

**Encouraging competition and investment into next generation
access networks: The case of long term risk sharing contracts**

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Abstract

Governments all over Europe are in the process of adopting new broadband strategies. The objective is to create modern telecommunications networks based on powerful broadband infrastructures". In doing so, they aim for innovative and investment-friendly concepts. For instance, in a recently published consultation paper on the subject the German regulator BNetzA declared that it will take "greater account of ... reducing risks, securing the investment and innovation power, providing planning certainty and transparency – in order to support and advance broadband rollout in Germany". It further states that when regulating wholesale rates it has to be ensured that "... adequate incentives for network rollout are provided on the one hand, while sustainable and fair competition is ensured on the other". Also an EC draft recommendation on regulated network access is about to set new standards for the regulation of next generation access networks. According to the recommendation the prices of new assets shall be based on costs plus a project-specific risk premium to be included in the costs of capital for the investment risk incurred by the operator.

This approach has been criticised from various sides. In particular it has been questioned whether such an approach is adequate to meet the objectives of encouraging both competition and investment into next generation access networks. Against this background, the concept of "long term risk sharing contracts" has been proposed recently as an approach which does not only incorporate the various additional risks involved in the deployment of NGA infrastructure, but has several other advantages. This paper will demonstrate that the concept allows for competition to evolve at both the retail and wholesale level on fair, objective, non-discriminatory and transparent terms and conditions. Moreover, it ensures the highest possible investment incentive in line with socially desirable outcome.

The paper is organised as follows: The next section will briefly outline the importance of encouraging competition and investment in an NGA-environment. The third section will specify the design of long term risk sharing contracts in view of achieving these objectives. The fourth section will examine potential problems associated with the concept. In doing so a way of how to deal with them will be elaborated. The last section will look at arguments against long term risk sharing contracts. It will be shown that these arguments are not strong enough to build a case against introducing such contracts.

KEYWORD

broadband market, regulation, Internet, next generation access networks, risk sharing

1 Introduction

Governments all over Europe are in the process of adopting new broadband strategies. The objective is to create modern telecommunications networks based on powerful broadband infrastructures". In doing so, they aim for innovative and investment-friendly concepts. For instance, in a recently published consultation paper on the subject the German regulator BNetzA declared that it will take "greater account of ... reducing risks, securing the investment and innovation power, providing planning certainty and transparency – in order to support and advance broadband rollout in Germany" (BNetzA, 2009). It further states that when regulating wholesale rates it has to be ensured that "... adequate incentives for network rollout are provided on the one hand, while sustainable and fair competition is ensured on the other". Also an EC draft recommendation on regulated network access is about to set new standards for the regulation of next generation access networks. According to the recommendation the prices of new assets shall be based on costs plus a project-specific risk premium to be included in the costs of capital for the investment risk incurred by the operator (European Commission, 2008).

This approach has been criticised from various sides. In particular it has been questioned whether such an approach is adequate to meet the objectives of encouraging both competition and investment into next generation access networks. Against this background, the concept of "long term risk sharing contracts" has been proposed recently as an alternative. The approach does not only incorporate the various additional risks involved in the deployment of NGA infrastructure, but has several other advantages. This paper will demonstrate that the concept allows for competition to evolve at both the retail and wholesale level on fair, objective, non-discriminatory and transparent terms and conditions. Moreover, it ensures the highest possible investment incentive in line with socially desirable outcome.

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2 Encouraging competition and investment in an NGA-environment

Any regulatory approach to pricing NGA-based products must meet several regulatory requirements in view of predefined policy objectives to be aimed at. Prominent goals in telecom policy are 1) the protection of consumer interests, 2) universally available telecom services at affordable prices, 3) the promotion of competitive telecom markets at both service and network level and 4) the

encouragement of efficient investment in new and alternative infrastructure. This objective of encouraging investment is particularly important in an NGA environment where new network infrastructure is required at the access level. Also the existing European regulatory framework stresses the importance of network infrastructure competition (European Commission, 2008, p. 4). Encouraging the development of infrastructure competition is essential for two reasons¹:

