Comment

Supplementary information to:

Running a car costs much more than people think — stalling the uptake of green travel

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SUPPLEMENTARY INFORMATION

Running a car costs much more than people think — stalling the uptake of green travel

Mark A. Andor, Andreas Gerster, Kenneth T. Gillingham and Marco Horvath

This Comment article uses data from a survey of German households conducted in 2018 and directed towards the head of the household. For every car owner, the survey elicited respondents' estimates of the cost of car ownership for the exact car type and driving behavior of that driver. In it, we show that there are systematically misjudged cost estimates and we assess the implications of removing such a misjudgment for car ownership decisions and compare the effect sizes with the effectiveness of other policies. We also present evidence from a survey experiment, where we estimate the effects of informing respondents about the actual cost of their car on respondents' willingness-to-pay (WTP) for public transport. In this Supplementary information, we describe the survey design, compare respondents' estimates with the actual cost of their car, explain the assumptions that underlie our extrapolations, and discuss our survey experiment.

Survey design

The survey underlying this research was conducted in collaboration with the survey institute *forsa*, which maintains a panel of more than 10,000 households that is representative for the German speaking population aged 14 and above. (Information on the panel is available at http://www.forsa.com/.) *forsa* collects data using a state-of-the-art tool that allows panelists to fill out the questionnaire using either a television or the internet. Respondents – in our survey the household heads – retrieve and return questionnaires from home and can interrupt and continue the survey at any time. A large set of socio-economic and demographic background information on all household members is available from *forsa's* household selection procedure and updated regularly. The survey used in our study was conducted between the 23rd of April 2018 and the 12th of June 2018. Out of 7,823 individuals who started the survey, 6,812 completed the questionnaire. We focus on the respondents that actually own a car, which are about 92% of the sample, which results in a sample of 6,233 car owners that completed the questionnaire. Of these respondents 5,483 stated cost estimates on their monthly car costs and thus form the basis for our analyses.

One particular focus of the survey was the travel behavior and the ownership of cars of individuals. For this purpose, we elicited information on the cars the respondents own, including the class of the car, the fuel type, the car age, and how many kilometers the respondents drive the car per year (find the translation of the survey questions into English in Section M1 at the end of the SI). In addition, we asked respondents about their estimates with respect to the total cost of car ownership per month when taking into account regularly and irregularly occurring costs. Respondents were also asked to state which of the following cost types they had figured into their estimate: the monthly depreciation, which takes into account the upfront costs of the vehicle, monthly operating costs (fuel and motor oil), monthly costs of taxes and insurance, monthly repair costs and other costs. The subsequent question asked respondents to indicate the percentages in total ownership cost of every cost factor they had considered. This approach provides us with individual-level estimates on the monthly costs of owning a car for a variety of cost factors.

We contrast these cost estimates with data from the German Automobile Club, which collects detailed and highly accurate ownership cost information on almost all cars models sold in Germany. These data include information on the list prices of the cars, their repair costs and their operating costs, which consists mostly of fuel costs. We use this information to calculate an estimate of the monthly cost of ownership for each individual in the sample, making use of the class and the age of the car as well as the kilometer driven by the person (see Table 1 for an overview). For every class of a car, we consider the cost of the model that was sold most often using the data and definition of car classes of the German Federal Motor Transport Authority (KBA), e.g. VW Golf for compact cars (see KBA, 2017).

Table 1 - Cost factors for different reference cars

Car type	Reference Car	List price, in EUR	Tax and Insurance Cost, in EUR	Repair Cost, in EUR	Fuel Costs, in EUR per km
Small Car	VW Polo	13,655	82	46	0.1016
Compact Car	VW Golf	21,670	94	56	0.1016
Middleclass Car	VW Passat	33,360	106	65	0.1104
Van	VW Touran	25,260	90	61	0.116
Upper-class Car	Mercedes E-Class	45,696	133	85	0.124
Luxury-class Car	Mercedes S-Class	98,098	208	146	0.1312
SUV	VW Tiguan	27,850	94	65	0.1176

Notes: Source: ADAC (2017)

We use the information on monthly costs of taxes and insurance as well as repair costs as provided by the German Automobile Club (ADAC, 2017). The German Automobile Club has extensive expertise in comparative testing of consumer products, such evaluating the cost of cars. Their test procedures follow international norms (ISO/IEC GUIDE 46) and the quality of these procedures is regularly evaluated within a structured quality management system (ISO 9001). As the German Automobile Club also provides road maintenance and offers car insurance for its more than 21 million members, they have vast knowledge of the most common repairs and services needed.

