Energy taxation, subsidy removal and poverty in Mexico

José M. Labeaga[1,3,*], Xavier Labandeira[2,3], Xiral López-Otero[1]

[1]Departamento de Teoría Económica y Economía Matemática, UNED, Madrid, Spain, [2]Rede, Universidade de Vigo, Facultade de CC.EE., Campus As Lagoas s/n, Vigo, Spain, and [3]Economics for Energy, Vigo, Spain
[*]Corresponding author. Email: jlabeaga@cee.uned.es

ONLINE APPENDIX

Appendix A. Mexican energy data

The ENIGH survey, provided by the Mexican National Institute of Statistics and Geography, is carried out every two years. The survey uses direct interviews to collect household budget data from a representative sample of Mexican households with the use of stratified random sampling. The survey collects information on the value of household expenses for different goods during the first three months of the year, and provides detailed information on demographic and dwelling characteristics.[1] Table A1 depicts the summary statistics for the ENIGH variables used in our model while figure A1 shows the evolution of spending shares, prices and total expenditures throughout the sample period (1994-2014).

Table A1. Summary statistics for the variables of the energy demand model

Variable	Observations	Mean	Std. Dev.	Min	Max
Food share	119406	0.5474	0.1704	0.0047	0.9835
Electricity share	119406	0.0706	0.0649	0.0002	0.8701
LPG share	119406	0.0401	0.0493	0	0.6748
Gasoline share	119406	0.0650	0.1107	0	0.8462
Other ND share	119406	0.2769	0.1401	0.0010	0.9711
Ln (food price)	119406	-0.0407	0.0655	-0.2278	0.1300
Ln (electricity price)	119406	-0.1570	0.1446	-0.5573	0.0673
Ln (LPG price)	119406	-0.0488	0.2323	-1.0382	0.4522
Ln (gasoline price)	119406	-0.0292	0.1263	-0.6645	0.2853
Ln (other ND price)	119406	-0.0042	0.0135	-0.0798	0.0367
Ln (Expenditure)	119406	8.9432	0.7209	6.6766	10.4768
Gender	119406	0.7692	0.4214	0	1
Age	119406	47.4078	15.8571	0	97
Members ≥12 years	119406	3.1055	1.5181	1	17

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[1] See http://www.inegi.org.mx for a comprehensive description of the survey and sampling methods.

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Members < 12 years	119406	1.0024	1.1961	0	11
Urban	119406	0.7616	0.4261	0	1
North	119406	0.2641	0.4408	0	1
Center	119406	0.4692	0.4991	0	1
Primary school	119406	0.6454	0.4784	0	1
High school	119406	0.1122	0.3156	0	1
University	119406	0.1300	0.3363	0	1
Car	119406	0.2527	0.4346	0	1
Van	119406	0.1388	0.3457	0	1
Radio	119406	0.2505	0.4333	0	1
Radio-tape recorder	119406	0.3462	0.4758	0	1
TV	119406	0.6872	0.4636	0	1
Videotape player	119406	0.2266	0.4186	0	1
Blender	119406	0.8429	0.3639	0	1
Microwave	119406	0.3495	0.4768	0	1
Refrigerator	119406	0.8095	0.3927	0	1
Stove	119406	0.8919	0.3105	0	1
Washing machine	119406	0.6020	0.4895	0	1
Iron	119406	0.8549	0.3522	0	1
Fan	119406	0.5412	0.4983	0	1
Vacuum cleaner	119406	0.0711	0.2569	0	1
Computer	119406	0.1908	0.3929	0	1
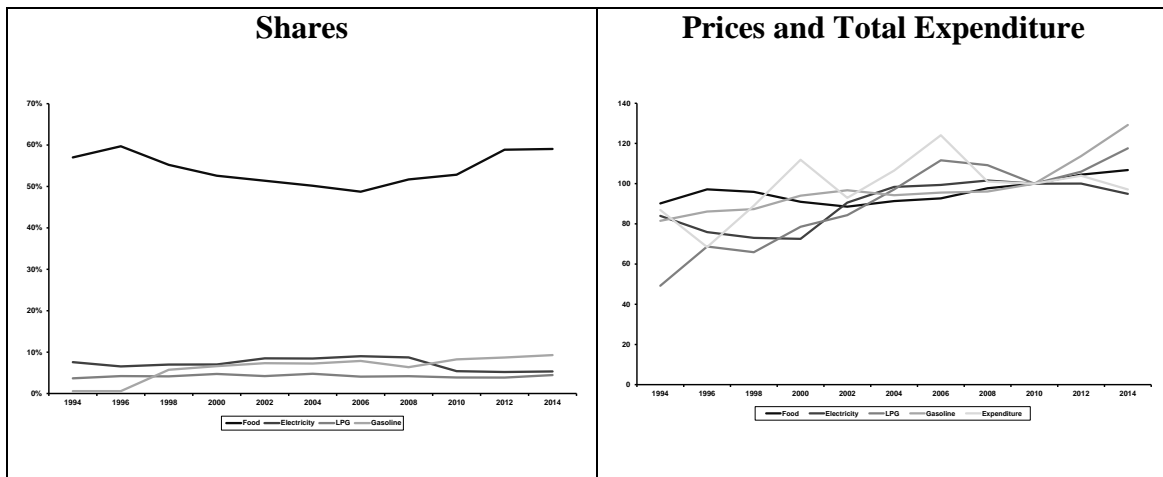
Figure A1. Evolution of the spending shares (%), prices and total per capita expenditure in Mexico 1994-2014 (2010=100).

Source: Authors' own calculations, based on ENIGH and INEGI data.

