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Energy subsidies: conceptual framework and measurement for distributional impacts in Argentina

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ABSTRACT

Argentina has massively subsidized energy in recent decades, and the distributional impacts of those subsidies has been widely studied. However, regional disparities and public financing are two dimensions often omitted by previous research. We extend the analysis in these directions, focusing on the electricity sector. First, we develop a conceptual framework to formalize the deviation of prices from production costs. Second, by applying the "*benefit incidence analysis*" to household survey microdata, we measure subsidies at the household level and perform a distributional analysis. Our results indicate that regional disparities in electricity distribution costs and in the pricing schedules set by distribution companies are key drivers of the distributional impacts. Subsidies, as a percentage of the final price, vary between regions in the range of 50 to 80 percent. Additionally, omitting public financing leads to a bias in the perception of their redistributive effect: when subsidies are financed by a general consumption tax, the net benefits are less than half of the benefits from the subsidy alone. A series of globally relevant policy recommendations can be derived from the paper.

Introduction

Argentina has massively subsidized energy (i.e., electricity, natural gas, and fuels) in recent decades and ranks among the top 25 countries that subsidize energy worldwide (IEA, 2022).[1] Energy subsidies increased nearly tenfold as a share of gross domestic product (GDP) in less than a decade, from 0.4 percent in 2005 to 3.5 percent in 2014. In 2019 they were around 1.5 percent of the GDP (Ministry of Energy, 2019). This policy has generated an extensive body of academic research highlighting a singular distributional result: subsidies are progressive since the poorer sectors received higher subsidies relative to their income (Giuliano et al., 2020; Hancevic et al., 2016). Interestingly, this empirical consensus presents two particularities. First, it focuses on the Buenos Aires Metropolitan Area (i.e., AMBA) given its geographical representativeness and data availability.[2] Second, it focuses on the subsidies' incidence without considering how the government finances them.

The objective of this paper is to extend the distributional analysis in these uncovered directions with theory and measurement. To do this, we focus on the electricity sector which represents more than 65 percent of total energy subsidies. Electricity subsidies rose from 0.3 percent of GDP in 2005 to 2.0 percent in 2014. In 2019 stood at 0.9 percent (Ministry of Energy, 2019). The Congressional Budget Office indicates that by 2022 electricity subsidies were 1.4 percent of GDP (OPC, 2023). To highlight the relevance of these subsidies, it is worth mentioning that in 2023, Argentina's main conditional transfer program (i.e., the Universal Child Allowance -AUH-) represented about 0.5 percent of GDP (Gasparini et al., 2024). That is, electricity subsidies are three times this social spending. In addition, when expressing the

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[1] Energy subsidies are defined as the difference between the price received by the supply, destined to cost coverage of energy production, and the price paid by the demand. The government covers this difference through the national budget (Ministry of Energy, 2019).

[2] AMBA is a geographical area including the Ciudad Autonoma de Buenos Aires and its surrounding areas, containing 40 municipalities of the Province of Buenos Aires. It covers 13,285 km2. According to the 2022 census, it accounts for approximately 14 million inhabitants, representing 37 percent of Argentina's total population.

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annual disbursements of these subsidies, the accumulated figure since 2002 amounts to approximately 110 billion dollars (2022).

Considering regional disparities is relevant because Argentina's federal government subsidizes electricity in the Wholesale Electricity Market (WEM) by covering the difference between generation and transmission costs and the price paid by regional energy distributors (i.e., the companies that deliver electricity to end users). This means that all jurisdictions, and all final users, receive the same unitary subsidy in the WEM. Then, distribution costs are determined by the cost structure of each energy regional distributor (e.g., distance to final users, operational efficiency, etc.). Currently, there are more than 600 regional companies throughout the country that differ in their pricing criteria for cost recovery (e.g., they apply higher prices at higher levels of consumption). These heterogeneities in distribution costs are relevant for a comprehensive distributional analysis and emerge partially from the country's size and geography. Argentina has an area of 2,795,677 km2, which extends 3,694 kms from north to south and 1,423 kms from east to west. Its territory and latitudinal amplitude, which exceeds 30°, together encompass diverse climates. Despite its size, as in many other developing countries, population and production are highly concentrated in a few provinces. When excluding the Autonomous City of Buenos Aires (CABA), four provinces (Buenos Aires, Cordoba, Santa Fe, and Mendoza) account for 60 percent of the total population.

Considering the public financing of subsidies is also relevant for a comprehensive distributional study, as this issue is at the heart of public finance analysis. Musgrave (1964) emphasized this point many decades ago *"..[a]ny meaningful theory or policy in public finance must ultimately combine the issues posed by the two sides of budget. This, indeed, is the cardinal principle of the economist's view of public finance"*. It is usual to treat public programs and taxes separately, but the convenience of analyzing them together is clear. For example, if a program is progressive but its financing is very regressive, income distribution may become more unequal after its implementation (Gasparini et al., 2014).

In our extended analysis, we first develop a conceptual framework following the classical literature on the design of prices for public services (Feldstein, 1972a, 1972b). The subsidy is conceptualized as the departure of prices from production costs. Second, combining microdata from Argentina households' surveys and sectoral administrative data (i.e., prices and costs of electricity), we measure the subsidy at the household level, and we perform distributional analysis (Bourguignon & Pereira da Silva, 2003; Gasparini et al., 2014; van de Walle, 1998). To be on the same page as the previous literature, we first do this for the AMBA. Then, we extend it to five additional provinces (Cordoba, Jujuy, Mendoza, Rio Negro, and Santa Fe), which account for more than 65 percent of the country's residential electricity consumption. Our results indicate that regional disparities in the costs of electricity distribution and in the pricing schedules set by distribution companies are key drivers for the distributional incidence. Also to be on the same page as previous literature we do not consider public financing at first, and we confirm the empirical consensus: progressive subsidies. Then, we assume that the government finances the subsidy with a general consumption tax (as Argentina implements in practice), and we find relevant results: the progressivity is strongly attenuated.

Our analysis clearly shows that examining the different stages of the electricity supply chain helps us understand how regional disparities determine distribution costs and electricity pricing. Additionally, analyzing how subsidies are financed is central to the discussion of economic policy, including the incidence of energy policy. As we discuss in the final section, a series of globally relevant policy insights can be derived from the paper. These include the use of energy prices as policy instruments for redistribution, the trade-off between efficiency and equity that policymakers typically face, the challenges associated with the irreversibility of subsidy policies, and the importance of using appropriate conceptual frameworks for policy analysis and implementation.

Our contribution is also precise and timely. Argentina is currently under an agreement with the International Monetary Fund (IMF) that seeks to reduce the fiscal deficit, and the removal of subsidies for residential energy consumption is a key component of the agreement. Moreover, energy subsidies have been a key topic in Argentina's recent presidential debates, and the incoming administration has just announced a subsidy reduction to be implemented during 2024. At the same time, although not covered in this paper, our results may be useful for natural gas subsidies that present very similar features in Argentina. As the country import natural gas, an external conflict such as the current conflict between Russia and Ukraine, which increases international energy prices, could put more stress on energy subsidies. In this sense, lessons from the Argentine experience could be globally relevant and useful for other developing countries dealing with energy subsidies and exposure to external shocks in the energy sector. Finally, although the paper does not focus on the dimension of climate change, its conclusions can be useful to think about the potential effects of the transition towards using clean and sustainable energy, at least on the effects of energy transition policies on the income distribution.

The paper proceeds as follows. The paper's contribution is contextualized and linked to pertinent strands in the literature in the next section. Section 'Conceptual framework' elaborates on the conceptual framework to formalize the departure of prices from production cost (i.e., the subsidy). Section 'Measurement and analysis' presents the measurement of electricity subsidy and provides a detailed analysis on their distributional impacts. Section 'Conclusion and policy implications' concludes and presents the policy recommendations.

Related literature

Our paper is related to an extensive body of literature on the impact of energy policy on income distribution. Rosas-Flores et al. (2017) use household survey microdata to simulate partial or total energy subsidy removal in Mexico. In line with our results, without considering financing, and with previous evidence for Argentina, they find that subsidies for electricity are progressive. Ersado (2012) and Krauss (2016) analyzed the distributional effects of a significant natural gas tariff reform in Armenia that increased the country's residential tariff by about 40 percent. The authors showed that poor households are more prone to experience economic distress due to energy tariff increases. Baclajanschi et al. (2006), Mitra and Atoyan (2012), Siddig et al. (2014), and Zhang (2011) provide evidence in the same line for Turkey, Moldova, Ukraine, and Nigeria respectively. In 2010 the government of Iran removed energy subsidies in the context of an aggressive energy price reform, but included cash handouts given to all households to compensate for higher prices (Moshiri, 2015). However, many difficulties followed, from an overly large national budget deficit to high inflation and devaluation, raising questions about the feasibility and sustainability of the direct compensation mechanism and even of the policy reform itself (Breton & Mirzapour, 2016). Dartanto (2013) emphasized the need to phase out the energy subsidy in Indonesia as it was inefficient and worsening the fiscal balance, even though removing the subsidy would increase the incidence of poverty. To ameliorate the negative effects of the reforms, he suggested higher social spending with the saved resources. Gelan (2018) simulates a subsidy reduction in Kuwait accompanied by cash transfers to energy users to compensate for welfare losses, indicating that such transfers would reduce the adverse effects of the policy reform. In the same line, Vandeninden et al. (2022) emphasize energy policies under the form of a cash transfer targeting the poor to maximize redistribution in Burkina Faso, where, like in Argentina, the subsidies are not pro-poor.

The paper is informative for previous literature on energy subsidies in other countries, but also for the literature that analyzes the role of energy prices in redistributing income even in the absence of subsidies. Levinson and Silva (2022) study redistribution through energy prices using regional data from the USA and conclude that the price charged to those who consume fewer quantities is lower than that of those who consume large quantities. They measure this effect using the "electric Gini" which is redistributive. However since electricity consumption exhibits a low correlation with income, the resulting income redistribution is weak. In our paper, a similar conclusion is reached based on microdata on consumption in each region by income level. An important difference to note is that in Levinson and Silva (2022) utilities finance themselves with prices and the distributional impact is direct. In Argentina, since consumption is subsidized, it is necessary to take an additional step and see how the subsidy is financed to reach relevant conclusions.

