

# EFFECTS OF ROAD TOLLS FOR INTERCITY BUSES ON TRAVEL ACTIVITIES AND THE CHOICE OF MEANS OF TRANSPORT IN GERMAN LONG-DISTANCE PASSENGER TRANSPORT

Workshop Long-distance passengers transport | Milan  
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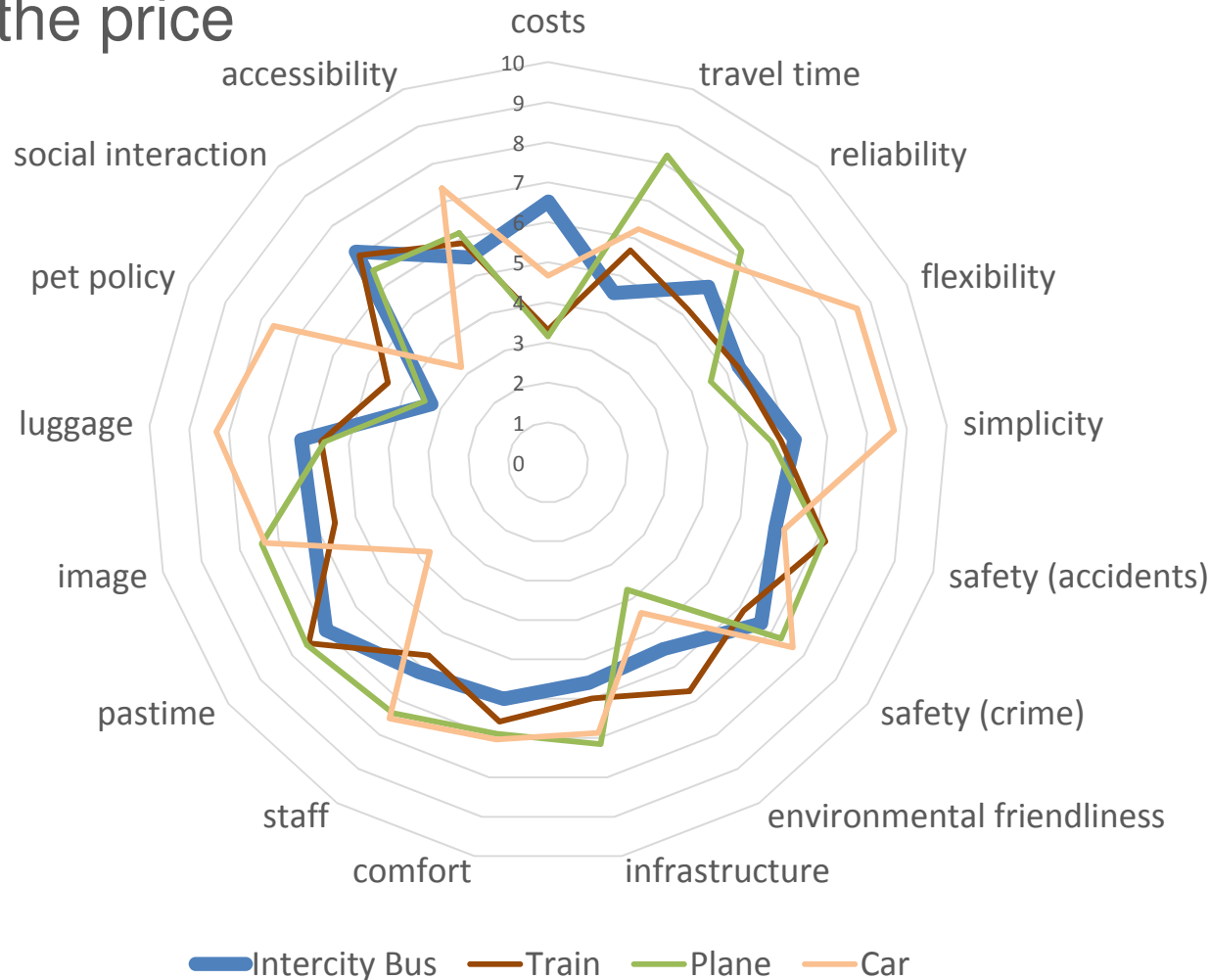
# Starting Point (1)

Intermodal competitive pressure by liberalization of intercity bus traffic

- | Strong growth and successful market development in the long-distance bus sector after the liberalization in January 2013
- | Competitive pressure on long distance rail services, impact already clearly observable (renouncing price increases, promotion prices, quality improvements)

# Assessment of Transport Modes

Best assessment of the long distance bus (only) with regard to the price



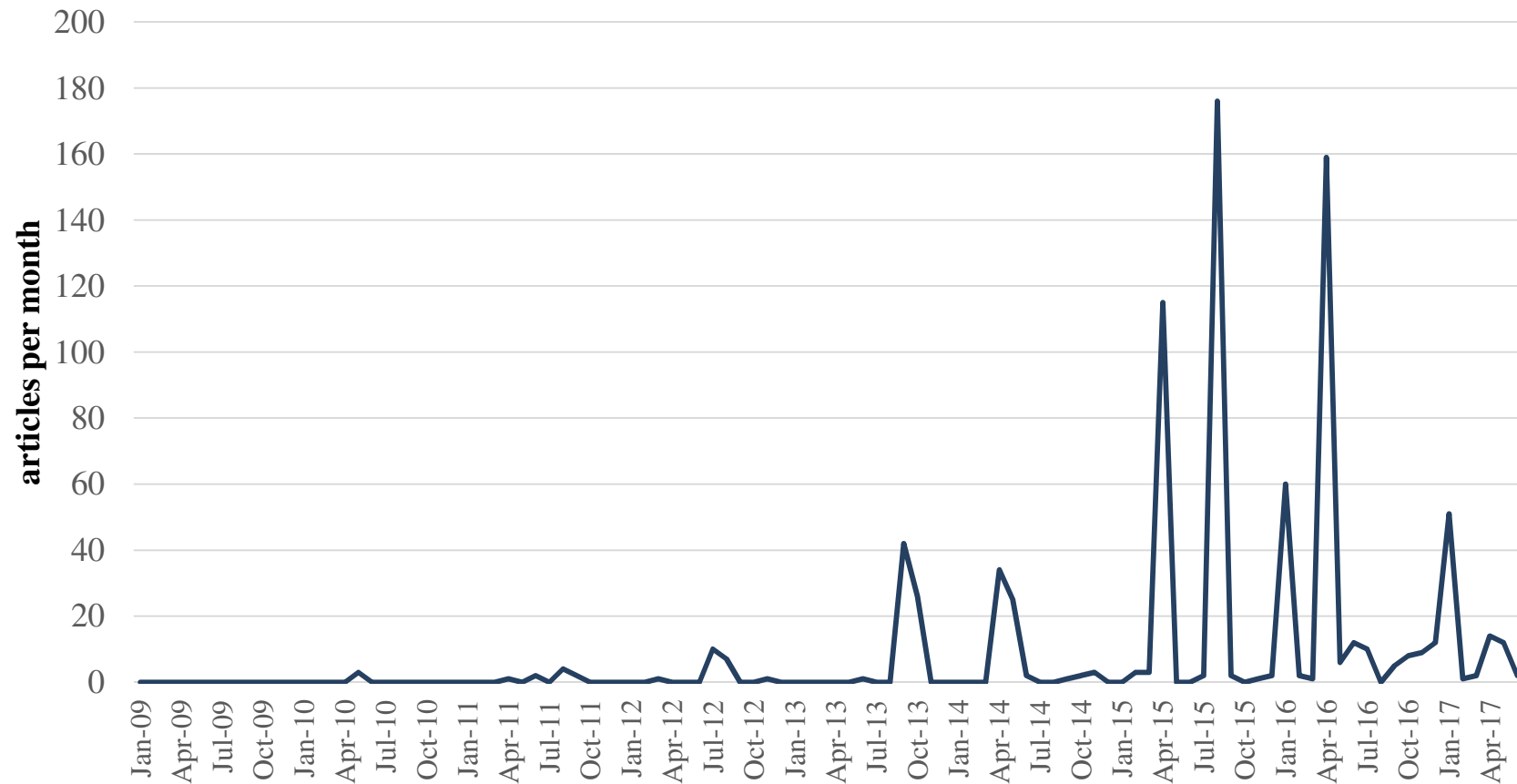
## Starting Point (2)

Due to the competitive pressure a toll for intercity buses is frequently requested and controversially discussed

- | Politics and railway lobby repeatedly demand tolls for intercity buses
- | Argument: Rail carriers suffer from disadvantages in intermodal competition because they have to pay infrastructure usage charges ("rail toll") while buses can use the roads free of charge
- | The German federal government is examining the expansion of truck tolls on long-distance buses by the end of 2017

# Resonance in the Media

Issue\* has been spotted throughout the whole initial period



\* search terms: "Maut für Fernbusse" OR Fernbusmaut OR Fernbus-Maut, source: GENIOS (Presse)

# Research Project (1)

## Effects of road tolls for intercity buses

- | Imposing a mileage-based road charge will lead to price increases for intercity bus services
- | Significant effects on the choice of means of transport and travel activities in national passenger transport are conceivable
- | Rail transport could benefit from this, but also motorized private transport by car

# Research Project (2)

Long-term market potential of intercity bus transport

## | Core: System Dynamics Simulation Model

- Simulation period: 20 years (2018 to 2037), step size: one year
- Consideration of different toll scenarios
- Main variables: Market volume (in passenger kilometers) and modal share of the relevant means of transport in domestic long distance passenger transport
- Software used for simulation: Vensim 6.0

## | Focus on long-term developments(→ 2025)

# Simulation Model (1)

## Preliminary Considerations

- | Long distance passenger transport: Travelling from 50 km (one way)
  - Private travel, business travel, vacation travel
- | Four transport modes (transport markets) in the model
  - Intercity bus, train, plane, car
  - No intermodal / multimodal trips, only shuttle services
  - No analysis from a business perspective, no consideration of welfare effects
- | Consideration of a fully developed long distance bus market; starting phase is excluded
- | Initially no capacity bottlenecks (e.g. infrastructure, vehicles, personnel)

