Distributive impact of transport expenditure: the case of Uruguay[1]

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Abstract

We estimate income elasticity of transport services consumed by households using data from the Expenditure and Income Survey of Uruguay (1994, 2006); applying non parametric methods proposed by Lerman and Yitzahki (1984, 1985, 1989, 1994) and parametric methods (sample selection of Heckman), with specifications proposed by Costa (1997) and Hausman et al. (1995).
Regarding to consumption patterns in Uruguay, individual transport goods and services are luxury goods; whereas only goods related to public transport are normal ones. Public transport remains as a luxury good for the first quintile of income, an inferior good for the richer quintile, and a normal good otherwise.
Consumption patterns evolve to those that characterize developed countries. Results are consistent with those estimated by Berri et al. (2010) for different countries in the European Union.
Implications for public policies design are analyzed, especially in investment decision making, investment financing, and regulatory policies. The BRT in public transport systems asks regulators for allocation of rights of use of limited urban space between public transport and car users.
Public investment in infrastructure or services of transport are not considered income of benefited sectors. We therefore question the validity of using information from expenditure decisions for evaluating the impact of public decisions in welfare distribution.

Keywords: *Income Elasticity, income distribution, Gini coefficient, Engel curves*

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INTRODUCTION

Public policies usually respond to a compromise of several objectives, particularly economic efficiency and equity. Economic theory provides a relatively objective basis for decision making based on economic efficiency, which requires very simple and hardly debatable assumptions (Pareto efficiency criterion). The incorporation of equity criteria in decision making requires stronger and therefore, more controversial ethical assumptions. In practice, this can be seen in the fact that efficiency criteria are predominant in technical recommendations when making public policy decisions (although it is difficult to know if this is the case for decisions taken effectively). For example, when making public investment decisions in transport infrastructure, it can be frequently seen the implementation of cost-benefit analysis (CBA) that rely on a utilitarian view that considers equally the welfare of all individuals in society when conceptualizing social welfare, and it is ultimately neutral regarding the distributional impact of the analyzed investment.

In the transport sector the predominance of efficiency criteria is even clearer than in other sectors due to certain sectorial characteristics, which turn the identification of beneficiaries of public decisions into something extremely complex. Among these are the following:

- Much of the transport infrastructure is geared towards the simultaneous satisfaction of two objectives: to provide mobility to persons, and competitiveness to production. Although some infrastructures accomplish with only one of these (subways or ports), a good part of the infrastructure is made so as to accomplish with both.

- The transport infrastructure has a strong public good imprint. Although it varies with the type of infrastructure, in general it consists in goods where the exclusion of consumers is difficult, and there is no rivalry in consumption.

- In parallel with this, the sector is characterized by multiple externalities, both positives and negatives, justifying government intervention for their provision, switching the determination of costs and benefits, as well as that of those affected and benefited by its decisions.

- Even in cases where the nature of public good is not apparent, and those benefited by the services provided by the infrastructure are easily identifiable, there are transaction costs of such magnitude in the provision of the goods that only the State has the administrative capacity to carry out these enterprises. Therefore, there are few cases of private development of transport infrastructure. Public participation in these cases "extends" the reasoning applicable to this situation of public goods and strong externalities.

In short, in the transport sector, decision making is done mainly on the basis of efficiency criteria in the understanding that the spread of benefits is so strong that it is not necessary

to analyze the distributional impact of decisions. This often masks strong transfers to specific sectors and has a regressive impact on welfare distribution for society. Moreover, this is consistent with the attention directed to the sector, indicating that the sectors benefited by this approach are those with strong political power, and while they receive a great benefit, the sectors politically disperse, with small individual loses end up as the losers.

In order to implement its objectives, the State handles several public policy instruments (mainly mobility and competitiveness). Among these, the three main ones are: public investment, regulation and financing. In the use of these instruments we can see the utility of analyzing the distributional impact in its design and implementation.

- The main instrument of public policy is the construction of transport infrastructure such as ports, roads, subways, street pavements, etc. As shown before, most of them deal with both objectives of mobility and competitiveness. It would be desirable to bring special attention to the distributional impact of infrastructures dealing with very specific beneficiaries (eg: agricultural).

- The second instrument consists in the regulation of private actors. In most countries the provision of transport services is destined to private hands, which operate in more or less regulated markets, with legal barriers to entries, heavy subsidies, pricing, etc.

- Finally, we mention the mechanisms for financing expenditure in infrastructure as policy instruments. There are basically three ways for financing transport infrastructure: specific taxes (eg: fuel), general taxes, and pay per use (tolls). As investment in infrastructure is supposed to have powerful externalities, it is seldom completely financed by users, be it by specific taxes or by direct payments. Moreover, in many cases there are very strong transfers to private, identifiable productive sectors product of this conception.

The alternative for distributive analysis of major policy decisions in the transport sector is given by the application of computable general equilibrium (CGE) models. This line of work is not only complex but for a proper calibration (appropriate to the level of detail of distributive analysis) requires information rarely available.

The approach followed in this paper consists in drawing, from the information disclosed in the consumption of individuals, a measure of the distributional impact of its modifications. While public decisions frequently refer to goods without markets, these are goods that are consumed jointly with others that do have them; thus, the analysis of consumption patterns of traded goods provides information about those good not traded on which the State takes no decisions.

METHODOLOGY

For the parametric estimation of the elasticities we used the proposal made by Costa (1997) where was specified different functional forms to estimate Engel curves (see Mas-Collel et. al. 1995) and obtained from them the elasticity between the share of spending on good i and the total expenditure.
Regarding to the parametric estimation, the methodology selected was the one suggested by Stark et. al. (1986), which represents the nonparametric estimation of a transformation from the Gini Index.

General considerations on Engel curves

Engel curve relates the expenditure shares of a given asset with total expenditure of the individual and his characteristics.

$w_i = f(z, x)$
where:
w_i: is the participation of good i in the budget
z: is the per capita household expenditure
x: are characteristics of the household or the head of household

The general functional form used is that proposed by Hausman et. al. (1995) in which the share of spending is a function of the logarithm of total expenditure. Specifically:

$$w_i = b_0 + b_1 \log(z) + b_2 \log^2(z) + b_3 \log^3(z) + x\beta$$

And the expenditure elasticity is:

$$w_i = 1 + \frac{b_1 + 2\, b_2 \log(z) + 3\, b_3 \log(z)}{b_0 + b_1 \log(z) + b_2 \log^2(z) + b_3 \log^3(z) + x\beta}$$

General considerations on nonparametric estimates of the Gini Index

The nonparametric method consists in writing the Gini coefficient as a function of covariance (Lerman and Yitzhaki, 1984) between the variable to be evaluated and its cumulative distribution function. Then the Gini coefficient is represented as the multiplication of three factors.

