Mark-up

METHODOLOGY FOR AND CALCULATIONS OF MARK-UPS FOR THE MINIMUM ACCESS PACKAGE

BANE NOR SF | KUNDE OG MARKED
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Mark-ups

Contents

1. Summary

Bane NOR will revise the charges for the minimum access package for Network Statement 2025 (NS2025). A major revision was conducted in connection with NS2024. At this stage, a few changes are being proposed in relation to the charge models published in NS2024.

The charges for the minimum access package are initially determined based on costs that are directly dependent on train services, the so-called basic charge. Secondly, the infrastructure manager has the opportunity to add a mark-up to the basic charge in market segments that can absorb such mark-ups, in order to cover more of its costs. This reports addresses the changes relating to mark-ups. Mark-ups are determined in accordance with the provisions relating to mark-ups set out in Section 6-3 of the Railway Regulations.

Mark-ups can only be added if the market can absorb such mark-ups, see Section 6-3(1) of the Railway Regulations. Therefore, a market segmentation process must be conducted and the absorption capacity of each segment must be assessed. The following segments are considered relevant in relation to mark-ups:

- Passenger trains covered under service obligations with the Norwegian Railway Directorate for which charge increases can be compensated (hereinafter referred to as public service obligation, PSO).
- Iron ore with low price elasticity
- Iron ore with high price elasticity
- Other ore and minerals
- Feeder transport to main airport

Bane NOR's total costs for maintenance, timetable planning, traffic management and modernisation were around NOK 5-6 billion per year during the 2020-2022 period. It is estimated that the basic charge for 2025 will cover around NOK 402 million of this (2024 price level after deducting discounts). Unlike the basic charge, the mark-up level is not determined solely based on underlying cost and traffic data, it is also based on how much of the costs need to be covered. Here, Bane NOR has carried out an assessment to establish a realistic level for the total of basic charges and mark-ups in recent years and the calculation has been based on a total of NOK 940 million in 2025 after deducting discounts (2022 traffic, 2024 price levels).

The mark-up is distributed between segments based on the Ramsey principle, in which segments with low price sensitivity absorb more of the mark-up than segments with high price sensitivity. This principle cannot be used for the PSO segment as fees are compensated in this segment. The mark-up for the PSO segment is therefore calculated as the segment's share of total traffic multiplied by the total mark-up limit. This report includes a detailed description of the calculation.

Results in 2024 NOK:

Segment	PSO	Iron ore, low el.	Iron ore, higher el.	Other ore and minerals	Feeder transport to main airport
NOK/train kilometre (2024 NOK)	11.06	518.44	131.63	7.90	4.22

- Compared to the 2023 charge model, the iron ore segment will, overall, experience an increase in the total basic charge and mark-up, although variations do exist within the segment.
- So far, other ore and minerals have been part of the common ore segment, but are separated out in 2024 with a lower mark-up. This has been adjusted upwards slightly for 2025 but remains low compared to the current charges.
- A change to the charge model does not result in any major changes to the total basic charge and mark-ups for feeder transport to the main airport.

2. Introduction

Bane NOR conducted a project in 2021 and 2022 concerning the pricing of the minimum access package.[1] This work resulted in a new charge model for the 2024 timetable. In 2023, Bane NOR worked on improvements relating to the model. This report addresses the source data and methodologies, which will generally remain the same as for 2024, as well as the proposed changes to mark-ups for the 2025 timetable.

A corresponding report is available for the basic charge, i.e. the prices for costs that are directly traffic-dependent. The basic charge will only cover some of the infrastructure manager's costs associated with the minimum access package. The infrastructure manager can cover additional costs using mark-ups.

3. Regulations

It follows from Section 6-1(1) of the Railway Regulations that the infrastructure manager shall calculate, determine and collect charges for the use of railway infrastructure.

The Railway Regulations are based on EU Directive 2012/34. Mark-ups are addressed in Section 6-3 of the Railway Regulations. While the infrastructure manager must charge for direct traffic-dependent costs (basic charge), mark-ups are something the infrastructure manager is allowed to collect in order to cover its costs.

Important principles for determining mark-ups can be found in Section 6-3(1). *"A mark-up on infrastructure charges may be established to fully cover the costs incurred by the infrastructure manager. Mark-ups can only be established if the market can absorb them. Mark-ups must be determined based on the principles of efficiency, transparency and equal treatment and shall ensure optimal competitiveness for railway market segments. The railway undertakings' own productivity increases must be excluded."*

Furthermore, Section 6-3 states that analysing the market segments for which mark-ups are relevant is a prerequisite. Mark-ups shall not be set in a way that excludes participants that could otherwise have paid the basic charge, see Section 6-3(2).

Market segmentation must be reviewed at least every 5 years (Section 6-3(4)).

Full cost coverage through mark-ups is unrealistic in the Norwegian railway market. This is because it would make it so expensive to run that services would decrease, which would conflict with society's

[1] The minimum access package is defined in Section 4-1 of the Railway Regulations.

goals of freight by rail and a greater share of public transport journeys. Bane NOR aims to cover a proportion of its costs associated with the minimum access package in addition to the basic charge. The rates are determined in line with Section 6-3 of the Railway Regulations. An analysis of market segments has been conducted and forms the basis for selecting the segments from which mark-ups will be collected and how large such mark-ups should be in each segment.

4. Framework for calculating mark-ups

This chapter describes the theoretical framework Bane NOR has used as its basis and how this has been applied in order to calculate mark-ups. The theory provides us with principles and calculation formulas. Knowledge of the markets for transport on the Norwegian rail network is used when applying the principles and formulas.

According to EU legislation and the Railway Regulations, the basic charge must be determined as the direct traffic-dependent cost, i.e. a form of marginal cost pricing. The basic charge will not cover the costs incurred by the infrastructure manager in order to provide the service. This is the reason why it is possible to charge a mark-up.

According to socio-economic theory, any deviations from marginal cost pricing will lead to a socio-economic loss. In a second-best solution, this loss will be minimised if we can affect the adjustments of stakeholders to the least possible extent. This is done by taking into account price sensitivity, or elasticity, in the various markets. In our context, this means that the mark-up must be reversed proportionally to elasticity. Price-sensitive markets face low or no mark-ups and gradually increasing mark-ups may be applied the less price- elasticity there is in relation to the demand for rail transport.

4.1. The theory of user payment and tax funding

The alternative to charging mark-ups would be for a corresponding amount to cover infrastructure costs being taken from the national budget and collected from taxpayers. A trade-off between covering costs via users (mark-ups) or via taxpayers (national budget) is relevant with regard to commercial train services, as services subject to public procurements (PSO) are financed via the national budget in any case.

Both forms of cost coverage would lead to a socio-economic loss according to financial theory. The socio-economic loss associated with collecting from taxpayers can be estimated using the Norwegian Ministry of Finance's recommended value for income tax analysis, NOK 0.20 per krone (Norwegian Ministry of Finance, 2021). The approach outlined in Figure 4-1 can be used to estimate the socio-economic loss associated with mark-ups.