As our paper revisits the particularities of Argentina's energy policy, it is closely related to several studies that analyzed the distributional incidence of energy subsidies in the country. For example, Lakner et al. (2016), Lustig and Pessino (2013) and Puig and Salinardi (2015) show that subsidies where well targeted and progressive only in relative, but not absolute, terms. That is, while poorer households received the highest subsidies relative to their income, the largest shares of subsidies went to non-poor sectors. This well-established middle-to-high-income bias was also confirmed by Hancevic et al. (2016) for the AMBA, who relates it as the result of "energy populism" in Argentina. Recently, Giuliano et al. (2020) analyzed the distributional effects of the 2016 subsidies' reduction attempt. As the policy reform also includes the introduction of a scheme to protect less well-off families (i.e., the social tariff), the authors also reviewed how well the targeting mechanism works. In line with our paper, Giuliano et al. (2020) apply traditional *"benefit-incidence analysis"* using household surveys and administrative data, focusing on residential subsidies to piped natural gas and electricity in the AMBA. They find that energy subsidies in Argentina (lower in aggregate terms) continue to be progressive, though pro-rich.

In the context of related literature in Argentina, the main contribution of our paper is its focus on the country, particularly by extending the distributional analysis to consider regional disparities and financing. It is also worth highlighting the fact that more updated empirical evidence is provided by our paper. Most recent studies, such as those by Giuliano et al. (2020) and Hancevic et al. (2016), focus only on the AMBA region. Previous research has often analyzed the topic at an aggregate level (i.e., the entire country) without addressing regional disparities (Lakner et al., 2016; Lustig & Pessino, 2013; Navajas, 2016; Puig & Salinardi, 2015). Regarding the financing analysis, all earlier studies generally omit this aspect, concentrating solely on the isolated distributional impact of energy subsidies. In general, these papers relate the distributional effect with the overall impact on the budget, without addressing which regions and individuals finance the subsidies. In this sense, and putting all the aforementioned facts together, we believe that our paper represents a significant contribution. Additionally, framing the analysis within a conceptual framework that models the deviation of prices from production costs is a distinctive feature of this paper. Most prior studies, with the exception of Hancevic et al. (2016), provide only applied empirical evidence.

Conceptual framework

The literature on the optimal and quasi-optimal design of prices for public services in different technological situations and policy objectives has a long history that begins with Dupuit (1844) and Hotelling (1938), and continues with Boiteux (1956), Bös (1994), Bradford and Oates (1971), Brown and Sibley (1986), Coase (1946), Feldstein (1972a, 1972b), Navajas and Porto (1990), and Navajas (2023).

When pricing public services, either in public or private companies with state regulation, diverging objectives compete: efficiency, equity, financing and political cost (e.g., in terms of lost votes). These objectives determine the tariff structure. The condition for an efficient public services provision is that prices equal the marginal costs. However, if average costs are decreasing financial losses will require departures from this condition. Another departures arise from introducing the other objectives. The pricing following these objectives may lead to a negative financial result.

We assume n goods (i = 1…n) and J individuals (j = 1…J). Marginal costs are assumed constant. Costs and compensated demands are independent. The margins (τ_i) between the price (p_i) and the marginal cost (c_i') are the result of the following maximization problem that considers the alternative objectives and its weight.[3]

$$max \quad \mathscr{L} = \alpha W(v_j) - \beta K(p_1, \ldots, p_n) + \delta E(p_1, \ldots, p_n) + \mu\left[\sum_{i=1}^{n} p_i q_i - \sum_{i=1}^{n} c_i(q_i) - F\right]$$

where α, β and δ are the weights of each objective, and $\alpha + \beta + \delta$=1. α is the weight for efficiency-equity, β for the political cost (in terms of votes lost), and δ for the cost of negative externalities (e.g., environmental pollution). F is the financial constrain (e.g., to cover fixed costs) and μ represents the Lagrange's multiplier. The first order condition for p_i is obtained as follows,

$$\frac{\partial \mathscr{L}}{\partial p_i} = \alpha\left(\sum_j \frac{\partial W}{\partial v_j}\frac{\partial v_j}{\partial p_i}\right) - \beta\frac{\partial K}{\partial p_i} + \delta\frac{\partial E}{\partial p_i} + \mu q_i + \mu\left[(p_i - c_i')\frac{\partial q_i}{\partial p_i}\right] = 0$$

The margin is obtained by solving for $\left(\frac{p_i - c_i'}{p_i}\right)$,

$$\tau_i = \frac{p_i - c_i'}{p_i} = \frac{\mu - \alpha.d_i}{\mu.\eta_i} - \frac{\beta.k_i'}{\mu.\eta_i} + \frac{\delta.e_i'}{\mu.\eta_i} \quad (1)$$

where η_i is the price elasticity of demand and d_i the distributive characteristic of the goods, defined by $d_i = \sum_j \sigma_j \cdot \theta_{ij}$, where $\sigma_j = \frac{\partial w}{\partial v_j}\frac{\partial v_j}{\partial y_j}$ (y_j= income of j), and θ_{ij} is the share of good i consumed by j (Navajas & Porto, 1994). Note that if there are no externalities ($e_i' = \frac{\partial E}{\partial p_i}.\frac{1}{q_i} = 0$), then $\delta = 0$ and $(\alpha+\beta) = 1$. If additionally no political costs are assumed ($k_i' = \frac{\partial K}{\partial p_i}.\frac{1}{q_i} = 0$), then $\beta = 0$ and $\alpha = 1$. If there are no distributional considerations either, then $(\mu - 1)/\mu.\eta_i$ which is Ramsey's rule. In this case, if μ tends to infinity, the margin is equal to $1/\ \eta_i$, which is the monopoly's case (where the financial objective is unique). When efficiency, financing and equity objectives are considered and there are no externalities or political costs, the result is $\mu - d_i/\mu.\eta_i$, which is the well-known Ramsey–Feldstein rule (Feldstein, 1972a). From Eq. (1) it turns out that the margin is inversely related with the distributive characteristic, the political cost, and the elasticity of demand. On the other hand the margin is higher the greater the financial restriction. The margin will also be greater the higher the cost of the negative externalities. From the interaction of these determinants, positive or negative margins can arise. A characteristic of the model is that the departure that results for each good is the same for all consumers.

To bring the theoretical concepts closer to our case study we presented an adaptation in which the political costs and negative externalities of consumption are omitted. The objectives are efficiency, equity and financing. There are n goods and J individuals ($j = 1, \ldots, J$). Some goods (i.e., $i = 1, \ldots, k$) are subsidized, while the rest (i.e., $i = k+1, \ \ldots, \ n$) are taxed. q_{ij} is the consumption of good i by individual j. p_i^s is the price of the subsidized good, defined as the difference between the marginal cost (c_i') and the subsidy per unit (s_i). The price of the taxed good is called p_i^g, defined as the marginal cost of the good (c_i') plus the unit tax (t_i). For simplicity, marginal costs are assumed to be constant and equal to average costs in both cases. Costs and compensated demands are independent. On the financing side, it is

[3] The fixed cost was not differentiated between consumers and is computed by subtracting from the financial constraint. If it were differentiated by consumer and everyone remained in the market (that is, if the consumer surplus is greater than the fixed cost for all), the margin between price and marginal cost would be zero. If the fixed cost were the same for all consumers, the relative margins between price and marginal cost do not change.

considered that the tax collection is equal to the spending on subsidies: $\sum_{i=1}^{k} s_i q_i = \sum_{i=k+1}^{n} t_i q_i$. Then, the maximization problem is:

$$max \ \mathscr{L} = w\left(v_j\left(p_i^s, \ldots, p_k^s, p_{k+1}^g, \ldots, p_n^g, y_j\right)\right) + \mu\left[\sum_{i=1}^{k} p_i{}^s q_i + \sum_{i=k+1}^{n} p_i{}^g q_i - \sum_{i=1}^{k} c\left(q_i\right) - \sum_{i=k+1}^{n} c(q_i)\right]$$

The margins presented in Eqs. (2) and (3).

$$\frac{p_i^s - c_i'}{p_i^s} = \frac{c_i' - s_i - c_i'}{p_i^s} = -\frac{s_i}{p_i^s} = \frac{\mu - d_i}{\mu\eta_i}; \qquad i = 1 \ldots k \tag{2}$$

$$\frac{p_i^g - c_i'}{p_i^g} = \frac{c_i' + t_i - c_i'}{p_i^g} = \frac{t_i}{p_i^g} = \frac{\mu - d_i}{\mu\eta_i}; \qquad i = k+1 \ldots n \tag{3}$$

Note that when defined positive, the subsidy is $\frac{s_i}{p_i^s} = \frac{d_i - \mu}{\mu\eta_i}$. The interpersonal distribution of the subsidy and taxes results also from Eqs. (2) and (3): (a) Subsidy for each j: $\sum_{i=1}^{k} s_i q_{ij} \quad j = 1, \ldots, J$; and (b) Tax for each j: $\sum_{i=k+1}^{n} t_i q_{ij}\ ,\ j = 1, \ldots, J$. In this model, the unitary subsidy and the unitary tax are the same for all individuals.[4]

The effect of the determinants of the margins differs if it is a subsidy or a tax. The greater the financial restriction (greater μ), the lower the subsidy and the higher the tax; the higher the distributive characteristic (greater d_i) the higher the subsidy and the lower the tax. As the subsidy and the tax are lower the higher the elasticity of demand (η).

The preceding model and its margins refer to the wholesale energy market because the price-setting criteria is applied to all regions and consumers. However, the sale to users is carried out by companies that purchase from the wholesale energy market and distribute to different locations. These companies add the distribution cost, which varies among them, to the wholesale price. Therefore, the price paid by users depends on: (a) the wholesale price, (b) the tariff schedule set by the power distribution company (uniform, two-part or multi-part tariffs), (c) the type and amount of energy demanded, and (d) personal or family characteristics that are added to the general tariff schedule, such as the social tariff or consumer segmentation. Taxes are equally applied to all consumers.

The previous points, (a) to (d), lead to "personalized" prices, which should be considered when conducting regional and/or personal distributional analysis. Thus, the "personalized" prices and its financing can be formally stated as follows.

$$max \ \mathscr{L} = w\left(v_j\left(p_{ij}^s, \ldots, p_{kj}^s, p_{k+1}^g, \ldots, p_n^g, y_j\right)\right) + \mu\left[\sum_{i=1}^{k}\sum_{j=i}^{J} p_{ij}{}^s q_{ij} + \sum_{i=k+1}^{n} p_i{}^g q_i - \sum_{i=1}^{k}\sum_{j=i}^{J} c_{ij}(q_{ij}) - \sum_{i=k+1}^{n} c(q_i)\right]$$

The margins are presented in the following equations,

$$\frac{p_{ij}^s - c_i'}{p_{ij}^s} = \frac{c_i' - s_{ij} - c_i'}{p_{ij}^s} = -\frac{s_{ij}}{p_{ij}^s} = \frac{\mu - \sigma_j}{\mu\eta_{ij}} \qquad j(i) = 1 \ldots J(k) \qquad \sigma_j = \frac{\partial w}{\partial v_j}\frac{\partial v_j}{\partial y_j} \tag{4}$$

$$\frac{p_i^g - c_i'}{p_i^g} = \frac{c_i' + t_i - c_i'}{p_i^g} = \frac{t_i}{p_i^g} = \frac{\mu - d_i}{\mu\eta_i} \qquad i = k+1 \ldots n \tag{5}$$

Again, note that when defined positive, the subsidy is $\frac{s_{ij}}{p_{ij}^s} = \frac{\sigma_j - \mu}{\mu\eta_{ij}}$. The interpersonal distribution of the subsidy and taxes results also from Eqs. (4) and (5): (a) Subsidy for each j: $\sum_{i=1}^{k} s_{ij} q_{ij} \quad j = 1, \ldots, J$; and (b) Tax for each j: $\sum_{i=k+1}^{n} t_i q_{ij}\ ,\ j = 1, \ldots, J$.