To determine the monthly depreciation, we construct a rule of thumb based on information by a number of sources, for example *Autoscout24*, which is one of the most used online marketplaces for used cars in Germany, and the company *Bähr & Fess Forecast*, which do yearly forecast for car depreciation in conjunction with the German periodical *Focus*. This rule of thumb states that the depreciation of a car is 25% in the first year, 15% in the second, 10% in the 3rd, 5% in each year from year 4 to year 10 and 1% from year 11 until year 15, afterwards we assume that the depreciation becomes negligibly small (see Table 2).

Table 2 - Calculation of yearly depreciation

Age of Car (in years)	Yearly Depreciation (in percent)
0	25
1	25
2	15
3	10
4	5
5	5
6	5
7	5
8	5
9	5
10	5
11	1
12	1
13	1
14	1
15	1
16 or higher	0

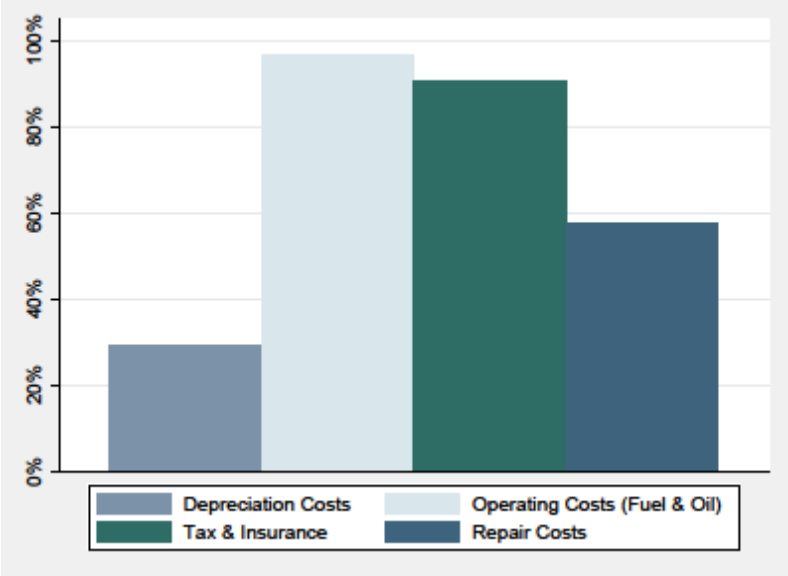
Notes: We constructed this formula based on information from Autoscout24 (2018), Focus (2016), and bussgeldkatalog.org (2017)

We use the list price of the reference vehicle and multiply it with the yearly depreciation, given the age of the car the respondent stated. Dividing it by 12 then results in the monthly costs of depreciation. Finally, for the calculation of the operating costs per kilometer, we divide the monthly operating costs by 1,250 km, as the German Automobile Club assumes a usage of 15,000 km per year, i.e., 1,250 km per month. To be conservative with our estimates of the cost of ownership we always used the most basic and therefore cheapest available version of the car, thereby estimating a lower bound of the costs.

Survey results

We start by analyzing which cost categories were considered by respondents when we asked them to estimate the total monthly cost of car ownership for their car (where we highlighted to also consider the monthly average of costs that accrue at irregular intervals). Figure 1 presents the percentage of survey respondents that have figured depreciation cost, operating cost, tax & insurance cost, as well as repair cost, into their calculation. While 96% included fuel costs and 90% the costs of taxes and insurance, only 57% included repair costs and only 29% included the depreciation of the car. This finding provides first evidence that depreciation and tax & insurance costs may not be carefully considered by all households.

Figure 1 - Percentage of respondents that figured in the respective cost factor



In a next step, we analyze the estimates for two groups of consumers. The first group consists of the full sample, i.e., it includes respondents who did not consider all cost components in their estimate of total monthly cost, assuming that estimates for cost components that were not mentioned are zero (Panel A of Table 3). In addition, we consider the group of consumers who have considered all cost components in their total cost (Panel B of Table 3). To eliminate outliers in our sample, we cut the 5% and the 95%-percentile of the cost estimates of the total costs from our sample.

In the full sample, the average estimates about the total monthly cost of a car are 204 EUR, substantially less than the 425 EUR that we calculated based on the data by the German Automobile Club, which translates into a misjudgment of 52%. The misjudgment is largest for depreciation (86%), repair cost (53%), as well as tax and insurance cost (45%) and substantially lower for fuel cost (21%).[1] These numbers are confirmed when looking at the median of the difference of estimated and actual costs. While for all other factors the

[1] We provide the t-statistics for two-sided tests of mean differences between estimated and actual fuel cost in Table M3. All mean differences are statistically significant at the 1% level (all t-statistics are above the critical value of 2.58).

misjudgment is still very high, ranging from 45 to 83 EUR, the median difference for fuel costs is merely -1 EUR.

