

**Report for the Agency for
Electronic Communications of
the Republic of North Macedonia**

**Methodology of the
economic replicability
test and associated
WACC calculation for
NGA-based offers**

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Annex A List of acronyms and abbreviations used

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1 Introduction

In 2016 and 2017, the Agency for Electronic Communications of the Republic of North Macedonia (AEC) conducted analyses of the wholesale (or upstream) local access market and the central access market provided at a fixed location¹ in the Republic of North Macedonia.²

Makedonski Telekom AD Skopje (Makedonski Telekom) and One.VIP DOO Skopje (One.VIP) were designated as operators with significant market power (referred to as ‘SMP operators’ or ‘dominant operators’ in this consultation document) in each upstream market.

Further to this, AEC mandated that an economic replicability test (ERT) should be applied to wholesale fixed broadband services based on next-generation access (NGA) provided by the dominant operators on:³

- copper and fibre (or fibre-only) networks, i.e.
 - IP-level⁴ central access point bitstream
 - Ethernet-level local access point bitstream
- hybrid fibre-coaxial (HFC) networks, i.e.
 - national IP-level access point bitstream
 - local CMTS⁵ access point bitstream.

In this context, AEC has implemented an ERT model that tests whether the NGA-based retail products of SMP operators that are dominant in the wholesale (or upstream) market can be replicated by an efficient retail operator based on the wholesale inputs from the dominant operators.

¹ Market 3(a) and Market 3(b), as defined by the European Commission in the ‘COMMISSION RECOMMENDATION of 9 October 2014 on relevant product and service markets within the electronic communications sector susceptible to ex ante regulation in accordance with Directive 2002/21/EC of the European Parliament and of the Council on a common regulatory framework for electronic communications networks and services’. Available at: <https://ec.europa.eu/digital-single-market/en/news/commission-recommendation-relevant-product-and-service-markets-within-electronic-communications>.

² http://www.aek.mk/index.php?option=com_k2&view=itemlist&layout=category&task=category&id=168&Itemid=581&lang=mk.

³ 20170502 Decision to Makedonski Telekom for local access market; 20170502 Decision to ONE.VIP for local access market; 20170502 Decision to Makedonski Telekom for central access market; 20170502 Decision to ONE.VIP for central access market

⁴ IP stands for Internet protocol.

⁵ CMTS is the abbreviation for cable modem termination system.

This consultation document describes the principles and methodology of our proposed approach to developing the ERT model and is structured as follows:

- Section 2 sets out the modelling principles that we adopted when constructing the ERT model
- Section 0 describes the implementation of the ERT in the Macedonian market and presents the main assumptions and input parameters underlying the ERT model
- Section 4 sets out our calculation of the weighted average cost of capital (WACC).

The report also includes an annex which provides an expansion of the acronyms used herein.

The draft version of this report has been published on the AEC website for public consultation during January 2019; this final version includes main comments received by stakeholders as well as Analysys Mason responses.

The following formats have been used throughout this document:

- Consultation questions:

Question #:

- Stakeholder comments and Analysys Mason responses:

Stakeholder comments

▶ *Stakeholder 1*

▶ *Stakeholder 2*

▶ *Stakeholder N*

Analysys Mason responses

- Final statements:

Statement #:

2 ERT methodology

This section discusses the modelling principles that have been adopted when constructing the ERT model.

2.1 Introduction to ERTs

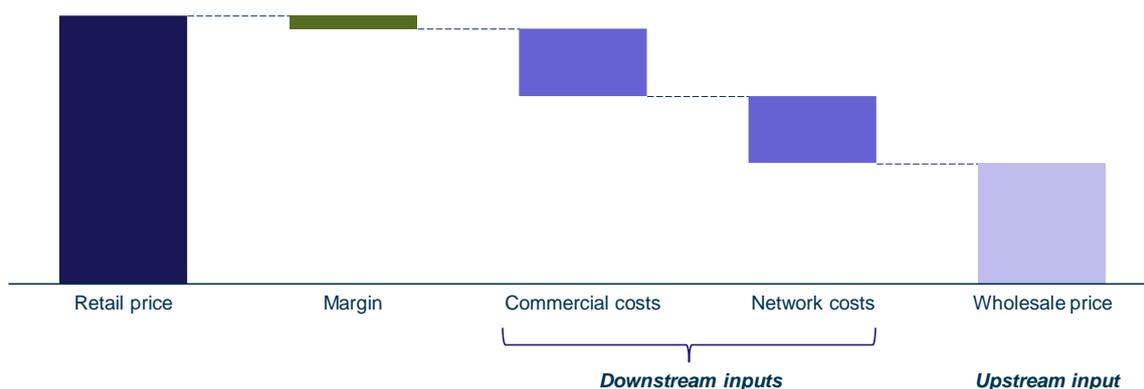
2.1.1 Margin squeeze and ERT

In simple terms, a margin squeeze occurs when the retail products of the (vertically integrated) operator that is dominant in the wholesale (or upstream) market cannot be economically replicated by an (efficient) competitor in the downstream market on the basis of the upstream inputs from the dominant operator because the wholesale and retail prices set by the dominant operator do not allow a sufficient margin. This is in line with the definition provided by AEC in its 2009 manual for price-squeeze test⁶ and confirmed in its 2012 margin-squeeze test methodology document:⁷

“The usage of prices to squeeze the competition (Price Squeeze) is a situation in which a vertically integrated operator having a substantial market power on a relevant wholesale market, on one hand on wholesale basis provides services to its competitors in the related retail markets, and on the other hand it forms prices for the retail services in a manner in which it makes unprofitable the activities of the competitors on the market for selling retail products and services”.

A margin-squeeze test therefore checks whether the difference between the wholesale and the retail price is sufficient to cover the downstream costs that are required to produce the retail product in addition to the wholesale input. In telecoms, the downstream cost inputs consist of both commercial and network costs. This overall principle is illustrated in Figure 2.1 below.

Figure 2.1: Illustration of a typical margin-squeeze test [Source: Analysys Mason, 2018]



⁶ AEC (2009), *Instructions for establishing prices for squeezing the competition from the electronic communication services market in the Republic of Macedonia*, par. 5.

⁷ AEC (2012), *Methodology to be used for the margin-squeeze model*, par. 2.1.

The concept of margin squeeze was developed in the ex-post/competition authority world, due to concerns that a company pursuing a margin-squeeze strategy could harm, limit and restrict competition in the downstream market. This would be to the detriment of the end user, who could end up with higher retail prices and/or lower-quality products and services. A margin-squeeze strategy can frustrate the efforts made through reforms and acts to increase competition in the downstream market. As in the antitrust field, margin-squeeze tests were mostly developed through a series of cases.

In this regard, the European Commission (EC) and the Body of European Regulators for Electronic Communications (BEREC)⁸ have commented in the past that they do not object to national regulatory authorities (NRAs) implementing margin-squeeze tests. They have also stated that margin-squeeze tests should be aligned with the principles established in ex-post/antitrust interventions.

Margin-squeeze tests (or ‘no-margin-squeeze rules’) are not on the list of formal ex-ante remedies defined by the EC, but have nonetheless been implemented by several NRAs as a tool either:

- to ensure that a regulated price does not lead to a margin squeeze by the SMP operator, or
- to verify compliance by the SMP operator where the prices of retail and/or wholesale services are regulated, or
- to verify that the offers of the SMP operator are replicable by competitors.

In 2013, the EC published its Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment (‘the EC Recommendation’).⁹ According to the EC, NRAs may apply an ex-ante margin-squeeze test to NGA-based wholesale products, and such a test should replace the cost orientation generally applicable to copper-based wholesale inputs under certain conditions. However, the EC Recommendation provided only limited guidance on how such a test should be implemented in the case of NGA-based wholesale products. It also renamed the test as the ‘economic replicability test’ to distinguish it from ex-post margin-squeeze tests.¹⁰

In September 2014, BEREC also issued guidance on the regulatory accounting approach to the implementation of the EC Recommendation.¹¹ The limited guidance currently available means that there will continue to be certain reliance on alignment with ex-post best practice and principles.¹²

⁸ Formerly the European Regulators Group (ERG).

⁹ http://ec.europa.eu/smart-regulation/impact/ia_carried_out/docs/ia_2013/c_2013_5761_en.pdf

¹⁰ This is a reflection of the fact that the methodology used can sometimes differ.

¹¹ BEREC Guidance on the regulatory accounting approach to the economic replicability test (i.e. ex-ante/sector specific margin squeeze test), BoR (14) 123, 26 September 2014. Available at: https://www.berec.europa.eu/eng/document_register/subject_matter/berec/regulatory_best_practices/guidelines/4782-berec-guidance-on-the-regulatory-accounting-approach-to-the-economic-replicability-test-ie-ex-antesector-specific-margin-squeeze-tests

¹² Ex-post principles have been developed mainly by the Directorate General for Competition (DG COMP) over the course of several margin-squeeze cases investigated in various industries. While these principles are very general

There are some important differences between an ex-ante and an ex-post margin-squeeze test, and these should be considered when designing an ERT. Some of the main differences are summarised in Figure 2.2 below.

Figure 2.2: Differences between an ex-ante and an ex-post margin-squeeze test [Source: Analysys Mason, 2018]

| | Forward-looking (ex ante) | Backward-looking (ex post) |
|------------------------------------|---|--|
| Purpose of regulation | <ul style="list-style-type: none"> Ensure competition in the market by testing whether efficient alternative operators can effectively compete with the SMP operator | <ul style="list-style-type: none"> Identify and penalise anti-competitive practices |
| Outcome of the margin-squeeze test | <ul style="list-style-type: none"> Adjust or approve retail pricing of the dominant operator (if retail prices are subject to ex-ante regulation) Block or allow launch of new products Adjust or approve wholesale pricing of the dominant operator (retail-minus approach) | <ul style="list-style-type: none"> Apply fines to operators engaging in anti-competitive behaviour (up to 10–15% of their annual revenue in some jurisdictions) Fines can typically also pave the way for civil lawsuits filed by access seekers |
| Implications | <ul style="list-style-type: none"> Need to be forward-looking Need to be aligned with maturity of the market and regulatory objectives Should start from the point of view of an alternative operator (although it may use the costs incurred by the dominant operator) | <ul style="list-style-type: none"> Focus on historical behaviour (although some assumptions will need to be made regarding the future) Focus on the dominant operator's behaviour |

An ex-ante approach offers greater transparency in the market, because any proposed change to prices would be assessed for potential margin squeeze before it comes into effect, using a method and a process which had already been agreed upon with industry stakeholders. This effectively precludes the possibility of margin squeeze. The benefit for the regulated firm is that it would know what margin-squeeze test would be applied and how, and would therefore be able to ensure compliance. The benefit for alternative operators is that a potential situation of margin squeeze is avoided.

A second benefit of an ex-ante approach is that it offers greater predictability in the market. By agreeing a retail price control which runs for a specified period of time, all operators are able to plan their product offerings and business strategies with more reliable financial information.

and often non-sector-specific, the following margin-squeeze investigations have occurred in the telecoms industry: Deutsche Telecom (Germany, 2003, line rental margin squeeze); Wanadoo vs. Telefónica (Spain, 2007, broadband margin squeeze) and TeliaSonera (Sweden, 2011, broadband margin squeeze).

2.1.2 Process for administrating an ERT

Criteria to run an ERT

An NRA may choose to conduct an ex-ante ERT for various reasons, as summarised in Figure 2.3 below.

Figure 2.3: Possible reasons for running an ERT, and their benefits and disadvantages [Source: Analysys Mason, 2018]

| Reason/situation | Benefits | Disadvantages |
|---|---|--|
| When SMP operators change their retail offers (and every time they do so) | <ul style="list-style-type: none"> Ensures strict replicability | <ul style="list-style-type: none"> Increases the administrative burden on SMP operators and AEC, especially if prices change often |
| When wholesale prices change | <ul style="list-style-type: none"> Closely tied to the market(s) in which the SMP operators are present | <ul style="list-style-type: none"> May allow too much room for SMP operators if there are no checks on retail products |
| Regularly forward-looking (e.g. quarterly/annually) | <ul style="list-style-type: none"> Consistent with ex-ante principles Provides certainty regarding wholesale prices | <ul style="list-style-type: none"> Leaves room for abuse of market position The more often the ERT is implemented, the greater the administrative burden on the market and especially the SMP operators |
| Regularly backward-looking (quarterly/annually) | <ul style="list-style-type: none"> Closer alignment with ex-post principles Ensures strict replicability | <ul style="list-style-type: none"> The more often the ERT is implemented, the greater the administrative burden on the market and especially the SMP operators Borders on ex-post regulation (depends on the remedy) |
| When a complaint about anti-competitive behaviour is submitted to the regulator (or an investigation is initiated by the NRA) | <ul style="list-style-type: none"> Lower administrative burden (provided the market functions properly) | <ul style="list-style-type: none"> Risk of regulation by litigation May not be sufficient on its own |

Ex ante generally implies that the regulation intervenes before the event occurs. The purpose is not to penalise actual behaviour, but to set the conditions for the market to function properly. In an ERT context, this implies that the test is done in advance, setting a wholesale price for a certain future period. The assumptions used by the NRA and how the NRA tests the wholesale prices in the ERT need to be made known to the dominant operator to create regulatory certainty and provide the necessary predictability. The complication with this approach is that the fixed market is undergoing continuous change and retail pricing is not static.

The ERT will be run:

- when a new retail ‘flagship’ offer is launched or changed
- when wholesale prices of relevant wholesale inputs are changed
- on a regular basis every 6 months.

Similarly, the ERT will be run on the current flagship offers (or a sub-set of them), always on a forward-looking basis (i.e. on the forecast gross adds). This approach is consistent with the guidelines included in the EC Recommendation.

Therefore, the following aspects must be defined:

- what a *retail flagship offer* is, and
- when it is deemed to be a new offer or to have been changed.¹³

This is treated in detail in Section 2.3.1.

Question 1: Do you consider the criteria which have been set about when to run the ERT to be appropriate?

Stakeholder comments

► *Makedonski Telekom*

Yes, we agree with the criteria regarding when to run the ERT. Additionally, we consider that beside the gross subscribers on a monthly basis, into consideration should be also taken the total number of subscribers on a particular flagship product, since it is likely that the payment systems and the operators’ subscribers analysis, to have different treatment and keeping-records methodology for gross additional subscribers (gross adds).

► *One.VIP*

One.VIP DOOEL Skopje considers that the set criteria, regarding when to implement the ERT, are appropriate

Analysys Mason responses

We have relied on the data provided by Makedonski Telekom as response to the data request submitted earlier on during the process; if discrepancies between internal IT systems (billing) could lead to an overestimation of the subscriber base, they could in turn lead to an underestimation of some downstream unit costs and consequently harm the output of the overall

¹³ The definition of a change in the relevant wholesale inputs looks conversely more straightforward.

ERT. As we understand that there are differences in the management of customer migration and revenue generating units between the various internal systems, we will take care of amending the data request template accordingly in order to capture these metrics appropriately.

The usage of the number of subscribers for the definition of the flagship offers is discussed in the responses to comments to Question 4.

Statement 1: The ERT will be run:

- when a new retail ‘flagship’ offer is launched or changed
- when wholesale prices of relevant wholesale inputs are changed
- on a regular basis every 6 months.