When the differentiation is done by groups (e.g., deciles, etc.) the model lies between the general case (where distributive characteristics are calculated considering the consumption of each group -and not each individual-) and the "personalized" case (where the distributive characteristic is σ_j, reflecting the fact that only that individual consumes such an amount).

Summarizing. Three models have been presented that are useful for studying the pricing of public services — in the case of this paper, electricity. In the first model, prices are set to accomplish with the financial constraint (e.g., due to the existence of fixed costs) considering several objectives. In this model, the positive or negative deviations between price and marginal cost are the same for all individuals. In the second model, there are subsidized goods and taxed goods and the subsidies and taxes per unity are determined based on the efficiency-equity parameters and the financial restriction given equalizing total subsidies with total revenue. Unitary taxes and subsidies are the same for all individuals. The third model sets "personalized" prices for subsidized goods (can be for individuals within a region or across regions) with equal taxes for all. The model is useful to study cases of discrimination between individuals or regions. In the next section we provide measurements for the second and third models, and perform the distributional analysis.

Measurement and analysis

For measurement purposes we combine micro-data from Argentina households' surveys and sectoral administrative data (i.e., prices and costs of electricity). In order to coincide with the year of the microdata (see below) we rely on administrative figures for the year 2018. This situation that our evidence reflects can be considered fully illustrative of the distributional incidence of electricity subsidies until the end of 2022, where there had been no major changes in the electricity subsidy system. For briefness, in the main text we present the results for the AMBA and three representative provinces of each region of the country: Cordoba (center), Jujuy (north), and Rio Negro (south). The results for Santa Fe and Mendoza are available in Appendix Section 'Measurement for Santa Fe and Mendoza'.

The most recent National Household Income and Expenditure Survey (ENGHo) for 2017 and 2018 is used to order individuals by per capita household income.[5] Specifically, we build deciles of this welfare indicator (Column [1] in Table 1). We use the income as reported in the survey, without correcting for underreporting. This choice is based on the imperfections present in Argentina's correction methods, which can introduce further distortions. For a discussion of this issue see Gasparini et al. (2014).

Following Navajas (2009) we do not use quantities as reported in the survey because they tend to under-report when compared with administrative data. The under-reporting is due to measurement error, as individuals are more likely to know precisely how much they paid for the utility bill than how many units they consumed. Specifically, in ENGHo 2017/18, nearly 70 percent of the observations on quantities are equal to or less than one unit. Thus, quantities are retrieved from the expenditures after deducting taxes with updated information from Cont (2007), and using the tariff charts for final users.[6]

[4] Suppose that a subsidized good (q_1) and taxed good (q_2) are consumed. The net subsidy will be positive (negative) if the ratio s_1/t_2 is greater (lower) than the ratio between the quantities consumed (q_2/q_1).

[5] The ENGHo provides information on Argentine households by collecting data on their expenses, incomes, and sociodemographic characteristics. Its results contribute to the development of the basket of goods and services used to measure the Consumer Price Index. Additionally, it provides information for estimating poverty and producing indicators of the national economy. The latest available waves correspond to the years 2004/05, 2012/13, and 2017/18.

[6] See Appendix Section 'Tariff charts for residential electricity consumption' for further details on this data source. In Argentina, the residential electricity bills have three components that are covered by different actors: (i) one representative of the costs of acquiring energy and power in the Wholesale Electricity Market, including associated transmission costs; (ii) another representative of the VAD constituted by the marginal cost of providing the service; and (iii) national and subnational taxes (i.e., VAT and other taxes) (Giuliano et al., 2020; Ministry of Energy, 2019).

Table 1
Key measures. Selected jurisdictions, 2018. By deciles of per capita income.
Source: Own elaboration based on ENGHo 2017-18 and specific information of the energy sector.

Panel A. AMBA

[1] Deciles	[2] kWh	[3] Cost (C)	[4] Price (P)	[5] (P-C)/P	[6] Subsidy	[7] VAT	[8] Net Subsidy
1	55.8	3.1	1.7	−0.8	76.9	40.6	36.3
2	50.9	3.1	1.6	−0.9	75.8	45.6	30.2
3	66.1	3.1	1.7	−0.8	90.4	58.0	32.4
4	74.6	3.1	1.8	−0.7	97.7	70.5	27.2
5	70.8	3.1	1.8	−0.7	90.1	75.2	15.0
6	86.0	3.1	1.8	−0.7	111.3	90.3	21.0
7	81.1	3.1	1.9	−0.6	99.2	102.3	−3.1
8	97.3	3.1	2.0	−0.6	111.1	126.5	−15.4
9	106.0	3.1	1.9	−0.6	126.7	160.6	−33.9
10	119.9	3.1	2.0	−0.6	138.7	248.2	−109.5
Mean	80.8	3.1	1.9	−0.7	101.8	101.8	0.0

Panel B. Cordoba

[1] Deciles	[2] kWh	[3] Cost (C)	[4] Price (P)	[5] (P-C)/P	[6] Subsidy	[7] VAT	[8] Net Subsidy
1	58.6	4.2	2.6	−0.6	93.0	57.0	36.0
2	55.0	4.2	2.7	−0.5	80.5	62.2	18.3
3	78.7	4.2	3.0	−0.4	96.6	90.4	6.2
4	88.6	4.2	3.0	−0.4	105.0	104.8	0.2
5	82.3	4.2	2.8	−0.5	116.7	102.3	14.4
6	86.3	4.2	2.9	−0.5	114.0	99.1	15.0
7	103.4	4.2	2.9	−0.5	135.9	129.4	6.4
8	101.5	4.2	2.9	−0.5	133.2	133.5	−0.3
9	129.6	4.2	3.0	−0.4	150.2	166.6	−16.4
10	135.5	4.2	3.1	−0.4	150.6	230.1	−79.5
Mean	92.0	4.2	2.9	−0.5	117.6	117.6	0.0

Panel C. Jujuy

[1] Deciles	[2] kWh	[3] Cost (C)	[4] Price (P)	[5] (P-C)/P	[6] Subsidy	[7] VAT	[8] Net Subsidy
1	33.8	3.7	1.8	−1.0	61.6	40.8	20.9
2	33.9	3.7	2.0	−0.8	56.6	48.4	8.2
3	39.7	3.7	1.9	−0.9	70.9	48.3	22.5
4	41.0	3.7	1.9	−0.9	71.5	59.5	11.9
5	43.1	3.7	2.3	−0.6	60.3	61.8	−1.5
6	47.2	3.7	2.1	−0.8	75.5	60.1	15.4
7	48.0	3.7	2.0	−0.8	78.6	76.4	2.2
8	59.8	3.7	2.3	−0.6	83.9	96.6	−12.7
9	69.8	3.7	2.2	−0.7	101.1	113.9	−12.8
10	95.4	3.7	2.4	−0.5	123.1	176.8	−53.7
Mean	51.2	3.7	2.1	−0.8	78.3	78.3	0.0

Panel D. Rio Negro

[1] Deciles	[2] kWh	[3] Cost (C)	[4] Price (P)	[5] (P-C)/P	[6] Subsidy	[7] VAT	[8] Net Subsidy
1	51.1	3.2	1.5	−1.2	86.9	40.9	45.9
2	38.9	3.2	1.5	−1.1	64.3	43.6	20.7
3	47.5	3.2	1.6	−1.0	73.6	46.1	27.5
4	50.8	3.2	1.6	−1.0	79.2	56.4	22.7
5	49.7	3.2	1.7	−0.8	71.6	62.9	8.8
6	83.8	3.2	1.8	−0.8	114.9	101.0	13.9
7	73.3	3.2	1.8	−0.8	99.6	88.3	11.3
8	84.5	3.2	2.0	−0.6	102.0	112.5	−10.5
9	86.5	3.2	2.0	−0.5	96.8	147.4	−50.6
10	131.2	3.2	2.1	−0.5	145.3	234.4	−89.1
Mean	69.8	3.2	1.8	−0.8	93.4	93.4	0.0

Notes: All values are weighted using the population expansion factor. [2] monthly average household consumption (per capita kWh); [3] cost of elect. in $ per kWh; [4] price of elect. in $ per kWh; [5] departure of price from costs (share of the price); [6] per capita subsidy in $); [7] per capita payment of VAT in $; [8] diff. between subsidy and payment of VAT in $.

Column [2] in each Panel of Table 1 presents the monthly average household consumption (per kilowatt hour -kWh- and in per capita terms). An increasing consumption pattern can be appreciated as higher levels of income are considered. There are also regional differences in consumption levels: while Cordoba consumes on average about 92.0 kWh/month, Jujuy (Rio Negro) approximately consumes 51.2 (69.8) kWh/month. The average consumption in AMBA is 80.8 kWh/month.[7] These differences in residential electricity consumption by regions and by socioeconomic status, are a common feature in many countries. See, for example, Hernandez and Patino-Echeverri (2022) for the case of Mexico.

We then compute electricity costs which reflect generation, transmission, and distribution.[8] Generation and transmission costs are determined in the WEM and are homogeneous throughout the country. Using the peso-per-dollar exchange rate in effect during 2018 (i.e., 28.85 ARS/USD), the unitary cost for generation and transmission was 2.20 $/kWh. Distribution costs are determined by the cost structure of each energy regional distributor (i.e., distance to final users, operational efficiency, etc.) and they are not homogeneous throughout the country. Based on data from EDENOR and EDESUR, the two main electricity distributors in AMBA, the distribution cost (known as value added of distribution -VAD-) was 0.9 $/kWh. Thus the total cost was 3.1 $/kWh (Column [3] in Table 1, Panel A). However, it can be appreciated that distribution costs differ between jurisdictions. Panel B (D) in Table 1 shows that in Cordoba (Rio Negro) the VAD was 2.0 (1.0) $/kWh, determining a total cost of 4.2 (3.2) $/kWh. In Jujuy, the VAD was 1.5 $/kWh, and the total cost was 3.7 $/kWh (Panel C). For the distributional analysis, these geographical differences in the cost of electricity will be critical, as will be seen shortly.