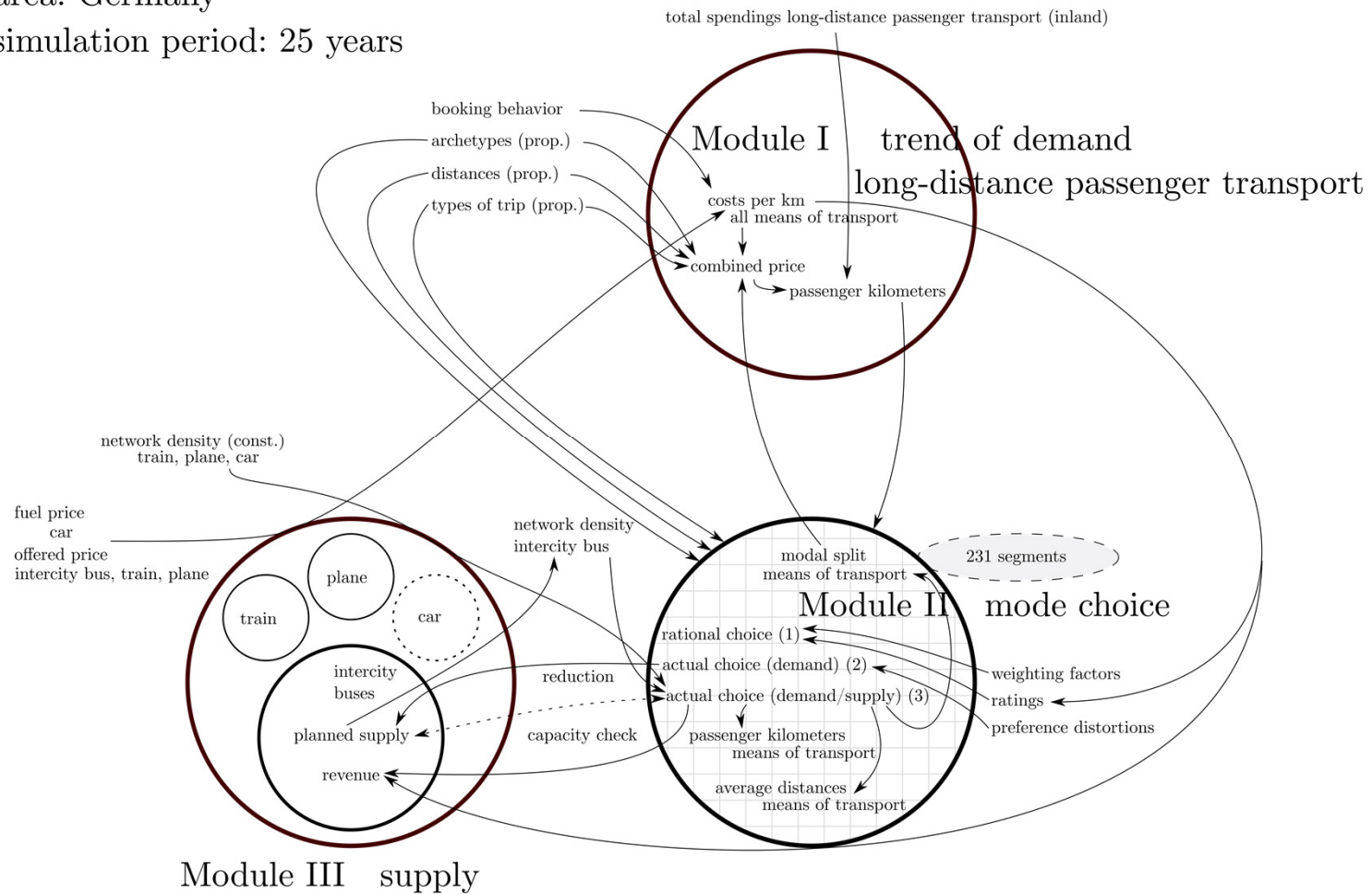


# Simulation Model (2)

## Composition

area: Germany

simulation period: 25 years



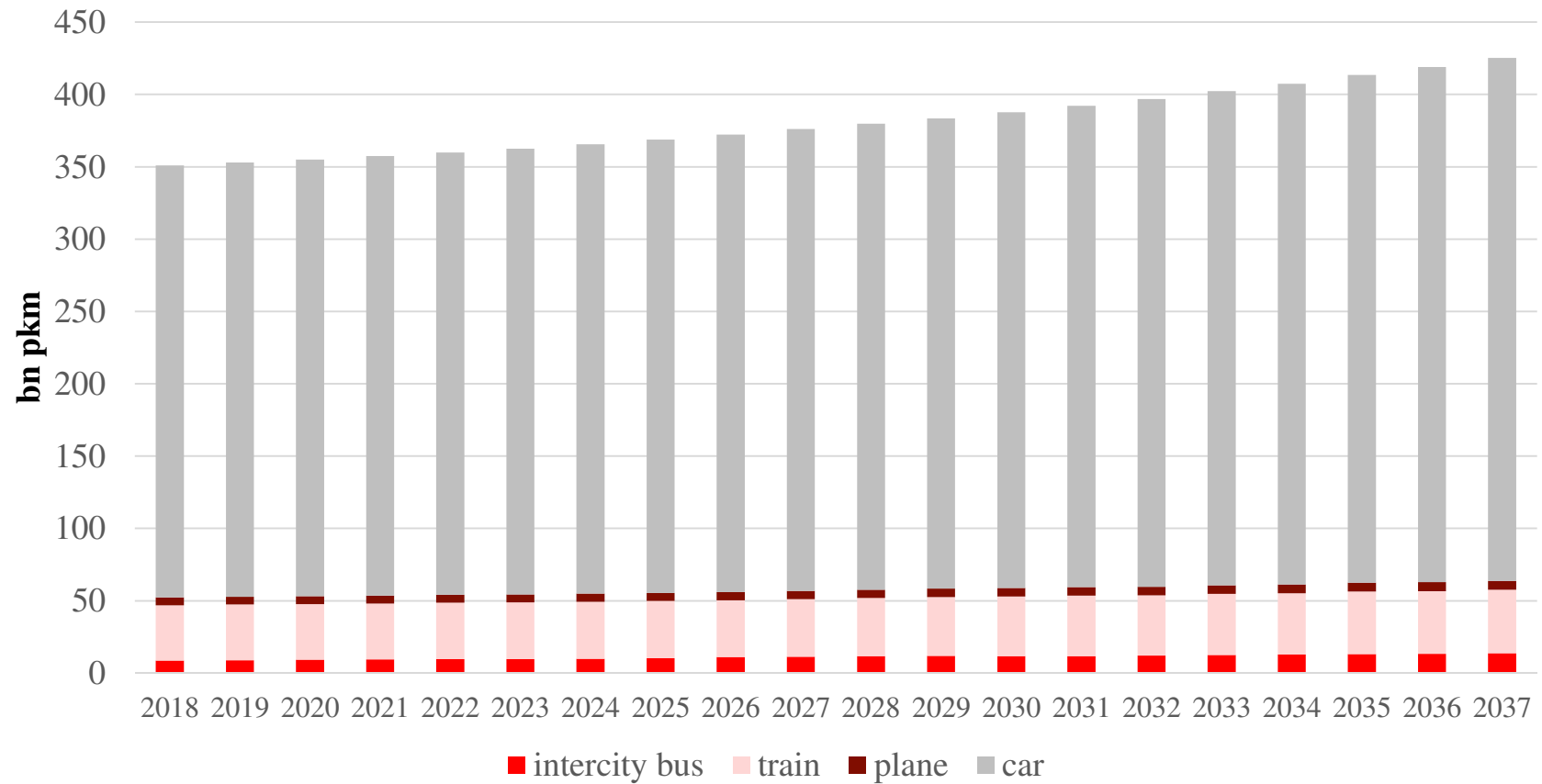
# Toll Rates

## 3 different cases

- | .4 ct / pkm
  - proposed by SPD politician Martin Burkert
  - 14.4 ct / vkm (60 seats and an average utilization rate of 60%)
- | .6 ct / pkm
  - based upon the current infrastructure cost report (Wegekostengutachten 2017)
  - bus related infrastructure costs, equivalent to truck tolls
  - toll rate: 10.9 ct / vkm (motorways), 26.2 ct / vkm (major federal roads), 37.3 ct / vkm (other federal roads) → 21.6 ct / vkm in total
- | 3.0 ct / pkm
  - fictitious toll rate
  - 108 ct / vkm
- | Respectively "starting price" in January 2018, afterwards annual dynamization
- | Toll applies to the entire road network
- | Benchmark case: 0 ct / pkm

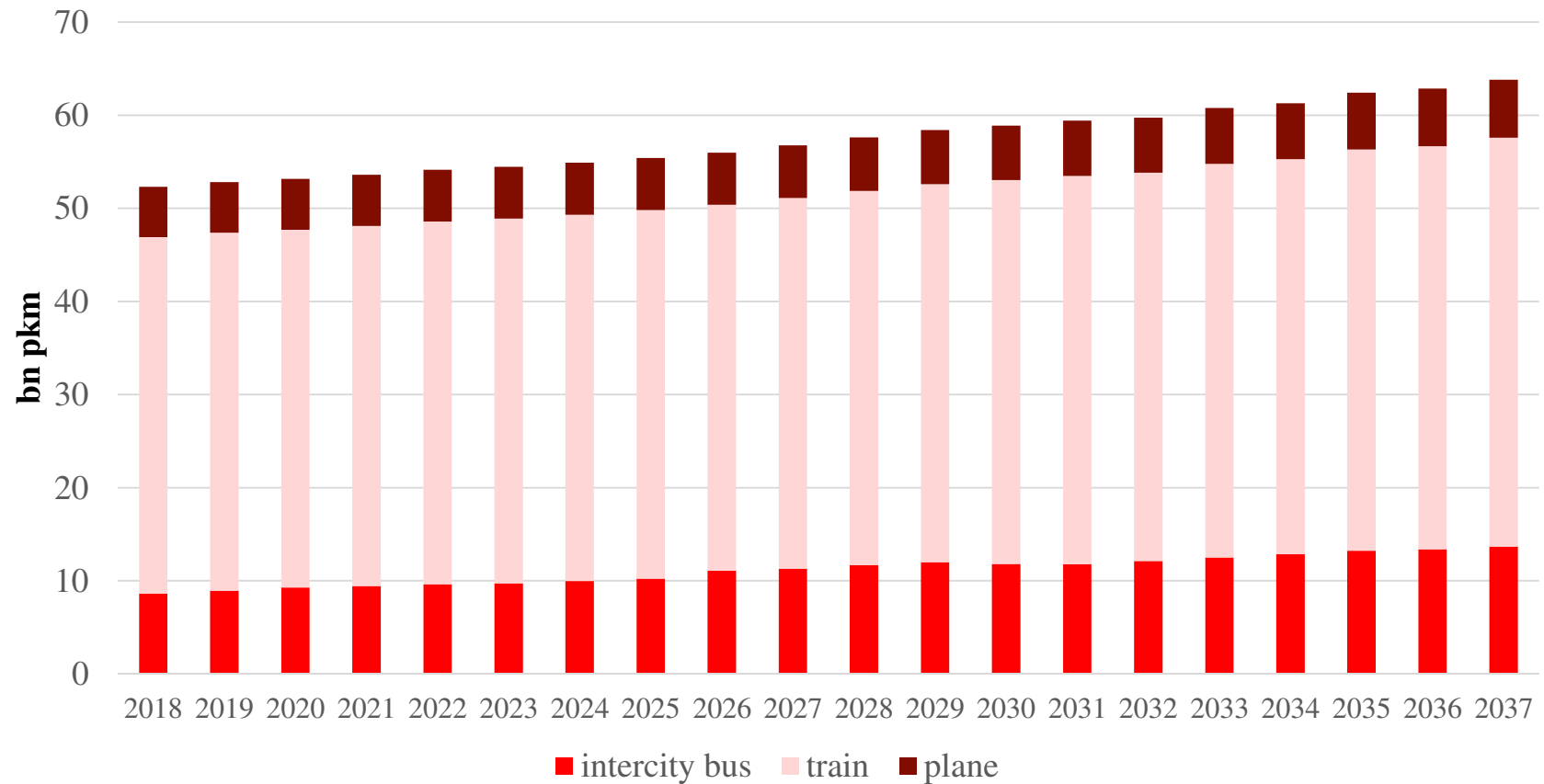
# Results (1)

Passenger kilometers (benchmark case, all modes)