In the sample of respondents who considered all cost factors, the cost estimates are higher for all cost categories, so that analyzing cost estimates based on that sample gives a more conservative measure of the misjudgment. We find that average misjudgment amounts to 51% for depreciation, 41% for tax and insurance cost, and 18% for repair and fuel cost, respectively. Again, the numbers for the median difference between estimated and actual costs are around the same order of magnitude, for the fuel cost category the median misjudgment is again lower than the mean. All numbers reported in the comment use these more conservative estimates for the misjudgment. We show the histograms for the full sample in Section M2 below.

Table 3 - Perceived and actual costs

	Depreciation cost	Repair cost	Tax and insurance cost	Fuel cost	Total cost
A) Full sample (n = 5,483)					
Cost estimate (mean), in EUR	20	26	52	106	204
Actual cost (mean), in EUR	141	55	95	134	425
Cost misjudgment (mean), in EUR	121	29	43	28	221
Cost misjudgment (mean), in %	86	53	45	21	52
Cost misjudgment (median), in EUR	83	45	57	-1	184
B) Sample of respondents who have considered all cost factors (n = 822)					
Cost estimate (mean), in EUR	82	45	57	117	301
Actual cost (mean), in EUR	168	55	96	143	462
Cost misjudgment (mean), in EUR	86	10	39	26	161
Cost misjudgment (mean), in %	51	18	41	18	35
Cost misjudgment (median), in EUR	66	17	45	10	138

Underestimating the cost of ownership leads to more cars, driving, and emissions: Extrapolations

To extrapolate the implications of eliminating the misjudgment on car ownership, we employ theoretical and empirical insights on car ownership decisions from Bento et al. (2009). The authors estimate a car ownership model that captures comprehensive interactions between new and used car markets, as well as car scrap markets. It allows us to investigate how changes in perceived cost influence car ownership, as well as the effectiveness of alternative policies, such as fuel price increases.

Conceptually, Bento et al. (2009) consider two different categories of costs of owning a car: so-called "rental prices" and operating costs. "Rental prices" capture all costs components that accrue directly from owning a car, such as its depreciation, insurance cost and registration fees, as well as the foregone real return on capital. Operating costs refer to the variable costs of driving, such as fuel cost and repair cost. Bento et al. (2009) provide evidence on how car ownership changes when rental prices and fuel prices increase. In particular, they find that the elasticity of car ownership with respect to "rental prices" is -0.82, while the elasticity of car ownership with respect to fuel prices is about -0.03.[2]

[2] Based on simulations, Bento et al. (2009) that a fuel tax increase by 0.25 $ per gallon reduces car ownership by 0.5%, where fuel prices are about 1.5 $ per gallon, which implies a car ownership elasticity with respect to the fuel price of around -0.03.

The estimated elasticities allow us to evaluate how change in prices affect car ownership decisions. They also allow us to evaluate how changes in the perception of cost would change such decisions as correcting misperceptions influences choices in the same way as price changes.

Table 4 - Calculation of Impact on Car Ownership using Bento et al. (2009) approach

Rental price			Operating cost		
	Actual cost	**Estimated cost**		**Actual cost**	**Estimated cost**
Depreciation	167.67	82.05	**Repair cost per km**	0.0537	0.0383
Insurance cost & registration fees	95.97	56.86	**Fuel cost per km**	0.0878	0.0914
Foregone real return on capital	75.14				
Total cost	338.78	214.05	**Total cost**	0.1415	0.1297
Misjudgment (evaluated at midpoint)	45.12%		**Misjudgment (evaluated at midpoint)**	8.7%	
Ownership elasticity with respect to ownership cost	-0.82		**Ownership elasticity with respect to fuel price**	-0.03	
Change in ownership, in %	-37.0%		**Change in ownership, in %**	-0.3%	
Total change in ownership when correcting misjudged estimates of cost of ownership and operating cost, in %					-37.3
Number of passenger cars in Germany, in Million (Numbers from January 1st 2019; KBA 2019)					47.1
Estimated total change in ownership, in Million					-17.55
Average CO2 emissions per passenger car per year, in tons					2.12
Total CO2 Emissions in Germany, in Million tons					866
Total CO2 Emissions in the German Transport Sector, in Million tons					162
Estimated total reduction of CO2 emissions, in %					-4.30
Estimated total reduction of CO2 emissions, in % of emissions from transportation sector in Germany					-23.01

Notes: The number of passenger cars is taken from KBA (2019), total CO2 emissions in Germany are drawn from BMU (2019). Elasticities are based on Bento et al (2009).