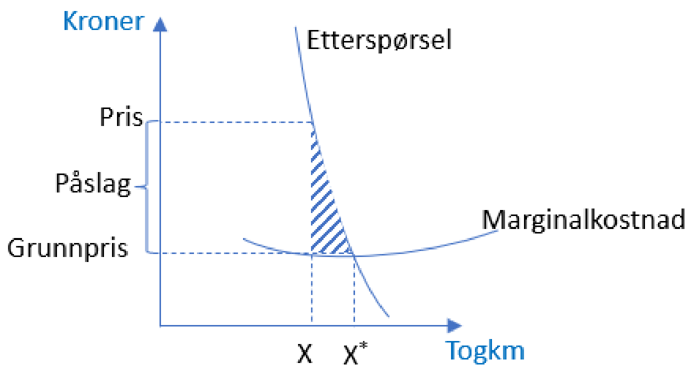

Figure 4-1 Socio-economic loss from funding via mark-ups

This figure shows the demand curve for the correlation between the charge and the requested amount of train kilometres. The curve will be steeper the less sensitive demand is. The chart also shows a marginal cost curve for the infrastructure manager's costs. The basic charge has been set as equal to the marginal cost. The total charge is equal to the basic charge plus mark-ups. The amount of train kilometres using this charge is X. If the charge had been equal to the basic charge, the requested amount would be X^*. The socio-economic loss resulting from the charge being higher than the marginal cost is virtually identical to the shaded triangle shown in the figure. The area of the triangle is ½ x mark-up x (X^x–X). Although the curves in the figure are not exact, we can determine that the socio-economic loss associated with mark-ups is likely to be less than the income tax cost associated with collecting a corresponding amount from taxpayers. This result is expected, as mark-ups should be collected only in markets with little price sensitivity, which are precisely the markets in which the socio-economic loss is limited.

A rough estimate of the socio-economic loss associated with collecting mark-ups from rail network users is around NOK 0.03 per krone mark-up on average in commercial market segments. Even though this figure is highly uncertain, it looks to be well below the NOK 0.20 per krone recommended by the Norwegian Ministry of Finance when calculating income tax costs in socio-economic analyses.

4.2. Ramsey-Boiteux pricing

Ramsey-Boiteux pricing (often called Ramsey pricing) is a method of pricing in second-best solutions in order to achieve a cost coverage that minimises socio-economic loss. As already mentioned, this entails setting the price for each market in a way that ensures that each market is reversely proportional to elasticity.

Ramsey-Boiteux pricing is a method that satisfies the regulations relating to mark-ups. Several European railway infrastructure managers use this method or pricing principles inspired by this method. Practices in other countries do not necessarily always fully correspond with the regulations but can still be helpful in determining a useful method for determining mark-ups. A possible Ramsey formula for segment *i* is:

$$(1) \quad Pris_i = MC_i * \frac{1}{1-\frac{k}{\varepsilon_i}}$$

Price$_i$ is the total of basic charge and mark-ups in segment *i*. MC_i is the basic charge in segment *i*. ε_i is the elasticity for segment *i*. *k* is a scaling factor that ensures that the sum of all mark-ups for all segments is equal to a measure (which we will return to). The formula therefore expresses that the price is equal to the basic charge times one factor for mark-up. That factor is inversely proportional to elasticity. Furthermore,

(2) $\varepsilon_i = \varepsilon_{SK} * A * PRT$

where ε_{SK} is elasticity of end customers, which may be passengers on passenger services or transport buyers on freight services, A is the proportion the charge constitutes in the train operator's revenue (or end user cost) and PRT is the pass-through rate, i.e. how large a proportion of the change to the charge the train operator passes on to its customers.

Formulas (1) and (2) are used in Austria. Here, the mark-up is a factor multiplied by the basic charge. The Ramsey principle is also used in Germany and the Netherlands, but the mark-up is a term added to the basic charge (formula from Germany):

(3) $Pris_i = MC_i + \frac{U_i}{\varepsilon_{SK}} * k$

In (3), U_i is revenue per train kilometre. This is added, as the share of revenue ($Price_i/U_i$) is included to convert from elasticity with regard to transport cost to elasticity with respect to charges. The pass-through rate has not been included, which indicates that it has been set to 1 (full pass-through). The mark-up is $Price_i – MC_i$, i.e. equal to the second term on the right side in (3).

It can be shown that the two formulas (1) and (3) are mathematical periphrases of the same expression (if we set *PRT=1*). Bane NOR has chosen to use the model from equation (1) and (2) in its calculations, using *PRT*=1.

IRG Rail has published a report describing the status of methodologies, practices in various countries and the challenges associated with determining mark-ups (Independent Regulators' Group, 2021). In addition to the variables included in the formulas above, the IRG Rail report shows that other considerations are also taken into account in the assessment, such as the parties' profitability in each market segment. In some cases, only the assessment of profitability is used as the basis and not demand elasticity (for example for commercial passenger traffic in the UK (Steer, 2022)). We will use the Ramsey principle and demand elasticities as the starting point and supplement this using profitability assessments when assessing affordability.

4.3. Implementation

The starting point is that the basic charge and mark-up is NOK 940 million in total after deducting discounts in 2025, using 2022 traffic and 2024 charge levels. In comparison, the corresponding amount paid by train operators in 2021 totalled approximately NOK 800 million, adjusted to 2024 levels. The limit has been raised slightly compared to the current level, as Bane NOR's costs have also increased since the current model was introduced in 2018. Bane NOR's total costs for maintenance, timetable planning, traffic management and modernisation have been NOK 5-6 billion each year during the 2020-2022 period. This does not include depreciation.

It would be unrealistic for Bane NOR to achieve full cost coverage through infrastructure charges. Mark-ups of the magnitude proposed here will far from cover the costs but will constitute a contribution. As mentioned, it would be socio-economically unprofitable to collect a corresponding amount from taxpayers.

The theory described above provides us with principles and calculation formulas for how to distribute the total mark-up across market segments. Knowledge of the markets is required in order to apply the above to the market segments in the Norwegian rail network. We can find such knowledge from e.g. the review of market segments conducted in 2022 (Oslo Economics, 2022), other literature on the demand for rail transport, train service statistics and charges from recent years, as well as dialogue with train operators and their customers.

Overall, this provides a good indication of what the ratio should be between mark-ups for the different segments so that we can enter it in the overall framework.

A description of markets, source data and other assumptions will be reviewed in the following chapters. Chapter 5 starts with market segmentation and an assessment of the segments for which mark-ups are relevant. Assumed elasticities used in the calculation of mark-ups have been discussed in Chapter 6.

Chapter 7 reviews other source data and calculations and results are presented in Chapter 8.