Appendix B. Details of the econometric model[2]

The QUAIDS assumes the following cost function:

$$\ln c(u, p) = \ln a(p) + \frac{ub(p)}{1 - \lambda(p)b(p)u} \quad , \tag{A1}$$

where u is utility, p is a set of prices, $a(p)$ is a function that is homogenous of degree one in prices, and $b(p)$ and $\lambda(p)$ are functions that are homogenous of degree zero in prices. Accordingly, the indirect utility function is

$$\ln V = \left\{ \left[\frac{\ln m - \ln a(p)}{b(p)} \right]^{-1} + \lambda(p) \right\}^{-1} \quad , \tag{A2}$$

where m is the total expenditure, $\ln a(p)$ and $b(p)$ are the translog and Cobb-Douglas functions of prices as

$$\ln a(p) = \alpha_0 + \sum_{i=1}^{n} \alpha_i \ln p_i + \frac{1}{2} \sum_{i=1}^{n} \sum_{j=1}^{n} \gamma_{ij} \ln p_i \ln p_j \qquad b(p) = \prod_{i=1}^{n} p_i^{\beta_i} \quad , \tag{A3}$$

where p_i and p_j are price indices of goods i and j, respectively. $\lambda(p)$ is a differentiable, homogeneous function of degree zero of prices, and defined as $\lambda(p) = \sum_{i}^{n} \lambda_i \ln p_i$.

Applying Shephard's lemma to the cost function (A1) or Roy's identity to the indirect utility function (A2), the share equation for good i is expressed as:

$$w_i = \alpha_i + \sum_{j=1}^{n} \gamma_{ij} \ln p_j + \beta_i \ln \left[\frac{m}{a(p)} \right] + \frac{\lambda_i}{b(p)} \left\{ \ln \left[\frac{m}{a(p)} \right] \right\}^2 \quad , \tag{A4}$$

where w_i is the budget share of the non-durable good i ($i = 1, \dots K$) and α, γ, β, and λ are parameters to be estimated. In this piece of research, the intercept α_i incorporates a wide

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[2] It should be taken into account that households do not obtain utility directly from the consumption of energy products, but rather from the goods and services that require energy use (e.g., lighting, hot water, processed foods, etc.). Within this context, one should use a two-stage procedure (see Dubin and McFadden, 1984, or West, 2004) to consider the utility derived from these final goods and services when estimating the demand for energy products to avoid estimation biases. However, the available data does not permit this analysis. We have therefore chosen to estimate a QUAIDS to correct problems associated with the estimation of this type of model (see section 3) in order to minimize biases.

range of household and individual demographic characteristics, thus $\alpha_i = \alpha_i(z_{ht})$. We also introduce heterogeneity in the demand responses to variation in total expenditure, $\beta_i = \beta_i(z_{ht})$. Additionally, the demand should satisfy additivity of budget shares, homogeneity of price responses and Slutsky symmetry:

Adding up: $\qquad \sum_{i=1}^{n} \alpha_i = 1, \sum_{i=1}^{n} \beta_i = 0, \sum_{j=1}^{n} \gamma_{ij} = 0, \sum_{i=1}^{n} \lambda_i = 0,$ (A5)

Homogeneity : $\qquad \sum_{j=1}^{n} \gamma_{ij} = 0,$ (A6)

Symmetry: $\qquad \gamma_{ij} = \gamma_{ji}$ (A7)

Considering that households take decisions at the extensive margin previous to demand choices made in a two-stage budgeting process, a model for good i can be expressed as:

$$d_i^* = z_i^{'} \gamma_i + \upsilon_i$$ (A8)

$$w_i^* = f\left(x_i^{'} \beta_i\right) + \varepsilon_i$$ (A9)

$$d_i = \begin{cases} 1 & if \ d_i^* \succ 0 \\ 0 & if \ d_i^* \leq 0 \end{cases}$$ (A10)

$$w_i = d_i w_i^* \ ,$$ (A11)

where **x** and **z** are vectors of sets of explanatory variables, d_i and w_i are two dependent variables for the consumption decision and budget share of good i, respectively, and d_i^* and w_i^* their corresponding unobserved latent variables. The process is implemented through the estimation of a probit model in the first stage and the calculation of the Inverse Mills Ratio (IMR) that, in turn, is used to correct the budget share equations of all goods at the second stage. Given that, to simulate the proposed reforms, we need not only the estimated parameters for vehicle owners but for the whole population, we also estimate the equations for non-owners of vehicles (i.e., a kind of Roy model as described, for instance by Cameron and Trivedi (2005)).

We derive the price and total expenditure elasticities (taking into account the whole model), which adopt the following expressions:

$$\mu_i = \frac{\partial w_i}{\partial \ln m} = \beta_i + \frac{2\lambda_i}{b(p)} \left\{ \ln\left[\frac{m}{a(p)}\right] \right\} \tag{A12}$$

$$\mu_{ij} = \frac{\partial w_i}{\partial \ln p_j} = \lambda_{ij} - \mu_i \left(\alpha_j + \sum_k \gamma_{jk} \ln P_k \right) - \frac{\lambda_i \beta_j}{b(p)} \left\{ \ln\left[\frac{m}{a(p)}\right] \right\}^2 .$$

The budget elasticities are given by $e_i = \frac{\Phi(z_i'\gamma_i)\mu_i}{w_i} + 1$, where $\Phi(\ )$ is the standard normal cumulative distribution. The uncompensated price elasticities are given by $e_{ij}^u = \frac{\Phi(z_i'\gamma_i)\mu_{ij}}{w_i} + \phi * \tau_{ij} * \left(1 - \frac{\delta_i}{w_i}\right) - \delta_{ij}$, where δ_{ij} is the Kronecker delta, τ_{ij} is the estimated parameter for price j with respect to good item i in the probit model. We use the Slutsky equation, $e_{ij}^c = e_{ij}^u + e_i w_j$, to calculate the set of compensated e_{ij}^c and assess the symmetry and negativity conditions by examining the matrix with elements that should be symmetric and negative semi definite in the usual way. To derive an expression of the variance estimator required for confidence intervals, we use the delta method.