ERT implementation

NRAs also need to define what will happen if the ERT is not passed, to provide regulatory certainty. For instance:

- Should SMP operators not be allowed to launch the retail product?
- Should SMP operators lower their wholesale prices?
- Should SMP operators retroactively lower their wholesale prices for the previous testing period (in the case of a backward-looking test)?

Alternatively, NRAs can also use the ERT to explicitly set a ceiling wholesale price for the next period (with an ex-ante determination of a minimum margin, which could be equal to zero).

The administration process of the ERT needs to be aligned with the NRAs’ regulatory objectives, such as improving market competitiveness and founding the required momentum for dominant operators and competitors to invest in NGA networks.

If a retail offer does not pass the ex-ante ERT, AEC will request the SMP operator to either amend or withdraw the product which has failed the no margin squeeze requirement.

The ultimate goal of the application of ERT is product price adjustment. When the result of the ex-ante margin squeeze test does not comply with the conditions set by the AEC, the SMP operator can on either AEC request or on its own initiative:

1. increase the price of the retail offer;
2. lower the prices of regulated wholesale inputs;

3. adjust prices both at the wholesale and at the retail level.

However, the SMP operator can, at a later stage, decide to amend the retail product in order to comply with the economic replicability requirement.

Following the provision of article 84 and 48 from Law of electronic communications, when the ex-ante margin squeeze test is not passed AEC can request the SMP operator to delay or withdraw the provision of the relevant retail offer. Delay in the provision of the relevant retail offer can derive in most cases from the adjustment of the wholesale price or the retail price of the relevant retail offer or because the SMP operator may be required by AEC to provide additional information in relation to costs and volumes of the non-replicable retail product. Article 10 of the Authorisation Directive empowers NRAs to apply sanctions in case the results of the ex-ante economic replicability test performed are not in compliance with NRA guidance.

Question 2: Do you consider the actions which have been proposed in the event that the ERT is not passed to be appropriate?

Stakeholder comments

► *Makedonski Telekom*

It should be kept in mind that imposing the obligation for economic replicability, is due to the regulation of wholesale markets for local and central access secured at a fixed location (3a and 3b). The aim is the wholesale products as a basis for the provision of retail services. For example, the wholesale package of 50/50 Mb/s offered in the bitstream offer by MKT is a primary upstream input of providing the entire flagship NGA-based retail offers for individuals. Even though ERT is testing individually each retail package, the results of the test should be viewed integrally, and if a retail package has no margin, the same package should be viewed integrally with all other retail packages in which the internet profile is 50/50 Mb/s. We remind that, the basis of this whole process is not a regulation of the retail packages (there aren't retail relevant markets) but a replica review of the wholesale upstream products as basis for provision of wholesale broadband services.

► *One.VIP*

We consider that the activities proposed in an event when ERT is not adopted are appropriate.

Analysys Mason responses

The ERT is a consequence of the regulation of wholesale markets for local and central access secured at a fixed location (3a and 3b); however, it involves also a subset of the retail bundles (namely the flagship ones).

Leaving the SMP operator the option of changing the retail prices of the tested retail offer is actually allowing it to have an additional lever to exploit (as opposed to mandating to reduce the wholesale prices).

The criteria for the selection of the retail offers to test is another topic, discussed in the responses to comments to Question 4.

The ERT is meant to be passed if the difference between the retail price proxy and the cost ones is positive (for avoidance of doubt, it is not set any specific margin threshold).

Statement 2: When the result of the ex-ante margin squeeze test does not comply with the conditions set by the AEC, the SMP operator can on either AEC request or on its own initiative:

1. Increase the price of the retail offer
2. Lower the prices of regulated wholesale inputs
3. Adjust prices both at the wholesale and at the retail level.

However, the SMP operator can, at a later stage, decide to amend the retail product in order to comply with the economic replicability requirement.

2.2 Key methodological choices

The practical implementation of an ERT involves a certain number of key methodological choices about all the main aspects of the test:

- **Relevant retail products and their aggregation level** – Offer and time dimensions of SMP operators' retail products have to be considered.
- **Relevant wholesale inputs and their treatment** – Retail products can be delivered through a series of wholesale products whose supply and price need to be assessed.
- **Level of efficiency of the operator** – The efficiency level of the tested operator can be comparable to that of the incumbent operator or to that of the alternative operators, depending from which perspective the ERT is conducted.
- **Downstream cost standard** – An economic or an accounting approach can be used to estimate the operator's downstream costs.
- **Considerations relating to the relevant time period** – Two methods are available to evaluate the profitability of an investment over time: the discounted cash flow (DCF) method¹⁴ and the

¹⁴ The DCF method is based on expected cash flows. It evaluates the offer using a financial approach and examines profitability over a reasonable long period and with a dynamic view. DCF, however, does not specify how and when

period-by-period (PbP) method¹⁵, which is more accounting based than the financial approach of the DCF method.

2.3 Relevant retail inputs to be considered

In defining the relevant set of retail inputs to be used when running the ERT, AEC has considered both the offer dimension and the time dimension of these retail inputs. This is discussed in more detail below.

2.3.1 Offer dimension

The EC Recommendation specifies that an ERT should be conducted on (only) the most relevant (the so-called ‘flagship’) product(s) offered by the SMP operators. These are to be identified by the NRAs based on observations regarding the products’ relevance for current and future competition (including retail market shares in terms of volumes and value, and advertising expenditure, where available).

The EC Recommendation also notes that NRAs can consider testing niche or lower-quality products which are not among the flagship retail products of the SMP operator, if these are important or are likely/deemed to be important to the access seekers.

The EC introduced the ERT to allow more pricing flexibility for the dominant operators’ NGA products. This pricing flexibility is intended to offset the demand uncertainty regarding the provision of NGA-based services. The EC notes that the ERT needs to give the SMP operator certain degree of flexibility to conduct appropriate penetration pricing (initially offer low prices to increase demand). Therefore, the commercial freedom of the SMP operator and its ability to engage in rational non-discriminatory commercial pricing strategies should not be unduly limited.

The EC does not specify how many flagship products it expects to be tested. A single product, in any case, may not be adequate – there may be additional products that are important to alternative operators in the market.

Typically, a standard offer should be tested. The EC notes that flagship products are likely to be offered as a bundle. A relevant stipulation for the selection of a bundle is that the alternative operator can source and offer all the components of the SMP operator’s retail bundle. ‘Innovative variations’ of bundles may be relevant if these are likely to become more important for competition in the future.

costs must be recovered (i.e. within the single sub-periods). The output of the DCF calculations is the net present value (NPV) of the whole investment/project.

¹⁵ The PbP method considers revenue and costs over a given period of time (typically one year). A PbP analysis evaluates the offer using a more accounting-based approach than DCF. For PbP, the main profit and loss (P&L) items (i.e. revenue, costs and depreciations) are used instead of cash flows. Expected economic results are compared separately within a single period. This means that the expected future figures are not discounted, so a discount factor (e.g. weighted average cost of capital or WACC) is not needed, and investments are amortised along the considered period.

In addition, time-limited promotions on the SMP operator's standard retail pricing are often offered. The EC Recommendation is not specific on how to treat such promotions (e.g. when to consider a promotion to be time-limited in nature and when to treat promotion changes as a new offer or an average).

In line with the EC Recommendation and with the proposed approach for running the ERT (see Section 2.1.2), the following aspects must be defined:

- What is a *retail flagship offer*?
- When is it considered to be new/changed?¹⁶

Definition of a retail flagship offer

The definition of a retail flagship product can be split into two components: definition of a retail offer and assessment of when a retail offer is considered a flagship product.

► *Definition of retail offer*

The definition of a retail offer includes the following elements:

- a product (family) name
- a pricing scheme
- a voice traffic allowance included in the subscription agreement (monthly fee)
- a broadband access nominal throughput
- an (IP)TV channel offering included in the subscription agreement (monthly fee)
- pre-defined add-on packages (e.g. additional voice traffic / (IP)TV channels)
- out-of-bundle / add-on packages service tariff conditions (e.g. voice traffic, additional (IP)TV content).

Question 3: Do you agree with the definition of 'retail offer'?

Stakeholder comments

► *Makedonski Telekom*

Yes, we agree.

► *One.VIP*

As an element of the definition for retail is also the service IPTV which is incompatible with the DOCSIS type of networks. We suggest a replacement of the IPTV channels with IPTV/TV channels. Additionally, we consider that the TV service should be exempted from the definition of

¹⁶ The definition of a change in the relevant wholesale inputs looks conversely more straightforward.

a retail offer, because this service is not regulated by AEC and there is neither a market nor a SMP operator.

Analysys Mason responses

The EC Recommendation states as follows:

- recital 6(m): “new retail offer means any new retail offer of services, including bundle services, by SMP operator based on already existing or new regulated wholesale input”
- recital (67): “NRAs should [...] assess the margin earned between the most relevant retail product including broadband services (flagship products) and the regulated NGA access input most used or identified, under a forward-looking approach...”.

The Recommendation prescribes to test flagship offers which are likely to be service bundles, and in this case the bundle as a whole is to be tested. TV services are to be tested to the extent they are included in retail bundles for which a regulated wholesale input is needed for them to be replicated.

The wording ‘IPTV’ has been replaced with ‘(IP)TV’ wherever appropriate throughout this document.

Statement 3: A retail offer is defined by the following elements:

- a product (family) name
- a pricing scheme
- a voice traffic allowance included in the subscription agreement (monthly fee)
- a broadband access nominal throughput
- an (IP)TV channel offering included in the subscription agreement (monthly fee)
- pre-defined add-on packages (e.g. additional voice traffic / (IP)TV channels)
- out-of-bundle / add-on packages service tariff conditions (e.g. voice traffic, additional (IP)TV content).

► *Assessment of whether a retail offer can be considered a flagship product*

To determine whether an NGA-based retail offer can be considered a flagship product, AEC adopts an approach by which flagship offers are the ones that, in descending order, represent in sum a revenue share of 80% of all NGA-based retail offers of the SMP operator in the broadband market. The period over which this calculation should be executed is 24 months.

Since there are two SMP operators in North Macedonia, these criteria must be applied separately to each of them.

Question 4: Do you agree with the proposed approach to assess whether a retail offer is considered to be a flagship product?

Stakeholder comments

► *Makedonski Telekom*

We do not agree with the approach flagship product to be determined only as a volume of the total revenues from all NGA-based retail offers. This approach practically does not achieve the aim because it doesn't take into consideration the absolute number of subscribers. We consider that it is more relevant, flagship product to be determined according to the volume of subscribers (which package from the total number of packages has a significant volume of subscribers). Therefore, offers with few numbers of subscribers will not be tested, because regardless of their eventually high price, the subscribers are the basis for which the operators are competing.

► *One.VIP*

We would like a slight clarification regarding the definition of flagship offers. Namely, will it be considered as a flagship offer the one that provides independently at least 80% of the total revenues from all NGA-based offers or as a flagship offers will be considered those offers in descending order which provide minimum 80% of the total revenue from the NGA-based offers?

Analysys Mason responses

Revenue and volumes approaches are both possible:

- there are cases / precedents / applications of both criteria
- this is not a matter of 'right or wrong', but rather of what the objective is.

Revenues have been initially proposed as they appear to be a more comprehensive metric since:

- price is a variable that is directly controllable by the SMP operator, while volumes are a consequence (price sensitivity of demand)
- revenue is a metric that includes both prices and volumes, i.e. a combination of the two.

It is worth of remarking that as of today the identified flagship offers and their number do not change significantly between the two criteria.

Regarding the definition of flagship offers, we clarify them to be are *all* NGA-based offers, sorted in descending order, that cumulatively sum up to 80% (or the percentage that AEC decides) of the total NGA-based revenues generated across test period (e.g. over 24 months from the test starting date).

Statement 4: Flagship offers are the retail offers that, in descending order, represent in sum a

revenue share of 80% of all NGA-based retail offers of the SMP operator in the broadband market. The period over which this calculation should be executed is 24 months.

Definition of a retail offer change

A retail offer is deemed to have changed if any of the below characteristics change:

- offer type
 - customer: from residential to business or *vice versa*
 - product: new services are included (e.g. inclusion of (IP)TV packages in an offer that previously included only voice and broadband)
- offer features
 - broadband: the nominal download and/or upload speeds in a way that would imply a change in the corresponding wholesale fixed access product
 - (IP)TV: for offers including TV services, inclusion of premium content (non-free by standard pricelist, e.g. live football matches) irrespective of a modification in the pricing conditions.
- pricing conditions (e.g. recurring charges, including promotions).

It is worth noting that the conditions defined to assess whether a retail offer is deemed to have changed are quite similar to those defined in relation to the implementation of the margin-squeeze test model, widely accepted by the industry and by Makedonski Telekom in particular.¹⁷

Question 5: Do you agree with the proposed approach to determine whether a retail offer is deemed to have changed?

Stakeholder comments

► *Makedonski Telekom*

We agree partially. We consider that the changes of the one-time fees should not be seen as the reason for changing the retail prices.

¹⁷ See 'Consultation on the AEC margin squeeze test model', par. 4.1, April 2012, according to which

An offer is deemed to be a new one if any of the below characteristics change:

- customer type – from residential to business or vice-versa
- product type – new services are included (e.g. inclusion of (IP)TV packages in an offer that previously included only voice and broadband)
- the nominal download and/or upload speeds in a way that would imply a change in the corresponding wholesale bitstream access product
- the subscription monthly fee (e.g. from MKD1000 to MKD800 per month).

► *One.VIP*

In general One.VIP agrees with the proposed approach, but with accepted and implemented comments/statements provided by our side.

Analysys Mason responses

One-off fees contribute to the calculation of the offer profitability; therefore, a change in this part of the offer requires a re-run of the ERT.

See response to comments to Question 3 for wording comments.

Statement 5: A retail offer is deemed to have changed if any of the below characteristics change:

- offer type
 - customer: from residential to business or vice versa
 - product: new services are included (e.g. inclusion of (IP)TV packages in an offer that previously included only voice and broadband)
- offer features
 - broadband: the nominal download and/or upload speeds in a way that would imply a change in the corresponding wholesale fixed access product
 - (IP)TV: for offers including TV services, inclusion of premium content (non-free by standard pricelist, e.g. live football matches) irrespective of a modification in the pricing conditions
- pricing conditions (e.g. recurring charges, including promotions).

Offer dimension choices for retail products

The options to aggregate the retail products to run an ERT are:

- all the packages of an SMP operator, on an individual basis
- only the most relevant single packages (flagship products)
- market level.

The rationale underlying each option is summarised in Figure 2.4 below.

Figure 2.4: Offer dimension choices for retail inputs [Source: Analysys Mason, 2018]

| | Each package | Single packages | Entire market |
|-----------|--|--|---|
| Rationale | <ul style="list-style-type: none"> • Often used when there is a process for pre-approval of retail packages | <ul style="list-style-type: none"> • Used on 'flagship' products only | <ul style="list-style-type: none"> • Consistent with the NRA's market definition |

| | Each package | Single packages | Entire market |
|----------------|--|---|---|
| Considerations | <ul style="list-style-type: none"> • Less useful to set wholesale prices (multiple ceilings) • Puts limits on pricing freedom (may not be consistent with Ramsey pricing)¹⁸ • Heavy administrative burden and complex calculations | <ul style="list-style-type: none"> • Simple calculations • Allows pricing freedom • May allow the incumbent to continue 'abuse' on other products • Easy to use in a forward-looking manner | <ul style="list-style-type: none"> • Allows pricing freedom • Includes certain segments in which the other licensed operators (OLOs) are <i>de facto</i> not competing (e.g. legacy subscribers) • More natural for a backward-looking test • May or may not allow for fibre vs. copper differentiation |

The ERT will be run on the retail flagship products on a 'single package' basis. This approach is consistent with the EC Recommendation, which favours conducting the test only on the most relevant flagship products.