Specifically, we can write the Gini index as:

$$G(x) = \frac{2\ Cov(x, F_x)}{m}$$

where *x* is the variable to assess, F_x the cumulative distribution function and *m* the average of the variable *x*.

Being *X* the total expenditure and x_k the expenditure on good *k,* we can write the total expenditure as follows:

$$X = \sum_{k=1}^{K} x_k$$

Then the linearity property of covariance allows us to re express the Gini coefficient as:

$$G(x) = 2 \sum_{k=1}^{K} \frac{cov(x_k, F_{x_k})}{m_k}$$

Where x_k, F_{x_k} and m_k, are the expenditure on good k, the cumulative distribution function of expenditure in good *k* and the average of good *x*, respectively.

This form of writing G*(x)* allows us to decompose as following form:

$$G(x) = \sum_{k=1}^{K} \left[\frac{Cov(x_k, F_x)}{Cov(x_k, F_{x_k})}\right] \left[\frac{2\ Cov\ (x_k, F_{x_k})}{m_k}\right] \left[\frac{m_k}{m}\right] = \sum_{k=1}^{K} (R_k\ G_k\ S_k)$$

The three components listed in the above equation are the Gini correlation coefficient(R_k), the Gini coefficient of expenditure on good k (G_k) and the share of good k in the total spending (S_k). The contribution of a particular good or category of goods to the inequality in spending remains explained by the three factors listed above.

The elasticity of expenditure on the product or category k respect to the total expenditure is defined as:

$$\theta = \frac{R_k\ G_k}{G} = \frac{Cov(x_k, F_x)}{Cov(x, F_x)}\ \frac{m}{m_k}$$

DATA

To estimate the models mentioned above were used data from the Income and Expenditure Survey of Uruguay. This survey is carried out approximately every 10 years and provides detailed information on household consumption. As regards transport, the survey reveals household expenditure on use of public transport (bus and taxi) and expenditure on individual private transport; that among these latter have incremental spending on cars, fuel and other costs associated with the car.

The data processing was done following the work of Berri et. al (2010), where total expenditure on transport costs are separated into private transport and public transport. In turn, the private transport is divided into the following categories:

- Spending on cars
- Spending in two-wheel vehicles
- Fuel expenditure
- Other private transport costs (insurance, registration certificates, maintenance, etc.).

For its part, public transportation was discriminated between:

- Total expenditure on public transport.
- Expenditure on taxi transport.
- Spending on urban transport.

In all cases household expenses were normalized by the number of individuals in the household.

Table I - Descriptive Statistics – Survey of 1994 (in current value)

Expenditure	***Average***	***Standard Deviation***	***Min***	***Max***
Total expenditure	2,548.97	2,400.36	109.06	42358.07
Total expenditure on transport	215.49	554.03	0	14588.42
Private transport expenditure	157.24	523.80	0	14588.42
Spending on cars	46.70	394.17	0	12566.67
Spending in two-wheel vehicles	6.92	59.91	0	1852.5
Fuel expenditure	49.06	107.41	0	1182.5
Private sector expenditure on other	54.56	183.63	0	5437.85
Expenditure on Public Transport	57.88	125.55	0	2939.03
Expenditure on taxi	11.28	43.26	0	928.8
Expenditure in urban transport	30.70	57.23	0	817.86

Table II - Descriptive Statistics – Survey of 2006 (in current value)

Expenditure	***Average***	***Standard Deviation***	***Min***	***Max***
Total expenditure	9,789.65	10,679.83	832.1	308575.7
Total expenditure on transport	796.02	1,677.18	0	43277.3
Private transport expenditure	550.81	1,435.72	0	38805.34
Car Expenditure	112.25	921.94	0	34071.36
Two-wheel vehicles expenditure	33.93	227.89	0	11450.38
Fuel expenditure	240.94	516.88	0	6600
Private sector expenditure on other	173.43	454.65	0	8281.53
Expenditure on Public Transport	230.48	571.65	0	17559.35
Expenditure on taxi	30.51	179.44	0	9030
Expenditure on urban transport	148.10	299.30	0	13770.75

For the estimation of parametric models there were used, in addition to the expenditure variables, the following covariates available in the income and expenditure survey:

- Sex of household head.
- Age of household head.
- The owning/ not owning of a vehicle.
- The educational level of household head.

Surveys of years 1994 and 2006 were used for the nonparametric estimation, in addition to the discrimination of results between the capital of the country and the other cities and by income quintile.

Due to the complexity of parametric models, only the 2006 survey data was used for estimation.

ESTIMATION STRATEGY

We computed the nonparametric estimation directly by the statistic mentioned above, using the command proposed by Lopez-Feldman (2006). Regarding to the parametric model we estimated equations proposed by Hausman et. al. (1995); by ordinary least squares (OLS) in the first place and then tested the possibility of the existence of selection bias in the decision of spending. Implicitly, what we were checking is whether there is independence of the decision of spending and the size of spending. To do this we estimated the equations using the two-step method proposed by Heckman (see Cameron and Trivedi, 2005). The same is to estimate the following equation:

$$E(w|\boldsymbol{x}, w^* > 0) = x_2\beta_2 + \sigma_{12}\lambda(x_1\beta_1)$$

where:

x_1 are the covariates used in the first step
x_2 are the covariates used in the second step

RESULTS

Nonparametric Results

We present the results obtained in the nonparametric estimation for the total of Uruguay, discriminating between Montevideo (the capital) and the rest of the urban country. Results are also presented for the total sample and divided by income quintile of households.

