

# An agent-based model of Île-de-France

## Overview and first results

Sebastian Hörl

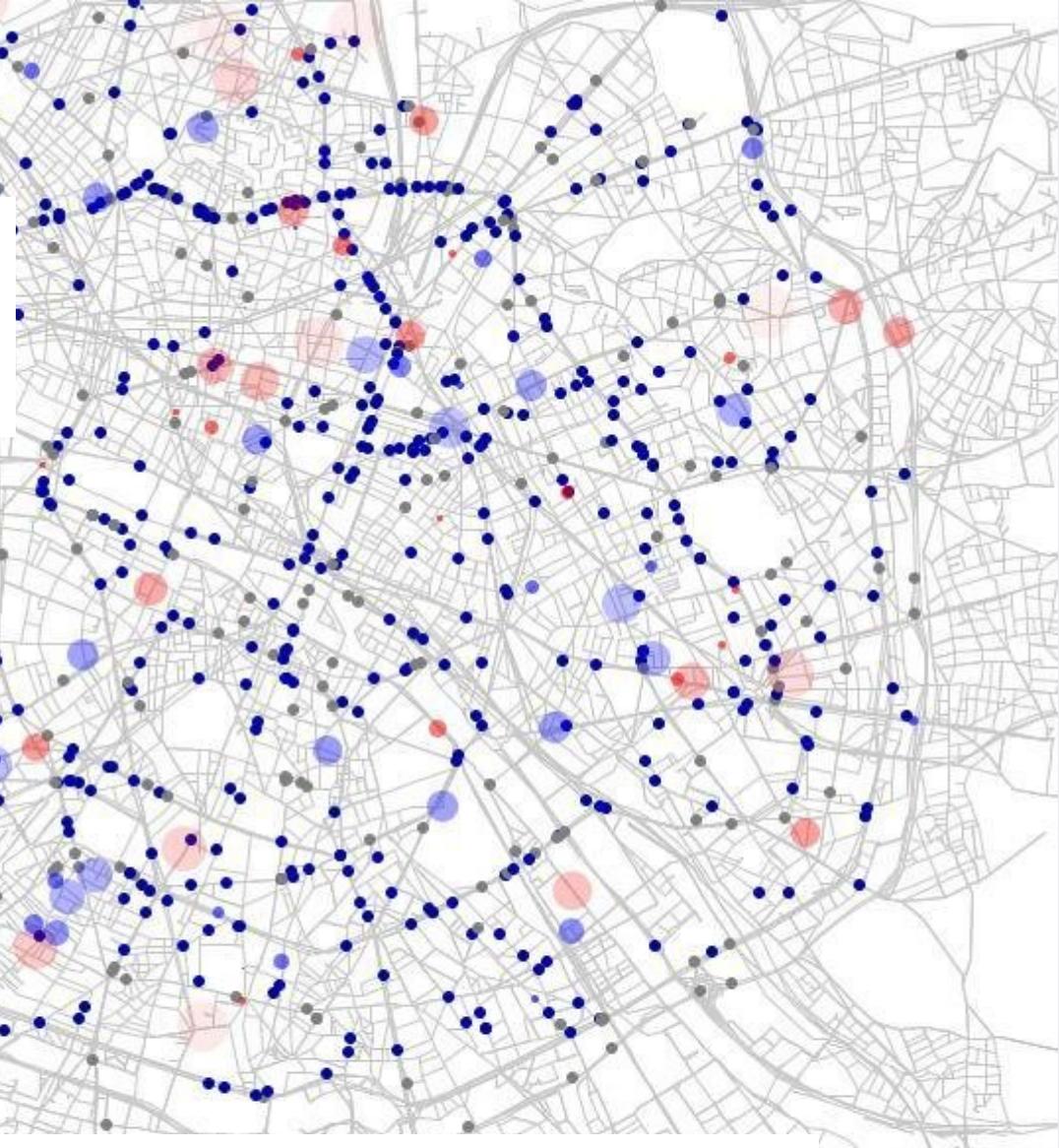
MATSim Conference Paris  
26 September 2019



Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich



Institut für Verkehrsplanung und Transportsysteme  
Institute for Transport Planning and Systems



# The street in 1900



# The street today



# The street of tomorrow?

- Autonomous Mobility
- Mobility as a Service
- Mobility on Demand
- Electrification
- Urban Air Mobility



# Agent-based models



<https://pixabay.com/en/traffic-jam-stop-and-go-rush-hour-143391/>



# The case of Île-de-France



Census data

*Référencement de la population*



# The case of Île-de-France



RP



Dispositif sur les revenus localisés sociaux et fiscaux  
*Income tax data*



# The case of Île-de-France



RP



FiLoSoFi



RP: Flux de mobilité  
*Commuting data*



# The case of Île-de-France



RP



FiLoSoFi



RP Mob



Enquête globale de transport  
*Household Travel Survey*



Enquête national transports et déplacements  
*Household Travel Survey*



# The case of Île-de-France



RP



FiLoSoFi



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Enquête globale de transport  
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# The case of Île-de-France