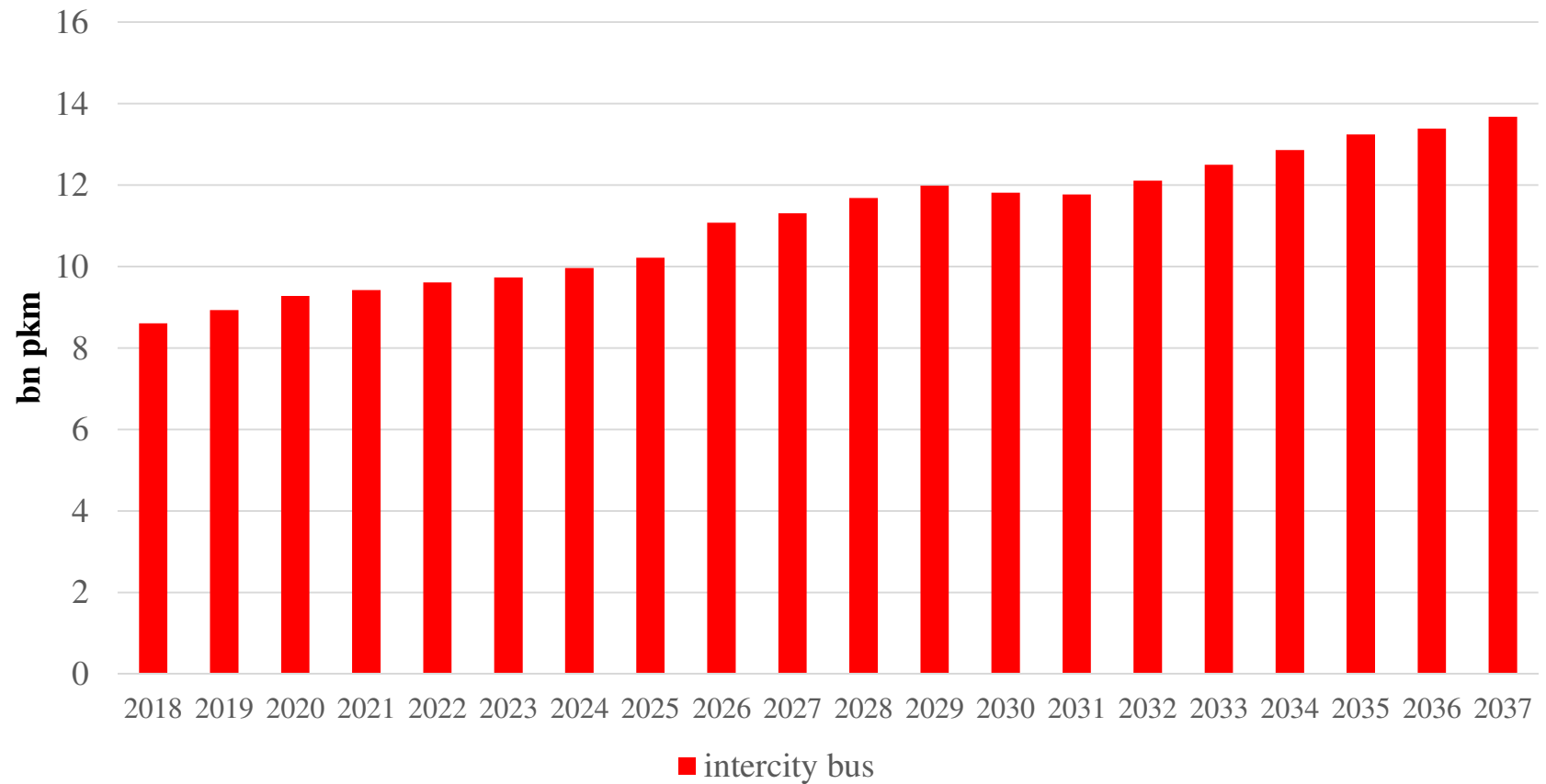
# Results (2)

passenger kilometers (benchmark case, public transport)



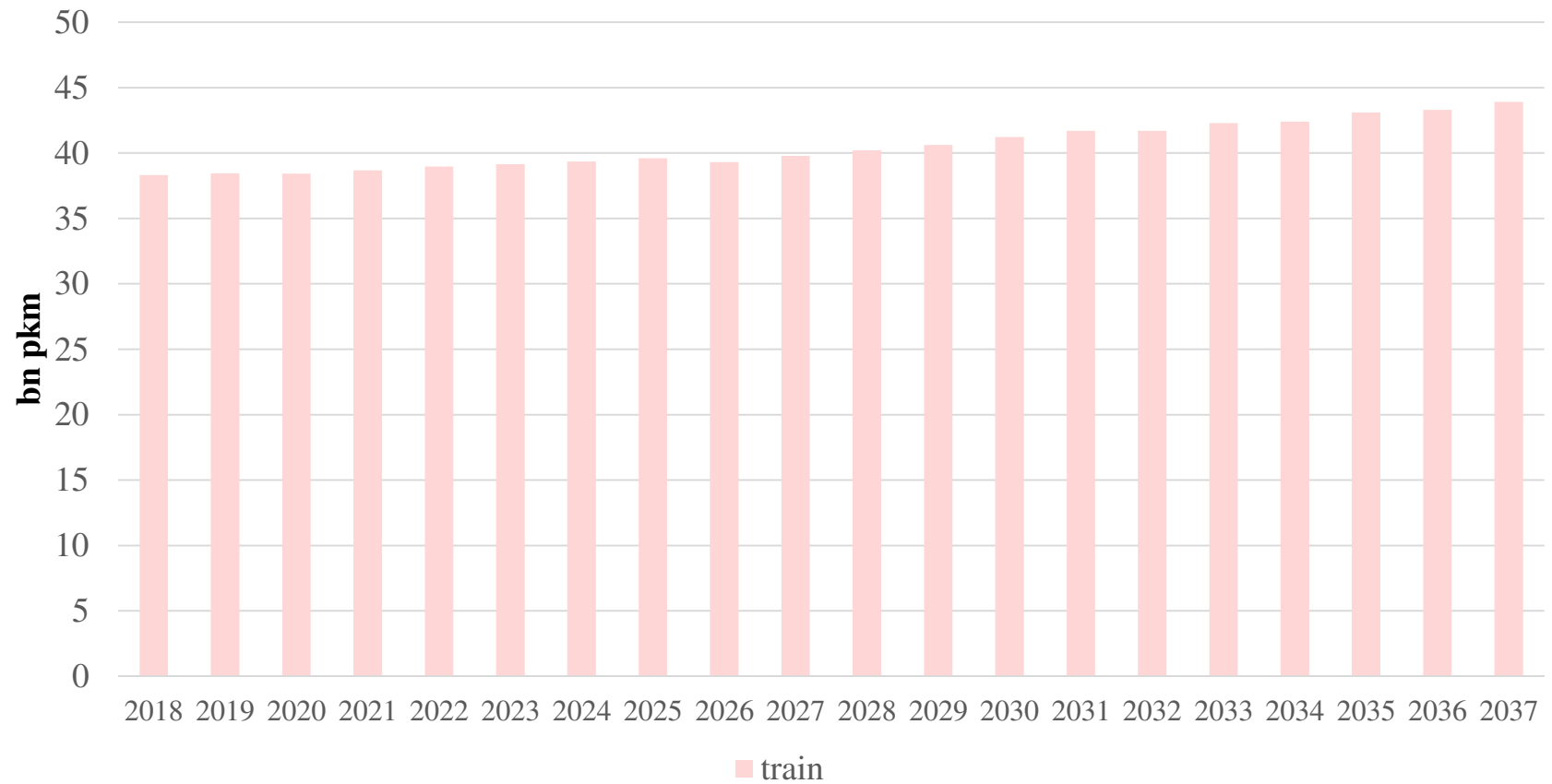
# Results (3)

Passenger kilometers (benchmark case, intercity bus)



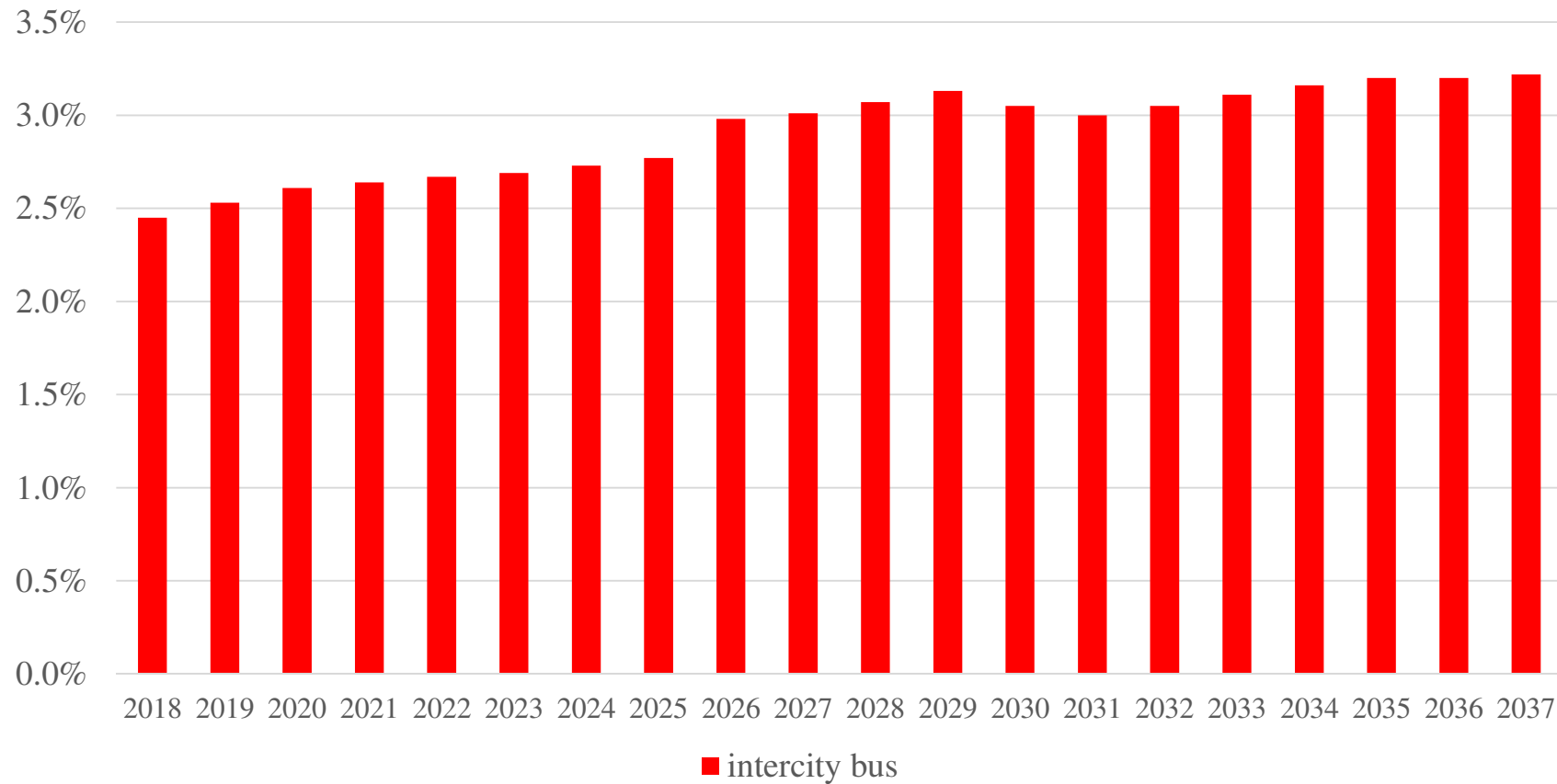
# Results (4)

Passenger kilometers (benchmark case, train)