1. Competition in the supply of network facilities is a prerequisite for the emergence of long-term competition that can be sustained without the need for future regulation. Once there is an alternative infrastructure, there are no barriers to entry for service providers by giving them a choice of network operators. A dominant network operator then cannot control essential facilities and therefore abuse its market power, for instance by charging prohibitive network access rates from its competitors. Conversely, in the absence of infrastructure competition the incumbent retains a monopoly on large parts of the market and ongoing regulatory intervention would be required.
2. If the focus is purely on service competition, neither the incumbent nor new entrants have an incentive to invest in new infrastructure. This is because the terms and conditions of network access do affect the investment decisions of network access providers. Assuming that prices for network access are set below costs, entrants would not be able to compete in infrastructure markets. While such a regulatory practice might ensure the economic success of new service providers, for example through guaranteed profit margins on retail tariffs, it would not stimulate investment in infrastructure. If competitors know that the incumbent has to provide its network elements at rates where costs are no longer covered, they are not willing to invest in building their own telecommunications networks.

Thus when introducing regulatory provisions on network access in an NGA environment such rules need to be assessed in view of the two goals referring to competition and investment. In other words, any future regulation should be shaped in a way that it supports sustainable infrastructure competition.

It has been argued that a risk premium as it has been proposed by the European Commission (2008) meets only partly this objective. While it is indeed important to establish a risk premium for investment in NGA infrastructure, such a regulatory tool is not sufficient to fully achieve the objectives of encouraging competition and investment into NGA infrastructure. There are a number of shortcomings which are not sufficiently addressed by the approach (Fredebeul-Krein and Steingröver, 2009, pp. 95), the most serious one being the fact that a risk premium would not allow investors to set off losses of an early market stage.² As will be shown below long

¹ It should be noted that infrastructure competition may not evolve in some geographical areas due to technological or economic infeasibility. Also, from an economic perspective the duplication of infrastructure should be avoided where it is impractical or undesirable.

² The argument is based on current regulatory principles where the retail price level must be sufficiently above a regulated wholesale level to grant the access seeker an adequate margin (to avoid price squeeze). With this principle being applied to NGA services a risk premium model would

term risk sharing contracts (LTRSC) could be an appropriate approach to overcome the pitfalls of risk free short term contracts applied to NGA networks.

3 The design of long term risk sharing contracts

Today's regulatory challenge in an NGA environment is to allow for new and flexible forms of regulations avoiding under-investment. Yet, as has been described elsewhere, NGA investments bear a very high risk due to the fact that future penetration rates and the willingness to pay for fibre access are uncertain. An appropriate risk sharing mechanism is therefore needed to prevent asymmetric distribution of losses and to avoid regulatory price cuts within an environment of ex-ante regulation. In other words, different levels of retail prices of different product groups (access bandwidths) should be reflected at the wholesale level. The solution is a value based risk sharing model based on long term and short term contracts. While the long term contracts grant a lessee the long term right to use the facilities of another carrier's infrastructure, short term contracts would be similar to the ones currently in place for various wholesale services. The contract duration of the long term contract reflects the break even point of the investment. To meet other regulatory requirements various options exist for designing corresponding contracts. In particular, LTRSC must contain several elements as to prices and other terms and conditions (Fredebeul-Krein and Steingröver, 2009, pp. 96)³:

- Prices for long term risk sharing contract are set at the beginning of the risk sharing contract. Risk sharing contracts are concluded before the investment takes place.
- Prices are based on i) long run average costs, ii) the perceived values of the given wholesale products to the customer, and iii) a forecast of the market development within the long term contract duration.
- The price of the risk sharing contracts is below the price of risk free access.
- The price difference between the risk sharing contracts and the risk free access reflects the risk premium to be paid for the risk free market entry.
- Access to the NGA infrastructure on the basis of long term risk sharing contracts can be obtained for a pre-defined period. The duration depends on obtaining the break-even.
- A prefixed share of the costs related to the new infrastructure is paid upfront at

no longer be an adequate regulatory approach. Either the NGA-investor is obliged to set high retail prices, resulting in unattractive NGA-based services and thus low penetration rates. Or NGA-based wholesale services would need to be offered at prices below costs. The investor would be in a loss making situation and the risk premium can no longer be applied.