According to Section 6-3(1) of the Railway Regulations, the railway undertakings' own productivity increases must be excluded when determining mark-ups. (Since the railway undertakings' customers are those who will bear the charges in several market segments, we will also take these customers into consideration here). The method of using demand price elasticity has no direct correlation to the companies' increase in productivity. The companies' financial strength is taken into account when final elasticity is chosen. Nevertheless, it is not the case that changes in productivity will affect the determination of mark-ups. Firstly, we will look at financial strength over time and not fluctuations that could potentially be caused by changes in productivity. Secondly, we do not adjust the mark-ups at regular intervals, allowing productivity increases to influence the adjustments. The new calculations of mark-ups for 2024 and 2025 does not constitute an update to the previous calculation, but has been designed from the bottom up based on a different methodology.

5. Market segmentation and absorption capacity

5.1. Segmentation

One prerequisite for determining mark-ups according to the Railway Regulations is that market segmentation has been performed. An update to Bane NOR's market segmentation, as well as an assessment of absorption capacity to mark-ups in each segment has been conducted. Oslo Economics has assisted Bane NOR with this work, see report from Oslo Economics (2022). Bane NOR has conducted further assessments and the final segmentation therefore deviates slightly from the proposal in the Oslo Economics report. Some adjustments have been made for NS2025 in relation to the segmentation published in NS2024.

In accordance with the Railway Regulations, it is necessary to differentiate between freight and passenger services and within passenger services it is necessary to distinguish between services that constitute public service offerings and other services. Furthermore, this distinction can be drawn in such a way that comparable train products are grouped together.

With regard to the determination of mark-ups, we also look at differences with regard to how sensitive the demand for train services is in relation to changes in transport costs. De Jong (2018) writes that there is a strong correlation between elasticities and market segmentation. Segmentation does, to a great degree, depend on the different elasticities of the various groups. According to de Jong, it may be necessary to go back and adjust the initial market segmentation once elasticities have been determined. This is one of the reasons why Bane NOR has made some adjustments in relation to the market segmentation performed by Oslo Economics.

In principle, each stakeholder may have a different elasticity to others offering similar transport services. The more detailed the segmentation is, the more customised each mark-up can be. This would result in higher socio-economic efficiency (see section 4.1). On the other hand, a high number of segments could result in a complex and unmanageable segmentation. Different market segmentations can be defended based on the considerations that are emphasised.

Figure 5-1 shows the new market segmentation.

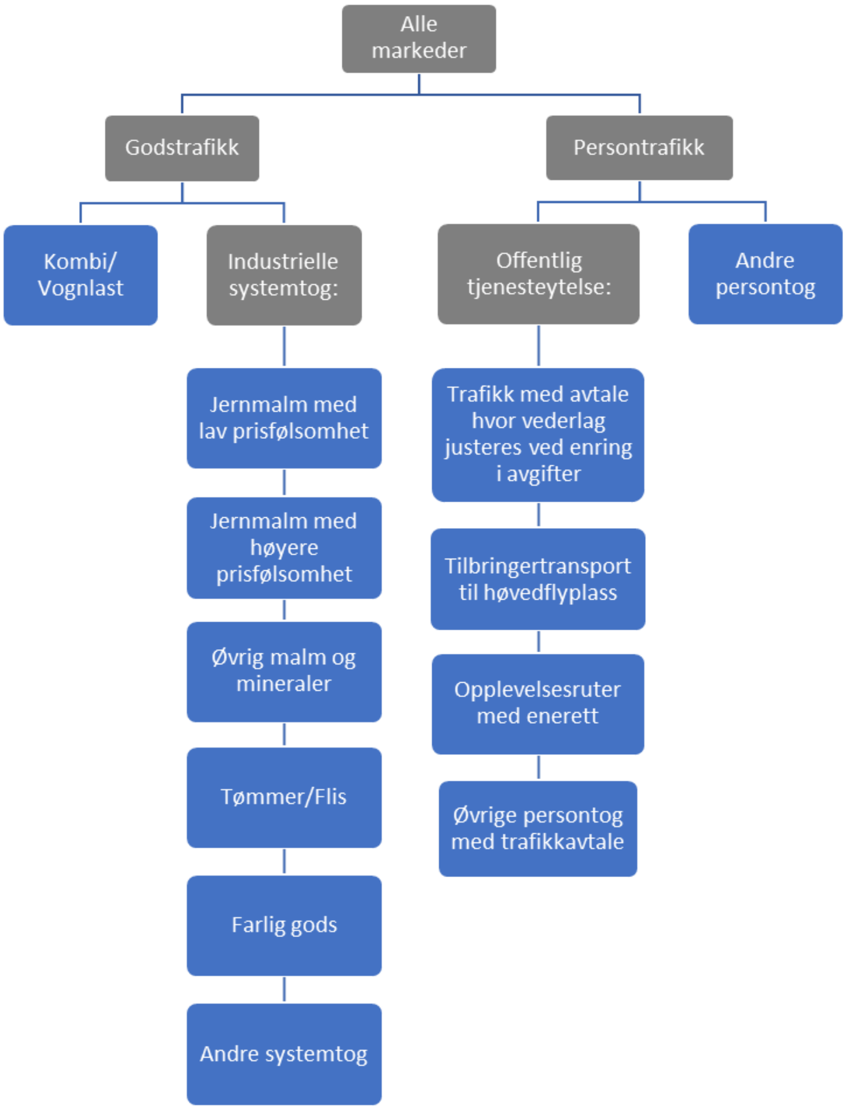

Figure 5-1 Market segmentation

Freight service segments

For freight services, a distinction is first made between combination/wagonload trains and system trains. In the combination/wagonload segment, several types of freight are transported using the same train. In industrial system transport, rail transport is typically geared towards a specific type of freight. System services are in turn divided into six segments based on market characteristics.

In Bane NOR's 2018-2023 market segmentation, all ore and mineral transport services have been grouped into one segment. The regulations require segmentation to be re-assessed every five years as a minimum. NS2024 presents a new segmentation in which a distinction is made between iron ore and other ore and minerals. In line with the findings from the Oslo Economics analysis, limestone transport services will be distinguished from other mine-related transport services, as such transport services are considered to be more price-sensitive. For NS2025, Bane NOR has conducted further segmentation of the iron ore segment and now uses services with low elasticity (low price sensitivity) and services with higher elasticity. This constitutes a further development of the segmentation from NS2024 in order to make the calculation of mark-ups more accurate.

The reason for distinguishing between the two iron ore segments is different price sensitivity, which has several underlying causes that, in some cases, are becoming more prevalent over time and there are therefore stronger reasons to conduct such segmentations for 2025 than there were for 2024. All services in these segments are highly dependent on the price of ore. However, the different transport services include different degrees of iron ore concentrate in the transported products. Those that have to run more trains in order to sell the same amount of iron ore have relatively higher rail transport costs, which makes these services more price-sensitive when it comes to charges. There are also infrastructure constraints that prevent railway undertakings from running longer or heavier trains. Although competition from other means of transport is very low for this type of system transport, any major changes to charges could make competition with road transport more relevant for ore transport services carrying lower volumes. Nevertheless, we consider the price sensitivity to be low in both segments, albeit somewhat higher for the transport of products with lower iron ore contents and for which the rail transport costs account for more of the stakeholders' revenues. With current service levels, LKAB's transport would be placed in the iron ore segment with low price sensitivity, while the segment with higher price sensitivity includes transport conducted by Railcare on the Ofoten Line and CargoNet on the Nordland Line.

