

A review of ACM's game theory analysis

Report for VodafoneZiggo

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1 Introduction

VodafoneZiggo commissioned Radicand Economics to critically review the game theoretical analysis performed by ACM in its latest draft decision “*Market Analysis: Wholesale Fixed Access*”, 27 February 2018.

Brief outline of ACM’s draft decision

ACM starts its analysis with a review of retail markets. ACM distinguishes between a retail market for business network services (hereafter referred to as the B2B market) and a retail market for (bundled) internet access services (hereafter referred to as the B2C market). ACM concludes that in the B2B market there is a risk of single dominance by KPN in the absence of regulation. It concludes that in the B2C market there is a risk of joint dominance by KPN and VodafoneZiggo in the absence of regulation. The joint dominant position may result in tacitly coordinated behaviour with regards to pricing strategies, resulting in above competitive retail prices. According to ACM, deviations by player A may be punished by player B through targeted rebates for switching consumers; a punishment which can easily be reversed when player A indicates its willingness to return to the coordinated equilibrium by means of raising its prices again.

To investigate options for mitigating the risks of (joint) dominance in retail markets, ACM analyses the underlying wholesale market(s). The starting point of the analysis is the market for wholesale local access (or WLA), as defined in ACM’s market analysis decision 2015. This market corresponded to market 3a in the European Commission’s Recommendation on Relevant Markets 2014 and comprises of physical and virtual local access products (ULL at MDF/SDF/ODF and VULA). Today, ACM concludes that, due to market and technological developments, there is no longer a distinction between local and central access products¹. ACM now defines one single market for ‘wholesale fixed access’ (or WFA) in which all forms of wholesale access (ULL, ODF, VULA, and WBA) are considered close substitutes for each other.

ACM finds that KPN and VodafoneZiggo have symmetric positions in the WFA market, with comparable market shares and opportunities, and that neither has significant market power

¹ The European Commission’s Recommendation on Relevant Markets 2014 considers the market for wholesale central access (WCA or market 3b) separate from the market for wholesale local access (WLA or market 3a).

(SMP) on its own. However, ACM establishes that KPN and VodafoneZiggo have the incentive and the ability to tacitly coordinate their behaviour in terms of refusing to provide entrants with wholesale access to their networks. Joint refusal to provide wholesale access would enable both parties to coordinate their behaviour in the retail market for (bundled) internet access services and gradually increase consumer prices to above competitive levels. In the absence of regulation, ACM concludes that there is joint SMP of KPN and VodafoneZiggo in the WFA market. According to ACM, deviations by party A from the joint refusal to supply wholesale access may be punished by party B through (temporary) reductions of the retail price and/or by also offering wholesale access. The latter punishment is less reversible and would imply going back to the uncoordinated equilibrium for a longer duration.

To mitigate the risk of joint dominance at retail level, ACM has decided to impose an obligation on both KPN and VodafoneZiggo to provide wholesale access to their networks, along with other regulatory obligations and measures at wholesale level.

Objective and approach of this report

Without prejudice to ACM's conclusions on the definition of the relevant market², the objective of this report is to provide an expert assessment of ACM's analysis and conclusion regarding the incentives and ability of KPN and VodafoneZiggo to tacitly coordinate their behaviour in the wholesale and retail markets.

The analysis in this report focusses on the game-theoretical approach followed by ACM. The approach hinges on:

- a presumed pay-off matrix, supporting ACM's conclusion that KPN and VodafoneZiggo have incentives to coordinate their behaviour; and
- an analysis of circumstances under which KPN and VodafoneZiggo are presumed to have the ability to coordinate their behaviour.

ACM concludes that VodafoneZiggo and KPN have an incentive to tacitly collude on retail prices, on investments, and on the provision of wholesale access. ACM's analysis seems to be structured around the notion that all three areas of coordination are interrelated and that one does not go without the other. We focus our analysis on coordination regarding the provision

² A critical review of ACM's conclusions on the definition of the relevant market is provided by Ecorys in a separate report - Ecorys (2018) "Wholesale Markets in the Netherlands - Update", a study for VodafoneZiggo

of wholesale access. When appropriate we comment on ACM's analysis of the coordination of retail prices and investments.

The report is structured as follows:

Chapter 2 discusses the incentives for each party to coordinate its behaviour with its competitor. ACM bases its analysis on a stylised representation of a typical prisoners' dilemma in which players have an incentive to coordinate. We conclude that ACM provides no proof that VodafoneZiggo and KPN are indeed involved in such a prisoners' dilemma. On the contrary, there is a wide range of academic literature which shows otherwise. Moreover, we show that even when the game would be characterised by a prisoners' dilemma, VodafoneZiggo experiences a competitive disadvantage on the wholesale market such that KPN will have no incentives to participate in a coordinated outcome.

Without prejudice to the conclusions in Chapter 2, Chapter 3 discusses the conditions facilitating the coordination of behaviour. Key for ACM's analysis is to show that individual payoffs (and thus the incentives to cheat/coordinate) remain balanced over time and that cheating can easily be detected and punished in such a way that the coordinated outcome will be restored. We show, however, that there are important asymmetries between the companies, that make it unlikely that there is a stable competitive balance. Due to technological differences between the networks, each infrastructure has different advantages and possibilities, which has an impact on the possibilities for differentiation of access-based retail offerings, and also affects how each firm is affected by different technological shocks (some of which affect cable, some copper, some fiber). The latter can be expected to make the game quasi finite and the coordinated outcome unstable. ACM fails to explain and motivate its assumption of an infinite game (also in the interpretation given by ACM in § 1038, footnote 334, which requires a foreseeable, symmetric probability that the game may end in each period), which is essential for reaching a coordinated outcome in the first place. Finally, we argue that the mechanisms for detection and retaliation as identified by ACM are unlikely to restore the coordinated equilibrium following a deviation by one of the players. ACM fails to properly analyse the effectiveness and credibility of the retaliation mechanism.

Annex I provides elaborate comments on the methodological approach followed by ACM throughout its draft decision. On many occasions, ACM's analysis reads like a 'checking-the-boxes-exercise', where different arguments are simply added up without an explanation of whether and why it makes sense to make comparisons in this fashion.

2 Incentives to coordinate

In the following sections we first briefly present ACM’s analysis of the incentives for KPN and VodafoneZiggo to coordinate (section 2.1). We note that VodafoneZiggo is currently not offering wholesale access while KPN is. This observation is not consistent with ACM’s analysis. In section 2.2 we provide explanations for this inconsistency. The first explanation is that VodafoneZiggo may experience a competitive disadvantage. The second explanation is that the game between KPN and VodafoneZiggo may not be characterised by a prisoners’ dilemma. Section 2.3 provides a summarising conclusion.

2.1 A brief description of ACM’s analyses of the incentives to coordinate

ACM starts its analysis with an assessment of single SMP by either party and concludes that this is not the case, because of symmetry between VodafoneZiggo and KPN.³ Next, ACM draws up a stylized pay-off matrix resembling the competitive interactions between two symmetrical companies to analyse whether, in an infinitely repeated game based on this pay-off matrix, both companies have an incentive to (tacitly) coordinate their behaviour.

In a general form, the pay-off matrix for two symmetrical companies is depicted below. The letters before the comma resemble the profits for KPN in each scenario. The letters after the comma resemble the profits for VodafoneZiggo in each scenario. Because companies are symmetrical they have the same pay-offs for different strategies.

		VodafoneZiggo	
		Deny Access	Provide Access
KPN	Deny Access	A, A	C, B
	Provide Access	B, C	D, D

³ ACM simulates what the market shares of VodafoneZiggo and KPN would be in a greenfield situation; it considers to what extent both companies enjoy scale and scope economies on their networks; and whether parties enjoy a competitive advantage resulting from having some exclusive features (e.g. content). ACM also considers the costs structure of both companies.

ACM then assumes that the pay-offs in the matrix are such that $B > A > D > C$, as depicted below:

		VodafoneZiggo	
		Deny Access	Provide Access
KPN	Deny Access	3, 3 (scenario 1)	1, 4 (scenario 3)
	Provide Access	4, 1 (scenario 2)	2, 2 (scenario 4)

Under this assumption on the pay-off parameters, the game corresponds to a prisoners' dilemma. If the two players play this game for an infinite number of periods, the repeated game has two potentially stable equilibria: scenario 1 and scenario 4. Scenario 1 (the collusive outcome) can only be stable if certain conditions are met, corresponding to the ability of parties to coordinate. If these conditions are not met, the repeated game will settle in scenario 4. It is not possible for the game to settle in scenario 2 or 3, because that would imply irrational behaviour by one of the network operators, in the sense that either player would have an incentive to choose a different action.

Based on the above pay-off matrix, ACM concludes that KPN and VodafoneZiggo have an incentive to tacitly agree not to provide wholesale access. However, this conclusion is based on incorrect reasoning that seems to be biased towards the establishment of joint dominance: while analysing whether players have an incentive to coordinate, ACM assumes the pay-offs to be consistent with the pay-offs of a prisoners' dilemma, knowing that players in a prisoners' dilemma have an incentive to coordinate when the game is repeated. In other words, ACM does not investigate whether players have an incentive to coordinate, ACM assumes they have an incentive to coordinate.⁴ Moreover, as observed in chapter 2, it is surprising that ACM immediately jumps to an analysis of tacit collusion, while the natural starting point would be to assess each firm's incentives to provide voluntary access on its own merits.

⁴ACM (2018, paragraph 215) argues the values from the profit matrix are "selected on the basis of the game theoretical analysis". However, in Annex D, ACM (2018, paragraph 1035) states "The only condition is that there must be a Prisoner's dilemma, which is the case if: $B > A > D > C$ ". In other words, the ACM did not select values on the basis of analysis, it made an assumption.

To analyse whether players have an incentive to coordinate, ACM should have analysed whether currently observed behaviour by market players is consistent with pay-offs as in a prisoners' dilemma. Notably the fact that VodafoneZiggo does not provide wholesale access in the presence of an access obligation for KPN, should have urged ACM to analyse whether VodafoneZiggo has its own individual incentives for not granting access.⁵ Below we perform such an analysis.

2.2 Observed behaviour is not consistent with ACM's pay-off matrix

A first observation is that KPN has been offering WBA for many years now. A second observation is that over the past 10 years, ACM has not identified any technological or economic development from which it may conclude that significant changes have occurred regarding the possibility to provide WBA over cable networks. If we assume, for the sake of the argument⁶, that WBA over cable is technically and economically possible in the Netherlands today, it has been for many years. It follows that, if the above pay-off matrix is a correct representation of the incentive structure of network operators in the Netherlands, cable operators should have granted access already a long time ago.⁷ However, the Dutch cable operator has not provided WBA.

According to ACM's payoff matrix, VodafoneZiggo has been conserving scenario 2, where it would be better off in scenario 4. The fact that KPN's prices of Wholesale Local Access has been regulated does not affect this conclusion. As long as wholesale prices remain above cost level, it follows from ACM's analysis that VodafoneZiggo should have an incentive to offer

⁵ This also confirmed by the European Commission in the serious doubts letter regarding Case SI/2009/0913 *"the Commission is of the view that being aware of Mobilitel's obligation to grant wholesale access, Si.mobil could be encouraged to provide access in order to generate wholesale revenues. Thus, **the fact that Si.mobil has not successfully finalised any negotiations in that regard, may indicate that it has its own individual incentives for not granting access.**"*

⁶ Ecorys (2017) provides evidence which questions the economic viability of wholesale access over VodafoneZiggo's network – see Ecorys (2017) "Wholesale access to cable", a study for VodafoneZiggo

⁷ At least since 2014, following the merger between UPC and Ziggo. But also before 2014, when the Dutch market was characterised by two large regional cable operators and one national DSL operator, the logic of ACM's pay-off matrix would have resulted in cable-companies granting access. The fact that the access seeker's willingness to pay for access to cable in region A is conditional to having access to cable in region B does in the end not alter the game.

wholesale access. Regulated prices of KPN's WLA products are set above cost level and, more importantly for VodafoneZiggo, KPN offers WBA services for commercially determined prices.

In our view, there are only three possible explanations for why VodafoneZiggo does not provide wholesale access:

1. VodafoneZiggo is irrational; or
2. VodafoneZiggo would have a competitive disadvantage vis-à-vis KPN if it were to offer WBA; and/or
3. The pay-offs in the matrix are not a correct representation of the actual pay-offs in the market.

We dismiss the first explanation. The following sections elaborate on the other ones.

2.2.1 Competitive disadvantage for VodafoneZiggo?

Regarding the second explanation, there are three (non-exclusive) reasons why VodafoneZiggo may have a competitive disadvantage vis-à-vis KPN regarding the provision of WBA:

1. VodafoneZiggo may experience barriers to enter the WFA market;
2. current wholesale access seekers are likely to experience high switching costs if they were to switch from KPN to VodafoneZiggo; and
3. VodafoneZiggo may not be able to provide an equally attractive wholesale offer.

We elaborate on each of these reasons below.

Barriers to enter?

Ecorys (2017)⁸ provides an analysis from which it follows that VodafoneZiggo indeed experiences barriers to enter. Ecorys explains that *“in order to provide WCA over coax, VZ would need to make a number of changes in its network and in its organisation.”* These changes amount to a substantial adaptation and cost. Major changes involve [REDACTED],

⁸ Ecorys (2017) “Wholesale access to cable”, a study for VodafoneZiggo

[REDACTED]

[REDACTED] According to Ecorys, [REDACTED]

[REDACTED]

[REDACTED]. Ecorys calculates that [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

Switching costs

Current wholesale access seekers are likely to experience high switching costs if they were to switch from KPN to VodafoneZiggo. For example, they would need to replace modems and set-top boxes of their current client base. In addition, they may have to pay a fine for breaking the existing long-term agreement they have with KPN.

ACM argues (without substantiation) that these switching costs are not high for current users of KPN's WBA. ACM argues that switching costs are higher for current users of KPN's VULA product, but that they can avoid switching costs by not immediately migrating all their current retail clients. Ecorys (2018)¹¹ shows that this argument is invalid for an access seeker that is considering a switch from VULA over copper to wholesale access over cable¹², or for an access seeker that is considering a switch from wholesale access over cable to VULA over copper¹³.

ACM makes a reference to the SMP guidelines regarding the greenfield methodology stating that *"In order to include a CATv-based wholesale access offer in the market NRAs should, therefore, analyse whether a **potential entrant** into the retail broadband market would*

⁹ [REDACTED]

¹⁰ The calculations by Ecorys are a minimum, based on conservative assumptions about timing of market entry and functionality offered to WCA clients. If these assumptions do not hold, the costs increase significantly – see Ecorys (2017, p. 33).

