spectrum bands. In other words, while they would charge the same uniform MCT rate to all MNOs—in line with the conclusion of section 5.2.1—they would seek to enforce the existing mobile 'delta' in which they pay a lower MCT rate to GSM900 operators and a (higher) reciprocal MCT rate to other DCS1800 operators.

According to DCS1800 providers, the differences in the cost of DCS1800 and GSM900 networks are explained by the following factors.[73]

– On the technical side, the main issue relates to the coverage of frequencies. DCS1800 frequencies have a more limited coverage than GSM900, which reduces the footprint in rural areas and, more importantly, limits indoor coverage. As a result, the ability of DCS1800 providers to gain new customers—particularly those whose demand is driven by quality and who are less sensitive to price differences (eg, high-margin business customers)—has certain limitations. According to one DCS1800 provider, lower market shares are 'directly linked' to these differences in the coverage of frequencies.[74]

– Differences in the conditions under which frequencies were acquired—GSM 900 frequencies were granted to KPN Mobile and Vodafone, while DCS1800 operators had to pay for the spectrum, imposing a cost disadvantage on the latter;

– Lower economies of scale resulting from the lower market share of DCS1800 operators.

Although some DCS1800 providers stated that the mobile delta could be decreasing over time due to a relative increase in traffic volumes on their networks,[75] it is not clear whether in the next three years they would agree on reciprocal rates with GSM900 operators.[76] Furthermore, as noted in section 3, the roll-out of 3G networks might over time tend to reduce the cost differences between MNOs.

[71] […], interview transcript, p. 5.

[72] […] and […], interview.

[73] […], questionnaire, introduction and Q5, Q6 and Q7. Comments (including Appendix 1) by […] on OPTA's draft BULRIC model, and RBB Economics (2006), 'Market Share and Extension and Quality of Network Coverage': these documents were sent by […] as part of its response to Oxera's questionnaire. It is of note that, during the interviews, […] stated that the scale and the technology deployed explain differences in the MCT rates charged by different operators.

[74] […], questionnaire, introduction, para 3.

[75] Orange, interview, p. 11.

[76] Although Oxera asked the operator during the interview for more information on its projections, the operator stated that this is 'work in progress'.

5.2.3 Summary

Based on the evidence discussed in this section, high-cost networks are unlikely to have incentives to agree on reciprocal rates since they would like to maintain a margin that allows them to cover at least the cost of providing services. In particular,

- no MNO is likely to be willing to agree on reciprocal termination rates with FNOs;
- DCS1800 providers would like to maintain the mobile delta (at least for the next three years), which means that they are unlikely to have the incentives to agree on reciprocal rates with GSM900 operators.

Similarly, low-cost networks (ie, GSM 900 operators) would be more willing to agree on reciprocal rates in their negotiations with DCS1800 operators.

5.3 Do operators have incentives to set termination rates below, equal to, or above costs?

5.3.1 Incentives of MNOs under scenario 2

Level of rates

Evidence from the questionnaires and interviews suggests that, in line with hypothesis 4, MNOs will have incentives to charge termination rates that are at least at or above cost to all fixed and mobile operators.

In effect, no operator responding to the questionnaire stated that it would have the incentive to offer a termination rate that was at zero or below cost, even in response to an offer from another operator that was believed to be below cost. Instead, all the operators stated that they would offer termination rates that were at or above costs.

The definition of the cost base of call termination services remains an issue, particularly as regards the allocation of common costs to the termination service. The specific issue of how to measure the mark-up above incremental costs of call termination services is a controversial one, but is beyond the scope of this research.

Historical events can provide significant insight into the incentives faced by the operators in regard to the level of MCT rates, and their ability to respond to those incentives. In particular, the evolution of MCT rates prior to the Covenant suggests that, in the absence of SMP regulation (or the threat of regulation), MNOs were able to charge termination rates at a level above the cost of an efficient new entrant in the Dutch market as defined in OPTA's concept BULRIC model—particularly in the case of GSM900 operators.

As Figure 3.4 shows, between October 2000 and December 2003 no MNO decreased the MCT rates charged to originating networks, while KPN Mobile, Orange and Tele 2 increased them. If the observed increases in termination traffic during this time enabled the operators to achieve cost efficiencies (or, at worst, their unit cost of termination services remained constant), it can be concluded that MNOs during that period had the incentive (and, more importantly, the ability) to charge above-cost termination rates. This is particularly the case of GSM900 operators given their relatively higher market shares and increasing traffic volumes, suggesting that unit costs might have been decreasing while MCT rates did not.[77]

In contrast, for DCS1800 operators, it cannot be ruled out that MCT rates could have been below cost, at least in the early 2000s, given the relatively short period of time they had been active in the market (from around 1999) and their low market penetration. Nevertheless, if a forward-looking approach is adopted (as is required when estimating the LRICs of a particular service), it is reasonable to consider that the increases in traffic volume achieved

[77] KPN Mobile actually increased its rate twice during 2000–02 (October 2000 and April 2002) after it had reduced its MCT rates, but no MNO followed.

by the DCS1800 operators would have led to reductions in their average termination costs. Hence, the increases in the MCT rates by Orange and Tele2 in 2003 are likely to have been driven not by costs, but by the incentives to charge high MCT rates.

In light of the observed behaviour of Tele2 prior to the Covenant, its status as an MVNO does not appear to have created different incentives from those faced by the physical MNOs. Although its cost base may be different, determined by the structure of the contract with its host network rather than the underlying network costs, its incentives to raise termination tariffs, and indeed its ability to do so, are the same as those faced by other operators.

Although KPN Mobile did lower its MCT rate in June 2000, as discussed in section 3.3.1, this appears to have been due largely to regulatory pressure. As […] stated in the follow-up interview:

> [termination rates were lowered because] of regulatory pressure … At that time we were designated as an operator with [significant] market power … We hoped we would set a trend in lowering tariffs.

Finally, during the follow-up interviews, Oxera explored the possibility that the common ownership of a mobile and fixed operator by KPN Group could have influenced KPN Mobile's incentives to offer a low MCT rate—ie, testing hypothesis 5. No operator appeared to support this hypothesis, suggesting that regulatory pressure played a major role.[78] In any event, as Figure 3.4 shows, this reduction was unwound shortly thereafter.

Factors giving MNOs' incentives to charge high MCT rates

As discussed in section 4, there are a number of factors that might enhance or weaken the incentives that MNOs have for charging above-cost termination rates, including:

– net balance of termination payments;
– elasticity of demand for call origination in relation to changes in termination rates;
– the ability to cross-subsidise retail activities via the waterbed effect.

As discussed in section 5.2.1, MNOs are net receivers of termination payments from FNOs. In addition, FNOs are the main source of termination revenues for MNOs, taken as a group. According to information provided by OPTA, in 2002 termination payments from FNOs (and KPN Fixed in particular) were […]% higher than those received from MNOs—ie, €[…]m versus €[…]m. Due to a lack of detailed information, it is not possible to make this calculation for the period 2004–06. However, Table 3.2 shows that this has been the case for […] and evidence from the interviews suggests that it also applies to […].

Charging above-cost F2M termination rates can be expected to enable MNOs to generate rents over and above the costs of providing the call termination service. This would depend on the extent to which the increase in MCT rates would generate a fall in F2M and M2M termination traffic and revenues, which would be determined by the elasticity of demand for call origination with respect to changes in MCT rates.

In relation to F2M traffic, as noted previously, there is a relatively low elasticity of demand of fixed call origination in relation to changes in the MCT rates—ie, around –0.22 according to the study conducted by NERA.[79] As a result of such a low elasticity, any changes in MCT rates are unlikely to significantly affect the demand for F2M call termination and, therefore, the net payments made by FNOs to mobile providers would be increased by raising MCTs.

[78] Indeed, in October 1999 KPN Mobile was found to have SMP in the market for mobile call origination, but this did not give OPTA the power to impose remedies on the MCT market. At the time, the only way in which OPTA could do this was to assess whether KPN had SMP in the combined market for fixed and mobile telephony. Investigations into this combined market started in 1999 and by the end of 2001 OPTA concluded that KPN did hold SMP in this market, so remedies could not be imposed on the MCT market.

[79] NERA (2005), op. cit. p. 25.

In relation to M2M traffic, the NERA study found that there is not a statistically significant relationship between mobile call origination and MCT rates, suggesting that changes in the MCT rate would not have a major impact on the retail market.[80] This might be explained by the fact that the waterbed effect in the MCT market is not fully effective—hence, the extra rents generated from increasing termination charges are not entirely passed through to the mobile retail market.[81]

The waterbed effect can also operate through changes in handset subsidies and subscriptions. Nevertheless, although several MNOs have claimed that if they were to increase MCT rates by 10% they would use the extra revenues to reduce the prices of calls, subscriptions and handsets, Oxera was not provided with quantitative evidence to support a conclusion that such rents would be fully competed away in the retail market.

During the interviews Oxera asked operators whether there is a relationship between a change of handset subsidy policy and the termination rates the network seeks to charge. One operator emphatically stated that 'there is no direct relationship'.[82] This was explained by the fact that revenues arising from other operators (via termination charges) appear to be a more reliable source of income than those arising from final users (ie, origination revenues). As this operator stated:

> To be perfectly frank I would prefer another network to guarantee my revenues … The risk of an end user not paying is far bigger than another network not paying, but the impact [on revenues] is smaller.[83]

It is of note that, in line with hypothesis 2, if the waterbed effect is not fully effective, it is unlikely that the incentives to set high F2M termination rates will be offset by the incentives to (potentially) set low M2M termination rates in order to limit the extent to which rival MNOs can use the extra revenues obtained from high F2M termination rates to cross-subsidise retail activities in the mobile market. The incentive to set high rates would be even stronger for those networks whose termination revenues represent a larger proportion of their revenues.

Even with a waterbed effect of 100%, it is unclear that the incentives to set high, above-cost MCT rates would disappear. As noted in section 4, an individual MNO would continue to have the unilateral incentive to charge above-cost MCT rates in order to compete effectively in the retail market against other MNOs. In addition, if MNOs were to collectively agree to a reduction in MCT rates to cost-based levels, this would only be profitable if it were accompanied by a significant change to pricing policies in the retail market through, for example, an elimination of handset subsidies. This seems an unlikely outcome given that, in the last three years, when MCT rates have been decreasing due to the Covenant, there has been no evidence of a reduction in cross-subsidies to the access and origination services.

Going forward, the fall in net mobile termination revenues following the Covenant might further enhance MNOs' incentives to set above-cost termination rates to FNOs in an attempt to recover lost rents. For example, as Table 5.2 shows, […] lost more than €[…]m in termination revenues between 2004–06 (see Table 5.2). As stated previously, Oxera was not provided with quantitative evidence that these revenues were recovered through higher origination rates or reduced subsidies.

[80] NERA (2005), op. cit., pp. 24–25.

[81] Or, on the contrary, any decrease in revenues in the wholesale market is not entirely recovered in the retail market via higher origination charges.

[82] […], interview, p. 10.

[83] […], interview, p. 9.

5.3.2 Incentives of fixed and mobile operators under scenario 1

In principle, the incentives of FNOs to set their level of FCT rates in a scenario in which they are free from regulation would be broadly similar to the incentives of an MNO discussed above—ie, they would have the incentives to charge high, above-cost FCT rates—or for those FNOs that currently charge regulated rates that are below their costs, to increase those rates to a level that is at least equal to their costs. Each FNO, with a monopoly in the market for call termination over its network, would have incentives to charge a monopoly FCT rate. This has traditionally been the rationale for regulating the FCT rates of FNOs both in the Netherlands and around the world.

Oxera has been unable to obtain access to data on KPN's pre-regulation FCT rates.

Do the incentives of MNOs change when FNOs' FCT rates are unregulated? In theory, the incentives should not change. The analysis described above establishing the fact that MNOs have incentives to charge high above-cost rates does not require FNOs' FCT rates to be regulated—suggesting that hypothesis 7 is correct.

In question 12, operators were asked to state the level of termination rate that they expected each network to charge them in the absence of SMP regulation on fixed and mobile networks. Those respondents that specified the level of MCT and FCT rates they expected to be charged expect tariffs to be significantly higher for mobile than for fixed termination.[84] Moreover, as can be seen in Table 5.3, most respondents expect MNOs to charge MCT rates above costs, while for FNOs, the expectations are more balanced between FCT tariffs equal to and above costs.

Table 5.3 Expected tariffs[1]

What is the level of termination rate you expect each network to charge you in the absence of SMP regulation on FNOs and MNOs?	MNOs would charge:		FNOs would charge:	
	Equal to costs	Above costs	Equal to costs	Above costs
Number of respondents	2	9	4	5
MNOs	1 ([…])	3 ([…], […][2] and […][3])	1 ([…])	1 ([…])
FNOs	1 ([…])	6 ([…], […], […], […], […], and […])	3 ([…][4] and […][4])	4 ([…], […], […], and […])

Note: [1] Please note that not all respondents answered every part of this question hence the totals will not necessarily coincide. [2] […] stated that, in the absence of regulation, it would expect all MNOs to charge above-cost rates except for […]. In relation to […], […] claimed that the 'answer seems less relevant in view of (i) similar network costs, (ii) similar market share and offnet/onnet percentage, (iii) direct interconnect which is used for all traffic and (iv) inbound and outgoing traffic is more or less in balance. Therefore, whatever the reciprocal tariffs will be, net payments from one party to the other will be (very) low'. [3] […/…] have been classified as a single mobile operator in column 2. In addition, in relation to the termination rate that FNOs would charge, it has not been possible to classify this company in either the third or fourth columns since it offered a wide range of responses. For example, they stated that […] and […] would charge below-cost rates; […] and […] would charge cost-oriented termination rates; and […] would charge above-cost rates in the absence of regulation.
[4] Respondents stated that all FNOs except […] would charge cost-oriented rates in the absence of regulation.
Source: Oxera analysis of Q12.

In part, this response could be influenced by the fact that most respondents found it difficult to imagine a world in which FCT rates are unregulated, and therefore based their responses on the more familiar scenario in which MNOs charge high above-cost rates and FNOs are regulated at, or close to, their cost levels.

[84] These respondents include two MNOs ([…] and […]) and four FNOs ([…], […], […] and […]).

During the follow-up interviews, the issue of whether MCT rates would be affected by the ability of FNOs to change FCT rates was explored in detail. In order to make the unregulated scenario more tractable, the question posed to interviewees started from the existing regulated scenario (and its associated MCT and FCT levels, balance of traffic and net flows of revenue) and explored how FNOs would react, and what the likely impact on MCT rates would be if FCT regulation were removed.

A consistent message across fixed and mobile operators was that it would be highly unlikely that the threat of increasing FCT rates could be used effectively to achieve lower MCT rates. Moreover, a large number of fixed and mobile parties stated that an increase in FCT rates would only trigger a 'tit for tat' game in which MCT rates would also increase, potentially triggering a price war that would culminate in high MCT and FCT rates. As one FNO stated:

> Given the current set of prices, most operators have a clear net position: a net amount that they receive or pay on interconnection and what we have seen in the past [is] that when they see another operator increase their mobile termination prices or fixed termination prices, they will respond with a similar increase in order to sustain the amount of net income.[85]

Another FNO stated that:

> I think overall if mobile and fixed operators would try to, from a financial perspective, balance their termination fees, this would mean that fixed operators would have to increase their rates very substantially to compensate for the net payments made to mobile operators. In this situation, why would a mobile operator, not say, 'Well OK, if you increase, I increase'?[86]

Similarly, asked how it would respond to an increase in FCT rates, one MNO stated that:

> A raise in tariffs from [an FNO] would consequently result in a dispute, might eventually result in non-payment [by us] and therefore major dispute which would probably end up in court, and could even resolve in the worse case scenario in an increase by the mobile operators.[87]

Another common message from the interviews was that triggering a price war was in the interests of neither FNOs nor MNOs. For example, one MNO stated that:

> If we come into a rat race where everybody is increasing and increasing [their termination rates] we kill our own business.[88]

Similarly, an FNO claimed that:

> Everyone will try to create a situation in which the net out payments are zero, which will ultimately mean that operators with relatively low volumes will have to ask relatively high rates compared to operators with relatively high volumes, which will have a negative effect on the competitive position of operators with low volumes, because calls to these networks would simply become too expensive, especially compared to 'on-net' calls of other (high volume) operators.[89]

The question of whether, in an unregulated scenario, FCT rates are likely to increase would depend on whether FNOs expect either that this would not result in a price war—hence, reducing the net payments they make to MNOs—or that the resulting price war would leave them in a better financial position than the status quo scenario.

