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Summary

Geographic redistribution and major government investments

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In this report, we discuss the importance of geographical distributional effects in the decision basis for large government investments. This can also be linked to the objectives of regional policy. We show how accessibility, for example to workplaces and services, can be used to quantify both existing geographical inequality and the distributional effects of interventions with scientific rigor. Furthermore, we look at the importance of geographical equity considerations in nine previous ex-ante evaluations of major public projects. We find that such considerations rarely play an explicit role in the reports, but that they could have played an important role if they had been dealt with more systematically.

Many major government investment projects are characterised by the fact that benefits are concentrated in a limited geographical area. The objective to prioritise such an area may be part of the reason why the state chooses to finance the project, in some cases also where the project in isolation is economically unprofitable. The attention given to geography in public debate also suggest that such concerns are regarded as important. It therefore seems natural to highlight geographical distributional effects as a consideration in itself when studying such projects. But how?

In this report, we examine the significance of geographical distributional effects for large government investments and discuss how such effects can be described and contribute to the decision-making basis for such investments. It should be emphasised that this does not mean including all possible considerations that are taken into account by decision-makers and that may be linked to geographical interests, such as considerations for specific voter groups or political allies. The purpose is to help ensure that decision-makers who are concerned with geographical distribution have a scientific basis for assessing such effects.

Here we do not make any judgement on what constitutes a desired geographical distribution of society's resources. We nevertheless believe it is relevant to highlight not only which areas lose and profit from the measure, but also to what extent a measure or a portfolio of measures contributes to increasing or decreasing geographical inequality, i.e., the degree of redistribution. This will provide a better basis for weighing considerations with respect to geographical distribution in decisions, while at the same time providing a clear scientific basis. A possible approach to fair distribution from political philosophy is sufficientarianism, which involves maximizing the number of people who have sufficient access to the goods in question.

Geographical distribution may be relevant for large government investments, both in terms of (1) choosing between different concepts or alternatives for a given project and (2) prioritisation between different projects in a portfolio. In the first case, the impacts may be at a fairly local or more regional level, depending on how the concepts are designed. In the second case, the regional perspective will become more important, since it is a matter of prioritisation between projects in different parts of the country.

In this report, we attempt to answer the following questions:

1. How can we measure geographical inequality and rural disadvantages with scientific rigor in a way that is relevant to large government investments, across sectors?
2. To what extent does this measure correspond to the effects typically included in a cost-benefit analysis?
3. What role do changes in secondary markets and land use play with regards to the geographical distributional effects of various measures?
4. How large is the geographical inequality between local communities or regions, and how can this change as a result of major government investments?
5. What role have distributional effects in general, and geographical distribution in particular, played in the key project assessment reports (KVU and KS1)?
6. What role can geographical distributional effects play in the assessments if they are treated more systematically?

To answer these questions, we will combine economic theory that we adapt for this purpose (questions 1-3), quantitative analyses of geographical inequality (question 4) and qualitative analyses of selected cases (questions 5 and 6).

In order to show the degree of geographical redistribution, we must have knowledge of the existing geographical inequality. There are many possible dimensions that could be looked at, but in this report we focus on inequalities in *accessibility.* We show how accessibility is a relevant concept and measure of both rural disadvantages and geographical distributional effects of measures that fall under the Norwegian scheme for quality assurance of major public investments. Through accessibility, we can measure access to jobs and services and the challenges posed by low population densities and large distances. Accessibility can be seen as a set of characteristics of a particular geographical area, where the level of accessibility is the access to possible destinations that can be reached from that point.

Accessibility is relevant across sectors. Accessibility is affected both by measures in the transport system, by shortening the distance to opportunities at other locations, and by the relocation or establishment of public sector jobs and services. Unlike, for example, user benefits from a project, available access can be used to measure both existing inequality and distributional effects of interventions.

Under certain assumptions, changes in accessibility capture the same as user benefits in traditional cost-benefit analysis. In cost-benefit analysis, the calculation method Rule-of-half is often used to measure the benefits of improved accessibility. In discrete choice analysis, the "logsum" serves as an indicator for consumer surplus. Logsum is a theoretically consistent measure of accessibility that can capture changes in land use and attractiveness and is compatible with cost-benefit analysis. Other accessibility metrics capture potential benefits to a greater extent, regardless of use, but coincide less with user benefit. An advantage of measuring accessibility compared to more technical measurements such as Rule-of-half and

Logsum is that the former can appear more intuitive to decision-makers and the general public.

In addition to the user benefits included in the cost-benefit analysis, which can be broken down into smaller geographical units, two additional classes of benefits may be relevant for analysing distributional effects. The first are the types of direct user benefits that are not captured in the current cost-benefit analysis framework due to methodological inadequacy, such as effects due to changes in an area's attractiveness and/or land use. The second group comprises the long-term equilibrium effects resulting from deviations from perfect competetion in economic markets, which give rise to what are often referred to as wider economic impacts. Changes in land use (localisation effects) may be particularly important if the goal is decentralised activity and growth in rural municipalities.

When measuring accessibility, one must make a number of practical choices related to, for example, the weighting of different destinations. Based on travel time by car, we show how accessibility to workplaces varies geographically. Accessibility is greatest in central areas, but there are also significant differences within municipalities. Statistics Norway's centrality index is based on accessibility to both jobs and services, but the index itself cannot be interpreted directly as a measure of accessibility or inequality in this. However, it can be used to say something about whether a measure affects an area with high or low centrality. The centrality index also varies considerably within municipalities.