Appendix C. Estimation and simulation results

Table A2. Estimates of the QUAIDS model for household demand conditional on owning a vehicle

Variable	Food	Electricity	LPG	Gasoline	Other non-durables
Intercept	-1.0334	0.6466	-0.3078	-0.3126	2.0072
	(-8.23)	(11.55)	(-7.98)	(-2.92)	(18.38)
Ln (food price)	-0.2696	0.2221	-0.1237	-0.1092	0.2804
	(-4.71)	(9.73)	(-10.75)	(-4.30)	(5.86)
Ln (electricity price)	0.2221	-0.1749	0.0822	0.0227	-0.1521
	(8.52)	(-11.12)	(11.66)	(1.31)	(-7.53)
Ln (LPG price)	-0.1237	0.0822	-0.0241	-0.0531	0.1187
	(-7.03)	(9.26)	(-3.60)	(-3.75)	(6.70)
Ln (gasoline price)	-0.1092	0.0227	-0.0531	-0.0402	0.1798
	(-4.21)	(1.29)	(-5.40)	(-1.34)	(4.48)
Ln (other ND price)	0.2804	-0.1521	0.1187	0.1798	-0.4268
	(4.85)	(-7.04)	(7.66)	(4.38)	(-6.67)
Ln (Expenditure)	0.3516	-0.1808	0.0875	0.0551	-0.3134
	(13.61)	(-15.51)	(10.62)	(2.57)	(-14.02)
Ln(Expenditure)^2	-0.0253	0.0123	-0.0063	0.0075	0.0118
	(-14.92)	(15.75)	(-11.56)	(5.65)	(8.24)
Gender	0.0457	-0.0045	0.0017	0.0105	-0.0534
	(13.58)	(-2.98)	(1.72)	(3.57)	(-18.05)
Age	0.0054	0.0010	0.0005	-0.0016	-0.0054
	(12.47)	(5.01)	(4.26)	(-4.10)	(-13.86)
Age^2	-0.0001	0.0000	0.0000	0.0000	0.0000
	(-11.99)	(-2.18)	(-1.44)	(3.28)	(11.78)
Members ≥12 years	-0.0104	-0.0060	-0.0065	-0.0086	0,0314
	(-1.53)	(-1.97)	(-3.28)	(-1.45)	(5.23)
Members < 12 years	0.0155	0.0008	-0.0012	-0.0198	0.0046
	(12.46)	(1.53)	(-3.22)	(-18.55)	(4.29)
Urban	0.0584	-0.0075	0.0238	-0.0310	-0.0437
	(2.35)	(-0.67)	(3.30)	(-1.42)	(-1.99)
North	0.2299	-0.1228	0.0430	0.0991	-0.2492
	(4.43)	(-9.79)	(5.25)	(4.15)	(-10.32)
Center	0.0109	-0.0095	0.0092	0.0071	-0.0176
	(4.43)	(-8.66)	(12.82)	(3.29)	(-8.12)
Primary school	0.0338	0.0028	0.0034	-0.0069	-0.0331
	(7.54)	(1.42)	(2.56)	(-1.76)	(-8.31)
High school	0.0394	0.0058	0.0043	0.0024	-0.0518
	(7.00)	(2.29)	(2.59)	(0.48)	(-10.40)
University	0.2105	-0.0512	0.0048	0.0767	-0.2408
	(6.11)	(-3.33)	(0.48)	(2.56)	(-7.95)