[85] […], interview.
[86] […], interview.
[87] […], interview.
[88] […], interview.
[89] […], interview.

If FCT rate increases were to lead to a price war in which the net balance of termination payments is unchanged, the key question is which network has the incentives and ability to credibly continue to increase its termination rates, eventually outdoing its rival.

The answer relies on the elasticity of demand for call termination services on fixed and mobile networks. If the MCT elasticity of demand were much lower than the FCT elasticity of demand, MNOs would have the incentives and ability to increase their termination rates more than FNOs.

The above analysis abstracts from the fact that an uncontrolled price war could lead to a situation similar to that observed during 2002–03, when OPTA was presented with a number of disputes over unreasonable termination rates, and the NMa initiated an investigation into the matter. During the interviews, MNOs stated strongly that the situation of regulatory uncertainty experienced during this timeframe was one they did not wish to see repeated in the future and that, therefore, a price war with the FNOs was clearly not in their interest.

5.3.3 Summary

In scenario 2, MNOs are unlikely to agree on rates that are below cost or zero, ruling out a bill-and-keep arrangement. Instead, operators would have incentives to charge MCT rates at or above cost—confirming hypothesis 4.

There are a number of factors that would encourage MNOs to set rates at such levels, including the balance of termination payments they receive from FNOs, the fact that the demand for MCT appears to be relatively low (even insignificant in the case of M2M calls), and the limited evidence obtained to support a conclusion that the waterbed effect is fully effective. In the context of scenario 2, the large net payments that MNOs receive from FNOs would provide them with incentives to charge high (above-cost) MCT rates to both fixed and mobile operators. Although there would be a reduction of F2M traffic following any price increase, it does not seem likely that this would offset any revenue gains that MNOs might obtain. Furthermore, MNOs are unlikely to experience a reduction in M2M traffic (and revenues) given that changes in MCT rates have no significant impact on the demand for call origination. Moreover, there is no compelling evidence that suggests that the extra revenues generated from high termination rates will be competed away in the retail market.

With respect to scenario 1, MNOs are likely to retain the incentive to charge high rates, taking into account both their own costs, and the net revenue flows they receive from FNOs—confirming hypothesis 7. Their ability to enforce an increase in MCT rates would depend on whether a price war with FNOs is triggered and the result of such a price war. This is analysed in more detail in section 6.2.3.

5.4 Conclusions

Identifying the incentives in relation to the degree of price differentiation, reciprocity, and level of termination rates that operators might be willing to offer is a first step in predicting the evolution of termination rates. The fact that operators have incentives to behave in certain way does not mean that they would have the ability to enforce their pricing policy. To an important extent this would be determined by the degree of bargaining power that originating networks have, and therefore their ability to constrain the terminating operator from acting independently of consumers.

As regards price discrimination, the information provided to Oxera indicates that technical and commercial factors mean that operators would have neither the incentives nor the ability to price-discriminate. A terminating network can only recognise the originating network when there is a direct interconnection agreement. Currently, most operators have a limited number of interconnection agreements and rely mainly on KPN CS for the termination of calls. As a result, KPN CS is the most important buyer of termination on each individual network, which might give it an advantage when negotiating termination tariffs. This implies that if a network

attempted to price-discriminate by increasing the termination rates offered to one group of customers, these customers would have the option to route their traffic through KPN CS to avoid paying the high charges. Although capacity constraints might prevent all traffic from changing routes, these are unlikely to be such that price discrimination would be worth pursuing.

In line with hypothesis 1, the relative costs of networks appear to be the main driver of the incentives in relation to the degree of reciprocity that an operator would be willing to agree on. This is because if there are cost differences, the higher-cost operator would be put at a competitive disadvantage if it were to agree on a reciprocal rate at a low level—ie, what is important is the margin that can be earned by charging different termination rates. Hence, in both scenarios, high-cost networks are not likely to agree on reciprocal rates, and this applies to both MNOs with respect to FNOs, and DCS1800 in relation to GSM900.

As for the level of payments, in scenario 2, MNOs are unlikely to agree on rates that are below cost or zero, ruling out a bill-and-keep arrangement. Instead, they would have incentives to charge MCT rates at or above cost—confirming hypothesis 4. This also applies to KPN Mobile, suggesting that the fact that it is part of the KPN Group has not influenced its incentives to offer a low MCT rate—ie, rejecting hypothesis 5.

There are a number of factors that would encourage MNOs to set rates at such levels, including the net balance of termination payments, the price sensitivity of demand, and the strength of the waterbed effect. The fact that MNOs are net receivers of termination revenues from FNOs appears to provide them with the main incentive to charge high termination rates in both scenarios. Such an incentive is strengthened by the fact that the demand for MCT from FNOs is low (–0.22 in the medium term). Moreover, MNOs are unlikely to experience a reduction in M2M traffic (and revenues) given that changes in MCT rates have no significant impact on the demand for call origination. Furthermore, there is no compelling evidence that suggests that the extra revenues generated from high termination rates will be competed away in the retail market. However, the fear of ex post intervention by the NMa could reduce MNOs' incentives to set high above-cost termination rates.

With respect to the level of termination rates in scenario 1, the evidence provided to Oxera supports the fact that MNOs are likely to retain the incentive to charge high rates, taking into account both their own costs, and the net revenue flows they receive from FNOs —confirming hypothesis 7. However, the absence of information on demand elasticities to fixed line origination rates means that it is not possible to conclude on hypothesis 6.

6 Countervailing buyer power in the mobile call termination market

According to the analysis in section 5, MNOs are likely to have incentives to charge the same termination rate to both fixed and other mobile operators and to set rates that are at or above cost. The question that arises is: would MNOs have the ability to enforce such termination rates? The answer depends on the strength of the bargaining power of buyers of termination services.

This section follows a three-step approach to assessing the existence and effectiveness of CBP in the Dutch MCT market described in section 4.

– **Step 1: measuring the potential for exercising CBP**—exploring the degree of concentration on the buying side of the market through measures such as the HHI of buyer concentration and buyer concentration ratios (section 6.1).

– **Step 2: analysis of the mechanisms through which CBP can be exercised**—this step explores the validity of the hypotheses defined in section 4.3 on the mechanisms through which buyers of MCT have attempted to influence MCT rates based on evidence from the interviews and questionnaires (section 6.2).

– **Step 3: measurement of the effectiveness of CBP mechanisms in achieving their intended outcome**—this step of the analysis aims to measure how effective buyers have been in exercising CBP in the market for MCT on each individual network (section 6.3).

The section concludes with a discussion about the expected evolution of MCT and FCT rates in the next three years (2007–09) for scenarios 1 and 2 (section 6.4).

6.1 Step 1: measuring the potential for exercising CBP

Effective buyer power is more likely to arise when a few firms or buyer groups are responsible for a large proportion of a seller's output—ie, when buyer concentration is high. A first step in assessing the existence of effective CBP in the Dutch MCT market is to explore simple measures of buyer concentration based on terminating traffic as well as net payments of termination revenue. As stated in hypothesis 9, only buyers that are important clients for the seller in terms of traffic and net payments are expected to be able to affect the seller's MCT rates.

Table 6.1 reports the HHI of concentration based on terminating traffic on each individual mobile network.[90] In 2006, […] had an HHI of around 5,000, which denotes a relatively high buyer concentration level. Nevertheless, these figures are considerably lower than their values in 2000–02.

A number of factors explain this decreasing trend. First, in the early 2000s, large operators such as […] generated a significantly higher proportion of traffic. As smaller operators […] have grown and large operators' market share of terminating traffic has declined,

[90] The HHI of terminating traffic is estimated as the sum of squared market shares (based on terminating traffic on each mobile network) of purchasers of MCT traffic. The HHI can take any value between 0 (no concentration) and 10,000 (maximum concentration—one buyer is responsible for 100% of the sales of that particular network). For example, if there are two buyers of MCT traffic on network A, each responsible for 50% of traffic, the HHI for network A would be 5,000 ($50^2 + 50^2 = 2{,}500 + 2{,}500 = 5{,}000$).

concentration measures have been gradually decreasing. This effect has been particularly strong for […], which has seen the market share of terminating traffic from […] increase significantly.

Second, Orange's strategy of setting up direct interconnection agreements in order to enter the market for transit service provision has led to a reduction in the market share of terminating traffic carried by KPN CS—operators which used to transit traffic through KPN CS to terminate their calls on Orange's network can now do so directly, bypassing KPN CS altogether.

Table 6.1 HHI of mobile call termination traffic

	2000	2001	2002	2003	2004	2005	2006
KPN Mobile[1]	[…]	[…]	[…]	[…]	[…]	[…]	[…]
Telfort[2]	[…]	[…]	[…]	[…]	[…]	[…]	[…]
Vodafone[3]	[…]	[…]	[…]	[…]	[…]	[…]	[…]
T-Mobile	[…]	[…]	[…]	[…]	[…]	[…]	[…]
Orange	[…]	[…]	[…]	[…]	[…]	[…]	[…]
Tele 2				[…]	[…]	[…]	[…]

Notes: […].
Source: […].

These effects can be seen more clearly in Table 6.2, which shows the market share, in terms of terminating traffic, of the largest buyer of call termination on each individual mobile network. In all cases, the identity of the largest buyer is KPN CS, although its market share has declined steadily since 2000. As can be seen in Table 6.2, the sharpest reductions in the importance of KPN CS as a buyer of call termination services have been experienced by […] and […], with respective falls of […] and […] percentage points between 2000 and 2006. Similarly, […] experienced a reduction in KPN CS's market share of […] percentage points during the same period.

Even though KPN CS's market share has been falling, it is still by far the largest buyer of traffic on each individual network. Moreover, with the acquisition of Telfort by KPN Mobile, and hence the re-routing of Telfort's traffic through KPN CS, the market share of KPN CS on […] and […] networks is expected to increase by approximately […] percentage points and […] percentage, respectively.[91]

[91] These are Telfort's market shares on the networks of […] and […], respectively, in 2006.

Table 6.2 Gross buyer concentration ratio: market share of the largest buyer of mobile call termination traffic on each individual network (%)

	2000	2001	2002	2003	2004	2005	2006	Identity of largest buyer
KPN Mobile[1]	[…]	[…]	[…]	[…]	[…]	[…]	[…]	KPN CS
Telfort[2]	[…]	[…]	[…]	[…]	[…]	[…]	[…]	KPN CS
Vodafone[3]	[…]	[…]	[…]	[…]	[…]	[…]	[…]	KPN CS
T-Mobile	[…]	[…]	[…]	[…]	[…]	[…]	[…]	KPN CS
Orange	[…]	[…]	[…]	[…]	[…]	[…]	[…]	KPN CS
Tele 2[4]				[…]	[…]	[…]	[…]	KPNCS

Notes: […].
Source: […].

If the gross measures of buyer concentration (HHI and market shares) described above show a market for MCT traffic which is highly concentrated, the level of concentration is even greater when measured in terms of the net payments of termination revenue, as shown in Table 6.3. KPN CS now represents more than […]% of the net termination revenues of T-Mobile and Orange (the ratio of net revenues of KPN CS over total net payments is larger than […]).[92]

Arguably, concentration measures based on net termination revenues provide a more accurate picture of the potential for exercising CBP, particularly in the Dutch market where one of the most commonly used mechanisms for challenging MCT rate increases (potentially a means for exerting CBP) has been the withholding of termination payments, as described in section 6.2.2. It is worth highlighting that only operators that are net payers of termination revenue could use this mechanism as a means of exercising CBP. Although this might seem obvious, it is important to make it explicit, particularly since it can be at odds with the gross measures of buyer concentration described above.

For example, even though KPN CS has a […] market share of terminating traffic on Tele 2's network (Table 6.2), it is not clear that it would be able to exercise CBP by threatening not to pay or by withholding termination payments, because KPN CS is actually a net receiver of termination payments from Tele 2 by virtue of the large volume of CPS traffic that Tele 2 terminates on KPN.

Similarly, even though, in 2006, KPN CS was the largest buyer of termination services on KPN Mobile's network (Table 6.2), it was not the largest net payer of termination revenue in that year.[93] Indeed, as shown in Table 6.3, the largest net payer of termination revenue to KPN Mobile during 2006 was […], whose payments represented around […]% of KPN Mobile's total net revenues.[94]

[92] For example, if an operator is a net receiver of termination revenue against KPN CS for €150m and a net payer against another operator for € 50m, in net terms, it would be a net receiver of €100m, of which KPN CS represents 150%.
[93] Oxera estimates based on […] responses to Q35 and Q36.
[94] While the net termination payments of […] to […] have remained fairly constant, […] total net termination revenue has been declining steadily.

Table 6.3 Net buyer concentration ratio: ratio of net revenue from largest net payer divided by total net revenues (%)[1]

Factor	2000	2001	2002	2003[2]	2004	2005	2006	Identity of largest net payer
KPN Mobile	[…]	[…]	[…]	[…]	[…]	[…]	[…]	KPN CS, except 2006 ([…])
Telfort[3]	[…]	[…]	[…]	[…]	[…]	[…]	[…]	KPN CS
Vodafone[4]	[…]	[…]	[…]	[…]	[…]	[…]	[…]	KPN CS
T-Mobile	[…]	[…]	[…]	[…]	[…]	[…]	[…]	KPN CS
Orange	[…]	[…]	[…]	[…]	[…]	[…]	[…]	KPN CS
Tele 2[5]	[…]	[…]	[…]	[…]	[…]	[…]	[…]	n/a

Notes: […].
Source: Oxera calculations based on responses to Q35 and Q21 of the questionnaire (for 2003–06) and information provided by OPTA (for 2000–02).

6.2 Step 2: factors and mechanisms through which CBP can be exercised

According to evidence from the interviews and questionnaires conducted by Oxera, the mechanisms through which bargaining power can be exerted when negotiating MCT rates in the Dutch market can be categorised into three groups. The first group relates to factors that are *internal* to the negotiating parties, which include:

– being a net payer of termination revenues to a negotiating party;
– the degree of information about the termination rates that other networks are charging or being charged by the negotiating party;
– the ability to transit calls to/from other networks.