Table III - Income elasticities of goods and transport services by income quintile (Year 1994)

	Variable	***General***	***Quintile 1***	***Quintile 2***	***Quintile 3***	***Quintile 4***	***Quintile 5***
For Uruguay	Total expenditure on transport	1.340 (0.04)	1.520 (0.12)	0.720 (0.32)	1.000 (0.39)	1.080 (0.33)	1.460 (0.15)
	Private transport expenditure	1.470 (0.04)	1.890 (0.20)	0.750 (0.57)	0.940 (0.64)	1.600 (0.47)	1.570 (0.18)
	Car expenditure	1.890 (0.05)	-0.210 (1.65)	3.210 (3.48)	0.560 (2.44)	2.760 (1.53)	2.100 (0.35)
	Two-wheel vehicles expenditure	0.310 (0.19)	1.880 (0.56)	-0.300 (1.25)	2.470 (2.11)	0.700 (2.02)	-0.620 (0.82)
	Fuel expenditure	1.200 (0.03)	1.950 (0.26)	0.850 (0.57)	0.670 (0.66)	1.150 (0.49)	0.960 (0.12)
	Private sector expenditure on other	1.500 (0.04)	2.120 (0.23)	0.890 (0.81)	1.080 (0.65)	1.670 (0.55)	1.550 (0.16)
	Expenditure on Public Transport	0.990 (0.04)	1.160 (0.18)	0.680 (0.39)	1.060 (0.44)	-0.070 (0.34)	1.040 (0.15)
	Expenditure on taxi	1.270 (0.06)	1.730 (0.52)	-0.270 (1.33)	1.740 (0.98)	-0.240 (0.77)	0.790 (0.24)
	Expenditure on urban transport	0.600 (0.04)	1.210 (0.20)	0.860 (0.42)	0.810 (0.48)	-0.240 (0.25)	0.100 (0.17)

Note: standard deviations in parentheses

Table IV - Income elasticities of goods and transport services by quintile for Montevideo (Year 1994)

	Variable	*General*	*Quintile 1*	*Quintile 2*	*Quintile 3*	*Quintile 4*	*Quintile 5*
For Montevideo	Total expenditure on transport	1.330 (0.03)	0.980 (0.21)	0.140 (0.38)	1.440 (0.37)	1.280 (0.42)	1.430 (0.18)
	Private transport expenditure	1.630 (0.06)	1.590 (0.47)	-0.490 (1.16)	2.510 (0.83)	2.350 (0.70)	1.600 (0.23)
	Car expenditure	1.980 (0.11)	NA NA	1.880 (4.67)	1.450 (4.26)	4.140 (2.05)	2.190 (0.47)
	Two-wheel vehicles expenditure	0.240 (0.38)	0.880 (0.98)	-4.470 (1.07)	5.180 (5.21)	-0.280 (2.33)	-1.530 (1.44)
	Fuel expenditure	1.330 (0.05)	1.970 (0.46)	-0.240 (1.21)	2.510 (1.02)	1.330 (0.80)	0.960 (0.13)
	Private sector expenditure on other	1.650 (0.06)	1.920 (0.59)	-1.820 (1.74)	2.420 (0.95)	2.710 (0.77)	1.570 (0.21)
	Expenditure on Public Transport	0.740 (0.06)	0.880 (0.25)	0.380 (0.35)	0.680 (0.37)	1.810 (0.41)	0.930 (0.17)
	Expenditure on taxi	1.020 (0.08)	0.970 (0.74)	-1.100 (1.46)	1.420 (0.92)	-0.340 (0.70)	0.750 (0.24)
	Expenditure on urban transport	0.240 (0.04)	0.890 (0.27)	0.620 (0.38)	0.350 (0.40)	-0.140 (0.52)	0.000 (0.16)

Note: standard deviations in parentheses

Table V - Income elasticities of goods and transport services by quintile for the rest of the country (Year 1994)

	Variable	*General*	*Quintile 1*	*Quintile 2*	*Quintile 3*	*Quintile 4*	*Quintile 5*
For the rest of the country	Total expenditure on transport	1.410 (0.06)	1.660 (0.17)	1.140 (0.51)	0.470 (0.66)	0.760 (0.52)	1.580 (0.22)
	Private transport expenditure	1.470 (0.06)	2.050 (0.20)	1.400 (0.57)	0.510 (0.71)	0.770 (0.61)	1.600 (0.23)
	Car expenditure	2.010 (0.07)	0.120 (1.69)	4.410 (5.28)	0.980 (2.78)	1.310 (2.64)	2.110 (0.42)
	Two-wheel vehicles expenditure	0.760 (0.18)	2.160 (0.61)	0.760 (1.58)	2.760 (2.06)	0.700 (2.51)	0.080 (0.95)
	Fuel expenditure	1.240 (0.04)	2.070 (0.22)	1.470 (0.57)	-0.280 (0.71)	0.990 (0.61)	1.000 (0.21)
	Private sector expenditure on other	1.400 (0.05)	2.290 (0.23)	1.490 (0.97)	0.280 (0.90)	0.400 (0.73)	1.380 (0.26)
	Expenditure on Public Transport	1.060 (0.09)	0.690 (0.26)	0.230 (0.77)	0.320 (1.07)	0.630 (0.80)	1.420 (0.41)
	Expenditure on taxi	1.230 (0.18)	1.150 (2.01)	0.620 (3.31)	-1.690 (3.05)	2.550 (3.15)	0.010 (0.51)
	Expenditure on urban transport	0.670 (0.10)	0.710 (0.30)	0.030 (0.95)	0.040 (1.47)	-0.360 (1.28)	0.380 (0.72)

Note: standard deviations in parentheses

Table VI - Income elasticities of goods and transport services by income quintile (Year 2006)

	Variable	*General*	*Quintile 1*	*Quintile 2*	*Quintile 3*	*Quintile 4*	*Quintile 5*
For Uruguay	Total expenditure on transport	1.288 (0.02)	1.826 (0.15)	1.562 (0.25)	1.430 (0.21)	1.203 (0.19)	1.366 (0.08)
	Private transport expenditure	1.387 (0.26)	2.275 (0.21)	2.119 (0.37)	1.700 (0.30)	0.998 (0.29)	1.470 (0.09)
	Car expenditure	1.755 (0.05)	3.720 (1.54)	2.749 (1.74)	2.480 (1.24)	1.577 (1.02)	2.030 (0.20)
	Two-wheel vehicles expenditure	0.526 (0.10)	2.540 (0.51)	2.025 (0.83)	1.940 (0.73)	0.362 (0.86)	0.111 (0.52)
	Fuel expenditure	1.250 (0.02)	1.955 (0.22)	1.766 (0.39)	1.581 (0.35)	0.764 (0.24)	1.218 (0.07)
	Private sector expenditure on other	1.387 (0.02)	2.567 (0.26)	2.701 (0.48)	1.771 (0.27)	1.357 (0.27)	1.268 (0.07)
	Expenditure on Public Transport	0.995 (0.03)	1.300 (0.21)	0.730 (0.24)	1.081 (0.55)	1.534 (0.24)	0.856 (0.12)
	Expenditure on taxi	1.307 (0.07)	3.072 (0.73)	1.450 (2.06)	3.440 (1.57)	2.660 (0.57)	1.011 (0.22)
	Expenditure on urban transport	0.673 (0.03)	1.249 (0.22)	0.539 (0.44)	0.770 (0.36)	1.235 (0.25)	-0.096 (0.16)