Question 6: Do you consider that running the ERT on the retail flagship products only on a 'single package' basis is an adequate approach?

Stakeholder comments

► *Makedonski Telekom*

In the context of our answer to the second question, even though ERT is testing every retail package individually, the results of the test should be seen integrally and if a retail package does not have a margin, the same package should be viewed and approved integrally with the rest of the retail packages that originate from the same wholesale bitstream profile (e.g. 50/50 Mb/s). We remind that, the basis of this whole process is not regulation of the retail packages (there aren't retail relevant markets), but review of the replica from the wholesale upstream products as the basis for providing retail broadband services.

► *One.VIP*

What if we have more flagship packages, having the definition for which package or which packages can be so-called flagship package, i.e. packages?

¹⁸ See Section 0 below.

Analysys Mason responses

The purpose of the test is to ensure that the SMP operator tested retail offers (as they defined and eventually selected) are replicable through the regulated wholesale inputs from the SMP operator itself on a stand-alone basis; therefore, it is a matter of profit and margin, i.e. of relativity between these two price levels; by no means the test is meant to check whether all of the retail offers based on a specific wholesale input are replicable (as a whole).

For the sake of clarity, *all* of the retail packages deemed as flagship according to the agreed criteria are to be tested.

Statement 6: The ERT will be run on the retail flagship products on a ‘single package’ basis. This approach is consistent with the EC Recommendation, which favours conducting the test only on the most relevant flagship products.

2.3.2 Time dimension

The time dimension of the retail offer relates to the SMP operators’ end users and the product take-up over time.

There are three possibilities for considering the time dimension of users and products, as summarised in Figure 2.5 below.

Figure 2.5: Time dimension choices for retail inputs [Source: Analysys Mason, 2018]

| Choice of retail input | Rationale |
|------------------------|---|
| All users | <ul style="list-style-type: none"> • Takes into account all users who are currently active • Accurately mimics the full user base and allows pricing freedom • Requires adequate consideration of one-off costs when legacy users joined the user base; also, data may be difficult to source and interpret |
| New users | <ul style="list-style-type: none"> • Models all new subscribers over a set period • Easier to implement than taking into account ‘all users’ • Provides a more accurate representation of the competitive context (competition is for new users) ... • ... but past anti-competitive actions would go unpunished |
| Cohort(s) | <ul style="list-style-type: none"> • A number of vintages/cohorts are modelled. A ‘cohort approach’ refers to grouping and testing groups of users according to their time of joining • Mimics the pricing decisions: competition in each period is for the gross additions in that period • If retail prices and costs are stable, then a single cohort can be modelled |

There is a direct interplay between this retail offer time dimension and the relevant period over which to run the ERT (discussed in Section 2.7). The decisions for these two aspects need to be considered in combination to ensure consistency.

Selecting all the SMP operators' users could be considered as backward-looking – it considers existing users but not necessarily future users (who may have different characteristics). Considering new users is a more forward-looking choice. Choosing a cohort approach is, however, more aligned with the EC Recommendation with regards to the relevant time period of the test. The EC recommends an ERT based on a dynamic multi-period analysis (as further discussed in Section 2.7).

The EC refers to the ERT being conducted on the retail price and not on the (blended) average revenue per user (ARPU), which seems to indicate a preference for conducting the test on new users. In practice, however, this may not be entirely possible as some data, such as take-up of add-on packages or out-of-bundle usage, may not be available for new users or even new packages. Further, conducting the test on prices instead of revenue may be misleading and lead to inappropriate results, as other revenue components (e.g. one-offs, out-of-bundles services) may not be accurately reflected/captured.

Therefore, the ERT is conducted on new users only.

Question 7: Do you consider that running the ERT test on new users only is an adequate approach?

Stakeholder comments

► *Makedonski Telekom*

Yes, ERT should be implemented dynamically for the upcoming period by running tests only on the new subscribers.

► *One.VIP*

We consider that the approach by which ERT will be implemented only for new users is appropriate.

Analysys Mason responses

Agreed.

Statement 7: The ERT will be conducted only on new users.

2.4 Relevant wholesale inputs to be considered

In defining the upstream inputs to be used in the ERT, the most relevant wholesale access products need to be considered, as well as their associated prices.

2.4.1 Wholesale products

In its market analysis, AEC outlined that the SMP operators' NGA-based fixed broadband retail offers which must be subject to ERT are the ones offered based on the following NGA-based wholesale fixed broadband access services:

- fibre and potentially a mix of fibre and copper, i.e.
 - IP-level bitstream at central level
 - Ethernet-level local access point (VULA)
- HFC networks based on DOCSIS 3.0 technology, i.e.
 - IP-level bitstream at national level
 - local CMTS level.¹⁹

The EC Recommendation sets out that the NRAs should identify the most relevant regulated upstream inputs that are likely to be used by access seekers to offer equivalent retail offers to the chosen flagship products/bundles (referred to in Section 2.3.1) in the timeframe of the current market review period.²⁰ This selection of the most relevant upstream inputs needs to consider the current and expected wholesale offer take-up and the SMP operators' network roll-out plans and network topology. The EC notes that the dominant operators' network characteristics and the wholesale offer take-up might vary geographically. If this is the case, NRAs should assess the feasibility of performing the ERT by geographical area.

In (ex-post) precedents, margin-squeeze tests were conducted for one wholesale input on each wholesale market in which an operator was dominant (including auxiliary wholesale services in the same market, e.g. co-location). In contrast, the EC states that only the most relevant wholesale inputs should be tested, which can be interpreted as less of an administrative burden. In the case of dominance on both Markets 3a and 3b, as is the case in the Republic of North Macedonia, this would mean that the ERT needs to be conducted (and passed) only in the market that is considered the most relevant and only on the wholesale service(s) that has or have been considered an essential input to the test. Wholesale products in other markets would not need to be included unless necessary (e.g. if they are essential to provide the service and cannot, in practice, be replicated by an (efficient) access seeker).

Having said that and given market conditions, the ERT tests all the relevant wholesale products. Therefore, the ERT has the capability to assess the replicability of the retail products based on the wholesale inputs outlined by AEC in its market analysis.

¹⁹ AEC, *Third market analysis for "wholesale local access provided at a fixed location" and fourth market analysis of the "wholesale central access provided at a fixed location for consumer goods"*, May 2017.

²⁰ 'COMMISSION RECOMMENDATION of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment', ANNEX II – Parameters of the ex ante economic replicability test, (iii).

Question 8: Do you agree that all the NGA-based access upstream products outlined by AEC in its market analysis should be tested?

Stakeholder comments

► *Makedonski Telekom*

We consider that as a wholesale input in the ERT should be taken only the referent offer for the bitstream approach.

► *One.VIP*

If it is thought for testing all wholesale products that are already part of the Wholesale offer for bitstream access, with the aim to verify if they pass the ERT, we agree, although this is contrary to the definition of so-called flagship offer. What if only one or only few products meet the criteria and AEC provides testing of all products, including those that are not part of the flagship offer?

Analysys Mason responses

The EC Recommendation states (recital (67)): “[The ERT should assess] the margin earned between the most relevant retail products including broadband services (flagship products) and the regulated NGA access input most used, or identified”.

In the context of this ERT:

- Flagship offers are all NGA-based offers, sorted in descending order, that cumulatively sum up to 80% (or the percentage that AEC decides) of the total NGA-based revenues generated in test period (i.e. over 24 months from the test starting date)
- All wholesale inputs (in terms of level) are tested to replicate the retail flagship offers as assessed through the set criteria.

In the ERT model we have taken into account all and only the wholesale products included in the NGA bitstream reference offer (namely Level 2, 3 and 4).

Statement 8: All the NGA-based access upstream products outlined by AEC in its market analysis will be tested in the ERT.

2.4.2 Wholesale prices

The price of the wholesale products used by the NRAs should be the price that the SMP operators effectively charge third-party access seekers for the relevant wholesale inputs. Given the

obligation of non-discrimination that AEC has imposed on SMP operators,²¹ these prices should be equivalent to the prices that the SMP operators charge to their own retail arm.

The EC also states that NRAs should take into account volume discounts and long-term pricing agreements between the SMP operators and the access seekers. This is required to “ensure the right balance [...] between incentivising efficient and flexible pricing strategies at the wholesale level and at the same time ensuring a sufficient margin for access seekers to maintain sustainable competition.”²²

The upstream input prices used in the ERT reflect an access seeker scale that is appropriate for the local market and corresponding volume and time-period commitments.

Question 9: Do you agree with the approach followed to define the upstream input prices used in the ERT?

Stakeholder comments

► *Makedonski Telekom*

Yes, we agree.

► *One.VIP*

We are consent.

Analysys Mason responses

Agreed.

Statement 9: The upstream input prices used in the ERT reflect an access seeker scale that is appropriate for the local market and corresponding volume and time-period commitments.

2.5 Level of efficiency of the operator

Two options are available to determine the level of efficiency of an operator:

- **Equally efficient operator (EEO)** – An EEO is an efficient player operating in the downstream market (which then needs to procure essential inputs from the upstream division of the SMP operator), with a scale and efficiency level similar to that of the SMP operator.

²¹ 20170502 Decision to Makedonski Telekom for local access market; 20170502 Decision to ONE.VIP for local access market; 20170502 Decision to Makedonski Telekom for central access market; 20170502 Decision to ONE.VIP for central access market

²² *Ibid.*

- **Reasonably efficient operator (REO)** – A REO is an alternative efficient player operating in the downstream market (which then needs to procure essential inputs from the upstream division of the SMP operator), with a scale and efficiency level lower than that of the SMP operator.

2.5.1 The EEO test

The EEO test aims to assess whether the downstream division of the dominant operator could make a profit if it had to pay the same input prices that the upstream division charges to access seekers for the provision of the essential inputs. In other words, the EEO test assesses whether a player that has the same cost structure as the downstream division of the SMP operator would be able to be profitable in the downstream market in light of both wholesale and retail prices set by the SMP operator.

2.5.2 The REO test

The REO test assesses whether the retail and wholesale prices of the SMP operator are sufficient for a ‘reasonably efficient’ operator to make a ‘normal’ profit in the downstream market. The REO test involves an alternative operator operating in the downstream market whose services are based on essential inputs purchased from the upstream operations of the SMP operator. However, the REO is generally not able to achieve the same economies of scale and scope as the SMP operator, implying that it should have higher unit costs than an EEO.

Therefore, the main difference between the two tests is that the EEO test takes the downstream costs (input network costs and commercial costs that must not be necessarily provided by the SMP operators) of the SMP operator as inputs, whereas the REO test uses the costs of (potentially theoretical) alternative operators.

In some cases, reference is also made to a hybrid operator type which has the same overall efficiency level as the EEO but a smaller scale, thus resulting in higher unit costs in an industry (such as telecoms) that is characterised by high economies of scale. This is sometimes referred to as the **similarly efficient operator (SEO)** test.

The key features of these approaches are summarised in Figure 2.6.

Figure 2.6: Key features of EEO, REO and SEO approaches [Source: Analysys Mason, 2018]

| | EEO | REO or SEO |
|---------------|---|--|
| Description | <ul style="list-style-type: none"> An assessment is made on whether the dominant operators' own downstream operations could trade profitably based on the upstream price charged by the upstream operating arm of the dominant company to the access seekers | <ul style="list-style-type: none"> An assessment is made on whether a hypothetical reasonably or similarly efficient operator using wholesale inputs from the dominant operator can trade profitably REO is typically used, but some regulators²³ use SEO which is intended to be similarly efficient as EEO but on a lower scale |
| Benefits | <ul style="list-style-type: none"> Measures costs in an objective manner Requires only few assumptions on cost structure and the business model Makes information available to the dominant operator (and can also be made available to the NRA) Is widely accepted in legal proceedings²⁴ Provides better incentives for investment by dominant operator | <ul style="list-style-type: none"> Provides a more accurate reflection of the real challenges faced by new entrants, including lower economies of scale and scope in network operations due to a lack of national presence, a targeted market strategy or a less diversified product portfolio, and a higher cost of capital due to higher relative risk Can be more suited to <i>ex ante</i> tests if purpose is to promote competition |
| Disadvantages | <ul style="list-style-type: none"> May not be sufficient to remove barriers to entry or growth (particularly in immature markets where new entrants need to gain scale) | <ul style="list-style-type: none"> Definition of REO inevitably introduces subjectivity Cannot be applied <i>ex post</i> Requires a larger number of assumptions about network configuration and the business model Requires more complex data collection, and information is often not audited Potentially reduces the dominant operator's incentives for investment and innovation |

The EEO approach is recognised as providing more incentives for the SMP operator to continue investing in NGA networks and NGA-based services. In avoiding adjustments for efficiency or scale, it is also regarded as the most objective measure.

According to the EC, costs are to be estimated on the basis of the SMP operators' own downstream business (the EEO approach) using its own audited downstream costs (provided they are sufficiently disaggregated), but may be adjusted for scale where "*market entry or expansion*

²³ Such as Ofcom and Agcom (Delibera n. 499/10/CONS).

²⁴ For example Ofcom, European Court of Justice and EC (Decision on Case COMP/C-1/37.451, 37.578, 37.579 – Deutsche Telekom AG, 2003/707/EC, May 2003).

has been frustrated in the past” and/or “market conditions do not favour the acquisition of scale by alternative operators”. Therefore, the default option to use is the EEO test; the NRA needs to demonstrate the need for any adjustments. The EC is clear in its Recommendation that an EEO approach should be applied for the ERT. However, adjustments reflecting the actual capability of the alternative operators may be justified if these are needed to ensure that economic replicability is a realistic prospect and to promote effective competition. New players that may initially be less efficient would be given time to become more efficient in the long run. The position that the alternative operator occupies in the value chain would also be considered. This implies that the alternative operator makes rational choices based on its infrastructure level and efficiency, irrespective of the levels achieved by the SMP operators.

In addition to practical questions on how to adjust the EEO’s downstream costs to a hypothetical REO or SEO, the adjustment also introduces certain risks into the ERT, such as introducing a degree of subjectivity because of the required definition of reasonable efficiency or similar efficiency.

If based on existing operators, there is a risk of *de facto* protection of (possibly) inefficient actual competitors. On the other hand, the assumption that dominant, often incumbent, operators have a higher efficiency due to economies of scale than large alternative operators may not necessarily be true. These alternative operators are typically leaner than an incumbent and have more modern and geographically focused networks which they may be able to expand in a more efficient way.

Further, in the Macedonian context, there are two SMP operators with significant and broadly comparable market share of retail broadband subscribers (approx. 40% and 30% for Makedonski Telekom and One.VIP, respectively). Consequently, the EEO approach appears reasonable.

Following the EC Recommendation, the EEO²⁵ approach is applied as the default operator efficiency level.

Question 10: Do you consider that EEO approach is the most reasonable approach to be considered from an efficiency level point of view to size own network and commercial cost levels?

Stakeholder comments

► *Makedonski Telekom*

Yes, we agree.

► *One.VIP*

We are consent.

²⁵ The EEO approach uses the assumption that the downstream operations have the same efficiency level and scale of those of the operator that is dominant in the wholesale market

Analysys Mason responses

Agreed.