Regarding final prices, residential users pay an electricity bill that contains a fixed and a variable component. Those prices are set for cost recovery and are higher as electricity consumption increases. Additionally, there is a social tariff for less well-off families.[9] The eligibility criteria are based on the income level and socioeconomic condition of the main service holder. Then, final prices are "personalized" for each household. Column [4] in each Panel of Table 1 presents the average price per kWh and remarkable differences between jurisdictions can be appreciated. First, it is worth noting that jurisdictions with higher costs reflect higher prices. Second, in AMBA and Rio Negro (Panels A and D, respectively) an average household paid 1.9 and 1.8 $/kWh, while in Cordoba paid 2.9 $/kWh (Panel B). In Jujuy, the average price of electricity was 2.1 $/kWh (Panel C). Third, the differences within the income distribution of each jurisdiction are notable: a household from the richest decile in AMBA paid 13 percent more than one from the poorest decile (i.e., 2.0 vs 1.7 $/kWh). This difference was 29 (41) percent in Jujuy (Rio Negro).

We then focus on the departure of prices from costs. It mostly takes place in the WEM as, since 2002, the national state has sold electricity below the cost of production. See Giuliano et al. (2020) for further details on this background. In 2018, distributors paid a unitary price of 1.17 $/kWh.[10] Thus, the difference between prices and costs in the WEM (i.e., 2.20 $/kWh) was nearly −0.9 (as a share of the price). This is the margin obtained in the second model of Section 'Conceptual framework' where the unitary subsidy is the same for all individuals (see Eq. (2)). The homogeneous margin at the WEM becomes specific for each household (in each jurisdiction) given the conjunction of several factors: the distribution costs of each company in each jurisdiction, the pricing schedules set by distribution companies,

[7] The distribution of total consumption by deciles in each jurisdiction is presented Appendix Section 'Electricity consumption by deciles'.

[8] See Appendix Section 'Data sources on electricity costs' for further detail on this data source.

[9] Note that the existence of this social tariff is crucial both for retrieving quantities (as mentioned above) and for determining final prices. Consequently, it requires estimating the number of beneficiaries for accurate measurement and analysis of the subsidies. We present our estimate with detail in Appendix Section 'On the estimation of the social tariff'.

[10] See Appendix Section 'Data sources on electricity costs' for further detail on this data source.

and the social tariff subsidy which enables beneficiaries to pay a reduced price of electricity. Column [5] in each Panel of Table 1 presents the measurement of the "personalized" margin (i.e., Eq. (4) in Section 'Conceptual framework'). On average, the highest departure is observed in Rio Negro and Jujuy (i.e., −0.8 in Panels C and D, respectively). The lowest took place in Cordoba (i.e., −0.5 in Panel B). Reflecting the pricing criteria and social tariff subsidy described above, in all cases the departures were higher in the lower part of the income distribution, decreasing as higher levels of welfare are considered. The average subsidy (in pesos) is then calculated in Column [6] of each Panel. The middle to high-income bias of electricity subsidies, previously well-established by Giuliano et al. (2020) and Hancevic et al. (2016) for AMBA is reaffirmed (Panel A). In addition, the results confirm it for the rest of the jurisdictions (Panels B, C and D). In absolute terms, the richest decile receives between 1.6 times (in Cordoba) and 2.4 times (in Mendoza) more subsidies than the poorest decile.

Now, we address the issue of public financing: who pays for electricity subsidies. For this purpose, we consider a financing scheme, which is naturally not exhaustive but selected to illustrate a conceptual point. It is important to note that a portion of electricity subsidies is already financed through taxes, specifically the value-added tax (VAT) collected via the electricity bill itself.[11] The remaining amount, necessary to ensure a balanced budget, is assumed to be financed through a general VAT, which applies to most goods and services as implemented in Argentina. So, we rely on standard assumptions of tax incidence: VAT is supported by final consumers as in Fernández Felices et al. (2016). Using the microdata, we distribute the tax based on the total household expenditure on goods and services.[12] Column [7] in each panel of Table 1 presents the measurement of the VAT that finances the subsidy, while Column [8] computes the resulting net subsidy per household and per jurisdiction. It is important to note that some households, typically those with higher incomes, contribute more in taxes compared to the subsidy they receive.

Finally, Fig. 1 presents the net effect as a share of the household income after fiscal policy.[13] For example, in the case of AMBA, a household in the poorest decile received an average of 4.1 percent of its income in terms of electricity subsidies. In turn, it contributed to the financing of the subsidies with 2.2 percent of its income in terms of VAT. In net terms, the average poorest household gained 1.9 percent of its income (i.e., Overall Effect). That is, less than half of what it gained solely from subsidies. Note that this benefit's reduction is true for all deciles in all jurisdictions. Thus, when considering financing the well-established result on progressivity of electricity subsidies in AMBA (Giuliano et al., 2020; Hancevic et al., 2016) is strongly attenuated. The same corollary applies to the rest of jurisdictions.

The previous corollary can be considered within the framework of alternative sources for financing subsidies. For instance, Argentina is currently experiencing high inflation, which can be viewed as another potential source of subsidy financing. Assuming inflation is regressive, this paper's findings can provide insights. Similarly, a comprehensive distributional analysis should compare subsidies with public expenditures. Higher energy subsidies might replace public social spending, which has a stronger redistributive impact, such as education expenditure. This scenario could illustrate a progressive program with very regressive financing, potentially leading to increased income inequality post-implementation of the program (Ebeke & Ngouana, 2015).

[11] See footnote 6.

[12] For our estimation on the distributional incidence of this general VAT, see Appendix Section 'Distributional incidence of VAT in Argentina'.

[13] As the aim of the paper is to make the point that someone finances the subsidy, we use this simple post-fiscal metric, but another metric such as the disposable or consumable income –like those estimated by Lustig and Pessino (2013)– are also perfectly valid. We are aware that our choice does not come free of potential biases (i.e., the positioning of the household in the welfare distribution may be biased, and the net incidence measure could have a different magnitude for the lowest deciles).

Conclusion and policy implications

In this paper, we extend the analysis on distributional incidence of electricity subsidies in Argentina. Although the topic has already been widely analyzed, we address two dimensions often omitted by previous research. On the one hand, regional disparities as previous studies mainly focus on the AMBA. Argentina's territorial heterogeneity demands further analysis given the remarkable differences in electricity distribution costs and in the pricing schedules set by regional distribution companies. On the other hand, the subsidies' financing as previous studies do not focus on the net incidence. Our conclusions indicate that both dimensions are relevant for a comprehensive distributional analysis on this topic.

Based on the conclusions of the paper, we believe that a series of globally relevant policy recommendations can be derived. First, prices below the marginal cost of provision (due to subsidies) may not be the most suitable instrument for income redistribution as leakages towards higher-income groups can often take place. In our measurement, in absolute terms, the richest decile receives between 1.6 times and 2.4 times more subsidies than the poorest decile. So, energy prices should only be considered when policymakers have no other viable policy instruments available. Most of all, if electricity consumption exhibits low correlation with income. In this sense, our paper reinforces (Levinson & Silva, 2022) remark on electricity pricing: "*…is an indirect tool for addressing income inequality. Perhaps, unsurprising, it is not an effective tool.*"

Second, it is worth noting that even with leakages, the subsidy can be progressive since the subsidy-to-income ratio decreases with increasing household income, as it is show in the paper. However, we recommend evaluating the distributional impact of subsidies considering (Musgrave, 1964)'s observation: both sides of the budget must be considered. The paper follows this advice, presents financing alternatives, and shows how they modify the results. A digression on the welfare effects of subsidies applies here when considering a welfare function as defined by Sen and Foster (1973): $W = y * (1 - G)$; where y is the average income and G is the inequality coefficient (i.e., Gini). Here, W increases with y and decreases with G. When financing is omitted, y increases and G improves. If financing is included, y remains constant, and the overall welfare effect depends on G. Thus, fully understanding how inequality moves is crucial for the final ruling on the distributional impact of subsidies.

Third, beyond the distributional impact, it is recommended to consider the efficiency-equity trade-off. From another perspective, the previous welfare function can be used to analyze this trade-off due to subsidies are inefficient from an economic point of view as they reduce production (Barril & Navajas, 2015) and increase consumption. Even with a balanced budget, the average income decreases due to these reasons (i.e., the equality between the marginal value of the good for consumers and the marginal cost of production is broken). Subsidies may improve equality but decrease the average income due to inefficiency. This is a common result in public policies: equality comes at a cost in terms of efficiency, and it is necessary to focus on measures with minimum cost (e.g., financing with fixed charges, segmentation, etc.).

Fourth, it is recommended to consider the "irreversibility of subsidy policies": once established, they are difficult to remove. This characteristic is common in budgetary policies and was first planned by Peacock and Wiseman (1961). The Argentine experience shows the difficulty of reversing subsidies. The government that took office in December 2015 attempted to reverse the sizeable subsidies (Giuliano et al., 2020) and faced legal problems and great social and political resistance (Cont et al., 2021), leading to abandoning the policy in 2019 and maintaining it thereafter. Since the end of 2022, attempts have been made to mitigate the burden of subsidies. During 2023, the government carried out a new segmentation of energy prices with the aim of reducing subsidies and focusing them even more on lower-income households. This policy