The second group of mechanisms relates to factors that are *external* to the networks, such as the fact that:

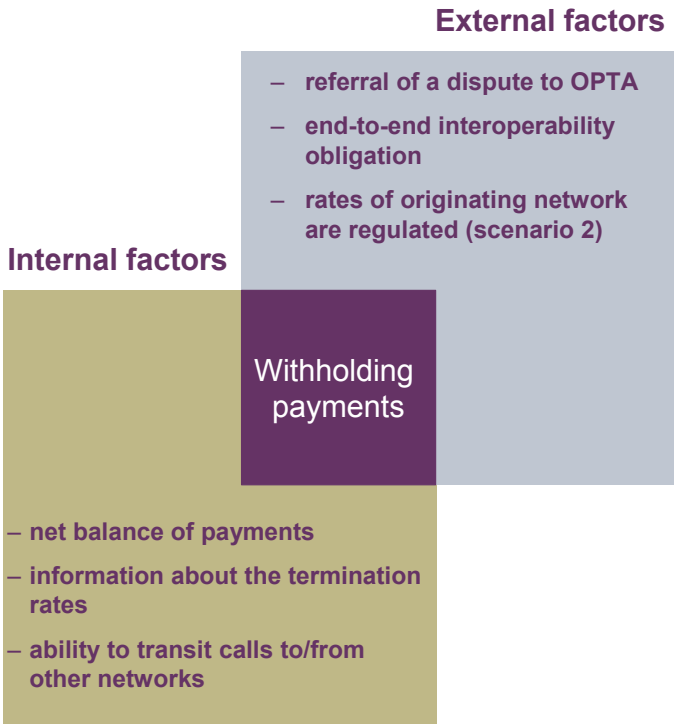
– a dispute about the level of MCT rates can be referred to OPTA;
– there is an end-to-end interoperability obligation in Dutch telecoms law;
– the termination rates of the negotiating party may be regulated (scenario 2 of the research).

There is a third group of mechanisms, which combines both internal and external factors. The most important of these is the ability of the buyer of call termination to withhold the totality or part of the termination payments due to the seller. The extent to which this mechanism works depends on:

– whether the buyer is a net payer of termination revenues and hence has the ability to reduce its termination payments (an internal factor);
– the expected outcome in the event of a dispute arising and being is referred to OPTA or an independent arbiter for resolution (an external factor); and
– whether the end-to-end interoperability obligation is absolute or whether the buyer can justifiably claim that the terms of conditions requested by the seller are unreasonable.

These mechanisms are summarised in Figure 6.1.

Figure 6.1 Typology of mechanisms influencing CBP in the Dutch mobile termination market



Source: Oxera.

Before discussing each of these factors and how they might affect CBP going forward, some preliminary evidence from the questionnaires is examined.

6.2.1 Factors affecting CBP: an overview based on responses to the questionnaire

Information on the factors affecting buyer power was provided by mobile and fixed operators, which were asked (in question 16) about their perceptions of the degree of influence of a number of factors affecting their relative bargaining position. According to the results, summarised in Table 6.4, the top five factors strengthening an operator's bargaining power are as follows.

- **Knowing the termination rates that other networks are charging**. This was the factor cited most by respondents, with all except one network noting that knowing how much others charge strengthens bargaining power to some extent (12 of the 15 stated that it strengthens bargaining power, while two noted that it does so to a significant extent).

- **Involving OPTA in a dispute related to the level of termination charges**. More than half of respondents (9/15) reported that the fact that they can *refer a dispute on MCT rates to OPTA* can (at least) strengthen their bargaining position (in line with hypothesis 14).

- **Having the ability to transit traffic to/from other networks**. In total, 9/13 operators stated that this factor would strengthen their bargaining position (in line with hypothesis 11). It appears to be a more important factor for FNOs, with 7/9 respondents stating that transiting traffic directly strengthens bargaining power in the context of a bilateral negotiation over termination rates.

- **Regulatory intervention to resolve a dispute**. More than half (8/15) of the respondents stated that this factor (at least) strengthened their bargaining position. It is

of note that, for MNOs, the fact that they can refer a dispute on MCT rates to OPTA is the most influential factor in their bargaining position.

– **The fact that the negotiating party's interconnection rates are regulated**. 8/15 respondents indicated that this strengthens or significantly strengthens their bargaining power, but it seems to be a particularly influential factor for MNOs (3/4 indicated that it would strengthen their position to some degree in a negotiation over termination).

In addition, the factor that appears to be the one that weakens an operator's bargaining power the most is *having a lower market share than the negotiating party*. 7/15 operators indicated that this would significantly weaken their bargaining power, while a further two noted that it would reduce their bargaining power.

Table 6.4 Importance of factors influencing bargaining power when negotiating termination rates according to fixed and mobile operators (average scores)[1]

To what extent would the following factors influence your relative bargaining position?	All operators[2]	MNOs	FNOs
You know what termination rates the other networks are charging	4.1	4.0	4.1
You can refer a dispute to OPTA for resolution in case you cannot reach a negotiated agreement	3.8	4.3	3.6
You have the capability to transit traffic directly to/from the other networks	3.7	3.0	4.0
You anticipate future regulatory intervention to resolve disputes	3.5	2.8	3.8
A prior agreement has been reached between your negotiating party and another network	3.4	3.3	3.4
Your negotiating party's termination charges are regulated	3.2	4.0	2.9
You have a direct interconnection agreement with your negotiating party	3.2	3.0	3.3
General telecommunications law obliges you to provide end-to-end interoperability	3.2	3.3	3.2
You are an MVNO negotiating with an MNO	3.0	3.4	2.8
You have a net outflow of calls with respect to your negotiating party (ie, you terminate more calls on its network than your negotiating party terminates calls on yours)	2.9	2.8	3.0
Your negotiating party is an MVNO	2.9	3.0	2.9
Your termination costs are above those of the negotiating party	2.6	2.5	2.6
Your negotiating party entered the market before you	2.4	2.5	2.4
Your negotiating party has better geographical coverage than you	2.4	2.5	2.4
Your negotiating party benefits from greater economies of scale or scope than you	2.1	2.5	2.0
Your market share is less than that of the negotiating party	2.0	2.4	1.8
Other factors	1.7	1.0	2.0

Note: [1] These figures correspond to the average strength of a factor which is calculated by giving scores of 1 for the responses 'Significantly weakens your bargaining power'; 2 'Weakens your bargaining power'; 3 'Neutral/No effect'; 4 'Strengthens your bargaining power'; and 5 'Significantly strengthens your bargaining power', and taking the mean average. [2] In total, 14 operators provided a response to Q16: 4 MNOs and 10 FNOs.
Source: Oxera analysis of Q16.

The above results are broadly confirmed by the responses to question 18, which asked operators to choose the five factors that have the greatest impact on their bargaining power. Table 6.5 presents the factors cited most often by MNOs and FNOs.

Table 6.5 Factors exerting a higher influence in bargaining strength[1]

Factor	All operators	MNOs	FNOs
Your market share is less than that of the negotiating party[2]	7		7
You have the capability to transit traffic directly to/from the other networks	7	3	4
You have a net outflow of calls with respect to your negotiating party (ie, you terminate more calls on its network than your negotiating party terminates calls on yours)	6		6
Your negotiating party's termination charges are regulated	6	1	5
You know what termination rates the other networks are charging	5	3	2
You can refer a dispute to OPTA for resolution in case you cannot reach a negotiated agreement	5	2	3
A prior agreement has been reached between your negotiating party and another network	5	2	3

Note: [1] Operators were asked to rank factors according to their relative influence on their bargaining strength, with 1 indicating that the factor was the most important; 2 the next most important; etc. [2] […] noted that Q18 was highly hypothetical and that it was therefore not in a position to provide specific answers. However, it stated that 'market share is a very important factor'.
Source: Oxera analysis of Q18.

6.2.2 Internal factors influencing CBP

Being a net payer of termination revenues

Hypothesis 8 states that, for the buyer to be able to affect the seller's MCT rates, the buyer must be an important client for the seller in terms of traffic and net payments. As the measures of buyer concentration discussed in section 6.1 have shown, KPN CS has been the largest net buyer of MCT services on the networks of all MNOs in the Netherlands. The only exception is […] which is a net buyer of call termination on KPN Fixed because of the large volumes of CPS traffic it terminates on KPN Fixed's network.

In addition, for […], the change in the traffic patterns over the last three years (a fall in F2M traffic from KPN Fixed and a slight increase in M2M traffic) has led to a situation in which its net termination revenues are falling to the point that in 2006 KPN CS was not the largest net payer of termination revenue. It is unclear whether KPN CS would again become the largest net payer in the next three years. A similar pattern could be occurring with […] due to the fact that its interconnection agreements for outgoing and incoming calls are identical to those of […], although Oxera has not been provided with the necessary information to make a comparable quantitative assessment.[95]

This suggests that KPN CS is likely to be in a position to exercise CBP by withholding termination payments to […] and […]. For […] and […], this would depend on the likely evolution of F2M, M2F and M2M traffic such that KPN CS continues to be the largest net payer to these networks. As discussed in more detail below, withholding termination payments has in effect been one of the strategies most widely used by KPN CS in an attempt to obtain better terms of trade in the MCT market.

In that sense, the analysis in section 6.1 on buyer concentration measures and the observation that the largest buyer of MCT traffic has been the most active player in the market attempting to influence the MCT terms of trade in the past supports hypothesis 8.

[95] That is, they both route all their outgoing and incoming calls through KPN CS except for the incoming calls of […] and […].

Moreover, hypothesis 9 states that the largest net buyer of termination on a particular mobile network should be expected to have more CBP than any other buyer of call termination on this particular network. In the Dutch market, this hypothesis can be rephrased as conjecturing that KPN CS, as the largest net buyer of MCT, is the most likely to have any CBP.

Transparency of information

Hypothesis 10 states that CBP might be stronger if there is clear and transparent information on the price and quality of call termination services. Responses to the questionnaire confirmed this view.

A number of operators stated that transparent and better information might improve a buyer's negotiating strategy by allowing it to compare the MCT rates that the terminating network is offering with those of different MNOs, and giving it an instrument to obtain a better deal. As one FNO noted:

> Given the possibility for arbitrage, knowing the termination rates charged by the negotiating partner to other firms is useful as it establishes a focus point. If rates would deviate from this focus point by more that the costs of transit (indirect interconnection), we would mention this and negotiate a tariff close to the lowest tariff offered by the negotiation party with any other firm.[96]

Another operator stated that:

> [A] New contracting party will not settle for higher tariffs than those it has already seen in other deals by the Negotiating Party.[97]

Although the responses to questions 16 and 18 suggest that having information about termination rates might increase bargaining power, responses to other questions suggests that, overall, this might not provide operators with CBP.

When asked to specify whether clear and transparent information about the price and quality of the termination services would have allowed operators to have a better negotiating position prior the Covenant, all except one agreed that this is unlikely to have been the case (see Table 6.6). This would suggest that, although having more information improves networks' ability to negotiate more favourable terms, transparency of information in itself is not an effective mechanism to exercise buyer power.

Table 6.6 The effect of transparency of information on CBP pre-2004

Would transparency in the price and quality of mobile termination have allowed you to have a better negotiating position pre-2004?	MNOs	FNOs
Unlikely	3	
Likely	1	5

Source: Oxera analysis of Q30.

The ability to transit traffic to/from other networks

The link between CBP and transit services can be analysed from two (related) sides:

– does selling transit services increase CBP when negotiating MCT rates?
– does the fact that transit services are available from third-party companies enhance an operator's buyer power?

[96] […], questionnaire, Q17.
[97] […], questionnaire, Q17.

In relation to the first question, having the ability to provide transit services might increase buyer power in the MCT market depending on the market share of the transit service provider. A strong position in the transit market might give an operator the traffic volumes to become an important buyer of call termination services. According to one operator, KPN CS currently has between 90% and 95% of the transit market.[98] As Tables 6.2–6.3 have shown, KPN CS is the largest buyer of termination services, representing between […]% and […]% of the traffic terminated on each individual mobile network and representing an even higher proportion of the net payments received by each network.

However, the fact that KPN CS has a strong position in the transit market does not necessarily mean that it would be able to exert buyer power in the call termination market and induce the terminating networks to decrease their MCT rates. In general, MNOs appear willing to fight an attempt by KPN CS to constrain MCT rates (or effective payments).

Specifically, as one operator noted in the context of a negotiation with KPN CS:

> If we think at some point we are right and they are not we do not bend, so we go for the thing we believe is correct.[99]

This message has also been reinforced by other operators.[100] Being a large transit provider does not in itself give rise to CBP. The question that arises is whether, in combination with other factors, an operator's position in transit services could give rise to CBP. In particular, the ability of KPN CS to exercise its bargaining power in a negotiation is likely to depend on the effectiveness of the following three mechanisms:

– the use of multi-market contacts to improve the terms of trade in the MCT market;
– referring the case to OPTA if KPN CS considers that the level of MCT rates offered is not 'fair and reasonable'; or
– withholding payments.

These mechanisms are not restricted to KPN CS but apply to any network that attempts to exert bargaining power. The effectiveness in strengthening buyer power of multi-market contacts is discussed in more detail below, while the other two mechanisms are discussed in sections 6.2.3 and 6.2.4 respectively.

Where the originating network does not provide transit services but is a buyer of both transit and termination, the existence of a large transit service provider might strengthen the originating network's negotiating position if the MCT rates offered by the terminating network are above those that the transit service provider is offering. A number of MNOs stated that the scale of KPN CS allows it to offer relatively low transit tariffs and obtain the most competitive MCT rates. The result is that such rates form the price ceiling for the MCT rates that an originating network might be willing to pay. As one operator stated after being asked whether it would consider alternative interconnection arrangements:

> The combination of fixed and mobile minutes from the KPN networks, combined with additional transit minutes, gives KPN the biggest volumes in the market, and therefore the biggest efficiency benefits, strongest negotiation position and maximum benefit on volume based charges. Therefore, the KPN transit service provides best prices and maximum efficiency for [our network] at this time.[101]

Another operator noted that:

[98] […], questionnaire, introduction.
[99] […], interview transcript, p. 8.
[100] […], interview.
[101] […], questionnaire, Q22.

> Currently we have no indications that we would have had a chance to have been offered lower tariffs in direct relations. In various negotiations on direct interconnect no fixed or mobile operator has shown any willingness to consider seriously requests for lower tariffs than [those offered to] KPN Fixed.[102]

Hence, the fact that KPN CS has a strong market position has the potential to generate benefits not only for KPN CS but also for third-party networks—in particular, those of KPN Mobile and Vodafone, which transit all their outgoing calls with KPN CS. Thus, it might be in the interest of all these parties to continue to use KPN CS for terminating their calls instead of establishing direct interconnection agreements. This argument has been put forward by some DCS1800 operators, which have claimed that KPN Mobile and Vodafone have been reluctant to sign direct interconnection agreements for calls terminating their networks.[103] In effect, such alleged reluctance to set up a direct interconnection agreement might be used to put pressure on DCS1800 operators to offer lower MCT rates. Hence, negotiations in separate but related markets (transit and MCT) might enable GSM900 operators to strengthen their negotiating positions—ie, multi-market contact is used to obtain better terms of trade. However, even if this were the case, the extent to which being the largest transit service provider might allow KPN CS (and, indirectly, KPN Mobile and Vodafone) to exert effective CBP depends on the remaining two mechanisms noted above: referring a dispute to OPTA, and withholding payments of termination revenues.