Car	-0.0295	0.0035	-0.0012	0.0367	-0.0095
	(-12.33)	(3.25)	(-1.66)	(17.44)	(-4.47)
Van	-0.0359	0.0009	-0.0007	0.0435	-0.0079
	(-14.96)	(0.88)	(-0.94)	(20.72)	-3.72
Radio	0.0026	0.0001	0.0026	-0.0006	-0.0047
	(1.56)	(0.12)	(5.48)	(-0.40)	(-3.22)
Radio-tape recorder	0.0039	-0.0019	0.0001	-0.0067	0.0046
	(2.52)	(-2.71)	(0.31)	(-4.98)	(3.35)
TV	0.0270	-0.0187	-0.0006	-0.0118	0.0041
	(11.51)	(-17.90)	(-0.93)	(-5.78)	(1.97)
Videotape player	0.0018	-0.0009	0.0028	-0.0079	0.0043
	(1.04)	(-1.24)	(5.72)	(-5.36)	(2.87)
Blender	0.0103	0.0014	0.0040	-0.0116	-0.0041
	(3.23)	(0.95)	(4.32)	(-4.12)	(-1.44)
Microwave	-0.0106	0.0086	0.0006	-0.0023	0.0037
	(-5.77)	(10.52)	(1.13)	(-1.46)	(2.28)
Refrigerator	-0.0073	0.0104	0.0005	-0.0184	0.0148
	(-1.82)	(5.76)	(0.43)	(-5.19)	(4.12)
Stove	-0.0049	0.0064	0.0182	-0.0272	0.0075
	(-1.01)	(2.96)	(12.90)	(-6.39)	(1.73)
Washing machine	0.0090	0.0037	0.0001	-0.0174	0.0046
	(3.85)	(3.55)	(0.10)	(-8.51)	(2.23)
Iron	0.0049	0.0001	0.0012	-0.0150	0.0088
	(1.54)	(0.05)	(1.28)	(-5.27)	(3.04)
Fan	0.00048	0.0066	-0.0079	-0.0069	0.0033
	(2.94)	(9.06)	(-16.49)	(-4.76)	(2.24)
Vacuum cleaner	-0.0051	0.0046	0.0014	-0.0027	0.0018
	(-2.40)	(4.91)	(2.20)	(-1.47)	(0.97)
Computer	-0.0079	0.0056	-0.0014	-0.0082	0.0119
	(-3.48)	(5.53)	(-2.06)	(-4.20)	(5.97)
Members ≥12 years *Ln (Expenditure)	0.0017	0.0007	0.0005	-0.0017	-0.0013
	(2.54)	(2.32)	(2.73)	(-2.84)	(-2.17)
Urban *Ln (Expenditure)	-0.0053	0.0014	-0.0028	0.0008	0.0059
	(-2.16)	(1.31)	(-3.96)	(0.38)	(2.69)
North *Ln (Expenditure)	-0.0246	0.0140	-0.0030	-0.0052	0.0188
	(-10.12)	(12.90)	(-4.24)	(-2.49)	(8.92)
University *Ln (Expenditure)	-0.0164	0.0055	0.0001	-0.0056	0.0164
	(-5.46)	(4.08)	(0.12)	(-2.13)	(6.19)
IV (ND expenditure)	0.0430	-0.0021	-0.0191	-0.1851	0.1633
	(2.41)	(-0.26)	(-3.65)	(-12.28)	(10.61)
Heckman's lambda	0.0997	-0.0022	0.0078	0.0297	0.1350
	(9.83)	(-0.49)	(2.61)	(3.40)	(-15.31)

Table A3. Estimates of the QUAIDS model for household demand conditional on not owning a vehicle

Variable	Food	Elec	LPG	Other non-durables
Intercept	-0.7116	0.2576	-0.1810	1.6350
	(-10.60)	(9.86)	(-8.02)	(24.71)
Ln (food price)	0.1032	0.0061	-0.0708	-0.0384
	(4.09)	(0.82)	(-13.00)	(-1.67)
Ln (electricity price)	0.0061	-0.0373	0.0288	0.0024
	(0.66)	(-9.73)	(11.61)	(0.31)
Ln (LPG price)	-0.0708	0.0288	-0.0038	0.0458
	(-6.20)	(6.36)	(-0.90)	(3.82)
Ln (other ND price)	-0.0384	0.0024	0.0458	-0.0098
	(-1.47)	(0.35)	(7.69)	(-0.39)
Ln (Expenditure)	0.2931	-0.0949	0.0512	-0.2494
	(21.46)	(-18.21)	(10.93)	(-18.62)
Ln(Expenditure)^2	-0.0184	0.0089	-0.0041	0.0135
	(17.03)	(22.44)	(-11.05)	(13.04)
Gender	0.0717	0.0020	0.0038	-0.0775
	(21.41)	(1.57)	(3.41)	(-23.71)
Age	0.0065	0.0008	0.0004	-0.0078
	(17.54)	(5.85)	(3.30)	(21.47)
Age^2	-0.0001	0.0000	0.0000	0.0001
	(16.65)	(-2.60)	(0.12)	(18.09)
Members ≥12 years	-0.0230	-0.0034	-0.0077	0.0342
	(-5.49)	(-2.07)	(-5.56)	(8.40)
Members < 12 years	0.0083	-0.0013	-0.0012	-0.0057
	(11.13)	(-4.64)	(-4.80)	(-7.94)
Urban	-0.0240	0.0390	0.009	-0.0190
	(-1.54)	(6.41)	(0.76)	(-1.25)
North	0.1552	-0.0082	0.0366	-0.1836
	(8.92)	(-1.21)	(6.34)	(-10.86)
Center	0.0240	0.0046	0.0124	-0.0410
	(13.11)	(6.46)	(20.39)	(-23.03)
Primary school	0.0295	0.0045	0.0063	-0.0403
	(11.02)	(4.28)	(7.12)	(-15.45)
High school	0.0399	0.0066	0.0084	-0.0549
	(8.89)	(3.75)	(5.64)	(-12.54)
University	0.0382	0.0182	-0.0027	-0.0538
	(1.14)	(1.39)	(-0.24)	(-1.65)
Radio	-0.0024	0.0016	0.0006	0.0002
	(-1.81)	(3.14)	(1.28)	(0.17)
Radio-tape recorder	-0.0023	-0.0019	-0.0006	0.0048
	(-1.84)	(-3.91)	(-1.52)	(3.98)
TV	0.0060	-0.0086	0.0007	0.0019
	(3.71)	(-13.51)	(1.26)	(1.18)