Note: standard deviations in parentheses

Table VII - Income elasticities of goods and transport services for Montevideo quintile (Year 2006)

	Variable	*General*	*Quintile 1*	*Quintile 2*	*Quintile 3*	*Quintile 4*	*Quintile 5*
For Montevideo	Total expenditure on transport	1.258 (0.03)	1.218 (0.28)	0.907 (0.42)	0.327 (0.47)	1.287 (0.24)	1.401 (0.08)
	Private transport expenditure	1.521 (0.04)	2.535 (0.61)	1.634 (1.24)	0.287 (1.01)	1.258 (0.45)	1.595 (0.11)
	Car expenditure	1.834 (0.08)	1.146 (3.54)	3.319 (0.82)	1.131 (0.54)	0.939 (1.60)	2.346 (0.21)
	Two-wheel vehicles expenditure	0.531 (0.24)	2.738 (0.73)	-0.974 (2.13)	2.017 (2.26)	-0.126 (2.17)	0.825 (0.62)
	Fuel expenditure	1.396 (0.03)	2.378 (0.65)	1.502 (1.65)	-0.712 (0.96)	1.136 (0.38)	1.277 (0.08)
	Private sector expenditure on other	1.440 (0.03)	3.084 (0.81)	2.359 (1.40)	0.700 (1.42)	1.481 (0.49)	1.323 (0.08)
	Expenditure on Public Transport	0.743 (0.05)	0.971 (0.32)	0.528 (0.46)	0.473 (0.45)	1.250 (0.31)	0.775 (0.13)
	Expenditure on taxi	1.225 (0.08)	5.137 (0.74)	1.310 (3.66)	3.210 (1.53)	2.541 (0.69)	0.861 (0.28)
	Expenditure on urban transport	0.227 (0.05)	0.876 (0.32)	0.464 (0.48)	0.195 (0.46)	0.799 (0.28)	-0.242 (0.21)

Note: standard deviations in parentheses

Table VIII - Income elasticities of goods and transport services by quintile for the rest of the country (Year 2006)

	Variable	*General*	*Quintile 1*	*Quintile 2*	*Quintile 3*	*Quintile 4*	*Quintile 5*
For the rest of the country	Total expenditure on transport	1.490 (0.03)	1.982 (0.16)	1.752 (0.31)	2.099 (0.35)	1.358 (0.29)	1.502 (0.16)
	Private transport expenditure	1.609 (0.04)	2.289 (0.24)	2.433 (0.36)	2.318 (0.44)	1.406 (0.35)	1.557 (0.19)
	Car expenditure	2.114 (0.06)	4.123 (1.53)	2.995 (1.57)	3.326 (2.17)	2.322 (1.10)	2.073 (0.35)
	Two-wheel vehicles expenditure	1.037 (0.05)	2.562 (0.52)	2.523 (1.00)	2.231 (0.93)	0.369 (1.08)	0.352 (0.81)
	Fuel expenditure	1.394 (0.03)	1.958 (0.25)	2.061 (0.42)	2.276 (0.40)	1.052 (0.34)	1.291 (0.14)
	Private sector expenditure on other	1.594 (0.03)	2.558 (0.27)	2.970 (0.46)	2.220 (0.69)	1.756 (0.38)	1.344 (0.17)
	Expenditure on Public Transport	0.910 (0.05)	1.378 (0.20)	0.405 (0.61)	1.162 (0.61)	0.880 (0.48)	0.819 (0.26)
	Expenditure on taxi	1.036 (0.16)	2.485 (0.80)	1.691 (2.20)	3.481 (1.68)	1.096 (1.08)	1.461 (0.44)
	Expenditure on urban transport	0.773 (0.04)	1.360 (0.27)	0.009 (0.56)	0.808 (0.66)	0.808 (0.66)	0.215 (0.29)

Note: standard deviations in parentheses

For Uruguayans, transport is a luxury good. The aggregated results do not change significantly in the 12 years between the two surveys. In terms of broad expenditure category, it appears that private transport is a luxury good, while public transport is a normal good. Disaggregating private transport, we observed that two-wheel vehicles (bicycles and motorcycles) are a normal good, while cars, fuel and other associated products are luxury goods. Disaggregating in turn public transport, it can be seen that bus service is a normal good and taxi service a luxury one.

From the statistical point of view, it should be noted that in some cases there are no robust estimates. It can be seen that the deviations are significantly higher in quintile estimates than in the aggregate estimates, clearly more robust. In the case of bus transport service, which as noted is identified as a normal good, one can observe that as income increases the level of household income elasticity decreases significantly, as for lower income households the public transport is considered a luxury good.

In the case of private transport behavior, the highest income quintile presents a special conduct: until quintile four it may be seen that as income increases, cars cease to be a luxury good, turning into a normal good. Nevertheless, in the fifth quintile this trend breaks up, and cars turn into a notoriously luxury good. This happens in both 1994 and 2006 estimates. We think that this may be because in the fifth quintile there is a modification in the consumption of goods, concentrating a great part of the consumption of upper range cars.

Comparison of parametric and nonparametric results

As shown in the table below, there is a relative similarity between the results obtained from the parametric and nonparametric estimates.

Table IX – Comparison by methods

Variable	Non parametric estimation	OLS	Heckman	Existence of selection
Total expenditure on transport	1.29	1.364	1.486	Si
Private transport expenditure	1.39	1.522	1.503	No
Car Expenditure	1.75	1.399	1.747	Si
Two-wheel vehicles expenditure	0.53	1.004	1.005	No
Fuel expenditure	1.25	1.143	1.231	Si
Private sector expenditure on other	1.39	1.410	1.388	No
Expenditure on Public Transport	1.00	0.800	0.801	No
Expenditure on taxi	1.31	0.991	0.993	No
Expenditure on urban transport	0.67	0.507	0.511	No

The results of the table above show that there is only selection bias (or that there are different determinants) between the decision of whether spending or not, and the size of expenditure, for total expenditure on transport for car expenses and the purchase of fuel. It is important to note, that possibly there are other variables, such as the distance between the workplace and the home or the valuation time, that may be influencing these decisions and they are not being observed for the selected sample.