The above discussion appears to lend to support to Hypothesis 11, which states that, in assessing CBP in the presence of a dominant transit service provider (in this case KPN CS), it is any CBP held by this provider that is the most important. A similar conclusion was reached by Ofcom when assessing the CBP held by BT—the largest net buyer of traffic on H3G and a dominant transit service provider—in the context of assessing whether H3G had a position of SMP in the MCT market.[104]

6.2.3 External factors influencing CBP

End-to-end interoperability obligations

A buyer may apply pressure on a seller by threatening not to purchase call termination services. The option not to purchase is, however, not feasible in the Dutch market given that fixed and mobile networks are under the obligation to enter into negotiations among themselves with the objective of guaranteeing the end-to-end connectivity of their subscribers. In particular, Article 6.1 of the Dutch Telecommunications Act states that:

> A provider of public electronic communications networks or public electronic communications services, who thereby controls the access to end-users, will enter into negotiations with the provider of public electronic communications networks or public electronic communications services at the latter's request with the aim of concluding an agreement on the basis of which the necessary measures will be taken, including if necessary by means of interconnection of the networks concerned, in order to effect end-to-end connections.[105]

Evidence from the questionnaires appears to confirm that any CBP of MCT purchasers may be limited due to Article 6.1 of the Tw. After being asked whether the interoperability obligation would have an effect on its bargaining position, one operator stated that:

> Basic telecommunication law obligations, like interoperability obligations, remove potential [bargaining strategies] like disconnection or refusal of access.[106]

[102] […], questionnaire, Q22.
[103] […] and […], interviews.
[104] Ofcom (2006), op. cit., p. 57, para. 5.32.
[105] Article 6.1, para 3.
[106] […], questionnaire, Q17.

Ofcom reached a similar conclusion when it assessed the extent to which BT had CBP as a purchaser of call termination on H3G's network:

> BT's end-to-end connectivity obligation requires BT to purchase termination from each of the MNOs. If the obligation on BT to purchase termination were absolute, BT would not have any buyer power at all.[107]

However, Ofcom noted that the end-to-end connectivity obligation is not an absolute obligation because telecoms service providers are obliged to interconnect on reasonable terms. A similar interpretation has been applied by OPTA in its policy rules of 2002. The policy rules set out the maximum MCT rate levels that purchasers can reasonably be expected to accept, on the basis of Article 6.1 of the Tw.[108] MNOs were thus not obliged to agree to purchase MCT rates at whatever rate offered. Indeed, between 2001 and 2003, MNOs referred a number of disputes concerning unreasonably high MCT rates to OPTA based on the principles set out in such rules (see section 3.3.2 for a discussion of the cases). It is, unclear, whether such dispute resolution procedures would exist in the scenarios set out by OPTA.

Although operators are in principle not obliged to agree to unreasonably high MCT rates, it can be still concluded that the existence of an end-to-end connectivity obligation significantly reduces any potential CBP of MCT purchasers, as outlined in hypothesis 13 in section 4.3, because it essentially eliminates a number of potentially effective CBP mechanisms, such as refusing to purchase call termination services.

Referring a dispute on MCT rates to OPTA

The fact that an originating operator has the option to refer a dispute on the level of MCT rates to OPTA may strengthen CBP. In line with hypothesis 14, evidence from the questionnaires appears to support this view. Table 6.7 shows that most MNOs expect dispute resolution procedures to strengthen their bargaining power to some degree.

Table 6.7 Responses to question 16

You can refer a dispute to OPTA for resolution in case you cannot reach a negotiated agreement	MNOs	FNOs
Significantly strengthens bargaining power	[…]	[…]
Strengthens bargaining power	[…]	[…]
Neutral/no effect	[…]	[…]

Source: Oxera analysis of Q16.

Similarly, one MNO stated that:

> The regulator is more likely to intervene in favor of the party who complains about terminating charges being too high. Thus, the possibility of regulatory intervention probably increases the power of each party to bring the charge of the other party down, but decreases the power of each party to raise its own terminating charge.[109]

Nevertheless, referring disputes to OPTA would only enhance CBP if operators had the certainty that disputes would be settled in their favour. Prior to the signing of the Covenant in 2003, OPTA's policy rules, published in early 2002, specifying the maximum allowable MCT rates, appeared to give some degree of certainty to operators when referring disputes to OPTA. However, there does not appear to be a clear consensus on the likely outcome of

[107] Ofcom (2006), 'Mobile Call Termination: Proposals for Consultation', September, p. 69.
[108] OPTA (2002), 'Policy Rules Regarding the Regulation of Mobile Termination Tariffs', March 28th.
[109] […], questionnaire, Q16(e).

dispute resolution procedures. Indeed, in response to question 11, no operator was able to state with certainty on what basis OPTA would settle disputes over MCT rates.

The fact that dispute resolutions did not effectuate a decrease in MCT rates between 2001 and 2003, when, arguably, operators had a relatively higher degree of certainty over the likely outcome of these procedures, implies that the influence of dispute resolution procedures on CBP is likely to be relatively small in the near future.

Regulation of FCT rates (the difference between scenarios 1 and 2)

In scenario 1, where FCT rates are unregulated, FNOs can use their own FCT rates as a bargaining tool in negotiations with MNOs. The fundamental question is whether this would strengthen the bargaining position of FNOs to a point where they can exert effective CBP over the MCT rates they are paying.

In theory, there are two mechanisms through which this can take place:

– FNOs could threaten to raise their FCT rates unless MNOs lower theirs; or
– FNOs could increase their FCT rates in order to reduce the net payments they currently make to MNOs.

There was general consensus across both the fixed and mobile operators interviewed that the use of FCT rates to achieve lower MCT rates is unlikely to be effective. Furthermore, the possibility of a threat to increase FCT rates triggering a reduction in MCT rates was not cited by any of the operators interviewed. Indeed, several stated that an increase in FCT rates would actually lead to a corresponding increase in MCT rates, not a decrease, as would be expected if the use of unregulated MCT rates is to be classified as an effective CBP mechanism.

For example, when asked whether FNOs would have any buying power in an unregulated world, one FNO stated that:

> No … it is the seller who dictates the price, the buyer has nothing to say about the price, unless [an FNO] would also threaten to increase their fixed termination rates … then you would enter into a sort of pricing war.[110]

It is worth exploring in more detail the options that MNOs face if FNOs threaten to use FCT rates in negotiations, in order to understand how effective this threat could be as a CBP mechanism.

Assuming that FNOs are willing to exercise their threat to increase FCT rates if MCT rates are not reduced, there would be two possible outcomes in this unregulated scenario:

a) MNOs reduce their MCT rates because of the threat of an increase in FCT rates; or
b) FCT rates increase and MNOs respond by increasing MCT rates.

From an MNO's perspective, they must assess which of these scenarios would generate higher profits. In scenario a), the effect for an MNO would be a fall in net termination revenues due to a reduction in the difference between MCT and FCT rates. In scenario b), the net outcome is likely to depend on the demand elasticity of call termination on fixed and mobile networks, as well as on the underlying retail elasticities of demand for fixed- and mobile-originated calls.

As discussed in section 5.3, if the demand elasticity of MCT is lower than that of FCT, this would indicate that the MNOs might obtain a positive net benefit from a price war in termination rates—ie, they would be likely to prefer scenario b) to scenario a). Estimates of the FCT price elasticity and/or fixed-origination elasticities for the Dutch market have not

[110] […], interview transcript, p. 4.

been made available to Oxera. Qualitative evidence from both fixed and mobile operators during the interviews stating that fixed telephony services face a number of substitutes (including VoIP and mobile telephony) would seem to suggest that the price elasticity of retail fixed telephony services is likely to be higher than the corresponding mobile estimates, as discussed in section 5.3. This would indicate that FNOs would gain less from an upward pricing spiral.

If MNOs would be willing to engage in a price war, and FNOs were to find such a war unprofitable, hypothesis 15—that an operator's ability to respond to an increase in the rates of another operator could enhance CBP—does not appear to apply in the context of an FNO whose termination rate has been unregulated.

6.2.4 Combination of internal and external factors influencing CBP

Withholding payments

Withholding of payments from the largest net buyer of call termination (KPN CS) has been the most important CBP mechanism employed in the Dutch market. As mentioned in section 3, between 2002 and 2003, KPN CS withheld a proportion of the payments of termination revenues to […] on the basis that these networks were charging unreasonably high rates.

While being a net payer of termination revenues gives KPN CS the ability to withhold payments, its actual decision to do so was influenced by the stipulation of maximum allowable rates in OPTA's 2002 policy rules. Indeed, the proportion of withheld payments broadly corresponded to the difference between the policy rules' maximum allowable rates and the actual MCT rates charged by operators in the market. As one MNO stated:

> KPN [CS] announced to us that they would start paying no more than OPTA's defined rates from the 1st May [2002].[111]

The Dutch civil courts eventually resolved these disputes and KPN CS was obliged to pay a significant proportion of the contested amount. (Oxera was not provided with information on the exact proportion that KPN CS eventually had to pay.)

In the near future, KPN CS will continue to have the ability to withhold payments in an attempt to enforce MCT rate reductions on behalf of its clients (including KPN Fixed, KPN Mobile and Vodafone). One strategy that could be employed is the withholding of payments for the value of the mobile delta on the grounds that this MCT rate differential between GSM900 and DCS1800 is not justifiable and is therefore unreasonable. Whether KPN CS has the incentives to do so, however, is less clear. In the past, its incentives to withhold payments were strengthened by OPTA's 2002 policy rules. Going forward, OPTA has not given any signal that a mobile delta is an unreasonable condition, thereby significantly reducing the merit of pursuing this strategy.

6.3 Step 3: measuring the effectiveness of CBP

This section explores the evolution of MCT rates in the Dutch market over the period 2000–06, to assess whether they have been influenced by any of the CBP mechanisms described above. As noted in section 4.2, there are essentially three ways in which the effectiveness of CBP mechanisms can be ascertained.

1) A year-by-year comparison between the actual MCT rate charged by each MNO and the respective competitive level of the MCT rate.

[111] […], interview.

2) A comparison of the evolution over time of the level of MCT rates and the underlying MCT costs.

3) A comparison between the level of MCT rates and what both buyer (and seller) would have liked to have paid (charge).

As argued in section 4.2, the first of these measures is hard to estimate in practice because of the difficulty in obtaining reliable estimates of the LRIC+ of call termination on each mobile network (a proxy measure for the competitive MCT rate) and the scope for extensive debate about the proportion of common costs that can justifiably be allocated to termination services. Indeed, four of the five MNOs that submitted responses to the questionnaire did not provide information on the unit cost of call termination on their networks. One of these MNOs noted that:

> [We are] of the opinion that a specific cost price for call termination services does not exist. We delivered a lot of cost and volume information to OPTA in relation to the draft LRIC model in 2005/2006. With that information, and several assumptions on allocation mechanisms, a more specific cost price could in theory be calculated. But on various major conceptual issues (like Ramsey pricing, 3G costs, network externalities) our opinion on adequate models conflicts with the draft of OPTA.[112]

The only MNO that did provide cost information for the period 2004–06 reported unit costs that were below the MCT rate level agreed in the Covenant during 2004–05, although its reported costs gradually increased to the 2006 value of the existing MCT rates in the Covenant. According to that operator, the reason for this increase in unit costs was the migration from 2G to 3G networks.[113]

To assess the effectiveness of CBP mechanisms through the second measure listed above, it is necessary to estimate the likely evolution of the underlying incremental unit costs of MCT traffic on each mobile network. The precise level of the costs is not important since the relevant comparison would be between an index of MCT rates and an estimated index of underlying costs. As noted in section 4.2, if CBP has been effective in constraining MCT rates at the competitive level, the MCT rate should closely track changes in costs, particularly if costs have been decreasing.

To construct the cost index against which MCT rates will be compared, it is useful to revisit the key assumptions behind the design of the LRIC models that a large number of regulators internationally have constructed to estimate the cost of call termination on both fixed and mobile networks. The focus is on assumptions that explain differences in the level of LRIC costs, not how to arrive at the actual level of these costs.

Regardless of whether the model adopts a 'bottom-up', 'top-down' or 'hybrid' approach, all LRIC models rely on making demand forecasts of traffic volumes in order to arrive at a unit cost estimate at the end of the target period. Traffic volumes have two main effects in LRIC models. First, larger traffic volumes require additional investments in network and non-network components. As Ofcom stated in its 2006 MCT consultation:

> The level of the network cost and non-network cost related components of the 2010/11 unit cost benchmark are strongly dependent on the overall demand scenario selected.[114]

The second effect is explained by the economies of scale generated by larger traffic volumes. This effect can be quite substantial and can more than compensate for the first effect described above. Indeed, in Ofcom's LRIC model the target MCT rate levels for

[112] […], questionnaire, Q34.
[113] […], interview.
[114] Ofcom (2006), 'Mobile Call Termination: Proposals for Consultation', September, p. 188, para A13.8.

2010/11 obtained for different demand scenarios ranged from 3.2p/minute in the 'high voice and data' scenario to 6.9p/minute in the 'low voice and data' scenario—more than a 100% increase moving from the high-demand scenario to the low-demand scenario.[115]

This suggests that it might be possible to infer how incremental costs of MCT have evolved using information on the volume of calls terminated on each mobile network. Over the period 2000–03, terminating traffic volumes on DCS1800 operators grew on average by […]% per year.[116] Within the same timeframe, MCT rates experienced a growth of around 2.3% per year. Similarly, terminating traffic volumes on GSM900 operators grew by […]% during 2000–03, while MCT rates increased by 2%.

Because of the absence of reliable data on the level of MCT costs on each individual mobile network, it is not possible to conclude that MCT rates were not in line with costs, and did not move as a result of cost changes. However, if the growth in terminating traffic is a good proxy for the evolution of MCT unit costs, the possibility that MCT rates were not tracking changes in costs during 2000–03, as would be expected if CBP had been effective in constraining MCT rates, is substantial.

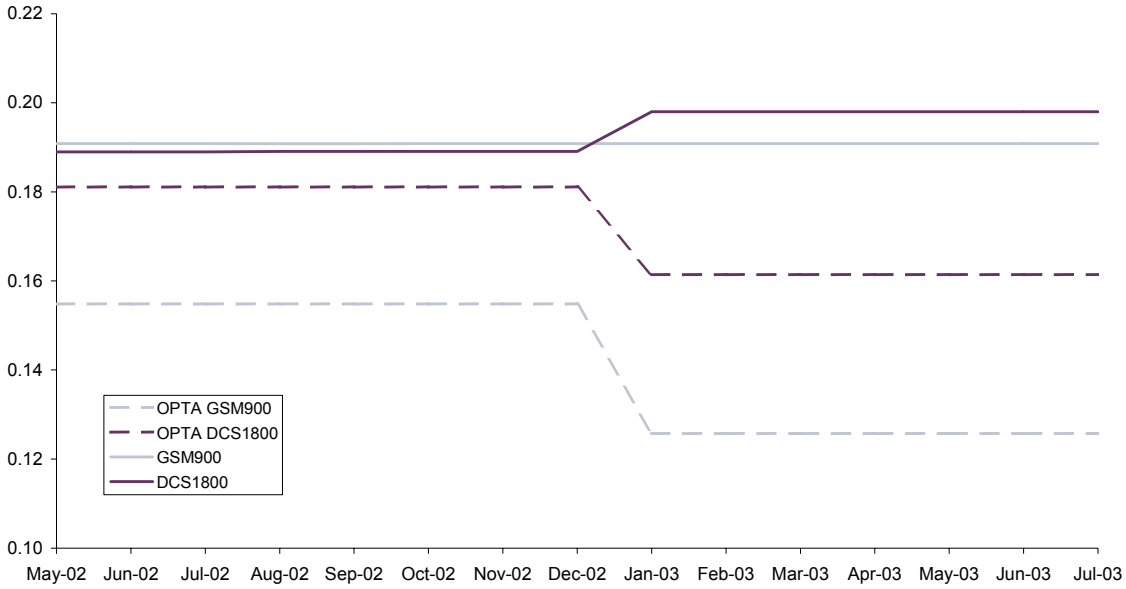
The third measure described above requires information on the starting negotiating positions of the buyer and the seller in order to compare these levels against the actual level of MCT rates agreed. As noted in section 3, between 2001 and 2003 fixed and mobile operators brought a large number of disputes to OPTA on the grounds that the MCT rates charged to them were unreasonably high.