Videotape player	-0.0051	-0.0003	0.0004	0.0050
	(-3.14)	(-0.54)	(0.83)	(3.16)
Blender	0.0004	-0.0013	0.0036	-0.0026
	(0.22)	(-1.95)	(6.28)	(-1.58)
Microwave	-0.0070	0.0024	0.0013	0.0033
	(-4.34)	(3.83)	(2.36)	(2.12)
Refrigerator	-0.0177	0.0136	-0.0002	0.0042
	(-9.63)	(19.03)	(-0.25)	(2.35)
Stove	-0.0443	0.0021	0.0336	0.0085
	(-19.62)	(2.43)	(44.86)	(3.88)
Washing machine	0.0040	0.0007	0.0004	-0.0051
	(2.78)	(1.33)	(0.87)	(-3.69)
Iron	-0.0074	-0.0025	0.0024	0.0075
	(-4.37)	(-3.77)	(4.31)	(4.53)
Fan	-0.0040	0.0074	-0.0065	0.0031
	(-3.13)	(14.95)	(-15.45)	(2.49)
Vacuum cleaner	-0.0080	0.0073	-0.0008	0.0014
	(-1.85)	(4.38)	(-0.53)	(0.33)
Computer	-0.0050	-0.0006	0.0004	0.0052
	(-2.13)	(-0.68)	(0.53)	(2.28)
Members ≥12 years *Ln (Expenditure)	0.0018	0.0001	0.0006	-0.0025
	(4.10)	(0.37)	(4.17)	(-5.80)
Urban *Ln (Expenditure)	0.0005	-0.0040	-0.0005	0.0040
	(0.30)	(6.19)	(-0.89)	(2.48)
North *Ln (Expenditure)	-0.0135	0.0051	-0.0021	0.0105
	(7.80)	(7.54)	(-3.68)	(6.26)
University *Ln (Expenditure)	-0.0001	-0.0009	0.0012	-0.0001
	(-0.02)	(-0.73)	(1.05)	(-0.04)
IV (ND expenditure)	-0.0282	-0.0476	-0.0143	0.0902
	(-2.65)	(-11.52)	(4.04)	(8.63)
Heckman's lambda	-0.1322	-0.0149	-0.0121	0.1592
	(16.46)	(-4.75)	(-4.52)	(20.28)

Table A4. Estimates of the QUAIDS model for household demand.
Unconditional to vehicle ownership

Variable	Food	Elec	LPG	Gasoline	Other non-durables
Intercept	0.2294	0.3908	-0.2281	-0.2028	0.8108
	(5.46)	(23.59)	(16.84)	(-9.70)	(21.48)
Ln (food price)	0.1423	-0.0257	-0.0187	0.0689	-0.1668
	(12.21)	(-4.38)	(-4.03)	(10.31)	(-15.68)
Ln (electricity price)	-0.0257	-0.0742	0.0542	0.0007	0.0449
	(-3.52)	(-18.13)	(22.41)	(0.19)	(7.22)
Ln (LPG price)	-0.0187	0.0542	-0.0218	-0.0275	0.0137
	(-2.29)	(15.52)	(-6.78)	(-6.57)	(1.80)
Ln (gasoline price)	0.0689	0.0007	-0.0275	-0.0040	-0.0381
	(8.90)	(0.18)	(-9.72)	(-0.83)	(-4.98)
Ln (other ND price)	-0.1668	0.0449	0.0137	-0.0381	0.1463
	(-17.37)	(9.34)	(3.83)	(-7.86)	(15.58)
Ln (Expenditure)	0.1002	-0.1099	0.0696	0.0526	-0.1125
	(8.99)	(-24.96)	(19.23)	(9.52)	(-11.20)
Ln(Expenditure)^2	-0.0080	0.0078	-0.0048	-0.0012	0.0062
	(-10.24)	(25.06)	(-19.01)	(-3.01)	(8.82)
Gender	0.0186	-0.0038	-0.0010	0.0040	-0.0178
	(16.73)	(-8.65)	(-2.91)	(7.29)	(-17.98)
Age	0.0019	0.0006	-0.0000	-0.0004	-0.0021
	(8.48)	(6.88)	(-0.41)	(-3.69)	(-10.36)
Age^2	-0.0000	-0.0000	0.0000	0.0000	0.0000
	(-7.23)	(-1.66)	(6.02)	(3.06)	(5.01)
Members ≥12 years	0.0352	-0.0087	0.0009	0.0226	-0.0500
	(8.99)	(-5.59)	(0.76)	(11.58)	(-14.36)
Members < 12 years	0.0149	0.0001	-0.0014	-0.0049	-0.0087
	(28.78)	(0.35)	(-8.52)	(-18.84)	(-18.88)
Urban	0.2180	0.0228	0.0582	-0.0183	-0.2807
	(15.62)	(4.12)	(13.23)	(-2.63)	(-22.59)
North	0.1314	-0.0611	0.0333	-0.0598	-0.0438
	(11.30)	(-13.22)	(9.08)	(-10.32)	(-4.23)
Center	0.0026	-0.0012	0.0091	0.0009	-0.0114
	(2.10)	(-2.48)	(23.35)	(1.42)	(-10.31)
Primary school	-0.0050	0.0016	0.0022	-0.0038	0.0051
	(-3.02)	(2.41)	(4.16)	(-4.62)	(3.43)
High school	-0.0207	0.0024	0.0014	-0.0002	0.0171
	(-9.20)	(2.67)	(1.99)	(-0.21)	(8.55)
University	-0.0298	-0.0483	-0.0268	-0.1475	0.2524
	(-1.61)	(-6.59)	(-4.61)	(-15.99)	(15.34)
Car	-0.0540	0.0017	-0.0050	0.1322	-0.0748
	(-35.64)	(2.77)	(-10.44)	(174.5)	(-55.36)
Van	-0.0618	-0.0019	-0.0042	0.1235	-0.0555
	(-35.60)	(-2.77)	(-7.71)	(142.18)	(-35.85)