Table X - Categorization by type of good

Variable	Well Type
Total expenditure on transport	Luxury Good
Private transport expenditure	Luxury Good
Car Expenditure	Luxury Good
Two-wheel vehicles expenditure	Good Normal
Fuel expenditure	Luxury Good
Private sector expenditure on other	Luxury Good
Expenditure on Public Transport	Good Normal
Expenditure on taxi	Well Normal / Luxury
Expenditure on urban transport	Good Normal

The goods are categorized in a similar manner regardless of the estimation method used, although some differences were found mainly in taxi expenditure.

Redistributive effects

An alternative approach is through redistribution analysis of marginal changes in spending of several goods, carried out with nonparametric estimation. The indicator of the table below (% change) shows the percentage change in the global Gini index to absolute modifications in the expenditure for each asset. If the percentage of change has a positive (negative) sign, it means that increases in spending will improve (worsen) the income distribution. There is work done in which they approximate the distributive impact of taxes on certain goods using the same indicator (Berri et. al. 2009); in that case it is shown that taxes applied on goods with a positive percentage change may be classified as regressive as they worsen the income distribution measured by the Gini index.

In the case of Uruguay, it can be seen that spending in general public transport - particularly in bus transport - presents a negative percentage of change, implying that reductions in spending on the good (eg: by decreasing the tax rate or increasing subsidies) would lead to an improvement in income distribution. By contrast, spending on private transportation (except in two-wheel vehicles) has a positive percentage of change, implying that increases in spending on the good would cause an improvement in income distribution.

Table XI - Decomposition of Gini Index

	Variable	***Sk***	***Gk***	***Rk***	***Share***	***% of change***
For Uruguay	Total expenditure on transport	0.0866	0.7136	0.7981	0.1115	0.0249
	Private transport expenditure	0.0614	0.816	0.7513	0.0851	0.0237
	Car Expenditure	0.0165	0.9826	0.7895	0.0289	0.0124
	Two-wheel vehicles expenditure	0.0035	0.9649	0.241	0.0018	-0.0016
	Fuel expenditure	0.0245	0.7865	0.701	0.0306	0.0061
	Private sector expenditure on other	0.0177	0.8307	0.738	0.0245	0.0068
	Expenditure on Public Transport	0.0235	0.7674	0.5733	0.0234	-0.0001
	Expenditure on taxi	0.0031	0.9565	0.6042	0.0041	0.001
	Expenditure on urban transport	0.0151	0.7514	0.396	0.0102	-0.0049
	Gini Index	0.4422				
For Montevideo	Total expenditure on transport	0.084	0.6614	0.7961	0.1057	0.0217
	Private transport expenditure	0.0525	0.8224	0.7742	0.0798	0.0273
	Car Expenditure	0.014	0.9805	0.7832	0.0257	0.0117
	Two-wheel vehicles expenditure	0.0008	0.987	0.2253	0.0004	-0.0004
	Fuel expenditure	0.0215	0.7944	0.7355	0.03	0.0085
	Private sector expenditure on other	0.0167	0.8135	0.741	0.024	0.0073
	Expenditure on Public Transport	0.0297	0.6456	0.4821	0.0221	-0.0076
	Expenditure on taxi	0.004	0.9174	0.5588	0.0049	0.0009
	Expenditure on urban transport	0.0163	0.6144	0.129	0.0031	-0.0132
	Gini Index	0.4186				
For the rest of the country	Total expenditure on transport	0.0896	0.7362	0.78	0.1335	0.0439
	Private transport expenditure	0.0722	0.8014	0.7736	0.1162	0.044
	Car Expenditure	0.0194	0.9835	0.828	0.0411	0.0216
	Two-wheel vehicles expenditure	0.0066	0.9515	0.42	0.0069	0.0002
	Fuel expenditure	0.0282	0.7648	0.7024	0.0394	0.0111
	Private sector expenditure on other	0.0189	0.8288	0.7409	0.0301	0.0112
	Expenditure on Public Transport	0.0159	0.8247	0.4253	0.0145	-0.0014
	Expenditure on taxi	0.002	0.9796	0.4077	0.0021	0.0001
	Expenditure on urban transport	0.0097	0.8732	0.3081	0.0067	-0.0029
	Gini Index	0.3853				

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CONCLUSIONS

We estimated income elasticities of major private consumption goods related to transportation, classified according to private or public transport. The results were those expected for a median income developing country like Uruguay. In particular, it highlights the fact that the use of private transport is a luxury good, while that of public transport is a normal good.

This result appears to be relevant when analyzing the distributional impact of several public policies in the transport area, where distributional issues usually are not taken into account when designing such policies (as they focus more on efficiency than on equity).

For instance, consider the assessment of the use of urban public space. The development of BRT-type public transport models questions the right of ownership over scarce public spaces. Particularly, the use of space for the construction of lanes exclusive for buses, often results in a reduction of the space used by public transport. As public space does not have a market allowing the observation of the choices of consumers regarding their use, we intended to use the information disclosed by them on consumption of goods associated with our main good. In the case of Uruguay, the analysis shows that the marginal change in the use of public space for public transport will lead to an improvement in the welfare distribution of citizens.

The difficulties of distributional analysis fall within the frame of a wider discussion, stemming from the fact that public services are strangely counted in conventional measures of income distribution or of poverty. This means that the public provision of transport infrastructure or services, as well as the provision of public education or public health, are not considered as an income of the benefited parties (Aaberge et. al. 2010). In this respect, although public investment in infrastructure would not affect income distribution, it would affect the distribution of welfare of individuals.