Partly based on OPTA's policy rules, KPN CS began to withhold payments of termination revenue for the difference between the MCT rates observed in the market and what OPTA had signalled were maximum allowable reasonable rates. Figure 6.2 illustrates the difference between OPTA's glide path, as specified in the policy rules, and the MCT rates observed in the market.

If KPN CS's strategy is to be considered effective, the MCT rates should be seen to converge towards the level of MCT rates specified by OPTA. This was clearly not the case, however. Not only did MCT rates not decline, they actually increased, as shown in Figure 6.2. This pattern of MCT rates is not consistent with CBP being exercised effectively in the Dutch MCT market.

[115] ibid., p. 200. This range corresponded to the MCT rate for a hypothetical 2G/3G and 900MHZ/1800MHz combined network. The MCT rate range for a 3G-only network was even higher (2.8p/minute in the high-demand scenario, up to 9.2p/minute in the low-demand scenario).
[116] Oxera calculation based on information provided by the two largest DCS1800 operators.

Figure 6.2 Level of MCT rates compared against OPTA's policy rules, 2002–03 (€/minute)



Source: Oxera.

6.4 Expected evolution of MCT rates

6.4.1 Scenario 2: SMP regulation of FCTs, no SMP regulation of MCTs

This section discusses (in the absence of SMP regulation or the threat of SMP regulation), how MCT rates might evolve in the Dutch market. To draw conclusions on this, Oxera has used the following propositions based on the evidence gathered from the questionnaire and follow-up interviews.

– MNOs have the incentives to charge high, above-cost MCT rates.

– As argued above, the Dutch MNOs' incentive to set high termination rates was constrained only by the threat of ex post competition law in the form of the NMa investigation.

– The existing level of termination rates agreed in the Covenant is a strong focal point for negotiations.

– MNOs believe that if MCT rates were to increase (either cooperatively in a new Covenant or non-cooperatively through a price war), the NMa could step in. Not only could this result in fines against the MNOs, it would also create a climate of regulatory uncertainty that could affect the firms' valuation in financial markets.

– The NMa would be unlikely to investigate the wholesale MCT market if rates do not rise significantly above their current levels—the precise level of MCT rate increases that would trigger an NMa investigation is unclear, but the risk of intervention would be greater the more any MCT rate increases.

– One of the main reasons for operators agreeing to a glide path in the existing Covenant was the expectation that OPTA would impose it through ex ante regulation.

– The main mechanism through which CBP is exercised in the MCT market—ie, the withholding of payments of termination revenues by KPN CS, the largest buyer and net

payer of termination—has in the past been unsuccessful in reducing the level of MCT rates charged by the respective sellers of MCT traffic.

These propositions lead Oxera to predict that, in the absence of SMP regulation (or the threat of SMP regulation) of wholesale MCT rates:

– there is zero probability that MCT rates would fall from their current levels, even if underlying costs were to fall;
– there is a probability of less than 50% that MCT rates would remain fixed at their current level (€0.11 for GSM900 operators; €0.124 for DCS1800 operators);
– there is a greater than 50% probability that MCT rates would increase from current levels.

Taking into account the comments received during the consultation on Oxera's draft report—particularly those from the NMa—in the scenario in which MCT rates are not regulated, there is a balance of probability that MCT rates would increase from their current levels. Such increases would not be constrained by CBP, as the analysis in this paper shows that effective CBP does not exist in this (or indeed in other) scenarios. Furthermore, the threat of ex post intervention by the NMa does not appear to represent a fully effective constraint that would prevent MCT rates from increasing.

While MNOs have an incentive to charge higher rates than those agreed to in the Covenant, the threat of triggering an NMa investigation constrains their ability to do so. Taking into account the financial penalties that could result from a competition law investigation, it is considered that competition law provides a stronger constraint than dispute resolution. This leads to the conclusion that, in the absence of competition law, rates could increase to a greater extent than when competition law constraints are present. It is not possible to state with certainty the precise level of increase that would lead the NMa to initiate an investigation, but given the potential increase in costs relating to the roll-out of 3G networks, it would be possible to envisage increases in MCT rates without necessarily triggering an NMa investigation. In light of the evidence provided during the course of this research, the maximum feasible increase that operators could impose without facing significant risks of ex post competition law intervention would involve a reversal of the most recent tariff reduction, raising rates by approximately 18% from current levels. Attempts to increase MCT rates by more than this amount could significantly increase the risks of such ex post intervention.

Had OPTA not expressed its intention to regulate the wholesale MCT market with a glide path culminating in cost orientation, Oxera considers that such a glide path would not have arisen as a negotiated outcome. Hence, while some MNOs have suggested that they are prepared to agree to a further reduction in MCT rates going forward, this proposal is likely to be heavily influenced by the expectation of ex ante regulation from OPTA.

Similarly, KPN CS is unlikely to be able to exercise CBP in the market to achieve a reduction in MCT rates from current levels. In the past, its non-payment strategy has not been successful in achieving this objective and Oxera has not found any evidence to conclude that KPN CS would be successful in the future. For the same reasons, KPN CS or the GSM900 MNOs would be unlikely to be able to exercise CBP to eliminate the mobile delta.

6.4.2 Scenario 1: No SMP regulation of FCTs or MCTs

The likely evolution of MCT rates in this scenario would appear to be very similar to scenario 2. However, there is a greater probability that MCT rates would increase, as the freedom for FNOs to increase their termination rates to levels equal to or above cost means that there are more potential triggers for retaliatory MCT rate increases.

As discussed above, removing FCT regulation does not appear to give any incremental CBP to FNOs because changes in the existing level of FCT rates are likely to be reciprocated by MNOs. Arguably, this price war could affect FNOs more than it would MNOs. Due to the

difference in levels of FCT and MCT rates, and the strong incentives among the MNOs to maintain the current net revenue flows from fixed to mobile operators, an increase of 10% in FCT rates could be matched by a significantly lower percentage increase (just over 1%) in MCT rates.[117]

Overall, MCT and FCT rates are likely to evolve in a very similar way as in the previous scenario where FCT rates are regulated. However, there is a non-zero probability of observing a scenario in which both MCT and FCT rates rise significantly. The event that triggers this price war could be an increase in FCT rates by small FNOs followed by retaliation from KPN Fixed. If KPN Fixed extends this rate increase to the MNOs, these could in turn respond by increasing their MCT rates. Importantly, it is only when KPN Fixed increases its FCT rate that MNOs are likely to retaliate; FCT rate increases by smaller FNOs are unlikely to trigger a direct response by MNOs because of the limited financial impact that MNOs would suffer.

In other words, while the evidence gathered during the course of this research points towards a very similar outcome for both scenario 2 and scenario 1, scenario 1—a completely unregulated call termination market—is inherently more unstable and high MCT and FCT rates cannot be ruled out.

It should be noted that KPN Fixed, in its contract with other fixed and mobile operators, has committed itself to charging an FCT rate at current levels until 2009. KPN Fixed would still be legally bound to these rates even if SMP regulation on FCT rates were to be removed. If this were the case, a price war between fixed and mobile operators would be unlikely.

6.4.3 Scenario without competition law

The third scenario considered by OPTA is that in which the constraints from the abuse of dominance provisions are removed, in addition to the removal of the regulatory constraints as described in scenario 1.

The likely evolution of MCT and FCT rates would be similar to that in scenario 1, due to two additional risks. First, there would be a high probability that rates would rise from their current levels as the threat of penalties following a finding of an abuse of dominance would not exist in the scenario without competition law. Second, the removal of competition law would raise the upper boundary of potential termination rate increases to above the 18% increase considered relevant for the two scenarios above. The operators provided insufficient information on demand elasticities to enable the profit-maximising levels of mobile and fixed termination rates to be determined; nevertheless, it cannot be excluded that termination rates would increase significantly to the €0.20 levels that existed before the Covenant was agreed.

[117] Insufficient information was provided by respondents on call-related elasticities to estimate this figure precisely.

7 Conclusions

This report presents the results of analysis undertaken by Oxera of countervailing buyer power in the mobile call termination market in the Netherlands. The research has been based on information collected from operators in the telephony markets in light of the theoretical framework that has been developed during this study.

This framework informed the design of the questionnaires distributed to mobile and fixed operators, which aimed to collect information to test the validity of a number of hypotheses related to the incentives that MNOs have when setting MCT rates, and the ability that each has to enforce any MCT level, assessing the existence and strength of any buyer power held and exerted by other mobile and fixed operators. The end result of the analysis has been a prediction of the evolution of MCT rates under the following two scenarios proposed by OPTA:

– scenario 1—neither FNOs nor MNOs are subject to ex ante regulation; and
– scenario 2—FNOs, but not MNOs, are subject to ex ante regulation.

OPTA also considers the likely outcomes in a scenario in which the constraints of the abuse of dominance provisions of competition law are removed. In these scenarios, general telecommunications law obligations continue to apply. Given the hypothetical nature of these scenarios, the questions related to situations which were outside the boundaries of the operators' experience and, as a result, were difficult for the operators to answer with great precision. To improve the degree of understanding of both scenarios, and to understand the motivation behind the answers given to the questionnaires, the responses were explored in greater depth during subsequent interviews held with most respondents.

This section discusses the main conclusions of this report, differentiating between types of operator (ie, MNOs versus FNOs, GSM900 versus DCS1800 operators, and MVNO (Tele2) versus other operators) when appropriate. The key results insofar as they relate to operators' incentives in setting call termination rates are summarised below, followed by the results of the analysis of CBP (section 7.2).

7.1 Incentives in setting call termination rates

An analysis of the incentives that mobile and fixed operators face in setting call termination rates is a fundamental step in seeking to predict the likely evolution of MCT rates under the scenarios set out by OPTA. This research therefore establishes a set of hypotheses that determine the key metrics required to assess whether operators face incentives to charge termination rates above, equal to, or below costs.

Before summarising the conclusions reached, it is important to emphasise that this analysis has been undertaken on the basis that the operators will continue to operate under a CPP regime, in which the call originating network operator pays a charge determined by the call receiving network operator for having the call terminated. Under this charging regime, consumers are unable to exert any direct influence over the terminating charges set by the operators of the networks they are calling. This charging structure contributes significantly to the ubiquitous concerns about terminating monopolists.

From the hypotheses presented in section 4.3.1, it is possible to identify the following key issues that drive the termination-related incentives of the different operators:

– the ability to price-discriminate;
– cost differences between operators;

– the balance of traffic;
– the balance of termination payments;
– the strength of the waterbed effect;
– consumers' price sensitivity to changes in MCT rates.

7.1.1 The ability to price-discriminate

The information provided to Oxera by mobile and fixed operators during the course of this research indicates that they have neither the ability nor the incentive to price-discriminate by charging different buyers of termination services different termination rates. From a technical perspective, price discrimination can only take place if the terminating network has direct interconnection agreements with each originating network. More importantly, were any attempt to discriminate on price to be made, operators reported that the route that call traffic would take to the terminating network would be distorted and would be drawn towards the operator offering the lowest termination rate. While there are likely to be capacity limitations that would prevent all traffic changing routes, the statements made by the operators during this research gave clear indications that price discrimination would not be a strategy worth pursuing.

The difficulties inherent in pursuing a successful price discrimination strategy would be compounded by the current transit arrangements, under which the majority of traffic is transited via KPN CS. Of all purchasers of termination services, KPN CS is most likely to have the strongest bargaining position over the terms of the termination services purchased and would therefore be the most likely to achieve a lower negotiated rate than other purchasers. Other mobile and fixed operators would therefore have the option to transit their traffic via KPN rather than via direct interconnection agreements that would tie them in to higher termination charges. This would undermine the ability of a seller of termination services to discriminate on price.

On the basis of the evidence provided to Oxera in this research, it can therefore be concluded that mobile and fixed operators do not have the incentives or ability to price-discriminate, and therefore that each operator's termination rate applies equally to calls from fixed and mobile networks. Hypotheses 2 and 3 were therefore rejected as these were based on there being an ability to price-discriminate.

7.1.2 Cost differences, the balance of traffic and the balance of termination payments

While it has been beyond the scope of this research to assess the existence and magnitude of cost differences in relation to the termination services provided, a clear picture has emerged of the perceived relative costs of the different groups of operators. This is depicted in Figure 7.1. These reported cost differences are driven by a range of factors including scale economies, underlying technology and spectral efficiency.

Figure 7.1 Relative call termination costs

Source: Oxera.

Relative costs are of particular importance in determining the incentives for operators to set termination rates above or below costs. This is because it is not the level of the termination rate per se that is of relevance to operators, but the extent to which the margin earned on termination enables the competing operators to cross-subsidise activities in the access and origination markets.

In terms of the impact that these cost differences have on incentives, lower-cost operators would have incentives to seek reciprocal rates with higher-cost operators. In contrast, higher-cost operators would not have the incentives to seek reciprocal rates with lower-cost operators since agreeing to reciprocal rates would have an adverse and significant impact on the net revenues earned by higher-cost operators. This conclusion applies as much to the operators using the 1800MHz spectrum band in relation to the 900MHz operators as to mobile operators as a whole in relation to the fixed operators.

When network costs are similar, the balance of traffic determines which network operator is the net recipient of termination revenues, with the network with a greater volume of inbound traffic being the net recipient. However, when costs (and termination rates) differ, the balance of traffic can be one way, with the balance of termination payments the other. This is precisely the case with mobile and fixed traffic and revenues. FNOs are net recipients of traffic, but due to the large difference in termination rates, MNOs are net recipients of payments.

Further quantitative evidence of MNOs' incentives to set high rates can be drawn from looking at the net flow of money between mobile and fixed operators. A number of individual MNOs are net receivers of money with respect to fixed operators (and KPN Fixed in particular) and this outweighs any potential outflow of money they have relative to another MNO. Hence, it would be in their interest to raise MCT rates and increase the net revenues they can obtain from fixed operators. This reinforces the incentives of higher-cost MNOs to resist reciprocal termination rates, as to agree to such rates could lead directly to the loss of significant revenues for those operators.

Hypothesis 1 is therefore strongly supported by this analysis. In other words, due to cost differences, MNOs would suffer a loss of revenues were they to agree reciprocal rates with fixed operators, and DCS1800 operators would suffer a loss of revenues were they to agree to reciprocal rates with GSM900 operators. In the case of F2M termination rates, the incentives to charge non-reciprocal (and high) rates are reinforced by the fact that MNOs are net receivers of payments from FNOs.

7.1.3 The waterbed effect and price sensitivity of demand

Evidence in support of a fully effective waterbed effect provided to Oxera during the course of this research was limited. In any event, the conclusions reached are not dependent on the existence, or otherwise, of a fully effective waterbed effect, since, even without the incentives to subsidise competitive activities in access and origination markets via the waterbed effect, the elasticity of demand for MCT is sufficiently low for it to be profitable for a provider of termination services to seek to raise MCT rates—ie, –0.22 in the case of calls originated on the fixed network, but statistically insignificant in the case of calls originated on mobile networks. Such a loss in demand making a price rise unprofitable would require the operators to earn extremely high margins on their termination service.

7.1.4 The level of termination rates

Combining the different factors outlined above enables conclusions to be reached about operators' incentives to charge MCT rates that are below, equal to, or above cost to all the buyers of call termination.

Scenario 2

No operator that responded to the questionnaire stated that it would have the incentive to offer a termination rate that was at zero or below cost, even in response to an offer from another operator that was believed to be below cost. Instead, all MNOs (including Tele2) claimed that they would offer termination rates that were at or above costs. The definition of the underlying costs remains an issue—particularly as regards the proportion of common costs to be allocated to the termination service. This is relevant, since the application of Ramsey pricing principles to call origination and termination would lead to a greater proportion of common costs being allocated to call termination.

