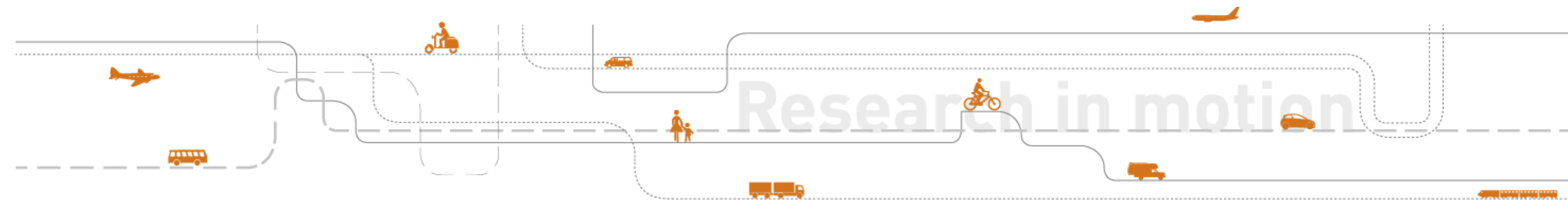# Evaluating regional equity in economic appraisal

Askill H. Halse – ash@toi.no

The 9th Concept Symposium on Project Governance

September 23, 2022

Research in motion

Background

- Economic and geographic inequality might challenge political stability

- Trade-off between equity and economic return on public investment?

- No concensus on the role of regional interests in policy-making, also not on how to define such interests
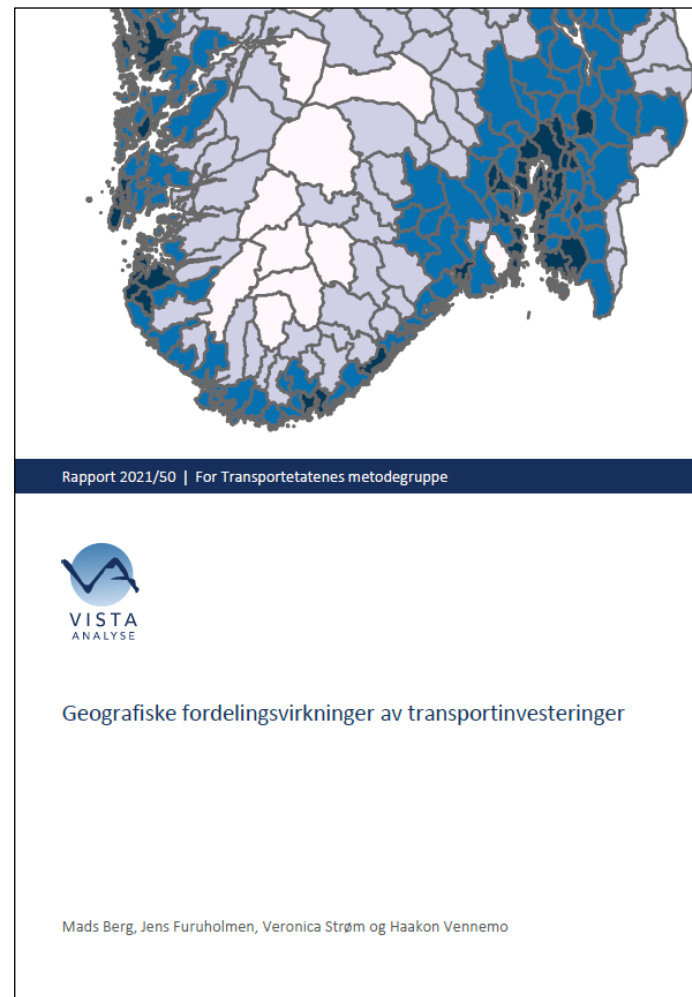
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Study on regional equity in economic appraisal

TØI rapport 1739/2019

Askill Harkjerr Halse

tøi Transportøkonomisk institutt
Stiftelsen Norsk senter for samferdselsforskning

Samfunnsøkonomisk lønnsomhet og hensynet til geografisk fordeling

Review of existing knowledge and practice:

- Guidelines in Norway and selected countries

- Application in assessment studies

- Academic literature on transport and inequality

- Current practice in cost-benefit analysis

- Recommendations for further work

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Norwegian Centre for Transport Research

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Samfunnsøkonomisk lønnsomhet og hensynet til geografisk fordeling

Rapport 2021/50 | For Transportetatenes metodegruppe

VISTA ANALYSE

Geografiske fordelingsvirkninger av transportinvesteringer

Mads Berg, Jens Furuholmen, Veronica Strøm og Haakon Vennemo

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Efficiency vs. equity: Theoretical perspective

▪ Cost-benefit analysis (CBA): Net change in consumer/producer surplus (WTP)

▪ Discriminates against those with low income (Medin et al. 2001, Nyborg 2012)

  ▪ *Partly mitigated by the use of national unit prices (e.g. values of travel time)*