In Table 4, we contrast actual costs with the estimates of costs stated by our respondents, splitting the total cost of a car into the rental and operating cost, as suggested Bento et al. (2009). Consistent with Bento et al. (2009), we treat repair costs as an operating cost. We calculate it by dividing the monthly repair cost by the driving distance mentioned by a respondent.[3] In a next step, we calculate the relative misjudgment for both cost categories and extrapolate how such changes in perceived cost affect ownership. As we consider a discrete change in perceived cost, we evaluate the relative misjudgment at the midpoint, following the

[3] Treating repair cost as a cost of ownership or an operating cost does not change our main results.

concept of an arc elasticity by Allen (1933).[4] As we did not consider the foregone real return of capital in our survey, we use the average list price given the cars in the sample and the interest rate used by Bento et al. (2009) and assume that people do not misjudge estimates for this cost category.[5] Based on this approach, we obtain a relative misjudgment of 45% for cost of ownership (the "rental price") and of 8.7% for operating cost.

Using estimates from a meta-analysis by Wardman et al. (2018) on the elasticities on bus and rail demand with respect to the total cost of cars, we extrapolate how a change in the perceived total cost of owning a car affects bus and rail demand. Given an average of total actual cost of 462 and of beliefs of 301 EUR per month yields a relative bias of 42% (evaluated at the midpoint). Multiplying the relative bias with the elasticities of 0.19 of bus demand with respect to total cost of cars and an elasticity of rail demand of 0.29 with respect to total cost of cars, we find that eliminating the cost bias could result in about an 8% increase in bus demand and 12% increase in rail demand.

Next, we evaluate whether our calculations are sensitive with respect to the core parameters that we use. First, we find that making alternative assumptions on the interest rate for the foregone real return on capital does not significantly change our results. We find that a lower interest rate of about 0.46%, which was the actual interest rate of a 10-year German federal bond in 2018, would result in a reduction of 49% of cars in Germany. Second, we analyze the impact of the ownership elasticity with respect to the rental price, which Bento et al. (2009) estimate at -0.82. As a robustness check, we proxied the ownership elasticity using the -0.2 elasticity of new vehicle sales with respect to the vehicle price used recently in U.S. regulatory impact analysis (EPA 2018). Note this elasticity is not exactly a total ownership elasticity and the U.S. is different than Germany, but this provides a rough lower bound estimate for the sake of comparison. When assuming that actual ownership elasticity is only -0.2, we find that the reduction of cars reduces to 9% (4.37 million cars) and a reduction of CO2 emissions of 9 million tons. These values are still significant from a policy perspective.

We also conduct two additional robustness tests. First, we consider the influence of rebates on car list prices. A calculation by the Center Automotive Research (CAR) of the University of Duisburg-Essen finds an average discount of 18.4% for the 30 most sold cars in Germany in 2018 (Focus, 2018). Recalculating the impact on the car ownership using an 18.4% lower list price, we still find a high decrease of car ownership of 29.8%. Second, we consider that in our dataset several respondents use their car for private and for business purposes. If we include only those households that use their car for private purposes, the impact of car ownership remains roughly the same (a 40% decrease compared to a 37% decrease before). The slight increase in the effect size could reflect that individuals who use their car for business purposes have a better knowledge of the cost of ownership. Beyond these robustness checks, our conclusions are also supported by the fact that many consumers actually finance and lease their cars. Considering that financing or leasing does potentially comes with a premium on top of the price of the car, this would lead to a higher per month price and thus to larger cost misjudgments. In addition, most consumers purchase additional optional extras, which make cars more expensive (e.g., navigation systems, seat heating, and sport seats). Newspaper articles and reports suggest that equipment cost amount to 27-58% of the vehicle price, which would imply that they more than make up for the car discounts on average (carwow, 2019). To evaluate the impact of removing the misjudgment of the cost of ownership, we calculate how the cost misjudgments found in Table 3 would change the perception of the cost of owning an electric vehicle relative to owning a vehicle with an internal combustion engine. For this purpose, we compare the ownership cost of an electric Volkswagen (VW) e-Golf – the electric version of the most popular car in Germany – with an almost identical Golf with an internal combustion engine (costs are taken from FÖS 2019). We then use data on cost estimates from our survey to

[4] For instance, we determine the relative misjudgment for the cost of ownership by calculating (214.05-338.78) / ((338.78+214.05)/2). Expressing the misjudgment as a percentage of perceived cost would give a higher relative misjudgment so that our calculations are conservative.