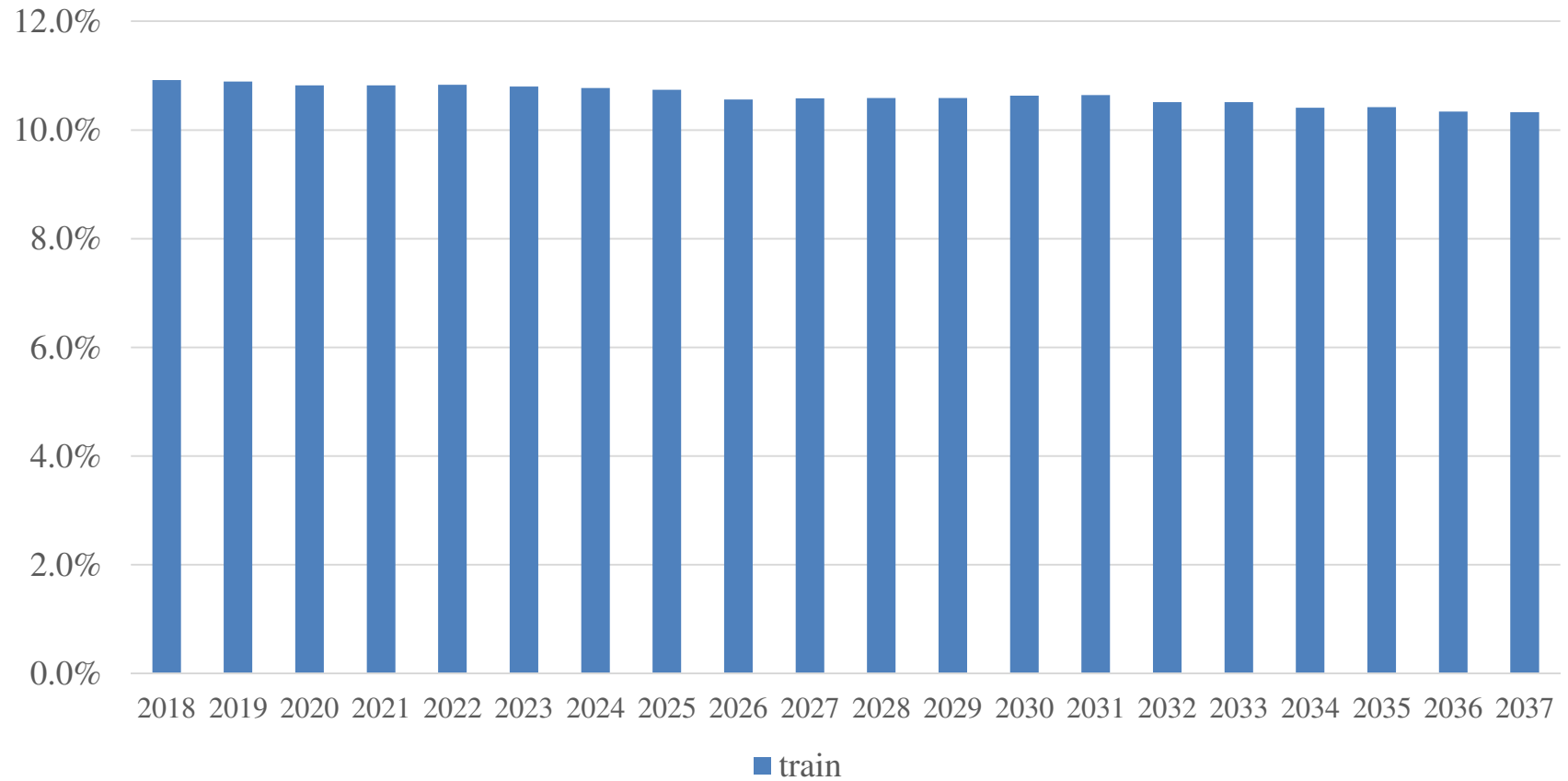
# Results (5)

Modal share (benchmark case, intercity bus)



# Results (6)

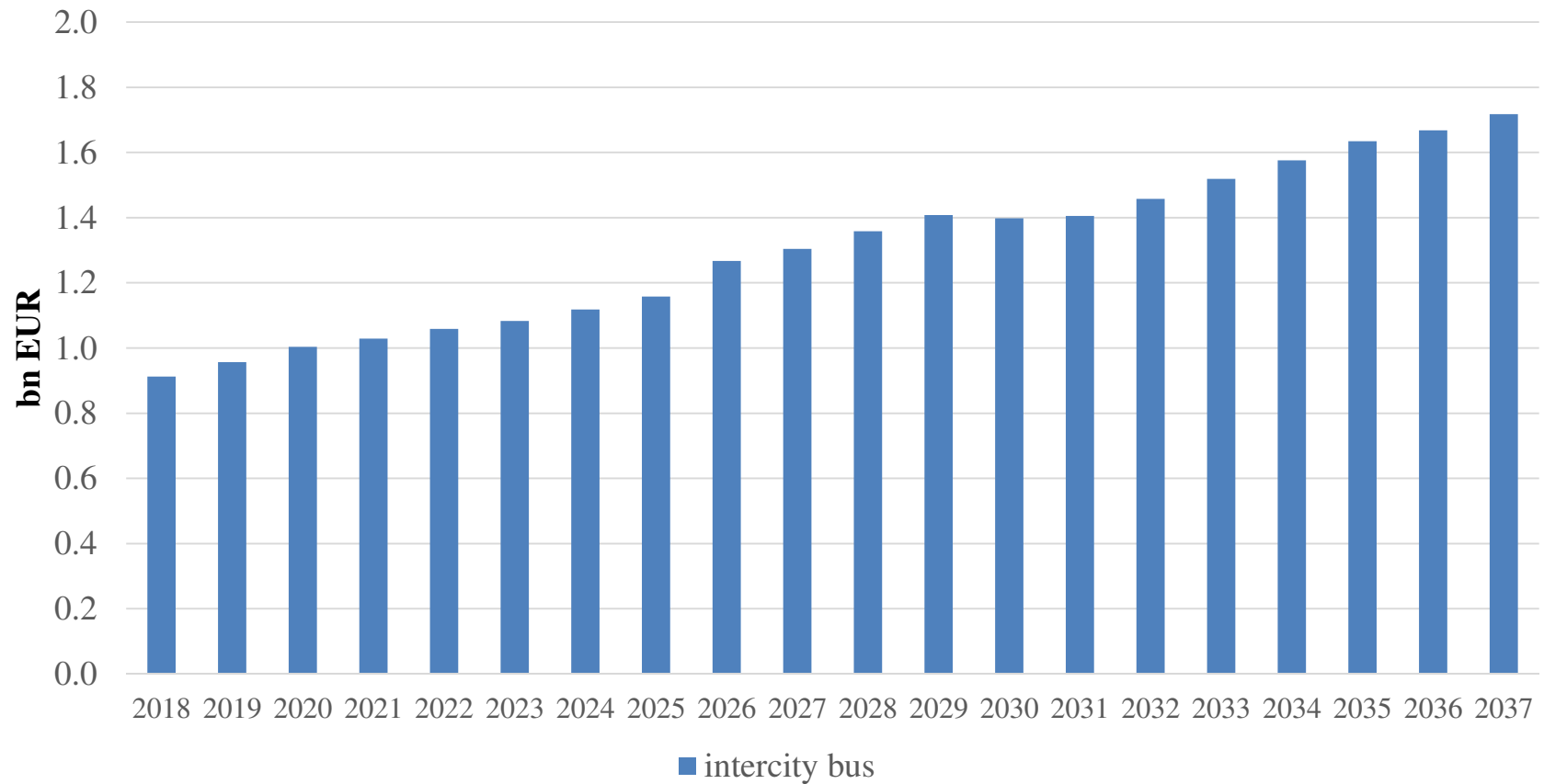
Modal share (benchmark case, train)





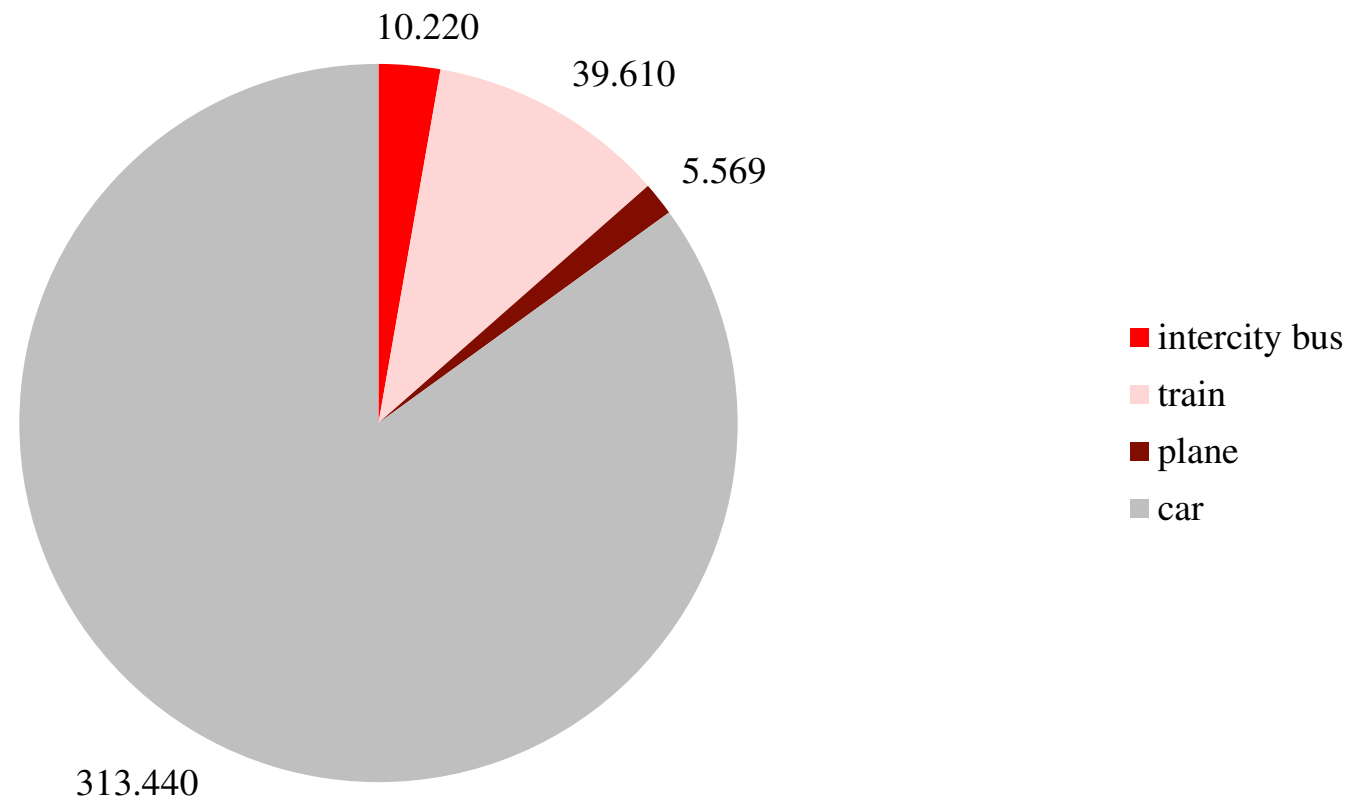
# Results (7)

Development of revenue (benchmark case, intercity bus)