Radio	0.0000	0.0011	0.0017	-0.0010	-0.0017
	(-0.01)	(2.52)	(5.12)	(-1.93)	(-1.85)
Radio-tape recorder	0.0003	-0.0021	0.0001	-0.0023	0.0040
	(0.28)	(-5.45)	(0.29)	(-4.64)	(4.61)
TV	0.0181	-0.0121	-0.0011	-0.0080	0.0030
	(13.29)	(-22.35)	(-2.55)	(-11.71)	(2.49)
Videotape player	-0.0003	0.0006	0.0016	-0.0061	0.0042
	(-0.25)	(1.25)	(4.33)	(-10.23)	(3.93)
Blender	0.0028	0.0010	0.0027	-0.0021	-0.0044
	(1.85)	(1.70)	(5.56)	(-2.78)	(-3.25)
Microwave	-0.0081	0.0051	0.0004	0.0028	-0.0002
	(-6.72)	(10.77)	(0.98)	(4.69)	(-0.23)
Refrigerator	-0.0130	0.0152	-0.0018	-0.0049	0.0045
	(-7.70)	(22.72)	(-3.44)	(-5.82)	(2.99)
Stove	-0.0400	0.0056	0.0297	-0.0042	0.0088
	(-19.46)	(6.90)	(45.79)	(-4.05)	(4.80)
Washing machine	0.0063	0.0020	-0.0007	-0.0029	-0.0047
	(5.15)	(4.15)	(-1.90)	(-4.77)	(-4.28)
Iron	-0.0074	-0.0015	0.0013	-0.0007	0.0084
	(-4.81)	(-2.52)	(2.67)	(-0.96)	(6.11)
Fan	-0.0023	0.0074	-0.0073	-0.0013	0.0034
	(-2.27)	(18.27)	(-22.51)	(-2.45)	(3.75)
Vacuum cleaner	-0.0043	0.0059	0.0012	0.0009	-0.0036
	(-2.28)	(7.78)	(1.98)	(0.91)	(-2.11)
Computer	-0.0036	0.0026	-0.0005	0.0030	-0.0014
	(-2.48)	(4.51)	(-1.14)	(4.07)	(-1.10)
Members ≥12 years *Ln (Expenditure)	-0.0031	0.0009	-0.0003	-0.0031	0.0056
	(-6.94)	(4.91)	(-2.19)	(-14.01)	(14.22)
Urban *Ln (Expenditure)	-0.0226	-0.0018	-0.0063	0.0012	0.0296
	(-14.78)	(-2.97)	(-13.11)	(1.52)	(21.71)
North *Ln (Expenditure)	-0.0190	0.0091	-0.0023	0.0077	0.0046
	(-16.25)	(19.62)	(-6.22)	(13.10)	(4.36)
University *Ln (Expenditure)	-0.0012	0.0050	0.0027	0.0155	-0.0221
	(-0.67)	(7.13)	(4.86)	(17.41)	(-13.91)
IV (ND expenditure)	0.0474	-0.0164	-0.0235	-0.0472	0.0397
	(6.71)	(-5.88)	(-10.51)	(-13.38)	(6.29)

Table A5. Poverty rate by regions for the different reforms under study (%)

	Initial	R1. T1	R1. T2	R1. T3	R2. T1	R2. T2	R2. T3	R3. T1	R3. T2	R3. T3
North	15.62	15.27	11.57	12.73	15.50	14.50	15.03	15.34	12.75	13.54
Center	19.33	19.16	14.70	15.93	19.32	18.21	18.71	19.32	15.91	17.00
South	35.66	35.13	29.63	31.37	35.51	34.12	34.71	35.32	31.48	33.07
Urban	15.62	15.41	11.40	12.56	15.55	14.55	15.04	15.49	12.56	13.54
Rural	45.41	44.83	38.52	40.47	45.36	43.77	44.35	45.17	40.53	42.20

Table A6. Households in energy poverty under the different reforms (%). 10% and AFCP

	10%	AFCP
Initial	*25.82*	*22.45*
Reform 1	26.56	22.32
Reform 1. T1	25.76	21.89
Reform 1. T2	25.42	18.53
Reform 1. T3	25.48	19.55
Reform 2	28.55	22.31
Reform 2. T1	27.02	22.23
Reform 2. T2	27.01	21.59
Reform 2. T3	26.95	21.77
Reform 3	23.50	22.36
Reform 3. T1	22.84	22.04
Reform 3. T2	22.77	19.94
Reform 3. T3	22.78	20.59

Table A7. Energy poverty rate by regions for the different reforms (%). MIS

	R1	R2	R3	R1. T1	R1. T2	R1. T3	R2. T1	R2. T2	R2. T3	R3. T1	R3. T2	R3. T3
North	29.68	29.78	29.58	28.32	28.48	28.75	29.43	29.47	29.50	28.77	28.74	28.99
Center	31.06	31.10	31.32	30.15	29.39	29.70	30.76	30.73	30.88	30.70	30.17	30.42
South	39.89	39.76	39.98	38.53	35.17	36.39	39.38	38.96	39.15	39.25	37.60	37.88
Urban	30.74	30.77	30.88	29.75	30.12	30.25	30.51	30.62	30.66	30.34	30.47	30.66
Rural	39.79	39.76	39.87	38.16	32.60	33.55	39.22	38.23	38.65	38.62	35.12	35.62

Table A8. Food poverty rate by region for the different reforms under study (%)

