Mobilitet til Lunsj, 27. august 2025

# Hva erstatter elsparkesykler – og betyr eierskap noe?

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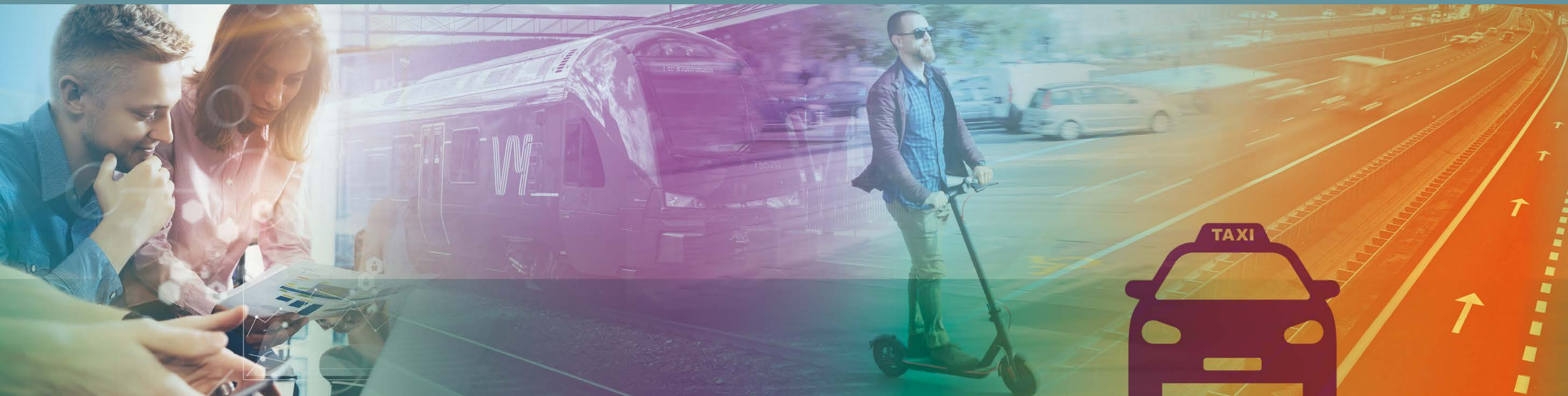

Research in Transportation Economics 113 (2025) 101626

Contents lists available at ScienceDirect

Research in Transportation Economics

journal homepage: www.elsevier.com/locate/retrec

Research paper

# Does e-scooter ownership matter? A comparison of usage patterns and mode replacement effects of shared vs. personal e-scooters

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ARTICLE INFO

*JEL classification:*
L92
L98
O33
R4
R41
R48

*Keywords:*
e-scooter
Micromobility
Regulation
Availability
Ownership
Mode substitution

ABSTRACT

E-scooters have changed from being an urban novelty to becoming an established phenomenon. Parallel to this maturing process of the technology the literature on e-scooters has expanded rapidly, in particular related to the shared e-scooters. However, the literature on privately owned personal e-scooters is still relatively slim.

Privately owned and shared e-scooters are accompanied by different advantages and disadvantages. While parking and littering problems cause considerable unrest and opposition against shared e-scooter schemes, these problems are virtually non-existent with personal e-scooters. However, and in contrast to privately owned personal e-scooters, shared e-scooters obey maximum speed, size and engine power legislation and other regulations that can be enforced with geofencing, like speed, parking, and zone restrictions.

We find that personal e-scooters replace car trips to a much larger extent than the case with shared e-scooters, while shared e-scooters are more often used in conjunction with public transport. We also find differences in e-scooter ownership along the urban-rural axis. The relative share of personal e-scooters is increasing with distance from city centres.

## 1. Introduction

E-scooters have changed from being an urban novelty to becoming an established phenomenon (Fluctuo, 2024). Parallel to this maturing process of the technology the literature on micromobility and shared e-scooters in particular has expanded rapidly (Behrendt et al., 2023; Zhang et al., 2024). However, the literature on privately owned e-scooters is still relatively slim.

Personal and shared e-scooters represent two different accessibility models; one in line with traditional structures with personal ownership, and the other is focused on accessibility without ownership. In this article, 'personal' refers to e-scooters owned by individuals for personal use, while 'shared' denotes e-scooters operated by companies and made available to users on a paid basis. Both are accompanied by advantages and disadvantages. On the one hand, shared e-scooters offer *accessibility without ownership*, lowering the threshold for use. However, and a major cause of opposition towards the *accessibility without ownership* focused option is parking issues and littering problems. These problems are virtually non-existent with privately owned personal e-scooters, where parking is mainly done on private areas. In the Norwegian city of Drammen, for example, 100 percent of parking tickets given to e-scooters have been given to shared e-scooters. On the other hand, and contrary to personal e-scooters, shared e-scooters obey maximum speed, size and engine power legislation and other regulations that can be enforced with geofencing, like speed, parking, zone restrictions and time restrictions. Out of a total of ten fatal accidents with e-scooter in Norway between 2020 and June 2024, eight were with privately owned e-scooter, and two were with shared e-scooter. Although information about these accidents is scarce, media coverage suggests that at least some of the fatal accidents with private e-scooters involved modified vehicles with higher speed than the legal limit of 20 km/h.

Focusing on the role different types of e-scooters may play in the overall transport system, and their relation to other transport modes we ask: *How does the use of private and shared e-scooters differ?*

To answer this question, we utilise a longitudinal series of surveys, with two different samples. One is focused on a representative sample of the population and the other on users of shared e-scooters. The two surveys were conducted annually between 2019 and 2023 and constitute a mix of representative samples and panel data elements.

The remainder of the paper is structured as follows. The next

This article is part of a special issue entitled: Selected Papers from the Thredbo 18 Conference published in Research in Transportation Economics.