It is beyond the scope of this research to determine the appropriate cost basis; nonetheless, it is of note that regulatory authorities have not accepted arguments in favour of applying the Ramsey pricing principle when regulating termination prices. While the relevance of previous decisions and decisions in other jurisdictions may be of limited direct relevance when assessing the likely outcomes in the scenario of no-SMP regulation on mobile operators' termination, it is nevertheless clear that the operators' desire to persuade the regulator that Ramsey pricing principles should be applied in itself answers the question as to whether operators would wish to raise termination prices above LRIC+ with a lower '+'. The ability of operators to respond to these incentives by raising termination rates can be observed in the pattern of termination rate movements prior to the agreement of the Covenant, and the expectation that MNOs would charge above-cost termination rates was clearly shown in the results to the questionnaire.

The evolution of MCT rates prior to the Covenant provides additional insight into the incentives faced by the operators in regard to the level of termination rates in scenario 2. This is because the MCT rate glide path agreed in the Covenant does not appear to have been a profit-maximising decision that would have been taken in the absence of the threat of regulation. Instead, the main factor resulting in the signing of the Covenant and the agreed glide path was regulatory pressure from the NMa and OPTA.

Similarly, KPN Mobile's decision to lower its MCT rate in June 2000 was largely in anticipation of an SMP designation by the Dutch regulator, and the reduction was not followed by any other MNO. On the contrary, between October 2000 and December 2003, Orange and Tele 2 increased their rates, as did KPN Mobile, partially reversing its previous reduction. On the basis that the observed increases in termination traffic during the 2000–03 period would have enabled MNOs to achieve cost efficiencies (or, at worst, the unit cost of termination services remained constant), this leads to the conclusion that, in the absence of SMP regulation (or the threat of SMP regulation), MNOs during that period had the incentive (and, more importantly, the ability) to charge above-cost termination rates. There would have been no developments that would have significantly changed the incentives of the operators to charge above-cost termination rates, so this conclusion remains valid.

While the incentive to set high and above-cost MCT rates is common to all MNOs, there are particular differences in the level of rates that GSM900 and DCS1800 operators would seek. The evidence points to the following.

– **GSM900 operators […]**. These operators want the mobile delta to be removed and to charge reciprocal rates. [KPN Mobile] has suggested a continuation of the glide path with all MNOs converging to the same rate by 2009 while […] has suggested €0.11 per minute for all, which is the current MCT rate of GSM900 operators.

– **DCS1800 operators […]**. These operators want to maintain the mobile delta. […] would agree to a continuation of the glide path but with the delta in place, and […] has suggested a slight decrease in rates but with a delta of around €[…] per minute. […] was not so explicit in its proposals for the next three years but appeared to agree on a mobile delta.

Hypotheses 4 is therefore supported by this analysis.

Scenario 1

It has been necessary to examine how the incentives of MNOs may change as well as the incentives faced by FNOs. In this scenario, the only change in the incentives of MNOs in setting their MCT rates would come from the level of termination rates that FNOs are expected to charge. In principle, FNOs' incentives are similar to those faced by MNOs in scenario 2—ie, they would have incentives to set high, above-cost termination rates. Examples of these incentives have been seen in the past in the Dutch market when, for example, FCT rates of unregulated operators increased following the separation of traffic flows (one for Internet dial-up, and another for telephone calls).

The question is therefore whether high FCT rates would affect MNO's incentives to set high MCT rates. Starting from the current level of MCT and FCT rates, and assuming that SMP regulation of FCT rates were removed, the analysis of the evidence from the questionnaire and follow-up interviews has found that neither FNOs nor MNOs are likely to raise their rates because this would lead to a price war.

Indeed, the majority of MNOs stated during the interviews that if FNOs were to increase their FCT rate, this would be likely to trigger a price war—ie, MNOs would react by increasing MCT rates in order to maintain the existing net balance of payments from the FNOs. Similarly, FNOs (KPN Fixed in particular) claimed that they could envisage a price war with MNOs if they raised their termination rates.

Smaller FNOs, on the other hand, could potentially have incentives to raise their FCT rates if they believed that this would not trigger a price war with KPN Fixed. These smaller operators might be able to raise their rates by a relatively small amount without triggering a response from KPN Fixed. This could happen if, for example, the gain for KPN Fixed of reciprocating an FCT increase from small FNOs is outweighed by the risk of triggering a price war with MNOs. It is unclear, however, how small the FCT rate increase of small operators would have to be for this to happen.

Conclusions on the MNOs' ability to raise rates in response to these incentives, and, in particular, the potential for CBP to constrain that ability, are presented below. It is important to emphasise that in order to maintain the net revenue flow from fixed to mobile operators following, say, a 10% increase in FCT rates, MCT rates would need to increase by a significantly lower percentage. This constrains the ability of FNOs to use increases in their rates as a tool to constrain MNOs.

In setting out the conclusions on the existence of CBP, scenario 2 results are presented prior to those of scenario 1. This enables the incremental effects of not having SMP regulation on MNOs to be observed separately from scenario 1 in which no regulation of either fixed or mobile operators is in place.

7.2 Countervailing buyer power

An assessment of CBP is an important element of any analysis of dominance or SMP in a market, as the presence of effective CBP indicates that sellers are unable to act independently of their customers, leading to the conclusion that the seller does not have SMP. Buyer power and relative bargaining positions are affected by a myriad of factors, and it is likely that the degree of influence that a buyer can exert over a seller will vary accordingly. For CBP to be considered effective, it must be sufficiently strong for outcomes to emulate those in a competitive market. This implies that effective CBP would not only prevent prices rising above cost, but would also ensure that cost reductions are reflected in MCT rates. If this is the case, although as discussed above operators appear to have incentives to charge high above-cost MCT rates, CBP would make tariffs converge to the competitive level.

The analysis of the existence and the extent of CBP in this research has followed a three-stage approach:

– step 1: measuring the potential for exercising CBP;
– step 2: analysis of the mechanisms through which CBP can be exercised;
– step 3: measurement of the effectiveness of CBP mechanisms in achieving their intended outcome.

The conclusions of the analysis are that in neither scenario is the bargaining power of any of the purchasers of termination services strong enough to be considered sufficiently effective to undermine conclusions that sellers of termination services possess SMP. The reasons for this are presented below for each of the scenarios considered (in reverse order).

7.2.1 Scenario 2: SMP regulation on fixed, not on mobile, termination rates

Step 1: buyer concentration measures

Preliminary measures of buyer concentration in terms of gross traffic and net payments show that the buying side of the market is highly concentrated. The largest sender of traffic—which in almost all cases is KPN CS—accounts for more than 60% of the traffic sent on each mobile network. In terms of payments, these concentration measures are even larger for DCS1800 operators, with KPN CS accounting for more than 100% of the net termination revenues of […]. However, it is unclear whether this would also be the case for […].

This analysis suggests that KPN CS could have the greatest potential to exercise CBP in the Dutch market for MCT. In light of the conclusions on the inability to price-discriminate between users, the focus of the analysis has therefore been on the identification of mechanisms through which KPN CS could credibly constrain MCT rates to the competitive level.

Step 2: mechanisms influencing CBP

The study has explored the various mechanisms through which CBP could have been exercised in the Dutch MCT market. These include mechanisms that have been broadly classified into the three following categories.

– **Mechanisms internal to the negotiating parties**. Factors that are under the control of, or are intrinsic to, the operators. These include the degree of information about the termination rates that other networks are charging or being charged by the negotiating party, and the ability to transit calls to/from other networks.

– **Mechanisms external to the negotiating parties**. These include OPTA's dispute resolution procedures; the end-to-end interoperability obligation in the Tw; and the fact that the termination rates of the negotiating party are regulated.

– **Factors that are a combination of external and internal mechanisms**. The most important of these is the ability of the buyer of call termination to withhold the totality or part of the termination payments due to the seller. The extent to which this mechanism works depends on whether the buyer is a net payer of termination revenues and hence has the ability to reduce its termination payments (an internal factor); the expected outcome in the event of a dispute arising and being referred to OPTA or an independent arbiter for resolution (an external factor); and whether the end-to-end interoperability obligation is absolute or whether the buyer can justifiably claim that the terms and conditions requested by the seller are unreasonable.

Of these factors, according to the evidence from the interviews with MNOs, the one that provides the most direct (potential) means of exerting CBP is the withholding of net termination revenues (for the difference between what the buyer deems is reasonable and what the seller is requesting). Since only KPN CS is a net payer of termination revenues to the MNOs, this mechanism could only applied by KPN CS. Indeed, this has been a mechanism used by KPN CS in the past to seek to reduce the termination payments it had to make to […].

A further mechanism that has been identified by operators as a factor that strengthens their relative bargaining position is the potential for referring disputes to OPTA. Evidence from the questionnaires suggests that this is particularly important for MNOs negotiating MCT rates. To a certain degree it is uncertain whether this mechanism is specifically related to ex ante regulation, or whether OPTA would have the powers and/or obligations to deal with such disputes in the absence of ex ante regulation. This is not a matter on which Oxera is qualified to comment, hence the analysis has sought to identify separately the effectiveness of dispute resolution as a constraint mechanism, such that outcomes with and without such a procedure can be predicted.

Step 3: effectiveness of CBP mechanisms

This element of the analysis explored the question of whether the evolution of MCT rates observed during 2000–06 in the Dutch market is consistent with a scenario in which CBP has been exercised effectively.

As has already been noted in relation to the incentives to seek to raise rates, evidence to support these conclusions on incentives was obtained from analysing events in the mobile markets between 2000 and 2006. In particular, the MCT rate glide path agreed in the Covenant was not a profit-maximising decision, and is unlikely to have been reached in the absence of the threat of regulation. Instead the main factor resulting in the signing of the Covenant and the agreed glide path was regulatory pressure from the NMa and OPTA, and the pattern of MCT rates prior to the signing of the Covenant were more representative of the behaviour of the MNOs in the absence of regulation. The fact that no MNO followed KPN Mobile's MCT rate reduction is a clear indication that they have incentives to set high rates when free of SMP regulation (or the threat of such regulation). This leads to the conclusion that, were there to be no threat of ex ante regulation, MNOs would be unlikely to reduce MCT rates in response to any reductions in cost and would be likely to have the incentives to raise them above current levels.

The evidence presented to Oxera and analysed in section 6 of this report reveals that withholding payments was not successful in achieving its intended outcome during 2000–06. Based in part on OPTA's policy rules, KPN CS began to withhold payments of termination revenue for the difference between the MCT rates observed in the market and what OPTA had signalled were maximum allowable reasonable rates. For KPN CS's strategy to be considered effective, the MCT rates would be expected to converge towards the level of MCT rates specified by OPTA. This was clearly not the case, however. Not only did MCT rates not decline, they actually increased in the case of Orange, Tele2 and KPN Mobile, and remained broadly constant in the case of T-Mobile and Vodafone. This pattern of MCT rates is not consistent with CBP being exercised effectively by KPN CS in the Dutch MCT market.

Going forward, one of the main differences in incentives between MNOs is the mobile delta. During the programme of interviews, DCS1800 operators seemed confident that they would be able to enforce a differential in their MCT rates against MNOs. In particular, they appeared to believe that OPTA's and NMa's view on what constituted reasonable MCT rates included the concept of a mobile delta (see section 7.1.4).

In that sense, it is not clear whether GSM900 operators will be able to either directly, or through KPN CS, enforce a reduction or elimination of the mobile delta through any of the CBP mechanisms discussed in this report.

7.2.2 Scenario 1: no fixed SMP regulation, no mobile SMP regulation

The analysis in this totally unregulated scenario was focused on the additional CBP mechanisms that could be employed by a fixed operator (ie, in addition to all previous CBP mechanisms explored which would still remain as potential strategies to pursue in this scenario). It is important to note that the effectiveness of the mechanisms previously analysed would not change in this scenario.

In this unregulated scenario, FNOs could potentially use their own termination rate as a bargaining tool in negotiations with MNOs. All else being equal, this could be expected to strengthen the relative bargaining position of the FNOs since it provides them with a 'threat' mechanism that could reduce the incentives of MNOs to increase rates.

It should be stressed that the conclusions in this scenario should be treated with more caution than those for scenario 2, to reflect the fact that this is a hypothetical scenario that extends well beyond the boundaries of current experience for the operators. Nevertheless, the evidence collated during the course of this research points towards the conclusion that, even with the ability to raise their rates, FNOs would not be able to do this in order to reduce or eliminate the net revenue flows to MNOs without a response from the MNOs to restore net revenue flows to their original levels.

Increasing the FCT rate would not be an effective strategy to achieve a reduction in MCT rates if this leads to a price war in termination rates.

Such a price war could be detrimental to FNOs themselves. The reason for this relates to the assumption that increases in FCT rates are likely to cause a significant substitution of calls from fixed networks to alternatives such VoIP and mobile networks.

7.3 Evolution of MCT rates

As a final element of the research, Oxera examined how MCT rates might evolve in the Dutch market under the scenarios in light of the conclusions on the absence of CBP.

The conclusions are as follows.

In scenario 2, in which MCT rates are unregulated, the likelihood that rates would increase is considered to be greater than the likelihood that they will remain at current levels. On balance of probability, MCT rates would increase from their current levels. Such increases would not be constrained by CBP, as the analysis in this paper shows that effective CBP does not exist in this (or indeed in other) scenarios. Furthermore, the threat of ex post intervention by the NMa does not appear to represent a fully effective constraint that would prevent MCT rates from increasing.

In scenario 1, in which neither MCT nor FCT rates are regulated, there is a greater probability that MCT rates would increase than in scenario 2, as the freedom for FNOs to increase their termination rates to levels equal to or above cost means that there are more potential triggers for retaliatory MCT rate increases. Significantly, removing FCT regulation does not appear to give any incremental CBP to FNOs and to KPN Fixed in particular. This is because changes in the existing level of FCT rates are likely to be reciprocated by MNOs, resulting in a price war that could affect FNOs more than it would MNOs. This conclusion is reinforced by the fact that MCT rates would have to increase by a much lower percentage than FCT rates in order to maintain the current net revenue flows between fixed and mobile operators.

In neither scenario do operators have the incentives to reduce MCTs, unilaterally or collectively across all MNOs, but significant increases would lead to a risk of intervention by the NMa. The precise threshold for intervention would be for the NMa to determine. Increases of 5–10% from current levels are likely to be insufficient to trigger an ex post investigation. The top end of the range of tariff increases is considered to be a reversal of the most recent tariff reduction, raising rates by approximately 18% from current levels, without triggering an ex post investigation under competition law. Attempts to increase MCT rates by more than this would significantly increase the risks of such ex post intervention.

While dispute resolution mechanisms are considered an important element in strengthening each operator's bargaining strength, in the face of a significant number of complaints about tariff increases, the dispute resolution and appeal procedure (and the criteria applied) appear

to be neither sufficiently transparent nor timely to provide an effective constraint on either MCT rates or FCT rates. Furthermore, when the potential financial penalties under competition law are taken into account, it would appear that the threat of ex post intervention is likely to be a more effective constraint on termination rates than dispute resolution. This leads to the conclusion that, in the absence of competition law, there is a greater risk that rates could increase; furthermore, rates could rise by significantly more than when competition law constraints are present, potentially returning to the levels that were being charged at the end of 2003, before the Covenant was agreed.

In conclusion, while the evidence gathered during the course of this research points towards a very similar outcome for both scenarios 2 and 1, scenario 1—a completely unregulated call termination market—is inherently more unstable, and increases in MCT and FCT rates cannot be ruled out. Finally, in the absence of competition law constraints, there would be a high probability that rates would rise significantly from their current levels as the threat of penalties following a finding of an abuse of dominance would not exist.