³ For a more detailed discussion of the concept see also Fredebeul-Krein and Knoblen (2009) and Never (2008).

the beginning of the contract with the remaining costs being spread across the remaining contract length.

In view of the two policy objectives of 1) encouraging investment and 2) promoting competition the proposed value based pricing under a long term risk sharing model has several notable benefits compared to the traditional regulatory approach, under which only risk free short term contracts are allowed for.

1) Encouraging investment

LTRSC effectively deal with the particularities of NGA networks in a proper way. They address the NGA investment challenges by

- being open to all potential investors, thereby ensuring the highest possible investment incentive,
- generating high incentives for increased market driven fiber rollout via the transmission of the willingness to pay to the wholesale level,
- taking into account the option value of the non-investor,
- making necessary initial penetration pricing strategies without running into margin squeeze problems,
- achieving a symmetric distribution of loss during the penetration phase, and
- allowing pricing flexibility for a faster recovering of the investment costs.

2) Promoting competition

For various reasons the long term risk sharing model does not only set better incentives for more investment into NGA networks but also encourages competition at both the wholesale and retail level. This is because there will be more competitors at the wholesale level:

- not will there be only cable TV operators offering high speed broadband access to customers but also telco operators competing with either their NGA infrastructure or with short term contracts on the basis of long term risk-sharing contracts, and
- the higher the geographical coverage of NGA the higher is it's potential for competition.

In addition, there will also be retail price competition due to more intermodal competition. Thus, by implementing the model of long term risk sharing contracts, also retail markets will become more competitive.

4 Potential problems and how to deal with them

Depending on the specific rules governing LTRSC regulators may face several problems which result from such contracts. This section will discuss these concerns and proposes a way of how to deal with them.

- 1) Dealing with forecast uncertainty
- 2) Perceived values of NGA products
- 3) Avoidance of market foreclosure
- 4) Regulatory obligations for holders of It-rs-contracts?
- 5) Price squeeze test?

1) Dealing with forecast uncertainty

One of the biggest challenges in a NGA environment relates to the demand forecast as to future active NGA lines. Both short term und long term contract prices are afflicted with uncertainties. In order to determine future penetration rates it is necessary to model and treat a range of alternative demand growth scenarios.

At present, a regulator would adjust short term prices in a cycle of one or two years to minimize forecast uncertainties. While this would be still possible for short term risk free contracts, it is no longer an option for long term contracts. When allowing for such contracts the key idea underlying these contracts is that they usually run for a period longer than current approval periods.

Competitors of the incumbent have an incentive to claim high rates as to future demand. The argument could be that any calculation of LTRS-prices must be based on optimistic expectations of demand, i.e. 100% active lines. Such adoption of "optimistic" demand assumptions would allow the regulator to bypass the issue of the presence of demand-side uncertainty, thereby making it unnecessary to model and treat a range of alternative demand growth scenarios.⁴

The regulator would not be asked to ratify the incumbent's investment plan (i.e. thus running the risk of promoting investment per se) because of two reasons:

- Entrepreneurial risk must be borne by the investor: if demand does not materialize, cost recovery is not granted.
- Any mechanism must be avoided, which would command subsequent upward price adjustments in case of unexpected revenue shortfall.

In order to forecast future demand it is necessary for the regulator to model and treat a range of alternative demand growth scenarios. To mitigate the problem of uncertainty, forecasts may be rectified regularly on the basis of past figures. Long term contracts will then be adopted accordingly without changing the methodology. After the first two years for example the regulator would replace in the forecast the values of the first two years by actual figures and forecast the remaining years on the basis of actual figures of the first two years. The same procedure would be used for the following years.

⁴ Alternative operators may also argue that such a demand forecast is justified because the incumbent intends to migrate all customers from copper to fibre anyway.

In allowing for regular forecast revisions and thus for future price corrections all stakeholders are interested forecasting the initial demand as precise as possible. Any strategic behaviour in the sense of i.e. having too high initial forecast figures would result in false investment decisions. Given that the figures will be corrected within a short period (i.e. after two years), the new price to be paid by the access seeker would be much higher. Thus, the incentive to behave strategically is relatively weak given that the forecast figures will be regularly upgraded.