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https://doi.org/10.1016/j.retrec.2025.101626
Received 25 February 2025; Received in revised form 3 July 2025; Accepted 3 August 2025
Available online 7 August 2025


Journal of Cycling and Micromobility Research 5 (2025) 100082

Contents lists available at ScienceDirect

Journal of Cycling and Micromobility Research

journal homepage: www.sciencedirect.com/journal/journal-of-cycling-and-micromobility-research

# What proportions of different transport modes do e-scooters replace? A meta-analysis

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ARTICLE INFO

*Keywords:*
Meta-regression
Micromobility
Mode shift
Substitution
Transport mode distribution

ABSTRACT

This paper presents a meta-analysis of stand-up e-scooters' mode replacement, based on outcomes from one hundred studies and dataset collections. The material includes scientific publications and grey literature from Europe, North America and Oceania. We aggregate the various replaced transport modes into three groups: private motorized vehicles, public transport and active transport. The mode replacement outcomes are survey-based, primarily directed towards e-scooter users. The mode replacement question is either about what mode would have been used on the last trip if the e-scooter were not available or about general changes in trip frequency of other modes after starting using e-scooter. Site-specific characteristics are added to the characteristics of the surveys. Meta-regressions show that the proportions of replaced private motorized vehicles and public transport are primarily associated with the proportions of these modes in the cities' transport/commuting at the outset. Active transport represents the largest proportion of modes replaced by the e-scooter, but with less explained variation with respect to site-specific characteristics. We derive quality-corrected meta-analytic estimates of e-scooter mode replacement proportions from a subset of the meta-data.

## 1. Introduction

Stand-up/standing e-scooters have been introduced and proliferated in many parts of the World since their appearance in the last decade; often as shared vehicles supplied by multi-national enterprises (Hardt and Bogenberger, 2019; Fearnley, 2020). A relatively large supply of e-scooters in major urban areas, with dockless (free flowing) access and online payment systems, have provided a new desired transport mode for some; and a new element of discomfort and obstruction for others (Tuncer et al., 2020; Gibson et al., 2021; Mitropoulos et al., 2023). The overall external net effects, or life cycle effects, from the increasing mode shift to e-scooter, are not obviously positive (Lazer, 2023). What transport modes e-scooters replace will have considerable impact on this net effect (Mitropoulos et al., 2023).

The body of literature presenting estimates of e-scooters' mode-replacement shares have become quite extensive over a period of just about seven years. In the last few years, review studies of e-scooter usage have also appeared (ITF, 2020; Fearnley, 2020; Badia and Jenelius, 2023; Mitropoulos et al., 2023; Wang et al., 2023). The review studies assert that e-scooters first and foremost replace walking (Mitropoulos et al., 2023; Wang et al., 2023), but also cycling and public transport (Badia and Jenelius, 2023). For the replacement of cars and other private motorized vehicles, it is indicated that this share is higher in North America than in, e.g., Europe (ITF, 2020; Fearnley, 2020; Wang et al., 2023). However, to date, no studies have formally analysed systematic variations in mode substitution towards e-scooter. In our paper, therefore, we extend the assessed body of mode replacement outcomes into a meta-analysis.

We aggregate the various replaced transport modes into three groups: private motorized vehicles (PMV), public transport (PT) and active transport (AT). Using meta-regression, we estimate whether characteristics of the cities and the outcomes/study contexts can explain variation in mode replacement proportions. The analysis takes into account that part of the replacement outcomes originates from studies that have produced multiple outcomes. We include only survey-based mode replacement outcomes, the majority of these comprising e-scooter users' retrospective assessments (Wang et al., 2023). Most surveys have been based on asking what mode would have been applied on the last (most recent) trip if the e-scooter were not available; in some surveys, respondents have been asked about general changes in trip usage frequency of various other modes after starting using e-scooter.

At the outset we have 307 e-scooter mode replacement outcomes

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https://doi.org/10.1016/j.jcmr.2025.100082
Received 27 January 2025; Received in revised form 1 August 2025; Accepted 4 August 2025
Available online 6 August 2025