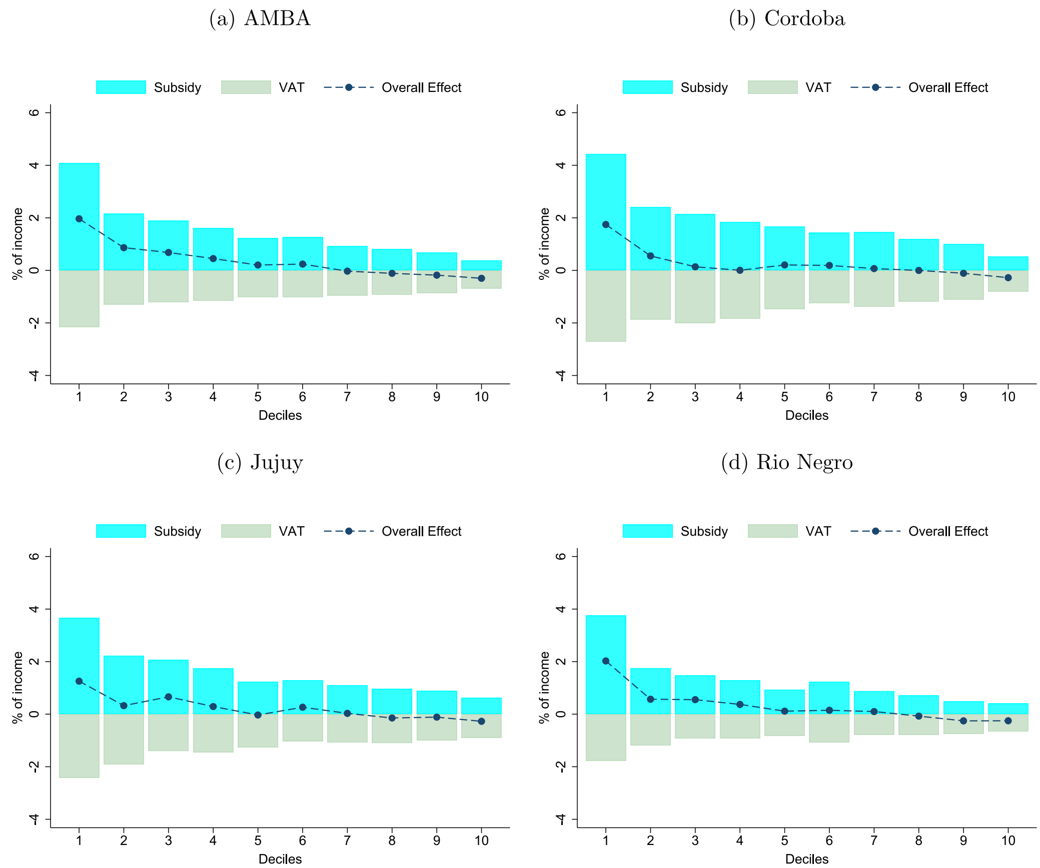

Fig. 1. Net distributional incidence of electricity subsidies when considering public financing through general VAT. Selected jurisdictions, 2018. By deciles of per capita income. In percentage of post-fiscal income.
Notes: All values are weighted using the population expansion factor.
Source: Own elaboration based on ENGHo 2017–18 and specific information of the energy sector.

is being implemented during 2024 and may generate changes in the distributional impact of subsidies. Although interesting and worthy of further research, we believe that the focus and the contribution of our paper is not distorted at all by the fact of not considering this more recent change. The regional disparities of countries like Argentina and the financing of subsidies must be considered when studying the distributive effects of energy subsidies, regardless of the implemented subsidy scheme.

Finally, the paper recommends analyzing both general public policies and those specifically impacting the energy sector using appropriate and well-established conceptual frameworks. This approach will offer precise guidance in analysis and result in well-founded conclusions, facilitating effective policy analysis and implementation.

CRediT authorship contribution statement

Octavio Bertín: Data curation. **Thomas García:** Software. **Francisco Pizzi:** Methodology. **Alberto Porto:** Supervision. **Julian Puig:** Software, Methodology, Investigation. **Jorge Puig:** Writing – original draft, Supervision.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that support the findings of this study are available on request from the corresponding author, Jorge Puig. All data used are public (i.e., household survey, tariff tables, and administrative information on the electricity sector). The programming codes for results replicability are also available upon request.

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Appendix

A.1. Measurement for Santa Fe and Mendoza

See Fig. 2 and Table 2.

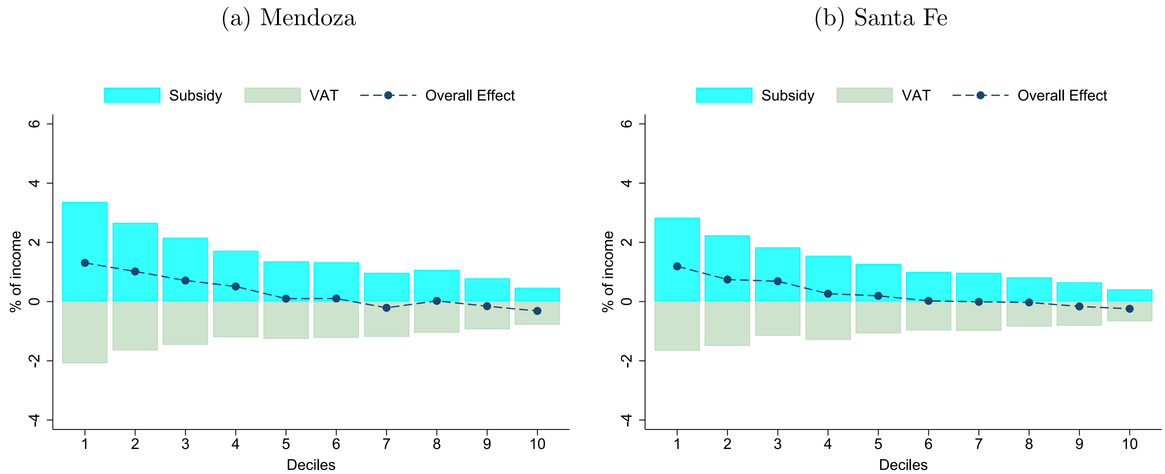


Fig. 2. Net distributional incidence of electricity subsidies when considering public financing through general VAT. Selected jurisdictions, 2018. By deciles of per capita income. In percentage of post-fiscal income.
Notes: All values are weighted using the population expansion factor.
Source: Own elaboration based on ENGHo 2017–18 and specific information of the energy sector.

Table 2
Key measures. Selected jurisdictions, 2018. By deciles of per capita income.
Source: Own elaboration based on ENGHo 2017-18 and specific information of the energy sector.

Panel A. Santa Fe

[1] Deciles	[2] kWh	[3] Cost (C)	[4] Price (P)	[5] (P-C)/P	[6] Subsidy	[7] VAT	[8] Net Subsidy
1	30.7	4.3	2.4	−0.8	56.6	33.1	23.5
2	50.1	4.3	2.7	−0.6	78.9	52.7	26.2
3	53.0	4.3	2.6	−0.6	88.1	55.3	32.8
4	69.4	4.3	2.9	−0.5	97.5	80.8	16.7
5	65.4	4.3	2.8	−0.5	98.4	83.4	15.0
6	66.3	4.3	2.9	−0.5	93.1	90.8	2.3
7	85.9	4.3	3.0	−0.4	111.3	112.3	−0.9
8	82.5	4.3	2.9	−0.5	117.2	121.4	−4.1
9	100.5	4.3	3.1	−0.4	122.7	153.8	−31.1
10	120.6	4.3	3.2	−0.4	136.3	216.3	−80.1
Mean	72.5	4.3	2.9	−0.5	100.0	100.0	0.0

Panel B. Mendoza

[1] Deciles	[2] kWh	[3] Cost (C)	[4] Price (P)	[5] (P-C)/P	[6] Subsidy	[7] VAT	[8] Net Subsidy
1	48.5	3.4	2.0	−0.7	68.1	42.0	26.0
2	55.5	3.4	1.9	−0.8	83.8	52.1	31.7
3	59.8	3.4	1.9	−0.8	91.6	61.7	30.0
4	65.9	3.4	2.1	−0.7	90.1	63.5	26.6
5	66.3	3.4	2.1	−0.6	86.1	79.8	6.2
6	76.7	3.4	2.1	−0.6	100.7	92.8	7.9
7	72.0	3.4	2.2	−0.6	88.7	107.7	−19.0
8	87.9	3.4	2.1	−0.7	119.5	116.9	2.5
9	92.7	3.4	2.2	−0.6	116.2	139.2	−23.1
10	115.0	3.4	2.3	−0.5	131.1	219.7	−88.6
Mean	74.0	3.4	2.1	−0.6	97.6	97.6	0.0

Notes: All values are weighted using the population expansion factor. [2] monthly average household consumption (per capita kWh); [3] cost of elect. in $ per kWh; [4] price of elect. in $ per kWh; [5] departure of price from costs (share of the price); [6] per capita subsidy in $); [7] per capita payment of VAT in $; [8] diff. between subsidy and payment of VAT in $.

A.2. Tariff charts for residential electricity consumption

The regional distributors analyzed in this paper are the following: (i) EDENOR *y* EDESUR (Empresa Distribuidora de Energía Norte SA *y* Empresa Distribuidora Sur SA) in AMBA; (ii) EPEC (Empresa Provincial de Energía de Córdoba) in Cordoba; (iii) EJESA (Empresa Jujeña de Energia SA) in Jujuy; (iv) EDEMSA (Empresa Distribuidora de Electricidad de Mendoza SA) in Mendoza; (v) EDERSA (Empresa de Energía de Rio Negro S.A.) in Rio Negro; (vi) EPESF (Empresa Provincial de la Energía de Santa Fe) in Santa Fe. As there are nearly 600 energy distributors (including small cooperatives), we take the most representative distributor in each jurisdiction (see Figs. 3–8).

A.3. Electricity consumption by deciles

See Fig. 9.

A.4. Data sources on electricity costs

Data on electricity cost in the wholesale electricity market (WEM) are drawn from CAMMESA. See annual reports at this link. To estimate the Value Added for Distribution (VAD), the ideal would be to gather this information from all distribution companies. Unfortunately, not all of them publish this data. Therefore, the VAD was estimated through an *indirect method* as the difference between the price paid by final users without the social tariff -net of taxes- (see Prices No ST in Table 3) and the price paid by distribution companies in the WEM (i.e., 1.17 $/Kwh in Table 3). Note that total costs include the costs of generation, transmission, and distribution. The corresponding VAD values are shown in Table 3.

For AMBA and Mendoza, information on distribution costs is available. Thus, as an attempt to cross-check our previous figures, the VAD was calculated through a *direct method* by combining the companies' own distribution cost tables, administrative data on consumption, and the number of users by consumption category. The tables on companies' own distribution costs (different from the tariff charts for final users) establish a fixed cost according to the user's consumption bracket (i.e., consumption category) and a variable cost depending on the level of consumption. See Figs. 10 and 11 for an example on these tables. The unitary cost of distribution via this method yielded very similar values. Specifically, in AMBA, the estimated VAD through the *direct method* was 0.89 pesos, and in Mendoza, it was 1.15 pesos. In the case of AMBA, the tables on companies' own distribution costs are drawn from ENRE's (National Electricity Regulatory Entity) Resolution N° 32 and Resolution N° 33 of 2018. In the case of Mendoza, the source is Resolution N° 106 of 2018, published by the EPRE (Provincial Electrical Regulatory Entity).

A.5. On the estimation of the social tariff

By the end of 2015, electricity subsidies represented around 1 percent of GDP putting strong pressure on the national budget, which exhibited a sizeable fiscal deficit (i.e., around 5 percent of GDP).

Cuadro Tarifario - Período 04/18.