[5] If in reality people do underestimate foregone real return of capital, this would lead to an even higher misjudgment. In addition, the assumed interest rate from Bento et al. (2009) is relatively high in comparison to current interest rates in Europe. If we assume a lower interest rate, the bias increases. Therefore, our assumptions are conservative.

impute the estimates that respondents would have for these two car models on average. Specifically, we calculate the ratio of the average estimates and the average actual value for each cost component and multiply the actual costs from Table 5 to obtain the imputed perceived costs of both car types.

We find that a VW e-Golf has a monthly cost advantage of around 106 EUR per month. While this cost advantage is mostly driven by lower operating cost (48 EUR per month), it also has lower depreciation, which – among other things – reflects the rather high subsidy levels for electric vehicles in Germany. Using the survey's cost estimates to impute estimates for these two cars, we find that the total perceived cost advantage of consumers is only 72 EUR per month – about 34 EUR per month lower. Summing cost over the total lifetime of a car of 12 years, we find that consumers underestimate the cost advantage of an VW e-Golf by 4,888 EUR, which corresponds to about 19% of the purchase price of an VW e-Golf. Using an estimate for the elasticity of electric vehicle purchases with respect to the purchase price of -3.9 (Muehlegger and Rapson, 2018), we find that removing the misjudgments would increase sales of electric vehicles by about 74% and thus substantially boost their adoption.

Table 5 - Calculation for impact on EV uptake

	VW e-Golf (electric engine)	VW Golf 1.5 TSI (combustion engine)	Cost advantage VW e-Golf
Actual costs (in €)			
Depreciation	328	364	36
Operating cost	90	138	48
Insurance and taxes	82	94	12
Repair cost	48	58	10
Total cost	548	654	106
Perceived costs (in €)			
Depreciation	161	178	17
Operating cost	73	113	40
Insurance and taxes	49	56	7
Repair cost	39	47	8
Total cost	322	394	72

Underestimation of cost advantage per month	33.9
Underestimation of cost advantage (over the lifetime)	4,888
Underestimation, expressed in percent of purchase price	18.9%
Elasticity of electric vehicle purchases with respect to price	-3.9
Increase in EV sales	73.6%

*Notes: Source for EV and non-EV costs is FÖS (2019), source for elasticity is Muehlegger and Rapson (2018). Perceived cost are calculated by Misjudgment factor*Actual costs, where the misjudgment factor is the survey respondents' average cost misjudgment expressed in % of average actual cost (49% for depreciation, 82% for operating cost, 59% for insurance and taxes, 82% for repair cost and 65% for total cost).*

Implications for policy: Survey experiment

After eliciting households' cost estimates, we also conducted a willingness-to-pay (WTP) experiment to estimate the effect of providing information on the total cost of car ownership on respondents' stated WTP for public transport (translations of the screens can be found below in Section M3). This survey was conducted with a representative subset of the survey respondents consisting of 932 respondents. In the experiment, we first elicit respondents' stated WTP for a hypothetical public transport ticket that is valid for one month in the region where the respondent lives. The average WTP for these individuals was 55 Euros. Then, a randomly selected subset of individuals (the treatment group) obtained detailed information on the different cost factors of owning a car and on how the total costs were calculated (the calculations are as described in the first section of this SI). All remaining respondents constitute the control group and obtained information on the average traffic volume in Germany or the average age of different vehicles (cars, motorcycles, and trucks), which we do not expect to influence participants WTP for public transport. After this information was provided, the respondents were again asked what their WTP for a public transport ticket would be.

We can then compare the change in WTP for both groups of respondents to obtain an estimate for the average treatment effect of providing information on the WTP for public transport. Table 5 provides the results of the following estimation equation:

$$\Delta WTP_i = \alpha + \beta\ CostInfo_i + \varepsilon_i,$$

where ΔWTP_i denotes the change in the WTP for individual *i*, $CostInfo_i$ denotes a dummy variable that equals one if respondent *i* obtains information on the cost of owning a car, and ε_i denotes an error term. As shown in Table 6, we find that cost information increases the WTP for public transport tickets by 12 Euros, which corresponds to about 22% of the average WTP.

Table 6 – Cost Estimate Experiment Regression

	ΔWTP_i	
	Coef.	*Std. Error*
Cost information$_i$	12.536***	(1.941)
Constant	2.587***	(0.749)
Number of observations	932	

*Standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01*

Implications for policy: Extrapolations

To put our findings into perspective, we make a hypothetical comparison between a policy that could completely eliminate the misjudgment in the cost estimation with the effectiveness of conventional policies, such as fuel taxes. First, we determine how much fuel prices would have to change to yield the same effect on ownership as the removal of the misjudgment (-37%). We again use the fuel price elasticity of car ownership of -0.03 (calculated based on Bento et al 2009). It shows that a 1% increase in fuel prices would only reduce ownership only very modestly by -0.03%. Accordingly, to obtain the change in ownership of -37%, we extrapolate that fuel price would have to increase by 1242% to have the same effect.