# Betyr eierskap noe?

~500 000 private

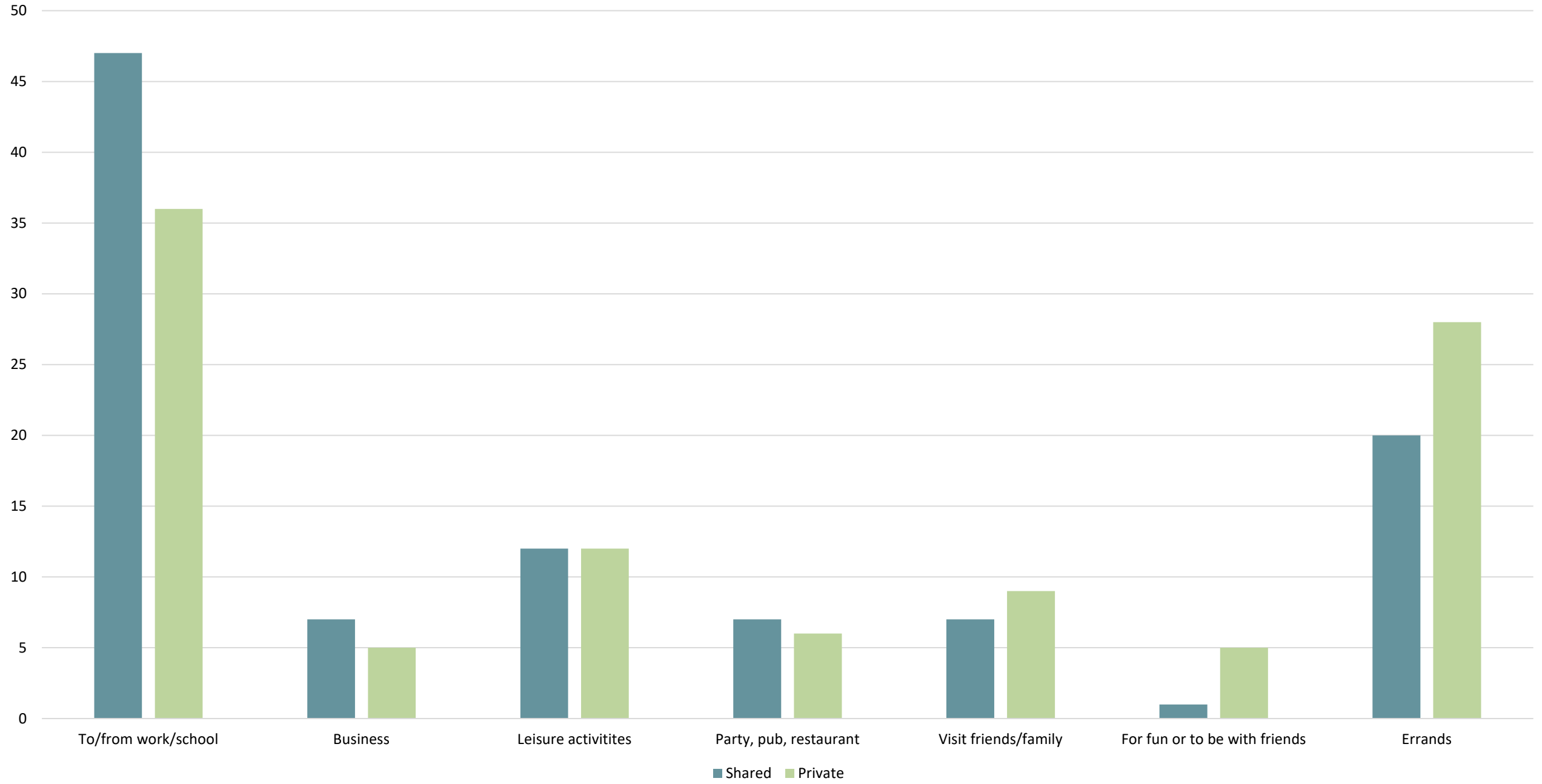
~30 000 delte

(25 000 i 2024)

Ulykker med private
Reguleringer på delte

# MikroReg-survey (2021-23 data)

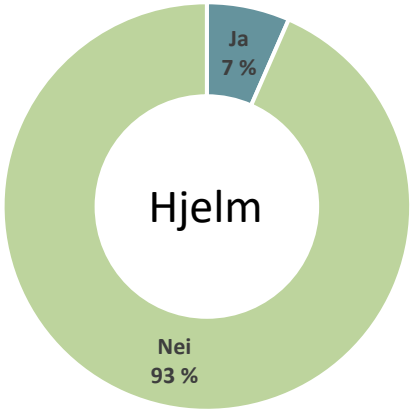
| | Owner | Non-owner |
|---|---|---|
| | n=893 | n=3475 |
| **Male** | 64% | 59% |
| **Age (SD)** | 38 (13.8) | 37 (13.2) |
| **Education** | | |
| **- High school or less** | 25% | 21% |
| **- Trades school** | 20% | 15% |
| **- Bachelor's degree** | 32% | 34% |
| **- Master's degree or above** | 23% | 30% |


50
45
40
35
30
25
20
15
10
5
0
To/from work/school
Business
Leisure activitites
Party, pub, restaurant
Visit friends/family
For fun or to be with friends
Errands
Shared
Private

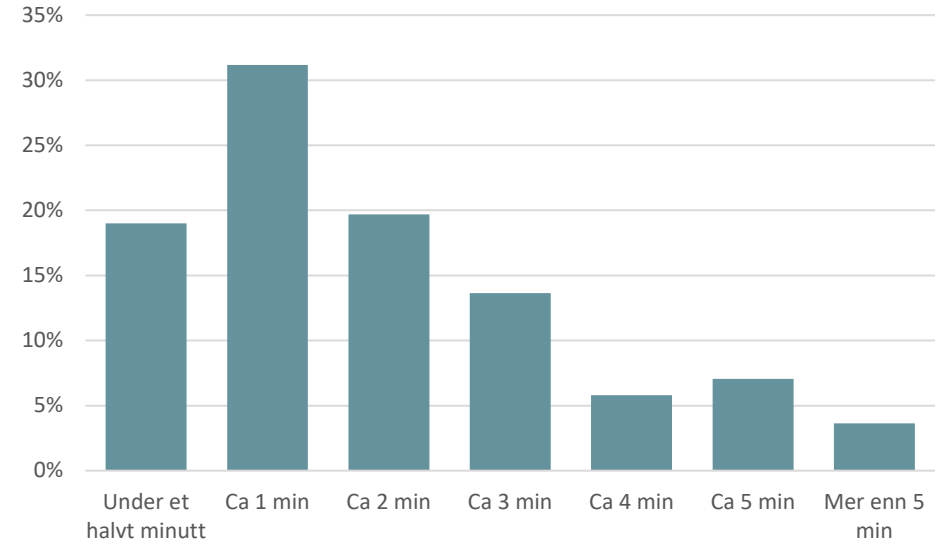
toi

| | Owned | | | Shared | | | Ratio |
|---|---|---|---|---|---|---|---|
| Year | 2021 | 2022 | 2023 | 2021 | 2022 | 2023 | Sum |
| Walked** | 33% | 27% | 24% | 51% | 46% | 53% | 0.57 |
| Biked** | 10% | 10% | 12% | 6% | 5% | 3% | 2.10 |
| Public transport * | 24% | 30% | 20% | 30% | 34% | 30% | 0.80 |
| Private car** | 26% | 27% | 25% | 7% | 8% | 6% | 3.69 |
| Taxi | 4% | 2% | 3% | 4% | 5% | 5% | 0.70 |
| Private e-scooter | - | - | - | - | - | 2% | |
| Share e-scooter | - | - | 12% | - | - | - | |
| Cancel/go elsewhere | 3% | 2% | 4% | 2% | 2% | 2% | 1.65 |
| Total | 100% | 100% | 100% | 100% | 100% | 100% | |
| Total active** | 43% | 38% | 36% | 57% | 51% | 56% | 0.71 |
| Total car** | 30% | 30% | 28% | 11% | 13% | 11% | 2.53 |
| N | 123 | 128 | 100 | 2579 | 1406 | 861 | |