Usuarios Residenciales - Entidades Bien Público

Tarifa 1 -R1		EDENOR	EDESUR	Tarifa 1 -R6		EDENOR	EDESUR
Cargo Fijo 0-150	$/mes	28,43	30,41	Cargo Fijo 501-600	$/mes	298,30	292,80
Cargo Variable 0-150	$/kWh	1,490	1,489	Cargo Variable 501-600	$/kWh	1,736	1,735
Tarifa 1 -R2		**EDENOR**	**EDESUR**	**Tarifa 1 -R7**		**EDENOR**	**EDESUR**
Cargo Fijo 151-325	$/mes	50,65	51,99	Cargo Fijo 601-700	$/mes	777,56	787,80
Cargo Variable 151-325	$/kWh	1,487	1,487	Cargo Variable 601-700	$/kWh	1,868	2,097
Tarifa 1 -R3		**EDENOR**	**EDESUR**	**Tarifa 1 -R8**		**EDENOR**	**EDESUR**
Cargo Fijo 326-400	$/mes	84,63	85,00	Cargo Fijo 701-1400	$/mes	1.115,99	1.115,26
Cargo Variable 326-400	$/kWh	1,538	1,537	Cargo Variable 701-1400	$/kWh	1,968	2,192
Tarifa 1 -R4		**EDENOR**	**EDESUR**	**Tarifa 1 -R9**		**EDENOR**	**EDESUR**
Cargo Fijo 401-450	$/mes	99,59	99,45	Cargo Fijo +1400	$/mes	1.343,79	1.336,93
Cargo Variable 401-450	$/kWh	1,612	1,611	Cargo Variable + 1400	$/kWh	1,992	2,216

Fig. 3. AMBA.
Notes: The Figure is illustrative. All tariff charts that cover the same period as the ENGHo 2017/18 microdata are used in the estimates. That is, those charts from November 2017 to November 2018. Quarterly tariff charts are constructed coinciding with the survey's quarters. Not all the used tariff charts are presented for reasons of brevity, but they are naturally available upon request.
Source: ENRE.

No SOCIAL TARIFF

Quarter	Less than 80 kWh/month		between 80 y 120 kWh/month		between 120 y 500 kWh/month			
						Variable		
	Fixed	Variable	Fixed	Variable	Fixed	0 - 120 kWh/month	120 - 200 kWh/month	Más de 200 kWh/month
I	27.57	1.55	27.57	1.60	38.29	1.98	2.63	2.64
II	29.52	1.98	29.52	1.98	40.99	2.41	3.11	3.11
III	31.44	2.11	31.44	2.11	43.66	2.56	2.71	2.71
IV	35.88	2.62	35.88	2.62	49.83	3.14	3.99	3.99

Quarter	between 500 y 700 kWh/month					between 700 y 1400 kWh/month					Más de 1400 kWh/month				
		Variable					Variable					Variable			
	Fixed	0 - 120 kWh/month	120 - 200 kWh/month	200 - 500 kWh/month	Más de 500 kWh/month	Fixed	0 - 120 kWh/month	120 - 200 kWh/month	200 - 500 kWh/month	Más de 500 kWh/month	Fixed	0 - 120 kWh/month	120 - 200 kWh/month	200 - 500 kWh/month	Más de 500 kWh/month
I	55.65	2.38	3.03	3.07	3.08	55.65	2.69	3.38	3.42	3.49	55.65	2.87	3.58	3.62	3.62
II	59.57	2.84	3.57	3.57	3.57	59.57	3.18	4.01	4.01	4.01	59.57	3.18	4.01	4.01	4.01
III	63.45	3.02	3.80	3.80	3.80	63.45	3.39	4.27	4.27	4.27	63.45	3.39	4.27	4.27	4.27
IV	72.40	3.66	4.55	4.55	4.55	72.40	4.08	5.09	5.09	5.09	72.40	4.08	5.09	5.09	5.09

SOCIAL TARIFF

Quarter	0 - 80 kWh/month		80 - 120 kWh/month		between 120 y 500 kWh/month						between 500 y 700 kWh/month						
						Variable						Variable					
	Fixed	Variable	Fixed	Variable	Fixed	0 - 120 kWh/month	120 - 150 kWh/month	150 - 200 kWh/month	200 - 300 kWh/month	300 - 500 kWh/month	Fixed	0 - 120 kWh/month	120 - 150 kWh/month	150 - 200 kWh/month	200 - 300 kWh/month	300 - 500 kWh/month	500 - 700 kWh/month
I	27.57	0.76	27.57	0.81	38.28	1.19	1.84	2.06	2.06	2.20	55.65	1.59	2.25	2.45	2.49	2.64	2.65
II	29.52	0.89	29.52	0.89	40.99	1.31	2.02	2.51	2.51	3.00	59.57	1.74	2.48	2.97	2.97	3.46	3.46
III	31.05	0.93	31.05	0.93	43.15	1.37	2.11	2.63	2.63	3.15	62.69	1.83	2.59	3.11	3.11	3.96	3.96
IV	34.67	1.04	34.67	1.04	48.15	1.53	2.35	3.01	3.01	3.67	69.97	2.03	2.87	3.54	3.54	4.21	4.21

Quarter	between 700 - 1400 kWh/month							Más de 700 kWh/month						
		Variable							Variable					
	Fixed	0 - 120 kWh/month	120 - 150 kWh/month	150 - 200 kWh/month	200 - 300 kWh/month	300 - 500 kWh/month	500 - 1400 kWh/month	Fixed	0 - 120 kWh/month	120 - 150 kWh/month	150 - 200 kWh/month	200 - 300 kWh/month	300 - 500 kWh/month	Más de 500 kWh/month
I	55.65	1.90	2.59	2.79	2.83	2.98	3.05	55.65	2.08	2.78	2.99	3.03	3.17	3.18
II	59.57	2.09	2.92	3.41	3.41	3.90	3.90	59.57	2.09	2.92	3.41	3.41	3.90	3.90
III	62.69	2.19	3.06	3.57	3.57	4.42	4.42	62.69	2.19	3.06	3.57	3.57	4.42	4.42
IV	69.97	2.43	3.39	4.05	4.05	4.72	4.72	69.97	2.43	3.39	4.05	4.05	4.72	4.72

Fig. 4. Cordoba.
Notes: The Figure is illustrative. All tariff charts that cover the same period as the ENGHo 2017/18 microdata are used in the estimates. That is, those charts from November 2017 to November 2018. Quarterly tariff charts are constructed coinciding with the survey's quarters. Not all the used tariff charts are presented for reasons of brevity, but they are naturally available upon request.
Source: EPEC.

Table 3
Cost ($/kWh), Prices ($/kWh) and Consumption (MWh) of Electricity. Selected jurisdictions, 2018.
Source: Author's elaboration based on ADEERA, CAMMESA, and provincial companies of electricity distribution (see Appendix A.2).

Jurisdiction	Supply				Demand			Consumption	
	Gen. & Trans.		Dist.	Total	Prices			Quantities	
	Cost	Price	VAD		No ST	ST	Mean	Residential	Total
Amba	2.20	1.17	0.91	3.11	2.08	1.33	1.85	26,756,393	50,556,886
Cordoba	2.20	1.17	1.98	4.18	3.15	2.63	2.90	4,177,593	9,912,069
Jujuy	2.20	1.17	1.47	3.67	2.64	1.34	2.14	543,771	1,098,396
Mendoza	2.20	1.17	1.24	3.44	2.41	1.59	2.12	2,017,382	5,658,965
Rio Negro	2.20	1.17	0.96	3.16	2.13	1.27	1.82	807,834	1,936,416
Santa Fe	2.20	1.17	2.09	4.29	3.26	2.46	2.91	4,908,732	12,662,734

Notes: Prices (No) ST corresponds to the mean price paid by those users that were (not) beneficiaries of the social tariff. Price Mean corresponds to the mean price paid by all users.

With the objective of alleviating this fiscal pressure and recomposing the signals of the electricity market Argentina envisioned a gradual reduction of subsidies. To accompany the tariff increases in electricity, a social tariff was established as a targeting mechanism to protect the less well-off families.[14] The eligibility criteria were based on the level of income and socioeconomic condition of the main service holder.[15] In the case of electricity, the social tariff subsidy covers part of the generation cost of electricity. Specifically, it covers 100 percent of the generation of the first 150 kWh and 50 percent of the following 150 kWh consumed per user per month. Beneficiaries pay to the distribution company the reduced cost of electricity, the full cost of transmission,

[14] The social tariff was established in Resolution No. 7/2016, followed by Resolutions 6/2016, 28/2016, and more recently 122/2018 from the Ministry of Energy. It has not been substantially modified since its implementation.

[15] Beneficiaries who qualified for these reduced tariffs were linked to social programs, had incomes from pensions or salaries below two minimum wages or had specific health conditions, among others. To this inclusion criteria, exclusion criteria were added related to property ownership of cars and immovable assets.

Vigencia: Desde el 1º de Febrero al 30 de Abril de 2018

TARIFA T1 **Pequeñas Demandas**		
T1-S Tarifa Social		
Cargo Fijo Tarifa Social	$/mes	65,25
Cargo Variable Tarifa Social (Primeros 150 kWh/mes)	$/kWh	0,2887
Cargo Variable Tarifa Social (Excedentes a 150 kWh/mes, sin superar los 300 kWh/mes)	$/kWh	2,0986
Cargo Variable Tarifa Social (Excedentes a 300 kWh/mes)	$/kWh	2,7050
Cargo Variable Tarifa Social (Excedentes a 150 kWh/mes, sin superar los 300 kWh/mes, si el consumo es un 20% menor con respecto a mismo mes de año 2015)	$/kWh	1,4721
Cargo Variable Tarifa Social (Excedentes a 300 kWh/mes, si el consumo es un 20% menor con respecto a mismo mes de año 2015)	$/kWh	2,0179
Electrodependientes		
Cargo Fijo		65,2500
Cargo Variable (Primeros 600 kWh/mes)		0,7276
Cargo Variable (Excedentes a 600 kWh/mes, si el consumo es menor o igual con respecto a mismo mes de año 2015)		1,2935
Cargo Variable (Excedentes a 600 kWh/mes, hasta 1050 kWh/mes, si el consumo es mayor con respecto a mismo mes de año 2015)		1,2935
Cargo Variable (Excedentes a 1050 kWh/mes, si el consumo es mayor con respecto a mismo mes de año 2015)		1,2935
T1R - Uso Residencial		
Cargo Fijo Residencial	$/mes	65,25
Cargo Variable por consumo de energía primeros 150 kWh mes	$/kWh	2,1410
Cargo Variable por consumo de energía excedentes a 150 kWh mes	$/kWh	2,7050

Fig. 5. Jujuy.
Notes: The Figure is illustrative. All tariff charts that cover the same period as the ENGHo 2017/18 microdata are used in the estimates. That is, those charts from November 2017 to November 2018. Quarterly tariff charts are constructed coinciding with the survey's quarters. Not all the used tariff charts are presented for reasons of brevity, but they are naturally available upon request.
Source: EJESA.