¹¹ Ecorys (2018) "Wholesale Markets in the Netherlands - Update", a study for VodafoneZiggo

¹² The retail client that would be serviced over the cable network would not contribute to recovering the investments made by the access seeker in its own backbone to the metro pop.

¹³ The access seeker would need to migrate its entire client base to realise the necessary scale for recovering the investments in the backbone to the metro pop.

switch to a CATv-based WCA product in case of a SSNIP test of the other WCA product". By presenting some of the quotation in bold, it seems as if ACM suggests it may consider all current access seekers as being a potential entrant in the greenfield analysis and ignore the switching costs of the already entered access seekers. This argument would be invalid because potential entrants would anticipate these future switching costs when choosing between cable access and copper access upon entry.

Not equally attractive wholesale offers

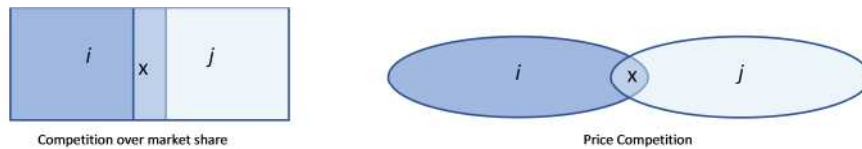
Furthermore, apart from entry barriers and switching costs, it appears that VodafoneZiggo cannot make an equally attractive wholesale offer compared to KPN's wholesale offers. This has two cumulative reasons: first, KPN's WBA product allows for more product differentiation by the entrant compared to VodafoneZiggo's hypothetical WBA product; and second, KPN can offer a set of complementary access products providing the entrant with better options for scaling up. We elaborate on these two arguments below.

KPN's wholesale products enable the entrant to differentiate more on retail level

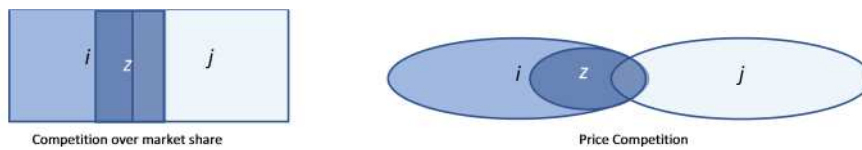
KPN's wholesale products may be more competitive when they provide alternative operators with more options to differentiate from the retail services currently provided. ACM (2018, paragraph 217) recognises that the ability for alternative operators to differentiate is essential for the incentives to provide and demand WBA. The reasoning is that when access seekers can only provide a me-too product, competition at the retail level will be more intense (notably between the access seeker and its wholesale provider). This results in lower profits for the access seeker as well as for the vertically integrated wholesale provider. The ability to differentiate retail products thus increases the access seeker's willingness to pay for the wholesale products and lowers the reservation price for which wholesale providers are willing to offer them. (The logic is visually illustrated in Text box 1 below).

Text box 1 Wholesale access decisions in differentiated retail markets

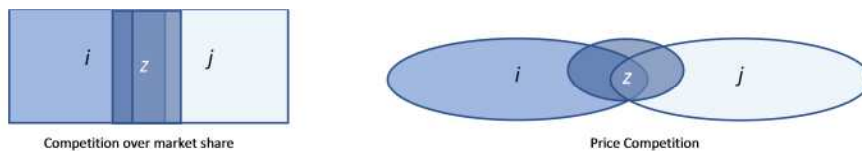
Consider two vertically integrated operators i and j competing in a differentiated retail market. The competitive "arena" in which i and j compete can be visualised as in the figures below. The left figure represents the competition over consumers (or market shares), the right figure represents the freedom for companies in setting their own price independent from each other. The partial overlap in the left figure is because only a fraction of the market will consider purchasing from i or j . The intensity of competition between i and j is thus reflected by the magnitude of x in the figures below. The right figure illustrates that, if this overlap is small, both firms impose little pricing constraints on each other and the firms have substantial freedom to act as quasi monopolists when setting prices.



In scenario A (see figures below), *i* offers wholesale access which allows the alternative operator to offer a me-too product that is similar to *i*'s retail product. The alternative operator *z* enters the competitive arena with a retail product that resembles *i*'s offering and is competing over market share mainly with *i*. Because of this, the entrant has little room to escape price competition with *i* and (consequently) *i* experiences increased constraints on its price setting behaviour. This situation is depicted (by way of example) as follows:



In scenario B (see figures below), *i* offers a wholesale access product which allows *z* to differentiate its retail product. *z* enters the competitive arena with a retail product that allows it to stay more out of the way of *i* and consequently compete more strongly with *j* over market shares. Both *i* and *j* experience increased constraints on their price setting behaviour compared to the baseline scenario, but *i* experiences less constraints compared to scenario A. Moreover, compared to scenario A, also the entrant *z* experiences less pricing constraints. This situation may be depicted as follows:



In scenario A, *i* will lose more (of its own) retail clients to *z* compared in scenario B. This implies that *i* will need a greater compensation at the wholesale level for these retail losses (i.e. require a higher wholesale price), compared to scenario B. In addition, in scenario A, *i*'s pricing strategy is much more constrained by *z* compared to its pricing strategy in scenario B. Again, this means that *i* will need a greater wholesale compensation for these retail losses (i.e. require a higher wholesale price), compared to scenario B. Moreover, in scenario A, *z*'s pricing strategy is more constrained compared to scenario B. This means that *z* is willing to pay more for wholesale access in scenario B compared to scenario A.

We note that KPN 's WBA service is handed over using layer 2 Ethernet and VodafoneZiggo's WBA service would hand over bitstream using a layer 3 IP-Protocol. WIK (2017, p. 68) explains that compared to Ethernet based WBA, IP based WBA allows for a "relative poor degree of differentiation of the products and services offered to the end-customers by the access seekers. [It] only can offer me-too like services and cannot get beyond the level the

wholesale provider offers for his own customers". In addition, there are other differences between Ethernet and IP handover protocols, as summarised by WIK in the following overview:

Protocol	Ethernet (Layer 2)	IP (Layer 3)
Quality control	direct	less direct
Transmission quality (delay, jitter, loss)	good	less good
Wholesale operator stack in stack VLAN tagging	direct	less direct
Larger protocol header	yes	no
Protocol overhead	lower	larger
Adress space	limited (VLAN)	internationally unique
Product definition freedom	higher	lower

Source: WIK

Figure 2-1 Ethernet or IP handover protocol

It follows that scenario A (in Text box 1) is more applicable to VodafoneZiggo, whereas Scenario B (in Text box 1) is more applicable to KPN. As such, KPN has a competitive advantage over VodafoneZiggo in the sense that 1) alternative operators are (likely) willing to pay more for ethernet based WBA over copper compared to IP-based WBA over cable; and 2) that KPN is (likely) willing to offer it for a lower price.

The fact that VodafoneZiggo’s cable network can provide higher speeds, which may be a reason for alternative operators to have an interest in wholesale cable access, does not change these incentive structures. On the contrary, this would give KPN even stronger incentives to provide wholesale access (at an even lower wholesale price). When KPN cannot offer its end-users the same quality as VodafoneZiggo in terms of maximum speeds, it should seek options for offering alternative forms of quality to counter this competitive disadvantage. One of such alternative forms of quality is a wider variety of choice available to end-users on its DSL network. When KPN provides wholesale access (based on its current wholesale access products), it leads to a wider variety of retail offers provided over its DSL network. This increases the overall attractiveness of the DSL network vis-à-vis the cable network. VodafoneZiggo could not realise a similar effect with an IP-based WBA product.

Only KPN offers a set of complementary access products

In addition, KPN’s WBA product is complemented with a wide set of complementary wholesale access products (ULL, ODF, and VULA) that each provide further options for

access seekers to differentiate. At least in the current regulatory period, VodafoneZiggo cannot offer any complementary wholesale product (see ACM 2018, paragraph 73). The complementary nature of the access products lies in the fact that access seekers can enter the market with a WBA-based product at the national hand-over point and, as their market shares grow, have the strategic option to gradually roll out and switch to local access points (based on other wholesale access products) in order to benefit from economies of scale (see Ecorys 2018)¹⁵ and to gain more control over the retail services offered (see ACM 2018, paragraph 233 and paragraph 370). The ability to offer a complementary set of wholesale access products adds to the attractiveness of KPN's network in the eyes of current access seekers as well as of potential entrants that aspire to grow and gain market shares. Thus, KPN's portfolio of wholesale access products provides access seekers with a wider variety of strategic options compared to the (single) hypothetical wholesale offer that VodafoneZiggo would be able to provide.

The fact that ACM considers these different wholesale access products (and the strategic option value that they provide) being part of the same relevant market, does not mean it can ignore the complementary nature of KPN's wholesale access products in the assessment of SMP. ACM will likely argue that this competitive advantage for KPN is non-existing in a greenfield situation as it *“expects that, if KPN provides access, it will always prefer to provide WBA over the provision of (virtually) unbundled access, because it allows KPN to maintain most control over the retail service provided by the potential user of its wholesale products. If KPN and VodafoneZiggo provide access and have a free choice as to which access product they offer, they would both choose WBA”*.¹⁶ This reasoning is incorrect. If there is significant difference between VULA and WBA which has strategic relevance in KPN's decision regarding the supply of wholesale access, it is only logical that such difference is of significant strategic importance to access seekers as well. It follows that the ability to provide VULA gives KPN a competitive advantage vis-à-vis VodafoneZiggo. It would be irrational for KPN to not exploit such a competitive advantage if both companies were to offer wholesale access. Not only would access seekers prefer DSL access over cable access,

¹⁵ Ecorys (2018) “Wholesale Markets in the Netherlands - Update”, a study for VodafoneZiggo

¹⁶ ACM (2018, paragraph 233) *“Daarnaast verwacht de ACM dat, indien KPN toegang biedt, hij het leveren van WBT altijd zal verkiezen boven het leveren van (virtueel) ontbundelde toegang, omdat hij hiermee de meeste controle behoudt over de retaildiensten die een potentiële wholesaleafnemer kan leveren. Indien KPN en VodafoneZiggo dus toegang leveren en hierin de vrije keuze hebben, zullen zij er naar verwachting beide voor kiezen WBT te leveren.”*

access seekers would be willing to pay a higher premium for VULA compared to WBA. In short, KPN would have the ability to gain a larger market share on the WFA market (the resulting market share would result from the level of the wholesale price, as in a regular profit-maximization problem), and, in any case, realise higher wholesale profit margins.

2.2.2 Incorrect pay-offs

The previous section presents facts from which it follows that VodafoneZiggo has a competitive disadvantage vis-à-vis KPN on the WFA market. Such a disadvantage implies that VodafoneZiggo cannot gain by moving from scenario 2 to scenario 4 (by offering wholesale access). An additional explanation for the observation that VodafoneZiggo does not have an incentive to move from scenario 2 to scenario 4, is that the presumed payoffs in ACM's matrix do not reflect the actual competitive situation. The payoffs may be based on wrong assumptions or on a wrong model which do not reflect market conditions.

Contradicting assumption on differentiation and price elasticities

ACM's analysis seems to be based on incorrect and contradicting assumption. ACM assumes that the retail market is characterised by product differentiation,¹⁷ yet in equilibrium, retail prices of all companies are assumed to be the same, following the assumption that companies are fully symmetric.¹⁸ Indeed, when both companies are exactly the same in terms of technology, cost function and elasticity of demand, retail prices are the same as well. However, it is unlikely that firms face similar elasticities of demand when products, and thus demand, is differentiated (this is the contradictory part in ACM's assumptions). In Annex C (table C3 and C5), ACM refers to Blauw (2017a, p31)¹⁹ indicating that elasticities are indeed different (this is the incorrect part of ACM's assumptions). Blauw finds that elasticity of demand for bundles over DSL is -2.89, for fibre it is -2.04, and for cable it is -2.32. The asymmetry between the demand faced by KPN and VodafoneZiggo becomes even larger when

¹⁷ ACM (2018, paragraph 217) *"Een belangrijke aanname voor de bovenstaande winstmatrix is dat de producten van de twee partijen niet homogeen zijn en dat het voor een wholesaleafnemer mogelijk is om op basis van de WFA-dienst een gedifferentieerd product in de markt te zetten. Alleen dan hebben partijen een prikkel om toegang te verlenen."*

¹⁸ ACM (2018 paragraph 1033) *"Vanwege de symmetrie geldt dat alle retailprijzen gelijk zijn aan een bepaalde retailprijs, i.e. $p_1=p_2=p_3$."*

¹⁹ Blauw Research (2017a), Overstapedrag bundels, juni 2017,

we compare elasticities for stand-alone internet services found by Blauw (2017b, p.30)²⁰. It shows that KPN faces much *lower* elasticities for stand-alone services (-1,61 for DSL and -1.59 for Fibre), whereas VodafoneZiggo faces *higher* elasticity of demand for stand-alone services (-2.53). This difference means that, within its sub-market, VodafoneZiggo is more constrained in the pricing of stand-alone products than bundles, whereas KPN is more constrained in the pricing of bundles than stand-alone products. Note that, contrary to these empirical findings, ACM's analysis in Annex D assumes symmetry in demand (see § 1027, which states that the demand for the firms' offerings is identical). Thus, the analysis of competition in Annex D is based on an assumption that is refuted by the market research that was carried out by Blauw, on the request of ACM.

Incorrect model

An indication the model seems less suitable for analysing the Dutch market as there are other models with differentiated retail markets that produce results that are consistent with observed behaviour by VodafoneZiggo. Bourreau et al. (2011)²¹ provide a model in which two vertically integrated firms i and j and an unintegrated firm z compete with differentiated products on the retail market. The integrated firms i and j compete in the wholesale market to provide wholesale access to z . Note that the model is compatible with the model used by ACM to construct the differentiated Bertrand model underlying their analysis of tacit collusion: the representative consumer's quasi-linear utility function depicted in equation (7HS) in paragraph 1026 is identical to Bourreau et al.'s utility function that illustrates their model (see p. 688 and p. 698)²². The authors show that when a vertically integrated firm i provides wholesale access to z , it may raise its retail price. They demonstrate that even for a high wholesale price charged by the integrated firm i , the other integrated firm j will not offer wholesale access. The reasoning is that "*when firm i increases its downstream price, it recognizes that some of the final consumers it loses will eventually purchase from the unintegrated downstream firm, thereby increasing upstream demand and revenues*" (p. 679). Thus, through providing access, firm i can recover some of the revenues that is loses by increasing its retail price. Therefore, i charges a higher retail price than j at the downstream

²⁰ Blauw Research (2017b), Overstappeddrag vast Internet, juni 2017,

²¹ Bourreau, M., Hombert, J., Pouyet, J. and Schutz, N. (2011), "Upstream Competition between Vertically Integrated Firms", Journal of Industrial Economics 59(4), p. 677-713.