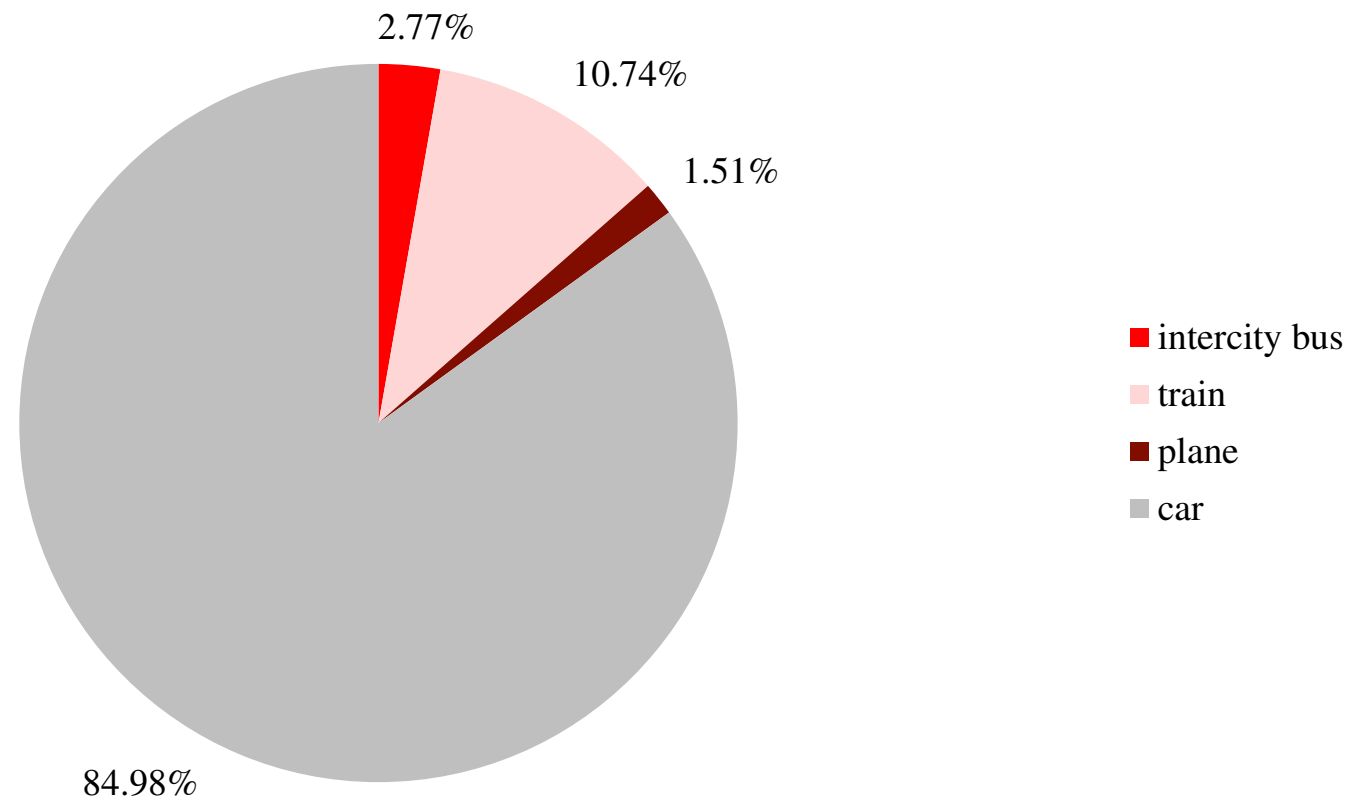
# Results (8)

Passenger kilometers (2025, bn pkm, benchmark case)



# Results (9)

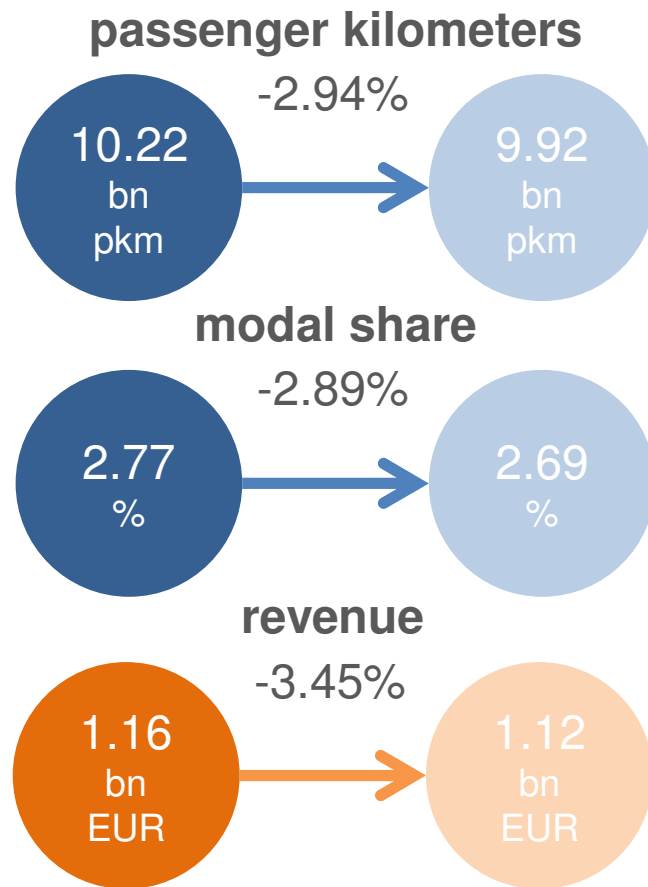
Modal share (2025, benchmark case)



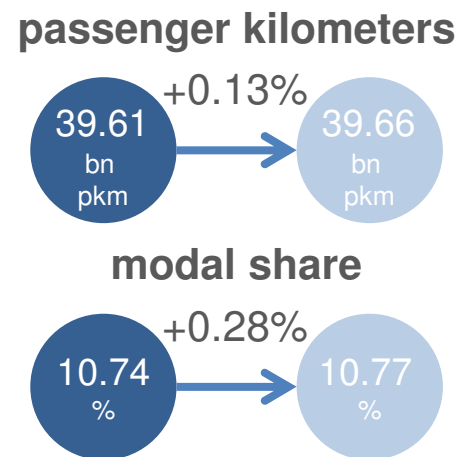
# Results (10)

Effects of road tolls | .4 ct / pkm, 2025 | "Burkert"

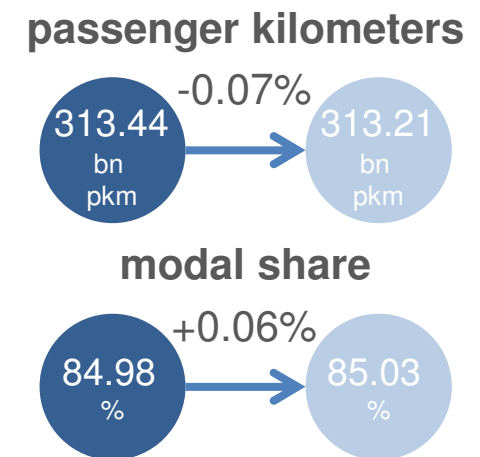
## intercity bus



## train



## car



# Results (11)

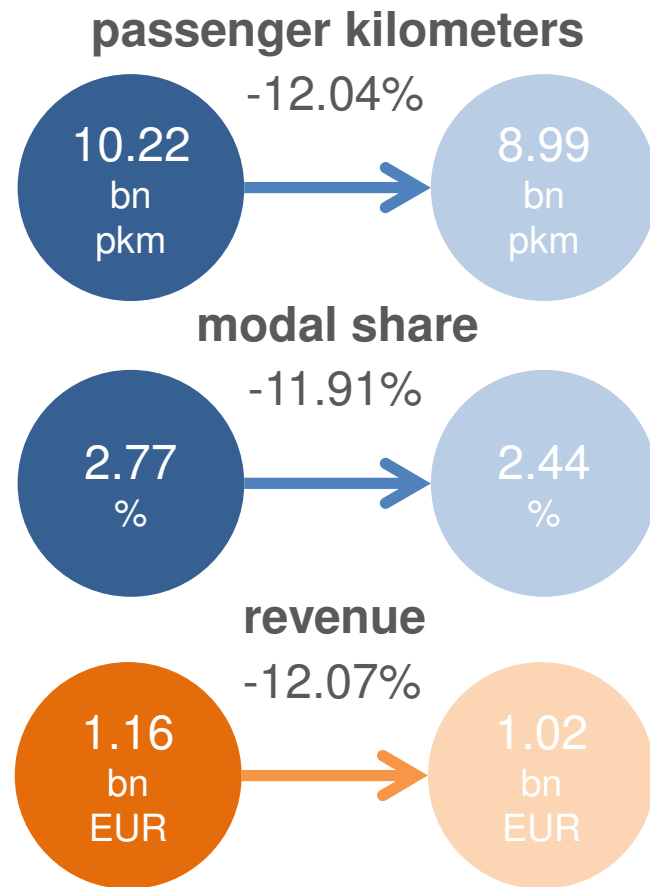
Effects of road tolls | .4 ct / pkm, 2025 | "Burkert"

- | Noticeable (but in scope very limited) impact on passenger kilometers and modal share
- | **Train hardly benefits**
- | Transports by car remain largely unaffected

# Results (12)

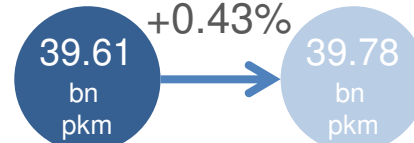
Effects of road tolls | .6 ct / pkm, 2025 | "infrastructure costs"

## intercity bus



## train

passenger kilometers



modal share



## car

passenger kilometers



modal share



# Results (13)

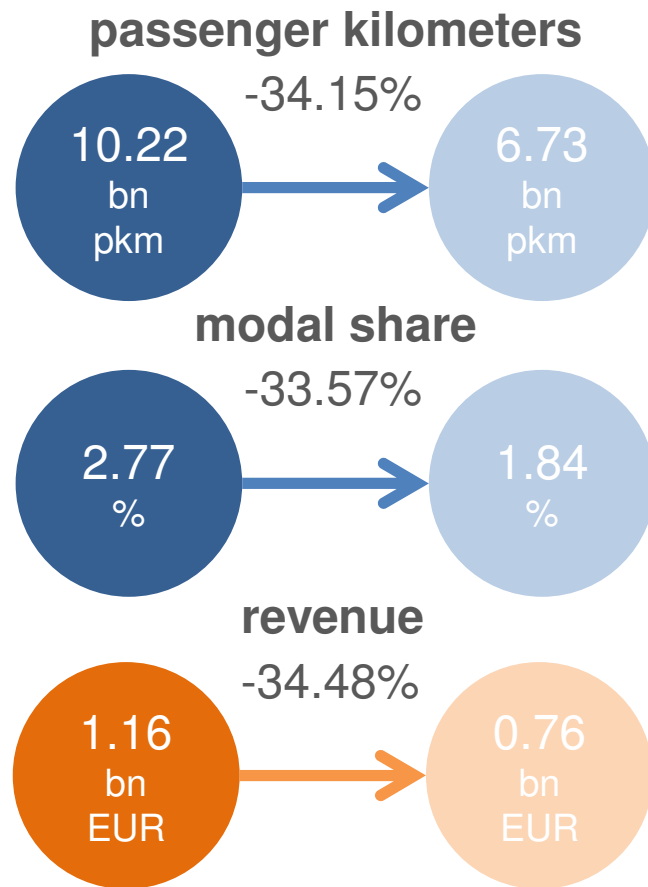
Effects of road tolls | .6 ct / pkm, 2025 | "infrastructure costs"

- | Significant impact on the intercity bus market, restriction of growth opportunities
- | **Train hardly benefits**
- | Transports by car remain largely unaffected

# Results (14)

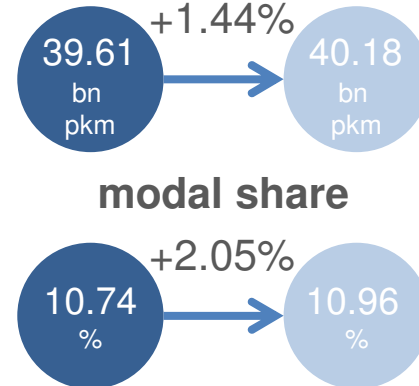
Effects of road tolls | 3.0 ct / pkm, 2025 | "far out"