▪ First-best: Maximize net benefits, compensate the losers

▪ Limits to redistribution: Trade-off efficiency vs. equity

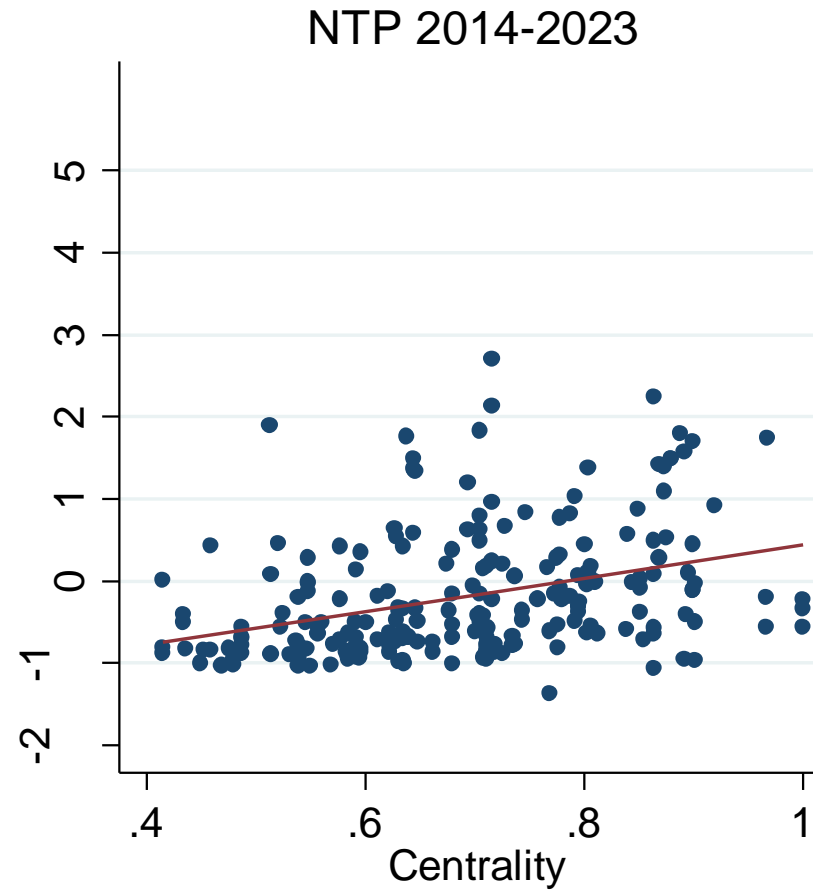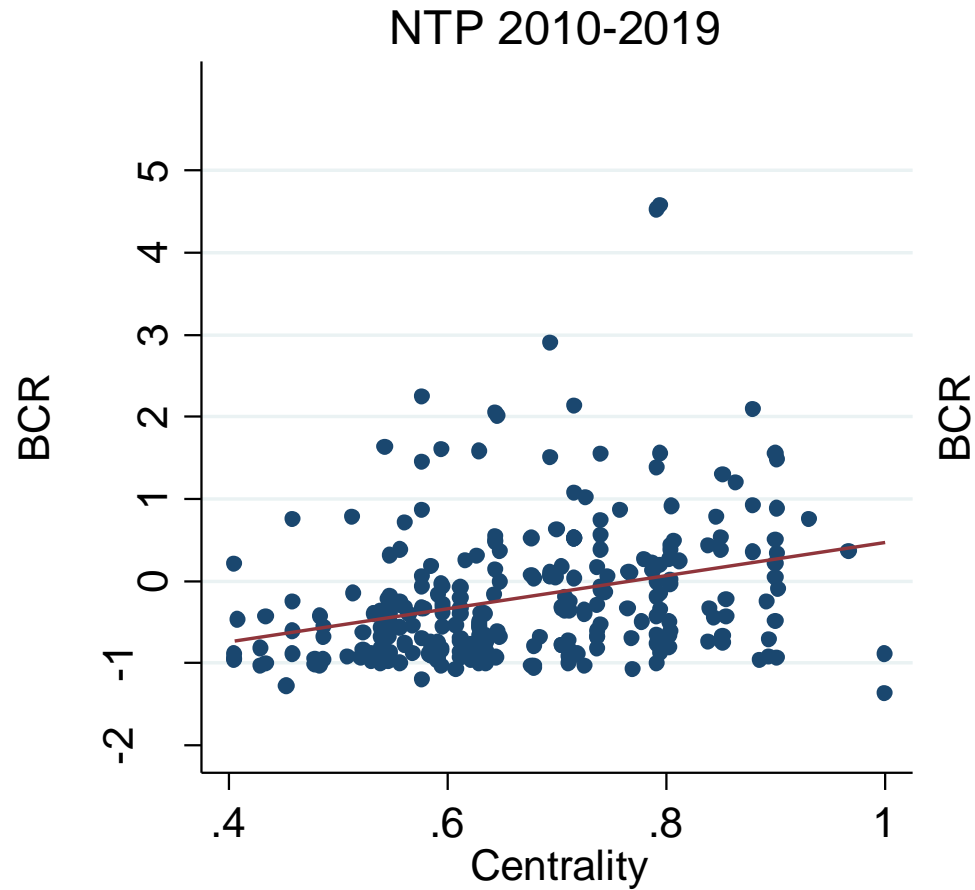Can be incorporated in CBA through distributional weights