Second, we extrapolate how car ownership would change if tickets for public transport were made available to everybody for free. Based on recent evidence from Fearnley et al. (2017), we use the elasticity of car demand with respect to public transport fares of -0.041 to -0.062. Our extrapolation suggests that a 100% decrease in public transport fares would decrease car use by only 4.1-6.2%.

Further materials

M1: Survey questions concerning the elicitation of cost estimates (translated from German)

Question M1:

How many cars are permanently available to your household (including privately used company and company cars, without car sharing) that you use yourself (as driver or passenger)?

NUMBER *Allowed entry: 0 – 99*

Question M3:

What kind of car is it?

- Small car (e.g. VW Polo, Smart ForTwo, Renault Twingo)
- Compact cars (e.g. VW Golf, Mercedes A-class, Opel Astra)
- Middle class (e.g. VW Passat, Ford Mondeo)
- Van (e.g. VW Touran, Seat Alhambra, Renault Espace)
- Upper class car (e.g. Mercedes E-Class, BMW 5 Series, Audi A6)
- Luxury class car (e.g. Mercedes S-class, BMW 7 series, Audi A8)
- SUV/off-road vehicle (e.g. VW Tiguan, Porsche Cayenne, Mercedes GLC)
- I do not know / not specified

Question M5:

How old is the car? If you are not sure, please estimate.

NUMBER (years) *Allowed entry: 0 – 99*

- I do not know / not specified

Question M6:

How many kilometers do you drive by car on average in one year? If you are not sure, please estimate.

NUMBER km *Allowed entry: 0 - 999999*

- I do not know / not specified

Question M7: *If respondent owns more than own car, questions M1 through M6 are repeated three times*

Which car do you personally use most?

Question C1:

If respondent owns one car
To start with, we are interested in the monthly total costs of your car. Please estimate the **monthly** total cost of your car. Do also consider the monthly average of costs that accrue in irregular intervals.

If respondent owns more than one car
To start with, we are interested in the monthly total costs of your car. Please estimate the **monthly**

total cost of the car that you use mainly. Do also consider the monthly average of costs that accrue in irregular intervals.

Question C2a: *If C1>0*

Please indicate which of the following cost you have considered in your estimation.

- Monthly depreciation
- Monthly operating cost (fuels and motor oil)
- Monthly cost through insurance and taxes
- Monthly repair cost
- Others: TEXT
- I do not know / no answer

Question C2b: *If for C2a at least one cost factor ticked*

If respondent owns one car

You have estimated that the monthly total cost of using your car are ANSWER C1 Euro.

If respondent owns more than one car

You have estimated that the monthly total cost of using your main car (SHOW ANSWER FROM M7) are ANSWER C1 Euro.

Please indicate how large the respective cost shares are for the following categories, which you have considered in your estimation.

Programming: Use indicated cost categories from C2a as answer categories.

- Monthly depreciation **NUMBER %** *Allowed entry: 0 - 100*
- Monthly operating cost (fuels and motor oil) **NUMBER %** *Allowed entry: 0 - 100*
- Monthly cost through insurance and taxes **NUMBER %** *Allowed entry: 0 - 100*
- Monthly repair cost **NUMBER %** *Allowed entry: 0 - 100*
- Others: **NUMBER %** *Allowed entry: 0 - 100*
- I do not know

M2: Distribution of cost estimates (full sample)

The numbers shown in the following histograms (Figure 2 and Figure 3) give the difference of the believed costs and the actual costs for each individual in the full sample.

Figure M2a - Overall Misjudgment of the costs of a car (raw sample)