RP



FiLoSoFi



RP Mob



EGT



ENTD



BPE

Base permanente des équipements  
*Enterprise census*



# The case of Île-de-France



RP



FiLoSoFi



RP Mob



EGT



ENTD



BPE



OpenStreetMap  
*Road network*



IDFm GTFS  
*Public transport schedule*

# The case of Île-de-France



RP



FiLoSoFi



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EGT



ENTD



BPE



OSM



GTFS

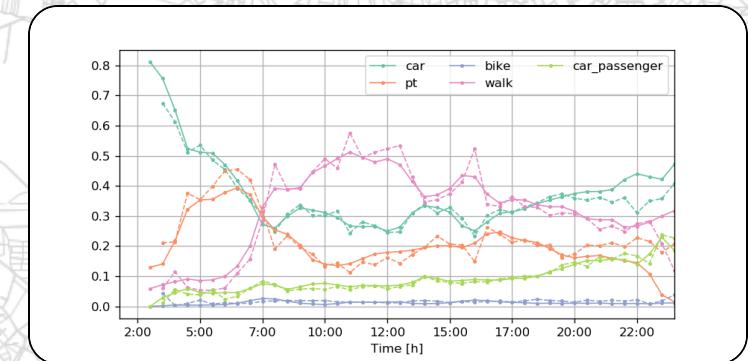
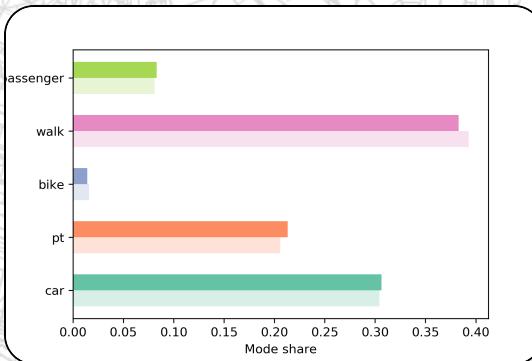
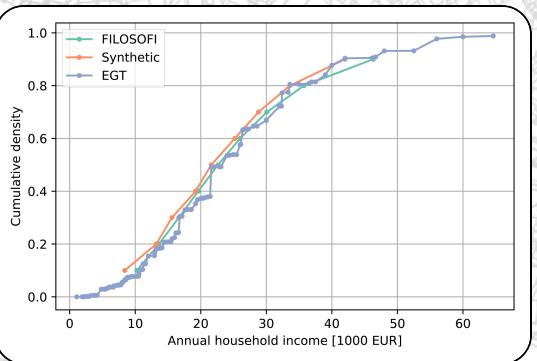
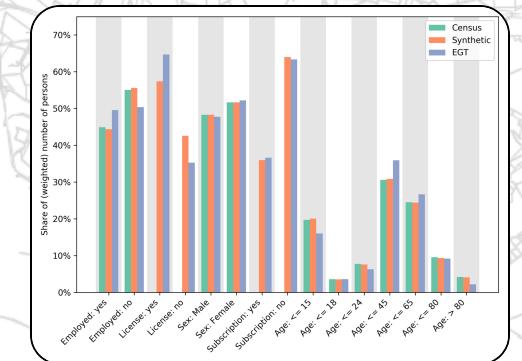


Discrete choice model  
*Agent behaviour*

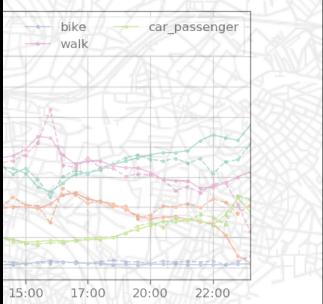
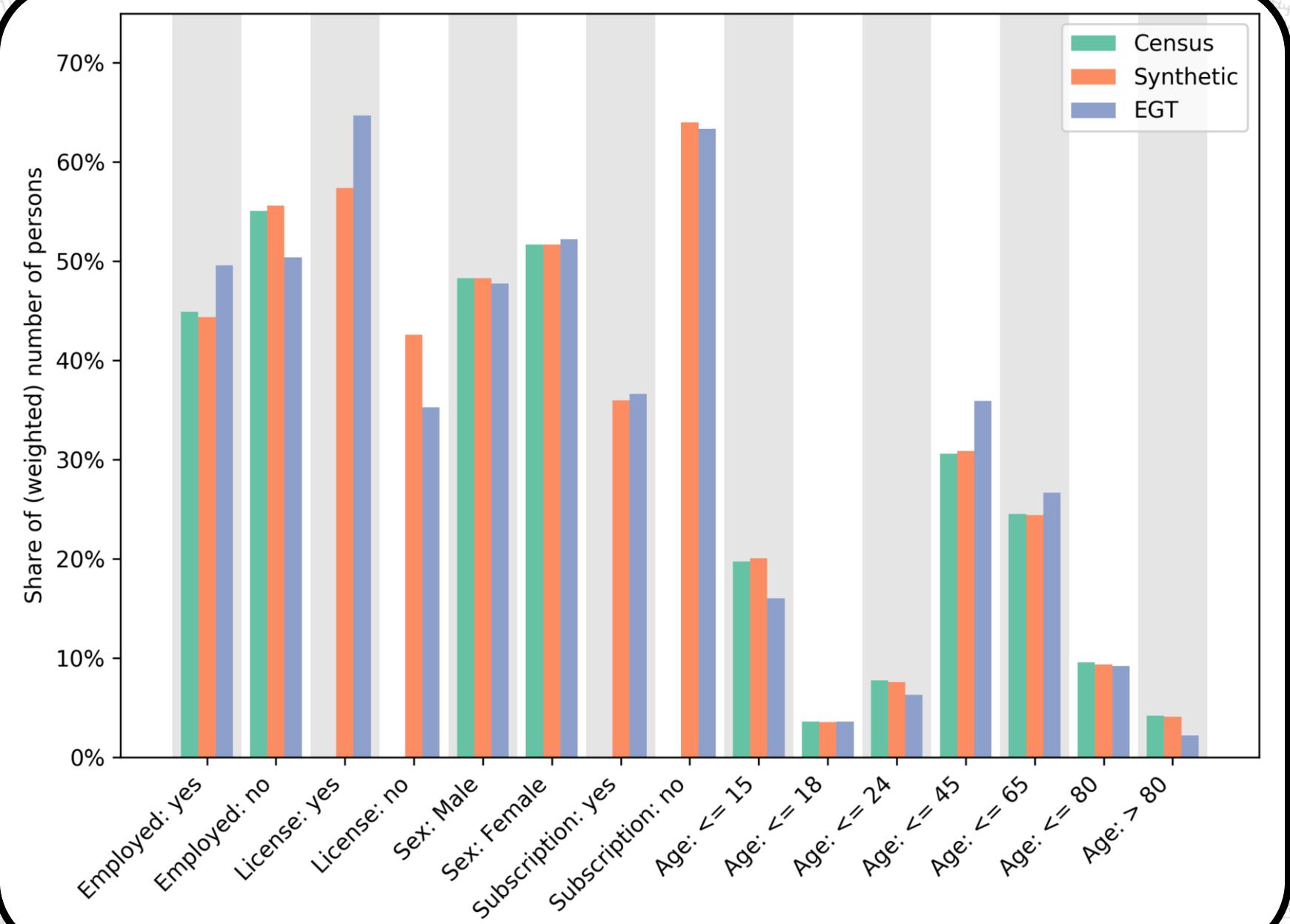
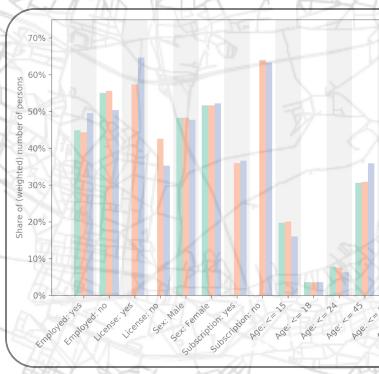
# The case of Île-de-France