Existing geographic inequality in terms of accessibility and change in inequality when establishing or relocating jobs/services through an intervention can be calculated by, for example, a Gini index. Three prerequisites must be in place here. Firstly, a relevant area of analysis must be selected. Secondly, one must choose the geographical resolution, in practice as high a resolution as possible. Thirdly, one must choose what to measure. This could for example be accessibility to services for (parts of) the population, availability of workers for businesses or accessibility to jobs (or certain types of jobs) for those in the labor force. We show that the results are highly dependent on the choice of geographical level and measure.

A possible disadvantage of the Gini index is that if inequality is initially large, an increase in accessibility in areas with low accessibility will initially have little impact on the Gini index, as it measures inequality along the entire distribution. An alternative to a Gini index could be to only look at the change in accessibility in the areas with the poorest accessibility in the first place or define a minimum requirement for accessibility and look at which areas are below this, i.e., the degree of sufficiency.

In the qualitative analyses we have looked at the following projects: *E18 Langang–Grimstad, the National Museum, the National Archives central depot and the Norwegian Health Archives at Tynset, Transport solution road/rail Trondheim–Steinkjer, Norwegian Ocean Technology Centre, E6 Høybuktmoen–Kirkenes, Future courthouse in Bergen, Transport solution Oslo–Jaren–Gjøvik–Moelv* and *KVU road use tax and road tolls*. Three of these are transport projects along a transport corridor, one (Høybuktmoen–Kirkenes) is a local road and port project, three are construction projects in other sectors, and one is a national project (road use tax and tolls).

In these analyses, we have assessed the role that geographical distribution plays and potentially could have played for these nine projects, in the form of eight questions:

a) Can the objectives and rationale for the project in the decision basis be linked to geographical distributional effects?

b) Is the geographical location of the investment part of the choice of concept?

c) Do the proposed concepts consist of packages of complementary measures, including measures other than major investments?

d) Do the Concept Study (KVU) and Quality Assurance (KS1) reports include any discussion and analysis of distributional effects?

e) Are geographical distributional effects relevant to this project, and if so, at what level?

f) Can the effects be analysed and quantified, and if so, how?

g) Will any of the proposed concepts help reduce the geographic inequality in accessibility at the portfolio level[2]?

h) Can such a geographical cohesion be achieved more effectively with other measures that supplement or replace investment?

In general, we see low scores on the questions concerning whether distribution in general, and geographical distribution in particular, have a clear and visible role in the assessments (questions a, b and d), with some exceptions. There are somewhat higher scores for the questions about the role that geographical distributional effects could *potentially* have played (questions e, f and g). This indicates that there is a potential for including such considerations in the reports in a more systematic manner.

There is otherwise a low score on the question of whether the concepts include measures other than major investments (question c), but a higher score on the question of whether supplementary/other measures will contribute more effectively to geographic cohesion (question h). If geographical distribution is to be given a more important role in the studies, it may therefore be necessary to include other types of measures in the studies, such as investments in local infrastructure, strengthening of public services and financial support. If the goal is geographical redistribution, a combination of other measures that supplement or replace the investment in question will in many cases probably be more effective.

Two projects that stand out slightly are *Transport solution Oslo–Jaren–Gjøvik–Moelv* and the *National Archives central depot and the Norwegian Health Archives at Tynset*. Concepts with quite different geographical profiles have been included here, and geographical distributional effects are thus potentially more relevant.

In a concrete example based on the case with the National Archives' central depot, we show how the location of this measure affects inequality between regions. Here we only look at accessibility to workplaces within archives, and only at Tynset and the other areas where the National Archives operates. We then find that the location at Tynset has a certain redistributional effect measured by the change in the Gini coefficient. Since accessibility to such workplaces is so much better in the Oslo area and other non-central areas do not benefit from the measure, the impact on inequality is nevertheless quite small. This can be seen as an illustration of how much is needed to counteract the centralisation tendencies. It can also be used as an argument for using measures other than the Gini coefficient that to a greater extent capture the change in the areas with low accessibility, at least when one only looks at the impact of a single project. If one looks at the effects of implementing a portfolio of large government investments, the Gini coefficient may be a more relevant measure.

In the light of our results, some new questions arise. First, should geographical redistribution be given a clearer place in the rationale for major government investments? In our view, this depends on the project, but for some types of projects it may be appropriate. If, for example,

[2] By portfolio level, we mean whether *the project contributes to improving accessibility in one or more areas characterised by low accessibility in the first place*, so that prioritizing this project will result in a stronger redistribution profile for the portfolio of large government investments.

there is a project that one has reason to believe in advance will be not economically profitable, but where the justification can be linked to geographical redistribution, it will be better to be honest about this in the stated goals of the project than to refer to other ad-hoc justifications. This will also make it easier to consider other alternative measures to achieve the same goal.

Secondly, should concepts with different locations or otherwise different geographical profiles be investigated to a greater extent? This could potentially make it even harder to decide which concepts to include in the Concept Studies. Here it is difficult to give a clear answer. Probably, this will depend on how different the concepts otherwise are with regard to expected costs, socio-economic profitability and goal attainment. If a potential concept stands out in terms of desired geographical distributional effects in addition to other effects, this will provide further arguments in favour including it.

We recommend further research on this topic, especially with regard to empirical effects of major government investments and other measures on local and regional development in less central areas. Here, for example, one could look at the effect of measures such as free/cheaper ferries and cheaper regional flights. It would also be useful to have better documentation of how public investment projects have been distributed geographically, and how both costs and benefits have been distributed, and/or how inequality in travel times and accessibility have changed over time.