Segments for passenger services

For passenger services, a distinction is made between services covered under obligations with the Norwegian Railway Directorate and other passenger services. Bane NOR deviates slightly from Oslo Economics' proposal in the further segmentation of services with obligations. This is because we consider the absorption capacity to be greater for services with obligations under which the consideration is adjusted if charges change than those that do not include such an option. Changed charges that can be compensated under the service obligation will be unlikely to have an impact on demand for train journeys. This is one of the arguments for such services being a separate segment. We operate with the following segments for services with obligations:

- Services for which consideration can be adjusted in the event of changes to charges
- Feeder transport to the main airport (includes Airport Express (Flytoget) services, see description of boundaries below)
- Adventure routes with exclusive rights (currently includes the Flåm Line)
- Other passenger trains with obligations (includes e.g. trains to/from Sweden)

Services without obligations constitute one segment:

- Other passenger trains (e.g. tourism-based trains without service obligations with the Norwegian Railway Directorate)

Oslo Economics' review identified adventure routes with exclusive rights as a segment that can withstand mark-ups, but indicated an elasticity that is higher than for the other mark-up segments. Demand elasticity for tourism destinations generally depends on a high number of factors, including competition and interactions with other attractions. Attractions that rely on cruise ship services experienced a large drop in visitors during the pandemic. According to Bane NOR's assessment, this segment should not currently be subject to mark-ups, but it has been separated out as a separate segment with a view to future developments, including the possibility of new offerings being created.

A train cannot belong to more than one segment. During the segmentation work, it is not always clear which segment a train product should belong to, as there are cases in which the product may serve different markets. This is, for example, the case for Vy trains with a similar stopping pattern as Flytoget between Drammen and Oslo Airport. The two train services serve, to some extent, the same passenger base and could have been assigned to the same segment. However, they are also different with regard to several aspects. Passengers travelling on Flytoget place greater emphasis on factors such as departure frequency, reliability, travel time and comfort than price (Urbanet Analyse, 2018) and Flytoget's ticket prices are also higher. Flytoget does not allow passengers to board en route from the airport or allow disembarkation before the terminus en route to the airport, which leads to less time being spent on passenger exchange. Vy's trains, on the other hand, permit passengers to embark and disembark at all stations at which the train stops and therefore have passengers in many more travel markets than to/from the airport. On the operator side, differences include Vy operating under public service obligations for which the consideration is adjusted in connection with changes to charges, while Flytoget operates commercially. Bane NOR has emphasised the differences between the two train products and has chosen not to allocate the Vy trains in question to the feeder transport to main airport segment. Additionally, it can be mentioned that there would have been administrative costs associated with separating out the Vy trains for this segment from other Vy trains within the region.

Trains to or from Oslo Airport on routes north of the airport or trains that serve airports elsewhere in the country currently do not have concepts with characteristics such as those described above and should therefore not be placed in the market segment feeder transport to the (main) airport.

Regardless of whether Vy and Flytoget are assigned to the same or different segments, consideration should be given as to whether mark-ups for Flytoget could have a competition-distorting impact while the passenger base potentially remains the same for Vy and Flytoget. More generally, whether a commercial party can be charged mark-ups if it competes with a party that is compensated for changes to charges. Nevertheless, it would not seem as though collecting mark-ups from Flytoget would result in Flytoget losing any customers to Vy. Statistics for infrastructure charges and market share in the 2012-2021 period do not indicate any correlation. Furthermore, there are also differences in preference between Flytoget's and Vy's customers, see Urbanet Analyse's report mentioned above. Price is not the main competitive factor for Flytoget. In general, journeys to the airport are less price-sensitive than the average for public transport journeys (Fu and Liu, 2020), which is something we will return to in Chapter 6 on elasticities.

5.2. Absorption capacity and suitability for mark-ups

In this context, the concept of absorption capacity is linked to whether the companies affected by mark-ups will readjust their services as a result of the mark-up. Emphasis can be placed on various interpretations of what this entails in concrete terms. Firstly, this relates to the extent to which changes to transport prices will affect demand for rail services directly via price mechanisms in the transport market. Here, intrinsic price elasticity and the competitive interface with alternative transport are important. It also relates to whether the undertakings' finances are robust enough that they will not want to adjust their services as a result of mark-ups.

Oslo Economics' report (2022) sheds light on absorption capacity using a thorough review of the markets for each segment. Point estimates have not been specified for elasticities ε, although a description has been included in which demand elasticity can be found on a scale from perfectly inelastic through neutral elastic to perfectly elastic. The intrinsic price elasticity normally has a negative sign, as an increase in price leads to a decrease in demand and vice versa. For the sake of simplicity, we will refer to the absolute elasticity value here. In the event of perfectly inelastic demand (ε=0), any changes to the transport price would not have an effect on demand. $0<\varepsilon<1$ means that demand will decrease in the event of increased charges, but demand will change less than the charge in terms of percentage. If ε >1, demand will change proportionally more than price. In Table 1, we have provided our summary of the results of the Oslo Economics report.

Table 1 Summary of demand elasticities based on Oslo Economics (2022)

Segments	Brief explanation	Elasticity
Ore and minerals	System transport established for and adapted to each service flow. For iron ore, volumes are significant and are therefore well-suited for rail rather than lorry. Demand is close to perfectly inelastic, but this could be influenced in the event of major price changes. Limestone and sand/concrete are slightly more price-sensitive with regard to volumes transported by rail.	Iron ore: Close to $\varepsilon=0$ Others: $0<\varepsilon<1$
Timber and woodchip	Competitive interface with road for shorter distances and sea for longer distances. Additionally, there are price-sensitive end customers that could, to some extent, choose other markets for timber.	$\varepsilon>1$
Other system transport	Aviation fuel, bottled water and waste transport have a competitive interface with road. Hydrochloric acid transport has a competitive interface with sea. For bottled water and waste transport, train operators or end customers also operate with finances that cannot absorb price increases.	Aviation fuel transport, hydrochloric acid transport: $0<\varepsilon<1$ Bottled water transport, waste transport: $\varepsilon>1$
Combination and wagonload	Complex market with partly price-sensitive parties and competitive interface with road	$\varepsilon>1$
Public service obligations	Elasticity for local and regional trains in Oslo Economics' report retrieved from other sources (Oslo Economics 2016 and the NTM6 transport model). Domestic local, regional and long-distance trains are subject to service obligations for which changes to charges are compensated. These trains are therefore associated with a high absorption capacity for mark-ups regardless of the passengers' demand elasticity. Nevertheless, when it comes to international long-distance trains, there are some trains that are not subject to compensation for changes to charges[2]. Tourism-based adventure routes with exclusive rights are considered inelastic, but not perfectly inelastic.	Local trains: $\varepsilon=\lvert 0.54\rvert$ Regional trains: $\varepsilon=\lvert 0.51\rvert$ Airport feeder transport: Close to $\varepsilon=0$ Domestic long-distance trains and international long-distance trains: $\varepsilon>1$ Adventure routes with exclusive rights: $0<\varepsilon<1$
Other passenger services	Applies to some international routes, charter trains and tourism-based trains. International routes have	$\varepsilon>1$

[2] This is not shown in Oslo Economics' report.

	a competitive interface with road and air. Tourism-based services without exclusive rights and without compensation for changes to charges are unlikely to have finances that can absorb mark-ups.	