# Delte elsparkesykler – siste reise




Gangvei til Elsparkesykkelen

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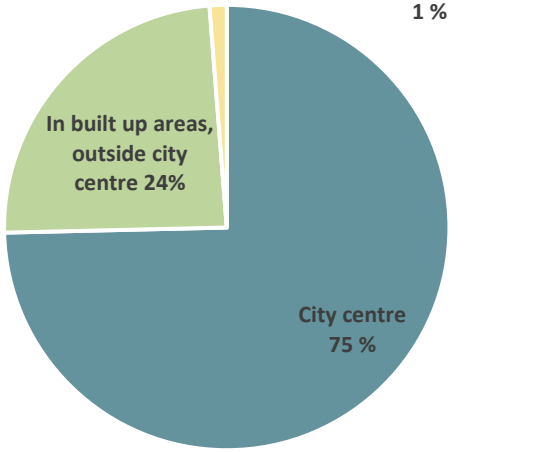
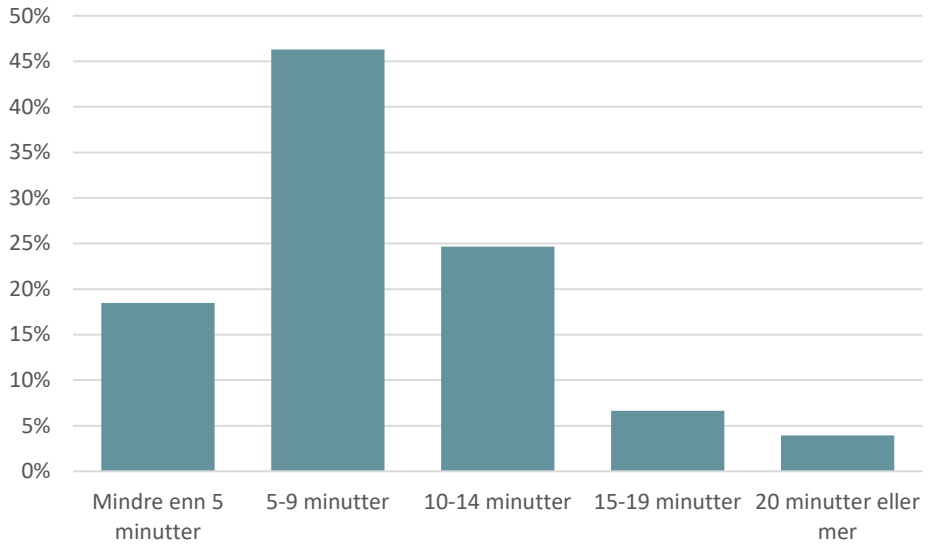
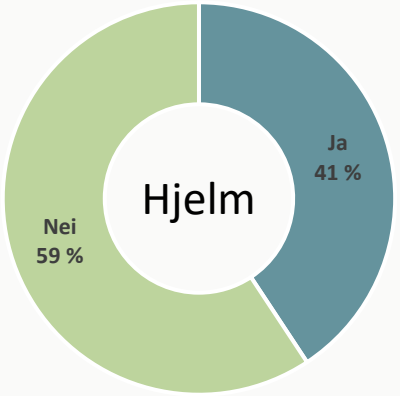


# Private elsparkesykler – siste tur

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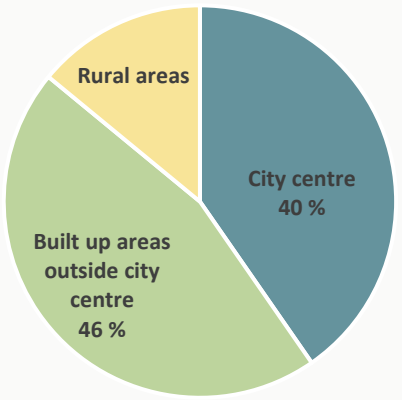
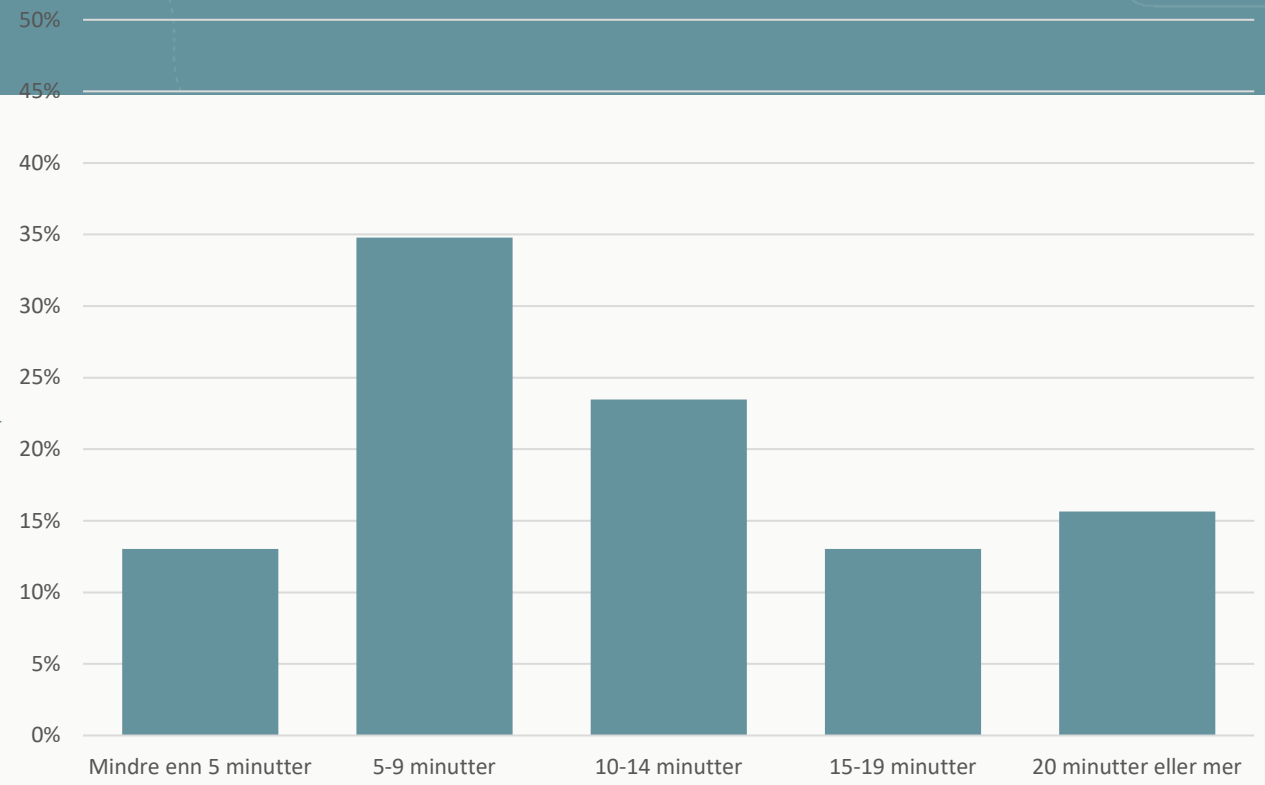