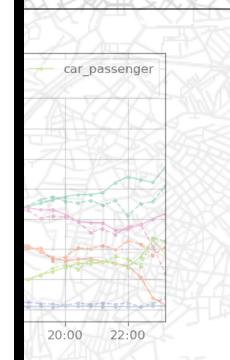
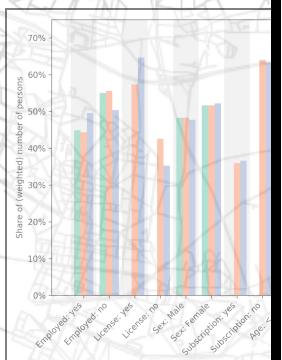
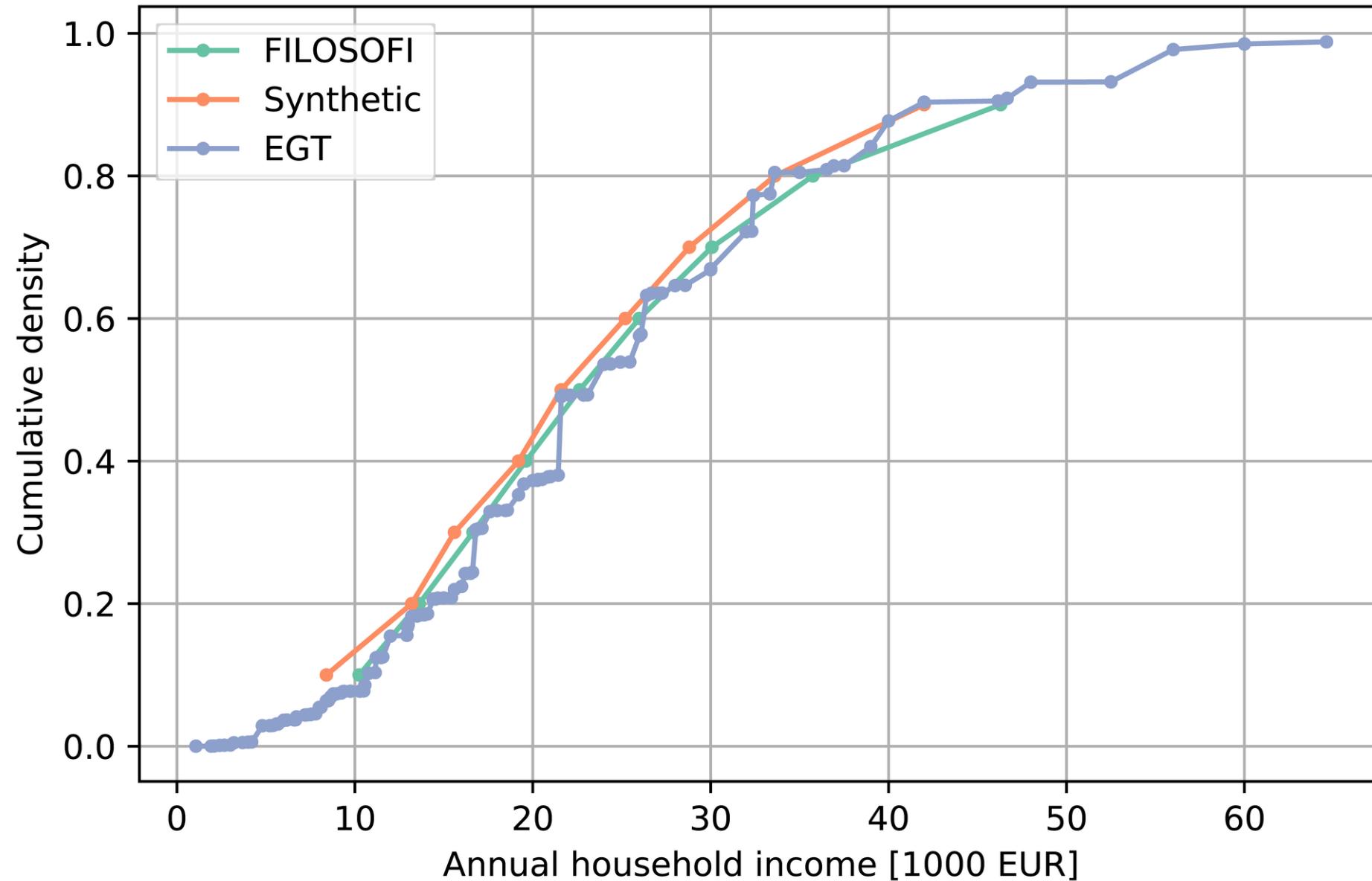
# The case of Île-de-France



