

# Kelheim v3.0 calibration - justification of non-zero mgnUtIOfTraveling (v3.0)

## Ride

We have set `<param name="marginalUtilityOfTraveling_util_hr" value="-12.0" />` for ride, according to the recommendation by Gregor Leich and Kai Nagel from early 2023.

The idea here is, to account for the time costs of the driver. Here, it is assumed the driver has to take the "rider" for one trip, and then has to go back as well, which means the trip needs to be accounted for twice in time. The value 12 results from the following calculation

```
<!-- 2*(beta_performing + marginalUtilityOfTraveling_util_hr_car)-->
```

We have experimented with values of -9.0 (part of the driver's trips would have been conducted even without "rider), but results were better with -12.0.

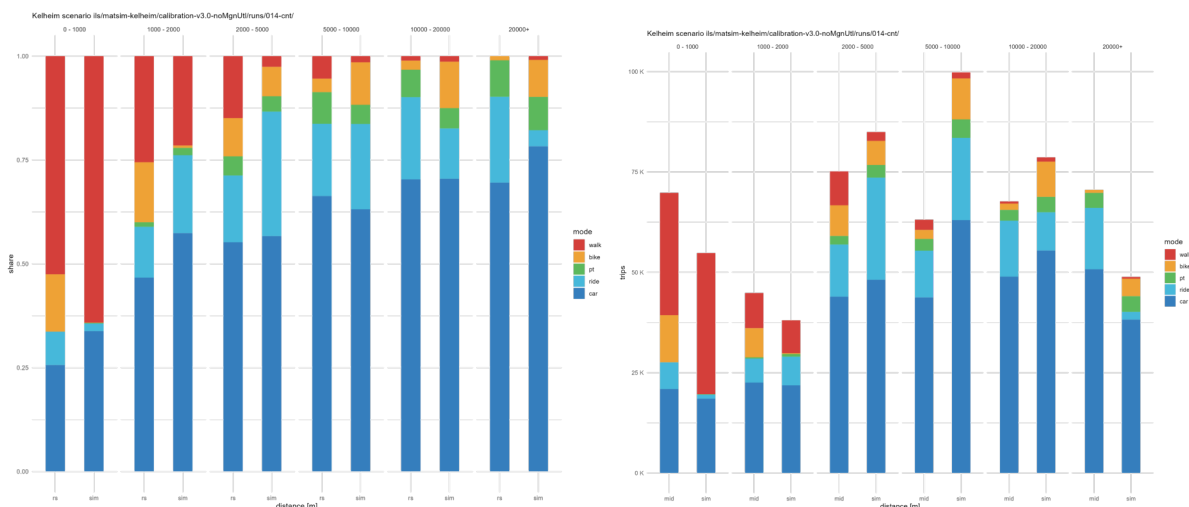
## Bike

Our target for the modal trip distance distribution reflects the trip distance distribution for the region type 77 (ländliche Region - kleinstädtischer, dörflicher Raum) from RegioStar.

It is computed by the following process

1. Take the modal split for Kelheim from MiD (Regionalbericht Bayern)
2. Calculate the modal split for each RegioStar 7 region type. Choose the one region type that has the closest modal split to the Kelheim Modal split (step 1). This result is region type 77 for our case.
3. Clean the distance distribution for 2. (non-modeled modes). Group distance classes.

This is the result, if we set no `marginalUtilityOfTraveling_util_hr` but for ride:



The left figure shows relative shares within each distance class, the right one shows absolute trip numbers. Within each distance class, the left bar displays the reference data, the right one displays the simulation result.

Note the yellow bars (for bike). We can clearly see that bike trips are too long. We observe (almost) no bike trips below 2 km. As the KelRide project focuses mainly on trips within the city, which spreads around 2 km North-South and 5 km West-East, we decided to try and fit the lower and middle distance classes better. Thus, we tried different settings for

`marginalUtilityOfTraveling_util_hr` for bike during calibration. (Technically, we started multiple auto ASC calibration batteries for different values). We got the best results for `<param name="marginalUtilityOfTraveling_util_hr" value="-3.0" />`, see below. Improvements are still possible :) but could not be managed in time for release v3.0