²² The upstream market also exhibits the same ingredients of competition as ACM's model: integrated firms compete in (linear) wholesale prices, produce a perfectly homogeneous upstream good, and incur the same constant marginal cost.

equilibrium. This also benefits j as it faces a less aggressive competitor on the retail market. The authors refer to this as the ‘softening effect’. If j undercuts i in the wholesale market, the roles in the retail market are reversed. It follows that j faces a trade-off between undercutting i at the wholesale level or accepting the situation and facing less aggressive competition from i at the retail level. When the softening effect is large enough, j chooses the second option. When i and j are symmetric firms, they both initially have equal incentive to provide access to z , but whoever gets first wins ‘the prize’ and the other one will accept the outcome. Whether the resulting wholesale price is at or above cost-level depends on the degree of differentiation at retail level: the more differentiated the retail market, the smaller the softening effect, the smaller the mark-up of wholesale prices over costs (this also follows from the analysis in Text box 1).

All in all, Bourreau et al. (2011) provide evidence that the payoff matrix is not characterised by a prisoners’ dilemma. This conclusion is confirmed by Ordober and Shaffer (2007) and Brito and Pereira (2010)²³.

2.3 Conclusion

Academic papers by Ordober and Shaffer (2007), Brito and Pereira (2010), and Bourreau et al. (2011) show that there are good prospects for market outcomes in which, without regulation, vertically integrated operators will provide access. These papers indicate that the game between vertically integrated operators is not characterized by a prisoners’ dilemma. Based on insights from the academic literature such as these papers, it would make sense for ACM to start its analysis with the premise that there will be competition to provide voluntary access. However, ACM immediately jumps to an analysis of tacit collusion in an infinitely repeated game whereas it fails to provide evidence that the game between VodafoneZiggo and KPN is indeed characterised by a prisoners’ dilemma. As a consequence, ACM’s model cannot explain the observation that VodafoneZiggo is not providing wholesale access while KPN is obligated to provide access.

²³ Ordober J. and G. Shaffer (2007), "Wholesale access in multi-firm markets: When is it profitable to supply a competitor?", *International Journal of Industrial Organization* 25, p. 1026-1045.

Brito, D. and P. Pereira (2010), "Access to Bottleneck Inputs under Oligopoly: A Prisoners' Dilemma?", *Southern Economic Journal* 76(3), p. 660-677.

Even when the game is characterised by a prisoners' dilemma, there is evidence that, in the absence of regulation, it will stabilise in scenario 2 where KPN provides voluntary access and VodafoneZiggo does not provide access because:

- VodafoneZiggo experiences barriers to enter the wholesale market;
- Wholesale access seekers experience switching barriers; and/or
- KPN's wholesale access products are more attractive to access seekers.

ACM (2018, paragraph 363) states that it does not expect wholesale competition to occur when it imposes an access obligation on only one of the players, because VodafoneZiggo has not provided access so far. This should have urged ACM to analyse whether VodafoneZiggo has its own individual incentives for not granting access²⁴. ACM fails to do so. Moreover, if ACM assumes the game between VodafoneZiggo and KPN to be characterised by a prisoners' dilemma and it observes that VodafoneZiggo is unlikely to provide wholesale access, ACM's logical conclusion would have to be that KPN would find it profitable to voluntarily provide access (which is apparently the case, given KPN's commercial WBT-offering; see § 56 in ACM, 2018). However, ACM has always maintained that access obligations were necessary to force KPN to provide access.

²⁴ This also confirmed by the European Commission in the serious doubts letter regarding Case SI/2009/0913 *"the Commission is of the view that being aware of Mobil tel's obligation to grant wholesale access, Si.mobil could be encouraged to provide access in order to generate wholesale revenues. Thus, **the fact that Si.mobil has not successfully finalised any negotiations in that regard, may indicate that it has its own individual incentives for not granting access.**"*

3 Ability to coordinate

Without prejudice to the conclusions of Chapter 2, we discuss below the conditions facilitating the coordination of behaviour.

Section 3.1 discusses a first category of conditions related to the symmetry between companies over time in terms of cost structure, technological advantages and the degree of product differentiation. Symmetry between firms results in symmetric (or balanced) incentives to coordinate/cheat, which makes it easier for firms to trust each other compared to a situation where one firm has a much higher payoff from cheating than the other. Over time, symmetry between firms may be affected by asymmetric impacts of technological change. When technological changes have asymmetric impacts on the individual companies, the game may become quasi finite and the coordinated outcome becomes unstable. This depends on whether the players expect such asymmetric technological changes to occur within a relevant time horizon. It is therefore essential to first establish the relevant time horizon before analysing the symmetry over time.

Section 3.2 discusses a second category of conditions related to the ease of detection and retaliation in the event of a deviation from the coordinated outcome. Detection of a deviation is facilitated when there is a clear focal point for coordination and when the market is transparent. Ease and effectiveness of the retaliation mechanism determine its credibility. There are two broad categories of punishments. The first is referred to as 'grim trigger punishment' which implies forever going back to the non-cooperative outcome. The second category is referred to as 'tit-for-tat punishments', which is a temporal punishment aimed at eventually restoring the coordinated outcome. The effectiveness and credibility of punishment mechanisms highly depends on specific circumstances.

3.1 Symmetry over time

Recall that the payoffs in a prisoners' dilemma (such as presumed by ACM) are such that $B > A > D > C$. This implies that in the game considered by ACM, the payoffs are equal for each firm. However, there may be some differences in the payoffs of a prisoners' dilemma. As long as the following condition is met $B_i > A_i > D_i > C_i$ and $B_j > A_j > D_j > C_j$, the payoff matrix remains a prisoners' dilemma with (in an infinitely repeated game) two possible outcomes: either both parties coordinate or they both cheat. The payoff matrix is then as follows.

		VodafoneZiggo	
		Deny Access	Provide Access
KPN	Deny Access	A_i, A_j	C_i, B_j
	Provide Access	B_i, C_j	D_i, D_j

Although the payoffs need not be the same for each player, a certain balance in the payoffs facilitates the ability to coordinate. For example, when B_i is much larger than B_j , it becomes more difficult for j to trust i and the coordinated equilibrium becomes less stable. The more similar competitors are in terms of organisation, costs structures, technological advantages, and the degree of product differentiation, the more similar are their results in terms of market shares and profits. As such, symmetry between firms results in symmetric (or balanced) incentives to coordinate/cheat, which makes it easier for firms to trust each other compared to a situation where one firm has a much higher payoff from cheating than the other.

In a dynamic setting of a repeated game it is important that the payoff matrix remains balanced over time. In the event of technological changes (or shifts in end-user preferences) with asymmetrical impacts on the payoffs of each player, the game may become quasi-finite with a destabilising effect on the coordinated equilibrium. This depends of course on whether the players expect such asymmetric technological changes to occur within a relevant time horizon. When an industry has been characterised in the past by regular asymmetric technological changes, players expect such technological changes to occur in the future as well. It follows that a coordinated outcome is less likely in industries that are characterised by regular asymmetric technological changes, where the term 'regular' is subject to the time horizon of the players²⁵.

This brings us to comment on the sequence of analytical steps taken by ACM in assessing the ability to coordinate. Its first step is an attempt to analyse the current symmetry between the players, followed by an attempt to analyse the complexity and stability of the market in terms of the number of players, stability of growth, and technological change. Finally, ACM analyses what time horizon players tend to have in strategic decision making, which gives weight to the impact of future changes to the payoff matrix on today's game. By following this order of analytical steps, the analysis quickly becomes a check-box exercise which does not

²⁵ In other words, if the players have a time horizon of (say) 20 years, then an event taking place in every 5 to 10 years may be considered 'regular'. However, if the time horizon of the players is only 3 years, the same event may be considered unexpected or irregular in the eyes of the players.

consider the inter-relatedness of each step. It would have made more sense for ACM to first identify the time-horizon of the players, as this tells us which time-horizon should be applied in the backward and forward analysis of the complexity and stability of the market. Such an approach prevents mistakes from too fervently applying extremely stylized models to real-world situations.

Below we discuss ACM's analysis in the suggested alternative order; starting with a discussion of the relevant time horizon, followed by a discussion of symmetry between the companies, we conclude with a discussion of the stability and complexity of the market.

3.1.1 The relevant time horizon

The time horizon of the analysis cannot be confined to the 3-year time horizon which typically applies to NRA decisions. The reason is that the dynamic version of the game is not confined to a three-year time horizon. The relevant time horizon should be in line with the time horizon adopted by telecom operators in their strategic decisions. ACM (2018, paragraph 1251 - 1255) indeed concludes that KPN and VodafoneZiggo are focussed on the long term as they have made considerable sunk investments that need time to be recouped and make it difficult to exit the market. Therefore, a specification of the "long term" is needed to understand how short-term and long-term incentives that affect competition (in prices, qualities, investments, as affected by technological shocks) is needed.

Notably when it is certain that technological developments will take place between now and a period of (say) ten years (like the roll out of 5G and the upgrade to Full Duplex) ACM should consider their potential asymmetric impact on future pay offs and how that may impact the game of today. Similarly, when analysing the stability of growth in the market, ACM needs to widen its time-horizon and analyse developments that have taken place over the past (say) 10 years rather than 3 years. ACM should analyse whether these changes have had an asymmetric impact on payoffs by affecting revenues, market shares, etc. By neglecting to do so, ACM overlooks crucial factors that influence the strategic interaction among market players.

3.1.2 Symmetry

ACM starts its analysis of symmetry between VodafoneZiggo and KPN by an analysis of market shares. Equal market shares may be an indication that firms are symmetric but cannot serve as conclusive evidence on its own. Additional evidence is required; e.g. on cost structures, elasticity of faced demand, technological advantages, and the degree of product differentiation. Below we discuss and comment on ACM's analysis of these topics.

Symmetry in cost structure and elasticity of demand

Regarding the cost structure, ACM (2018, paragraph 201) argues that KPN and VodafoneZiggo both benefit from economies of scale. These economies of scale stem from comparable cost structures (high upfront investments in the network and low marginal costs). ACM recognises that KPN has scope economies in the backbone network related to mobile and B2B services. ACM argues that these advantages are small due to the large scale of the fixed B2C market. ACM does not support its claim with quantitative evidence, nor does it analyse how certain scope advantages may be affected by future technological changes; e.g. ACM should have analysed whether (and to what extent) mobile related economies of scope become more important with the roll out of 5G.

Symmetry in cost structures may contribute to symmetry in the payoff matrix. On the other hand, the payoff matrix remains asymmetric when elasticities of faced demand are different. ACM has not at all considered the differences in elasticity of faced demand while discussing symmetry between VodafoneZiggo and KPN; neither in its analysis of the retail market, nor in its analysis of the wholesale market. As shown by Blauw 2017a and 2017b, and as discussed above in section 2.2.2, the elasticities of faced demand differ considerably between KPN and VodafoneZiggo thereby making the coordinated outcome less stable.

Symmetry in technology

ACM's conclusion that cost structures are similar is remarkable in light of different technological advantages enjoyed by VodafoneZiggo and KPN which impact on their investment strategies (and thus on their cost structures). For example, RBB (2014) explains that the technological difference between the architecture of cable networks and DSL networks result in different drivers for investments and different investment strategies: "*KPN operates a fixed telecom network, which is characterized by a 'point-to-point' architecture [...]. In contrast, capacity on cable networks such as Ziggo's is shared between users. This implies that the need for Ziggo to invest in network upgrades is primarily driven by the overall development of traffic on the network. In KPN's case, network investments are mainly driven by the need to get coverage with high(er) peak rates for subscribers. This difference implies that upgrades of cable networks are typically rolled out quickly across the entire network, whereas investments by KPN [...] take place on an area by area basis.*" In other words, VodafoneZiggo has been able to upgrade its network faster and more efficiently than KPN. ACM has not considered this information in its assessment of cost structures; nor has ACM considered how the analysis by RBB may be different in relation to a

future upgrade to Docsis 3.1 Full Duplex and how this may impact on the future payoff matrix.

As far as ACM has analysed technological advantages, it has been comparing apples and oranges. ACM states in paragraph 193 that:

- VodafoneZiggo's cable network offers higher speeds and better upgrade options than KPN's copper network,
- KPN's fibre optic network offers unlimited up and download speeds, but it still has limited network coverage, and that
- KPN can provide guaranteed capacity for B2B services via its networks.

ACM implies in the same paragraph that these different advantages cancel each other out as it states that “*it cannot conclude that KPN or VodafoneZiggo has a clear advantage over the other*”. We note that these differences do not cancel each other out. KPN's fibre network only covers about 1/3 of the Dutch households, while VodafoneZiggo's network is nearly ubiquitous. In the B2C market, VodafoneZiggo has thus a clear advantage. To balance the scale, ACM adds to the equation an advantage for KPN in the B2B market which has no relevance for speed and upgrade options, nor does it provide any technological advantages for KPN in the B2C market. If anything, the technological superiority of KPN's network regarding guaranteed capacity for B2B services adds another dimension for asymmetry, rather than mitigating the asymmetry in speed and upgrade options. When we ignore ACM's incorrect argument related to B2B services, one has to conclude that for 2/3 of its network, KPN has a disadvantage vis-à-vis VodafoneZiggo in terms of speed and upgrade options which results in different investment strategies. This asymmetry contributes to the instability of coordinated actions with competitors.

Symmetry in terms of product differentiation

ACM (2018 paragraph 232) refers to its analysis of the retail market in which ACM concludes that VodafoneZiggo and KPN can avail of different wholesale products, but that these differences are said not to be material because all wholesale products can be used to provide similar retail products. This analysis and conclusion are not correct. We explain this below.

We assume that ACM's conclusion relates only to the comparison of ethernet based WBA by KPN vs IP based WBA by VodafoneZiggo because in paragraph 233 ACM assumes that KPN will not provide VULA in a greenfield situation because KPN would have less control over the retail service offered by the access seeker. First, we note that ethernet based WBA by KPN offers access seekers more options to differentiate their retail products compared to IP-based

WBA by VodafoneZiggo²⁶. Second, it would be irrational of KPN not to offer VULA as it provides KPN with a competitive advantage vis-à-vis VodafoneZiggo by offering access seekers further options to differentiate their retail products²⁷. Third, by offering VULA, KPN also makes its WBA product more attractive. The complementary nature of VULA and WBA services further strengthens KPN's competitive advantage²⁸.