# The case



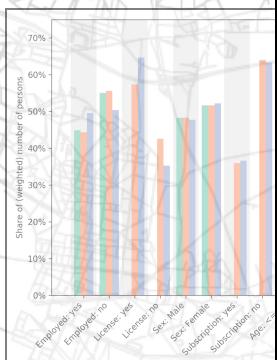
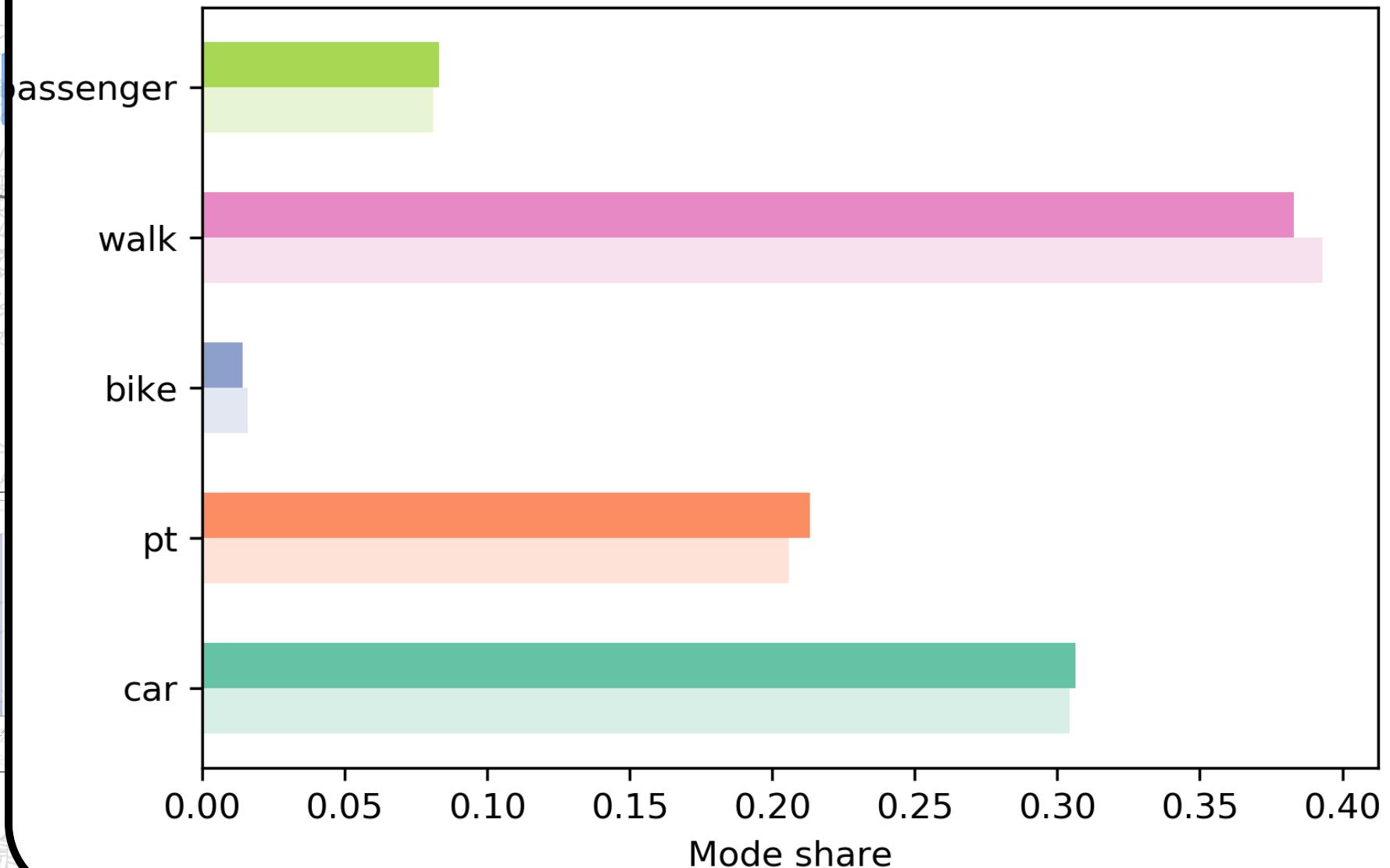
# The car