  ▪ *Not recommended by experts (NOU 2012:16)*

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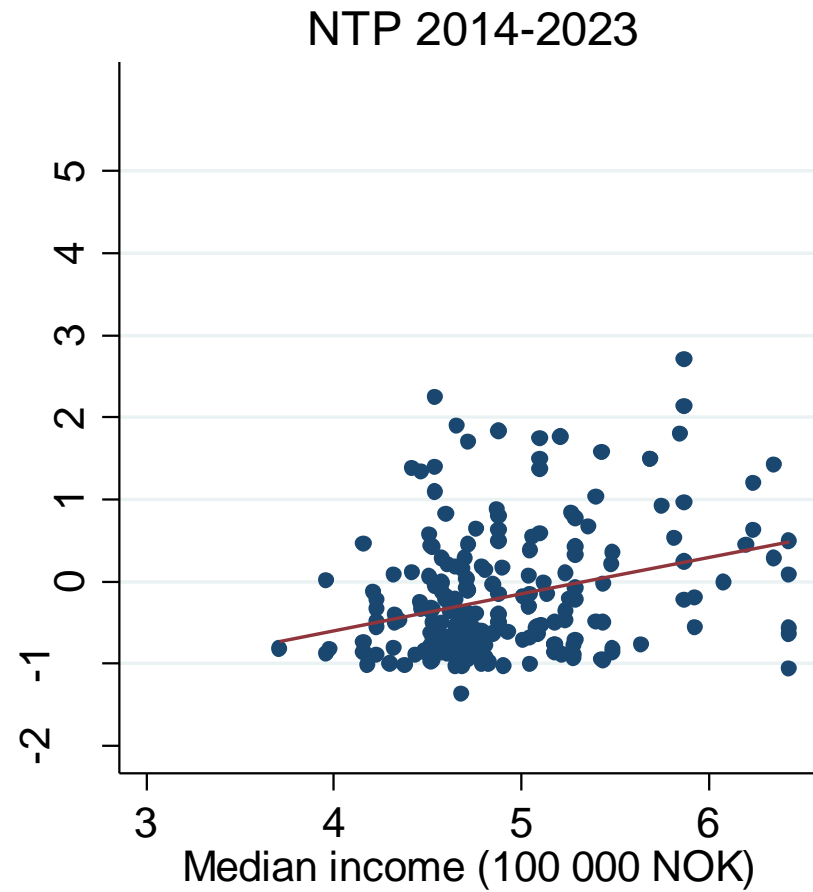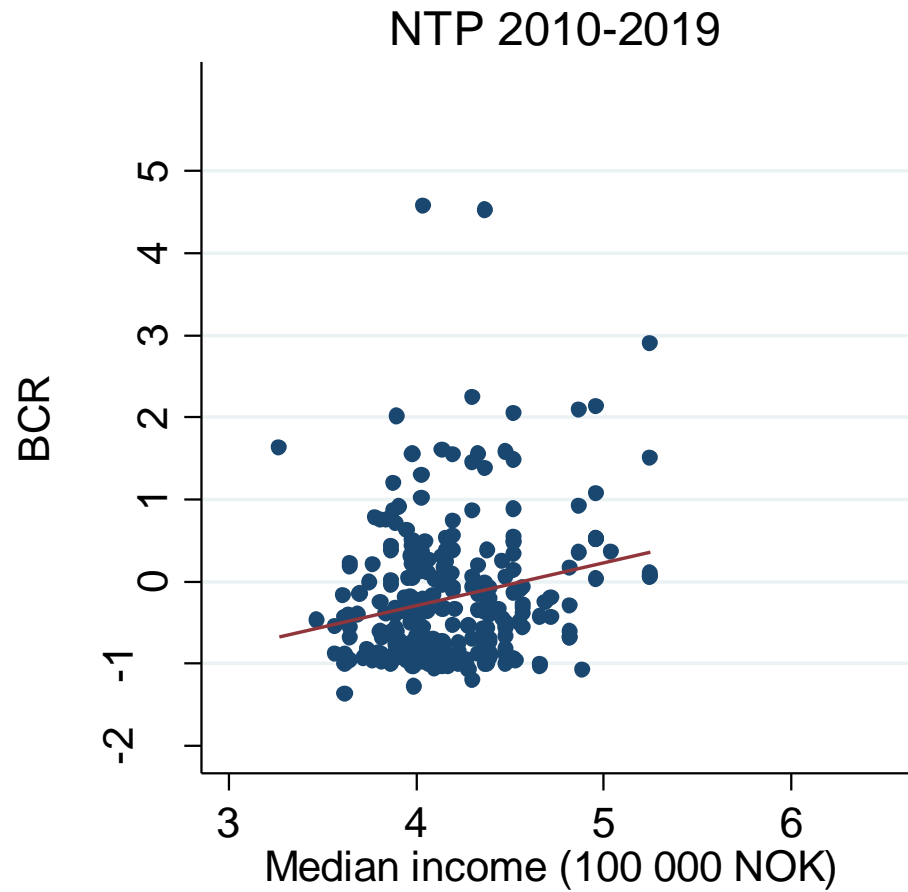Norwegian Centre for Transport Research