2) Perceived values of NGA products

One issue of crucial importance for LTRSC to work in practice is the determination of the perceived values of NGA products. Incumbents may argue in favour of using high values of NGA products. At the same time alternative operators may claim very low values of NGA products because the lower the expected value for access lines the lower will be the price they have to pay. They may even propose the value of NGA access lines to be equal to the value of copper access lines. Given that costs of high speed bandwidth products are hardly higher than the prices of low speed bandwidth products it could be argued that it is not justified to charge prices higher than those for current access products. Given that access line based pricing methodologies are much easier to realize and consistent to current access pricing methodologies (ULL) regulators could be inclined to apply such an approach.

Any value based pricing approach must ensure that prices are not higher than the costs of efficient service provision. Thus, when using the perceived value to the customer as a method for value based pricing realistic assumptions need to be made, using established methods. A common understanding of how customers measure value, through evaluation of customer operations needs to be applied. Standard methods used in sciences are “Van Westendorp Price Sensitivity Meter” (Van Westendorp, 1976) and “Conjoint Analysis”. (Gustafsson et al., 2003).

3) Avoidance of market foreclosure

Market foreclosure could arise if investors would purchase all available access “lines” via long term risk sharing contracts. In such a case the contract owners would be able to restrict market entry and foreclose the market. Given that LTRSC are likely to have a duration of ten years⁵ and more they could be a form of abusive behaviour. This is because assuming that competitors of the incumbent may want to build their own NGA infrastructure, which would then be offered to third parties on a wholesale basis, LTRSC would be anti-competitive in the sense that holders of such contracts would no longer be potential access seekers of competing networks. Long term risk sharing contracts would result in market foreclosure in terms of impeding alternative operators to roll out their own alternative NGA infrastructure. From a legal perspective there would be no objective justification for a vertical market foreclosure because the incumbent does not undertake any contract specific investment for

⁵ Such a long contract duration is likely to be necessary in order for the investment to pay off.

competitors which is why there would be no case for refinancing investments via LTRSC.

While it might be true that alternative operators would no longer roll out their own alternative NGA infrastructure once there is already one in place, from an economic perspective such a result is beneficial. This is because new infrastructure investment should only be evoked if existing capacity used efficiently is not sufficient considering the future demand. As for NGA infrastructure it can be assumed that for the time being a duplication of such an access network is not needed in relation to the expected demand. Thus if LTRSC discourage the building of a second infrastructure, such a result is welcomed because an inefficient duplication would be avoided.

In order to avoid other anti-competitive effects it may be appropriate to either limit the sale of long term risk sharing contracts and allow entry on a short term basis alternatively or to allow the fungibility of long term contracts so that long term contract holder can deal free capacities on a basis of short term risk free contracts. Such risk free contracts would allow market entry and exit at any time without a long term binding commitment of the access-seeker. The risk free access would include as described above a price-premium in the costs of capital for the investment risk incurred by the operator. By having the choice between the two types of contracts all access seekers are entitled to access the NGA network according to their individual risk calculation.

4) Regulatory obligations for holders of It-rs-contracts?

One issue to be decided upon is whether holders of long term risk sharing contracts should be exempted from any regulatory obligations. In particular they may be allowed to deal free capacities

- in case of shortage of short term capacities (from the moment that no short term capacities are left all), and
- in both options bitstream access and sub loop unbundling (from that moment that all short term capacities are consumed).

Yet, in case holders of LTRSC are not subject to regulatory obligations, holders of short term-contracts could argue that LTRSC are anticompetitive.⁶ This is because in the case of shortage of short term contracts market foreclosure is the result. To avoid such anti-competitive effects a regulator may oblige the incumbent to negotiate corresponding contract terms. Assuming that the efficient usage of existing capacities is intended by national telecom laws, market foreclosure can be prevented by requiring holders of LTRSC to return non-used capacities.

⁶ Regulators need to analyse on a case-by-case basis whether operators entering a LTRSC have market power or not. Once they are in control of potential access to customers there might be a case for market power, especially in a situation where the incumbent has no access lines left.