Statement 10: The EEO approach is applied as the default operator efficiency level.

2.6 Downstream cost standard

There are two main approaches to calculate the downstream costs when performing an ERT:

- an **accounting approach** – known as the fully allocated (or distributed) cost (FAC) method, which uses the accounts of the company
- an **economic approach** – implemented by, for example, using the long run incremental cost (LRIC) method,²⁶ which uses the cost of a single service.

For each approach, costs can be calculated in different ways. Both LRIC and FAC identify the cost of services and their drivers. The main difference lies in the definition of increments and the allocation of common costs.

2.6.1 Cost standard measures

FAC

One of the most commonly used cost measures under this approach is a top-down costing method where all costs incurred are attributed to services based on allocation drivers (e.g. activities). This approach uses the company's audited downstream costs to calculate the cost per service and answers the following question: 'how much did it cost me to get here?'

Under this approach, costs that are directly and indirectly attributed to services or products are allocated using a range of techniques, such as activity-based costing (ABC), samples and surveys, revenue or price-proportional mark-ups.

LRIC

An incremental cost is an economic cost concept, defined as the increase in a firm's total costs as a result of an increase in output, or the costs avoided if the output falls. The addition of 'long-run' indicates that the time horizon is sufficiently long for all types of cost to be avoidable. LRIC includes all variable costs and also the fixed costs specifically relevant to the increment of output

²⁶ It should be noted that 'LRIC' is a broad concept. Over time, several other concepts have been associated with LRIC in ex-ante cost-oriented regulation. These include adjustments to current cost accounting or modern equivalent assets, forward-looking dimensioning, efficiency adjustments, and different amortisation methodologies such as economic depreciation or tilted annuities. In an ERT downstream cost context, however, it is not necessarily the case that all these associations are appropriate.

under consideration. Fixed costs that are shared between, and common to, several services are not included.

2.6.2 FAC versus LRIC

The following table summarises the main differences between these two approaches.

Figure 2.7: Key features of FAC and LRIC approaches [Source: Analysys Mason, 2018]

| | FAC | LRIC |
|---------------------------|--|---|
| Description | <ul style="list-style-type: none"> • Uses financial accounts • Top-down costing method where all costs incurred are attributed to services based on their component activities | <ul style="list-style-type: none"> • Uses the (unit) cost of one service • Measures incrementally, i.e. considers the cost to procure or produce one more unit • Refers to the service-specific costs associated with the output volume of that service |
| Methodology | <ul style="list-style-type: none"> • Can be undertaken using either historical or current cost accounting (HCA and CCA) • Allocates costs that are both directly and indirectly attributed to services using various techniques (ABC, samples and surveys, revenue or price-proportional mark-ups) • Services comprise a series of activities, each of which use resources and therefore contributes to costs • Identifies the drivers of costs by mapping and allocating inputs, outputs and costs onto each activity | <ul style="list-style-type: none"> • Is calculated as the difference between the total cost when producing all services, and the total cost when the output volume of the examined service is zero (while keeping all other output volumes fixed) • Measures those costs caused directly by the production of the examined service • Takes into account only the incremental costs directly attributable to a service, i.e. not shared or common costs |
| Treatment of common costs | <ul style="list-style-type: none"> • Common costs are shared between the upstream and the downstream divisions • Accounting separation is useful to split common costs between individual divisions | <ul style="list-style-type: none"> • Common costs are allocated using a mark-up (then getting to the so-called 'LRIC+' measure) |
| Benefits | <ul style="list-style-type: none"> • Based on real data and can be audited using objective criteria • Costs are fully recovered, i.e. the total cost of services in any given year can be reconciled with the total operating costs, depreciation and the cost of capital incurred that year | <ul style="list-style-type: none"> • Overcomes the problem of attributing common costs to different services • Could produce more reasonable results when the market presents strong growth |

| FAC | LRIC |
|-----|---|
| | <ul style="list-style-type: none"> • Could be more suitable in a mature market |

The EC Recommendation provides the following guidance on the relevant standard for the downstream costs:²⁷

“The incremental cost of providing the relevant downstream service is the appropriate standard. A LRIC+ model should be used to calculate the incremental cost (including sunk costs) and to add a mark-up for common costs related to the downstream activities.”

In line with the EC Recommendation, AEC recommends that the LRIC+ method²⁸ should be used to calculate downstream costs.

Question 11: Do you consider that the LRIC+ method is the appropriate standard to calculate downstream costs?

Stakeholder comments

► *Makedonski Telekom*

We do not agree that the LRIC + method should be used as a relevant standard for calculating downstream costs and we consider that these costs should be calculated according to the LRIC, without adding the common cost as additional costs. This is because the scope and the purpose of ERT are only NGA-based services and not all the retail and wholesale services. NGA-based services are only a small part of the entire portfolio of services, they are relatively new, recently introduced on the market and it is assumed that the operators for new technologies have already reached a higher level of efficiency. Even without offering NGA-based services, the operator will again have the same volume of common costs (e.g. salaries of management, facilities, property, etc.). Therefore, we consider that the common costs should not be allocated at all to the costs of providing NGA services because they do not indicate efficient functioning and in order to justify / cover the larger costs (because of the common ones), the need for higher retail prices for services arises and this will cause a harm of the end-users. If the LRIC + method is already applied, it is important how and how much will be calculated (+), i.e. the level of common costs. That value should be reasonable, very small and the regulator has to give an appropriate explanation for the assessment of the common costs.

²⁷ ‘COMMISSION RECOMMENDATION of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment’, ANNEX II – Parameters of the ex-ante economic replicability test, (ii). Available at: http://ec.europa.eu/smart-regulation/impact/ia_carried_out/docs/ia_2013/c_2013_5761_en.pdf

²⁸ In long-run incremental costing, the (+) suffix denotes that common costs are allocated using a mark-up. For further details, please refer to the *Initial Report: ERT and associated WACC calculation specification document*, pp.19–20.

► *One.VIP*

We consider that LRIC + method is an appropriate standard for calculating downstream costs.

Analysys Mason responses

The proposed approach is aligned with the EC Recommendation (recital (67)): “NRAs should apply a LRIC+ model while taking into account the SMP operator’s audited downstream costs [...]”.

We suggest the share of common cost to be considered to be 50% for two main reasons:

- Because of capabilities of NGA infrastructure and customer attitude, data consumption of NGA-based subscribers is likely to be higher than data consumption of legacy-based subscribers
- On a forward-looking basis, the NGA-based subscribers are expected to represent a significant share of the entire fixed broadband subscriber base (approx. 35% in 2019, getting to approx. 70% in 2022).

Statement 11: Downstream costs are evaluated according to a LRIC+ measure.

2.6.3 Practical considerations in applying the EC Recommendation

The key downstream cost elements (non-essential input network costs and commercial costs) that may be relevant for the ERT include:

- multi-service access nodes (MSANs)/switches in local exchanges
- backhaul, aggregation and core network
- service platforms
- content costs (TV content)
- customer premises equipment (CPE)
- subscriber acquisition and retention costs (SAC and SRC, respectively)
- personnel costs
- marketing costs
- sales network costs
- billing and collection costs
- general and administration costs
- customer care costs.

As explained earlier in this section, the EEO approach relies on the use of the SMP operators’ own downstream costs, which, according to the EC, should be estimated based on the SMP operators’ audited accounts. However, such accounts are rarely sufficiently disaggregated to be used as direct

inputs into an ERT model. Therefore, a top-down cost-allocation methodology generally needs to be used to estimate some of the downstream costs.²⁹ The REO and SEO approaches may also rely heavily on these cost account inputs, although they may in those cases need to be complemented with *ad hoc* bottom-up models³⁰ or estimates, as actual data may not be available.

For the LRIC approach, it is necessary to identify those costs that are incremental (or specific to produce the examined product) and those that are not. The EC states that a ‘reasonable’ percentage of common costs should be included in the downstream costs in addition to the incremental costs (LRIC+).³¹

The definition of the ‘reasonable’ share of common costs to be included, and the fact that there is no formula for establishing the reasonable share, is a key consideration for the ERT, ensuring that:

- The SMP operator has sufficient pricing flexibility and can choose from which products to recover common costs according to typical unregulated retail pricing logic. It is economically rational to recover fewer common costs from products subject to a higher price elasticity of demand.³² Flagship products typically represent such products as they are the products where competition is the most intense.
- The ERT does not allow the SMP operator to abuse its market position by setting wholesale prices at a level relative to its retail prices that does not allow access seekers to compete.

2.7 Considerations relating to the relevant time period

The launch of a retail product in the downstream market can be considered as an investment undertaken by the operator. For an investment to be considered profitable, the total revenue generated must exceed all the costs incurred by the operator. To evaluate the profitability of the investment, other parameters (notably time and risk) should be considered, together with estimates of costs and revenue.

To evaluate the profitability of a retail product subject to an ERT, a range of techniques and methods are available. In particular, two methods can be used:

- the **DCF** method, which is based on expected cash flows over the lifetime of the investment

²⁹ A Copenhagen Economics study on applied margin squeeze confirms that some NRAs have taken this approach. See https://eng.nkom.no/market/market-regulation-smp/financial-regulation/margin-squeeze/_attachment/3391?_ts=13a405f63fb.

³⁰ It should be noted, however, that a large share (typically the majority) of the downstream costs in an ERT context (such as TV content and SAC) will be variable (direct/fully incremental) costs for which bottom-up models are rarely necessary.

³¹ ‘COMMISSION RECOMMENDATION of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment’, recital 64

³² This is sometimes referred to as ‘Ramsey pricing’.

- the **PbP** method, which considers product revenue and costs over a given time period.³³

2.7.1 Profitability measurement options

The DCF method

The value calculated through the DCF approach is a function of three variables:³⁴

- cash flows generated by the investment
- the time horizon in which these cashflows are generated
- the associated risk.

The DCF method puts together these three variables, calculating the value of an activity as the present value of its expected future cash flows according to the following formula:

$$NPV = \sum_{t=0}^n \frac{FC_t}{(1+r)^t}$$

Where:

- *NPV* = *net present value*, i.e. the present (or discounted) net value of the expected cash flows
- *n* = activity lifetime
- *FC_t* = net cash flow in the period *t*
- *t* = index representing the considered period to estimate the present value of cash flow *FC_t*
- *r* = discount factor reflecting the risk of the estimated cash flow (usually the WACC).³⁵

A model based on expected cash flows requires estimates to be used, which in turn requires the formulation of hypotheses about the evolution of revenue and costs of the activity.

In addition, a DCF evaluation usually includes a *terminal value* (*V_T*) which considers that the examined activity can have a value at the end of the considered period. This is required to reflect that the number of periods for which detailed cash flow estimates are made must be limited and that at the end of the investment lifetime some assets may still have a value, even if they are no longer used for that investment (a so-called *scrap value*). By isolating the terminal value, the DCF formula becomes as follows:

³³ These two methods were also examined by AEC in its legacy document about price-squeeze tests (in this document, DCF was referred to as the 'dynamic method' and PbP was referred to as the 'static method'). See AEC, *Instructions for establishing prices for squeezing the competition from the electronic communication services market in the Republic of Macedonia*, October 2009, par. 39–41.

³⁴ Aswath Damodaran, *Investment valuation*, Wiley Finance, 2002.

³⁵ WACC stands for weighted average cost of capital.

$$NPV = \sum_{t=0}^T \frac{FC_t}{(1 + WACC)^t} + \frac{V_T}{(1 + WACC)^T}$$

where T represents the investment time horizon for which detailed cash flow estimates are calculated (thus $T < n$).

EBITDA³⁶ from a profit and loss (P&L) account minus the capital expenditure (capex) of the investment is often used as a proxy to estimate the net cash flows (FCs) for a DCF.

The PbP method

Under a PbP method, the profitability of a retail product is evaluated using an approach which is more accounting-based than the DCF method. For a PbP analysis, P&L account items (i.e. revenue, costs and depreciation) are used instead of cash flows. Results are produced separately for a single period. Figures that are forecast for a future period are not discounted and investments are amortised along the considered asset lifetimes.

The (accounts-based) EBITDA of the activity can also be used for a PbP analysis. The capex of the activity is considered by deducting from the EBITDA the asset depreciation (which allocates a share of the capex to the examined period through a defined allocation method) and a capital charge to reflect the cost of capital in the examined period. The period length considered is usually one year but could be shorter (e.g. a quarter or single month).

2.7.2 DCF versus PbP

As explained above, the two methods address cost recovery over time in a different manner. Figure 2.8 below illustrates the key methodological difference between the two methods.

³⁶ EBITDA is the abbreviated for earnings before interest, taxes, depreciation, and amortisation. EBITDA reflects operating expenses (opex) and revenue (assuming there is no significant discrepancy between revenue recognition/cost occurrence and cash movement).

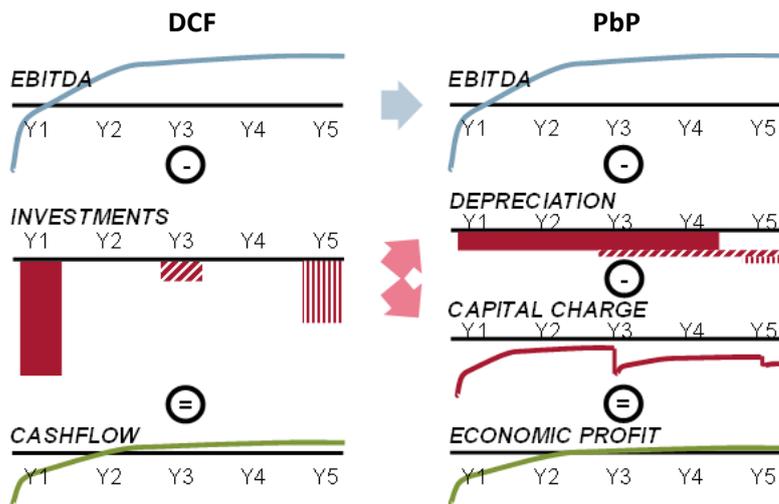


Figure 2.8: Calculation differences between DCF and PbP methods [Source: Analysys Mason, 2018]

A DCF approach examines profitability over a reasonably long period (usually a number of years, thus with a more dynamic view). A PbP approach examines a single period by considering some of the costs as expenses (in the year in which they are incurred) and other costs as capitalised costs (allocated over a number of periods, usually using straight-line depreciation). A DCF approach does not specify how and when these capitalised costs are recovered (i.e. in which single sub-periods). The profitability of the activity is assessed based on the NPV of all future expected cash flows over the whole investment period. If the NPV is positive, then the activity creates value (i.e. it is profitable) for the operator.

Both methodologies can be used for backward-looking and forward-looking tests. Figure 2.9 below summarises the main characteristics of the two approaches.