Efficiency vs. equity: Practical perspective

- Many public investments in Norway have negative estimated net benefits

- Net benefits do not seem to explain project choice (Eliasson et al. 2015)

- Not clear whether this is due to other systematic priorities

  - *… or an ad-hoc justification project-by-project? (Mackie et al. 2014)*

- Without systematic evaluation of distributional effects, we might end up choosing projects that provide <u>neither high return nor redistribution</u>

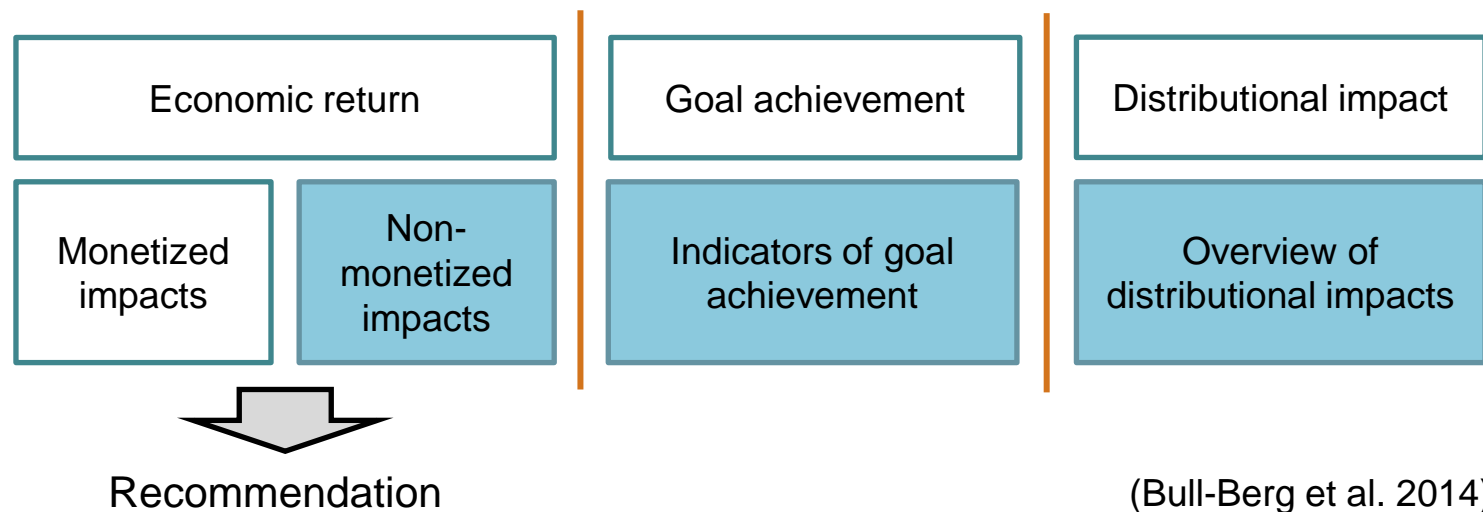# Road projects (Halse & Fridstrøm 2018)

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Road projects (Halse & Fridstrøm 2018)

NTP 2010-2019

NTP 2014-2023

Equity in the Norwegian project model

- Should be shown, but not given weight in the recommendation (DFØ 2018)

- Lack of guidelines and established practice (Bull-Berg et al. 2014)
  - *Mixed up with non-monetized impacts and goal achievement*
  - *"Regional impacts": Both net economic impacts and distributional impacts*

Economic return	Goal achievement	Distributional impact
Monetized impacts / Non-monetized impacts	Indicators of goal achievement	Overview of distributional impacts

Recommendation

(Bull-Berg et al. 2014)

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Assessment of a project or a portfolio?

- One single project cannot ensure a fair/desirable distribution of resources
  - *Equity should be evaluated wrt. **redistribution** to selected groups*
  - *Common metric across projects → can be used in project ranking*

- Should not impose absolute requirements for equity on the project level
  - *Could be bad for equity, but very good along other dimensions*

- Can evaluate distributional effects of a project portfolio (e.g. transport plan)
  - *Maximize benefits with distributional requirements as a constraint (Minken 2015)*
  - *Can evaluate both redistributional impact and whether the portfolio itself is «just»*

Distributional impacts in Norwegian guidelines

DFØ (2018):

- Geographic regions
- Public entities
- Private industry
- Consumers
- Socio-economic groups, e.g. income
- Family status, age, families with children, disabilities, diseases
- Occupations
- Generations
- Gender

Regional policy also mentioned

Statens vegvesen (2018):

- Transport user groups
- «Sectors» (transport users, transport operators, the public sector, rest of society)
- Age groups
- Trip purposes
- Passenger and freight transport
- Grups with different mobility
- Current and future generations
- Neighborhoods/areas