All in all, KPN's wholesale products are more differentiated compared to VodafoneZiggo's hypothetical wholesale product. Moreover, KPN's wholesale products offer the access seekers more options to differentiate their retail products. KPN is less likely to stick to the coordinated outcome, given the superiority of its wholesale access options. This effect is enhanced by the fact that VodafoneZiggo has a competitive advantage at retail level in terms of speeds and upgrade options (as explained at the end of section 2.2.1)

3.1.3 Complexity and stability of the market

Reaching an agreement among a smaller number of players is easier because there is less risk of unbalanced incentives and there is less risk of a misunderstanding of the tacit agreement. Moreover, if the market is characterised by stable growth and predictable symmetric technological developments, the payoff matrix remains stable over time. This contributes to a predictable repetition of the game over time, and thereby to the stability of the coordinated outcome. When the market is characterised by unstable growth or regular asymmetric technological changes, the payoff matrix may change significantly over time, making the game quasi 'finite' and thereby making the coordinated outcome unstable.²⁹

Number of players and stable growth

ACM (2018 paragraph 242) argues that the market is characterised by a few players and stable growth in terms of number of connections. ACM concludes on this basis that the market is stable. However, for the payoff matrix to be stable, revenues and profits should be stable over time. ACM fails to provide a proper analysis that would support this claim. We note that revenues and profits in the telecom market have been in decline. Notably the rise of OTT services in voice and text put increasing pressures on mobile telecom revenues

²⁶ For an elaborate discussion of the differences see WIK (2017). For a summarised discussion see section 2.2.1 above.

²⁷ As we explained in section 2.2.1 above.

²⁸ As we explained in section 2.2.1 above.

²⁹ See also Petit (2013).

throughout Europe since 2012 (see Ecorys and TNO, 2016, based on data from Gartner).³⁰ Similar effects may be expected for fixed revenues stemming from the growing popularity of OTT video services.

It is more difficult to coordinate behaviour under conditions of declining revenues and revenue models being in constant evolution. The reason is that such developments may create or enlarge asymmetries between the players. For example, the OTT video and TV trend may hit VodafoneZiggo harder compared to KPN, considering VodafoneZiggo's larger share in the TV market. ACM (2018, paragraph 1275) argues that this is unlikely and that KPN and VodafoneZiggo are said to have equal stakes in the TV market. This statement contrasts with an earlier conclusion made by ACM (2018 paragraph 1194) that VodafoneZiggo has a greater cost advantage in TV as it has more (about twice more) connections than KPN.

Technological change

ACM discusses the developments in DSL and DOCSIS technology and concludes that these are exogenously determined and predictable. ACM concludes that technological developments thereby have little impact on the ability to coordinate. This conclusion is hasty and short-sighted in the light of the long time-horizon applied by telecom operators as well as the long-time horizon that ACM needs to assume to support an equilibrium with tacit collusion. Furthermore, ACM (2018, paragraph 248) argues that KPN and VodafoneZiggo are already coordinating investment behaviour today and that they will have more incentives to coordinate investments in the absence of regulation. Again, ACM seems too quick in drawing conclusions.

We elaborate on our comments on these two arguments by ACM below.

Impact of technological change

Over time, constant technological advances have taken place with impact on marketing and pricing strategies, contrasting the serene picture described by ACM:

- Developments of voice functionality in DOCSIS in the early 2000s have contributed to increased competition by cable companies for KPN.

³⁰ Ecorys and TNO (2016) "Study on future trends and business models in communication services" A study prepared for the European Commission DG Communications Networks, Content & Technology

- KPN started to provide TV over DSL as of 2007 allowing KPN to gradually regain its competitive position vis-à-vis cable companies and spurring the continuously expanding bundling trend from 2P, to 3P to 4P.
- Since 2009, several OTT communication apps are springing up, eating away telecom revenues since 2012 and forcing telecom operators to change revenue models from two-part tariffs to flat-rate pricing³¹.
- Since 2013, several OTT video services are springing up, forcing telecom operators to respond with developing their own OTT TV services and their own VOD services, resulting in rising operating expenses for content rights.
- Since 2017, mobile operators have started to offer unlimited data packages at fixed locations. This appears a first step by mobile players to contest the fixed market.
- As of 2020, the first 5G network roll out will allow for 10Gbit/s download speeds over mobile networks, lifting mobile players to a higher level while contesting the fixed market.
- As of 202X, DOCSIS 3.1 Full Duplex allows for 10Gbit/s up- and download speeds over cable, likely spurring KPN's investments in FTTH already before that date.

Over the years, and ongoing, the telecom industry has regularly experienced exogenous asymmetric technological shocks that challenge market boundaries and asymmetrically affect business and revenue models. These illustrations contrast ACM's claim that technological developments are predictable because they are exogenous, and also the claim that they do not cause shifts in the payoff matrix and the incentives to coordinate/cheat. ACM fails to analyse whether the already foreseen technological developments, such as 5G rollout and Full Duplex upgrade, may have disruptive effects on future payoff matrices and thereby affect incentives to deviate from the coordinated outcome even within the next market review cycle.

Coordinated investments

ACM (2018, paragraph 245) recognises that the coordinated outcome may be undermined by investment strategies and suggests therefore that KPN and VodafoneZiggo are likely to coordinate investments as well. ACM sees proof of this in the fact that KPN has scaled down the pace at which Reggefiber is rolling out its FTTH network and the fact that VodafoneZiggo has not yet specified when it will start the upgrade to DOCSIS 3.1 whereas other cable companies (such as Delta) have. ACM argues (in paragraph 248 and paragraphs 1243 to

³¹ See Ecorys and TNO (2016)

2146) that VodafoneZiggo is deliberately stalling investments not to provide incentives for KPN to regain speed in rolling out of FTTH; and vice versa.

It may be possible that, as ACM concludes, KPN prefers to upgrade its copper network compared to replacing it with fibre lines. Nevertheless, there may be a rationale for this that is unrelated to any type of tacit agreement. For instance, KPN has to deal with the risk of cannibalisation.³² This effect is confirmed by Dialogic (2014)³³ showing that around 80% of the subscribers to FttH networks were former DSL subscriber (and 20% were former cable providers). Moreover, ACM itself contributed to KPN's ability to scale down Reggefiber's activities by allowing the take-over in 2014, which indicates that giving KPN more influence over fibre investments was not seen as a competitive risk. Following this event, VodafoneZiggo may or may not have experienced less competitive pressures regarding its investment strategy, but ACM has not substantiated its conclusion that VodafoneZiggo and KPN are coordinating strategies; KPN clearly has its own (unilateral) reasons for scaling down the pace of Reggefiber's investments.

Furthermore, ACM draws a conclusion on tacit coordination of investment strategies without considering KPN's and VodafoneZiggo's ability to coordinate in this dimension. First, KPN and VodafoneZiggo are far from symmetric companies regarding network investments; as explained earlier with reference to RBB (2014) *"[...] upgrades of cable networks are typically rolled out quickly across the entire network, whereas investments by KPN [...] take place on an area by area basis"*. In other words, an upgrade of the cable network is a faster process and requires less investments as the roll-out of FTTH. Second, because network upgrades (in general) involve projects of longer duration, neither cheating is immediately detected, nor can the other party respond easily and swiftly with a punishment that will convince the cheater to restore the coordinated equilibrium. Thus, one may expect that it will be difficult and farfetched to argue that there is tacit collusion in investments. Even if VZ was not fully exploiting its competitive advantage by upgrading as fast as some other cable companies have been doing, the question (for ACM to address) is whether VodafoneZiggo has other reasons, such as organisational limitations due to the fact that [REDACTED]

³² A similar problem was described in OPTA's ULL decision (2008) regarding KPN's incentives to invest in a switch from voice over PSTN to Voice over Broadband - see paragraph 346 in OPTA/AM/2008/202719

³³ Dialogic. (2014) "Prospectief onderzoek naar de marktaandeelontwikkeling op de telecommunicatiemarkten voor internettoegang, vaste telefonie en zakelijke netwerkdiensten", a study commissioned by ACM

3.2 Detection and retaliation

A punishment mechanism is required for both players to stick to the coordinated outcome. In effect, a punishment mechanism should reduce the payoff of cheating (over time).

Punishments may work, provided that cheating can be detected swiftly and punishment mechanisms are credible and can easily and swiftly be enforced.

3.2.1 Transparency of the market (easy of detection)

Transparency of the market and a clear focal point of the agreement facilitate a fast detection of cheating. This is important if cheating remains undetected for a long time, the rewards for cheating, and thus the incentives to cheat, become larger. Moreover, the timing of cheating may also affect the possibilities for restoring the coordinated equilibrium which may be relevant for the credibility of the punishment mechanism.

ACM (2018, paragraph 256 and 257) argues that KPN and VodafoneZiggo aim to tacitly coordinate retail prices, but that they can only do this if they jointly refuse wholesale access to third parties. According to ACM, the focal point of coordination on the wholesale market is thus the refusal to provide wholesale access. According to ACM (2018, paragraph 258 and 259) deviations from the coordinated outcome will be detected immediately when a third party enters the retail market using the network of the other. The question is, however, whether detection will occur in a timely manner such that the process of entry can still be reversed. Once access seekers are operational in the retail market, they will probably have entered into a long-term agreement with one of the vertically integrated operators. Under these conditions it is less easy to implement a (credible) retaliation mechanism that leads back to the coordinated outcome. We elaborate on this below.

3.2.2 Retaliation mechanism

Cheating may go on for a while after detection when punishment mechanisms cannot be swiftly and easily enforced. This increases the rewards and incentives for cheating. Moreover, in order to effectively discourage cheating, a punishment mechanism needs to be credible in the sense that it can be enforced and that it does not hurt the punishing party more compared to when it simply accepts the situation.

When analysing the credibility of the punishment mechanism(s), it is essential to keep focus on the interrelatedness of different focal points of coordination. ACM concludes that VodafoneZiggo and KPN have an incentive to tacitly collude on retail prices and on the provision of wholesale access³⁴. ACM's analysis seems to be structured around the notion that all areas of coordination are interrelated and that one does not go without the other. In other words, if the coordinated outcome regarding retail prices is not stable, it is less likely that the coordinated outcome regarding the provision of wholesale access is stable; and vice versa.

ACM considers two retaliation mechanisms for maintaining the coordinated equilibrium in the retail and wholesale market:

1. Temporary (fierce) price competition at retail level; and
2. Offering wholesale access

The objective of the first strategy is to eventually return to the coordinated outcome. The second strategy is a so-called grim trigger mechanism resulting in a return to the non-coordinated equilibrium for ever. Below, we discuss each of these strategies in light of sustaining the coordinated outcomes at retail level and wholesale level.

Deviation from coordinated retail prices

Not all the coordinated outcomes have to be equally stable. E.g. some temporal deviations from the coordinated outcome on retail prices may occur without immediately triggering the provision of wholesale access, provided players manage to revert to the coordinated outcome at retail level relatively fast. ACM assumes temporary returns to fierce price competition as the primary retaliation mechanism on the retail market to serve this purpose³⁵.

Such retaliation mechanisms are also referred to as 'tit-for-tat' punishments and these are not always effective. A tit-for-tat strategy can easily result in a negative spiral of tits-for-tats as illustrated by the classical Laurel and Hardy movies; particularly if there is a lot of noise on the lines of communication, which is inherently the case when parties are tacitly colluding (Molander 1985)³⁶. In effect, such a spiral causes the tit-for-tat strategy to become a grim

³⁴ ACM argues (in paragraph 248 and paragraphs 1243 to 2146) that they also coordinate investments. We ignore that for the moment to keep the analysis less confusing.

³⁵ see paragraph 1265 and footnote 440

³⁶ Molander (1985), "The Optimal Level of Generosity in a Selfish Uncertain Environment," *Journal of Conflict Resolution* 29, 611-618

trigger strategy, and possibly work its way through to the wholesale market³⁷. A grim trigger strategy appears to be a very effective deterrent on paper, and it may indeed be effective in overt collusive agreements (Freidman, 1971)³⁸. However, in the case of tacit collusion where parties are limited in their ways of communication, parties may not know if they are facing a grim trigger strategy or not. Also, parties may find it difficult to ascertain the margins in which prices are considered to be part of the collusive agreement versus a deviation. Reaching and sustaining a tacit agreement requires a certain degree of freedom for experimenting and testing from time to time. Under these circumstances, the unforgiving nature of a grim trigger strategy as well as of the out of hand tit-for-tat spiral likely lead to a non-cooperative outcome already at day one (Axelrod, 2000)³⁹.

Parties may avoid the negative spiral by being forgiving (i.e. not retaliate immediately but apply a two-strikes-and-you're-out rule).⁴⁰ However, this may result in punishments not outweighing the gains of temporal deviation. Consequently, parties may take advantage of the forgiving nature of the punishment mechanism by being more aggressive cheaters.

In light of all these shortcomings of a tit-for-tat strategy, ACM should provide more analysis of why it would work in this particular case.

Deviation from the coordinated refusal to supply

Suppose the coordinated equilibrium at retail level does not break down directly because of a deviation from the agreed retail prices, but it breaks down because one of the players provides wholesale access to third parties. Once a player has provided access, those deals are likely to last for several years. We refer to multiple deals, because a smart cheater will provide access to multiple parties at once (the mobile-only players being the most qualified access seekers for they have the largest market share potential).

³⁷ Suppose the coordinated equilibrium at retail level breaks down and one of the players provides wholesale access to third parties. The first question the other party asks itself and will not find an answer to is whether it should consider this a cheat at wholesale level, or whether it is a punishment for deviations from the coordinated outcome at retail level.

³⁸ Freidman, James W. (1971), "A Non-Cooperative Equilibrium in Supergames," *Review of Economic Studies*.

³⁹ Axelrod (2000), "On Six Advances in Cooperation Theory"

⁴⁰ Boyd, Robert (1989). "Mistakes Allow Evolutionary Stability in the Repeated Prisoner's Dilemma Game". *Journal of Theoretical Biology*. 136 (1): 47–56.

Below we discuss the two potential punishment mechanisms as identified by ACM: 1) offering wholesale access as well, or 2) imposing fierce price competition at retail level, thereby hurting the cheater and driving the access seekers out of the retail market.

Offering wholesale access

Retaliation by also providing access cannot be imposed swiftly and easily, if at all. First, it takes time to set up a wholesale department and to develop wholesale products. Next it will take time to find potential wholesale clients. Note that retaliation is likely to fail already at this point when the cheating party has reached long term agreements with most of the largest potential access seekers. If a potential access seeker can still be identified, it will subsequently take time to negotiate a wholesale deal and it will take time for the access seeker to develop an actual retail offer. The fact that this retaliation mechanism cannot be imposed swiftly and easily, as well as the fact that it may fail, urges ACM to provide more arguments of why it considers this a credible punishment mechanism.