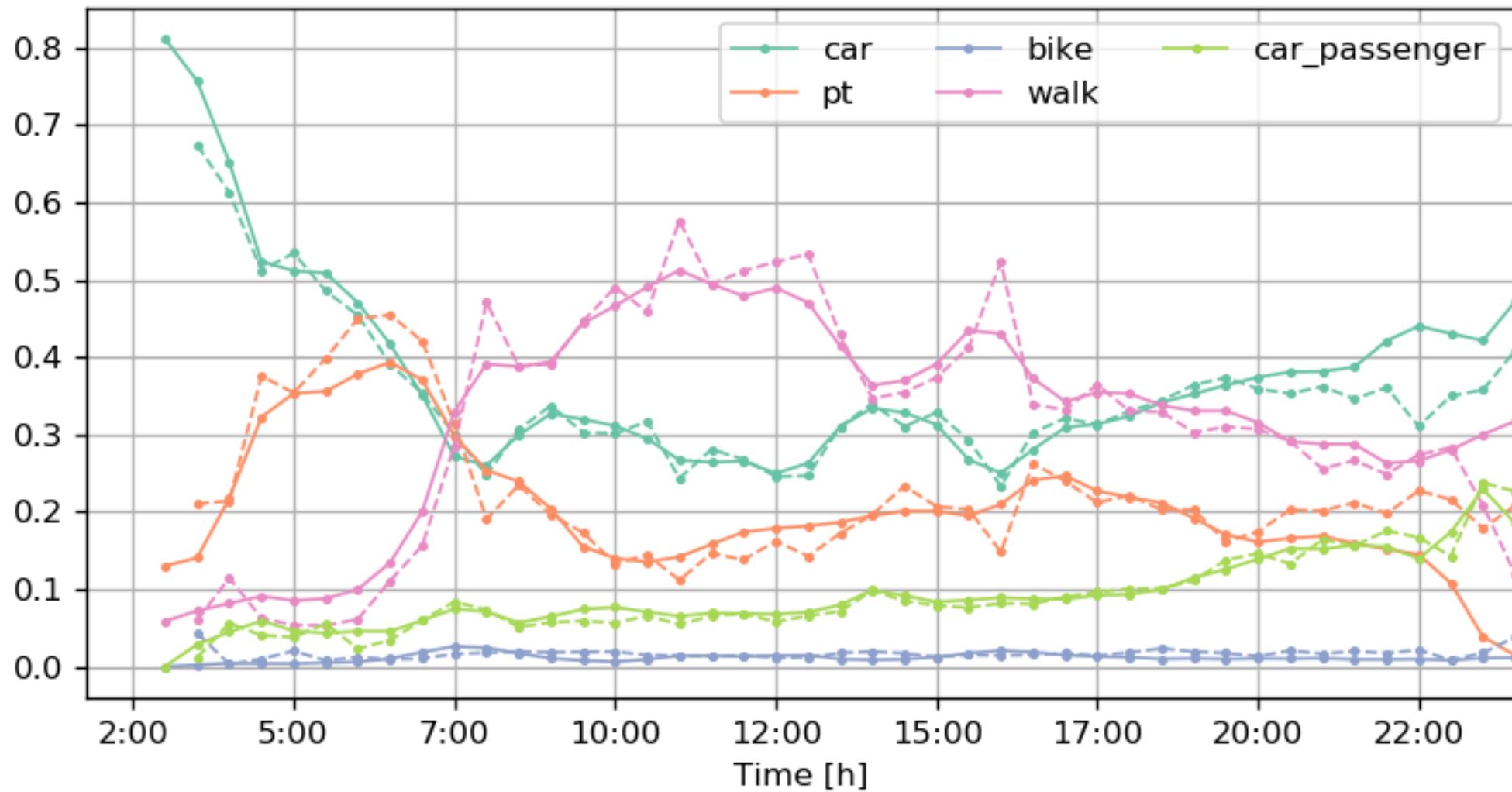


# The car

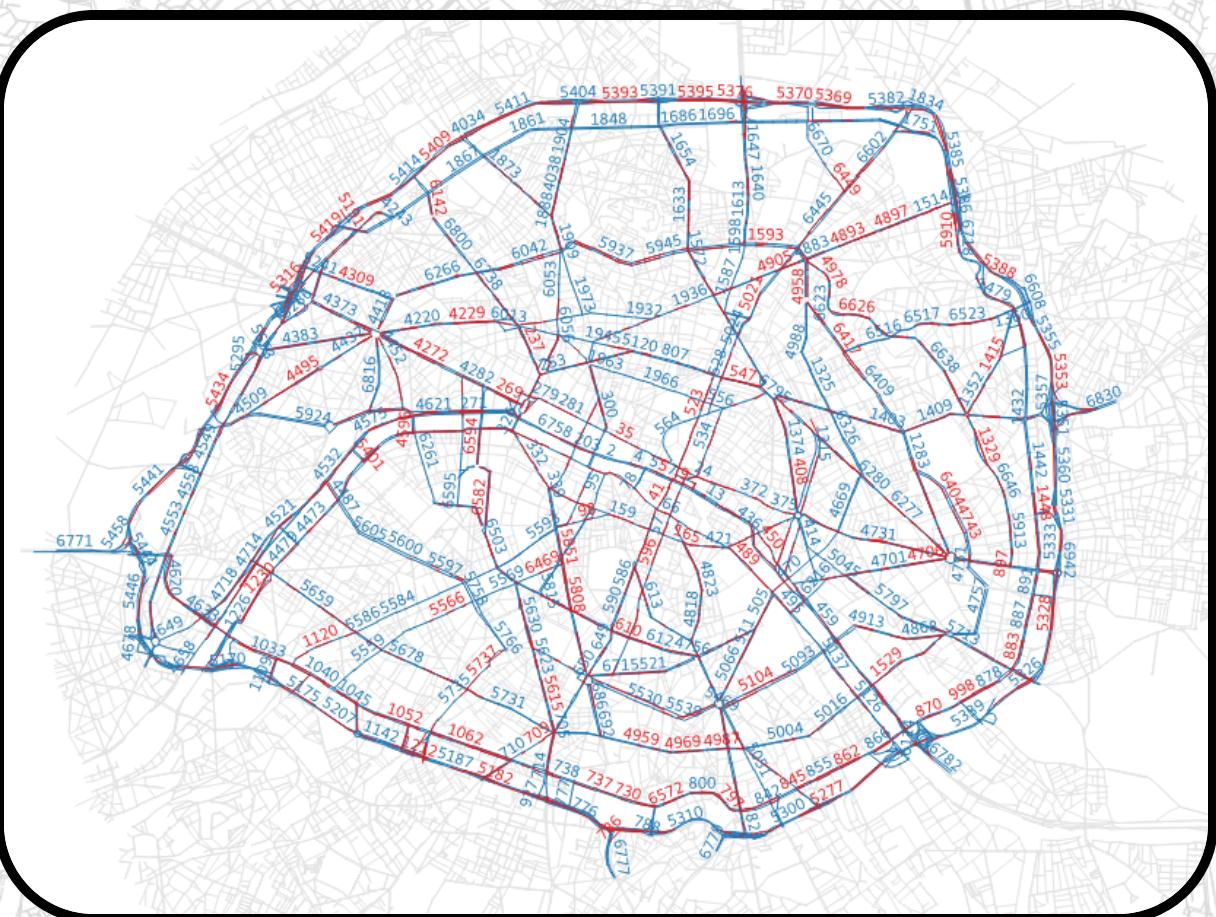


RP





# The case of Île-de-France



# The case of Île-de-France



RP



FiLoSoFi



RP Mob



EGT



ENTD



BPE



OSM

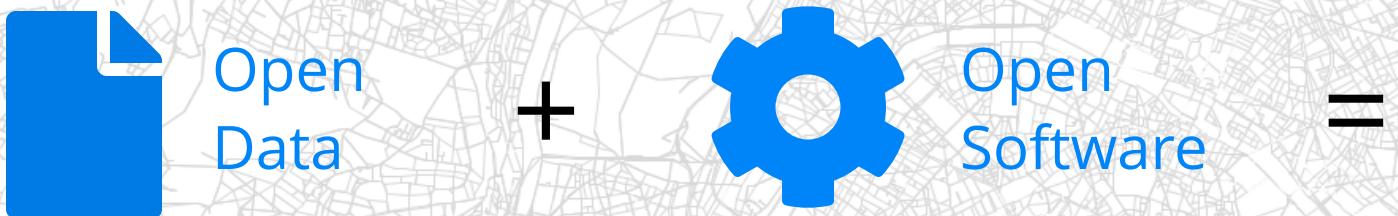


GTFS



DCM

# The case of Île-de-France



- Detailed documentation of whole open-source **pipeline** is under preparation