- Separate section on regional impacts (including wider economic benefits)

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Guidelines in other countries

- Distributional impacts hardly covered in international reviews of appraisal practice (Bristow & Nellthorp 2000, Odgaard 2006, Mackie & Worsley 2013, Holmen & Hansen 2019)

- Some older studies conclude that guidelines are lacking (Grant-Muller et al. 2001, López et al. 2001, Geurs et al. 2009)

- This study: Transport appraisal in Sweden and the UK

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Sweden (Trafikverket 2019)

Equity dimension	Benefits most	Benefits 2nd	Loses most	Motivation
Gender: Access to passenger transport				
Local/regional/national/international				
Region (län)				
Municipality				
Industry				
Transport user group				
Age group				
Policy-specific classification, e.g. income				

Also propose an «extended distributional analysis» of impacts of the national transport plan on inequality in accessibility to services and destinations

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UK (Department for Transport 2014)

Table 2 Scope of Socio-Demographic Analyses for DIs (Step 2b)								
Dataset / social group (Ticks indicate analysis required for each impact)	User Benefits	Noise	Air quality	Accidents	Security	Severance	Accessibility	Affordability
Income Distribution (see below)	✓	✓	✓				✓	✓
Children: proportion of population aged <16		✓	✓	✓	✓	✓	✓	
Young adults: proportion of population aged 16-25				✓			✓	
Older people: proportion of population aged 70+				✓	✓	✓	✓	
Proportion of population with a disability					✓	✓	✓	
Proportion of population of Black and Minority Ethnic (BME) origin					✓		✓	
Proportion of households without access to a car						✓	✓	
Carers: proportion of households with dependent children							✓	

UK (Department for Transport 2014)

Table 5 General system for grading of DIs for each of the identified social groups

Impact	Assessment
Beneficial and the population impacted is significantly greater than the proportion of the group in the total population	Large Beneficial ✓✓✓
Beneficial and the population impacted is broadly in line with the proportion of the group in the total population	Moderate Beneficial ✓✓
Beneficial and the population impacted is smaller than the proportion of the group in the total population	Slight Beneficial ✓
There are no significant benefits or disbenefits experienced by the group for the specified impact	Neutral
Adverse and the population impacted is smaller than the proportion of the population of the group in the total population	Slight Adverse ✗
Adverse and the population impacted is broadly in line with the proportion of the population of the group in the total population	Moderate Adverse ✗✗
Adverse and the population impacted is significantly greater than the proportion of the group in the total population	Large Adverse ✗✗✗

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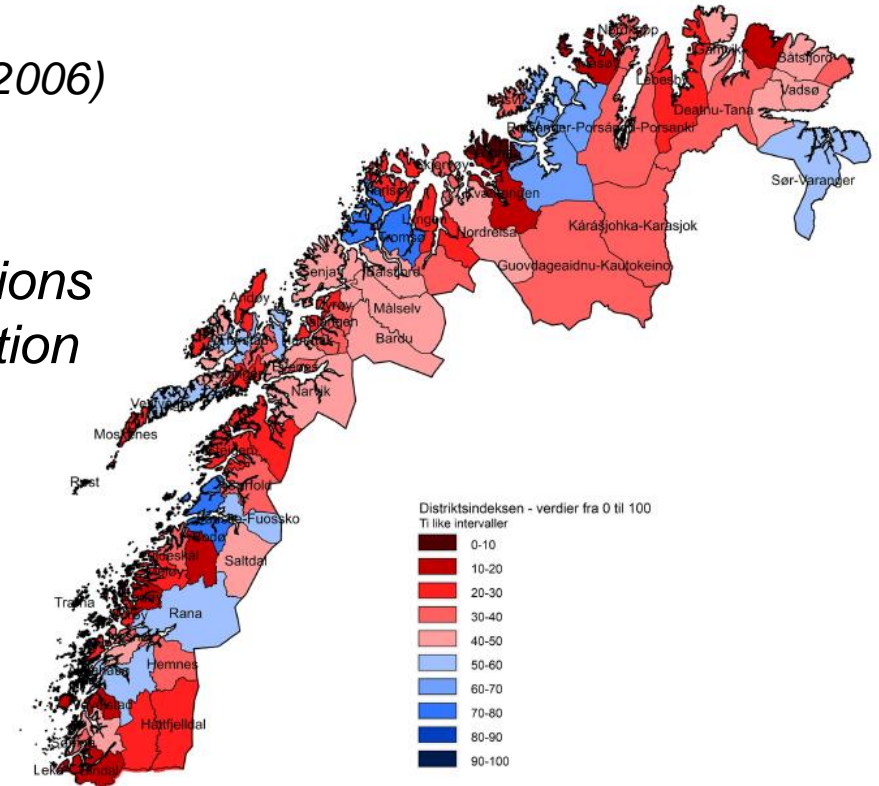Norwegian Centre for Transport Research