Imposing fierce price competition

We note that when the retaliator manages to successfully provide wholesale access, it means that there is no way back to the coordinated outcome at retail level. As such, when the punishing party maintains the ambition to revert to the coordinated outcome at retail level, providing wholesale access is not a credible retaliation mechanism. This leaves retaliation through fierce retail price competition, aimed at hurting the cheater and driving the access seekers out of the market.

According to ACM, this punishment can easily and swiftly be imposed, it restores the coordinated outcome at wholesale level, and it lays the basis for restoring the coordinated outcome at retail level. Moreover, ACM (paragraph 261) argues that *“this form of retaliation is particularly effective because it has a real negative impact on the cheater in the form of declining market shares as end-users will switch to the punishing party”*.

We note that ACM makes a number of implicit assumptions:

1. It assumes that the retail market is not differentiated, and that end-users experience no switching costs; otherwise there is no guarantee that the retaliation strategy will be successful in pushing the entrant out of the market.
2. It assumes that the cheating party and the entrant will not follow the retail price reductions of the punisher. If both follow the retail price reductions it is unclear why the cheater would lose market share to the punishing party.

The assumption that the retail market is not differentiated contradicts with ACM's assumption in paragraph 217 that the retail market must be differentiated for parties to have an incentive to provide wholesale access⁴¹. In paragraph 1229, ACM confirms that punishments (through fierce price competition) will be less effective in differentiated markets because end-users will less likely switch. As such, the punishment mechanism will also be less effective when end-users experience switching costs; the telecom market is known for its sizeable proportion of inert end-users.

Furthermore, the assumption that the cheating party will not follow retail price reductions is an unreal assumption. If the cheating party and the access seeker follow the punisher's price decrease to the extent necessary to protect their market shares in a differentiated retail market, the punisher will be hit equally by its own punishment. Even when it succeeds in reducing the market share of the cheater and the entrant, it remains highly uncertain whether the punishment mechanism succeeds in driving out the access seeker entirely and restoring the coordinated outcome at wholesale level. Under these circumstances, the punishment mechanism will lose its credibility as the punisher cannot maintain fierce price competition forever.

3.3 Conclusion

The ability to coordinate depends on two categories of conditions: 1) the symmetry between companies over time in terms of cost structure, technological advantages and the degree of product differentiation; and 2) the ease of detection and retaliation in the event of a deviation from the coordinated outcome.

ACM's analysis of symmetry over time is seriously flawed as it fails to interpret its conclusions on the (current) symmetry between the players based on its assessment of the market's complexity and stability (over time). Consequently, the analysis becomes a check-box exercise which does not consider the inter-relatedness between the analytical steps. Besides the failure to perform an integrated dynamic analysis of symmetry, ACM makes several wrong conclusions or unsubstantiated claims regarding symmetry of cost structures, of technological advantages, of differentiated wholesale offerings, as well as regarding differences in investment strategies.

⁴¹ This assumption is consistent with the conclusions by Boureau et al (2011) and Brito and Pereira (2010).

ACM's analysis of detection mechanisms is flawed as it fails to analyse whether detection would occur in time to restore the coordinated outcome. Moreover, ACM makes a number of unreal assumptions when analysing the credibility of possible retaliation mechanism. These assumptions do not hold in the real world, and subsequently, the retaliation mechanisms are not credible.

4 Summary and conclusions

General impression

Our general impression of ACM's analysis is that it is weakly supported by evidence. ACM refers to empirical evidence observed in the market when it seems to support its analysis, while ignoring the same empirical evidence when it contradicts its analysis. For example, ACM argues it will not suffice to impose an access obligation on only one party to ignite wholesale competition because "VodafoneZiggo has not provided voluntary access to its network when KPN was obliged to provide regulated access to its network". Where ACM presents this as empirical evidence for a reason to impose an access obligation on VodafoneZiggo, it ignores this same evidence as giving it a reason to critically review its analysis of joint dominance in the first place; after all, being aware of KPN's obligation to provide access, VodafoneZiggo should be encouraged to provide access, unless it has own individual incentives for not granting access⁴². Moreover, if ACM assumes the game between VodafoneZiggo and KPN to be characterised by a prisoners' dilemma and it observes that VodafoneZiggo is unlikely to provide wholesale access, ACM's logical conclusion would have to be that KPN would find it profitable to voluntarily provide access. However, ACM has always maintained that access obligations were necessary to force KPN to provide access.

On several occasions ACM's analysis cuts corners, resulting in a 'checking the boxes exercise' without little further analysis. For example, following the analysis of the retail market in which ACM concludes there are two dominant suppliers, ACM checks the box of 'two symmetrical large suppliers at wholesale level'. ACM does not consider whether VodafoneZiggo experiences barriers to enter the wholesale market. Next, ACM immediately jumps to an analysis of tacit collusion in an infinitely repeated game. However, the natural starting point would be a deeper exploration of the incentives of KPN and VodafoneZiggo to provide voluntary access in the absence of regulation. Academic papers by Ordober and Shaffer (2007), Brito and Pereira (2010), and Bourreau et al. (2011) confirm that there are good prospects for market outcomes in which, without regulation, vertically integrated operators will provide access; i.e. there is no prisoner's dilemma. As a consequence of jumping too hastily to a scenario of joint dominance, ACM's model cannot explain the observation that VodafoneZiggo is not providing wholesale access while KPN is obligated to provide access.

⁴² See Case SI/2009/0913

Incentives to coordinate

The above mentioned academic papers confirm that the pay-Offs for KPN and VodafoneZiggo are likely not characterised by a prisoners' dilemma. We conclude that ACM's analysis underlying the pay-off matrix is based on contradicting assumptions and a wrong model of competition. But even when the game is characterised by a prisoners' dilemma, there is evidence that, in the absence of regulation, it will not stabilise in a coordinated outcome, but rather in the scenario where KPN provides voluntary access and VodafoneZiggo does not provide access because:

- VodafoneZiggo faces barriers to enter the wholesale market in the form of [REDACTED]
[REDACTED]
[REDACTED]
- (potential) wholesale demand (anticipates) faces switching costs related to the replacement of CPE when migrating from WBA over cable to VULA over copper (and vice versa); and/or
- wholesale products by KPN provide the entrant more options to differentiate retail products and more options for scaling up. This makes KPN's wholesale products more attractive to end-users (it increases their willingness to pay) and provides KPN with more incentives to offer wholesale access (at a lower wholesale price). The latter effect is enhanced when we consider that VodafoneZiggo enjoys a competitive advantage at retail level in terms of speed and upgrade options.

Ability to coordinate

The ability to coordinate depends on two categories of conditions: 1) the symmetry between companies over time in terms of cost structure, technological advantages and the degree of product differentiation; and 2) the ease of detection and retaliation in the event of a deviation from the coordinated outcome. ACM's analysis of each of these conditions is flawed.

Symmetry over time

When analysing (current) symmetry between the players, ACM must interpret its analysis based on its assessment of the market's complexity and stability (over time). However, in ACM's analysis these analytical steps are treated as stand-alone exercises. The reason for this, is that ACM does not start its analysis by identifying which time-horizon should be applied. Consequently, the analysis becomes a check-box exercise which does not consider the inter-relatedness between the analytical steps. For example:

- ACM recognises that KPN has scope economies in the backbone network related to mobile services. ACM argues that these advantages are small due to the large scale of the

fixed B2C market. ACM fails to analyse whether (and to what extent) mobile related economies of scope become more important with the roll out of 5G.

- ACM argues that the market is characterised by a few players and stable growth in terms of number of connections. ACM concludes on this basis that the market is stable. However, for the payoff matrix to be stable, revenues and profits should be stable over time. ACM neither analyses the stability of revenues and profits and how these have changed over time as a consequence of regularly observed asymmetric technological and market shocks, nor does ACM analyse how revenues and profits may change in the future as a consequence of foreseen technological and market developments with possible asymmetric impacts.

Besides the failure to perform an integrated dynamic analysis of symmetry, ACM makes several wrong conclusions regarding symmetry, such as:

- ACM ignores how different technological advantages enjoyed by VodafoneZiggo and KPN impact on their investment strategies and thus on their cost structures.
- ACM recognises that VodafoneZiggo has a competitive advantage over KPN in the B2C market in terms of speeds and upgrade options. ACM wrongly states that this advantage cancels out against an advantage for KPN to provide guaranteed capacity for B2B services which has no relevance for speed and upgrade options, nor does it provide any technological advantages for KPN in the B2C market.
- ACM ignores that KPN's wholesale products are more differentiated compared to VodafoneZiggo's hypothetical wholesale product and that KPN's wholesale products offer the access seekers more options to differentiate their retail products.
- ACM recognises that the coordinated outcome may be undermined by investment strategies and concludes that KPN and VodafoneZiggo therefore have incentives to coordinate investment strategies. ACM claims that KPN and VodafoneZiggo are currently already stalling investments in a coordinated fashion. Without prejudice to whether both parties could speed up their investment strategies, we conclude that ACM fails to analyse whether KPN and VodafoneZiggo have other (unilateral) reasons for their strategic choices regarding investments.

Detection and retaliation

According to ACM, deviations from the coordinated outcome at wholesale level will be detected immediately when a third party enters the retail market using the network of the other. The question is, however, whether detection will occur in a timely manner such that the process of entry can still be reversed, and the coordinated outcome can be restored.

ACM considers two retaliation mechanisms for maintaining the coordinated equilibrium in the retail and wholesale market:

1. Temporary (fierce) price competition at retail level; and
2. Offering wholesale access

The objective of the first strategy is a form of tit-for-tat strategy which has the purpose of eventually returning to the coordinated outcome. The second strategy is a so-called grim trigger mechanism resulting in a return to the non-coordinated equilibrium for ever.

Temporary price competition to retaliate for non-coordinated price setting behaviour in the retail market can easily result in a negative spiral of tits-for-tats and in effect become a grim trigger mechanism. The risk of a negative spiral is particularly present when there is a lot of noise on the lines of communication, which is inherently the case when parties are tacitly colluding. Moreover, under these circumstances of imperfect communication, the unforgiving nature of a grim trigger strategy, as well as of the out of hand tit-for-tat spiral, may lead to a non-cooperative outcome already at day one. Considering these shortcomings of a tit-for-tat strategy, ACM should provide more analysis of why it would work in this particular case.

ACM argues that temporary price competition at retail level may also discourage cheating at wholesale level by hurting the cheater in terms of market share and simultaneously drive the entrant out of the market. This conclusion is wrong. In a differentiated market and/or in the presence of switching costs, fierce price competition will be a less effective punishment mechanism because end-users will less likely switch. Furthermore, if the cheating party and the access seeker follow the punisher's price decrease to the extent necessary to protect their market shares in a differentiated retail market, the punisher will be hit equally by its own punishment. Under these circumstances, the punishment mechanism will lose its credibility as the punisher cannot maintain fierce price competition forever.

Retaliation by also providing access cannot be imposed swiftly and easily, if at all. ACM fails to provide arguments of why it considers this a credible punishment mechanism.

Annex I: ACM's methodology and suppositions

Throughout the decision one notices many examples of fundamental methodological mistakes made by ACM. Below we present an elaborate (non-exhaustive) overview.

Comments to paragraphs in Section 3.6 *"Is WBA part of the market?"*

- § 111. "Partijen die retailproducten aanbieden op basis van een combinatie van (virtueel) ontbundelde toegang en WBT hebben één landelijk aanbod. Dit landelijke aanbod is ook goed vergelijkbaar met het aanbod van KPN en VodafoneZiggo. In dit opzicht kan WBT als een functioneel substituut voor (virtueel) ontbundelde toegang worden beschouwd. Deze conclusie verandert niet als meer specifiek gekeken wordt naar de criteria die de Commissie hanteert."
- Translation § 111. "Parties that offer retail products based on a combination of (virtual) unbundled access and WBT provide a single national coverage offer. This national offer is also quite comparable to the offer by KPN and VodafoneZiggo. In this respect, WBT can be regarded as a functional substitute for (virtual) unbundled access. This conclusion does not change if more specific attention is paid to the criteria used by the Commission."
- The fact that similar retail services can be produced does not imply that there is functional equivalence between the underlying but different wholesale access products. To illustrate, consider buying eggs to bake a pancake, buying a "just-add-water" pancake mix, or buying ready-made pancakes. All products can be used to eventually eat pancakes, but none of these products are functionally equivalent.
- § 122. [...] "Tegenover het hogere wholesaletarief dat afnemers dienen te betalen voor ODF-access FttH, VULA, OWM en WBT, staan daarmee ook hogere potentiële opbrengsten per eindgebruiker dan bij MDF-access. In dat opzicht zijn (virtueel) ontbundelde toegang en WBT over koper en glasvezel ook bedrijfseconomisch gezien substituten van elkaar."
- Translation § 122. [...] "In contrast to the higher wholesale prices that customers have to pay for ODF access FttH, VULA, OWM and WBT, there are also higher potential returns per end-user than with MDF access. In that respect, (virtual) unbundled access and WBT over copper and fiber optics are also substitutes from a business economics perspective."
- It is not clear what the assertion in § 122 means. "From the perspective of business economics" is an undefined interpretation of the economic notion of substitutes. ACM

suggests a specific interpretation of the well-known concept of substitutes without explanation or justification. Furthermore, what is argued here contradicts what is argued in § 111.