Figure 2.9: Comparison of approaches for test time period consideration [Source: Analysys Mason, 2018]

| | DCF | PbP |
|----------------------|--|--|
| Logic | <ul style="list-style-type: none"> Financial Simulation of an investment decision | <ul style="list-style-type: none"> Economic/accounting Simulation of a P&L account |
| Investment treatment | <ul style="list-style-type: none"> As cash flows | <ul style="list-style-type: none"> Depreciated over the underlying asset lifetime |
| Time value of money | <ul style="list-style-type: none"> Considered through WACC Discount of expected future cash flows | <ul style="list-style-type: none"> Not explicitly considered (no actualisation) |
| Time period | <ul style="list-style-type: none"> A single, defined period A timeframe similar to an operator's typical investment period | <ul style="list-style-type: none"> Single periods Often accounting periods or the period for which the data has been collected Variable lengths: year by year or month by month |
| Output | <ul style="list-style-type: none"> One single value (NPV) | <ul style="list-style-type: none"> One value for every considered period |

| | DCF | PbP |
|------------------|--|--|
| Potential issues | <ul style="list-style-type: none"> • Expected cash flow estimate needed (especially long term) • Cost of capital estimate needed • Terminal value estimate needed | <ul style="list-style-type: none"> • Misleading about economic value creation (short-sighted approach) • Constant cost recovery over time for capitalised costs (even for different asset usage over time) |
| Best for | <ul style="list-style-type: none"> • Growth/dynamic markets | <ul style="list-style-type: none"> • Stable markets |

The DCF approach provides a better framework for investment decisions. The DCF result is sensitive to the time period considered.

The PbP approach is more straightforward as a concept and does not require any adjustments to the terminal value. A PbP test can easily be expressed as a result per average user month which is informative to understand the wholesale price ceiling. However, the PbP approach is less suitable to calculate the one-off costs that are initially needed to launch an activity. In growing markets with significant variations of demand, PbP can introduce distortions. This is because investment recovery is often allocated equally to each period of the asset lifetime, while the actual utilisation of the asset could be lower during the first years of its service life. In this case, it would be more appropriate to recover different portions of capitalised costs over time. Using an economic depreciation method instead of a straight-line depreciation would better reflect the asset utilisation in the examined period, but economic depreciation is more complex to implement and needs an estimation of the demand take-up curve.

2.7.3 Practical considerations in applying the EC Recommendation

The EC recommends that the ERT should evaluate the profitability of retail products on the basis of a “*dynamic multi-period analysis*”, that is, the DCF approach. The relevant period for the ERT should be set in accordance with the estimated average customer lifetime (which is a relatively short period). The EC also specifies that downstream costs for shared assets (for example, the core network or platforms) shall be included in the DCF test on an annualised basis.

In practice, it can be difficult to estimate the average customer lifetime as consideration should be given to issues such as product maturity and migration between products. Also, setting the relevant period for the ERT in accordance with the average customer lifetime at a given point in time (without other adjustments) would mean that investments for the acquisition of later subscribers are included in the DCF test but that (part of) the recovery of these investments (future margins) is excluded. As such, the test would be punitive towards the SMP operator unless the time period is long enough to capture the benefits expected by the investments of such later subscribers explicitly, or unless terminal values are included.³⁷

³⁷ See e.g. Section 3.2 in the Wanadoo vs. Telefónica case decision of the DG COMP (Case COMP/38.784).

Alternatively, a single- (average-) user or cohort DCF over the lifetime of that specific user (cohort) can be calculated and annualised costs for assets which have a longer lifetime than the tested period can be used. Subscriber-specific investments, such as SAC or wholesale activation fees, would be treated as investments that are annualised over the lifetime of the cohort. This is consistent with the EC Recommendation:

“Such average customer lifetime would be the period of time over which the customer contributes to the recovery of the (a) downstream costs that are annualised according to a depreciation method that is appropriate to the asset in question and the economic lifetime of the corresponding assets required for the retail operations (including network costs that are not included in the wholesale NGA access service) and (b) other downstream costs that are normally not annualised (typically the subscriber acquisition costs) and which the operator incurs to gain customers and should seek to recover over the latter’s average lifetime”³⁸.

Because of the short period of time over which the test is to be conducted and because shared assets are to be annualised, the DCF and the PbP approaches should yield similar results (if implemented correctly and over the same time period).

The DCF approach³⁹ is used to evaluate the profitability of the retail products that are subject to ERT.

Question 12: Do you consider that the DCF approach is the appropriate method to evaluate the profitability of the SMP operators’ retail offers subject to ERT?

Stakeholder comments

► *Makedonski Telekom*

Yes, we agree the DCF approach to be used in ERT.

► *One.VIP*

We consider that the DCF approach is an appropriate method for estimating the profitability of the retail offers of SMP operators, subject to ERT.

Analysys Mason responses

Agreed.

³⁸ ‘COMMISSION RECOMMENDATION of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment’, ANNEX II – Parameters of the ex ante economic replicability test, (v).

³⁹ The DCF method is based on expected cashflows generated over the investment lifetime

Statement 12: The profitability of the SMP operators' retail offers subject to ERT is evaluated through a DCF approach.

3 Practical implementation of the ERT

This section describes how the ERT has been implemented in the Excel model for the Macedonian market. It is structured as follows:

- Section 3.1 presents the relevant (retail and wholesale) products and services that have been modelled
- Section 0 describes the calculations within the ERT model
- Section 0 summarises the main assumptions and input parameters used in the model.

3.1 Retail offers and wholesale services included in the model

3.1.1 Retail offers

The ERT model tests whether the NGA-based retail products of SMP operators that are dominant in the wholesale (or upstream) market can be replicated by an efficient retail operator based on the wholesale inputs from the dominant operators. The model has been developed using information submitted by the SMP operators in September 2018 in response to our data requests, combined with estimates and calculations performed by AEC. All retail offers include broadband services, and some of them also include (IP)TV services.⁴⁰

⁴⁰ Most retail offers also include voice services.

Figure 3.1: Most relevant retail offers included in the ERT model [Source: Analysys Mason, 2018]

| SMP | Segment | Package group | Packet | Package Name |
|--------------------------------------|----------|---------------|-------------------|-------------------------------|
| Descending rank of NGA offers | | | | |
| OV | Consumer | 3P | 3P - Fix/Net/TV | Vip Combo Neo 3S |
| OV | Consumer | 3P | 3P - Fix/Net/TV | Vip Combo Neo 3L |
| OV | Consumer | 2P | 2P - Fix/Net | Vip Fix/Net S |
| OV | Consumer | 3P | 3P - Fix/Net/TV | Vip Combo Neo 3M |
| OV | Consumer | 3P | 3P - Fix/Net/TV | Vip Combo 3 XS |
| OV | Consumer | 2P | 2P - Fix/Net | Vip Net Neo S |
| OV | Consumer | 2P | 2P - Fix/Net | Vip Net Neo M |
| MKT | Consumer | Magenta 1 | Magenta 1 LM | Internet L & TV M |
| MKT | Consumer | Internet & TV | Internet & TV LM | Internet L & TV M |
| MKT | Consumer | Magenta 1 | Magenta 1 LL | Internet L & TV L |
| MKT | Consumer | Internet & TV | Internet & TV LL | Internet L & TV L |
| MKT | Business | Magenta 1 | Magenta 1 SM | Fix line S & Internet M |
| MKT | Business | Magenta 1 | Magenta 1 SL | Fix line S & Internet L |
| MKT | Business | Internet | Business Office M | Business Office M 2r. |
| MKT | Business | Magenta 1 | Magenta 1 MM | Fix line M & Internet M |
| MKT | Business | Internet | Business Office L | Business Office L 2r. |
| MKT | Consumer | Internet | Internet L | Internet L |
| MKT | Business | Magenta 1 | Magenta 1 ML | Fix line M & Internet L |
| MKT | Business | Internet | Business Office M | Business Office M 50 2r. |
| MKT | Business | Magenta 1 | Magenta 1 SM | Fix line S & Internet M 50 |
| MKT | Business | Magenta 1 | Magenta 1 LM | Fix line L & Internet M |
| MKT | Business | Magenta 1 | Magenta 1 LL | Fix line L & Internet L |
| MKT | Business | Internet | Business Office M | Business Office M 100 2r. |
| MKT | Consumer | Internet & TV | Internet & TV LS | Internet L & TV S |
| MKT | Consumer | Internet | Naked Internet | Max Optic Start |
| MKT | Business | Internet | Naked Internet L | Naked Business Internet L 2r. |
| MKT | Consumer | Magenta 1 | Magenta 1 LS | Internet L & TV S |
| MKT | Business | Magenta 1 | Magenta 1 MM | Fix line M & Internet M 50 |

3.1.2 Wholesale services

Retail operators need to buy the wholesale inputs from the SMP operators in order to provide the retail offers shown in Figure 3.1 above, including all related items: voice (i.e. 128/128kbps, 256/256kbps and 512/512kbps), broadband (e.g. 50/1Mbps and 100/100Mbps) and (IP)TV services. Figure 3.2 below lists all the wholesale products included in the ERT model.

| Service type | Wholesale product |
|-----------------------|--|
| Broadband | Bitstream access by technology (i.e. FTTH, VDSL, HFC) and by interconnection level (i.e. 2, 3 and 4) per connection |
| Voice | VoIP channel by cost type (monthly fee and one-off) by speed (i.e. 128/128kbps, 256/256kbps and 12/512kbps) per connection |
| Interconnection links | Interconnection links by cost types (i.e. monthly fee and one-off fee) |
| (IP)TV | Monthly fee per (IP)TV channel per user |

Figure 3.2: Wholesale products included in the ERT model [Source: Analysys Mason, 2018]

Question 13: Do you agree with the retail and wholesale products included in the ERT model?

Stakeholder comments► *Makedonski Telekom*

According to the table 3.1 in the document, identified are only 7 retail flagship offers by VIP Operator, and 21 offers by MKT. All single and bundled 2play, 3play, 4play packages by VIP are at speeds greater than 30 Mb / s (practically the entire retail portfolio of VIP) and from the entire retail portfolio by MKT, from the three types of packages S, M, L, only in the L packages for individuals the Internet access speeds exceeds 30 Mb /s (the speed in the L package is 50 Mb /s) and in the business users' packages except in L and in certain M packages, the speed for accessing the Internet exceeds 30 Mb /s. Therefore, it is surprisingly how the analysis has shown that the subject of ERT should be 21 packages by MKT and only 7 packages by VIP !?

According to our delivered inputs for the packages and the corresponding combinations of the same, the number of subscribers for many of those offers that are identified as flagship is really small. Some retail offers, according to the number of subscribers, account for less than 1-2% of the total number of flagship NGA-based retail offers (from the total of the 21 offerings identified as such). We consider and insist at the same time, those retail offers not be treated as a flagship. Those retail offers are the following:

- Magenta 1, combination of internet L and TV S;
- Internet + TV, combination of internet L and TV S;
- Independent internet, package Max Optic Start;
- Independent business internet L, package independent Business Internet L for 2 years;
- Business Office M, package Business Office M 100 for 2 years;
- Business Office M, package Business Office M 50 for 2 years;
- Business Office L, package Business Office L for 2 years;
- Magenta 1 Business, combination fix line S internet M 50;
- Magenta 1 Business, combination fix line M internet M 50;
- Magenta 1 Business, combination fix line M internet L;
- Magenta 1 Business, combination fix line L internet M;
- Magenta 1 Business, combination fix line L internet L.

The sum of the subscribers of these 12 offers participates with only 7% (according to the data provided on the number of subscribers in December 2018) in the total number of subscribers to the flagship NGA- based retail offers for which we have submitted inputs. Individually, each of these 12 offers does not participate with more than 1.1% in the total number of subscribers to the flagship NGA-based retail offers.

► *One.VIP*

We are consent, except for the part for TV services.

Analysys Mason responses

Only the revenue criterion is considered to assess the retail offer ‘flagshipness’ (see Statement 4). There are no reasons to make an assessment on a subscriber base basis.

Figure 3.1 contains most relevant retail offers included in the ERT model. It does not mean they are all deemed to be flagship offers.

Flagship offers are all NGA-based offers, sorted in descending order, that cumulatively sum up to 80% (or the percentage that AEC decides) of the total NGA-based revenues generated in test period (i.e. over 24 months from the test starting date); in any case, the number of offers to be tested should not be an issue (rather, in percentage terms the entire One.VIP UBB portfolio is tested).

Statement 13: Retail and wholesale products initially included in the ERT model are the retail flagship offers as defined in Statement 4 and the services included in Figure 3.2, respectively. These lists will be updated by AEC as long as new inputs are received.

3.2 Treatment of each component of the ERT formula

The ERT formula is typically calculated as follows:

$$P - r - w \geq d$$

Where:

- P is the price of the SMP operators’ retail offer
- r is the price of the wholesale inputs needed to provide the retail service
- w are the network costs
- d are the commercial costs.

The test is run over a period of 24 months, which is the period over which the net present value (NPV) of each component of the ERT formula is calculated, on a monthly basis, using a DCF approach. For this reason, a monthly WACC is derived from the annual WACC to estimate the NPV of each component. An example calculation is shown in Figure 3.3 below.

Figure 3.3: Example of NPV calculation in the ERT model using a DCF approach [Source: Analysys Mason, 2018]

| | | Unit | Cumulative | Dec-18 | Jan-19 | Feb-19 | Mar-19 | Apr-19 | May-19 |
|----------------------------|-----------------------|------|------------|--------|--------|--------|--------|--------|--------|
| NPV calculation | | MKD | 6,774 | 116 | 295 | 295 | 295 | 295 | 295 |
| Parameter | | | | | | | | | |
| | Time | | | 0.5 | 1.5 | 2.5 | 3.5 | 4.5 | 5.5 |
| | Capitalisation factor | | | 1.00 | 0.99 | 0.98 | 0.98 | 0.97 | 0.96 |
| NPV Revenue | | | | | | | | | |
| | Cash Flow | MKD | 35,472 | 1,478 | 1,478 | 1,478 | 1,478 | 1,478 | 1,478 |
| | Discounted Cash flow | MKD | 32,824 | 1,473 | 1,464 | 1,454 | 1,444 | 1,435 | 1,426 |
| NPV Wholesale cost | | | | | | | | | |
| | Cash Flow | MKD | 13,876 | 755 | 574 | 574 | 573 | 572 | 572 |
| | Discounted Cash flow | MKD | 12,855 | 752 | 568 | 564 | 560 | 556 | 552 |
| NPV Network cost | | | | | | | | | |
| | Cash Flow | MKD | 7,872 | 339 | 338 | 337 | 336 | 335 | 334 |
| | Discounted Cash flow | MKD | 7,290 | 338 | 334 | 331 | 328 | 325 | 322 |
| NPV Commercial cost | | | | | | | | | |
| | Cash Flow | MKD | 6,380 | 268 | 268 | 268 | 267 | 267 | 267 |
| | Discounted Cash flow | MKD | 5,905 | 267 | 265 | 263 | 261 | 259 | 257 |
| NPV total | | | | | | | | | |
| | Cash Flow | MKD | 7,344 | 117 | 298 | 300 | 302 | 304 | 306 |
| | Discounted Cash flow | MKD | 6,774 | 116 | 295 | 295 | 295 | 295 | 295 |

The formula used for calculating a monthly WACC from the annual WACC is presented below:

$$\text{Monthly WACC} = (1 + \text{WACC})^{\frac{1}{\text{months per year}}} - 1$$

In carrying out the ERT, each component must be analysed separately.

3.2.1 Retail price (P)

The P component of the ERT formula includes the revenue generated at the retail level by a customer subscribed to the offer. Three main revenue streams are considered in the ERT:

- **subscription-driven revenue** – customer subscription revenue, both recurring (e.g. monthly charge) and non-recurring revenue (e.g. first installation)
- **discounts** – a reduction in revenue (negative revenue) from discounts on the subscription-driven fees
- **additional service fees** – revenue from the sale of additional services on top of the standard services.

Question 14: Do you agree with the proposed revenue streams to calculate the price of a retail offer?