Mark-ups are recommended for the following segments in Oslo Economics' report: Iron ore, other ore and minerals, feeder transport to main airport and other passenger services covered by service obligations.

Bane NOR has generally used Oslo Economics' recommendations as its starting point, with certain adjustments. Iron ore is divided into two segments as there are different elasticities for different stakeholder groups in iron ore transport (see section 5.1). For other passenger services covered by service obligations, mark-ups are relevant to services that may be eligible for adjustments to public fees in the event of changes to charges. Additionally, trains that fall into this category, regardless of whether their stopping patterns are similar to Flytoget, will belong to the segment "Traffic for which consideration is adjusted in the event of changes to charges".

Bane NOR therefore finds that mark-ups should be applied to the following segments:

- Iron ore with low price elasticity
- Iron ore with high price elasticity
- Other ore and minerals
- Feeder transport to main airport
- Passenger services with obligations under which consideration is adjusted in the event of changes to charges

The absorption capacity assessments that have been conducted constitute an important part of the basis for distributing mark-ups across the relevant segments. This is supplemented using other sources in order to estimate elasticities for use in the calculation.

6. Elasticities

As in several other countries, we will distinguish between PSO and other segments. Since the PSO segment can pass entire changes to charges on to the government as the scheme currently operates, no changes to adjustments in demand or services in this segment are expected. The Ramsey formula is therefore not suitable for determining mark-ups for PSO. Instead, the segment's share of the mark-up limit is set to be equal to the share of train kilometres.

Consequently, we need an estimate of how price-sensitive demand for rail transport is within each market segment that will be subject to mark-ups, excluding PSO. Intrinsic price elasticity expresses how large a change in demand for rail transport can be expected when the price for such transport is changed by 1%. The infrastructure charge is only a proportion of the transport price. Based on elasticity with regard to transport price, we need to use the charge proportion of the price in order to convert this to elasticity with regard to the charge. An elasticity of 0.20 with regard to price, for example, and a charge constituting 5% of the price, will result in an elasticity with regard to the charge of 0.20x0.05=0.01.

In its review of mark-ups in European rail networks, IRG-Rail notes that a lack of access to data can often be a challenge. Quantification is necessarily fraught with uncertainty.

Oslo Economics' market segmentation report represents important data in this respect, but the assessments are largely qualitative and are therefore supplemented using other sources.

6.1. Methods

Some possible sources for identifying elasticities with regard to transport price are literature searches, economic analyses, interviews and transport model calculations.

An **econometric analysis** is a regression analysis that can be used to identify how changes to a variable explain changes to another variable. In this case, this would relate to how changes to infrastructure charges could explain changes to train services. Elasticities can be derived from this. The Italian infrastructure manager RFI recently calculated the elasticity for freight services (Ferrari et al., 2023) and passenger services (Beria, 2023). An econometric analysis was used for freight services. This was not possible for passenger services, partly because the charges had been stable for a period of time. There was no data with sufficient variation to explain any changes. We can also ascertain that the latter is the case in Norway, both with regard to passenger services and freight services. If the charges are converted using the same price level, they have remained unchanged for several years. Taking into account that some segments have had an implementation discount for a period, charges have, however, increased over time. While charges have stood still or increased, there has also been an increase in services. This means that in order to find any correlations between charges and services, we need to correct for a number of other factors that have an impact on the demand for rail transport. This necessitates a large dataset. We do not have anywhere near enough observations in our market segments to conduct such an analysis in a way that would yield meaningful results.

We have chosen not to use separate **transport model calculations** as the starting point for estimating elasticities, but we have conducted some tests relating to freight services (see section 6.2). The available Norwegian transport models, such as the regional transport models (RTM) and national freight model (NFM) are designed for analyses of transport flows at a general level and will be less accurate at a detailed level. The Trenklin passenger traffic model also cannot be used to differentiate between segments at a level that would be useful for our purposes.

Interviewing stakeholders in the relevant markets, either using written questionnaires or verbally, constitutes one source of knowledge relating to the market. Bane NOR enters into useful dialogue with train operators and their customers regarding the price models proposed in the Network Statement. Nevertheless, such dialogue is not used as a method for collecting data on elasticities either directly or indirectly through hypothetical choices (stated preference method). There is only one or very few stakeholders in many of the segments. We should build on data from objective sources. Especially for the freight segments, the situation is quite different to what it is in the questionnaires that can be conducted in markets, with hundreds or thousands of respondents without as strong a connection to the results.

There is one passenger segment among the segments for which we require data. Reports from questionnaires are already available.

If we were to use results found through **literature studies**, it would be important to assess the transferability in each case. As a basis for elasticities with regard to changes to transport costs, we have the review of the Norwegian markets as conducted by Oslo Economics. This provides us with knowledge of the magnitude of elasticity for the Norwegian markets. If a study arrives at a completely different elasticity for a foreign market, there is little probability that the latter would be more suitable for the Norwegian market.

It can also be the case that systematic factors associated with a study could affect all of the results of the study. However, there are also significant differences between segments with regard to what drives demand for rail transport, so it is not a given that elasticities for different segments from a study as a whole can or cannot be transferable. We can look at iron ore and combination/wagonload transport as examples. For iron ore, it is typically the case that rail services have been established to serve a specific service from a specific mine, that the competition relating to other means of transport is low and that the price of ore in the international markets acts as a driver for the volume transported. These factors remain largely independent of the country we are looking at. Combination and wagonload transport covers several different freight groups and is generally exposed to greater competition from road. Here, regional factors will often be of greater importance when it comes to the demand for rail services. We have not assessed the transferability of elasticities within segments for which no mark-ups are charged, as we do not have a need for more detailed quantification in these segments than what we can derive from the assessments in the Oslo Economics' report.

In the following sections, we will take a closer look at how the elasticities have been derived.

The decisive factor for the distribution of the limit is not the level of the elasticities, but the relative ratio of segment elasticities, i.e. $\varepsilon_i / \varepsilon_j$. The closer to 1 this ratio is, the more similar the proportion of the mark-up limit will be applied to segment *i* and *j*. The Ramsey principle, combined with knowledge of the markets, provides us with information about how the mark-ups for the different market segments should relate to one another.