- § 125. "De ACM stelt vast dat de grens tussen (virtueel) ontbundelde toegang en WBT in Nederland is vervaagd. Hoewel de verschillende toegangsdiensten technisch gezien nog wel op een aantal punten kunnen worden onderscheiden, lijkt het hierbij vooral te gaan om een onderscheid tussen de fysieke toegangsdiensten (SDF-, MDF- en ODF-access) en de niet- fysieke toegangsdiensten (VULA, OWM en WBT) over koper en glasvezel. In die laatste categorie vallen producten die zowel tot markt 3a als markt 3b behoren."
- § 126. "Op basis van VULA, OWM en WBT zijn afnemers in staat om gelijkwaardige retaildiensten aan te bieden als op basis van fysiek ontbundelde toegang. Het enige significante verschil tussen deze wholesalediensten lijkt de verschillende tarifiering te zijn waartegenover echter ook andere investeringen staan. Ook dit lijkt echter functioneel geen aanmerkelijk verschil te zijn, aangezien afnemers van deze verschillende wholesalediensten in de praktijk in staat zijn om gelijkwaardige producten voor vergelijkbare retailprijzen in de markt te zetten. Deze conclusie wordt bevestigd door marktpartijen. KPN geeft aan dat zijn dienstverlening voor alle WBT- afnemers gelijk is, ongeacht of ze gebruik maken van het standaard WBA-, het VULA-, of het OWM-tariefmodel. Tele2, Online en T-Mobile bevestigen dat zij weinig verschillen zien anders dan de verschillende tarieven van WBT, OWM, en VULA".
- Translation § 125. "The ACM establishes that the boundary between (virtual) unbundled access and WBT in the Netherlands has faded. Although the various access services can technically still be distinguished on a number of points, it seems to be a distinction between the physical access services (SDF, MDF and ODF access) and the non-physical access services (VULA, OWM). and WBT) on copper and fiberglass. The latter category includes products that belong to both market 3a and market 3b."
- Translation § 126. "On the basis of VULA, OWM and WBT, customers are able to offer equivalent retail services as on the basis of physically unbundled access. The only significant difference between these wholesale services seems to be the different pricing, which is however based on different investments. Again, however, this does not seem to be a functional difference, since customers of these various wholesale services are in practice able to put equivalent products at comparable retail prices on the market. This conclusion is confirmed by market parties. KPN indicates that its services are the same for all WBT customers, regardless of whether they use the standard WBA, VULA or OWM tariff model. Tele2, Online and T-Mobile confirm that they see few differences other than the different rates of WBT, OWM, and VULA."

- In § 125, the ACM argues that although various access services can technically be distinguished in various aspects, the difference appears to be mainly a distinction between physical and non-physical access. In § 126, the ACM asserts that the only significant difference between these wholesale services lies in the price structure, which can, supposedly, be justified by different investment requirements. This line of reasoning is based on comparing and adding up "apples and oranges", as it suggests that the differences between pricing structures and investment requirements cancel out. In reality, though, a combination of lower prices and high investments complement each other and result in economies of scale.
- § 127. "Omdat afnemers op basis van WBT-diensten over koper en glasvezel gelijkwaardige retaildiensten (kunnen) leveren als op basis van de (virtueel) ontbundelde toegangsdiensten, en er ook daadwerkelijk overstap heeft plaatsgevonden van ontbundelde toegang naar WBT, concludeert de ACM dat WBT over koper en glasvezel een direct substituut vormt voor (virtueel) ontbundelde toegang."
- Translation § 127. "Because customers can supply equivalent retail services on the basis of WBT services on copper and optical fiber as on the basis of the (virtually) unbundled access services, and there also has actually been a switch from unbundled access to WBT, the ACM concludes that WBT is on copper and fiber is a direct substitute for (virtual) unbundled access."
- To justify this conclusion, one would need to analyse whether observed switching was the result of a change in prices (a SSNIP) or of other reasons. Note that those parties that switched from ULL to VULA or WBT, switched because of a technological upgrade of the access network and not because of a change in prices.
- § 134. "Zoals de ACM reeds heeft vastgesteld in de analyse van de retailmarkt voor (bundels met) internettoegang zijn over kabelnetwerken dezelfde retaildiensten mogelijk als over koper- en glasvezelnetwerken. Deze diensten worden thans door VodafoneZiggo aangeboden op basis van interne leveringen. Er is geen reden om aan te nemen dat toetreders via extern geleverde WBT niet dezelfde retaildiensten zouden kunnen leveren en daarmee zouden kunnen concurreren met andere aanbieders die via koper- en glasvezelnetwerken hun diensten aanbieden. Buitenlandse voorbeelden laten ook zien dat kabeltoegang een reële mogelijkheid is. In een aantal landen is kabeltoegang al gereguleerd en wordt op basis van deze regulering ook daadwerkelijk toegang afgenomen."
- Translation § 134. "As the ACM has already established in the analysis of the retail market for (bundles of) internet access, the same retail services are possible over cable networks

as over copper and fiber optic networks. These services are currently offered by VodafoneZiggo on the basis of internal deliveries. There is no reason to assume that entrants via externally supplied WBT would not be able to provide the same retail services and would thus be able to compete with other providers that offer their services via copper and fiber optic networks. Foreign examples also show that cable access is a real possibility. Cable access is already regulated in a number of countries and access is actually being purchased on the basis of this regulation."

- The assertion that entrants can be expected to supply equivalent retail services over cable as over DSL networks, and thus compete with firms using copper and fiber optic networks, is not substantiated and would require further analysis — in particular because WBA over cable is offered on the basis of the IP-protocol. On the latter, WIK (2017, p.67) concludes that the major weakness of IP-based access products is *“the relative poor degree of differentiation of the products and services offered to the end-customers by the access seekers. They only can offer me-too like services and cannot get beyond the level the wholesale provider offers for his own customers.”*
- § 149. "Aangezien er geen wholesaleaanbod is voor toegang tot het kabelnetwerk van VodafoneZiggo is er geen sprake van daadwerkelijke overstap van koper- en glasvezelnetwerken naar kabelnetwerken. Verschillende marktpartijen hebben echter aangegeven belangstelling te hebben om toegang te krijgen tot het kabelnetwerk van VodafoneZiggo. Een enkele partij heeft recent VodafoneZiggo (tevergeefs) benaderd om toegang tot het kabelnetwerk te krijgen. Er is dus sprake van potentiële vraag naar toegang tot kabelnetwerken." [...]
- Translation § 149. "Since there is no wholesale offer for access to the VodafoneZiggo cable network, there is no actual switching from copper and fiber optic networks to cable networks. However, various market parties have indicated that they are interested in gaining access to the cable network of VodafoneZiggo. One party recently approached VodafoneZiggo (in vain) to gain access to the cable network. Hence there is potential demand for access to cable networks." [...]
- The fact that parties indicate during interviews with ACM that they have interest in gaining access to VodafoneZiggo's network, does not necessarily mean that they have. Stated preferences may be different from actual behaviour, for example, when respondents do not oversee all consequences of their choice, in terms of the investments needed and/or the costs of switching, when answering the question. Moreover, in this case, the answers may be strategically motivated to influence the perception of ACM.
- Revealed preferences have much more informative value as they are based on actual behaviour. As such, what matters most in this case is the one party that recently

requested access to VodafoneZiggo's network. To establish the size of potential demand by this party, one needs to know how large its potential market share would be at retail level. Next, the information on the size of potential demand needs to be interpreted along with information on VodafoneZiggo's investments in setting up a wholesale department. ACM has not analysed whether potential demand is large enough to warrant such investment by VodafoneZiggo.

Comments to paragraphs in Section 4.3 "Single SMP"

- § 174. "In afwezigheid van regulering verwacht de ACM dat KPN geen toegang meer zal geven. Dat betekent dat wholesaleafnemers van (on)gereguleerde diensten in een situatie zonder regulering geen diensten in kunnen kopen bij KPN." [...]
- Translation § 174. "In the absence of regulation, the ACM expects that KPN will no longer provide access. This means that wholesale customers of (un)regulated services in a situation without regulation cannot buy services from KPN." [...]
- The assertion that KPN will no longer provide access if there is no access regulation is not substantiated. There is a stream in the academic literature that investigates competition in the wholesale market and confirms that competing networks may voluntarily provide access, and under which circumstances (see e.g. Brito and Pereira, 2010). Moreover, mobile markets in the EU illustrates that voluntary access provision is a viable business proposition that can emerge through competition at the wholesale level. Note that the assertion in § 174 forms the basis for the decision by the ACM.
- § 193. "De ACM komt op basis van het voorgaande tot de conclusie dat zowel KPN als VodafoneZiggo over netwerken beschikken die voordelen bieden. Zo biedt het kabelnetwerk van VodafoneZiggo hogere snelheden en betere upgrademogelijkheden dan het kopernetwerk van KPN. Anderzijds biedt het glasvezelnetwerk van KPN, dat een beperktere dekking heeft, de mogelijkheid tot ongelimiteerde up- en downloadsnelheden en kan het capaciteitsgaranties leveren aan zakelijke eindgebruikers. De ACM kan op basis hiervan niet concluderen dat KPN of VodafoneZiggo een duidelijk voordeel heeft ten opzichte van de ander. Beide partijen hebben via hun netwerken de mogelijkheid om de komende jaren netwerkupgrades uit te voeren en hogere snelheden aan te bieden. Naar de verwachting van de ACM kunnen beide partijen daarom in de komende jaren voldoen aan de groeiende bandbreedtebehoefte van eindgebruikers. Eventuele voordelen als gevolg van een technologische voorsprong of superioriteit van KPN of VodafoneZiggo zijn daarom beperkt."

- Translation § 193. "Based on the above, the ACM concludes that both KPN and VodafoneZiggo have networks that offer advantages. For example, VodafoneZiggo's cable network offers higher speeds and better upgrade options than KPN's copper network. On the other hand, KPN's fiber optic network, which offers more limited coverage, offers unlimited upload and download speeds and can provide capacity guarantees to business end-users. On this basis, the ACM cannot conclude that KPN or VodafoneZiggo has a clear advantage over the other. Both parties have the possibility through their networks to carry out network upgrades in the coming years and to offer higher speeds. According to the expectation of the ACM, both parties can therefore meet the growing bandwidth needs of end users in the coming years. Any benefits resulting from a technological advantage or superiority of KPN or VodafoneZiggo are therefore limited."
- The ACM's line of reasoning can be summarized as follows:
 1. both firms have networks with specific advantages;
 2. these advantages differ from each other but it is impossible to figure out in which dimensions or to what extent;
 3. it is impossible to establish which firm has, if one would add it all up, the largest advantage overall;
 4. both firms are able to upgrade their networks to meet growing bandwidth demand;
 5. neither firm can benefit significantly from a technological advantage or superiority.
 This line of reasoning is flawed for the following reasons:
 1. One cannot compare and add up technological advantages that may come to the surface in different dimensions and may have different and diverging impacts (both technically and from the perspective of the impact on the demand side). Doing that would amount to comparing, and adding up, "apples and pears".
 2. Based on the discussed uncertainties, one cannot conclude which firm has, overall, the largest advantage, or, for that matter, that the differences are of equal size and neither has a substantial advantage.
- § 196. "Zowel KPN als VodafoneZiggo zijn verticaal geïntegreerde ondernemingen. Beide ondernemingen kunnen met hun eigen netwerk vergelijkbare diensten leveren aan eindgebruikers. Vanwege hun landelijk dekkend netwerk kunnen ze onafhankelijk van elkaar opereren. Voor zowel KPN als VodafoneZiggo geldt dat ze geen voordeel hebben ten opzichte van de ander. De ACM concludeert daarom dat KPN en VodafoneZiggo beschikken over gelijke voordelen uit verticale integratie."
- Translation § 196. "Both KPN and VodafoneZiggo are vertically integrated companies. Both companies can provide comparable services to end users with their own network. Because of their national coverage network, they can operate independently of each other."

Both KPN and VodafoneZiggo have no advantage over the other. The ACM therefore concludes that KPN and VodafoneZiggo have equal benefits from vertical integration."

- The claim is that because of the national footprint of both firms' networks, they can operate independently of each other. If that were the case, both companies would have single SMP.
- § 198. "KPN en VodafoneZiggo bieden hetzelfde palet aan diensten aan. Beide ondernemingen leveren internettoegang, vaste telefonie, televisie, zakelijke netwerkdiensten en mobiele communicatiediensten. Deze diensten worden zowel gebundeld als los aangeboden en kunnen volledig via het eigen vaste en mobiele netwerk worden aangeboden. De ACM ziet daarom geen verschillen tussen KPN en VodafoneZiggo wat betreft het aanbod."
- § 199. "Gelet op het voorgaande komt de ACM tot de conclusie dat KPN en VodafoneZiggo beschikken over dezelfde voordelen uit product- en dienstendiversificatie."
- Translation § 198. "KPN and VodafoneZiggo offer the same range of services. Both companies provide internet access, fixed telephony, television, business network services and mobile communication services. These services are offered bundled as well as separately and can be offered entirely via their own fixed and mobile network. The ACM therefore sees no differences between KPN and VodafoneZiggo with regard to the supply."
- Translation § 199. "In view of the above, the ACM comes to the conclusion that KPN and VodafoneZiggo have the same benefits from product and service diversification."
- The assertion made in § 198 can only be justified on an abstract level that transcends the product dimensions that consumers take into consideration. At the level of the actual offer there are relevant differences. For example, the offered contract forms, price structures, and content of the packages may diverge, in particular with regard to the content-offering for television. Hence the conclusion in § 199 does not relate to the possibilities for diversification to make the product offer more heterogeneous — a business strategy that is highly relevant in practice.
- § 201. [...] "KPN is actief op een groot aantal markten, zoals de retailmarkten voor internettoegang, zakelijke netwerkdiensten en mobiele en vaste telefonie en de wholesalemarkt voor HKWBT/HL. Hiermee beschikt KPN over een relatief groot portfolio over hetzelfde netwerk aan diensten waarmee de kosten van een aansluitnetwerk kunnen worden terugverdiend. KPN kan zijn kosten daarom over een groter aantal diensten spreiden. Als gevolg daarvan zijn de kosten per product voor KPN

lager waardoor onder meer de business case voor de uitrol van nieuwe aansluitingen verbetert."

- Translation § 201. [...] "KPN is active in a large number of markets, such as the retail markets for internet access, business network services and mobile and fixed telephony, and the wholesale market for HKWBT/HL. This means that KPN has a relatively large portfolio on the same network of services with which the costs of a connection network can be recouped. KPN can therefore spread its costs over a larger number of services. As a result, the costs per product for KPN are lower, which among other things improves the business case for the roll-out of new connections."
- § 201 provides examples of scope advantages for KPN. In the following § 202-206, the ACM elaborates on these advantages one by one without providing concrete information on how substantial these advantages are. It is asserted, without substantiating, that scope economies from business services are largest and that these are limited. The line of reasoning gradually evolves into a conclusion that there are no differences between KPN and VodafoneZiggo and that neither party has a competitive advantage over the other.