Stakeholder comments

► *Makedonski Telekom*

Yes, but in addition to the revenue calculation should take into account the revenues from the international incoming traffic, as those revenues have a significant contribution to the calculation of ARPU on a fixed line and of course they improve the margin. This approach was taken into account in the retail regulation of fixed services with margin squeeze.

► *One.VIP*

We are consent.

Analysys Mason responses

We have included revenues from international fixed voice incoming traffic on a net revenue basis.

Statement 14: Four revenue streams are considered in the ERT:

- **subscription-driven revenue** – customer subscription revenue, both recurring (e.g. monthly charge) and non-recurring revenue (e.g. first installation)
- **discounts** – a reduction in revenue (negative revenue) from discounts on the subscription-driven fees
- **additional service fees** – revenue from the sale of additional services on top of the standard services
- **international traffic** – revenues from international fixed voice incoming traffic on a net revenue basis.

Subscription-driven revenue

This revenue stream is broken down into two sub-items:

- **one-off fees** – non-recurring fees paid by a new customer for installation/activation
- **monthly fees** – recurring fees paid by an existing subscriber each month.

One-off and monthly fees vary by offer, depending on the target customer segment, the underlying technology and the range of services included in the offer. Consequently, subscribers are split by offer type in the ERT model.

Subscription-driven revenue is calculated monthly using the following formulas (and then summed up to obtain total revenue):

$$\text{One-off fee} = \frac{\text{One-off revenues}}{\text{Gross adds}}$$

$$\text{Monthly fee} = \frac{\text{Monthly revenues}}{\text{Subs., period average}}$$

Question 15: Do you agree with the calculation of subscription-driven revenue in the model?

Stakeholder comments

► *Makedonski Telekom*

Yes, we agree.

► *One.VIP*

We are consent.

Analysys Mason responses

Agreed.

Statement 15: Subscription-driven revenues in the ERT model are calculated as follows:

$$\text{One-off fee} = \frac{\text{One-off revenues}}{\text{Gross adds}}$$

$$\text{Monthly fee} = \frac{\text{Monthly revenues}}{\text{Subs., period average}}$$

Discounts

Discounts and promotions represent costs that must be subtracted from the total nominal revenue. The ERT model allows for the inclusion of discounts on monthly revenue.

For each type of discount, the monthly discount is calculated using the following formula:

$$\text{Unit discount} = \frac{\text{Discount}}{\text{Subs. benefitting of discount}}$$

Question 16: Do you agree with the treatment of discounts in the ERT model?

Stakeholder comments

► *Makedonski Telekom*

Yes, we agree.

► *One.VIP*

We are consent.

Analysys Mason responses

Agreed.

Statement 16: Discounts in the ERT model are calculated as follows:

$$\text{Unit discount} = \frac{\text{Discount}}{\text{Subs. benefitting of discount}}$$

Additional services

This revenue stream comes from the sale of value-added services (VAS) to subscribers on top of the standard services (i.e. voice traffic, broadband and (IP)TV) included in a retail offer.

Monthly revenue from additional services is calculated as follows:

$$\text{Additional services unit revenue} = \frac{\text{Additional services revs}}{\text{Additional services subs}}$$

Question 17: Do you agree with the approach followed to calculate revenue from additional services?

Stakeholder comments

► *Makedonski Telekom*

Yes, we agree.

► *One.VIP*

We are consent.

Analysys Mason responses

Agreed.

Statement 17: Additional service unit revenues in the ERT model are calculated as follows:

$$\text{Additional services unit revenue} = \frac{\text{Additional services revs}}{\text{Additional services subs}}$$

Figure 3.4 shows the calculation of the retail price for one of the offers included in the ERT model.

Figure 3.4: Example of retail price calculation in the ERT model [Source: Analysys Mason, 2018]

| | Unit | Cumulative | Dec-18 | Jan-19 | Feb-19 | Mar-19 | Apr-19 | May-19 | Jun-19 |
|--|------|------------|--------|--------|--------|--------|--------|--------|--------|
| Revenues calculation (total per user) | | | | | | | | | |
| Recurring | | | | | | | | | |
| Recurring price / subscription charge | MKD | 35,472 | 1,478 | 1,478 | 1,478 | 1,478 | 1,478 | 1,478 | 1,478 |
| Fees for additional services - MKT - Mkt | MKD | 40,637 | 1,693 | 1,693 | 1,693 | 1,693 | 1,693 | 1,693 | 1,693 |
| Discount fee (per unit, MKD, w/o VAT) | MKD | -5,168 | -215 | -215 | -215 | -215 | -215 | -215 | -215 |
| One-off | | | | | | | | | |
| One time fee - MKT - Magenta - Waga | MKD | - | - | - | - | - | - | - | - |

3.2.2 Wholesale inputs (*r*)

The *r* component of the ERT formula represents the costs incurred by an operator to buy the wholesale inputs needed to provide a retail offer. These costs are grouped into following categories:

- **access**
 - *recurring* – recurring fee for bitstream access using either VDSL or FTTH technologies. Access is provided at three different network levels (i.e. Level 2, Level 3 or Level 4)⁴¹
- **voice**
 - *one-off* – one-off fee for a virtual voice channel
 - *recurring* – monthly recurring fee for a VoIP channel depending on the channel speed (i.e. 128/128 kbit/s, 256/256 kbit/s and 512/512 kbit/s)
- **link**
 - *one-off* – one-off fee for interconnection between the access seeker and the SMP operators’ networks
 - *recurring* – recurring fee for the interconnection between the access seeker and the SMP operators’ networks.
- **(IP)TV**
 - *recurring* – monthly recurring fee per (IP)TV channel per user.

Most of the above services are regulated, and therefore cost inputs are sourced from the SMP operators’ reference offers.

Figure 3.5 shows an example calculation of the wholesale costs for a given offer in the ERT model.

Figure 3.5: Example of wholesale cost items [Source: Analysys Mason, 2018]

| | Unit | Cumulative | Dec-18 | Jan-19 | Feb-19 | Mar-19 | Apr-19 | May-19 |
|-----------------------------------|------------|--------------|------------|------------|------------|------------|------------|------------|
| Wholesale (total per user) | MKD | 7,412 | 302 | 102 | 102 | 102 | 102 | 102 |
| <i>Recurring</i> | MKD | 7,198 | 102 | 102 | 102 | 102 | 102 | 102 |
| Access recurring | MKD | 7,160 | 100 | 100 | 100 | 100 | 100 | 100 |
| Voice recurring | MKD | - | - | - | - | - | - | - |
| IPTV recurring | MKD | - | - | - | - | - | - | - |
| Links recurring | MKD | 38 | - | - | - | - | - | - |
| <i>Unitary one-off</i> | MKD | 200 | 2 | 2 | 2 | 2 | 2 | 2 |
| Voice one-off | MKD | 200 | 200 | - | - | - | - | - |
| <i>Monthly instalment</i> | MKD | 14,04 | 0.585 | 0.585 | 0.585 | 0.585 | 0.585 | 0.585 |
| Monthly Links | MKD | 14 | 0.585 | 0.585 | 0.585 | 0.585 | 0.585 | 0.585 |

Question 18: Do you agree with the approach used to account for the wholesale inputs?

⁴¹ Resale services.

Stakeholder comments► *Makedonski Telekom*

Yes, we agree.

► *One.VIP*

We are consent.

Analysys Mason responses

Agreed.

Statement 18: Wholesale inputs in the ERT model are grouped into following categories:

- **access**
 - *recurring* – recurring fee for bitstream access using either VDSL or FTTH technologies. Access is provided at three different network levels (i.e. Level 2, Level 3 or Level 4)⁴²
- **voice**
 - *one-off* – one-off fee for a virtual voice channel
 - *recurring* – monthly recurring fee for a VoIP channel depending on the channel speed (i.e. 128/128 kbit/s, 256/256 kbit/s and 512/512 kbit/s)
- **link**
 - *one-off* – one-off fee for interconnection between the access seeker and the SMP operators' networks
 - *recurring* – recurring fee for the interconnection between the access seeker and the SMP operators' networks.
- **(IP)TV**
 - *recurring* – monthly recurring fee per (IP)TV channel per user.

Non-replicable upstream inputs for which a Reference Offer is not available (e.g. TV services over cable network) are costed through a mix of provided SMP operator own costs and benchmarks.

► *Calculation of the monthly wholesale costs*

In the ERT model, wholesale costs are expressed as a monthly cost per subscriber.

Since the model is built on a monthly basis, the following formula is used to calculate the monthly instalment for specific one-off items (i.e. interconnection links one-off).

⁴² Resale services.

$$\text{Monthly instalment: One - Off} \times \frac{\text{Monthly WACC}}{1 - \frac{1}{(1 + \text{Monthly WACC})^N}}$$

Where:

- N is the asset lifetime expressed in months.

Question 19: Do you agree with the proposed approach for calculating the monthly cost of one-off wholesale inputs?

Stakeholder comments

► *Makedonski Telekom*

Yes, we agree.

► *One.VIP*

We are consent.

Analysys Mason responses

Agreed.

Statement 19: Monthly cost of one-off wholesale inputs in the ERT model are calculated as follows:

$$\text{Monthly instalment: One - Off} \times \frac{\text{Monthly WACC}}{1 - \frac{1}{(1 + \text{Monthly WACC})^N}}$$

3.2.3 Network (w) and commercial (d) costs

Network (w) and commercial (d) costs are the downstream costs included in the ERT model. As explained in Section 0 we propose to estimate these costs using a LRIC+ methodology. Under this approach, the unit cost per subscriber is calculated by adding a share of the non-incremental costs to the incremental cost of providing the relevant downstream service, using the following formula:

$$\text{Unit cost per subscriber (LRIC+)} = \text{LRIC} + \text{share of common costs}$$

The share of costs that can be considered as incremental depends on the chosen increment. The more granular the test, the higher the proportion of costs that can be considered as common (as the increment becomes smaller). Figure 3.6 below shows an example of measurable cost categories by service.

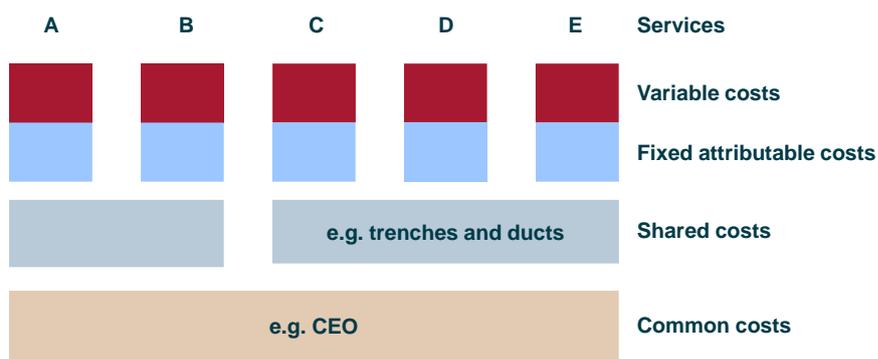


Figure 3.6: Cost classification by service
[Source: Analysys Mason, 2018]

The share of common costs is calculated as follows:

$$\text{Share of common costs} = 50\% \times (FAC - LRIC)$$

For each commercial and network cost item reported by the SMP operators, unit costs have been calculated using a fully allocated cost (FAC) methodology, as follows:

$$FAC = \frac{\text{Total costs}_i}{\text{Subscribers}_j}$$

Where:

- i is a piece of equipment
- j is the number of subscribers served by that piece of equipment.

In addition, unit LRIC is calculated for all commercial and network cost items taking into account whether they are considered incremental or not with respect to the launch of the whole NGA offer (customer base).

$$LRIC = FAC \times \% \text{ of 'incrementality'}$$

Question 20: Do you consider the proposed approach for implementing LRIC+ adequate?

Stakeholder comments

► *Makedonski Telekom*

Please see the answer to question number 11. This approach is not very clear and also what is the meaning of "increment" i.e. "incrementality".

► *One.VIP*

We consider that the proposed approach for implementation of LRIC+ is appropriate.

Analysys Mason responses

See responses to comments to Question 11.

Statement 20: In the ERT model LRIC+ is implemented as follows:

$$\text{Unit cost per subscriber} = (\text{LRIC} +) \text{LRIC} + \text{share of common costs}$$

$$\text{LRIC} = \text{FAC} \times \% \text{ of 'incrementality'}$$

$$\text{Share of common costs} = 50\% \times (\text{FAC} - \text{LRIC})$$

$$\text{FAC} = \frac{\text{Total costs}_i}{\text{Subscribers}_j}$$

Where:

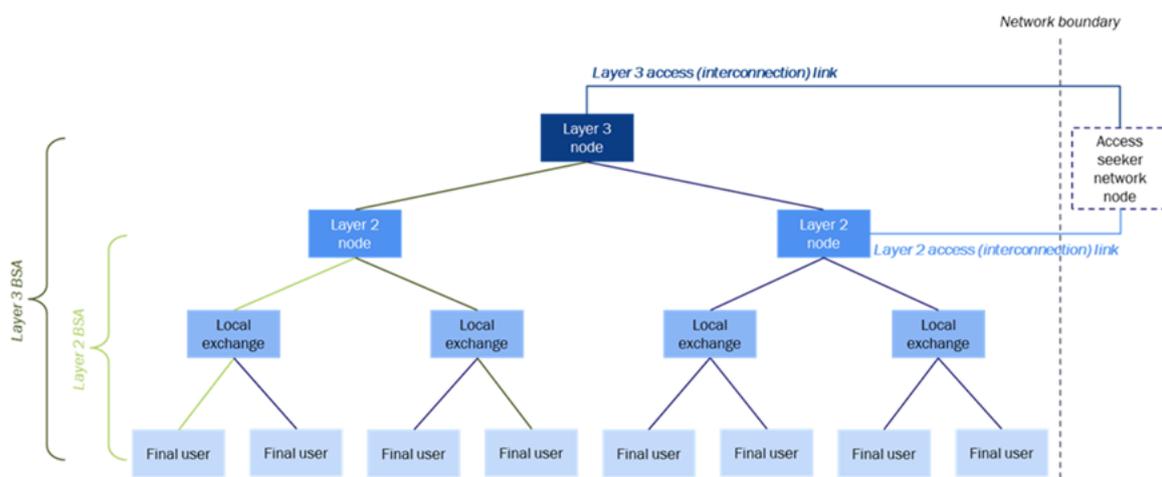
- i is a piece of equipment
- j is the number of subscribers served by that piece of equipment.

Network costs (w)

The w component of the ERT formula represents the other network costs that an operator would incur in providing the SMP operators' selected retail offers for network services that must not be necessarily provided by the SMP operators. For instance, it covers the cost of the active equipment needed to operate, manage and control the network and to route the traffic over it.

The network is split into three levels: access network, transmission and core. This is illustrated in Figure 3.7 below.