# Konklusjon

- Eierskap har betydning!
- Eiere er nærmere middelaldrende mann på bygda

  (men elsparkesykler er fortsatt i hovedsak et byfenomen)
- Private elsparkesykler erstatter bil mer

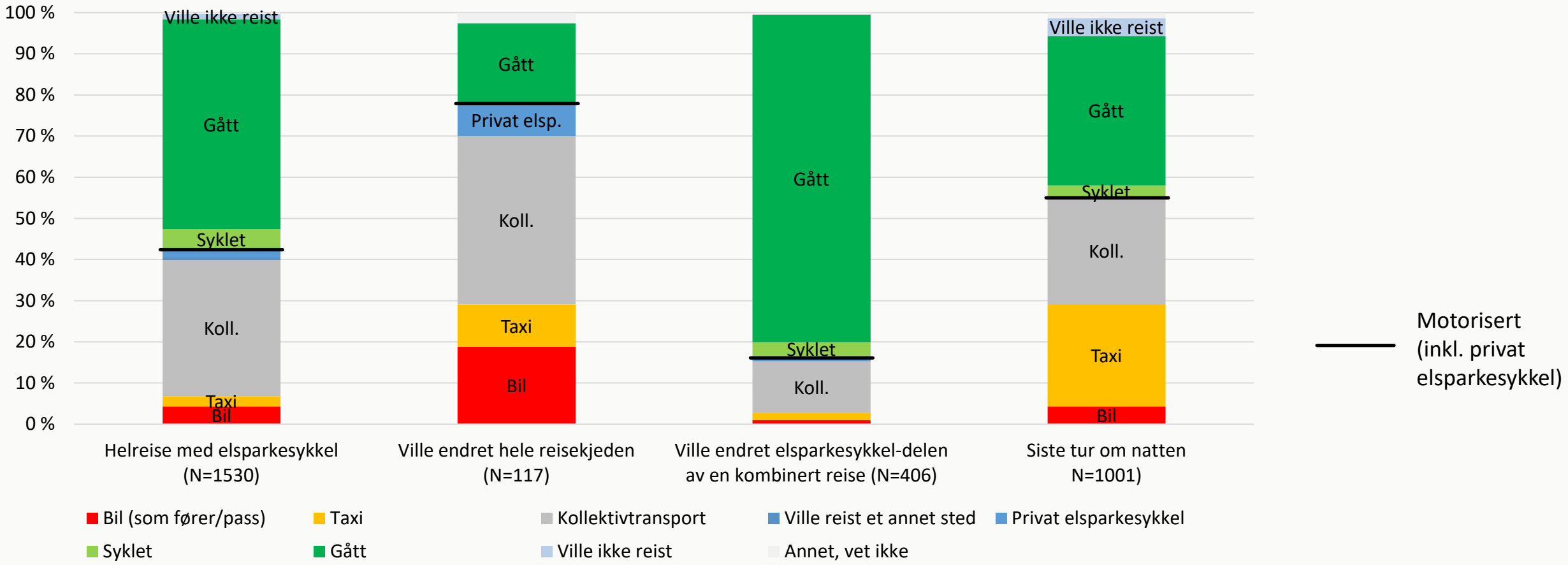
  (men det kan delvis forklares av stedseffekten)