NO SOCIAL TARIFF

Quarter	Residential 1 Up to 299 kWh/bim		Residential 2 Between 300 and 599 kWh/bim		Residential 3 more than 600 kWh/bim	
	Fixed	Variable	Fixed	Variable	Fixed	Variable
	$/bim	$/kWh	$/bim	$/kWh	$/bim	$/kWh
I	15.74	1.04	31.59	1.31	200.10	1.33
II	18.35	1.43	36.43	1.76	227.71	1.79
III	18.88	1.61	37.35	1.96	232.51	1.99
IV	19.36	1.95	38.59	2.29	242.59	2.32

SOCIAL TARIFF

Quarter	Residential 1 Up to 299 kWh/bim		Residential 2 Between 300 and 599 kWh/bim			Residential 3 more than 600 kWh/bim			
	Fixed	Variable	Fixed	Variable 0 a 300	Variable 301 a 599	Fixed	Variable 0 a 300	Variable 301 a 599	Variable more than599
	$/bim	$/kWh	$/bim	$/kWh	$/kWh	$/bim	$/kWh	$/kWh	$/kWh
I	15.74	0.33	31.57	0.59	0.95	200.10	0.61	0.97	1.33
II	18.35	0.41	36.42	0.74	1.25	227.71	0.77	1.26	1.75
III	18.88	0.44	37.35	0.79	1.37	232.52	0.82	1.41	1.99
IV	19.36	0.49	38.59	0.84	1.56	242.59	0.86	1.59	2.32

Fig. 6. Mendoza.
Notes: The Figure is illustrative. All tariff charts that cover the same period as the ENGHo 2017/18 microdata are used in the estimates. That is, those charts from November 2017 to November 2018. Quarterly tariff charts are constructed coinciding with the survey's quarters. Not all the used tariff charts are presented for reasons of brevity, but they are naturally available upon request.
Source: EDEMSA.

E.P.R.E.
Ente Provincial Regulador de la Energía

ANEXO I
CUADRO TARIFARIO PROVINCIAL
Vigente para el período: 1º de diciembre de 2017 al 31 de enero de 2018

RESOLUCIÓN Nº 215 EPRE
EXPTE. Nº EPRE

		Residencial		Tarifa Social y Electrodependientes				No Residencial	
			Con Ahorro mayor o igual a 20% al 2015		Electro dependientes	Tarifa Social (TS)	(TS) Con Ahorro mayor o igual a 20% al 2015	< 300 kW	>= 300 kW
TARIFA 1 - PEQUEÑAS DEMANDAS									
T 1-R Uso residencial									
Cargo fijo (haya o no consumo)	$/mes	42,52	42,52	Cargo fijo (haya o no consumo) $/mes	42,52	42,52	42,52		
Cargo Variable por energía:	$/kWh								
Primeros 100 kWh/mes		1,7094	1,6038	Prim 150 kWh/mes	0,7369	0,7564	0,7564		
Siguientes 100 kWh/mes		2,0181	1,9125	Sig 50 kWh/mes	0,9427	1,4902	1,4374		
Siguientes 100 kWh/mes		2,9443	2,8387	Sig 100 kWh/mes	1,8689	2,4164	2,3636		
Excedente de 300 kWh/mes		3,4127	3,3071	Excedente de 300 kWh/mes	2,3374	3,4127	3,3071		
T 1-Rural Residencial									
Cargo fijo (haya o no consumo)	$/mes	117,80	117,80	Cargo fijo (haya o no consumo) $/mes	117,80	117,80	117,80		
Cargo Variable por energía:	$/kWh								
Primeros 150 kWh/mes		2,0060	1,9006	Prim 150 kWh/mes	0,9323	0,9517	0,9517		
Siguientes 150 kWh/mes		3,2729	3,1675	Sig 150 kWh/mes	2,1991	2,7458	2,6930		
Excedente de 300 kWh/mes		4,0820	3,9766	Excedente de 300 kWh/mes	3,0082	4,0820	3,9766		
T 1-Rural General									
Cargo fijo (haya o no consumo)	$/mes							117,80	
Cargo Variable por energía:	$/kWh								
Primeros 150 kWh/mes								2,0106	
Siguientes 150 kWh/mes								3,2881	
Excedente de 300 kWh/mes								3,5223	
T 1-G Uso General									
Cargo fijo (haya o no consumo)	$/mes							104,95	
Cargo Variable por energía:	$/kWh								
Primeros 125 kWh/mes								2,1405	
Siguientes 225 kWh/mes								2,7899	
Excedente de 350 kWh/mes								3,2370	
TARIFA 2 - MEDIANAS DEMANDAS									
Por capacidad de suministro contratada	$/kW-mes							159,07	
Cargo Variable por energía:	$/kWh							2,0586	

Fig. 7. Rio Negro.
Notes: The Figure is illustrative. All tariff charts that cover the same period as the ENGHo 2017/18 microdata are used in the estimates. That is, those charts from November 2017 to November 2018. Quarterly tariff charts are constructed coinciding with the survey's quarters. Not all the used tariff charts are presented for reasons of brevity, but they are naturally available upon request.
Source: EDERSA.

EPE
Energía de Santa Fe

EMPRESA PROVINCIAL DE LA ENERGIA DE SANTA FE

Área de aplicación: Todo el territorio de la Provincia de Santa Fe
Consumos registrados entre el 01 y el 31 de ENERO de 2018
CUADRO TARIFARIO COMPLETO MENSUAL - FACTURACION BIMESTRAL

TARIFA PEQUEÑAS DEMANDAS URBANAS

TARIFA RESIDENCIAL - SIN AHORRO o CON AHORRO MENOR AL 20% RESPECTO DEL CONSUMO 2015

Tarifa 1 - Uso Residencial (menor de 20 kW)		Cuota de Servicio $/sum. Mes	Primeros 60 kWh/mes ($/kWh)	Siguientes 60 kWh/mes ($/kWh)	Excedente de 120 kWh/mes ($/kWh)
1J01	Residencial hasta 20 kW - CONSUMO hasta 120 kWh/mes para Jubilados y Pensionados	27,52581	0,80558	0,92612	
1001	Residencial hasta 20 kW - CONSUMO hasta 120 kWh/mes	55,05164	1,32364	1,56470	
1101 1201 1301 1401	Residencial hasta 20 kW - CONSUMO mayor a 120 kWh/mes hasta 700 kWh/mes	93,30478	1,55094	1,78348	2,73349
1501 1601	Residencial hasta 20 kW - CONSUMO superior a 700 kWh/mes	93,30478	2,00501	2,20814	3,01755

TARIFA RESIDENCIAL - CON AHORRO MAYOR O IGUAL A 20% RESPECTO CONSUMO 2015

Tarifa 1 - Uso Residencial (menor de 20 kW)		Cuota de Servicio $/sum. Mes	Primeros 60 kWh/mes ($/kWh)	Siguientes 60 kWh/mes ($/kWh)	Excedente de 120 kWh/mes ($/kWh)
1DC0	Residencial hasta 20 kW - CONSUMO hasta 120 kWh/mes para Jubilados y Pensionados	27,52581	0,70458	0,82512	
1AC0	Residencial hasta 20 kW - CONSUMO hasta 120 kWh/mes	55,05164	1,25836	1,49404	
1AC1 1AC2 1AC3 1AC4	Residencial hasta 20 kW - CONSUMO mayor a 120 kWh/mes hasta 700 kWh/mes	93,30478	1,44994	1,68248	2,63249
1AC5 1AC6	Residencial hasta 20 kW - CONSUMO superior a 700 kWh/mes	93,30478	1,90401	2,10714	2,91655

Fig. 8. Santa Fe.
Notes: The Figure is illustrative. All tariff charts that cover the same period as the ENGHo 2017/18 microdata are used in the estimates. That is, those charts from November 2017 to November 2018. Quarterly tariff charts are constructed coinciding with the survey's quarters. Not all the used tariff charts are presented for reasons of brevity, but they are naturally available upon request.
Source: EPESF.

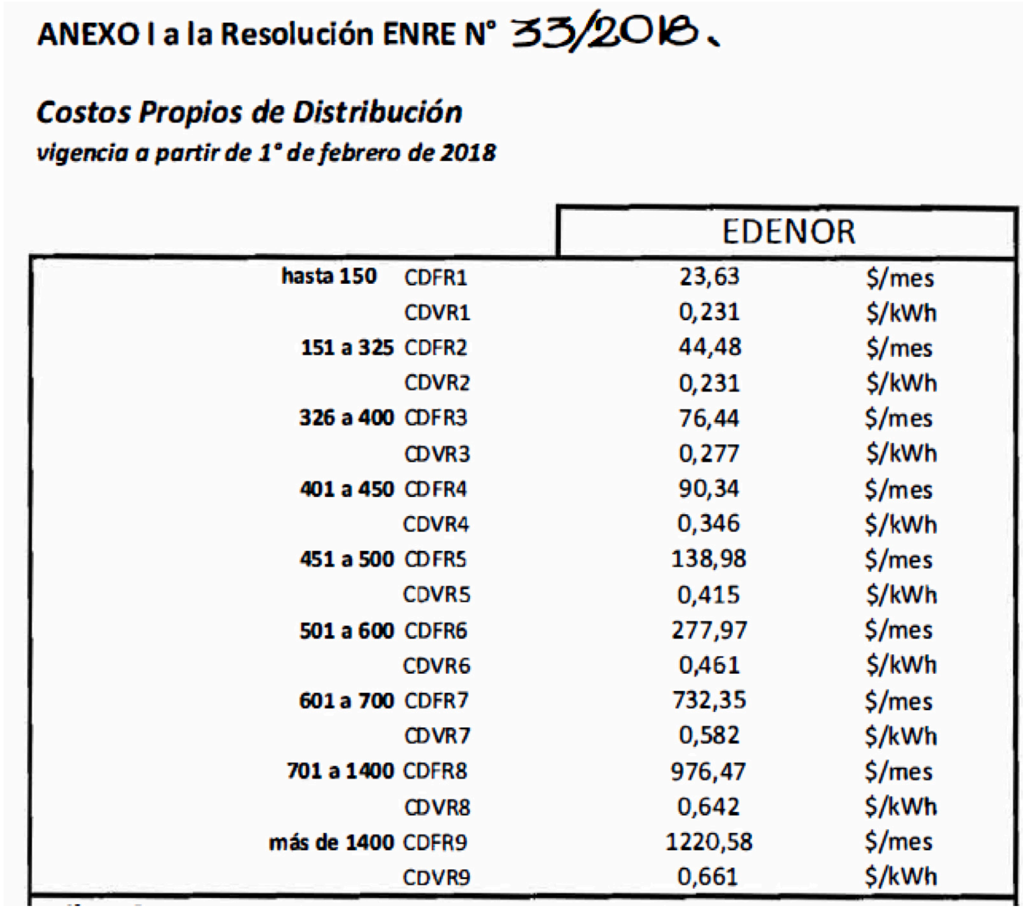
Fig. 9. Electricity consumption in Argentina. By deciles of per capita income. Level in kWh per capita and share in the total consumption. Selected jurisdictions, 2018.
Notes: All values are weighted using the population expansion factor.
Source: Own elaboration based on ENGHo 2017–18 and specific information of the energy sector.