Figure 3.7: Network scheme [Source: Analysys Mason, 2018]



Each level has its own equipment, plus the service platforms, supporting/central systems, and customer premises equipment (CPE). This is shown in Figure 3.8 below.

| Network level | Item |
|------------------------------|---|
| CPE | <ul style="list-style-type: none"> • HGW • FTTH CPE |
| Access network | <ul style="list-style-type: none"> • Copper access lines • FTTH access lines • Duct access network • MDF • Splitter • ADSL access |
| Transmission | <ul style="list-style-type: none"> • IP core transmission • IC transmission • BRAS • Retail Internet access |
| Core | <ul style="list-style-type: none"> • IMS • Signalling |
| Service platforms | <ul style="list-style-type: none"> • (IP)TV equipment • Number portability • Other retail activities |
| Supporting / central systems | <ul style="list-style-type: none"> • Directory service |

Figure 3.8: Network equipment [Source: Analysys Mason based on SMP operators, 2018]

There are some aspects that need to be taken into consideration regarding the network elements included in the table above:

- most equipment is further split into other sub-elements
- some cost items do not belong exclusively to one level, but for modelling reasons they have been assigned to one level
- the cost of power supply and accessory costs are included in each network item
- the cost of space rental and management is included in each network item
- the total cost is calculated as the sum of the net book value (NBV)*WACC, annual depreciation and opex.

These items represent a fair proxy of the downstream network costs incurred by the EEO, as the data is sourced from the SMP operators.

Figure 3.9 shows an example of how the network costs associated with a retail offer are calculated in the ERT model

Figure 3.9: Example of network cost items [Source: Analysys Mason, 2018]

| Network (total per user) | Unit | Cumulative | Dec-18 | Jan-19 | Feb-19 | Mar-19 | Apr-19 | May-19 |
|--------------------------|------|------------|--------|--------|--------|--------|--------|--------|
| | | | MKD | 7,872 | 339 | 338 | 337 | 336 |
| <i>Recurring</i> | | | | | | | | |
| Equipment 1 | MKD | - | - | - | - | - | - | - |
| Equipment 2 | MKD | - | - | - | - | - | - | - |
| Equipment 3 | MKD | - | - | - | - | - | - | - |
| Equipment 4 | MKD | - | - | - | - | - | - | - |
| Equipment 5 | MKD | - | - | - | - | - | - | - |
| Equipment 6 | MKD | - | - | - | - | - | - | - |
| Equipment 7 | MKD | - | - | - | - | - | - | - |
| Equipment 8 | MKD | 985 | 45 | 45 | 44 | 44 | 44 | 43 |
| Equipment 9 | MKD | 577 | 24 | 24 | 24 | 24 | 24 | 24 |
| Equipment 10 | MKD | 159 | 7 | 7 | 7 | 7 | 7 | 7 |
| Equipment 11 | MKD | 1,446 | 62 | 62 | 62 | 62 | 61 | 61 |
| Equipment 12 | MKD | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Equipment 13 | MKD | - | - | - | - | - | - | - |
| Equipment 14 | MKD | 207 | 9 | 9 | 9 | 9 | 9 | 9 |
| Equipment 15 | MKD | 3,456 | 150 | 149 | 149 | 148 | 148 | 147 |
| Equipment 16 | MKD | 27 | 1 | 1 | 1 | 1 | 1 | 1 |
| Equipment 17 | MKD | 901 | 37 | 37 | 37 | 37 | 37 | 37 |
| Equipment 18 | MKD | 113 | 5 | 5 | 5 | 5 | 5 | 5 |

Each network cost item has a certain percentage of incrementality in order to determine the share of costs that are deemed to be incremental. This is illustrated in Figure 3.10 for a selection of network items.

| Network part | Network item | Incrementality |
|------------------------------|-------------------------------|----------------|
| Access Network | Copper access lines | -% |
| Access Network | FTTH access lines | -% |
| Access Network | Duct access network | -% |
| Access Network | MDF | -% |
| Access Network | Splitter | -% |
| Access Network | ADSL access | -% |
| CPE | HGW | 100% |
| CPE | FTTH CPE | 100% |
| Core | IMS | 50% |
| Core | Signalling | 50% |
| Transmission | IP core transmission | 50% |
| Transmission | IC transmission | 50% |
| Transmission | BRAS | 50% |
| Transmission | Retail Internet access | 50% |
| Service Platforms | IPTV equipment | 50% |
| Service Platforms | Number portability | 50% |
| Service Platforms | Other retail activities - fix | 50% |
| Supporting / central systems | Directory service | 50% |

Figure 3.10: Example of percentage of incrementality per network item [Source: Analysys Mason, 2018]

Question 21: Do you agree with the proposed approach for account for the network costs? Do you agree with the proposed network scheme?

Stakeholder comments

► *Makedonski Telekom*

It should be taken into consideration that all the costs for the access network are included in the wholesale prices for access. It is not clear from the description which network element and to what extent is it associated with a particular retail offer. We consider that much attention should be given to the calculation approach because it is actually this part of the costs ("w" in the margin squeeze formula) which has an actual impact for receiving negative or positive results from the testing. In general, network costs should be just slightly above the wholesale service costs (level 2 and level 3 of the BSA offer). Many of the network elements are already included in the cost, i.e. wholesale price for services from the BSA offer, especially in the fees for Level 3 of the BSA. Again, the "incrementality" part is not clear, i.e. why the cost for each network element has a percentage increase (incrementality)!?

► *One.VIP*

n.a.

Analysys Mason responses

The ERT consider the “incrementality” based on the whole portfolio of NGA-based offers (as the test is on the NGA-based offers).

For the network items deemed to be partially incremental, the percentage is set to 50% as on a forward-looking basis the NGA-based subscribers are expected to represent a significant share of the entire fixed broadband subscriber base (approx. 35% in 2019, getting to approx. 70% in 2022).

There are clearly network items which are not considered incremental at all, notwithstanding the (large) increment considered (e.g. the civil infrastructure), and other ones which are considered as 100% incremental due to their specific subscriber-dependence (e.g. CPE).

Statement 21: Network costs in the ERT model are treated by means of an ‘incrementality’ percentage and according to the network scheme proposed in Figure 3.7.

Commercial costs (d)

Commercial costs include:

- marketing and sales costs
- operational costs (e.g. customer care, billing, invoicing)
- content costs.

There are some aspects that need to be taken into consideration regarding the commercial costs detailed above:

- most items are further split into other sub-elements
- each item has a certain percentage of incrementality in order to determine the share of costs that are deemed to be incremental

| Item | SMP | Type | Metric | Unit | Incrementality |
|----------------|-----|-------|---------------------------|------|----------------|
| Incrementality | MKT | Total | Total commercial cost | % | -5% |
| Incrementality | MKT | Opex | Content cost | % | -5% |
| Incrementality | OV | Opex | Marketing - business | % | -5% |
| Incrementality | OV | Opex | Marketing - home | % | -5% |
| Incrementality | OV | Opex | Marketing - wholesale | % | -5% |
| Incrementality | OV | Opex | Sales - business | % | -5% |
| Incrementality | OV | Opex | Sales - home | % | -5% |
| Incrementality | OV | Opex | Sales - wholesale | % | -5% |
| Incrementality | OV | Opex | Billing | % | -5% |
| Incrementality | OV | Opex | Billing - Intact | % | -5% |
| Incrementality | OV | Opex | Invoicing | % | -5% |
| Incrementality | OV | Opex | Collection | % | -5% |
| Incrementality | OV | Opex | Customer care - business | % | -5% |
| Incrementality | OV | Opex | Customer care - home | % | -5% |
| Incrementality | OV | Opex | Customer care - wholesale | % | -5% |
| Incrementality | OV | Opex | Content cost | % | -5% |
| Incrementality | OV | Opex | Broadband cost | % | -5% |
| Incrementality | OV | Opex | Roaming cost | % | -5% |

Figure 3.11: Examples of percentage of incrementality per commercial item [Source: Analysys Mason, 2018]

These items represent a fair proxy of the downstream commercialisation costs incurred by the EEO, as the data is sourced from the SMP operators.

Figure 3.12 shows an example of how the commercial costs associated with a retail offer are calculated in the ERT model

Figure 3.12: Example of commercial cost items [Source: Analysys Mason, 2018]

| Commercial (total per user) | Unit | | Cumulative | | | | | |
|------------------------------------|------------|---------------|------------|------------|------------|------------|------------|------------|
| | Unit | Cumulative | Dec-18 | Jan-19 | Feb-19 | Mar-19 | Apr-19 | May-19 |
| Commercial (total per user) | MKD | 10,018 | 427 | 426 | 425 | 424 | 422 | 421 |
| <i>Recurring</i> | | | | | | | | |
| Marketing - business | MKD | - | - | - | - | - | - | - |
| Marketing - home | MKD | 1,556 | 66 | 66 | 66 | 66 | 66 | 65 |
| Marketing - wholesale | MKD | - | - | - | - | - | - | - |
| Sales - business | MKD | 2,327 | - | - | - | - | - | - |
| Sales - home | MKD | - | 99 | 99 | 99 | 98 | 98 | 98 |
| Sales - wholesale | MKD | - | - | - | - | - | - | - |
| Billing | MKD | 1,185 | 51 | 50 | 50 | 50 | 50 | 50 |
| Billing - Intact | MKD | - | - | - | - | - | - | - |
| Invoicing | MKD | - | - | - | - | - | - | - |
| Collection | MKD | 126 | 5 | 5 | 5 | 5 | 5 | 5 |
| Customer care - business | MKD | - | - | - | - | - | - | - |
| Customer care - home | MKD | 940 | 40 | 40 | 40 | 40 | 40 | 40 |
| Customer care - wholesale | MKD | - | - | - | - | - | - | - |
| Content cost | MKD | 3,074 | 131 | 131 | 130 | 130 | 130 | 129 |
| Broadband cost | MKD | 706 | 30 | 30 | 30 | 30 | 30 | 30 |
| Roaming cost | MKD | 104 | 4 | 4 | 4 | 4 | 4 | 4 |

Question 22: Do you agree with the proposed approach to account for the commercial costs?

Stakeholder comments

► *Makedonski Telekom*

In the delivered inputs for retail costs (commercial costs), we gave a suggestion that these costs would be the best if are calculated as a mark-up% from the total wholesale and network costs, i.e. $d = (r+w) \cdot \%$. The mark-up percentage should be 10 to 12%. This is due to the fact that there is no precise allocation for each commercial cost per commercial offer and determining a mark-up is the simplest solution. This approach has been used in the margin squeeze methodology in the process of retail regulation on the fixed services.

Again, the "incrementality" part is not clear, i.e. why the cost for each commercial element has a percentage increase (incrementality)!?

► *One.VIP*

We are consent.

Analysys Mason responses

The suggested approach is a change of methodology compared to the margin squeeze test model; indeed, for the margin squeeze test there was a reference case (i.e. the Italian one); in this case, the cost measure used for commercial costs is LRIC+, as for the network costs.

This is indeed consistent with the EC Recommendation, (recital (67)): “NRAs should apply a LRIC+ model while taking into account the SMP operator’s audited downstream costs [...]”.

In addition, for the sake of clarity, the LRIC+ methodology applied to commercial costs, according its formula, is equal to 50% of FAC, as the incremental cost share is 0 (i.e. the LRIC component is 0).

Statement 22: Commercial costs are evaluated according to a LRIC+ measure as all downstream costs are in accordance with the EC Recommendation.

3.3 Model assumptions and relevant parameters

In this section, we first describe the main assumptions employed in the ERT model, and then summarise the main input parameters.

3.3.1 Relevant time period

The model assumes a period of 24 months to execute the test because the most relevant retail offers have a contract duration (constraint) of 24 months.

Question 23: Do you agree with the proposed values for the relevant time period?

Stakeholder comments

► *Makedonski Telekom*

Yes, we agree the ERT time period to be 24 months.

► *One.VIP*

We are consent.

Analysys Mason responses

Agreed.

Statement 23: The ERT is executed over a 24-months’ time period.

3.3.2 Relevant parameters

The ERT model includes a number of parameters that are relevant to various cost elements, such as subscriber volumes and the dimensioning of network elements and equipment. Figure 3.13 below lists the main parameters used in the model and their values.

Some of these parameters have already been discussed elsewhere in this consultation document.

Figure 3.13: Parameters used in the ERT model [Source: Analysys Mason, 2018]

| Item | Value | Notes and comments | Use |
|---|--|---|---|
| WACC | <ul style="list-style-type: none"> Makedonski Telekom: 8.29% One.VIP: 8.25% | See Section 4 | Discount rate for the DCF method and for the calculation of the <i>monthly instalment</i> |
| ERT period | <ul style="list-style-type: none"> 24 months | Timeframe of analysis for the examined offer; set on the basis of the contract duration of the main retail offers | Relevant time period in the ERT model |
| Interconnection level tested | <ul style="list-style-type: none"> Access is provided at three different network levels (i.e. Level 2, Level 3 and Level 4) | Based on the configuration of the network submitted by SMP operators in response to the data request | Calculation of wholesale access and interconnection costs |
| Asset depreciation period | <ul style="list-style-type: none"> 60 months | The lifetime of interconnection links | Calculation of network costs |
| Share of common costs | <ul style="list-style-type: none"> 50% | See Section 0 | Calculation of LRIC+ unit costs |
| Number of nodes per interconnection level | <ul style="list-style-type: none"> Level 2: 20 Level 3: 2 for Makedonski Telekom and 1 for One.VIP Level 4: 1 | Based on data submitted by SMP operators in response to the data requests | Calculation of wholesale costs |

Question 24: Do you agree with main assumptions used in the model and the proposed values for the key model parameters?

Stakeholder comments

► Makedonski Telekom

For each used assumption we gave our opinion in the corresponding answers above.

Except, for us remains unknown how ERT will test the three interconnection levels of access according to the BSA offer. Given that the inputs, the wholesale prices are different for each level, is the ERT for each retail offer will check a replica separately with level 2, level 3, level 4, or a replica will be checked as a mix (average) of all three levels. If checked separately for each level, what would be the case if a certain retail offer can be replicated in e.g. with level 2 and level 4, but it cannot be replicated with level 3 and otherwise? According to the guidelines and the recommendation of the European Commission, it is recommended to use "the most relevant, most used wholesale input". Therefore, we believe that ERT should only pass with one wholesale option.

► *One.VIP*

n.a.

Analysys Mason responses

The ERT tests whether each flagship offer is replicable separately with Level 2, Level 3 and Level 4 inputs. The rationale behind this approach is allowing retail offers to be replicated by OLOs irrespective of their level of infrastructuring (i.e. from their positioning on the so-called ‘ladder of investment’). If the test is failed only for some levels, then the SMP operator can alternatively (or in combination):

- Decrease the wholesale input price for the ones for which the test fails
- Increase the retail offer price to make the test be passed for all wholesale levels.

Statement 24: The ERT model is run according to the main assumptions and the proposed values reported in Figure 3.13.

4 Cost-of-capital methodology and calculation

The ERT requires the definition of a reasonable level of return on capital employed by the modelled operator. There is a general consensus among operators and regulators worldwide that the cost of capital employed should be estimated using the weighted average cost of capital (WACC).

This section sets out our approach to deriving a suitable WACC for the ERT. The proposed approach is similar to, for instance, the one previously used by AEC to estimate the costs of broadcasting free-to-air services on the digital terrestrial television (DTT) platform in the Republic of North Macedonia.⁴³

The capital employed typically comprises equity and debt. The cost of capital borne by an operator should fairly remunerate both its shareholders and lenders through the application of the WACC.

A post-tax WACC is calculated as follows:

$$WACC_{post-tax} = C_d \times \frac{D}{D + E} + C_e \times \frac{E}{D + E}$$

Where:

- C_d is the cost of debt
- C_e is the cost of equity
- D is the value of the operator's debt
- E is the value of the operator's equity.