Comments to paragraphs in Section 4.4 "*Analyses of joint SMP*"

- § 208. [...] "Daarnaast heeft de ACM geconcludeerd dat de symmetrie tussen KPN en VodafoneZiggo op de markt voor WFA kan duiden op gezamenlijke AMM." [...]
- Translation 208. [...] "In addition, the ACM concluded that the symmetry between KPN and VodafoneZiggo on the market for WFA could indicate joint AMM." [...]
- This conclusion, or rather statement, comes as a surprise, since now the presumption is that there is symmetry, while before, various differences and similarities regarding cost structure, functionality, coverage and served market segments were discussed, while it was stated that the differences are limited. In § 207, the ACM states that "especially when it comes to providing services to consumers", the players "have equal opportunities". This remark may refer to the symmetry that the ACM has in mind. However, note that in the conditions that support tacit collusion, various dimensions are relevant, the cost structure being one of them. Also, the statement that the cost structure is comparable for the players lacks a solid argumentation and empirical evidence.
- 213. "In deze paragraaf beoordeelt de ACM de prikkel van partijen om tot een verstandhouding te komen over toegangswegering. Hiertoe introduceert de ACM een speltheoretisch model dat kan worden toegepast op de situatie op de markt voor WFA.

Dit is een model dat de interactie tussen KPN en VodafoneZiggo op de markt voor WFA op een sterk vereenvoudigde wijze weergeeft, zodat hier voor de analyse relevante conclusies uit getrokken kunnen worden. Ondanks dat de realiteit complexer is dan de theorie, is het speltheoretisch model nuttig om te analyseren welke prikkels partijen hebben om tot een verstandhouding te komen."

- Translation § 213. "In this section, the ACM assesses the parties' incentive to come to an agreement on access denial. To this end, the ACM introduces a game theoretic model that can be applied to the situation on the market for WFA. This is a model that shows the interaction between KPN and VodafoneZiggo on the market for WFA in a very simplified way, so that relevant conclusions can be drawn for the analysis. Despite the fact that reality is more complex than theory, the game theoretic model is useful to analyze which incentives parties have to come to an understanding."
- The line of reasoning is as follows: the model is a highly simplified depiction of the interaction on the market, which implies that relevant conclusions may be drawn. However, the ACM ignores the (crucial) question whether relevant conclusions can be drawn from this model in the first place.
- § 214. "De opzet van het speltheoretisch model is een spel met twee fases, voor de wholesale- en retailmarkt. In de eerste fase bepalen partijen of zij toegang verlenen of weigeren op de markt voor WFA. In de tweede fase bepalen partijen welke prijs zij zetten op de retailmarkt. De combinatie van deze twee keuzes bepaalt de winst die partijen kunnen behalen." [...]
- Translation § 214. "The design of the game theoretic model is a two-period game for the wholesale and retail market. In the first period, the parties determine whether they grant or refuse access on the WFA market. In the second period, the parties determine prices on the retail market. The combination of these two choices determines the profit that parties can obtain."
- There is a multitude of ways, many of them more realistic, to structure this type of game. The decision to grant access will depend, among other factors, on the outcome of negotiations between access provider and access seeker, for instance regarding price, quality, conditions and length of time. Another relevant factor is the market segmentation and the differences in segments targeted by all players, access providers as well as access seekers. Factors such as these determine the payoffs of access providers. Generalizing these interdependencies into a single number (as a representative profit level ignoring the underlying factors) simplifies matters, which has its value, but at the same time ignores intricacies that may be determining factors.

- § 215. "De waardes uit de winstmatrix zijn geselecteerd op basis van de speltheoretische analyse in Annex D. Ze zijn niet gebaseerd op de daadwerkelijke winsten van KPN en VodafoneZiggo op de markt voor WFA, maar zijn zo gekozen omdat ze goed de verhouding weergeven van de winsten die beide partijen kunnen behalen, gegeven hun eigen actie en de actie van de ander ($B > A > D > C$, waarbij $A=3$, $B=4$, $C=1$ en $D=2$). Deze verhouding is kenmerkend voor het zogenoemde Prisoners' Dilemma, waarin KPN en VodafoneZiggo zich op de WFA-markt bevinden."
- Translation § 215. "The values from the payoff matrix have been selected on the basis of the game theoretic analysis in Annex D. They are not based on the actual profits of KPN and VodafoneZiggo on the market for WFA, but have been chosen because they accurately reflect the ratio of the profits that both parties can obtain, given their own action and the action of the other ($B > A > D > C$, where $A=3$, $B=4$, $C=1$ and $D=2$). This ratio is characteristic of the so-called Prisoners' Dilemma, in which KPN and VodafoneZiggo find themselves on the WFA market."
- § 216. "Uit de matrix volgt dat de gezamenlijke winst van KPN en VodafoneZiggo het grootst is wanneer zij beide toegang weigeren (scenario 1)." [...] "Indien beide partijen besluiten toegang te bieden (scenario 4), zijn de winsten op wholesale- en retailniveau evenredig verdeeld, maar lager dan in een situatie zonder alternatieve aanbieders."
- Translation § 216. "It follows from the matrix that the joint profits of KPN and VodafoneZiggo is greatest when they both refuse to provide access (scenario 1)." [...] "If both parties decide to provide access (scenario 4), the profits at the wholesale and retail level are proportionally distributed, but lower than in a situation without alternative providers."
- The payoffs A, B, C and D have been chosen such that the payoff matrix depicts a prisoners' dilemma. A motivation why these payoffs are representative for the ratio of potential profit levels is missing though. Moreover, while § 215 states that the payoffs are nog based on actual profit levels, § 216 continues by presuming that the payoff levels in the matrix are representative for profit levels.
- § 217. "Een belangrijke aanname voor de bovenstaande winstmatrix is dat de producten van de twee partijen niet homogeen zijn en dat het voor een wholesaleafnemer mogelijk is om op basis van de WFA-dienst een gedifferentieerd product in de markt te zetten." [...] "Met een gedifferentieerd product kan de wholesaleafnemer waarde toevoegen, wat leidt tot een winst van 4 voor de toegangverlenende partij. Die toegevoegde waarde komt bijvoorbeeld voort uit het bedienen van een niche." [...]
- Translation § 217. "An important assumption for the above payoff matrix is that the products of the two parties are not homogeneous and that it is possible for a wholesale

customer to introduce a differentiated product on the market, based on a WFA service." [...] "With a differentiated product, the wholesale customer can add value, leading to a profit level of 4 for the access provider. This added value comes, for example, from serving a niche." [...]

- The assumption on product differentiation affects the payoffs. With differentiation in the retail market, and depending on the niche market served by an access seeker, the game played by KPN and VodafoneZiggo in the wholesale market need not correspond to a prisoners' dilemma. Indeed, Brito and Pereira (2010) show that if an entrant's (access seeker's) product is sufficiently differentiated from the incumbents' offerings, wholesale competition does not correspond to a prisoners' dilemma.
- § 222. "In het dynamische spel wordt de interactie uit het statische spel herhaald. In een herhaald spel kunnen KPN en VodafoneZiggo elkaars gedrag observeren en hun eigen gedrag hierop aanpassen. Dit stelt hen in staat hun gedrag stilzwijgend af te stemmen om zo een hogere winst te behalen. Tabel 4.4 laat zien dat KPN en VodafoneZiggo gezamenlijk de hoogste winst kunnen behalen wanneer zij beiden geen toegang verlenen (scenario 1). De ACM verwacht daarom dat KPN en VodafoneZiggo in een situatie zonder regulering allebei de prikkel hebben om toegang tot hun netwerken te weigeren."
- Translation § 222. "In the dynamic game, the interaction depicted in the static game is repeated. In a repeated game, KPN and VodafoneZiggo can observe each other's behavior and adjust their own behavior accordingly. This allows them to mutually and tacitly adjust their behavior in order to achieve higher profits. Table 4.4 shows that KPN and VodafoneZiggo can jointly achieve the highest profits if they do not grant access (scenario 1). The ACM therefore expects that KPN and VodafoneZiggo, in a situation without regulation, will both have the incentive to refuse access to their networks."
- In an infinitely repeated game, like the prisoners' dilemma depicted in the payoff matrix, tacit collusion may indeed be a feasible equilibrium outcome. Still there are important objections against the ACM's expectation.
 1. Tacit collusion is not the only possible equilibrium outcome. Scenario 4, in which KPN and VodafoneZiggo voluntarily provide access, is equally possible. More generally, depending on the level of horizontal differentiation (among all active firms, including access seekers) in the retail market, the payoff matrix may or may not be a prisoners' dilemma, as shown by Brito and Pereira (2010). In such a more general game, various equilibrium outcomes are possible, including one in which the network operators provide access for free. Hence, the ACM not only leaves out a justification why there would be a prisoners' dilemma in the wholesale market, in addition it does not motivate why the outcome of tacit collusion would prevail.

2. The ACM's expectation on the behaviour of KPN and VodafoneZiggo pertains to the actual market situation, not the stylized game in the payoff matrix. Hence, the ACM jumps from a stylized, simplified game model to the actual market situation, while implicitly assuming that this model is representative for that situation. The ACM also presumes that the infinitely repeated interaction is representative for the actual competitive situation. It is by no means established that these implicit assumptions are valid.
- § 224. "In het bovenstaande heeft de ACM laten zien dat KPN en VodafoneZiggo een prikkel hebben om tot een verstandhouding te komen op de markt voor WFA over het weigeren van toegang."
 - Translation § 224. "In the above, the ACM has shown that KPN and VodafoneZiggo have an incentive to come to an agreement to refuse access on the market for WFA."
 - The ACM now claims that it has shown that KPN and VodafoneZiggo have incentives to tacitly collude. However, this claim followed from various assumptions made in a stylized and simplified setting that were then, implicitly, taken as representative for the actual market setting. Thus the claim was not supported by solid arguments, contrary to the impression that the formulation by the ACM gives. To draw the conclusion stated in § 224, one needs to empirically establish that:
 1. the stylized game situation in the payoff matrix is representative for the actual market situation;
 2. the competitive situation corresponds to an infinitely repeated interaction based on the static game in the payoff matrix; and
 3. the equilibrium outcome of the infinitely repeated game corresponds to scenario 1 (tacit collusion) instead of scenario 4 (voluntary access provision), which may equally well constitute an equilibrium outcome.
 - § 228. "Wat betreft de kostenstructuur worden de netwerken van KPN en VodafoneZiggo gekenmerkt door hoge vaste kosten en relatief lage variabele kosten: het leveren van een extra WFA-aansluiting betekent wel een extra beslag op de capaciteit van het netwerk, maar die capaciteit kan relatief gemakkelijk en tegen geringe kosten worden uitgebreid; de kosten van een extra levering van WFA zijn dus beperkt. Dat maakt dat de eventuele verschillen in de variabele kosten van KPN en VodafoneZiggo een klein effect hebben op de prijsstelling die beide partijen hanteren. Op basis hiervan concludeert de ACM dat eventuele verschillen in de kostenstructuur van KPN en VodafoneZiggo geen wezenlijk andere belangen creëren."

- Translation § 228. "Regarding the cost structure, the networks of KPN and VodafoneZiggo are characterized by high fixed costs and relatively low variable costs: suing an additional WFA connection does imply an extra burden on the capacity of the network, but that capacity can relatively easy, at a low cost, be expanded; the costs of providing an additional unit of WFA are therefore limited. This implies that the possible differences in the variable costs of KPN and VodafoneZiggo have a small effect on the pricing that both parties use. On this basis, the ACM concludes that any differences in the cost structure of KPN and VodafoneZiggo do not create any substantially different interests."
- Recall that the ACM builds its reasoning on a "modified greenfield approach", that is, the ACM discards existing regulation from market analyses (see § 13). Nevertheless, because in the present situation KPN does provide access while VodafoneZiggo does not, there is an asymmetry. This asymmetry has an impact on the cost to make access provision feasible and on the perceived cost difference between the two networks that access seekers will take into account. The asymmetry in the cost structures of KPN and VodafoneZiggo may be significant in practice. Also, firms that currently purchase wholesale access from KPN will make a revenue/cost calculation that is different from firms that do not yet purchase access. Hence the claims made in § 228 are based on assumptions that lack empirical content.
- § 229. "Als de technologische mogelijkheden van partijen te veel uiteen lopen, kan dit een partij met betere technologische mogelijkheden een prikkel geven om van het gecoördineerde evenwicht af te wijken. Hoe groter de technologische superioriteit, hoe groter de potentiële winst die behaald kan worden als van het evenwicht wordt afgeweken. Om stilzwijgende afstemming te laten slagen is het dus van belang dat geen van beide partijen over zodanige technologische mogelijkheden beschikt, dat deze veel beter in staat is om eindgebruikers te bedienen."
- § 230. In randnummers 187 tot en met 193 beschrijft de ACM de technologische mogelijkheden van de netwerken van KPN en VodafoneZiggo. De ACM komt hier tot de conclusie dat beide partijen over bepaalde voordelen beschikken: Zo biedt het kabelnetwerk van VodafoneZiggo hogere snelheden en betere upgrademogelijkheden dan het kopernetwerk van KPN, maar het heeft een iets beperktere dekking dan het kopernetwerk. Anderzijds biedt het glasvezelnetwerk van KPN, dat een nog beperktere netwerkdekking heeft, de mogelijkheid tot ongelimiteerde up- en downloadsnelheden en is KPN via zijn netwerken beter in staat diensten aan zakelijke eindgebruikers te leveren. De ACM kan op basis van het voorgaande niet concluderen dat één partij technologisch superieur is aan de ander. Beide partijen hebben via hun netwerken de mogelijkheid om

de komende jaren netwerkupgrades uit te voeren en hogere snelheden aan te bieden. Naar de verwachting van de ACM kunnen beide partijen daarom in de komende jaren voldoen aan de groeiende bandbreedtebehoefte van eindgebruikers. Daarmee is er de komende jaren ook wat betreft de technische mogelijkheden geen sprake van zodanige asymmetrie dat dat resulteert in wezenlijk andere belangen van KPN en VodafoneZiggo."

- Translation § 229. "If the technological possibilities of the parties diverge too much, this can give a party with better technological possibilities an incentive to deviate from the equilibrium outcome in which there is tacit collusion. The greater the technological superiority, the greater the potential profit from deviating from the collusive outcome. To make tacit collusion work, it is therefore important that neither of the parties has technological possibilities that would result in a substantially better ability to serve end-users."
- Translation § 230. "In § 187-193, the ACM describes the technological possibilities of KPN's and VodafoneZiggo's networks. The ACM arrives at the conclusion that both parties have certain advantages: For example, VodafoneZiggo's cable network offers higher speeds and better upgrade options than KPN's copper network, but it has a slightly more limited coverage than the copper network. On the other hand, KPN's fiber optic network, which has even more limited network coverage, offers unlimited upload and download speeds, and KPN is better able to provide services to corporate end-users via its networks. On the basis of the foregoing, the ACM cannot conclude that one party is technologically superior to the other. Both parties have the possibility, through their networks, to carry out network upgrades in the coming years and to offer higher speeds. According to the expectation of the ACM, both parties can therefore meet the growing bandwidth needs of end-users in the coming years. This means that as far as the technical possibilities are concerned, in the coming years there will not be an asymmetry that would result in substantially different interests for KPN and VodafoneZiggo."
- The ACM's line of reasoning can be summarized as follows:
 1. both firms have specific advantages;
 2. these advantages differ from each other but it is impossible to figure out in which dimensions or to what extent;
 3. it is impossible to establish which firm has, if one would add it all up, the largest advantage overall.