6.2. Ore and minerals. Elasticity with respect to transport cost.

In this section, we will review the sources of elasticities linked to the segments "iron ore with low price elasticity", "iron ore with higher price elasticity" and "other ore and minerals". For a description of the market segmentation, see section 5.1.

Tests conducted using the National Freight Model (NFM) yield no results that can be used as the basis for estimating elasticities for ore and minerals. The model distributes fixed flows of goods between means of transport. When the cost ratios between means of transport change, the same flows of goods could result in a completely different distribution by means of transport pattern. Different levels of changes to the rail infrastructure charges were tested, but the model yielded no changes to the use of means of transport. If this was to be used as the basis, the conclusion would have been that elasticity is equal to zero for these transport services. We must also remember that the charge is a proportion of the transport costs and a percentage change to the charges would yield a smaller percentage change to the transport cost.

We have conducted literature searches and we have found a small number of studies that may be relevant for our purposes. Some of the studies will primarily be useful when it comes to knowledge of what we need to be aware of when using results. The transferability of results is limited for most of the studies we have identified.

Beuthe et al. (2014) include an extensive review of different studies on elasticities for freight transport by rail, road and sea. They discuss how the results depend on the selected methodology and model specifications and whether the analyses use aggregated or disaggregated data. The variation in results increases when you get down to a more disaggregated level, looking at specific goods types and regions and the available transport options in each case. This indicates that when we are looking for elasticities for the two iron ore segments, we need to look for studies that include values specific to iron ore. We need to compare the competitive conditions associated with the transport covered in the study with the conditions applicable in the region we are looking at.

The ideal scenario would be to find studies on intrinsic price elasticity for the demand for rail transport in the specific goods group we are looking at, from regions with a corresponding transport network and relevant competitive conditions and that are preferably relatively recent in terms of time. We cannot expect to be able to find such data and would be lucky if we could find one study that provides details for at least some of the criteria. Therefore, the best we can do is to identify studies with some degree of transferability and consider whether elasticities should be adjusted to take into account any conditions that differ in our case. Understanding the market through dialogue with train operators and customers contributes to the above.

In our case, elasticities will apply to changes to transport prices and not general costs. The latter may capture the effect of changes to other factors associated with transport, such as journey time.

The unit the price relates to and the unit that demand effects have been measured in also differ between studies. Significance (2018) will use elasticities as input in a model for mark-ups per train kilometre. The authors write that elasticities measured by train kilometres barely exist but that tonne kilometres provide a good approximation.

However, we are not including the results from Significance here as transferability is believed to be limited. The same is the case for KWC (2018). Demand for freight transport by rail is more elastic in these studies than we have found in the Norwegian markets (csee Oslo Economics, 2022). Beuthe et al. (2014) reproduce elasticities from a number of studies, of which some include Scandinavian data, and note that the studies show highly inelastic demand, which may have something to do with Scandinavian transport networks and organisation.

Table 2 shows some of the sources that were assessed.

As previously shown, Oslo Economics assessed the elasticity for iron ore to be close to, or just above, zero (absolute value). However, there are several reasons why we do not believe that elasticity is equal to zero. LKAB may choose to send more of its production via the Baltic Sea, albeit to a limited extent. In the event of a major increase in charges, Rana Gruber may consider road to be an alternative (even though this would take a lot). The Swedish study is likely close to Norwegian conditions. Given the comment in the email correspondence with the Swedish Transport Administration (see Table 2), the absolute value is less than 0.10. All in all, we can estimate that the value is just below 0.10. We have therefore chosen to use 0.09 in calculations for iron ore with low elasticity and a somewhat higher value (0.0901) for iron ore with higher elasticity[3]. It is not possible to use statistics on charge levels and transported volume in order to estimate the correlation between charges and demand, as factors other than charges are also highly crucial when it comes to transport volumes, especially the price of ore.

The Swedish Transport Administration and Beuthe et al. have the same inelastic demand for other ore and minerals as iron ore, i.e. 0.1 when it comes to the Swedish Transport Administration. Based on

[3] Combined with the charge share factor, see section 6.4, this will yield significant differences between the two iron ore segments.

Oslo Economics' analysis, this does not appear to be fully transferable to the Norwegian markets, where the competitive advantage of the railways for other ore and minerals can be weakened in the event of higher transport prices. Demand remains in the inelastic part of the scale and an interval with a midpoint in the range of 0.4 has been indicated. Considering that the financial conditions of the segment are resilient and the fact that the segment has withstood mark-ups under the current pricing model, we will use a value between the two findings of 0.1 and 0.4 and we have therefore used 0.25 in our calculations.

Please remember that the values mentioned here apply to the elasticity for transport costs. In order to determine the elasticity for charges, we need to take into account the charge proportion in relation to transport costs (section 6.4)

Table 2 Demand elasticity for the iron ore segment and the other ore and minerals segment

Source	Background for values	Values	Transferability
Swedish Transport Administration 2020	Elasticities calculated using the Samgods transport model	Ore trains: 0.1011 System trains: 0.1011	Applies to operational costs for transport links, which is precisely suited to our purpose. Here, ore has the same elasticity as all system trains. In email correspondence with the Swedish Transport Administration in May 2022, we were informed that iron ore likely has lower elasticity than system trains in general, as there are no alternative transport options.
Beuthe et al. 2014	Results from several previous studies[4] are shown before their own transport model is presented. The model appears to be based on a good knowledge platform. It covers road, sea and rail, as well as 11 goods groups. Geographical boundaries: Transport in and through the Rhine region, including international transport.	Iron ore and scrap iron: 0.51 Minerals, etc.: 0.41	Uncertain comparability of transport networks. The characteristics are not specified in the article. The literature review in the same article finds that Scandinavian studies have more inelastic demand than other studies. For other minerals: Grouped together with other products for the construction/civil engineering industry, which reduces transferability.
Cambridge Economic Policy Associates (CEPA), 2017	CEPA reproduces transport model results from 2006. The average distance for iron ore is 41 km and there is little competition from other modes of transport.	Iron ore: 0.00	The assumptions are similar to Norwegian conditions in the iron ore segment. However, the transport model may be associated with the same

[4] We will not reproduce the referenced studies here, as they appear to have little transfer value. The studies often date far back in time to when transport models were not as well developed as today, they often relate to regions with greater density of transport options, elasticities are not always linked to price changes and results have not been reproduced for each goods group.

			challenges as the Norwegian freight transport model.
National Freight Model (NGM)	Testing performed by Bane NOR	Iron ore and other ore/minerals: 0.00	The model is unable to yield a response to changes to infrastructure charges.