## intercity bus



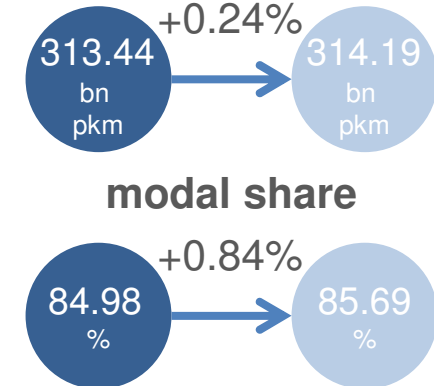
## train

**passenger kilometers**



## car

**passenger kilometers**





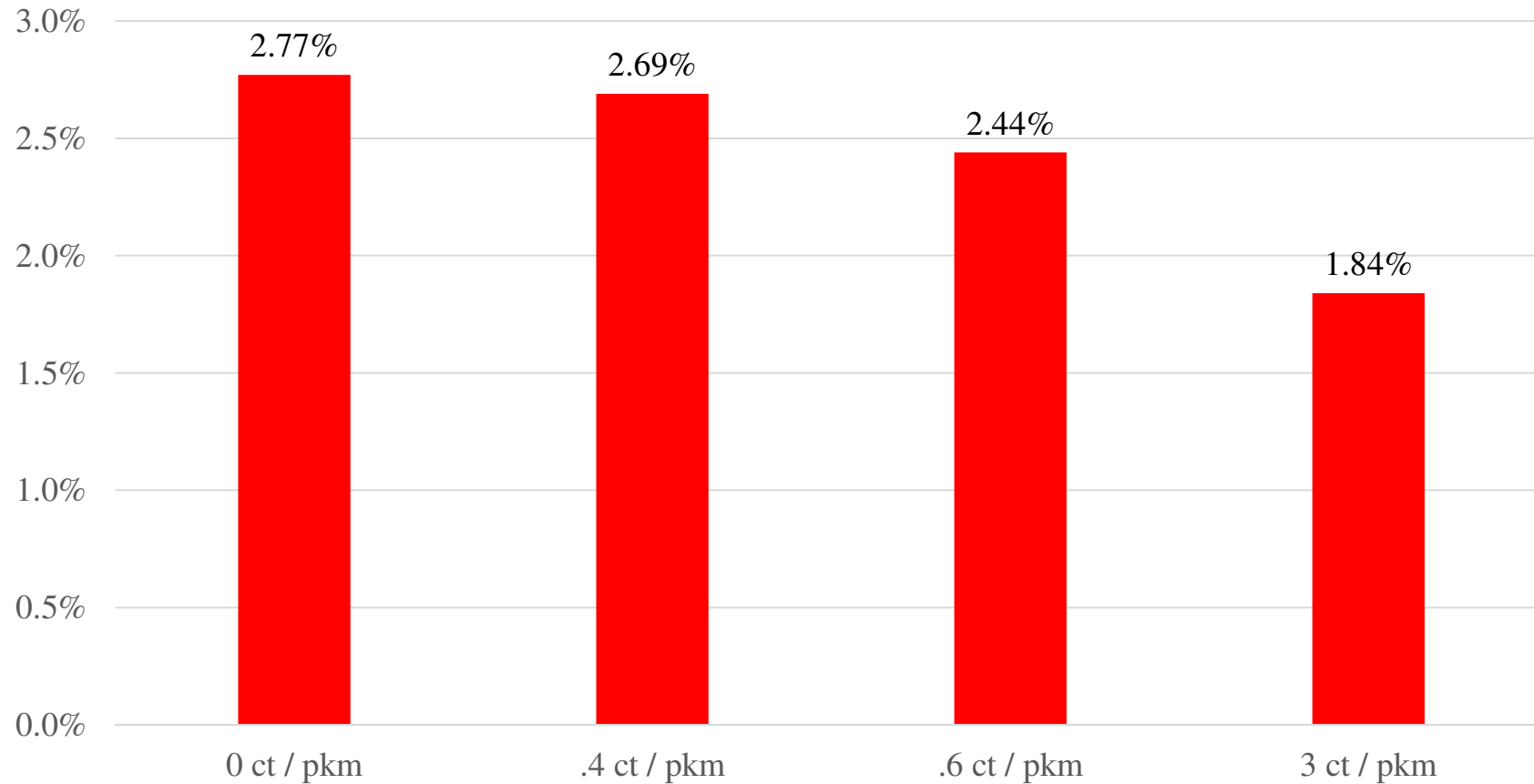
# Results (15)

Effects of road tolls | 3.0 ct / pkm, 2025 | "far out"

- | Massive impact on the intercity bus market, hardly any opportunities for further growth
- | **Train benefits visibly, but still relatively little**
- | Transports by car remain largely unaffected

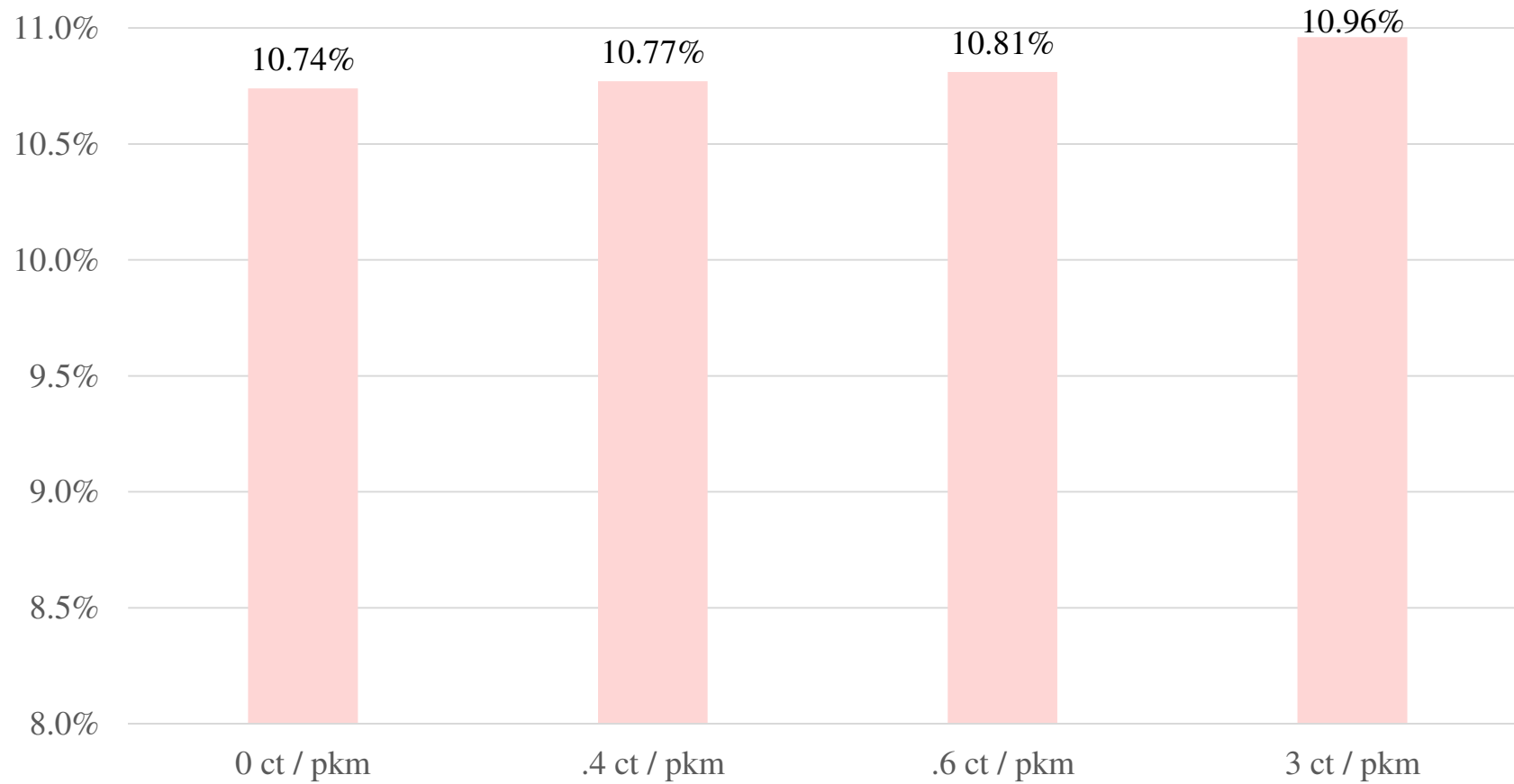
# Results (16)

Modal share, intercity bus, 2025, toll rates



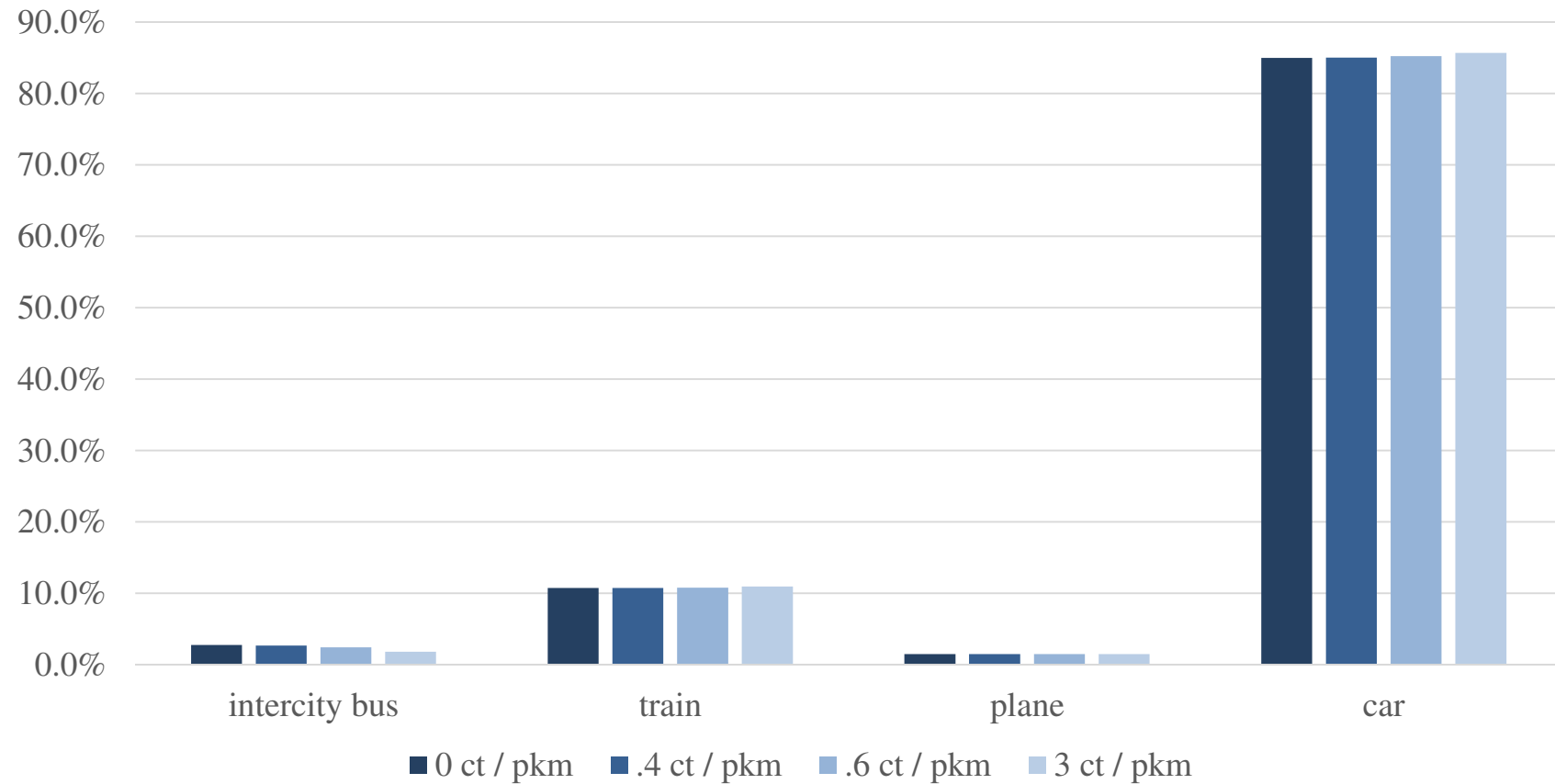
# Results (17)