This line of reasoning is flawed for the following reasons:

3. One cannot compare and add up technological advantages that may come to the surface in different dimensions and may have different and diverging impacts (both technically and from the perspective of different types of customers). Doing that would amount to comparing, and adding up, "apples and pears".

4. Based on the discussed uncertainties, one cannot conclude which firm has, overall, the largest advantage, or, for that matter, that the differences are of equal size and neither has a substantial advantage.
- § 231. "Hoe groter het verschil in het productaanbod van aanbieders, hoe moeilijker het is om tot stilzwijgende coördinatie te komen. Het afstraffen van afwijkend gedrag is bijvoorbeeld veel minder effectief als eindgebruikers niet overstappen, omdat ze het ene product zien als superieur ten opzichte van een ander product. Ook zou de partij die een superieur product biedt meer baat hebben bij afwijken van het gecoördineerde evenwicht dan de partij die een inferieur product biedt. Het gecoördineerde evenwicht is in dat geval relatief niet erg stabiel."
 - § 232. "Zoals geconcludeerd in hoofdstuk 3 van dit besluit zijn er enkele verschillen tussen wat KPN en VodafoneZiggo kunnen leveren op de markt voor WFA. KPN is in staat om (virtueel) ontbundelde toegang te leveren tot zijn koper- en glasvezelnetwerk, evenals WBT. VodafoneZiggo is daarentegen op basis van zijn huidige coaxnetwerk enkel in staat WBT te leveren. Naar het oordeel van de ACM levert dit echter geen uiteenlopende belangen op. Onder meer in randnummer 140 heeft de ACM geconcludeerd dat op basis van de wholesalediensten die KPN en VodafoneZiggo kunnen leveren, vergelijkbare retaildiensten kunnen worden aangeboden."
 - § 234. "De ACM concludeert op basis van het bovenstaande dat eventuele verschillen tussen KPN en VodafoneZiggo met betrekking tot de wholesalediensten die zij mogelijk zullen leveren niet leiden tot superioriteit van de een ten opzichte van de ander."
 - Translation § 231. "The greater the difference in providers' product offerings, the more difficult it is to arrive at tacit coordination. For instance, punishing deviant behavior is much less effective if end-users do not switch, because they see one product as superior to the other product. Also, the party that offers a superior product would benefit more from deviating from the collusive outcome than the party offering an inferior product. In that case, the equilibrium with tacit collusion will relatively be not be very stable."
 - Translation § 232. "As concluded in chapter 3 of this decision, there are some differences in what KPN and VodafoneZiggo can provide on the market for WFA. KPN is able to provide (virtual) unbundled access to its copper and fiber network, as well as WBT. On the basis of its current coax network, however, VodafoneZiggo is only able to supply WBT. This does not, in the opinion of the ACM, result in divergent interests. In § 140, among others, the ACM concluded that, on the basis of the wholesale services that KPN and VodafoneZiggo can supply, comparable retail services can be offered."

- Translation § 234. "On the basis of the above, the ACM concludes that any differences between KPN and VodafoneZiggo, with respect to the wholesale services that they possibly will provide, do not lead to superiority of one firm above the other one."
- The conclusion in § 234 is based on an assessment by the ACM as given in § 232. The motivation of that assessment is not solid; one could equally well conclude that there are diverging interests. The conclusion that is drawn depends on a subjective assessment of the size of certain differences.
- § 233. "Daarnaast verwacht de ACM dat, indien KPN toegang biedt, hij het leveren van WBT altijd zal verkiezen boven het leveren van (virtueel) ontbundelde toegang, omdat hij hiermee de meeste controle behoudt over de retaildiensten die een potentiële wholesaleafnemer kan leveren. Indien KPN en VodafoneZiggo dus toegang leveren en hierin de vrije keuze hebben, zullen zij er naar verwachting beide voor kiezen WBT te leveren."
- Translation § 233. "In addition, the ACM expects that, if KPN provides access, it will always prefer supplying WBT over supplying (virtual) unbundled access, as it retains the most control over the retail services that a potential wholesale customer can deliver. If KPN and VodafoneZiggo therefore provide access and have discretion in this, they are both expected to choose to provide WBT."
- The expectation expressed by the ACM presupposes that KPN, in case an access seeker would prefer VULA, would not provide it. That would be surprising, especially since the access seeker may have a higher willingness to pay for this type of access (which could be based on larger possibilities to translate the access service into a distinct retail offering). Thus not providing VULA may not be a rational strategy for KPN. In addition, it is unclear why KPN would have all the bargaining power so that it can "call the shots", given that access seekers can negotiate with VodafoneZiggo at the same time to obtain the best deal.
- § 235. "Zowel KPN als VodafoneZiggo is verticaal geïntegreerd. Dit betekent dat ze beide actief zijn op verschillende niveaus in de productieketen en wat dit betreft een vergelijkbaar belang hebben."
- Translation § 235. "Both KPN and VodafoneZiggo are vertically integrated. This means that they are both active at different levels in the production chain and have a similar interest in this respect."
- This paragraph gives the impression that the fact that both KPN and VodafoneZiggo are vertically integrated, implies that they have "a similar interest in this respect" — without

specifying what "similar interest" and "in this respect" mean. Without further details and elaboration, the claim that is made in § 235 does not contain a meaningful statement.

- § 236. "De ACM concludeert dat KPN en VodafoneZiggo op basis van de marktaandeelen, kostenstructuur, technologische mogelijkheden, productdifferentiatie en verticale integratie in grote mate symmetrisch zijn, waardoor zij vergelijkbare belangen hebben op grond waarvan beide partijen in een situatie zonder regulering de mogelijkheid hebben om tot een verstandhouding te komen."
- Translation § 236. "The ACM concludes that KPN and VodafoneZiggo, based on market shares, cost structure, technological possibilities, product differentiation and vertical integration, are to a large extent symmetric, so that they have similar interests on the basis of which both parties in a situation without regulation have the opportunity to develop an agreement."
- At this point, all partial conclusions, many of which based on assumptions and lacking solid motivation, are interpreted as pointing in the same direction. Thus the claim in § 236 is more an assertion than a justifiable conclusion.
- § 238. "Op de markt voor WFA zijn KPN en VodafoneZiggo voortdurend met elkaar in interactie. Op elk moment kunnen zij observeren of er toegang wordt geboden, en een wijziging in het toegangsbeleid kan direct worden gedetecteerd. Partijen kunnen daarom direct reageren als een andere partij afwijkt van het gecoördineerde evenwicht. In onderdeel vii gaat de ACM nader in op de wijze van afstraffing."
- Translation § 238. "On the market for WFA, KPN and VodafoneZiggo are constantly interacting with each other. At any time they can observe whether access is offered, and a change in the access policy can be detected immediately. The parties can therefore react immediately if another party deviates from the coordinated equilibrium outcome. In section vii, the ACM will deal in more detail with the method of punishment."
- If access is being provided, will be detectable as soon as the retail offering of access seekers materializes in the retail market. That will take time, ranging from perhaps a few months to half a year. Changes in (the nature of) an access policy will, however, not always be observable, because wholesale contracts will remain private and because changes in access seekers' retail tariffs can not be translated one-on-one to changes in wholesale prices.
- § 241. "Op de markt voor WFA zijn slechts twee partijen actief met een landelijk dekkend netwerk. Dit zorgt ervoor dat partijen relatief gemakkelijk met elkaar tot een verstandhouding kunnen komen."

- Translation § 241. "On the market for WFA, only two parties with a national coverage network are active. This ensures that parties can come to an agreement relatively easily."
- The conclusion drawn in § 241 is incorrect. It is true that a small number of players contributes to the *ability* to tacitly collude, as it becomes easier to satisfy the necessary conditions for tacit collusion. The ACM now asserts that only this specific condition makes it easy to reach an agreement. However, the only thing that is known at this stage is that *one of the necessary* conditions holds, that is, it has become somewhat less likely that tacit collusion, if it would occur, will break down, or one of the potentially destabilizing factors is absent. Based on the arguments made so far, nothing can be inferred about the ease with which parties can reach an agreement.
- § 250. "In de afwezigheid van regulering zullen KPN en VodafoneZiggo bij het plannen van netwerkinvesteringen minstens net zo veel rekening houden met investeringen van de andere partij. De prikkel om netwerkinnovaties op voorspelbare wijze uit te voeren zal immers nog groter zijn als het gecoördineerde evenwicht moet worden beschermd. De ACM concludeert daarom dat technologische ontwikkelingen slechts een beperkt destabiliserend effect zullen hebben op de prikkel of mogelijkheid om tot een verstandhouding te komen."
- § 251. "De ACM komt daarmee tot de conclusie dat de markt voor WFA relatief stabiel is en een beperkte mate van complexiteit kent. Dit maakt het relatief gemakkelijk voor partijen op deze markt om hun gedrag stilzwijgend af te stemmen."
- Translation § 250. "In the absence of regulation, KPN and VodafoneZiggo, when planning network investments, will at least as much take into account investments by the other party. After all, the incentive to implement network innovations in a predictable manner will be even greater if the coordinated equilibrium outcome has to be protected. The ACM therefore concludes that technological developments will only have a limited destabilizing effect on the incentive or opportunity to come to an understanding."
- Translation § 251. "The ACM therefore concludes that the market for WFA is relatively stable and has a limited degree of complexity. This makes it relatively easy for parties on this market to tacitly agree on their behavior."
- Recall that the structure of the game in each period is as follows:
 1. parties simultaneously decide to provide access or not;
 2. parties compete on the retail market, resulting in the payoffs for that period.
 If the parties would also have the opportunity to invest in their networks (a possibility which is implicitly assumed to be absent in the model employed by the ACM), the per-period game would have the following structure:
 1. parties simultaneously decide to invest in their networks (increase the speed);

2. parties simultaneously decide to provide access or not;
3. parties compete on the retail market, resulting in the payoffs for that period.

This richer and more realistic game may have a different payoff structure than the one that the ACM assumes in the payoff matrix. The currently emerging literature on competition between networks that can invest in their networks before providing access, illustrates that there are various possibilities. One may, for instance, expect that there is a feedback effect between the possibility to invest and the provision of access. A higher wholesale tariff makes investing more attractive, and investing in a faster network has an impact on competition in the wholesale market.⁴⁴ The market is complex, contrary to what the ACM asserts in § 251.

- § 255. "Gelet op het voorgaande concludeert de ACM dat KPN en VodafoneZiggo vooral gericht zullen zijn op de lange termijn en dat dit bijdraagt aan de prikkel en mogelijkheid om te komen tot een verstandhouding."
- Translation § 255. "In view of the foregoing, the ACM concludes that KPN and VodafoneZiggo will mainly focus on the long term and that this will contribute to the incentive and opportunity to come to an understanding."
- There are many relevant factors that one has to take into account before being able to draw a strong conclusion like the one in § 255. For instance, will the corporate governance situation (e.g. shareholders' wishes and influence) allow for a long-term orientation like the one the ACM needs to support tacit collusion in an infinitely repeated game? Why would a long-term orientation make tacit collusion in a prisoners' dilemma without possibilities to invest more likely than another equilibrium outcome in a different (more realistic) game that has possibilities to invest for the firms?
- § 257. "KPN en VodafoneZiggo zijn volgens de ACM alleen in staat hun prijzen op die wijze af te stemmen, wanneer zij geen toegang verlenen aan alternatieve aanbieders (of in elk geval geen toegang op basis waarvan concurrenten daadwerkelijk effectieve en duurzame concurrentiedruk kunnen uitoefenen op KPN en VodafoneZiggo). Dat KPN en VodafoneZiggo daarom een prikkel hebben om toegang te weigeren, heeft de ACM

⁴⁴ See for instance N. Matsushima and K. Mizuno (2018), "Strategic investments under competition for access provision", *Telecommunications Policy* 42, 127–144. They find that "Because competition for access provision induces a strong incentive for infrastructure investment, it also achieves a higher social welfare than does access regulation."

beschreven in paragraaf 4.4.2. Het weigeren van toegang is volgens de ACM dan ook een voor de hand liggend focal point op de markt voor WFA."

- Translation § 257. "KPN and VodafoneZiggo are, according to the ACM, only able to adjust their prices in this way, if they do not grant access to alternative providers (or in any case no access on the basis of which competitors can effectively and sustainably exercise competitive pressure on KPN and VodafoneZiggo). That KPN and VodafoneZiggo therefore have an incentive to refuse access has been described by the ACM in section 4.4.2. The refusal of access, according to the ACM, is therefore an obvious focal point on the market for WFA."
- The ACM repeats that it has established the incentive and ability for tacit collusion. However, there is also another equilibrium outcome of the dynamic game, in which both parties do provide access (scenario 4). One might argue, as the ACM has done, that scenario 1 is a focal point, but this assertion leaves unaddressed that it is unclear how, starting from the current market situation (and not a modified greenfield situation), the parties would end up there. An analysis of the transition from the current competitive situation towards the tacit collusion equilibrium outcome of the modified greenfield situation is not provided. The ACM only claims that it can discard the fact that in the current situation, the fact that KPN provides access is irrelevant since it was induced by regulation (§ 29). This claim ignores that the current asymmetry in the wholesale market will have an impact on wholesale negotiations and switching by access seekers.
- § 259. "Om tot een duurzame verstandhouding te komen op de markt voor WFA, moet het voor partijen dus transparant zijn of er toegang wordt geboden of niet. De ACM is van oordeel dat dit zeer transparant is. Immers, als één van beide partijen toegang gaat bieden aan een alternatieve aanbieder, zal deze aanbieder actief worden op de retailmarkt. Een nieuwe aanbieder op de retailmarkt zal voor KPN en/of VodafoneZiggo onmiddellijk zichtbaar zijn."
- Translation § 259. "In order to achieve a sustainable understanding on the market for WFA, it must therefore be transparent for parties whether access is offered or not. The ACM is of the opinion that this is very transparent. After all, if one of the parties offers access to an alternative provider, this provider will become active on the retail market. A new provider in the retail market will be immediately visible to KPN and/or VodafoneZiggo."
- "Immediately" is an inaccurate qualification, since the successful completion of a wholesale agreement — which in itself may follow from a lengthy negotiation period — need not lead to a fast realization of a retail offer on the market.