Assessment of guidelines in Sweden and the UK

- UK guidelines are more detailed

- Swedish guidelines includes geography as a dimension

- Both consider relative distributional impacts → A project could have insignificant impacts, but still receive a high score on dimensions of equity

  - *Not suffcient for comparing projects and evaluating equity on the portfolio level*

- Interesting Swedish example of analysis of regional equity on the portfolio (transport plan) level (Trafikverket 2018)

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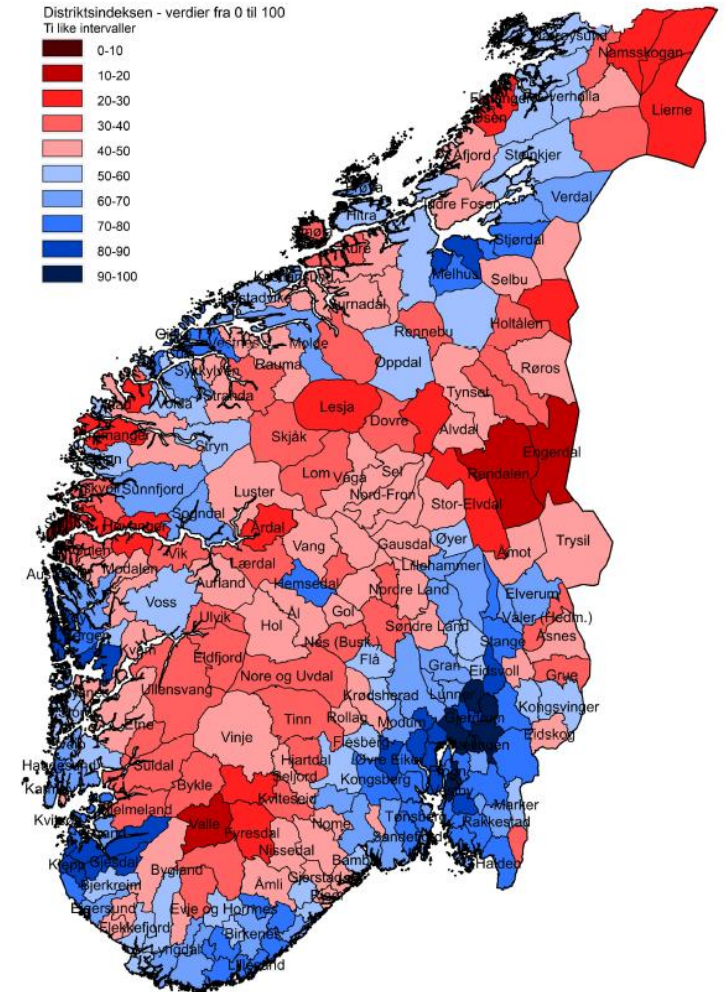Norwegian Centre for Transport Research

A metric for regional policy

- Traditional objective: Maintain «overall settlement pattern»
  - *Interpretation has evolved from local to regional (Johansen et al. 2006)*
  - *Less prominent in recent white papers (KMD 2019b)*

- Regional policy areas (*distrikter*): *«smaller labour market regions where changes or new policies could impact labour participation and services, and thereby settlement»* (KMD 2019a)

- Regional policy index (Asplan Viak 2018, KMD 2020)
  - *40 % Statistics Norway centrality index*
  - *40 % population growth*
  - *10 % growth in labour participation*
  - *10 % industrial differentiation*

Distriktsindeksen - verdier fra 0 til 100
Ti like intervaller

- 0-10
- 10-20
- 20-30
- 30-40
- 40-50
- 50-60
- 60-70
- 70-80
- 80-90
- 90-100

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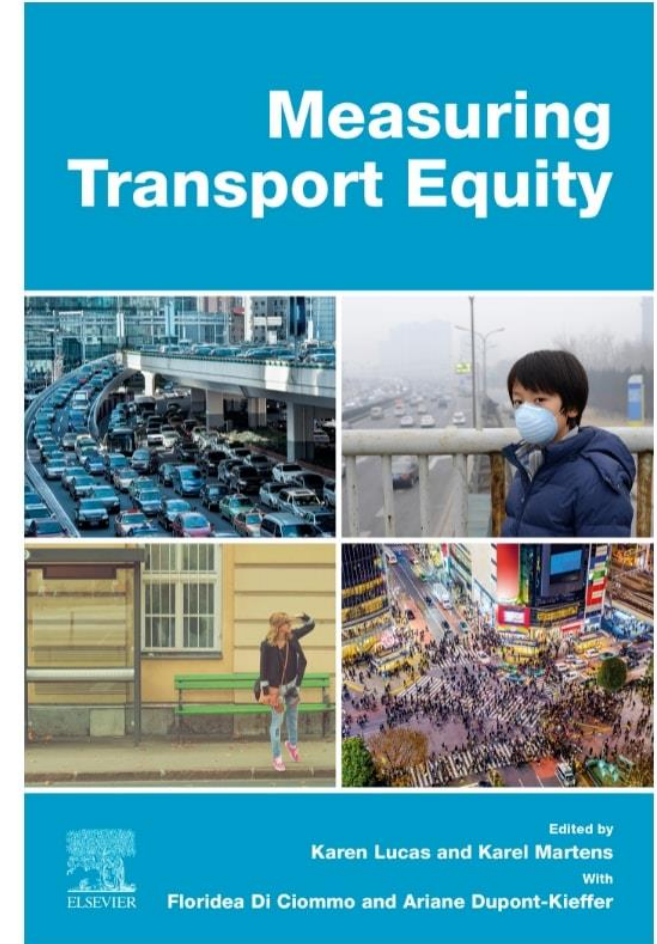Norwegian Centre for Transport Research