6.3. Feeder transport to main airport. Elasticity with respect to transport cost.

We are interested in how demand for train journeys to/from airports will change as a result of changes to ticket prices. Studies on elasticities for public transport do not, however, distinguish these types of journey from other train journeys. What we can look for is elasticities for different journey purposes (commuting, leisure and business journeys), journey lengths and journey times. As mentioned by Urbanet Analyse (2018) and Fu and Liu (2020), airport express passengers place greater emphasis on factors other than price. They are looking for a fast, reliable and comfortable service. The price for journeys to and from the airport also constitutes a smaller proportion of the cost associated with the total journey. We can therefore expect price sensitivity to be lower than it otherwise would be for comparable train journeys.

Results from the literature are inconclusive with regard to the relative differences in elasticity between different journey purposes. Nevertheless, many studies indicate that leisure journeys within the journey lengths we are interested in here have low price sensitivity (Oslo Economics 2016, Significance 2018, KWC 2018). Commuting is more price-sensitive, but remains in the inelastic part of the scale. How business journeys are positioned varies in relation to commuting, but somewhat lower price sensitivity has often been found for business journeys than commuting.

The composition of journey purposes for train journeys to/from the airport will typically involve fewer commuting journeys than the average for train journeys within the same geographical region. Urbanet Analyse (2018) conducted a questionnaire among passengers travelling by train to Oslo Airport, showing that approximately 5% of journeys were commuting. This indicates less price-sensitive demand than average.

Elasticities can be calculated based on changes in the number of journeys or changes in the number of passenger kilometres. Higher elasticities can be expected when measured based on passenger kilometres than when measuring based on the number of journeys (Oslo Economics 2016, Significance 2018).

The time period may also be of importance to elasticity (Oslo Economics 2016, Significance 2018, KWC 2018). In the long term, price sensitivity is generally greater since passengers may make several changes, while many may also choose different modes of transport in the short term when it comes to passenger services. The difference in elasticity in the short and long term varies in different studies from almost insignificant to doubling.

Oslo Economics (2016) has compiled demand elasticities for train journeys from literature and conducted its own calculations. Geographical boundaries constitute the region covered by Ruter's rate system, i.e. Oslo Airport falls within the region. Elasticities with regard to price were estimated to fall within a range of 0.20 to 0.54, where 0.54 applies to all train journeys within the Oslo region and 0.20 applies to train journeys within the Oslo region with a duration exceeding 15 minutes. Other literature findings indicate that longer train journeys are more price-sensitive than short journeys, but not necessarily very short journeys. One explanation here could be that journeys of less than 15 minutes in Oslo face more competition from alternative modes of transport, such as walking and cycling. The size range for elasticities in general is in line with previous literature findings.

Elasticities from different sources are shown in Table3. None have elasticities specific to feeder transport trains to airports.

Table3 Demand elasticity for train journeys (absolute values)

Source	Background for value	Value	Transferability
Oslo Economics, 2016	Regression model for estimating the correlation between price and the number of train journeys between station pairs. Applies to train journeys in general, not specifically journeys to/from the airport.	0.543 for all journeys; 0.204 for journeys of 15 minutes or more. Measured by the number of journeys.	The results from Oslo Economics apply to all journeys. To/from the airport, a smaller proportion of journeys will entail commuting, which indicates a lower price sensitivity than these values, which apply as averages for all journeys within the Oslo region. For journeys to/from the airport, a large majority of journeys will likely be longer than 15 minutes, i.e. in the lower part of the range.
Vibe et al., 2005	Demand model for public transport. Applies to urban areas in Norway. Effect on the number of journeys per capita as a result of rate changes.	0.33 Measured by the number of journeys	Applies to all public transport in urban areas, i.e. not specifically trains or journeys to/from the airport.
National transport model, NTM6	Value for train journeys exceeding 70 km, referenced in Oslo Economics (2022)	0.51	Little relevance to train journeys that constitute feeder transport to the main airport
Significance (2018)	Based on transport model for the Netherlands	Average of all passenger services in a working day measured by journeys is 0.33. Measured by passenger kilometres 0.46; Elasticities for journey purposes (working day): Education 0.10 Work 0.57 Business 0.46 Shopping 0.77 Other 0.88	Elasticity measured by passenger kilometres gives a higher value than elasticity measured by the number of journeys. To/from the airport is not stated. The average values are very similar to Norwegian findings. However, the differences in journey purposes do not appear to be transferable. Leisure journeys in particular appear to be much higher here than in Norwegian and other international studies.
KWC (2018)	Willingness to pay survey for train journeys	Average, long-distance trains 0.41	Elasticity for short journeys (up to 50 km) has not been weighted against comparable figures. The underlying data indicates that elasticity for short journeys is somewhat higher.

In the absence of sources with estimates specifically for feeder transport to airports, we need to combine information about elasticities relating to train journeys in the geographical region we are interested in, relevant journey lengths, journey purposes and knowledge of passenger preferences.

It seems reasonable to assume that journeys to the main airport have an elasticity between 0.204 and 0.33, measured by the number of journeys. This is based on the lower part of the range from Oslo Economics that we expect this figure to fall below average for all train journeys. Furthermore, we will correct for the fact that this has been measured by the number of journeys, when elasticity measured by passenger kilometres is a more representative measure in this context. From the Dutch study (Significance, 2018), we can see that elasticity is 0.13 higher when measured by passenger kilometres using the same dataset. The value is pulled up by the ratio between elasticity on long versus short journeys and the proportion of long journeys. Transferred to the market we are looking at, we therefore expect the difference between measuring elasticity by the number of journeys and the number of passenger kilometres to be somewhat smaller. Against this background, elasticity can be estimated at 0.35-0.40, measured by passenger kilometres.

Another factor that should be considered is whether the pandemic in 2020 and 2021 has resulted in lasting changes in journey habits for the feeder transport to the main airport segment. Leisure journeys appear to have picked up again. The other major group in this segment is business journeys. Here, it seems more likely to assume that the scope also will be reduced in the long term. The composition of journey purposes could therefore have changed. This could pull elasticity down somewhat, although it is unlikely to have a major impact.

We have chosen to use 0.38 in our calculations, based on the intervals and reasoning described here.

6.4. Elasticities with regard to infrastructure charges.

Values for elasticity ε_i with regard to infrastructure charges depend on the elasticity ε_{SK} with regard to transport price and the charge proportion *A* of the operator's revenues from the train service.

The level of elasticity with regard to transport price has been presented in sections 6.2 and 6.3. Bane NOR has conducted an analysis of the proportion of charges in markets that will be subject to mark-ups (excluding PSO). Using the segmentation applicable from NS2025, a detailed report on the proportion of charges needs to include information about the undertakings' financial situation and this information is not publicly available. We will therefore describe the procedure and present the results at an overarching level.

We have used data that provides information about:

Proportion of charge = Charge per train kilometre for the segment/The train operator's revenue per train kilometre for the segment

Historical infrastructure charge data per train operator and segment is available from Bane NOR's statistics (Drage/KYT). The same applies to train kilometres. We are therefore able to ascertain the charge per train kilometre for the segment.