# Case study: AMoD

Automated mobility on demand

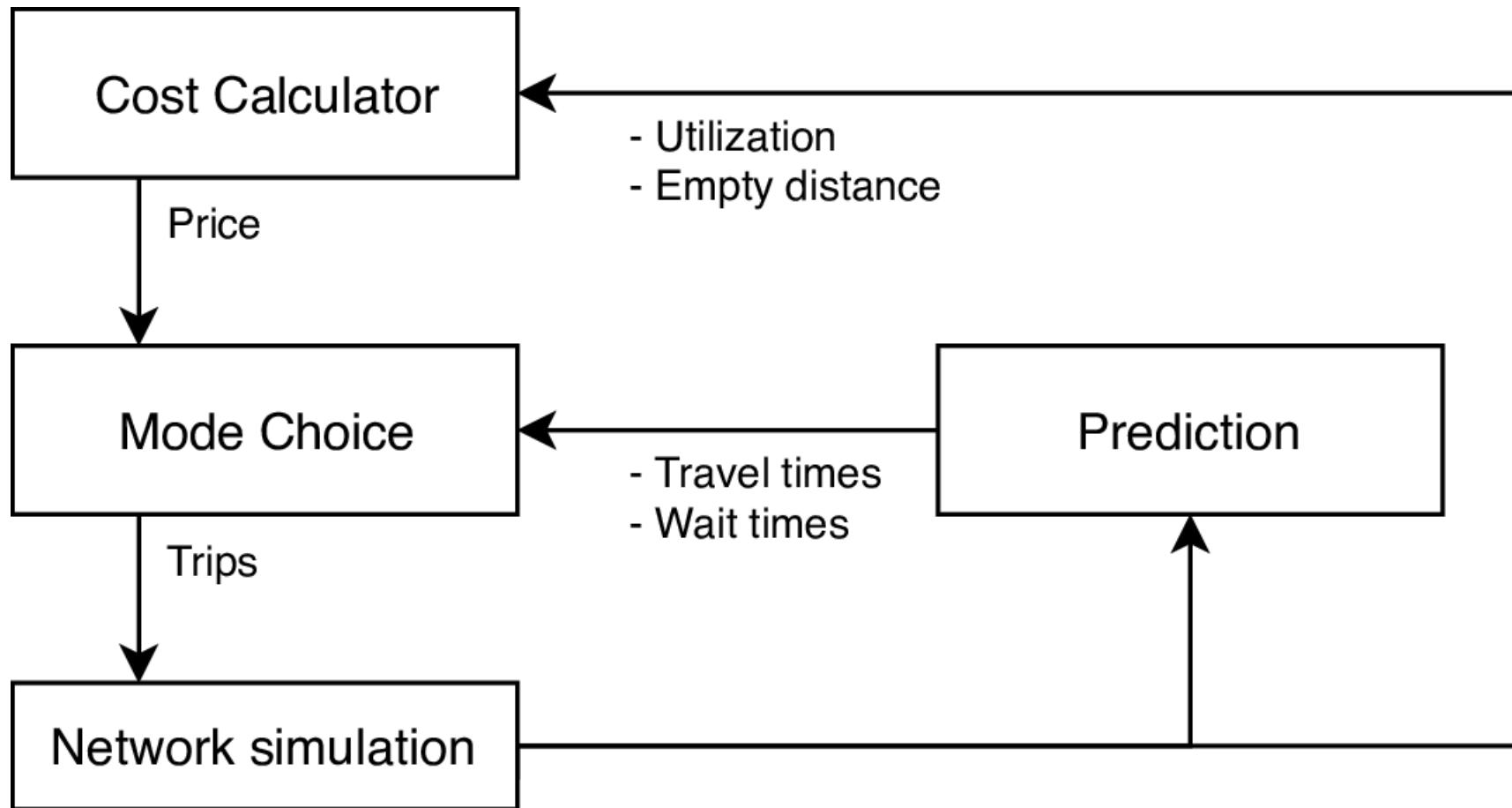
= "driverless taxi"

## Open Questions

- Optional fleet control?
- Single taxi vs. pooling?
- Induced demand?
- Policies?
- ...



# Case study: AMoD



# Case study: AMoD

Travel Behaviour

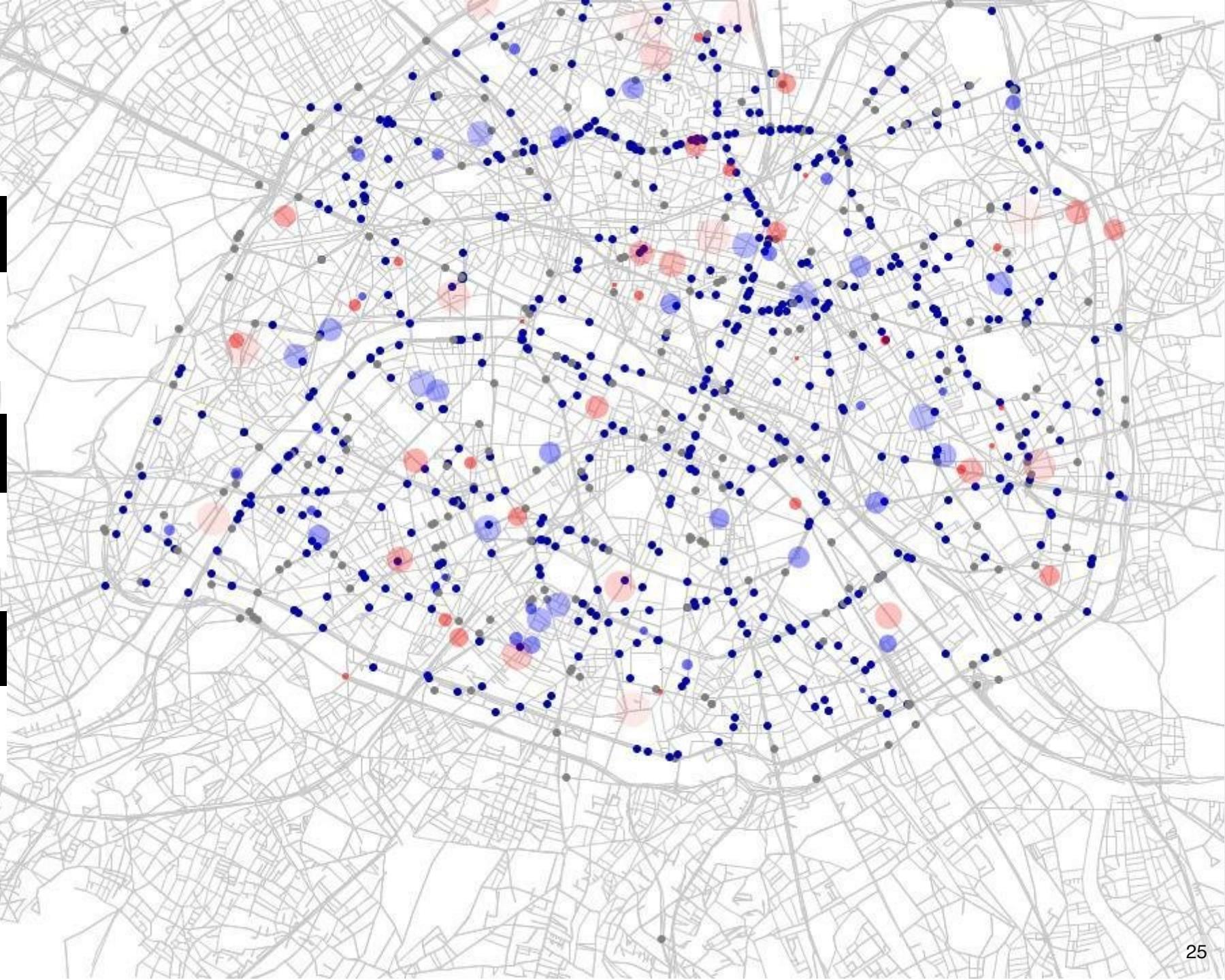
Zurich model, calibrated  
for Paris population