5) Price squeeze test?

Given that fibre access is a key input for competitors and vertically integrated NGA-investors will be able to control the upstream NGA-market regulators are likely to continue to apply price squeeze-tests, also to NGA-related services. In doing so, the question arises which prices to be used for determining a possible price squeeze, prices of short term contracts or other prices.

An argument in favour of short term contract prices is that both the “incumbent” and the “access seeker” have the option to insure against the risk associated with long term contracts (notably the risk of passive access lines). Such insurance increases the wholesale access costs of the two parties, which is an argument in favour of their relevance when applying a margin squeeze test. If prices of long term contracts were used for the price-squeeze test competitors would no longer be able to have a viable business model on the basis of short term contracts.

Yet, a counter-argument is that “expensive” short term risk free contracts must not be considered to be a case of margin squeeze, since every access seeker is free to enter the market on terms reflecting the individual risk calculation. Since both, the “incumbent” and the “efficient entrant” are able to acquire LTRSC at the same terms and conditions the weighted average of short term and long term contract prices needs to be used for calculating any margin squeeze in case such a test is carried out. Moreover, the particularities of NGA investment require a long term horizon which is why holders of short term contracts must also take a long term perspective.

5 Are there arguments against long term risk sharing contracts?

Depending on the specific rules governing long term risk sharing contracts (LTRSC) there are several threats which may result from such contracts. This section will discuss such threats and proposes a way of how to deal with them in order to avoid any drawbacks. The most prominent arguments against LTRSC are that they

1. undermine other, more advantageous forms of collaboration,
2. are a form of risk shifting,
3. undermine the ladder of investment principle,
4. are a form of discrimination, and
5. are inappropriate.

1) Other forms of collaboration

Experts of the telecom industry acknowledge that there is a substantial need for collaboration among network operators to ensure efficient and timely investment in next generation access networks. Yet, instead of long term risk sharing contracts different forms of collaboration may be established: For instance, an infrastructure sharing framework could be set up where interested parties can truly collaborate and agree on the overall design and standards used in deploying the passive

infrastructure in new developments. Within such a framework the passive infrastructure which includes trenches and ducts would be built by a single company, however according to the specification mandated by all parties willing to invest in the roll out of NGA networks. Once the passive infrastructure has been deployed, the committed parties would then own and operate the passive infrastructure together. Such a sharing agreement would lead to savings in construction and maintenance as well as speed up the process for deploying passive infrastructure in new developments.

Given that collaboration will be a key for next generation access, operators should see a role for collaboration of players in terms of making a common commitment to open wholesale access and a common commitment to open standards and platforms. Should joint investment as described above have benefits for both existing network owners and alternative network operators, it is very likely that they will agree to duct and trench sharing, however on a voluntary basis. It is for this reason that such a form of collaboration should not be mandated on operators. If it was forced it adds to the uncertainty around a new build NGA investment.

2) Threat of risk shifting

Competitors of the incumbent may argue that long term risk sharing contracts (with duration of 10 years and more) are abusive behaviour in the sense that the potential for competition by alternative operators is seriously affected due to risks being passed away to them. The incumbents' risk of inactive lines would be significantly lower than competitors' risk given their larger customer base. Moreover, LTRSC might be abusive behaviour because it is the incumbent that invests into NGA infrastructure and not the alternative operators:

- in which region,
- to what extent,
- deploying which technology.

Accordingly one could argue that the incumbent should bear all the risk involved with the investment. Consequently a regulator should not allow for LTRSC.

However, it is at least questionable whether LTRSC are disadvantageous to alternative operators in the sense that the incumbent enforces them to bear the risk of stranded investment. From an economic point of view the behaviour of risk shifting (or risk allocation) is not only legitimate but also desirable: In businesses where risks are high it is a common practice to allocate risks to as many market players as possible. The concept of LTRSC would achieve both risk rewarding and reduction. Any investor would be free to choose whether he wants to participate. In other words, no access seeker would be obliged to take the risk involved with LTRSC. Given that they also can always opt to sell access lines on wholesale trading platform, abusive behaviour in form of risk shifting is hardly possible.