Modal share, train, 2025, toll rates



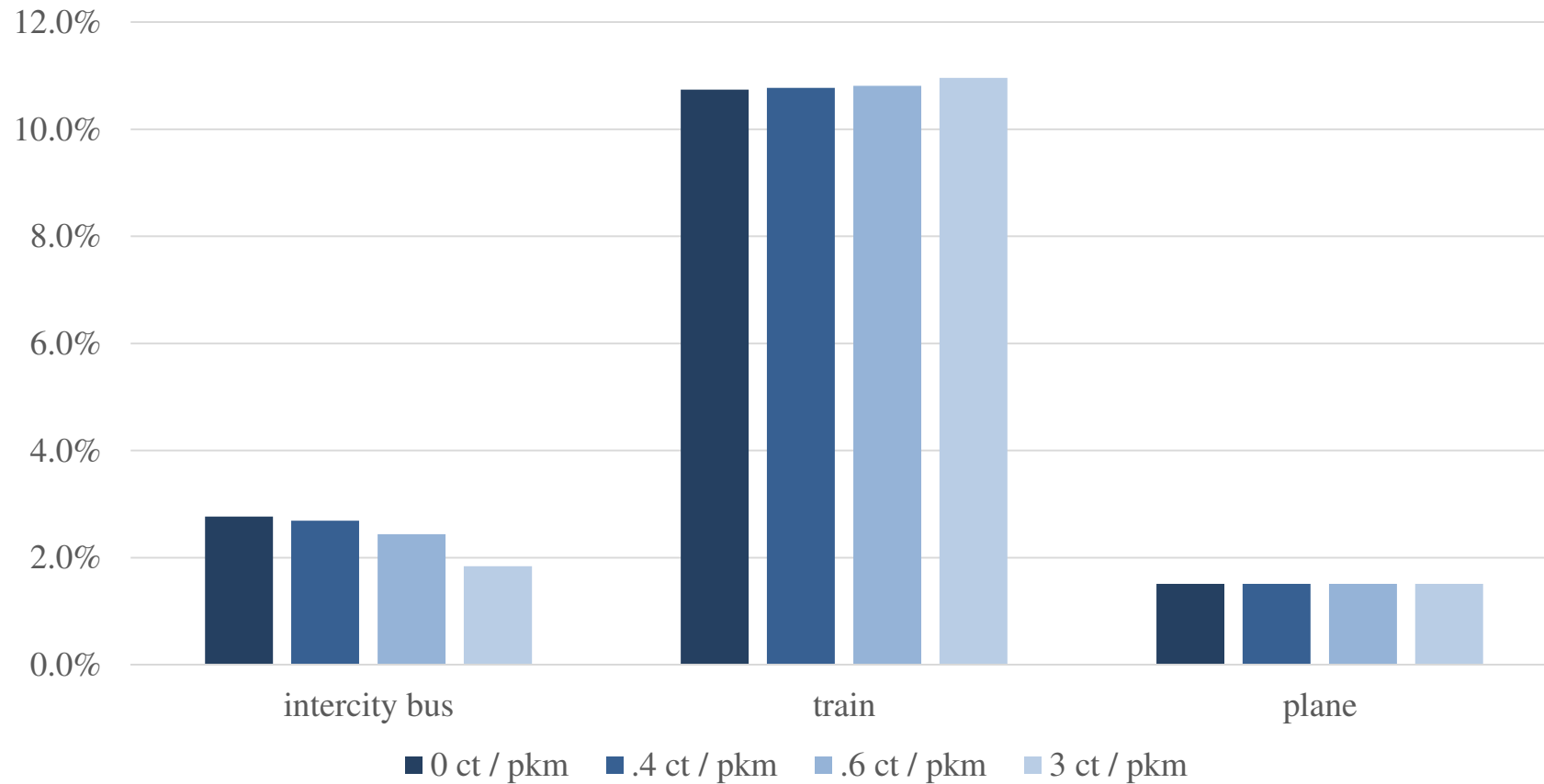
# Results (18)

Modal share, all modes, 2025, toll rates



# Results (19)

Modal share, public transport, 2025, toll rates



# Results (20)

Toll revenues, toll rates, m EUR

	0 ct / pkm	.4 ct / pkm	.6 ct / pkm	3 ct / pkm
2018	0.00	33.37	49.37	178.20
<b>2025</b>	<b>0.00</b>	<b>42.33</b>	<b>57.56</b>	<b>215.47</b>
2037	0.00	61.25	89.18	295.41

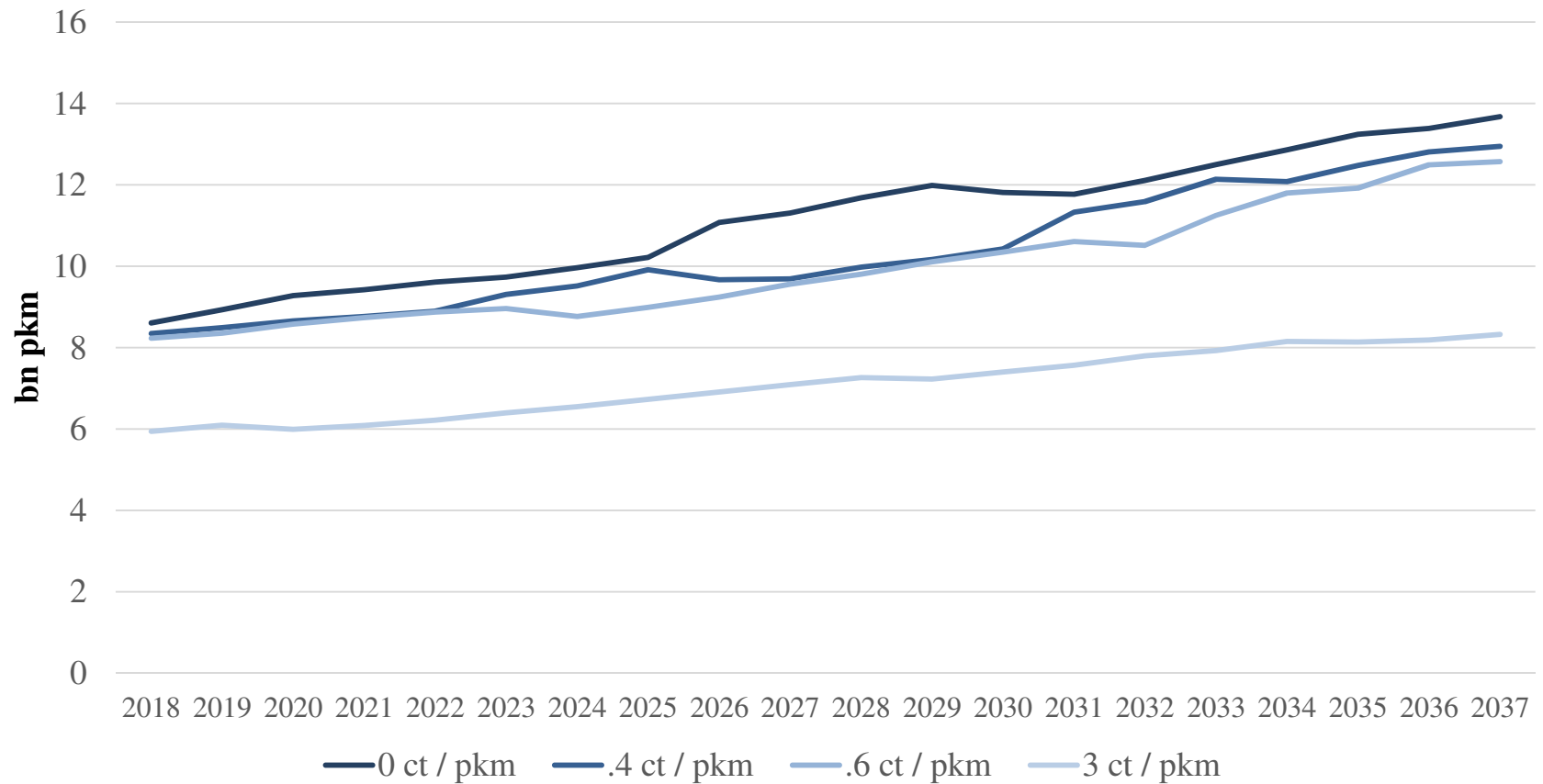
# Results (21)

Revenue (intercity bus), toll rates, bn EUR

	0 ct / pkm	.4 ct / pkm	.6 ct / pkm	3 ct / pkm
2018	0.91	0.89	0.87	0.63
<b>2025</b>	<b>1.16</b>	<b>1.12</b>	<b>1.02</b>	<b>0.76</b>
2037	1.72	1.63	1.58	1.05

# Results (22)

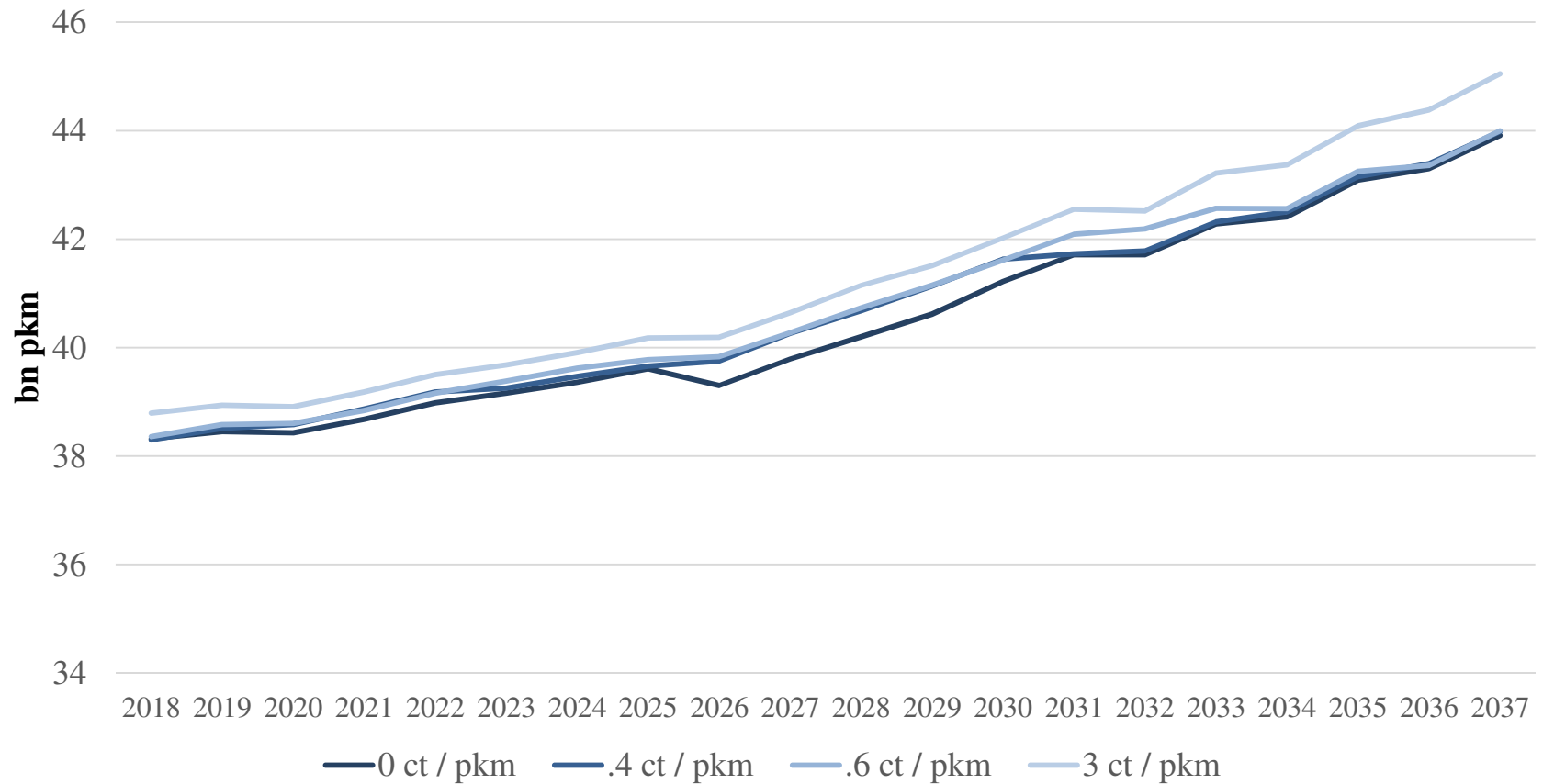
Development of pkm (intercity bus), toll rates





