CIVITAS indicators

Transport services affordability index – Version 2 (SOC_EQ_AF2)

DOMAIN

Transport	Environment	Energy	**Society**	Economy

TOPIC

Equity

IMPACT

Affordability of transport services *Improving the affordability of transport services*	**SOC_EQ**

Category

Key indicator	Supplementary indicator	State indicator

CONTEXT AND RELEVANCE

Transport services offer an alternative to private motorised modes….

This indicator provides a measure of the cost of transport services. **It is a relevant indicator when the policy action is aimed at reducing or removing economic barriers preventing some groups of citizens to use transport services. A successful action is reflected in a <u>LOWER</u> value of the indicator.**

DESCRIPTION

This indicator is a **dimensionless index** obtained from an estimated **average cost for using public transport services** and the **average income of poorest quintile of the population**.

METHOD OF CALCULATION AND INPUTS

The indicator is calculated as the ratio between an average yearly cost for using transport services (public transport as well as shared mobility services) and the income of the poorest quintile of population. **The calculation of the average yearly cost and of the ratio is made within the supporting tool building on a set of inputs**.

Method		
Calculation of the index based on Public Transport fares, shared services fares and income statistics	Significance: **1.00**	

METHOD OF CALCULATION

The indicator is computed according to the following steps (managed in the supporting tool):

- **Quantification of the average yearly cost for using public transport**
- **Quantification of the average yearly cost for using sharing services**
- **Quantification of the average yearly cost for transport services**
- **Estimation of the cost/income ratio**.

INPUTS

The following information should be coded in the supporting tool to compute the indicator:

a) $TckPrice$. **Representative cost of a public transport ticket**. Ticket fares are readily available from transport operators. This element should be the base tariff for one single urban trip.

b) $MonthPass$. **Representative cost of a pass allowing for using urban public transport for one month**. Ticket fares are readily available from transport operators. If only one urban monthly pass exists, then the input is its price. If alternative passes exist, an "average" representative cost should be defined.

c) $MonthPassStd$. **Representative cost of a pass allowing students for using urban public transport for one month**. In many cases, students are entitled to use public transport paying a reduced fare. If discounted passes for students do not exist in the experiment area, this input should be considered equal to $MonthPass$.

d) $MonthPassEld$. **Representative cost of a pass allowing elderly individuals for using urban public transport for one month**. In many cases, elderly individuals are entitled to use public transport paying a reduced fare. If this does not apply in the experiment area, this input should be considered equal to $MonthPass$.

e) $TckShr$. **Relative importance of base single trips ticket** for the calculation of average cost. This share should be defined considering the popularity of this type of ticket based on statistics of tickets sold or other information.

f) $MonthPassShr$. **Relative importance of monthly pass** for the calculation of average cost. This share should be defined considering the popularity of this type of pass based on statistics of tickets sold or other information.

g) $MonthPassStdShr$. **Relative importance of student monthly pass** for the calculation of average cost. This share should be defined considering the popularity of this type of pass based on statistics of tickets sold or other information. If a discounted pass for students does not exist in the experiment area this share should be set to zero.

h) $MonthPassShr$. **Relative importance of elderly monthly pass** for the calculation of average cost. This share should be defined considering the popularity of this type of pass based on statistics of tickets sold or other information. If a discounted pass for elderly individuals does not exist in the experiment area this share should be set to zero.

i) $^{S}_{}YrlSubs$. **Yearly subscription fare (euro/year) for each existing sharing service**. It should be defined based on fares of existing shared mobility services in the experiment area. In case there are more providers for a given shared service (e.g.,

more car sharing providers, more scooter sharing providers, …), the cost of that service should be a representative value considering all competing providers.

j) $_{\square}^{S}TimeFare$. **Time-based fare (euro/min) for using existing sharing service**. It should be defined based on fares of existing shared mobility services in the experiment area. In case there are more providers for a given shared service (e.g., more car sharing providers, more scooter sharing providers, …), the cost of that service should be a representative value considering all competing providers.