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ANNEXES

Annex I: Description of variables

Total expenditure per capita: total expenditure per capita household

Log of total expenditure: Log of total expenditure for person

(Log of total expenditure) ^ 2: squared logarithm of total expenditure for person

(Log of total expenditure) ^ 3: logarithm to the cube of total expenditure for person

Owner: binary variable that takes value one if the household has own car

Sex: dummy variable that takes value one if the household head is male

Age: age of household head

Age ^ 2: Age squared of household head

No Education: binary variable that takes value one if the household head has no studies (excluded variable in the estimation)

Primary: binary variable that takes value one if the household head has primary education

Secondary: binary variable that takes value one if the household head has secondary education

Technique: binary variable that takes value one if the household head has technical education

Professors: binary variable takes value one if the head of household education teacher

Military: binary variable that takes value one if the head of the household are a military

University: binary variable that takes value one if the head of household has college education

Annex II: Models for the proportion of spending on transport

Independent variable	proportion of spending on transport		
Dependent variables	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	0.1826392	0.2774916	0.51
(Log of total expenditure)^2	-0.0114358	0.0300608	0.704
(Log of total expenditure)^3	0.0002117	0.0010801	0.845
Owner	-0.0028551	0.0023614	0.227
Sex	0.0295389	0.0023534	0
Age	-0.0001479	0.0004194	0.724
Age^2	-7.86E-06	3.88E-06	0.043
Primary	0.0038913	0.0090004	0.666
Secondary	-0.0082734	0.0092572	0.372
Technique	-0.0113945	0.0095716	0.234
Professors	-0.0140103	0.0110954	0.207
Military	0.0012138	0.0171799	0.944
University	-0.0218007	0.0098167	0.026
Cte	-0.7625797	0.8495378	0.369

Independent variable	proportion of spending on transport		
Dependent variables	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	-0.4512895	0.1302569	0.001
(Log of total expenditure)^2	0.0469472	0.0152341	0.002
(Log of total expenditure)^3	-0.0014983	0.0005878	0.011
Sex	0.0019062	0.0008184	0.02
Age	0.0025207	0.0004243	0
Age^2	-3.70E-05	3.90E-06	0
Primary	0.0000544	0.0012094	0.964
Secondary	0.0002454	0.0012279	0.842
Technique	-0.0000784	0.0013435	0.953
Professors	0.001753	0.002556	0.493
Military	0.0130252	0.0023138	0
University	-0.0010591	0.0019446	0.586
Cte	1.387947	0.3671407	0
Selection equation			
Total expenditure per capita	0.0000385	0.00000281	0
Age	0.0287463	0.0046132	0
Age^2	-0.0004151	0.0000424	0
Cte	0.055394	0.1187497	0.641
/athrho	5.544374	0.4092469	0
/lnsigma	-2.373411	0.0097049	0
Rho	0.9999694	0.000025	
Sigma	0.0931624	0.0009041	
Lambda	0.0931596	0.0009043	
	P-value		
LR Test for rho	0		

Annex III: Models for the proportion of spending on private transport

Independent variable	proportion of spending on private transport		
Dependent variables	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	-0.3048754	0.3408246	0.371
(Log of total expenditure)^2	0.0446229	0.0366871	0.224
(Log of total expenditure)^3	-0.0018976	0.0013095	0.147
Owner	-0.0054155	0.003113	0.082
Sex	0.0294212	0.0032858	0
Age	-0.0013529	0.000571	0.018
Age^2	5.17E-06	5.36E-06	0.336
Primary	0.0080246	0.0131346	0.541
Secondary	-0.0088772	0.0134518	0.509
Technique	-0.0091894	0.0137934	0.505
Professors	-0.0213326	0.0157754	0.176
Military	0.0103967	0.0225834	0.645
University	-0.0258616	0.014109	0.067
Cte	0.6400449	1.050112	0.542

Independent variable	proportion of spending on private transport		
Dependent variables	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	-0.2987458	0.3410961	0.381
(Log of total expenditure)^2	0.0440739	0.0366894	0.23
(Log of total expenditure)^3	-0.001884	0.0013084	0.15
Owner	-0.0054196	0.0031076	0.081
Sex	0.0294212	0.00328	0
Age	-0.001353	0.00057	0.018
Age^2	5.17E-06	5.36E-06	0.335
Primary	0.0080315	0.0131113	0.54
Secondary	-0.0088665	0.013428	0.509
Technique	-0.0091786	0.013769	0.505
Professors	-0.0213106	0.0157478	0.176
Military	0.0104162	0.0225441	0.644
University	-0.02585	0.0140841	0.066
Cte	0.6215519	1.050834	0.554
Selection equation			
Total Expenditure per capita	0.0000272	0.00000192	0
Cte	-0.0832673	0.0229284	0
/athrho	-0.0334282	0.1285766	0.795
/lnsigma	-2.439403	0.0114691	0
Rho	-0.0334157	0.1284331	
Sigma	0.0872129	0.0010003	
Lambda	-0.0029143	0.0112085	
	P-value		
LR Test for rho	0.8439		

Annex IV Models for the proportion of spending on car

Independent variable	Proportion of spending on car		
Dependent variables	**Coefficient**	**Standard Deviation**	**P-value**
Log of total expenditure	0.5118571	2.042499	0.802
(Log of total expenditure)^2	-0.0283775	0.2149117	0.895
(Log of total expenditure)^3	0.0002094	0.0075043	0.978
Owner	-0.0154228	0.0155332	0.322
Sex	0.0361306	0.0184662	0.051
Age	-0.0067199	0.0037978	0.078
Age^2	0.0000721	0.0000394	0.069
Primary	0.1355918	0.1176443	0.25
Secondary	0.1071427	0.1183628	0.366
Technique	0.0849887	0.1193536	0.477
Professors	0.0947304	0.1319638	0.473
Military	0.087259	0.1288203	0.499
University	0.0681712	0.1199964	0.57
Cte	-2.284568	6.457888	0.724

Independent variable	Proportion of spending on car		
Dependent variables	**Coefficient**	**Standard Deviation**	**P-value**
Log of total expenditure	0.4290318	2.033214	0.833
(Log of total expenditure)^2	-0.0185175	0.2151541	0.931
(Log of total expenditure)^3	-0.0001852	0.0075733	0.98
Owner	-0.0142141	0.0162794	0.383
Sex	0.0303389	0.0338346	0.37
Age	-0.0067143	0.0037031	0.07
Age^2	7.20E-05	3.85E-05	0.061
Primary	0.1303077	0.1176426	0.268
Secondary	0.0979645	0.1239775	0.429
Technique	0.0775408	0.1220641	0.525
Professors	0.0893289	0.1314531	0.497
Military	0.0735351	0.142795	0.607
University	0.0597186	0.1242401	0.631
Cte	-2.010001	6.441081	0.755
Selection equation			
Total Expenditure per capita	0.0000152	0.00000188	0
Owner	-0.1079935	0.0575368	0.061
Sex	0.502626	0.0701607	0
Primary	0.4352968	0.3680009	0.237
Secondary	0.7738735	0.3678135	0.035
Technique	0.6193268	0.3742713	0.098
Professors	0.4431851	0.4236707	0.296
Military	1.182066	0.4543122	0.009
University	0.7093368	0.3729601	0.057
Cte	-2.844631	0.3705415	0
/athrho	0.119368	0.5888964	0.839
/lnsigma	-2.186277	0.0731729	0
Rho	0.1188043	0.00045	
Sigma	0.1123342	0.0082198	
Lambda	0.0133458	0.0660213	
	P-value		
LR Test for rho	0.01		