Ingen observerbar effekt på tilbøyeligheten til å eie bil

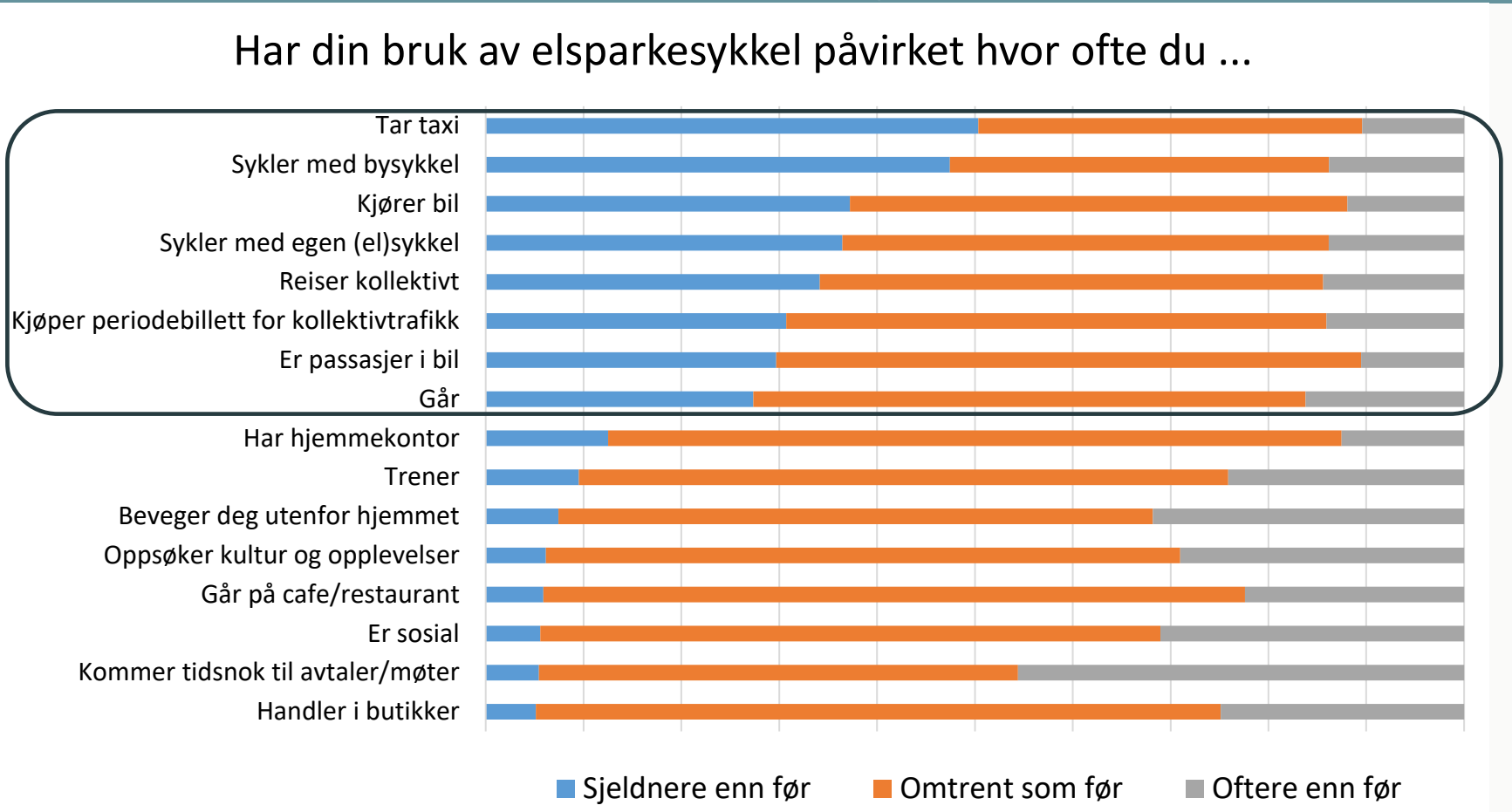
# Hva erstatter delte elsparkesykler?