Appendix 1 Questionnaire

A1.1 Background information

1. Please state your name, your role in your organisation, your telephone number, fax number and email address for possible further enquiries and/or a follow-up interview in January 2007.

2. Is it possible for your company to charge a different termination rate to each of the operators to which it provides call termination services?

    a. If 'no', what prevents your company from doing so?

    b. If 'yes', please list the factors that explain the differences in termination charges.

3. **[For all fixed and mobile operators]** Is it possible for your company to identify the network and/or service provider from which calls originate? If not, how do you determine which company to bill for the call termination services you provide?

4. **[For all fixed and mobile operators]** When negotiating termination rates with the mobile virtual network operator (MVNO) Tele2, does your company:

		Yes	No
a	Negotiate the termination rate directly with Tele2 only		
b	Negotiate both with the host network and Tele2		
c	Negotiate the termination rates with the host network operator only		

If your company has not negotiated Tele2's termination charges just with the MVNO (ie, you answered 'Yes' to b or c), please explain why.

A1.2 Incentives to determine termination charges

For the questions in section 3 please assume, unless specified otherwise, that there is no SMP regulation on mobile or fixed operators, and that general telecommunications law obligations apply (in particular, the end-to-end interoperability obligation of Article 6.1 and the option to refer disputes for OPTA to resolve).

5. If, in the context of a bilateral negotiation with **a mobile operator**, your company were offered a termination rate (a) equal to zero, (b) below the negotiating party's termination cost but above zero, (c) equal to its cost, or (d) above its termination cost, what termination rate would you offer in return? Please list the mobile operators to which you would offer the different termination rates using the table in the attached excel workbook. Below an illustrative example is provided (companies selected randomly).

Example response:

	1. You would offer a termination rate of **zero**	2. You would offer a termination rate **below** your company's termination cost but **above** zero	3. You would offer a termination rate **equal** to your company's termination cost	4. You would offer a termination rate **higher** than your company's cost
a. The negotiating party offers you a termination rate of **zero**	All mobile companies [1]			
b. The negotiating party offers you a termination rate **below** its termination cost but **above** zero	KPN Mobile	Vodafone	All other mobile companies	Tele2
c. The negotiating party offers you a termination rate **equal** to its termination cost		T-Mobile	Orange	All other mobile companies
d. The negotiating party offers you a termination rate **above** its termination cost				All mobile companies

Note: [1] The combination in which both you and your negotiating party offer termination rates of zero is known as a "bill-and-keep" arrangement

6. If, in the context of a bilateral negotiation with **a fixed operator**, your company were offered a termination rate (a) equal to zero, (b) below the negotiating party's termination cost but above zero, (c) equal to its cost, or (d) above its termination cost, what termination rate would you offer in return? Please list the fixed operators to which you would offer the different termination rates using the table in the attached excel workbook.

   For this question, please differentiate your responses according to whether:

   a. you are negotiating termination rates with a fixed operator and there was no SMP regulation on fixed or mobile termination rates; and

   b. you are negotiating termination rates with a fixed operator whose termination rate is regulated at cost, but there is no SMP regulation on mobile termination rates

   Below an illustrative example is provided (companies selected randomly). Please note that regulated fixed operators can only be listed in line (c) since fixed termination rates are assumed to be regulated at cost.

Example response:

	1. You would offer a termination rate of **zero**	2. You would offer a termination rate **below** your company's termination cost but **above** zero	3. You would offer a termination rate **equal** to your company's termination cost	4. You would offer a termination rate **higher** than your company's cost
a. The negotiating party offers you a termination rate of **zero**	All fixed operators[1]			
b. The negotiating party offers you a termination rate **below** its termination cost but **above** zero		KPN fixed (unregulated)		All other unregulated fixed operators
c. The negotiating party offers you a termination rate **equal** to its termination cost	All other fixed regulated operators	KPN fixed (regulated)	All other unregulated fixed operators (including KPN if it is unregulated)	
d. The negotiating party offers you a termination rate **above** its termination cost				All fixed operators

Note: [1] The combination in which both you and your negotiating party offer termination rates of zero is known as a "bill-and-keep" arrangement

7. In any negotiation over termination rates, please indicate with an "X" in the table in the excel workbook whether the factors identified: (i) strengthen your incentives to offer a termination rate **above** your costs; (ii) strengthen your incentives to offer a termination rate **equal** to your costs; (iii) strengthen your incentives to offer a termination rate **below** your costs; or (iv) have a neutral effect on your incentives. The identified factors are:

   a. your company's market share relative to that of your negotiating party;

   b. the net flow[118] of traffic to or from your network;

   c. your you costs of call termination relative to those of your negotiating party;

   d. your company's geographic coverage relative to those of your negotiating party;

   e. the availability of substitutes;

   f. the scope for price discrimination;

   g. the feed-through from termination rates to call origination prices.

   h. the possibility of referring a dispute to OPTA

   i. the end-to-end interoperability obligations from general telecommunications law

8. Would your answers to Q7 change depending on the mobile operator with which you were negotiating? If yes, please explain how your answers would change and why.

[118] Net flow is the difference between incoming and outbound traffic.

9. Would your answers to Q7 change if you were negotiating termination rates with a fixed operator and there was SMP regulation on fixed termination access. If yes, please explain why.

10. If your company could unilaterally raise termination charges by 10% from the current level, what would be the impact on

    a. mobile call prices (both mobile-to-mobile and mobile-to-fixed);

    b. subscription prices (ie, monthly rental prices);

    c. handset prices;

    d. marketing costs;

    e. your company's ability to compete for new customers;

    f. total revenues;

    g. profitability;

    h. any other dimensions of the business (please specify)?

    Please explain why providing quantitative evidence, if available.

11. **[For all fixed and mobile operators]** If a failure to reach an agreement over termination rates were to lead to a referral to OPTA, on what basis would you expect OPTA to rule (eg, cost-based charges, fair and reasonable terms)? Please explain the reasoning behind your response.

12. **[For all fixed and mobile operators]** Consider the situation where there is no SMP regulation on mobile or fixed termination rates and general telecommunications law obligations apply. In the context of a bilateral negotiation with **another fixed or mobile network operator**, what do you expect would be the termination rates that the other networks would offer you? Please provide your response in the excel workbook attached, stating whether this is above or below the other networks' termination costs. Please also explain the reasoning behind these expectations.

13. **[For all fixed and mobile operators]** Consider the situation where there is no SMP regulation on mobile or fixed termination rates and general telecommunications law obligations apply. In this scenario, using the table in the excel workbook, please indicate what would be level of termination rates you would seek to obtain from each operator in the following three years.

14. If the price of call termination on fixed networks were regulated at a level equivalent to the regulated fixed termination charge (FTC), how would this affect your answers to Q13? If this would affect the level of termination rates that you would seek to obtain, please provide the new termination rates in the table in the excel workbook and explain why you would charge different tariffs to the ones in Q13.

15. **[For all fixed and mobile operators]** If, according to your answers to Q13 and Q14, the termination rates your company would like to charge are different to rates your company currently charges, please list the factors that would explain such a difference.

A1.3 Evidence of CBP

A1.3.1 Overview

16. **[For all fixed and mobile operators]** Please indicate with an "X" in the table in the attached excel workbook, in the context of a bilateral negotiation over termination rates, to what extent the identified factors influence your relative bargaining position vis-à-vis the operator with which you are negotiating (your "negotiating party"). If there are other factors that you consider influence your relative bargaining position, please include those in the table and indicate their influence.

17. **[For all fixed and mobile operators]** Please explain why and how the factors identified in response to Q16 affect your bargaining position in the way you have stated, providing specific examples of the manner in which these factors have affected prior negotiations. If relevant, please also include in your reply reasons why you have stated that certain factors have no effect on your bargaining position.

18. **[For all fixed and mobile operators]** Of the factors identified in Q16 that could influence your relative bargaining strength, please indicate which are the 5 most important in the attached excel workbook. Please rank their relative importance on a scale of 1–5, with 1 being the most important factor, 2 the next most important, etc.

19. **[For all mobile operators other than KPN Mobile/Telfort]** How, and to what extent, would the common ownership of KPN's fixed telephony operations and KPN Mobile/Telfort influence your negotiations with the KPN group in relation to (i) fixed-to-mobile calls; and (ii) mobile-to-mobile calls and SMS termination? Please explain your response.

20. **[For KPN and all mobile operators]** How, and to what extent, would the common ownership of KPN's fixed telephony operations and KPN Mobile/Telfort change KPN's profit-maximising termination rate for termination on (a) its fixed network and (b) its mobile network(s) for calls and SMS termination? Please explain your response stating clearly whether (in the absence of regulation) KPN would have the incentives and the ability to charge above cost termination rates on either fixed or mobile networks.

A1.3.2 Direct interconnection

21. **[For all fixed and mobile operators]** In the table in the attached excel workbook, please specify whether you have a direct interconnection agreement with each of the following operators and whether this is a one-way or two-way agreement (mark with an '**X**'). In the case the interconnection agreement is one-way, please specify the direction (ie, for calls originated or terminated on your network). In this latter case (and in the case when there is no direct interconnection), please indicate the alternative arrangements that are in place (eg, transit through KPN Telecom or another provider).

    See example below:

Name of operator	1) There is a **two-way** direct interconnection agreement	2) There is a **one-way** direct interconnection agreement (for calls **originated** in my network)	3) There is a **one-way** direct interconnection agreement (for calls **terminated** on my network)	4) There is **no** direct interconnection agreement	If you selected options 2), 3) or 4), please specify the **alternative arrangements** that are in place
KPN Mobile		X			Transit through provider Y
Orange	X				
Vodafone				X	Transit through provider Z

22. **[For all fixed and mobile operators]** Please describe your motivations for seeking direct interconnection, including, for example, the impact of direct interconnection on (a) your costs; (b) your ability to negotiate better deals with other networks.

23. **[For all fixed and mobile operators]** For the operators with which you currently have no direct interconnection, please specify whether (a) you have had a direct interconnection agreement in the past; (b) you have unsuccessfully tried to negotiate a direct interconnection agreement in the past; (c) you are in the process of negotiating a direct interconnection agreement. If necessary, please provide detailed responses.

24. **[For all fixed and mobile operators]** If you have not reached an agreement in relation to direct interconnection, please explain for what reason the request to interconnect directly was not accepted by the negotiating party. Please also explain how the matter was settled. In particular, did you refer the dispute to OPTA?

A1.3.3 Sequence of negotiations

25. **[For all fixed and mobile operators]** In a situation where your company would in absence of SMP regulation on mobile and fixed termination have to negotiate termination rates with other providers of mobile or fixed telephony (eg, as in the pre-2004 situation), would you negotiate simultaneously with all operators, or would you seek to conclude negotiations with certain operators first?

26. **[For all fixed and mobile operators]** If you would (or did) negotiate with a certain operator (or operators) first, with which operator would you like to start (or did start) negotiations with? Please explain why.

27. **[For all fixed and mobile operators]** In the pre-2004 situation, did your company reach an agreement with the operators named in response to Q26 prior to finalising agreements with the other operators?

28. **[For all fixed and mobile operators]** Did the rate agreed with the operators named in response to Q26 in effect determine the rate at which you would set termination charges to the other operators? If not, please explain which factors lead to any differences.

A1.3.4 Other factors

29. **[For all fixed and mobile operators]** Does your company consider that clear and transparent information on the price and quality of mobile call termination services offered by alternative operators is readily available? Please explain why. Was this the case before 2004?

30. **[For all fixed and mobile operators]** In the pre-2004 situation, do you consider that having clear and transparent information would have allowed you to have a better

negotiating position when agreeing MCT charges with third-party operators? Please explain why.

31. **[For all fixed and mobile operators]** Before 2004, had another company refused to pay you or delayed reaching an agreement with you on call termination rates? If yes, please explain the arguments used by the other company to refuse or delay reaching an agreement and how the matter was eventually resolved. If the matter was referred to OPTA, what was OPTA's decision in relation to the level of the MCT rates and their relationship with the costs of the terminating network (eg, were they cost oriented)?

A1.4 Data request

A1.4.1 Termination prices

32. **[For all fixed and mobile operators]** Please provide in the table in the attached excel workbook information on the annual average call termination rates charged (€ cents per minute) by your company to each operator between 2003-06 inclusive and their estimated annual growth rates for 2007-09 inclusive.

33. **[For all fixed and mobile operators]** Please provide in the table in the attached excel workbook information on the annual average call termination rates that each operator charged your company between 2000-06 inclusive and their estimated annual growth rates for 2007-09 inclusive.

A1.4.2 Termination costs

34. **[For all fixed and mobile operators]** Please provide in the table in the attached excel workbook information on the annual average unit cost of providing call termination services between 2000-06 inclusively (€ cents per minute) and the estimated annual growth rates for 2007-09 inclusive.

    a. Please specify whether the average unit costs stated above are based on long-run incremental costs (LRIC), LRIC+, fully distributed costs (FDC) or another cost allocation mechanism (and if so, please describe your costing methodology).

    b. Do the cost estimates provided include costs of your company's 3G network? If so, please provide a breakdown between 2G and 3G costs.

    c. Do the results of OPTA's LRIC model differ from your own cost calculations? If yes, by how much do your estimates of termination costs differ from those in the LRIC model, and please list the factors that might explain the difference in the calculations.

A1.4.3 Traffic volumes

35. **[For all fixed and mobile operators]** Please provide in the table in the attached excel workbook information on the annual volume of calls that each operator terminated on your network (millions of minutes) between 2003–06 inclusive and the estimated annual growth rates for 2007-09 inclusive.

36. **[For all fixed and mobile operators]** Please provide in the table in the attached excel workbook information on the annual volume of calls originated on your company's network and terminated on each operator's network (millions of minutes) between 2003–06 inclusive and the estimated annual growth rates for 2007-09 inclusive.

A1.4.4 Customer base

37. Please provide in the table in the attached excel workbook information on the total number of customers in your network split between (a) contract customers (ie, pay monthly customers), and (b) prepay customers between 2000-06 inclusive and the estimated annual growth rates for 2007-09 inclusive.

A4.1.5 Revenues

38. Please provide in the table in the attached excel workbook information on the total annual average revenue per user (ARPU) your company obtained between 2000-06 inclusively and the estimated annual growth rates for 2007-09 inclusive.

A4.1.6 Other information

39. Please provide in the table in the attached excel workbook information on the annual subscriber acquisition costs in terms of (a) net handset costs (ie, handset subsidies), (b) advertising and marketing costs, (c) other costs (please specify) between 2000-06 inclusive and the estimated annual growth rates for 2007-09 inclusive.