The initial question to address is which operator's WACC should be used to test whether the NGA-based retail products of SMP operators (Makedonski Telekom and One.VIP) that are dominant in the wholesale (or upstream) market can be replicated by an efficient retail operator based on the wholesale inputs from the dominant operators. As discussed in Section 0, the EEO approach is applied as the default operator efficiency level, in line with the EC Recommendation. Consequently, the WACCs of Makedonski Telekom and One.VIP are both applicable.

Both Makedonski Telekom and One.VIP are fixed and mobile operators. However, strictly speaking, the WACCs that are relevant for the ERT are those that apply to their whole (integrated) fixed-line businesses, including their retail and wholesale operations.

The cost of capital is calculated separately for the two SMP operators, based on the weighted average of the cost of debt and the cost of equity (WACC). For each SMP operator, the WACC value is estimated based on different sources, as explained in the remainder of this section.

⁴³ See Analysys Mason (2016), *Final report for cost-based model for broadcasting free to air services on the DTT platform and associated WACC*. Available at: http://signal.aek.mk/index.php?option=com_k2&view=item&id=1885:final-report-for-cost-based-model&Itemid=469&lang=en

Question 25: Do you consider that the approach used to calculate the cost of capital is appropriate?

4.1 Cost of equity

The most common method used in calculating the cost of equity is the capital asset pricing model (CAPM). The Independent Regulators Group (IRG) has acknowledged that this is a generally accepted method and is commonly used by other telecoms regulators in determining the cost of equity of incumbent operators.⁴⁴

The formula used for calculating the cost of equity using the CAPM is presented below:

$$C_e = R_f + \beta \times R_e$$

Where:

- R_f is the risk-free rate of return
- R_e is the equity risk premium
- β is a measure of the relative risk of a particular company or sector with respect to the national economy as a whole.

Question 26: Do you consider that the CAPM is an adequate approach for calculating the cost of equity?

4.1.1 Risk-free rate of return

The risk-free rate of return is the return expected on a risk-free asset, i.e. an asset that carries zero risk. The risk-free rate of return is typically estimated using the expected return on government bonds with a long (e.g. 10- or 15-year) maturity period, as they are likely to carry the lowest default risk in a given market and are therefore the best proxy for a risk-free asset.

The ERT is calculated in Macedonian dinars (MKD). Therefore, MKD denominated bonds issued by the government of the Republic of North Macedonia are suitable indicators of the risk-free rate of return. This could either be based on the yields of recent bonds issued with a 10- or 15-year maturity period or the average yield of 10- or 15-year bonds issued by the Macedonian authorities over a number of years.⁴⁵

In our calculations, we have used the average yield of a 10-year bond issued in MKD by the Macedonian authorities over the last ten years, which is **4.02%**.

⁴⁴ IRG (2007), *Regulatory accounting: Principles of implementation and best practice for WACC calculation*. Available at: https://berec.europa.eu/doc/publications/consult_principles_best_implement/erg_07_04_pibs_on_wacc_public_cons_summary_mar2007_final.pdf

⁴⁵ <https://www.finance.gov.mk/en/node/744>.

Question 27: Do you consider the approach used to calculate the risk-free rate of return and the output value adequate?

4.1.2 Beta coefficient

Beta (β) is a statistical measure of the sensitivity of the returns of an asset equity in relation to the return from a fully diversified equity index. The theory compares the returns from the asset with the returns from the equity market with the view that equity investors can diversify their risks by investing equally in the full range of assets available in the market. By holding such a market portfolio, the investors would receive the average market returns. Therefore, a beta coefficient greater than one implies that the company's equity returns are more volatile (and hence riskier) than the market returns.

To derive the actual beta coefficient of a given operator, the shares of this operator should be publicly traded. Makedonski Telekom is listed on the Macedonian Stock Exchange. However, One.VIP, which is owned by Telekom Austria Group and Telekom Slovenije Group, is not listed on any stock exchange. Therefore, it is not possible to derive an actual beta coefficient for this operator.

A possible range of beta values based on benchmarks of similar companies is, therefore, the most suitable approach. When benchmarking the beta coefficient, it is important to note that the value of the equity beta (i.e. the beta required by the CAPM calculation) does not only reflect the operational risk, but also the financial risk. The equity beta of the benchmark company can be adjusted based on the gearing to remove the financial risk and to give an asset beta (which only reflects operational risk) according to the following formula:

$$\beta_{equity} = \beta_{assets} \times (1 + (D/E))$$

The asset beta is therefore more likely to represent a suitable benchmark. This is a company-specific parameter whose value can be benchmarked with that of comparable operators in other countries.

In our calculations, the beta value is estimated based on a benchmark of the betas of comparable operators in other countries. The benchmark inputs have been sourced from Infront Analytics:⁴⁶

| WACC calculation | Beta coefficient value |
|----------------------------------|------------------------|
| Benchmark for Makedonski Telekom | 0.55 |
| Benchmark for One.VIP | 0.53 |

Figure 4.1: Benchmark of beta coefficients [Source: Analysys Mason, 2018]

Question 28: Do you consider the approach used to calculate the beta coefficient and the output values adequate?

⁴⁶ <https://www.infrontanalytics.com/>

4.1.3 Equity risk premium

The equity risk premium is the increase over the risk-free rate of return that investors demand for providing equity financing. As it is riskier to invest in stocks (equity) than to invest in risk-free government bonds, investors demand a risk premium. Companies listed on the national stock market are often taken as the sample over which this average is calculated.

The IRG recommends⁴⁷ a balanced approach considering the relevance and quality of available information, using one or more of the following methods:

- (adjusted) historical premium
- survey premium
- benchmarking
- implied premium (ex-ante approaches based on, for example, the dividend growth model).

In our calculations, the equity risk premium is estimated based on the information published by BEREC on the equity risk premium used by other European NRAs⁴⁸, which is **5.82%**.

Question 29: Do you consider the approach used to calculate the equity risk premium and the output value adequate?

4.1.4 Gearing level

The gearing (G) denotes loan capital as a proportion of the total financing needs of a company, and is expressed as:

$$G = \frac{D}{D + E}$$

The gearing can be estimated based on an operator's financial information. However, if such data is not available, then a quantitative approach (such as benchmarking analysis against the capital structure of comparable operators across Europe) may be adopted to derive a suitable gearing level.

Our approach uses benchmarks sourced from Infront Analytics to derive a suitable gearing level for the SMP operators.

| WACC calculation | Gearing level |
|----------------------------------|---------------|
| Benchmark for Makedonski Telekom | 42.25% |

Figure 4.2: Benchmark of gearing level [Source:

⁴⁷ IRG (2007), *Regulatory accounting: Principles of implementation and best practice for WACC calculation*. Available at: https://berec.europa.eu/doc/publications/consult_principles_best_implem/erg_07_04_pibs_on_wacc_public_cons_summary_mar2007_final.pdf

⁴⁸ BEREC (2018), *Regulatory Accounting in Practice 2018*. Available at: https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/8310-berec-report-regulatory-accounting-in-practice-2018

Benchmark for One.VIP

58.10%

Analysys Mason, 2018]

Question 30: Do you consider the approach used to calculate the gearing level and the output value adequate?

4.2 Cost of debt

The cost of debt is calculated to reflect the applicable corporate bond yields of the relevant operator. It is expressed as:

$$C_d = (1 - t) \times (R_f + R_d)$$

Where:

- R_f is the risk-free rate
- R_d is the company's debt premium
- t is the corporate tax rate.

4.2.1 Risk-free rate and debt premium

The risk-free rate calculated for the cost of equity (see Section 4.1.1 above) will also be used for the risk-free rate underlying the cost of debt.

Debt premium is defined as the company-specific risk premium for corporate debt above the risk-free rate and can be derived from an operator's financial information. In the absence of the required financial information, the operator's risk premium is estimated based on a benchmark of debt premium values of comparable operators across Europe.

In our calculations, the debt premium is estimated based on benchmarks sourced from public sources (e.g. operators' annual reports), as shown in Figure 4.3 below.

| WACC calculation | Debt premium |
|----------------------------------|--------------|
| Benchmark for Makedonski Telekom | 1.08% |
| Benchmark for One.VIP | 1.08% |

Figure 4.3: Benchmark of debt premium [Source: Analysys Mason, 2018]

Question 31: Do you consider the approach used to calculate the risk-free rate and debt premium, and the output value adequate?

4.2.2 Tax rate

The corporate profit tax rate applied in North Macedonia is 10%⁴⁹. This is the relevant rate to be applied in the ERT calculations.

4.3 Pre- and post-tax WACC

The ERT model works in pre-tax terms, i.e. the corporate tax liabilities of the modelled operator are not included in the considered costs. Therefore, the calculated post-tax WACC must be translated into a corresponding pre-tax WACC. The relation between pre- and post-tax WACC is represented by the following formula:

$$WACC_{pre-tax} = \frac{WACC_{post-tax}}{(1 - t)}$$

4.4 WACC results

Based on the input parameters set out in the previous sub-sections, we calculate a WACC for each of the SMP operators. The results are shown in Figure 4.4 below.

| Parameter | Makedonski Telekom | One.VIP |
|--------------------------|--------------------|--------------|
| Risk-free rate | 4.02% | 4.02% |
| Beta asset coefficient | 0.55 | 0.53 |
| Beta equity coefficient | 0.95 | 1.26 |
| Equity risk premium | 5.82% | 5.82% |
| Debt premium | 1.08% | 1.08% |
| Gearing level | 42.25% | 58.10% |
| Cost of equity (pre-tax) | 10.63% | 12.61% |
| Cost of debt (pre-tax) | 5.10% | 5.10% |
| WACC output | 8.29% | 8.25% |

Figure 4.4: Parameters and output for the WACC calculation [Source: Analysys Mason, 2018]

These results are in line with the WACC values published by BEREC⁵⁰ regarding the implementation of regulatory cost accounting methodologies by NRAs across Europe, focusing on Market 3a (i.e. wholesale local access provided at a fixed location). An average WACC value of 7.80% across Europe is drawn from the data published by BEREC.

Question 32: Do you agree with the approach used to calculate the WACC and the resulting values for the SMP operators?

⁴⁹ See <http://www.ujp.gov.mk/en/plakjanje/category/21>.

⁵⁰ BEREC (2018), *Regulatory Accounting in Practice 2018*. Available at: https://berec.europa.eu/eng/document_register/subject_matter/berec/reports/7316-berec-report-regulatory-accounting-in-practice-2018

Stakeholder comments► *Makedonski Telekom*

For the questions from number 25 to 32, related to the approach and the method of calculating WACC for SMP Operators, it should be clearly specified that the established WACC for NGA-based services will be used only in the analysis of the DCF model for ERT. In addition, we consider that in the part for calculating the equity risk premium and the level of transfer, it is necessary an appropriate analysis that will take into consideration the specifics of the Macedonian economy and the country's risk.

► *One.VIP*

n.a.

Analysys Mason responses

The calculated WACC is the one to be used in the execution of the ERT; however, for the way it is calculated it can be used for any other fixed application.

Analysys Mason has used the standard methodology to calculate the WACC:

- Country risk premium and Size premium value parameters used by Deloitte in 2009 to calculate a risk-free rate are not part of the standard and widely accepted methodology for WACC calculation, “the adjusted”
- The bond yield (10-years) used as proxy for the risk-free rate takes into account the specifics of the Macedonian economy as well as the country risk.

Statement 25: The cost of capital is calculated as Weighted Average Cost of Capital (‘WACC’), according to the formula

$$WACC_{post-tax} = C_d \times \frac{D}{D + E} + C_e \times \frac{E}{D + E}$$

Where:

- C_d is the cost of debt
- C_e is the cost of equity
- D is the value of the operator’s debt
- E is the value of the operator’s equity.

The ERT model uses a pre-tax WACC; The relation between pre- and post-tax WACC is represented by the following formula:

$$WACC_{pre-tax} = \frac{WACC_{post-tax}}{(1 - t)}$$

Statement 26: The cost of equity is calculated according to the Capital Asset Pricing Model ('CAPM') formula, i.e.:

$$C_e = R_f + \beta \times R_e$$

Where:

- R_f is the risk-free rate of return
- R_e is the equity risk premium
- β is a measure of the relative risk of a particular company or sector with respect to the national economy as a whole.

Statement 27: The risk-free rate is calculated as the average yield of a 10-year bond issued in MKD by the Macedonian authorities over the last ten years, i.e. 4.02%.

Statement 28: Beta coefficients are sized through a benchmarking exercise with comparable companies and are set at 0.55 and 0.53 for Makedonski Telekom and One.VIP, respectively.

Statement 29: The equity risk premium is estimated based on the information published by BEREK on the values used by other European NRAs, and is set at 5.82%.

Statement 30: Gearing ratios are sized through a benchmarking exercise based on Infront Economics data and are set at 42.25% and 58.10% for Makedonski Telekom and One.VIP, respectively.

Statement 31: Debt risk premiums are sized through a benchmarking exercise based on public sources and are set at 1.08% for both Makedonski Telekom and One.VIP.

Statement 32: The WACC values initially used in the ERT model are 8.29% and 8.25% for Makedonski Telekom and One.VIP, respectively.

Annex A List of acronyms and abbreviations used

The table below lists the acronyms and abbreviations used in this report.

| Acronym | Meaning |
|---------|--|
| ABC | Activity-based costing |
| ADSL | Asymmetric digital subscriber line |
| AEC | Agency for Electronic Communications of the Republic of North Macedonia |
| ARPU | Average revenue per user |
| BEREC | Body of European Regulators for Electronic Communications (formerly the ERG) |
| BRAS | Broadband remote access server |
| Capex | Capital expenditure |
| CAPM | Capital asset pricing model |
| CATV | Cable TV |
| CCA | Current cost accounting |
| CMTS | Cable modem termination system |
| CPE | Customer-premises equipment |
| DCF | Discounted cash flow |
| DG COMP | Directorate General for Competition |
| DOCSIS | Data over cable service interface specification |
| DTT | Digital terrestrial television |
| EBITDA | Earnings before interest, taxes, depreciation, and amortisation |
| EC | European Commission |
| EEO | Equally efficient operator |
| EOI | Equivalence of inputs |
| EPMU | Equi-proportionate mark-up |
| ERG | European Regulators Group (now BEREC) |
| ERT | Economic replicability test |
| FAC | Fully allocated cost |
| FTTH | Fibre to the home |
| HCA | Historical cost accounting |
| HFC | Hybrid fibre coaxial |
| IMS | Information management system |
| IP | Internet protocol |
| (IP)TV | (Internet protocol) television |
| IRG | Independent Regulators Group |
| LRIC | Long-run incremental cost |
| MDF | Main distribution frame |
| MKD | Macedonian dinar |
| MPLS | Multi-protocol label switching |

| Acronym | Meaning |
|---------|--|
| NGA | Next-generation access |
| NPV | Net present value |
| NRA | National regulatory authority |
| OLO | Other licensed operator |
| Opex | Operating expenditure |
| PbP | Period by period (approach) |
| REO | Reasonably efficient operator |
| SAC | Subscriber acquisition cost |
| SEO | Similarly efficient operator |
| SMP | Significant market power |
| SRC | Subscriber retention cost |
| TV | Television |
| VAS | Value added service |
| VDSL | Very-high-bit-rate digital subscriber line |
| VULA | Virtual unbundled local access |
| VLAN | Virtual local area network |
| VoIP | Voice over Internet protocol |
| VULA | Virtual unbundled local access |
| WACC | Weighted average cost of capital |