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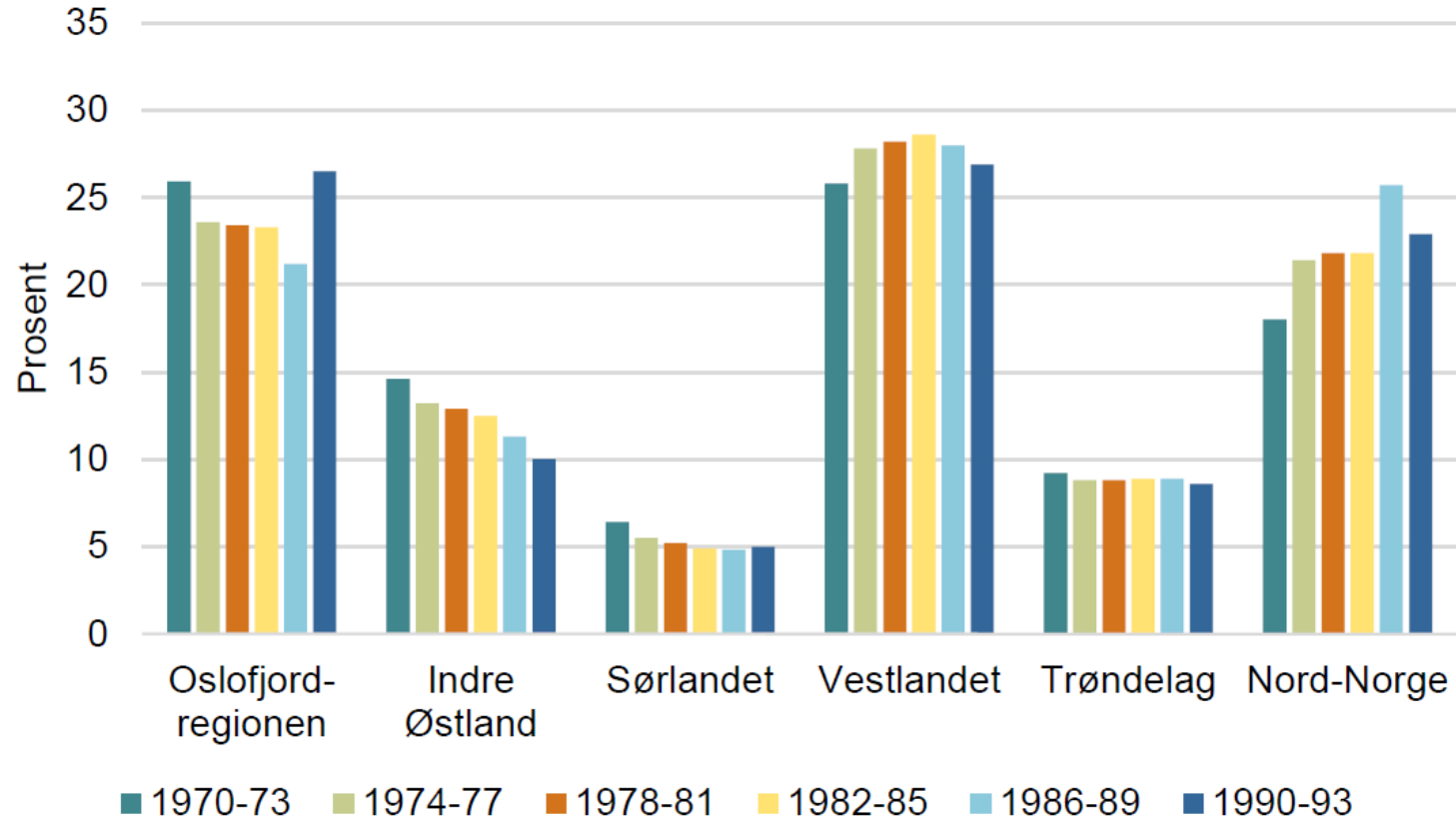 - *10 % industrial differentiation*

Transport and (re)distribution

- Fairly large literature on transport and inequality
- Often considers other types of policies, and other dimensions than geography
- Key metric: Accessibility to destinations (services, employment etc.)
  - *Can be applied to different geographic units, as well as other classifications*
  - *Can measure both existing inequality and changes in inequality*
  - *Can be based on output from the transport demand analysis*
- López et al. (2008): Historical changes in regional inequality in accessibility in Spain, by transport mode (road/rail)

Measuring Transport Equity

ELSEVIER

Edited by
Karen Lucas and Karel Martens
With
Floridea Di Ciommo and Ariane Dupont-Kieffer

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Preferences for distribution (Strand 1993)

Figur 2. Fordeling av riksveiinvesteringer mellom landsdeler over tid (Strand 1993).