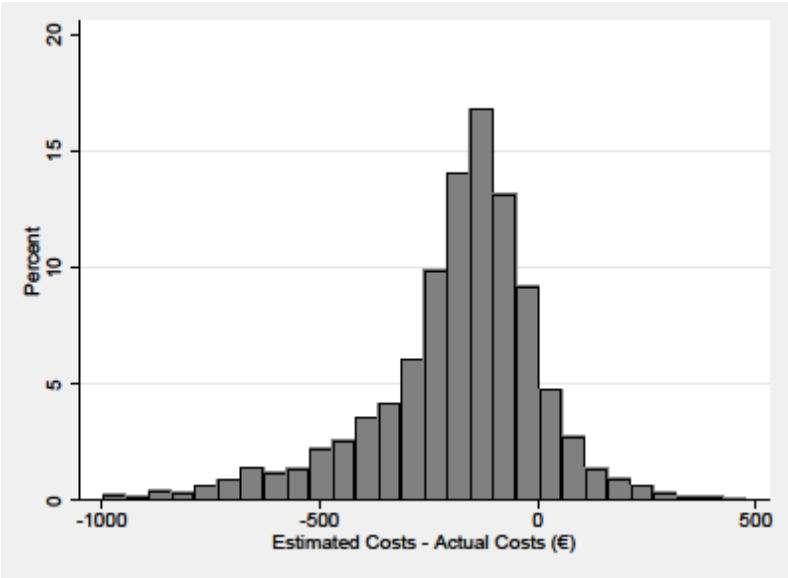
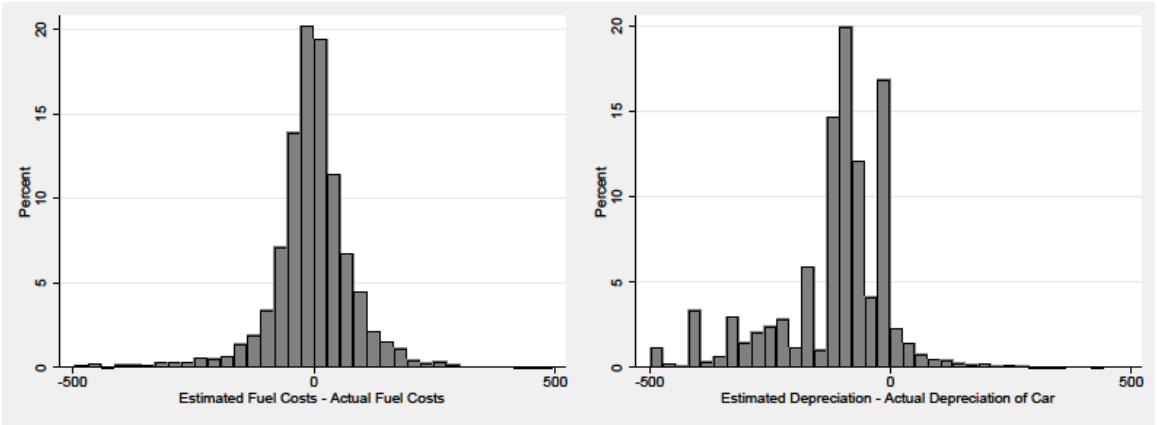
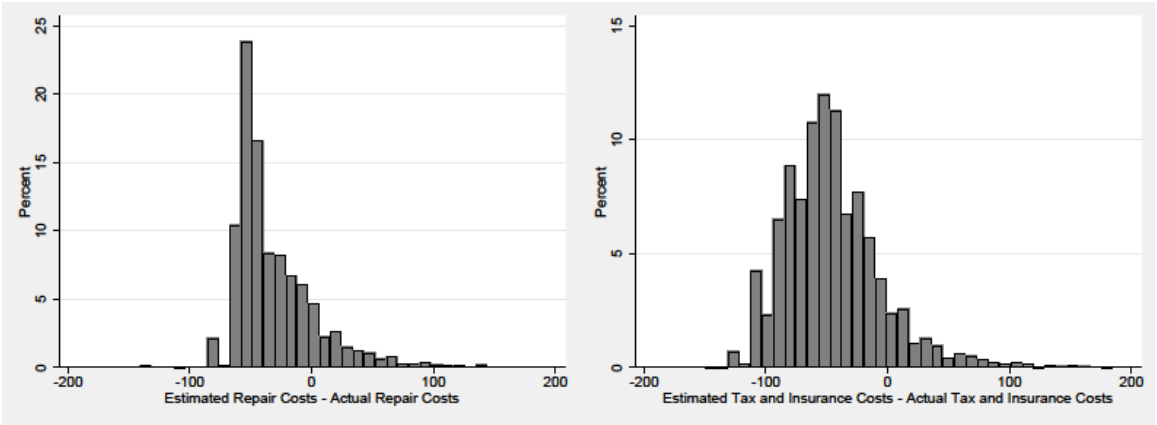


Figure M2b - Cost misjudgment for different cost factors (raw sample)





M3: Survey questions concerning the WTP experiment (translated from German)

This part of the survey is about public transport in your region. The territory of a transport association typically covers several counties.