Annex V: Models for the proportion of spending on two-wheel vehicles

Independent variable	proportion of spending on two-wheel vehicles		
Dependent variable	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	0.004389	0.0030411	0.149
Owner	-0.0115929	0.0041296	0.005
Sex	0.010911	0.0044555	0.015
Age	-0.0019439	0.0008387	0.021
Age^2	0.0000203	0.00000865	0.019
Cte	0.0442401	0.03218	0.17

Independent variable	proportion of spending on two-wheel vehicles		
Dependent variable	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	0.0054175	0.0032088	0.091
Owner	-0.011665	0.004114	0.005
Sex	0.0092361	0.004749	0.052
Age	-0.0021529	0.0008636	0.013
Age^2	0.000024	0.0000094	0.011
Cte	0.0539335	0.0335158	0.108
Selection Equation			
Total Expenditure per capita	-0.0000138	0.00000285	0
Age	0.0221395	0.0086296	0.01
Age^2	-0.0004186	0.0000862	0
Sex	0.197535	0.0462499	0
Cte	-1.239672	0.2054928	0
/athrho	-0.1884457	0.1861283	0.311
/lnsigma	-2.934684	0.0385184	0
rho	-0.1862462	0.1437592	0.1796719
sigma	0.0531475	0.0004439	0.0020472
lambda	-0.0098985	0.0048395	0.0098348
	P-value		
LR Test for rho	0.7		

Annex VI: Models for the proportion of spending on fuel

Independent variable	proportion of spending on fuel		
Dependent Variable	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	-0.3039331	0.1378728	0.028
(Log of total expenditure)^2	0.0346575	0.0147568	0.019
(Log of total expenditure)^3	-0.0012937	0.0005239	0.014
Owner	-0.0007359	0.0012413	0.553
Sex	0.0103607	0.0013449	0
Age	-0.0001796	0.0002336	0.442
Age^2	1.24E-06	2.18E-06	0.568
Primary	0.0055098	0.0054201	0.309
Secondary	0.0029846	0.0055385	0.59
Technique	0.0039129	0.0056686	0.49
Professors	0.0034834	0.0063862	0.585
Military	0.00039	0.0086715	0.964
University	0.0049228	0.0057594	0.393
Cte	0.9059548	0.4272318	0.034

Independent variable	proportion of spending on fuel		
Dependent Variable	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	0.0024478	0.0027145	0.367
(Log of total expenditure)^2	-0.0001318	0.0001417	0.352
Owner	0.0135183	0.0014232	0
Sex	0.0336341	0.0014734	0
Age	0.0020768	0.0002545	0
Age^2	-2.34E-05	2.36E-06	0
Primary	0.014078	0.0053048	0.008
Secondary	0.020235	0.0054018	0
Technique	0.0169792	0.0056218	0.003
Professors	0.0322415	0.0065257	0
Military	0.0277067	0.0102294	0.007
University	0.0334324	0.0055707	0
Cte	-0.0978208	0.0152829	0
Selection Equation			
Owner	0.2994037	0.0301246	0
Age	0.0453759	0.0053671	0
Age^2	-0.0005138	0.0000496	0
Sex	0.7058665	0.0308318	0
Primary	0.287036	0.111629	0.01
Secondary	0.4213517	0.1136461	0
Technique	0.3428797	0.1184668	0.004
Professors	0.6823278	0.1376056	0
Military	0.5797818	0.2184807	0.008
University	0.7167346	0.1173129	0
Cte	-1.894509	0.1726299	0
/athrho	4.370506	0.2306514	0
/lnsigma	-3.05057	0.0134995	0
rho	0.9996803	0.0001475	
sigma	0.0473319	0.000639	
lambda	0.0473168	0.0006405	
	P-value		
LR Test for rho	0		

Annex VII: Models for the proportion of spending on other private transport goods

Independent variable	proportion of spending on other private transport goods		
Dependent Variable	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	-0.0466525	0.1739031	0.789
(Log of total expenditure)^2	0.0104734	0.0186134	0.574
(Log of total expenditure)^3	-0.0005353	0.0006608	0.418
Owner	-0.0022963	0.0015772	0.145
Sex	0.0073442	0.0016583	0
Age	-0.000924	0.0002883	0.001
Age^2	6.63E-06	2.69E-06	0.014
Primary	0.0027538	0.0066231	0.678
Secondary	-0.0055537	0.0067787	0.413
Technique	-0.0044132	0.0069473	0.525
Professors	-0.0063945	0.0078683	0.416
Military	0.0027206	0.0108826	0.803
University	-0.0098744	0.0070644	0.162
Cte	0.0244173	0.5388831	0.964

Independent variable	proportion of spending on other private transport goods		
Dependent Variable	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	-0.0405035	0.1744479	0.816
(Log of total expenditure)^2	0.0098707	0.0186569	0.597
(Log of total expenditure)^3	-0.0005173	0.0006615	0.434
Owner	-0.0025681	0.001752	0.143
Sex	0.0067921	0.0022764	0.003
Age	-0.0009589	0.0003043	0.002
Age^2	7.08E-06	2.97E-06	0.017
Primary	0.0026952	0.0066116	0.684
Secondary	-0.0056126	0.0067669	0.407
Technique	-0.0044772	0.0069356	0.519
Professors	-0.0064762	0.0078558	0.41
Military	0.0026651	0.0108623	0.806
University	-0.0099338	0.0070521	0.159
Cte	0.0068972	0.5401494	0.99
Selection Equation			
Total Expenditure per capita	0.0000452	0.0000022	0
Owner	0.3764964	0.03487	0
Age	0.0443597	0.0060212	0
Age^2	-0.0005714	0.0000553	0
Sex	0.7313778	0.034176	0
Cte	-1.687993	0.1535993	0
/athrho	-0.0314189	0.088955	0.724
/lnsigma	-3.195002	0.0119516	0
rho	-0.0314086	0.0888672	
sigma	0.0409665	0.0004896	
lambda	-0.0012867	0.0036426	
	P-value		
LR Test for rho	0.7519		