# Hva ville du gjort hvis leid elsparkesykkel ikke var tilgjengelig på siste tur?

TØI nasjonal survey 2024/25 N≈2600

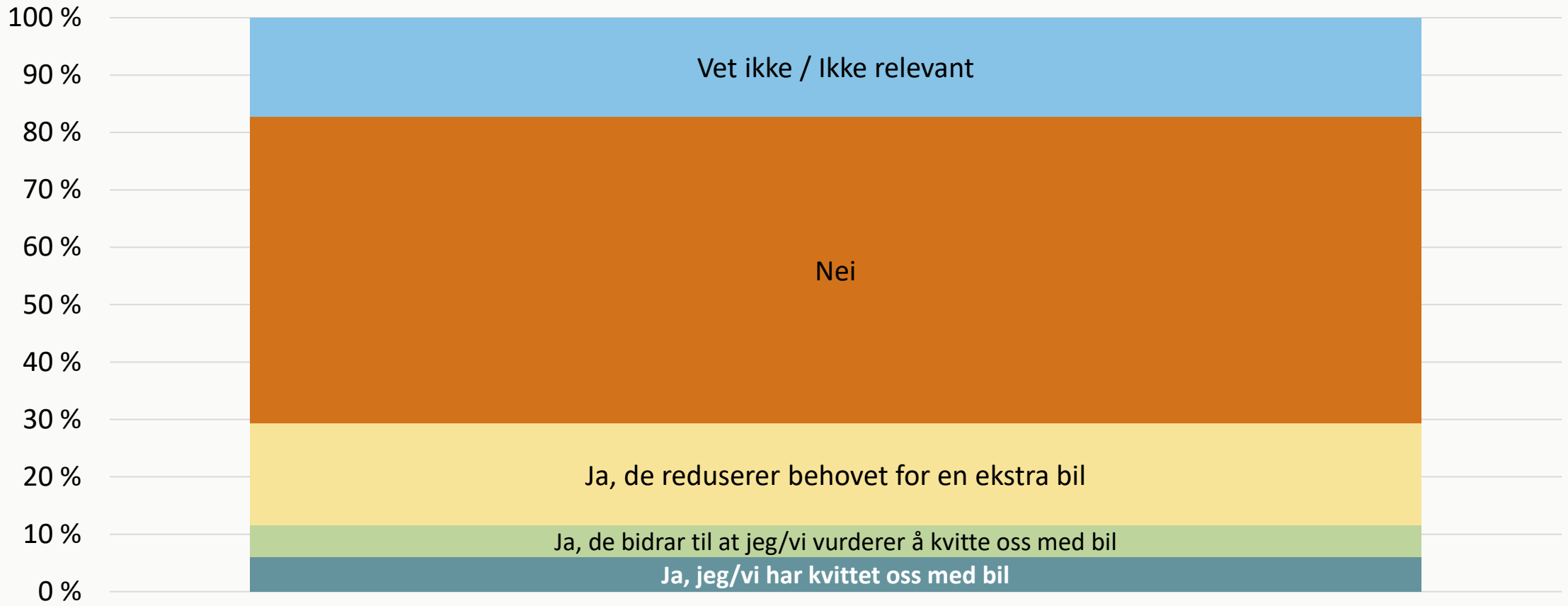


# Atferdsendring – generelt (i motsetning til siste tur)



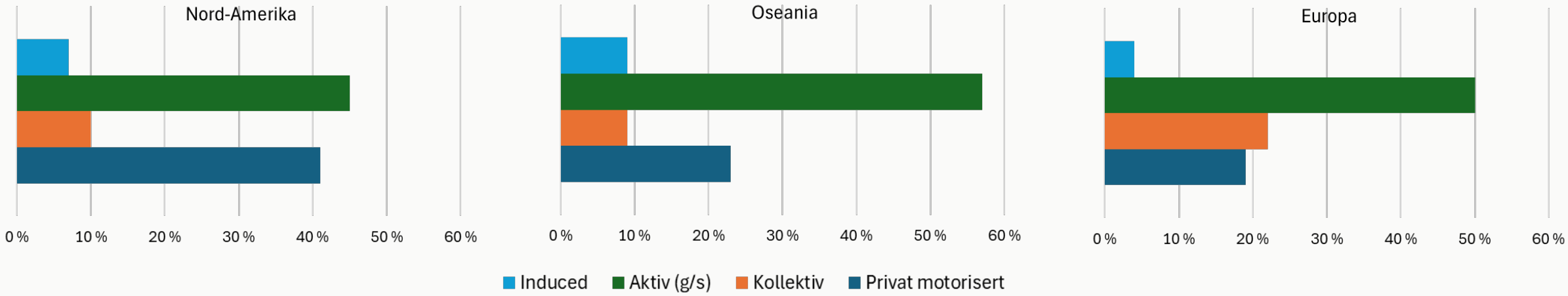

n = 2584

# Endrer tilgang til elsparkesykkel behovet for å ha/eie bil for deg eller din husholdning?



# Metaanalyse internasjonal empiri

- 100 studier
  - Nord-Amerika: 43 studier, 60 funn
  - Oseania 6 studier, 10 funn
  - Europa 51 studier 237 funn