Publicly available accounts figures (from annual reports or proff.no) include all transport conducted by the undertaking and, in most cases, it is not possible to distinguish what applies to the segment we are looking at. However, if revenues from the undertaking's total transport in the Norwegian rail network are known, we can determine average revenues per train kilometre. Using this data, we can establish an indication of the charge proportion. If there is reason to assume or if we have information that the revenue per train kilometre for the segment deviates from the average for the train operator, we will make adjustments.

The assumptions used in the calculations are shown in Table 4.

Table 4 Elasticity with respect to infrastructure charges, i.e. Elasticity with regard to transport cost * Proportion of charge

Iron ore, low elasticity	Iron ore, higher elasticity	Other ore and minerals	Feeder transport to main airport
0.0099	0.0104	0.0188	0.0198

The lower the value of a segment in relation to the values in other segments, the higher the mark-up. As previously mentioned, it is not the *level* of the elasticity that is decisive for the distribution of mark-ups, but the mutual relationship between segments.

7. Other data

7.1. Traffic data

When working on the basic charge, Bane NOR worked with a time period running from 2017 to 2021. Mark-ups are not possible since data from 2018 and before does not include the necessary market segmentation for traffic. Due to the impact of the pandemic on services (primarily passenger services) in 2020 and 2021, 2019-2021 will also not provide good data, as the pandemic years constitute such a large proportion of this period. We have therefore chosen to use traffic data for 2019, 2021 and 2022. By excluding 2020, we can largely avoid distortions due to the effects of the pandemic. Furthermore, the data will be expanded to include 2022 to ensure a longer time range.

The average number of train kilometres per year for each segment does not always provide a good prognosis for future years. For example, new freight transport services launched in 2019 or 2021 would not be fully operational before the following year. At a more detailed level, e.g. by train operator, there have also been some changes in recent years with regard to passenger service operators and the new service agreements have a duration spanning multiple years into the future. Due to the considerations above, we have not used the average number of train kilometres for 2019, 2021 and 2022 indiscriminately, but we have, at a more detailed level, assessed whether all three years, the last two years or 2022 only would be most representative with regard to future train services. The results have subsequently been summarised at segment level, as shown in Table 5.

Table 5 Train kilometres (1,000)

Segment	2019	2021	2022	Used
Combination/wagonload trains	6,221	6,809	7,124	6,826
Timber and pulp timber	661	886	1,038	937
Iron ore, low elasticity	192	217	206	205
Iron ore, higher elasticity	127	142	182	180
Other ore and minerals	15	16	17	16
Other system transport	64	244	228	233
PSO with changes to consideration	32,322	33,362	35,830	34,709
Feeder transport, main airport	5,015	4,199	4,643	4,619
Adventure routes with exclusive rights	100	67	82	83
Other passenger trains with obligations	20	20	157	157
Other passenger services	2,376	161	275	278
Total	**47,114**	**46,123**	**49,798**	**48,242**

7.2. Basic charge

The methodology for and calculation of the basic charge are documented in a separate report enclosed with Network Statement 2025 (Bane NOR, 2023). The rates are shown in the table below.

Table6 Basic charges. NOK per train kilometre

Axle load, tonnes per axle	Track section	Basic charge, NOK/train km
Less than 25 tonnes	Oslo region	5.50
	Ofoten Line	9.36
	Other lines	9.36
More than 25 tonnes	All	149.69

8. Calculation and results

The assumption is that train traffic must be measured in train kilometres, just like the basic charge. Based on this traffic data and the basic charge from Chapter 7, we have calculated a revenue from the basic charge of approximately NOK 410 million before deducting any discounts.

The calculation process is as follows: We start with a test value for the limit before discounts and deduct the basic charge to find the mark-up limit. From this, we calculate the PSO share as the segment share of train kilometres. PSO has a share of train kilometres of 0.7195, based on the traffic from Table 5. The rest of the mark-up limit is distributed between other segments for which mark-ups are relevant using the following equation system (for an explanation of symbols, please see Chapter 4):

(4) $Påslag_i = MC_i * \frac{1}{1-\frac{k}{\varepsilon_i}} - MC_i$

(5) $\sum_i Påslag_i = Ramme$

The mark-up rate for each segment can be found by dividing the mark-up by the number of train kilometres. The rates are then applied to 2022 traffic and the result is derived after deducting discounts. If the result is equal to the target, the rates are left as they are. If not, the test value we started with will be adjusted. This becomes an iterative process until we identify the rates that meet the target given the assumptions[5].

Table7 presents the results.

Table7 Results (2024 price level)

	Iron ore with low elasticity	Iron ore with higher elasticity	Other ore and minerals	Feeder transport, main airport	PSO
Mark-up, NOK per train kilometre	**518.44**	**131.63**	**7.90**	**4.22**	**11.06**

In order to see the effect of the model and not the effect of inflation and traffic growth, comparisons have been conducted using the same price level (2024 kroner) and traffic (2022) in Table 8. This means that the charges measured in 2024 kroner have been multiplied by traffic from 2022. Discounts are deducted in Table 8.

Table 8 Comparison of price models in segments subject to mark-ups. Total of basic charge and mark-up. NOK millions

	PSO	Other segments with mark-ups
Model in NS2023	559	173
Model in NS2024 after a reduction in mark-ups of 50 per cent[6]	506	107
Model in NS2025	692	189

[5] The calculation could have been performed without an iterative process, but this approach makes it easier to keep control of discounts.

[6] Bane NOR published the 2024 mark-ups in December 2022. Following dialogue with the Norwegian Ministry of Transport, the decision was made on 1 November 2023 that mark-ups for 2024 would be reduced by 50 per cent.

9. Price change mechanisms

Bane NOR generally intends for the charges to be adjusted periodically. In the event of significantly improved base data or other larger changes, the charges could, however, be changed on such a basis.

Period, etc.	**Description**
5-year adjustments	Bane NOR will update the cost calculations approximately every 5 years, based on equivalent or improved methods and more up-to-date data may be used in the basis for the estimation.
Annual adjustment	Between the 5-year adjustments, charges will be changed annually in accordance with an appropriate index from Statistics Norway. The cost index for the operation and maintenance of road systems will be used. The price adjustment itself will be undertaken according to the following principle (1): $$P_{t+1} = P_t \cdot \left(\frac{KI_t^{Q2}}{KI_{t-1}^{Q2}} \right) \quad (1)$$ where: P_{t+1} = charge next year P_t = charge this year KI^{Q2} = Statistics Norway's index as at second quarter for the present year (t) and previous year (t-1) This means a price adjustment in arrears, but provides a great deal of predictability for the railway undertakings as the following year's charges will be completed in the third quarter of the previous year. At the same time, it will be possible to monitor the index throughout the year.
New, rebuilt or decommissioned objects	New constructions involving the completion of new objects, major rebuilds or decommissioning of old objects over a 4-year period will be included in the cost basis when the construction or object is commissioned/decommissioned.

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