Cost structure

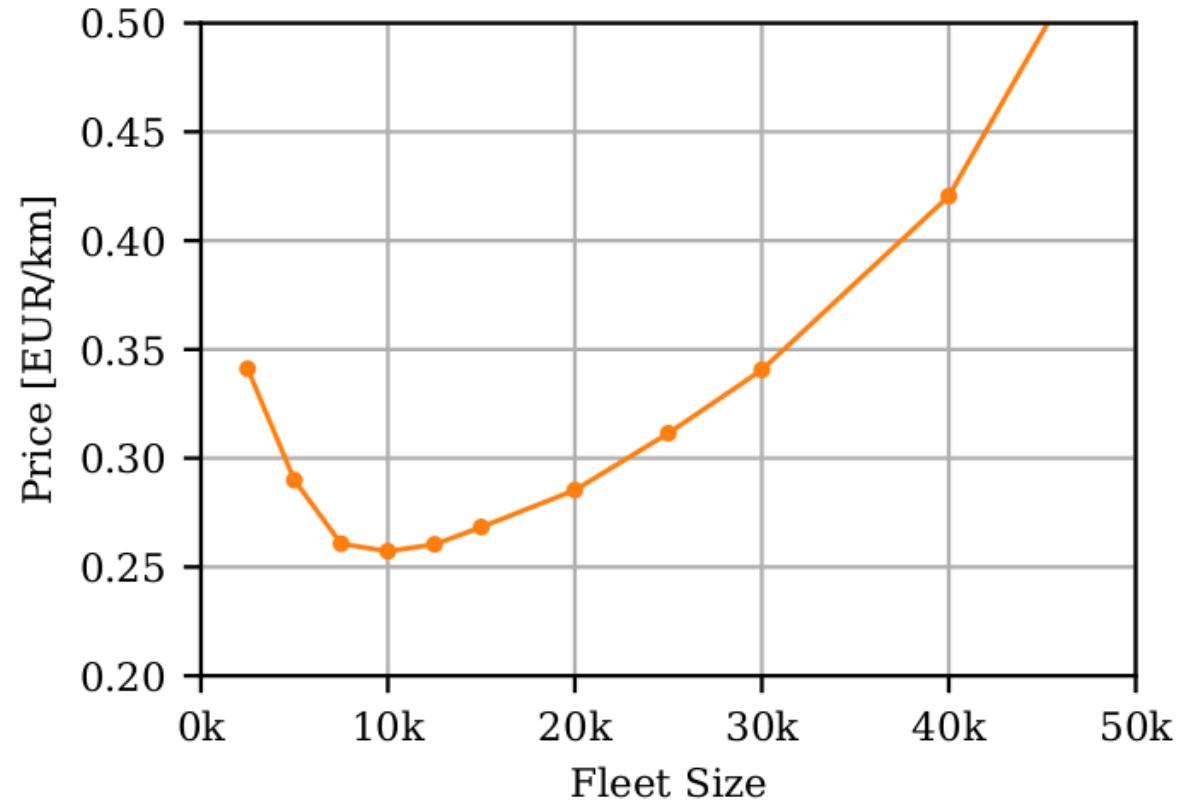
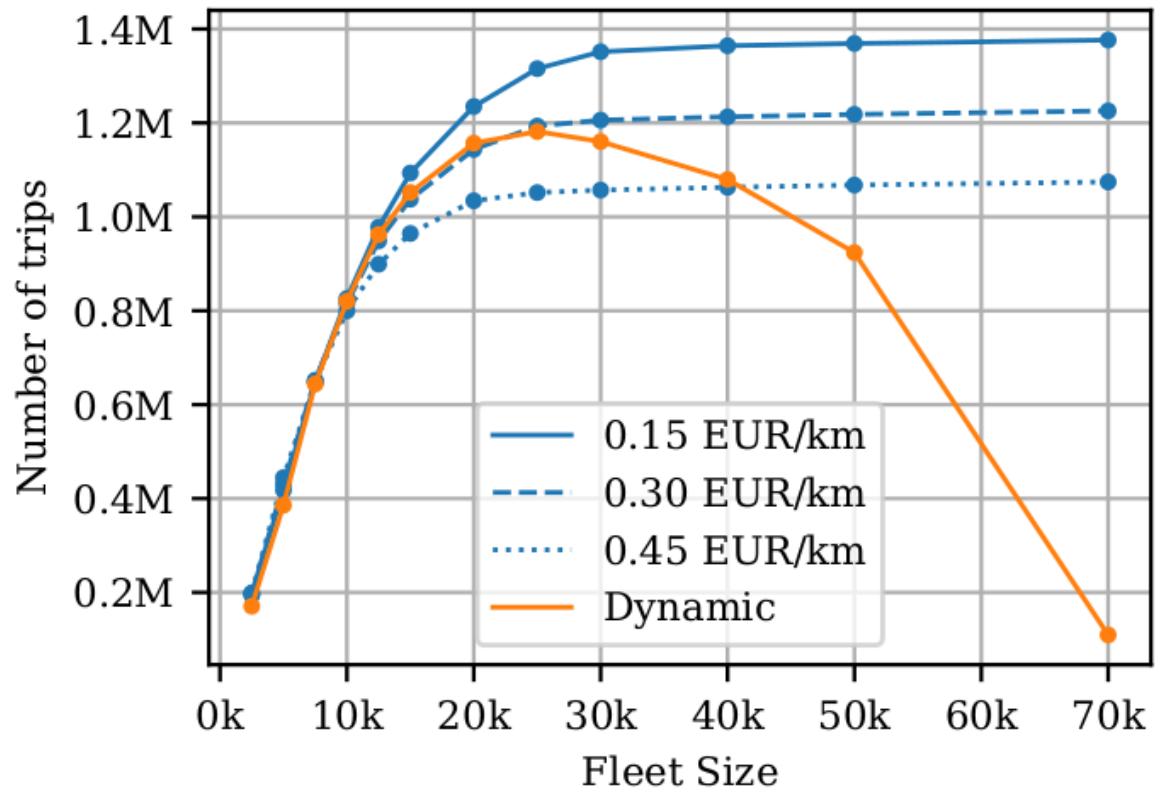
Adapted from Berlin