# Erstatter privat motorisert

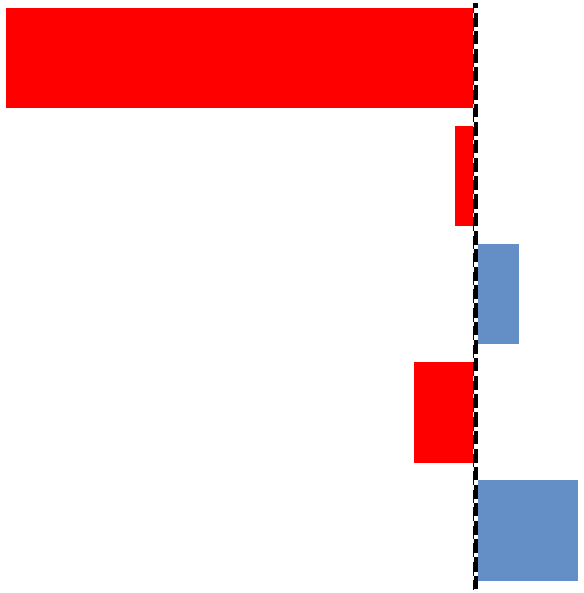
Konstant**

Europa x LN(bef.tetthet) ***

LN(bilandel) **

Registrert elsparkesykkelbrukere**

Spm om reiser generelt (ikke siste reise)**



Kun signifikante estimater inkludert
*** <0.001, ** <0.01, * <0.05

# Erstatter kollektivtransport

Konstant***

Europa x LN(landareal) ***

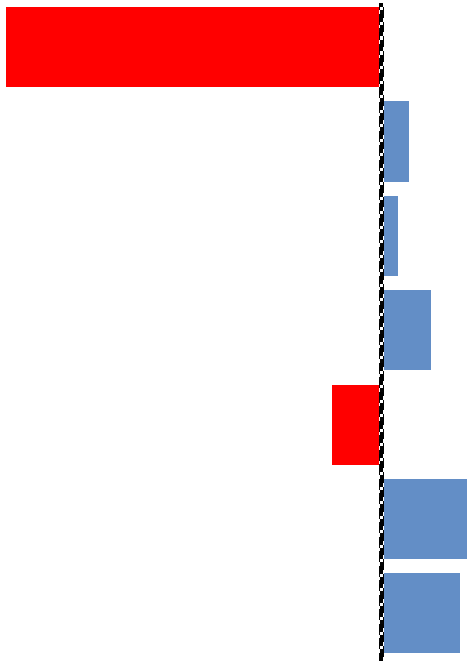
Europa x LN(skinneandel) ***

LN(kollektivandel) ***

LN(andel <30 år I utvalget) **

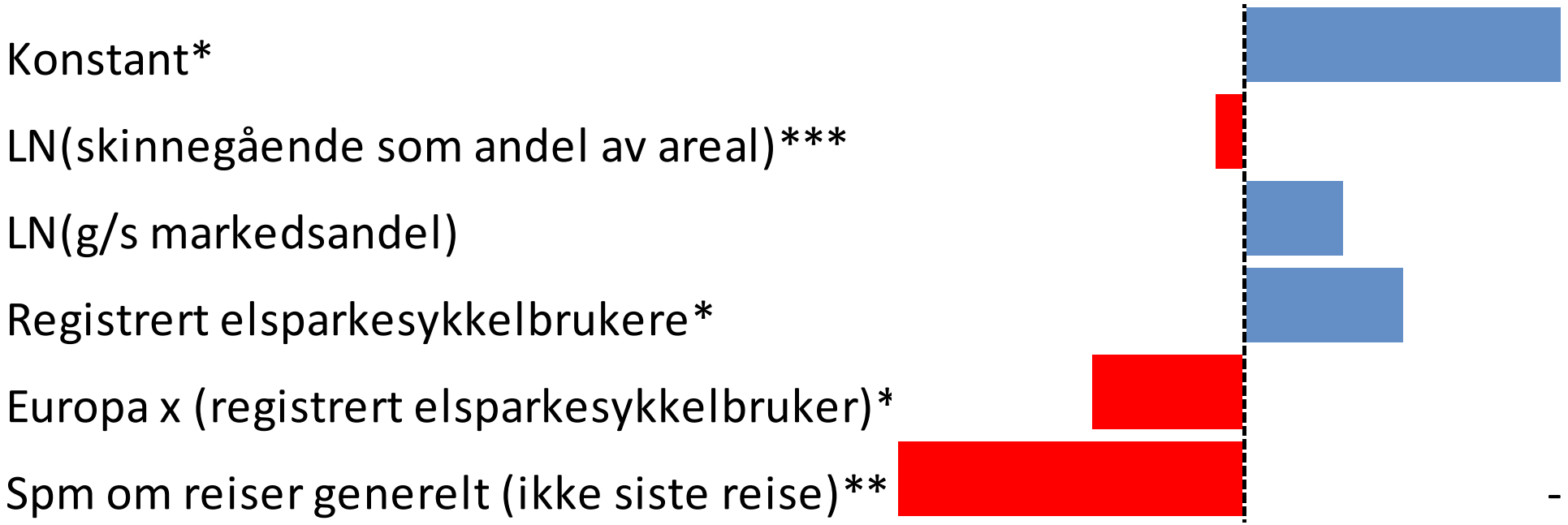
Europa x (registrert elsparkesykkelbruker)*

Europa x Spm om reiser generelt*



Kun signifikante estimater inkludert
*** <0.001, ** <0.01, * <0.05

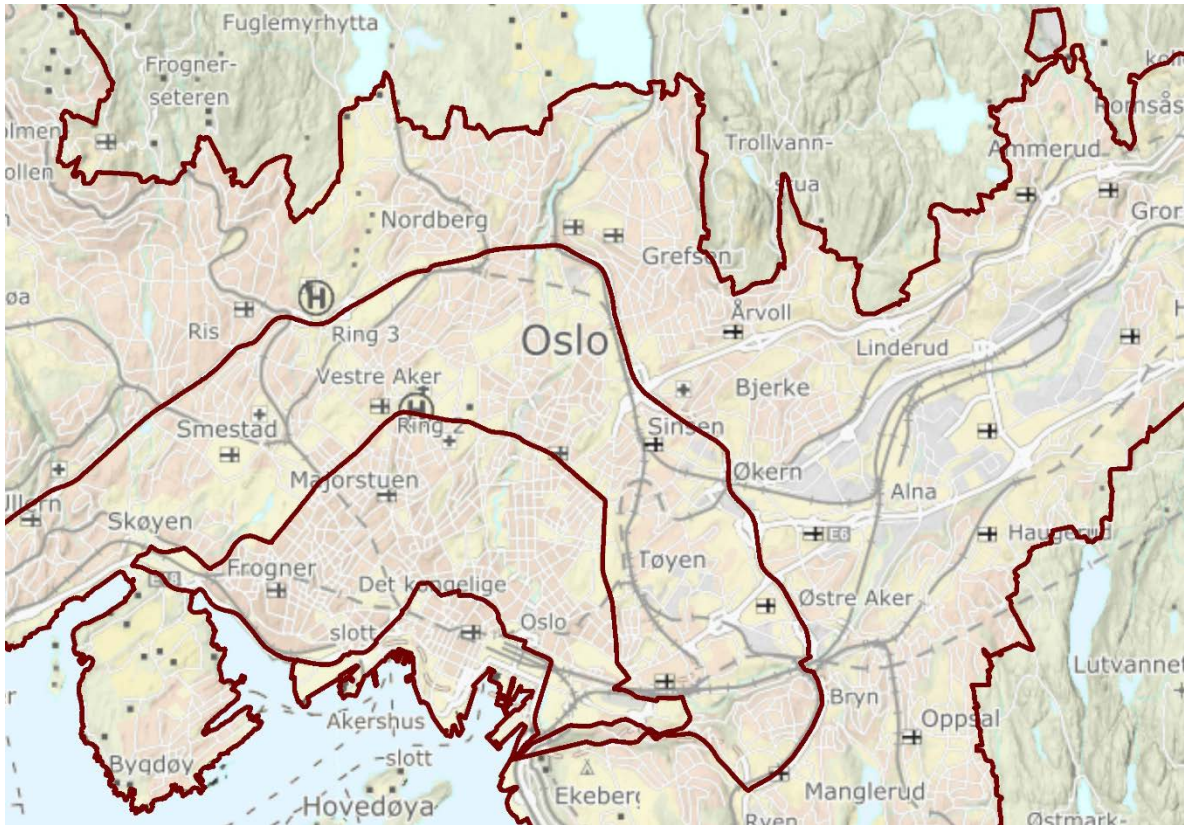
# Erstatter aktiv  transport




Kun signifikante estimater inkludert
*** <0.001, ** <0.01, * <0.05

# Policy implication

Zoning!

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# Referanser


Aarhaug, Egner og Fearnley (2025). «Does e-scooter ownership matter? A comparison of usage patterns and mode replacement effects of shared vs. personal e-scooters» *Research in Transportation Economics* 113, Oct 2025 https://doi.org/10.1016/j.retrec.2025.101626

Fearnley og Veisten (2025) «What proportions of different modes do e-scooters replace? A meta-analysis» *Journal of Cycling and Micromobility Research* 5, Sept 2025

https://doi.org/10.1016/j.jcmr.2025.100082