40. Using the table in the excel workbook, please provide estimates (if available) of the following measures **of firm-specific**:

    a. responsiveness (ie, elasticity) of:

        (a) demand for mobile subscriptions: (ie, % change in the number of mobile subscribers/ % change in mobile subscription prices)

        (b) demand for mobile calls (ie, % change in the volume of mobile calls/ % change in the price of mobile calls)

        (c) demand for fixed-to-mobile calls (ie, % change in the volume of fixed-to-mobile calls/ % change in the price of fixed-to-mobile calls)

    b. responsiveness (ie, elasticity) of:

        (a) demand for mobile subscription with respect to changes in mobile calls prices (ie, % change in the number of mobile subscribers/ % change in the price of mobile calls);

        (b) demand for mobile subscriptions with respect to changes in fixed-to-mobile calls prices (ie, % change in the number of mobile subscribers/ % change in the price of fixed-to-mobile calls)

        (c) demand for mobile calls with respect to changes in the price of mobile subscriptions (ie, % change in the volume of mobile calls/ % change in the price of mobile subscriptions)

        (d) demand for mobile calls with respect to changes in the price of fixed-to-mobile calls (ie, % change in the volume of mobile calls/ % change in the price of fixed-to-mobile calls)

        (e) **[For fixed operators]** demand for fixed-to-mobile calls with respect to changes in the price of mobile subscriptions (ie, % change in the volume of fixed-to-mobile calls/ % change in the price of mobile subscriptions)

        (f) **[For fixed operators]** demand for fixed-to-mobile calls with respect to changes in the price of mobile calls (ie, % change in the volume of fixed-to-mobile calls/ % change in the price of mobile calls)

41. Using the table in the excel workbook, please provide estimates of the following measures of **industry-wide responsiveness** of demand:

    a. the responsiveness (ie, elasticity) of:

        (a) demand for mobile subscriptions: (ie, % change in the number of mobile subscribers/ % change in mobile subscription prices)

        (b) demand for mobile calls (ie, % change in the volume of mobile calls/ % change in the price of mobile calls)

        (c) demand for fixed-to-mobile calls (ie, % change in the volume of fixed-to-mobile calls/ % change in the price of fixed-to-mobile calls)

    b. the responsiveness (ie, elasticity) of:

        (a) demand for mobile subscription with respect to changes in mobile calls prices (ie, % change in the number of mobile subscribers/ % change in the price of mobile calls);

        (b) demand for mobile subscriptions with respect to changes in fixed-to-mobile calls prices (ie, % change in the number of mobile subscribers/ % change in the price of fixed-to-mobile calls)

        (c) demand for mobile calls with respect to changes in the price of mobile subscriptions (ie, % change in the volume of mobile calls/ % change in the price of mobile subscriptions)

        (d) demand for mobile calls with respect to changes in the price of fixed-to-mobile calls (ie, % change in the volume of mobile calls/ % change in the price of fixed-to-mobile calls)

        (e) **[For fixed operators]** demand for fixed-to-mobile calls with respect to changes in the price of mobile subscriptions (ie, % change in the volume of fixed-to-mobile calls/ % change in the price of mobile subscriptions)

        (f) **[For fixed operators]** demand for fixed-to-mobile calls with respect to changes in the price of mobile calls (ie, % change in the volume of fixed-to-mobile calls/ % change in the price of mobile calls).

Appendix 2 Overview of the theoretical literature on access pricing in telecoms

The economic models of call termination can be classified in to one of four categories, depending on whether they analyse the determination of reciprocal or non-reciprocal termination rates,[119] and whether they deal with M2M or F2M call termination.

Table A2.1 shows the main findings of two key contributions from the literature on non-reciprocal M2M call termination. Gans and King (2000) and Carter and Wright (2003) conclude that, given that each operator takes its rival's termination rate as fixed, both operators will have the unilateral incentive to raise their respective call termination rates above cost—ie, each operator believes that in doing so, it would raise its rival's cost and experience an increase in interconnection revenues.[120] Similarly, each operator has the incentive to face the lowest possible termination rate. The final level of termination rates that operators will agree on would then depend on the relative CBP of operators.

Table A2.1 Key contributions in M2M call termination with non-reciprocal charges

Contribution	Model assumptions	Main findings
Gans and King (2001)	Two-part tariffs (ie, rental charge plus retail per-minute prices), symmetric market shares and cost structures, on-/off-net price differentials in retail prices	Both firms have an incentive to raise the call termination rate they would charge the other operator, which would be passed on to the other operator's customers Moreover, because of the profits obtained in call termination from each additional subscriber that joins a network, operators will compete strongly for new customers and erode all extra rents—ie, the 'waterbed effect'
Carter and Wright (2003)	Two-part tariffs, asymmetric market shares but symmetric costs	Both firms have a unilateral incentive to set an access price above marginal cost (for the they calls terminate), and would prefer to face an access price below cost (for calls that are terminated by the rival firm) They also note that in a potential negotiation, an incumbent may be able to achieve a higher access rate than its rival, which could be used as a barrier to entry An additional result is that, starting from a cost-based charge, joint profits can be increased by raising the larger firm's access price and lowering the smaller firm's access price. However, small firm would only agree to this structure if lump-sum transfers were permitted

Source: Oxera.

While mobile operators have incentives to set above-cost termination rates in the case of non-reciprocal negotiations, this may no longer be the case when termination rates are set on a reciprocal basis. It is important to note that while scenarios 1 and 2 identified by OPTA do not oblige operators to agree on reciprocal termination rates, reciprocity may arise endogenously during the negotiation process if the interests of two or more operators

[119] Reciprocity in this context means that the termination rate that firms A and B agree on will apply for calls going in both directions (ie, A to B and B to A).

[120] Gans, J.S. and King, S.P. (2001), 'Using "bill and keep" Interconnect Arrangements to Soften Price Competition', *Economic Letters*, **71**:3, 413–20; and Carter, M. and Wright, J. (2003), 'Asymmetric Network Interconnection', *Review of Industrial Organization*, **22**, 27–46.

coincide—ie, by agreeing on reciprocal termination rates, they would be able to obtain higher profits than under non-reciprocal negotiations.

Table A2.2 shows the main findings of some of the key contributions of the literature on reciprocal M2M call termination. Different assumptions on the competitive dynamics in the mobile market will provide different results. Understanding how these market characteristics influence the incentives of operators is a fundamental first step of the research.

Armstrong (1998), for example, predicts high (above-cost) termination rates: by raising each other's costs, operators are able to increase the retail per-minute prices to the monopoly level and achieve a collusive outcome.[121] Armstrong's result, however, is highly sensitive to the assumption that mobile firms compete on retail prices only. Laffont, Rey and Tirole (LRT) (1998a and 1998b) introduce the more realistic assumption of two-part tariffs in their model and are able to show that operators would be indifferent to the level of termination rate due to the fact that any excess rents obtained on retail prices are competed away through rental charges or handset subsidies.[122] LRT's result relies on the waterbed effect being 100% effective—ie, the tendency for competition for mobile subscribers to eliminate rents obtained in termination services.

Moreover, when LRT's model is extended to include on-/off-net price differentials (Gans and King, 2000[123]), the intensity of competition is even more sensitive to the level of the termination rate, which raises the possibility of the waterbed effect being more than 100% effective. In other words, firms would prefer below-cost, possibly even 'bill-and-keep', arrangements (ie, where termination rates are zero).

However, when LRT's model is extended to introduce asymmetric market shares, as Carter and Wright (2003) do, it is the large network that prefers cost-based charges while the small network's incentives will coincide with the large one only when its market share is below some threshold; otherwise, it prefers a termination rate that deviates from costs (see Table A2.2 for an explanation on the intuition behind this result).

It is interesting to note that, in Carter and Wright's paper, the balance of traffic between operators is endogenous to the model. In other words, when access charges are set at cost, traffic between operators is, by assumption, perfectly balanced. Higher or lower levels of the access charge will tip this balance towards one network or the other. More generally, all of these models start with the assumption that all consumers are assumed to be identical and make on-/off-net calls in proportion to each network's market shares and, hence, traffic between firms is in balance.[124]

It should be noted that, in practice, traffic is likely be out of balance even if access charges are set at cost, particularly if networks have users with different calling profiles—eg, some networks may have a higher proportion of pre-paid customers which tend to be net receivers of calls. Net call receivers would, all else being equal, have an unambiguous incentive to set reciprocal call termination rates above cost, provided that the cost increase does not tip the balance of traffic the other way round (and provided this does not increase the intensity of competition to excessively high levels from the network's perspective).

[121] Armstrong, M. (1998), 'Network Interconnection in Telecommunications', *The Economic Journal*, **108**, 545–64.

[122] Laffont, J.J., Rey, P., and Tirole, J. (1998a), 'Network Competition I: Overview and Nondiscriminatory Pricing,' *Rand Journal of Economics*, **29**:1, 1–37; Laffont, J.J., Rey, P., and Tirole, J. (1998b), 'Network Competition II: Price Discrimination,' *Rand Journal of Economics*, **29**:1, 38–56.

[123] Gans, J. and King, S. (2000), 'Mobile Network Competition: Customer Ignorance and Fixed-to-Mobile Call Prices', *Information Economics and Policy,* **12**:4, 301–28.

[124] Consider two networks, A and B, with 70% and 30% market share, respectively. If the total identical customers are making calls in proportion to each network's market shares, 21% of calls would originate on network A and would terminate on network B (30% of 70%). Conversely, 21% of calls would originate on network B and would terminate on network A (70% of 30%).

Table A2.2 Key contributions in M2M call termination with reciprocal charges

Contribution	Model assumptions	Main findings
Armstrong (1998)	Linear pricing (not rental charge), symmetric market shares and costs	Predicts high access prices by both networks Access prices can be used as an instrument of collusion. By networks raising each other's costs, retail prices are increased to the monopoly level and operators can achieve monopoly rents
LRT (1998a and 1998b)	Same as Armstrong (1998) plus two-part tariffs	Profit-neutrality result—ie, profits are independent of the level of the termination rate While access charges push up retail per-minute prices, these are offset by more intense competition in rental charges, which wipes out any excess profits—ie, the waterbed effect
Gans and King (2001)	Same as LRT (1998a and 1998b) plus on-/off-net retail price differentials	Both firms will choose 'bill-and-keep' (ie, zero call termination rates). Intuition is as follows With above-cost reciprocal termination rates, each customer represents a valuable source of termination profit—hence firms compete vigorously for customers. The opposite is the case for below-cost termination rates In sum, this model finds that on-/off-net price differentials have a dramatic impact on the intensity of competition. In the presence of these price differentials, the waterbed effect can be more than 100% effective
Carter and Wright (2003)	Same as LRT (1998a and 1998b) but with asymmetric market shares	Large network will prefer a cost-based reciprocal termination rate. Intuition is as follows If termination rates were above cost, there would be two effects: (i) the large network would gain market share;[1] but (ii) it will experience an interconnection deficit.[2] In this model, the second effect outweighs the first The small network may also prefer cost-based charges when asymmetry is large; with moderate asymmetry, the small network prefers charges that deviate from costs

Notes: [1] This is because the average call tariff charged by the large network to its customers (a weighted average of the costs of on- and off-net calls) would be lower than the respective tariff of the small network—hence, the larger network becomes more attractive to a proportion of users of the small network.
[2] Because of the lower average call tariff the large network's customers would make more calls, on which it pays above-cost termination rates. Note that the opposite is the case when termination rates are priced below cost—the large network's customers would receive more calls, but these are priced below cost. Hence the preference for cost-based charges.
Source: Oxera.

Table A2.3 presents the main findings of two key contributions from the literature on F2M call termination when the FCT rate is regulated (scenario 2 of this research). Wright (2002)[125] and Gans and King (2000) both conclude that mobile operators have the unilateral incentive to set termination rates at (or above) the monopoly level. As the fixed termination rate is regulated, the problem is that of a classic monopoly provider (the mobile network) maximising profits by raising its price (the termination rate).

The studies highlight a number of factors that might exacerbate this result. For example, if an F2M caller cannot identify the mobile network it is calling (a situation that has been referred to in the literature as 'customer ignorance'), fixed customers make call decisions based on the *average* cost of F2M calls. Hence, a mobile operator that increases its termination rate would affect the volume of F2M calls terminating on *all* mobile networks and not only its

[125] Wright, J. (2002), 'Access Pricing under Competition: An Application to Cellular Networks', *The Journal of Industrial Economics*, **50**, 289–315.

own—such an increase would be profitable. This effect could arise with mobile number portability, or could also be present when fixed operators do not differentiate the prices of F2M calls by mobile operator for either technical, commercial or regulatory reasons.

Table A2.3 Key contributions in F2M call termination with non-reciprocal charges and regulation of the M2F call termination rate

Contribution	Model assumptions	Main findings
Wright (2002)	One regulated fixed operator, n, imperfectly competitive symmetric mobile operators	When the fixed operator can set differential prices for F2M calls depending on the terminating network, mobile firms have incentives to set F2M termination rates at the monopoly level When the fixed operator is constrained to set a uniform price for F2M calls, profit-maximising F2M termination rate might be even higher than the monopoly level
Gans and King (2000)	One regulated fixed operator, n, imperfectly competitive symmetric mobile operators	Customer ignorance (the fact that the fixed-line caller cannot identify the network they have reached when making F2M calls) gives incentives to mobile networks to raise the termination rate. Intuition is as follows Higher F2M termination rates will increase the (average) F2M retail price. Hence, from an individual operator's perspective, this increases its termination margin without a significant fall in the volume of F2M calls that terminate on its network

Source: Oxera.

Oxera is not aware of formal models dealing with the determination F2M and M2F call termination rates where the fixed operator's rate is free of regulation—ie, under scenario 1, as specified by OPTA. The reason for this apparent gap in the literature is that, historically, fixed call termination rates tend to be regulated, so this case would not have much practical relevance.

Nevertheless, the results obtained from the literature on reciprocal M2M termination rates, which show that, under some circumstances, firms may have incentives to set cost-based or even bill-and-keep arrangements, have led some authors to suggest the possibility of deregulating fixed termination rates and oblige fixed and mobile operators to negotiate reciprocal termination rates on their networks.

Wright (2002), for example, suggests that 'as long as the firms' (fixed and mobile operators) bargaining power is roughly balanced, the tendency for cellular firms to set high termination charges may be alleviated.'[126] Valletti and Houpis (2005) propose a similar solution, but warn that this remedy may be inappropriate in the case of asymmetric networks (eg, traffic flows are not balanced).[127]

In addition, Sidak and Crandall (2004), highlight the case of the USA where voluntarily negotiated termination rates between (fixed and mobile) network operators had to have low and relatively equal F2M and M2F termination rates by 2000.[128] It is worth highlighting, however, that the USA operates under a receiving party pays (RPP) system, whereby it is the receiving customer who pays the termination rate, a system which provides direct incentives for consumers to seek a network provider with both low originating and terminating

[126] Wright J. (2002), 'Access Pricing under Competition: An Application to Cellular Networks, pp. 313–14.

[127] Valletti, T. and Houpis, G. (2005), 'Mobile Termination: What is the "Right" Charge?', mimeo.

[128] Sidak, J.G., and Crandall, R.W., (2004), 'Should Regulators Set Rates to Terminate Calls on Mobile Networks?', *Yale Journal on Regulation*, **21**, 43–44.

charges.[129] The outcome of a negotiation between fixed and mobile operators may be different in markets with a CPP system such as the Netherlands.

[129] RPP has been criticised as generating inefficient levels of usage, as it provides incentives for consumers to switch off their handsets to avoid incurring the costs of receiving calls.

Appendix 3 Industry acronyms

ARPU	average revenue per user
BSC	base station controller
BTS	base transceiver station
CBb	College van Beroep voor het bedrijfsleven
CBP	countervailing buyer power
CPP	calling party pays
CPS	carrier pre-selection
ERG	European Regulators Group
F2M	fixed to mobile
FCT	fixed call termination
FDC	fully distributed costs
FL-LRIC	forward-looking long-run incremental cost
FNO	fixed network operator
HHI	Herfindahl–Hirschmann index
ISP	Internet service provider
KPN CS	KPN Carrier Services
LRIC	long-run incremental cost
M2F	mobile to fixed
M2M	mobile to mobile
MCT	mobile call termination
MNO	mobile network operator
MSC	mobile switching centre
MVNO	mobile virtual network operator
NMa	Nederlandse Mededingingsautoriteit
OFT	Office of Fair Trading
PTSN	public telephone switched network
RPP	receiving party pays
SMP	significant market power
Tw	Telecommunicatiewet
VoB	voice over broadband
VoIP	voice over Internet protocol

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