AMoD Simulation

Amodeus framework



# Case study: AMoD



\* Hörl, S., M. Balac, and K.W. Axhausen (2019) Dynamic demand estimation for an AMoD system in Paris, Upcoming.

**Thanks!**

**Questions?**

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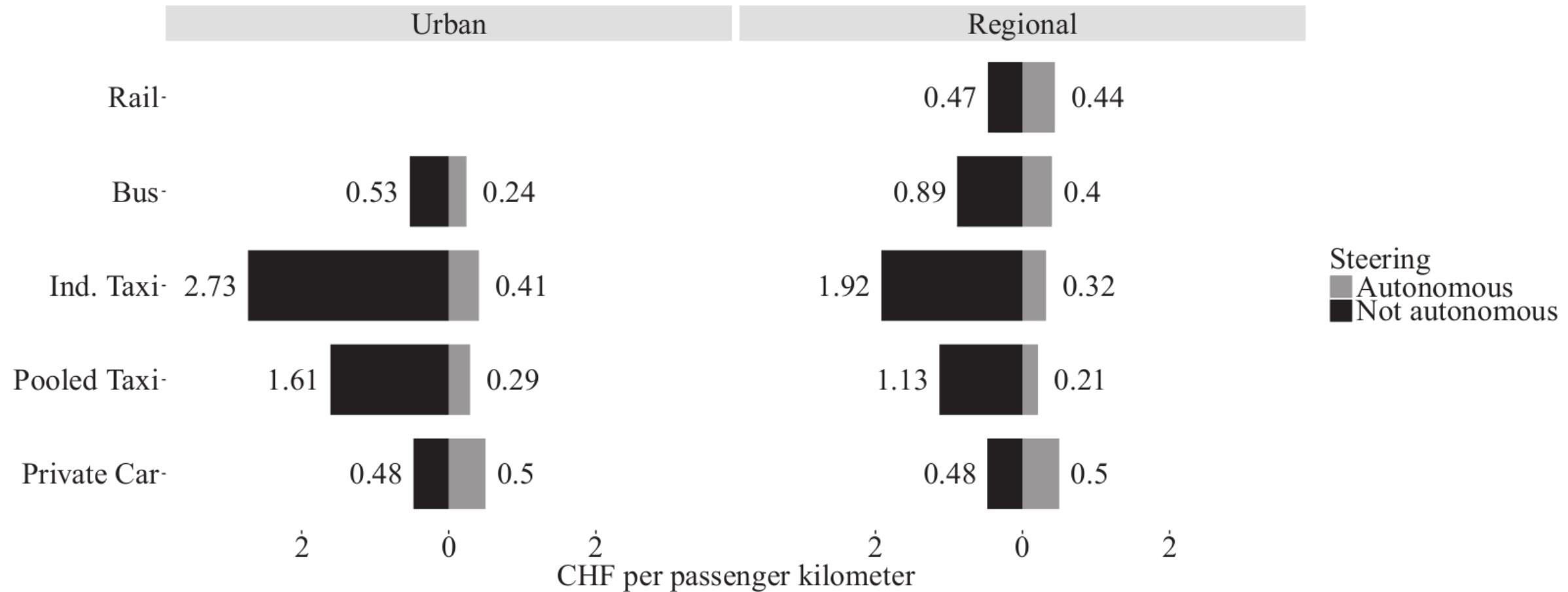
Slides: <https://slides.com/sebastianhoerl/matsim-paris>



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# AMoD Cost Calculator



# AMoD Survey

The diagram illustrates the survey process through a series of tables and arrows:

- Fleet introduced:** Shows the fleet introduced (Two weeks ago), weather (20°C), mobility tools (Priv. aut. car, car, Half-fare card), and provided trip (Work).
- Currently chosen:** Shows the currently chosen mobility tools: Car, Private automated car, Train, Pooled-Service, and Taxi-Service.
- Main transport mode:** Breaks down the main transport mode into Car, Private automated car, Train, Pooled-Service, and Taxi-Service.
- Feeder:** Breaks down the feeder into Bus / Tram.
- Total travel time:** Summarizes the total travel time for each mode: 00:30 h, 00:30 h, 01:08 h, 00:44 h, and 00:25 h.
- Provided trip:** A large table showing time breakdowns for different modes. It includes columns for Time in main transport mode, Time in feeder, Time waiting / transferring, Access and egress time, Transfers, Frequency, Variable costs, and Please choose.

# AMoD in Paris

Maximum static demand: **2.3M trips**