Next Screen

Question C4_1_H:

With a ticket from the transport association you can use all means of local transport, such as buses, trams, underground and regional trains. Long-distance trains, such as IC and ICE, cannot be used with this ticket.

Please estimate: How much does a monthly ticket (without discounts for children, students, seniors, etc.) cost, which allows you to travel in the entire area of your transport association?

NUMBER (Euro) *Allowed entry: 0,00 - 999,99*

Next Screen

In the following we are interested in what you would be willing to pay for a monthly ticket for public transport in your transport association. Please assume that it is a ticket issued to you and usable in a month of your choice between August 2018 and August 2019.

With this monthly ticket, you could use all means of public transport (buses, trams, regional trains, etc.) in your entire transport association for one month.

Question C4_3_H:

Please indicate the maximum amount you would be prepared to pay for a monthly ticket in your transport association.

What is the maximum amount you would be prepared to pay for this monthly ticket? Please also indicate if your maximum willingness to pay is 0 Euro.

If you do not want to answer the question, please enter "do not know".

NUMBER (Euro) *Allowed input: 0,00 - 999,99*

Alternative answer options (under the number field):

- do not know (do not want to answer question)

Treatment-Screen E_Costs

Filter cost data by M3 (car class) and M7 (mainly used car)

IF M1>0 (at least one car owned)

If M6 = missing/white not: take 15,000 km as calculation

In the following we would like to inform you about your monthly costs of driving a car. The calculations are based on estimates of the ADAC and take into account which car you mainly use and how often you use it.

M1=1

In total, your car will cost you about XXX Euro per month.

M1>1

All in all, your mainly used car costs you about XXX Euro per month.

These costs come about as follows:

- Monthly loss of value: X1 Euro

- Monthly operating costs: X2 Euro

- Monthly costs through insurance and taxes: X3 Euro

- Monthly workshop costs: X4 Euro

Therefore, the total monthly costs for you are X1+X2+X3+X4 = XXX Euro.

If M6 is not missing:

For your information: Your annual mileage of answer *M6* km is included in the calculation of operating costs for fuel, motor oil, etc. The age of your car is included in the calculation of the depreciation.

If M6 = missing/white not:

For your information: An annual mileage of 15,000 km is included in the calculation of operating costs for fuel, motor oil, etc. The age of your car is included in the calculation of the depreciation.

Control Screen 1:

In the following we would like to inform you about the development of traffic volumes in Germany. The figures are taken from the survey of the Federal Ministry of Transport and Digital Infrastructure (BMVI): "Verkehr in Zahlen 2017/18".

Motorized traffic volume relates to public transport (trains, trams, buses, etc.) and motorized individual transport (cars and motorcycles).

The average traffic volume in Germany has developed as follows:

- In 2000: 15,351 km per person transported

- In 2010: 15,603 km per person transported

- In 2016: 15,907 km per person carried

Overall, the volume of traffic (i.e. including public transport and motorized individual transport) in Germany has thus remained almost constant.

Control Screen 2:

In the following we would like to inform you about the average age of all registered vehicles in Germany. The following information is based on data from the Federal Motor Transport Authority (KBA).

- For passenger cars, the average age in 2017 was 9.3 years

- For motorcycles (motorcycles, scooters, etc.) the average age in 2017 was 17.1 years

- For trucks, the average age in 2017 was 7.9 years

Overall, the average age of all registered vehicles in Germany in 2017 was 10.6 years.

Question C4_4_H:

You now have the opportunity once again to adjust your maximum willingness to pay for a monthly ticket.

To your reminder:

With the monthly ticket you can use all means of local transport (buses, trams, regional trains, etc.) for one month in your complete transport association.

What is the maximum amount you are willing to pay for this Monthly Ticket? Please also indicate if your maximum willingness to pay is 0 Euro.

If you do not want to answer the question, please enter "do not know".

NUMBER (Euro) *Allowed entry: 0,00 - 999,99*

Alternative answer options (under number field):

- do not know (do not want to answer question)

M3: Statistical tests of mean difference between cost estimates and actual costs

Table M3: Results from Statistical Tests of Mean Difference

	Depreciation cost	**Repair cost**	**Tax and insurance cost**	**Fuel cost**
A) Full sample (n = 5,483)				
Cost misjudgment (mean), in EUR	121	29	43	28
Standard Error of mean difference	2.18	0.84	0.76	2.80
T-statistic	55.35	33.61	43.23	9.64
B) Sample of respondents who have considered all cost factors (n = 822)				
Cost misjudgment (mean), in EUR	86	10	39	26
Standard Error of mean difference	5.51	1.25	1.35	6.39
T-statistic	15.47	8.20	28.87	4.11

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