	Initial	R1. T1	R1. T2	R1. T3	R2. T1	R2. T2	R2. T3	R3. T1	R3. T2	R3. T3
North	6.55	5.66	3.32	5.17	6.29	6.21	6.22	5.88	5.58	5.56
Center	8.80	7.78	4.74	6.69	8.53	8.24	8.20	8.08	7.23	7.08
South	21.56	19.29	13.10	14.44	20.88	19.91	20.04	20.15	17.15	16.49
Urban	8.31	7.45	4.70	6.86	8.08	7.90	7.93	7.66	7.20	7.22
Rural	21.19	18.43	11.92	12.36	20.36	19.22	19.18	19.58	15.73	14.58

Table A9. Gini index under the different reforms

Initial	Reform 1			Reform 2			Reform 3		
	Transfer 1	Transfer 2	Transfer 3	Transfer 1	Transfer 2	Transfer 3	Transfer 1	Transfer 2	Transfer 3
0.438	0.434	0.427	0.427	0.437	0.435	0.435	0.435	0.430	0.430

Appendix D. Mexican energy and poverty data

Table A10. Share of Mexican households in energy and food poverty, 2014 (%)

	Energy Poverty			Food Poverty
	10	AFCP	MIS	
Mexico	*25.82*	*22.45*	*32.61*	*11.09*
North	45.46	19.59	29.40	6.55
Center	20.19	19.24	31.04	8.80
South	16.29	33.07	39.89	21.56
Urban	26.41	16.53	30.53	8.31
Rural	23.71	43.92	40.15	21.19

Source: Our own calculations based on ENIGH and CONEVAL (2015) data.
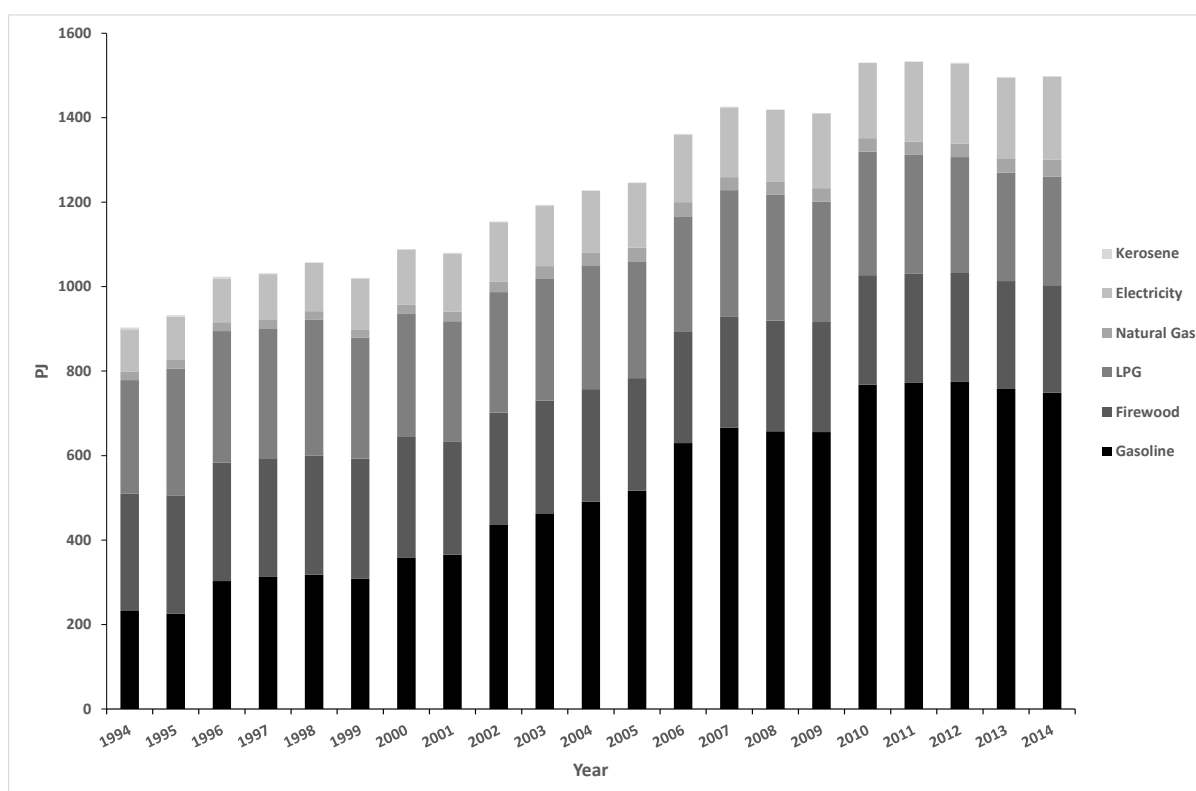
Figure A2. Residential energy consumption by energy source in Mexico (1994-2014).