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Preferences for distribution (Mouter et al. 2017)

There are multiple locations in the Netherlands where the Government can reduce travel times by investing in transport infrastructure.

The government has decided to start an investment program which reduces travel times for Dutch citizens.

The government now has to make a decision regarding the composition of the investment program.

You now receive 10 questions in which we present 3 alternatives of the investment program and ask you which alternative you advise to the government.

You can assume the following:

- The alternatives of the investment program consist out of a large package of transport projects (rail and road)
- The alternatives of the investment program only differ in terms of travel time savings accruing to individuals living in Region A (provinces of Zuid-Holland, Noord-Holland, Flevoland and Utrecht and Region B (Zeeland, Noord-Brabant, Limburg, Gelderland, Overijssel, Drenthe, Groningen, Friesland);
- Costs of the alternatives of the investment program are equal and the alternatives have the same effects on the environment and traffic safety;
- Regions A and B are inhabited by an equal number of Dutch citizens (around 8.5 million);

Region A

Region B

Below you find the travel time savings for the average inhabitants of Regions A and B accruing from the alternatives of the investment program.

Which alternative of the investment program would you recommend to the government?

	Alternative 1	Alternative 2	Alternative 3
Travel time savings for the average inhabitant of Region A	5 minutes per day	8 minutes per day	1 minute per day
Travel time savings for the average inhabitant of Region B	5 minutes per day	1 minute per day	10 minutes per day
Number of respondents choosing Alternative	109 (63%)	32 (18%)	33 (19%)

Key findings:

- Many prefer an even distribution of time savings

- For traffic accidents, total reduction more important

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Practice in Norwegian assessment studies

- Distributional impacts mentioned in some studies (Bull-Berg et al. 2014)

- Mentioned (briefly) in 7 of 24 quality assessments (KS1) (Lædre et al. 2012)

- I show five examples from studies (KVU and KS1) from 2012-2017
  - *None of these have a systematic analysis of distributional impacts*
  - *Distributional impacts are not part of the basis for recommendation*

Recommendations

More guidelines for analysing distributional impacts are needed

- Redistribution to targeted groups most important in appraisal
  - *But overall distribution can be relevant information for decision-makers*
- Should estimate distributional impacts in absolute terms, not just relative
- On the portfolio level, distributional objectives could be included as constraints

- Assessment of regional equity should be grounded in stated regional policy objectives

- Analysis of net benefits and distributional impacts should be consistent
  - *Might need to consider impacts in secondary markets and land use effects*

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Scope for further research

- Review guidelines on distributional impacts in other sectors

- Review practice in appraisal studies

- Review updated guidelines in a larger sample of countries

- Develop and test methods for analysing distributional impacts in large public investments, both on the project and portfolio level

- Study historical allocation and distributional effects of public investments

- Estimate preferences for equity of decision-makers and citizens

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APPENDIX

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Table 2. The relationship between the benefit cost ratio (BCR) and geographic characteristics

	NTP 2010-2019			NTP 2014-2023		
	(1)	(2)	(3)	(4)	(5)	(6)
Altitude diff.	-0.028***	-0.040***	-0.040***	-0.036***	-0.051***	-0.047***
	(0.010)	(0.011)	(0.011)	(0.011)	(0.012)	(0.013)
Coastal area	-0.219*	-0.368***	-0.368***	-0.216*	-0.401***	-0.398***
	(0.115)	(0.134)	(0.134)	(0.118)	(0.140)	(0.141)
Island share	-0.110	-0.094	-0.061	-0.090	-0.113	-0.110
	(0.209)	(0.224)	(0.220)	(0.226)	(0.234)	(0.233)
Temperature	0.064***	0.075***	0.074**	0.040*	0.061**	0.062**
	(0.024)	(0.028)	(0.029)	(0.021)	(0.025)	(0.025)
Precipitation	0.024	-0.083	-0.096	0.387***	0.193	0.195
	(0.087)	(0.085)	(0.086)	(0.119)	(0.132)	(0.133)
Centrality	1.547***	2.052***	1.948***	1.487***	2.327***	2.385***
	(0.430)	(0.559)	(0.502)	(0.431)	(0.518)	(0.508)
Pop. density	-0.208	-0.387	-0.374	-0.496***	-0.732***	-0.702***
	(0.251)	(0.250)	(0.247)	(0.133)	(0.149)	(0.158)
Median income	0.134	-0.136	-0.108	0.015	-0.252*	-0.217
	(0.174)	(0.231)	(0.225)	(0.112)	(0.151)	(0.153)
Observations	267	267	267	219	219	219
R-squared	0.18	0.20	0.20	0.28	0.32	0.32
Region fixed effects	No	Yes	Yes	No	Yes	Yes
Planning stage controls	No	No	Yes	No	No	Yes