3) Undermining the ladder of investment principle

One of the most respected regulatory remedy concepts is the so-called "ladder of investment" approach to the one-way access regulation (Cave and Vogelsang, 2003). Its main idea is that the facilities-based competition can be achieved gradually, as new entrants acquire their own customer base and capital. At the beginning, entrants can be provided with a full access to the incumbent's facilities, however, later they are required to build their own infrastructure elements in order of replicability, or "climb the ladder of investment". Based on this idea competitors must be allowed to gradually upgrade investment in infrastructure with the final objective of becoming infrastructure competitors on their own. It could now be argued that long term risk sharing contracts undermine the "ladder of investment"-principle:

- Once being a holder of such a contract alternative operators would no longer have any incentive in building up their own infrastructure step-by-step.
- Once the contract has expired owners of NGA networks are established and it will no longer be attractive for others to set up a parallel NGA infrastructure.

While both arguments are legitimate it must be questioned whether the "ladder of investment" principle is appropriate in an NGA environment because finding an economic balance between several options of wholesale offers in a given area is becoming impossible. Moreover, the principle can yield inefficient technology choices to avoid wholesale access products. There is thus no longer any point to impose on the incumbent SMP operator an obligation to accommodate and support all possible competing business models with several levels of wholesale offers in the same area.

4) Discrimination of smaller operators

As a matter of principle an incumbent is obliged to offer NGA access in case of market dominance at non-discriminatory terms. It could therefore be argued that the definition of two markets, depending on contract duration, would be discriminatory, unless justified on objective terms: A combination of contract duration and price discounts could be problematic because smaller operators would be disadvantaged due to lower demand figures for access lines.

However, it must be noted that smaller operators have always cost disadvantages on markets with economies of scale. From an economic perspective it may seem sensible for a regulator to determine two tariffs based on different contract durations. This is because price discount of long term risk sharing contracts is not due to volumes but due to risk taking.

5) Inappropriateness

Opponents of LTRSC may argue that long term risk sharing contracts are inappropriate for any consideration currently. Although some aspects of long term risk sharing price regulation may be usable in practical solutions, the many problems and drawbacks with this untested regulatory technique render it inappropriate for the

time being. In particular it might be argued that it is unlikely that industry and/or regulators could agree on perceived values of products, line forecasts and prices to begin with and very likely that the need for review would be onerous and continuous thereafter. For instance, given the high degree of forecast uncertainty any contract duration of more than three years would not be justified: This is because there is hardly any information available on NGA networks and (demand for) related retail services. Given that from a technological perspective NGA network markets are very dynamic, any forecasts as to the future development of NGA markets (in terms of demand, potential for cost savings etc.) is hardly possible.

Yet, as with any complex model (i.e. cost calculation) experts can be found willing to support a regulator in determining the details of long term risk sharing models. One specified model (Fredebeul-Krein and Knoblen, 2009) is already operational. For example, as to the above mentioned issue of contract duration it should be in the discretionary power of the regulator to fix the duration of tariff validity. Given that there are objective reasons (long term horizon of NGA investment) to have long contract durations the problem of forecast uncertainty may be mitigated by forecast being rectified regularly on the basis of past figures.

6 Conclusion

In search for a new regulatory framework to be applied to a future NGA environment new and innovative regulatory ideas are discussed. One such idea is the concept of long term risk sharing contracts. Yet, there is so far some skepticism among regulators as to the introduction of long term risk sharing models as a regulatory tool in an NGA environment. This paper has demonstrated that any possible problem related to the concept can be overcome. If a well thought design of such models is implemented there are large benefits to all market players, the incumbent, alternative operators and regulators: Competition will be promoted and investment will certainly be more encouraged. The concept's openness to all potential investors ensures highest possible investment incentive in line with socially desirable outcome. As a consequence, competition will not only evolve at the retail level but also at the wholesale level on fair, objective, non-discriminatory and transparent terms and conditions. Moreover, the model can be relatively easily implemented, it is able to react flexibly to changing market and/or regulatory conditions and it complies with EU and national regulations.

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