Annex VIII: Models for the proportion of spending on public transport

Independent variable	proportion of spending on public transport		
Dependent Variable	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	0.5956061	0.1855886	0.001
(Log of total expenditure)^2	-0.0639945	0.020165	0.002
(Log of total expenditure)^3	0.0022508	0.0007268	0.002
Owner	-0.0045325	0.0014758	0.002
Sex	-0.0035218	0.0014349	0.014
Age	-0.0000944	0.00026	0.717
Age^2	1.55E-07	2.40E-06	0.949
Primary	-0.0047951	0.0058987	0.416
Secondary	-0.0016387	0.0060504	0.787
Technique	-0.0052058	0.0062486	0.405
Professors	0.0008405	0.0070265	0.905
Military	-0.0061883	0.0106877	0.563
University	-0.0017049	0.0063477	0.788
Cte	-1.762349	0.5665107	0.002

Independent variable	proportion of spending on public transport		
Dependent Variable	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	0.5952611	0.1853214	0.001
(Log of total expenditure)^2	-0.06395	0.0201387	0.001
(Log of total expenditure)^3	0.0022488	0.000726	0.002
Owner	-0.0045324	0.0014732	0.002
Sex	-0.0035218	0.0014323	0.014
Age	-0.0001008	0.0002746	0.714
Age^2	2.25E-07	2.59E-06	0.931
Primary	-0.0048497	0.0059372	0.414
Secondary	-0.0017598	0.0062712	0.779
Technique	-0.0053199	0.006437	0.409
Professors	0.0006623	0.0074407	0.929
Military	-0.0063704	0.0109665	0.561
University	-0.0018971	0.006879	0.783
Cte	-1.760926	0.5658511	0.002
Selection Equation			
Total Expenditure per capita	0.00000796	0.00000168	0
Age	0.0264416	0.0056025	0
Age^2	-0.000287	0.0000511	0
Primary	0.1862231	0.1067428	0.081
Secondary	0.4559869	0.1103438	0
Technique	0.4261871	0.1161849	0
Professors	0.7224861	0.1434897	0
Military	0.7423252	0.2590267	0.004
University	0.8081121	0.1199414	0
Cte	-0.8053007	0.1762714	0
/athrho	-0.0099612	0.1437734	0.943
/lnsigma	-3.391401	0.013186	0
rho	-0.0094375	0.1314946	
sigma	0.0423718	0.000478	
lambda	-0.0003999	0.005572	
	P-value		
LR Test for rho	0.9462		

Annex IX: Models for the proportion of spending on taxi

Independent variable	proportion of spending on taxi		
Dependent Variable	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	-0.0093444	0.0017413	0
Age	-0.001613	0.0004555	0
Age^2	0.0000181	0.00000409	0
Owner	-6.10E-03	2.85E-03	0.033
Cte	0.1438716	0.0194153	0

Independent variable	proportion of spending on taxi		
Dependent Variable	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	-0.0069321	0.0020834	0.001
Primary	-0.0278968	0.0081282	0.001
Secondary	-0.0368943	0.0082051	0
Technique	-0.0411054	0.0090064	0
Professors	-0.0283497	0.0097949	0.004
Military	-0.0422141	0.0145154	0.004
University	-0.0372671	0.0084922	0
Cte	0.126774	0.0239902	0
Selection Equation			
Age	0.0010616	0.0012098	0.38
Cte	-1.319056	0.067551	0
/athrho	-0.076105	0.223451	0.733
/lnsigma	-3.364745	0.0298478	0
rho	-0.0759584	0.2221617	
sigma	0.0345708	0.0010319	
lambda	-0.0026259	0.0077181	
	P-value		
LR Test for rho	0.08		

Annex X: Models for the proportion of spending on urban transport

Independent variable	proportion of spending on urban transport		
Dependent Variable	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	0.9027466	0.2434406	0
(Log of total expenditure)^2	-0.0990826	0.0267831	0
(Log of total expenditure)^3	0.0035359	0.0009781	0
Owner	-0.0037527	0.0013785	0.007
Sex	-0.0043189	0.0013306	0.001
Age	0.0005581	0.0002487	0.025
Age^2	-6.74E-06	2.31E-06	0.004
Primary	0.0081459	0.0070151	0.246
Secondary	0.0086117	0.0071069	0.226
Technique	0.0056766	0.0072369	0.433
Professors	0.0083219	0.007832	0.288
Military	0.0038923	0.0104879	0.711
University	0.0061724	0.0073109	0.399
Cte	-2.647397	0.7345904	0

Independent variable	proportion of spending on urban transport		
Dependent Variable	**Coefficient**	**Standard deviation**	**P-value**
Log of total expenditure	0.9027466	0.2434406	0
(Log of total expenditure)^2	-0.0990826	0.0267831	0
(Log of total expenditure)^3	0.0035359	0.0009781	0
Owner	-0.0037527	0.0013785	0.007
Sex	-0.0043189	0.0013306	0.001
Age	0.0005581	0.0002487	0.025
Age^2	-6.74E-06	2.31E-06	0.004
Primary	0.0081459	0.0070151	0.246
Secondary	0.0086117	0.0071069	0.226
Technique	0.0056766	0.0072369	0.433
Professors	0.0083219	0.007832	0.288
Military	0.0038923	0.0104879	0.711
University	0.0061724	0.0073109	0.399
Cte	-2.647397	0.7345904	0
Selection Equation			
Owner	-0.0521828	0.0333267	0.117
Age	0.0434008	0.0058667	0
Age^2	-0.0004297	0.0000536	0
Sex	-0.1401764	0.0328713	0
Primary	0.4495129	0.1259263	0
Secondary	0.8105123	0.1280906	0
Technique	0.8671235	0.1334539	0
Professors	0.970887	0.1544384	0
Military	1.199927	0.2570233	0
University	1.152944	0.1326771	0
Cte	-1.7751	0.1924821	0
/athrho	-0.0099612	0.1437734	0.945
/lnsigma	-3.391401	0.013186	0
rho	-0.0099609	0.1437592	
sigma	0.0336615	0.0004439	
lambda	-0.0003353	0.0048395	
	P-value		
LR Test for rho	0.9466		