k) $_{\square}^{S}KmFare$. **Distance-based fare (euro/km) for using existing sharing service**. It should be defined based on fares of existing sharing services in the experiment area. In case there are more providers for a given shared service (e.g., more car sharing providers, more scooter sharing providers, …), the cost of that service should be a representative value considering all competing providers. If a distance-based fare is not applied for a given shared service, this input should be set to zero for that service.

l) $_{\square}^{S}ServWght$. **Relevance of each urban transport service type**. **For each service type, it should be a value between 0 and 1; the sum over all service types must be 1**. The values should reflect the role of each transport service in the experiment area and should be ideally computed considering statistics on the number of users or other statistics. In the worst case, they should be assessed as educated guess. For instance, if public transport provides the largest part of transport services, car sharing and bike sharing have a similar popularity, scooter sharing is less important and moped sharing does not exist, these weights could be: $_{\square}^{<PT>}ServWght = 0.90$ $_{\square}^{<CrSh>}ServWght = 0.04$; $_{\square}^{<BkSh>}ServWght = 0.04$; $_{\square}^{<ScSh>}ServWght = 0.02$; $_{\square}^{<MpSh>}ServWght = 0$.

m) $Income$. **Yearly household income of the fifth (i.e., poorest) quintile of population**. Ideally, this should be the income in the experiment area, but if local data does not exist, regional or even national data can be used. National income by quintile in all EU countries can be found in the Eurostat database (**table ilc_di01**).

The experiment would be reflected in the indicator by changing some input costs (e.g., public transport tickets or fares for sharing services). Ticket shares and transport services relevance should instead remain unchanged.

EQUATIONS

The equations **used within the supporting tool** to manage the calculation, building on the provision of the inputs, are the followings:

Estimation of the average yearly cost for using public transport:

$$AvYearPTCost = (TckPrice * TckShr) * 100 \\ + (MonthPass * MonthPassShr + MonthPassStd * MonthPassStdShr \\ + MonthPassEld * MonthPassEldShr) * 12$$

100 reflects the exogenous assumption that single tickets are used for 100 trips per year (2 trips per week) as those travelling by public transport for daily mobility are expected to use monthly or yearly passes.

12 reflects the exogenous assumption that yearly passes are purchased in any month of the year.

Estimation of the average yearly cost for using shared mobility services:

$$_{\square}^{<CrSh>}AvYearServCost = {}_{\square}^{<CrSh>}YrlSubs + {}_{\square}^{<CrSh>}TimeFare * 2000 + {}_{\square}^{<CrSh>}KmFare * 1000$$

$$^{<BkSh>}AvYearServCost = {}^{<BkSh>}YrlSubs + {}^{<BkSh>}TimeFare * 2000 + {}^{<BkSh>}KmFare * 300$$

$$^{<ScSh>}AvYearServCost = {}^{<ScSh>}YrlSubs + {}^{<ScSh>}TimeFare * 2000 + {}^{<ScSh>}KmFare * 700$$

$$^{<MpSh>}AvYearServCost = {}^{<MpSh>}YrlSubs + {}^{<MpSh>}TimeFare * 2000 + {}^{<MpSh>}KmFare * 700$$

2000 is a conventional number of yearly minutes used to compute the time-related component of shared services fare.

The absolute values (1000, 300, 700) multiplying the ${}^{S}KmFare$ elements are conventional number of yearly kilometres used to compute the distance-related component of shared services fare.

Estimation of average transport services yearly cost:

$$AvYearServCost = \sum_{S} ({}^{S}AvYearServCost * {}^{S}ServWght)$$

Estimation of the cost/income ratio (indicator value):

$$PTAff = \frac{AvYearServCost}{AvIncome} * 100$$

OTHER RELEVANT INDICATORS

An alternative indicator for measuring the same impact is **SOC_EQ_AF1**. This alternative indicator uses only public transport costs. Therefore, it is less complex to implement but less significant. **If in the experiment area there are no shared transport services, the two indicators are equivalent**.

		SOC_EQ_AF1	SOC_EQ_AF2
Complexity	Method 1	▮▯▯▯	▮▮▮▯
	Method 2	▮▮▯▯	
Significance	Method 1	▮▮▯▯	▮▮▮▮
	Method 2	▮▮▮▯	