Source: SENER (2015); Solís and Sheinbaum (2013) and authors' own calculations.
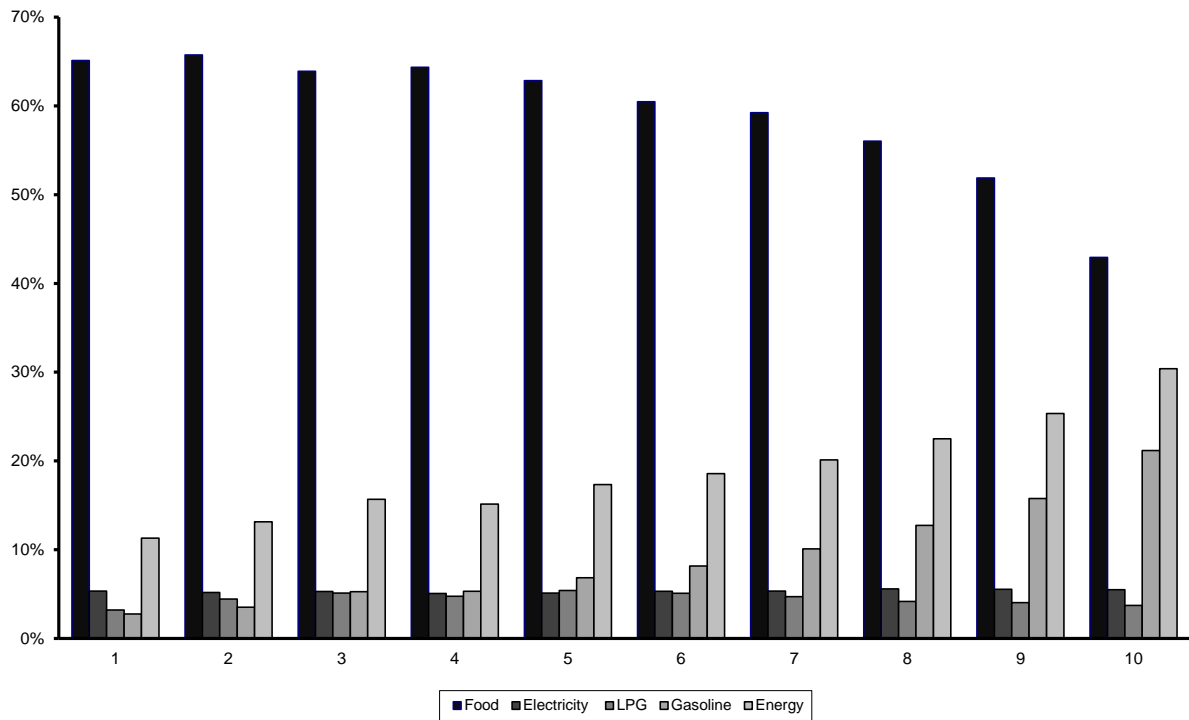
Figure A3. Share of expenditure on food and energy by deciles of equivalent income, 2014.

Note: Energy is the sum of electricity, LPG and gasoline.
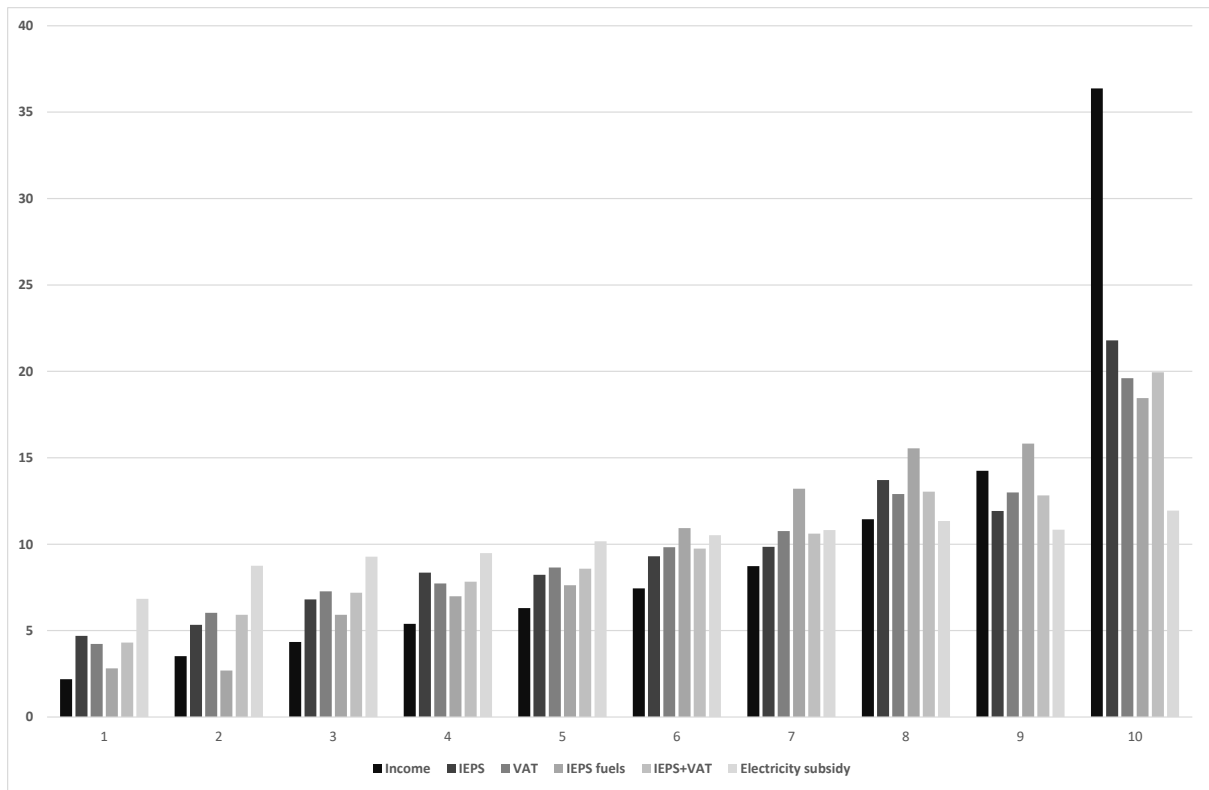*Source*: Authors' own calculations based on ENIGH and INEGI data.

Figure A4. Distribution of equivalent income and tax payments/subsidies by deciles of equivalent income in 2014 (%).

Note: IEPS fuels consider the on-going collection of the IEPS tax applied to fuel, i.e., the general IEPS, carbon IEPS and the IEPS for the federative entities.

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