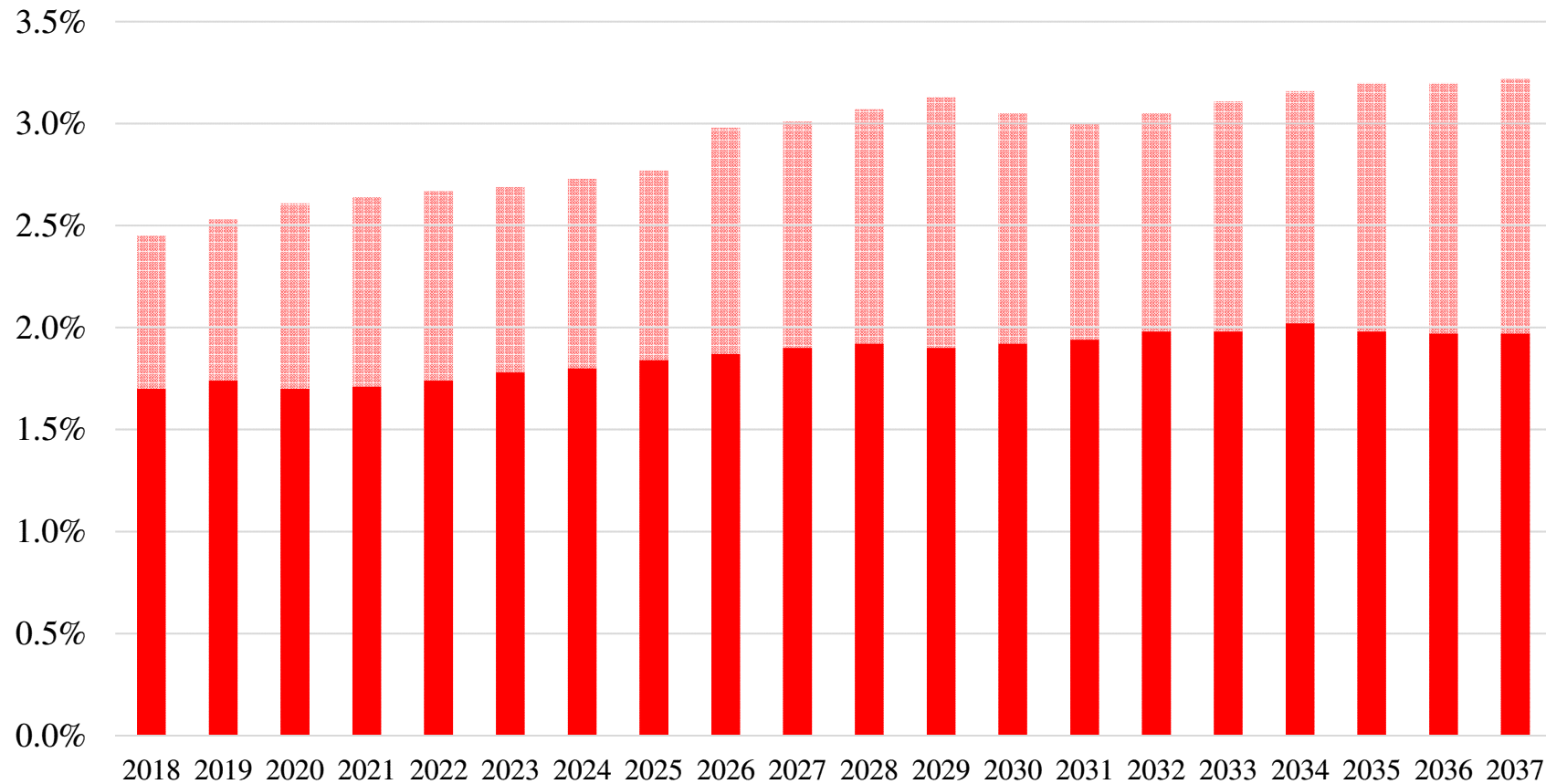
# Results (23)

Development pkm (train), toll rates



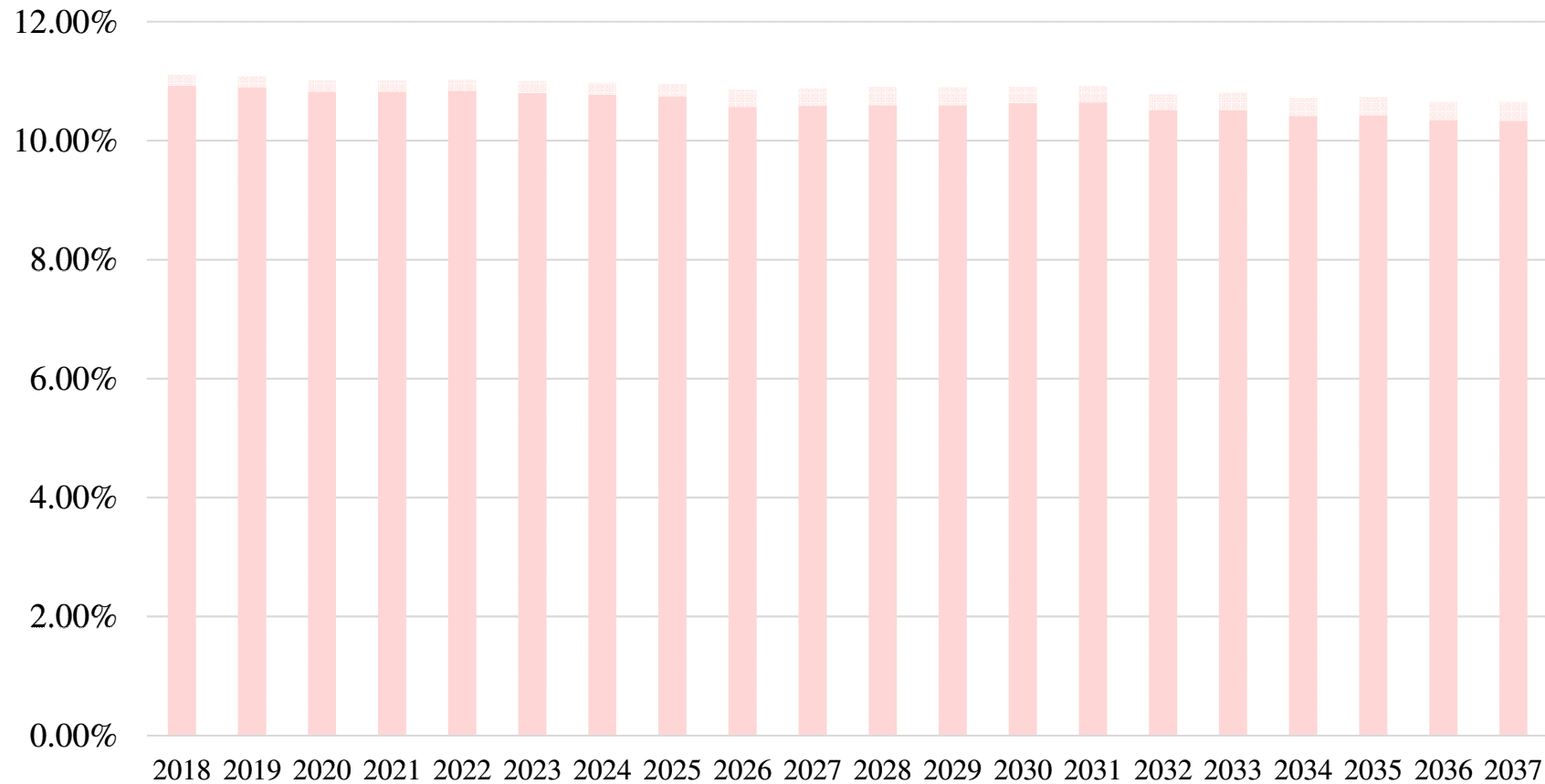
# Results (24)

Modal share (intercity bus), benchmark vs 3 ct / pkm



# Results (25)

Modal share (train), benchmark vs 3 ct / pkm



# Conclusion

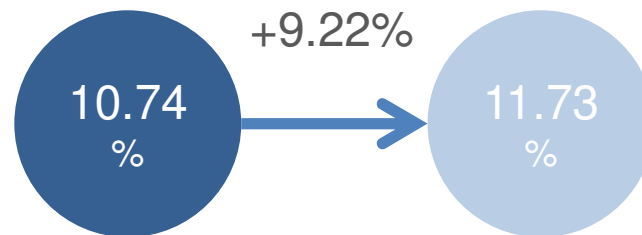
- | Demand for road tolls is mautable from a political-economic point of view: Deutsche Bahn and stakeholders want tolls as a "guard fence" against intercity buses
- | Toll (at realistic rates) dampens growth in the intercity bus sector, but does not lead to a significant modal shift in favor of the railway sector
- | Loss of welfare due to lost trips (caused by the increase of mobility costs)

# Discussion

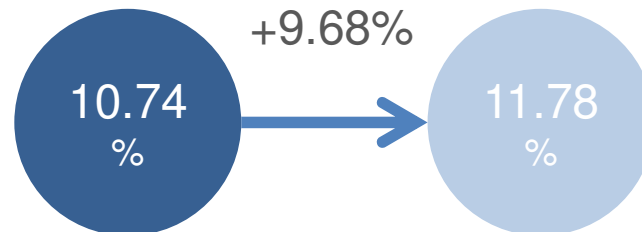
uKZ\*-Case („Halbierung der Schienenmaut“), 2025

## train

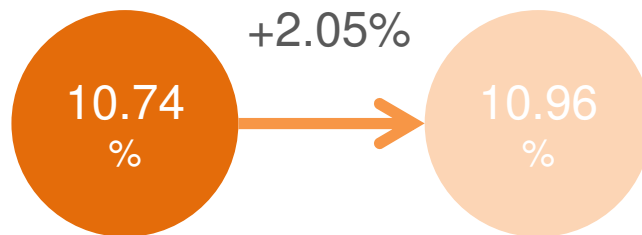
modal share (without additional tolls for intercity buses)



modal share (+ additional tolls for intercity buses)



modal share (3 ct / pkm only)



\*cost that is directly incurred as a result of operating the train service

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