distribution, and taxes, and the same variable cost as non-beneficiaries for the kilowatts over 150 kWh. Beyond the social tariff, it is worth mentioning that the consumers who did not have access to the social tariff continued to receive electricity subsidies.[16]

The social tariff presents an additional methodological challenge for quantity retrieval. First, because beneficiaries are not directly identified in the ENGHo 2017/18. That is, no variable denotes whether or not a household is a beneficiary of the social tariff and therefore a variable must be generated to identify potential beneficiaries. Second, for the same amount of expenditure observed in ENGHo 2017/18, two different levels of consumption may correspond: one for the case in which the identified household has a social tariff and another for which it does not.[17] To overcome these obstacles, we create a binary variable that takes the value 1 if the household meets any of the eligibility criteria required to access the social tariff. For the current social tariff scheme for electricity, see for example, Edenor and Edesur. In Table 4 we present the estimates and coverage by deciles of the social tariff in

[16] See Giuliano et al. (2020) for further details on the implementation of this dual-universal and focalized-subsidy scheme.

[17] Note that this methodological issue is not present in Giuliano et al. (2020) since these authors use the previous ENGHo (corresponding to the years 2012 and 2013) where the social tariff did not exist.



ANEXO I a la Resolución ENRE N° 33/2018.

Costos Propios de Distribución

vigencia a partir de 1° de febrero de 2018

		EDENOR	
hasta 150	CDFR1	23,63	$/mes
	CDVR1	0,231	$/kWh
151 a 325	CDFR2	44,48	$/mes
	CDVR2	0,231	$/kWh
326 a 400	CDFR3	76,44	$/mes
	CDVR3	0,277	$/kWh
401 a 450	CDFR4	90,34	$/mes
	CDVR4	0,346	$/kWh
451 a 500	CDFR5	138,98	$/mes
	CDVR5	0,415	$/kWh
501 a 600	CDFR6	277,97	$/mes
	CDVR6	0,461	$/kWh
601 a 700	CDFR7	732,35	$/mes
	CDVR7	0,582	$/kWh
701 a 1400	CDFR8	976,47	$/mes
	CDVR8	0,642	$/kWh
más de 1400	CDFR9	1220,58	$/mes
	CDVR9	0,661	$/kWh

Fig. 10. Example of tables on companies' own distribution costs. Edenor.
Source: ENRE.

Table 4
Distribution of households with and without access to social tariff. By deciles and by jurisdiction.
Source: Own elaboration based on ENGHo 2017-18 and eligibility criterias for the Social Tariff.

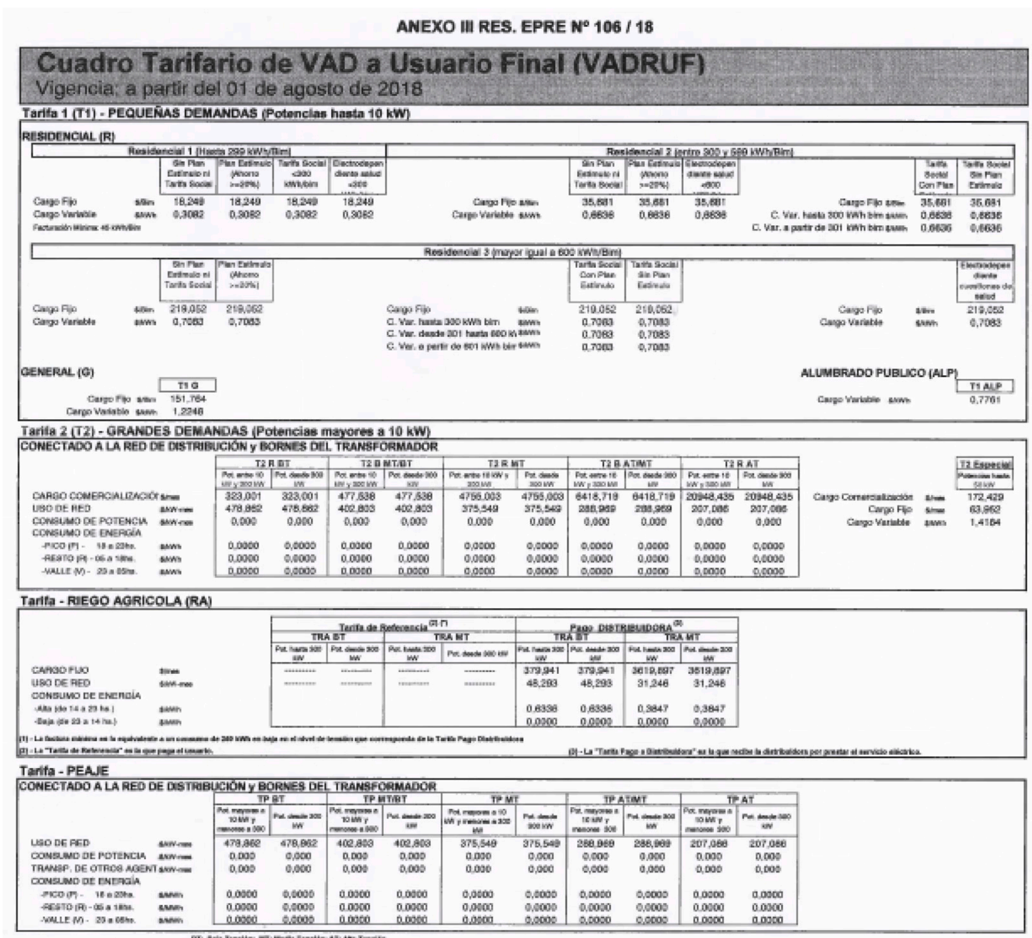
		Decil										
		1	2	3	4	5	6	7	8	9	10	Total
AMBA	Without Social Tariff	149,559	168,788	210,043	276,815	304,161	355,326	367,700	442,718	503,334	684,167	3,462,611
	With Social Tariff	186,120	169,728	157,625	137,408	147,424	141,405	115,951	107,949	106,796	62,313	1,332,719
	Total	335,679	338,516	367,668	414,223	451,585	496,731	483,651	550,667	610,130	746,480	4,795,330
	Share with Social Tariff (%)	55.45	50.14	42.87	33.17	32.65	28.47	23.97	19.60	17.50	8.35	27.79
Cordoba	Without Social Tariff	20,955	25,366	46,982	47,973	61,158	65,138	67,389	83,267	93,213	147,059	658,500
	With Social Tariff	52,493	47,336	42,980	46,308	45,536	41,417	39,309	32,174	43,136	16,750	407,439
	Total	73,448	72,702	89,962	94,281	106,694	106,555	106,698	115,441	136,349	163,809	1,065,939
	Share with Social Tariff (%)	71.47	65.11	47.78	49.12	42.68	38.87	36.84	27.87	31.64	10.23	38.22
Jujuy	Without Social Tariff	5,299	6,637	5,606	5,653	13,330	8,091	10,559	14,367	14,508	22,391	106,441
	With Social Tariff	7,275	7,118	6,954	6,733	3,755	6,583	8,487	4,888	6,648	4,717	63,158
	Total	12,574	13,755	12,560	12,386	17,085	14,674	19,046	19,255	21,156	27,108	169,599
	Share with Social Tariff (%)	57.86	51.75	55.37	54.36	21.98	44.86	44.56	25.39	31.42	17.40	37.24
Mendoza	Without Social Tariff	15,957	14,850	24,920	25,734	34,308	39,505	44,077	34,929	48,749	59,555	342,584
	With Social Tariff	15,653	17,652	18,263	14,281	9,473	12,441	8,209	16,896	12,332	8,401	133,601
	Total	31,610	32,502	43,183	40,015	43,781	51,946	52,286	51,825	61,081	67,956	476,185
	Share with Social Tariff (%)	49.52	54.31	42.29	35.69	21.64	23.95	15.70	32.60	20.19	12.36	28.06

(*continued on next page*)

Table 4 (*continued*).

		Decil										
		1	2	3	4	5	6	7	8	9	10	Total
Rio Negro	Without Social Tariff	4,587	5,303	8,392	7,891	11,122	15,538	15,673	21,556	26,573	34,797	151,432
	With Social Tariff	11,497	8,843	9,818	9,078	7,215	7,692	8,183	3,836	2,646	1,510	70,318
	Total	16,084	14,146	18,210	16,969	18,337	23,230	23,856	25,392	29,219	36,307	221,750
	Share with Social Tariff (%)	71.48	62.51	53.92	53.50	39.35	33.11	34.30	15.11	9.06	4.16	31.71
Santa Fe	Without Social Tariff	13,145	37,365	25,460	49,300	58,366	57,837	75,449	79,303	112,705	122,070	631,000
	With Social Tariff	49,060	43,831	52,913	51,166	44,901	40,423	40,427	42,949	23,031	28,905	417,606
	Total	62,205	81,196	78,373	100,466	103,267	98,260	115,876	122,252	135,736	150,975	1,048,606
	Share with Social Tariff (%)	78.87	53.98	67.51	50.93	43.48	41.14	34.89	35.13	16.97	19.15	39.82

Notes: All values are weighted using the population expansion factor. Deciles of individuals ordered by per capita familiar income.



ANEXO III RES. EPRE Nº 106 / 18

Cuadro Tarifario de VAD a Usuario Final (VADRUF)

Vigencia: a partir del 01 de agosto de 2018

Tarifa 1 (T1) - PEQUEÑAS DEMANDAS (Potencias hasta 10 kW)

RESIDENCIAL (R)

Residencial 1 (Hasta 299 kWh/Bim)

	Sin Plan Estímulo ni Tarifa Social	Plan Estímulo (Ahorro >=20%)	Tarifa Social <300 kWh/bim	Electrodependiente salud <300
Cargo Fijo $/Bim	18,249	18,249	18,249	18,249
Cargo Variable $/kWh	0,3082	0,3082	0,3082	0,3082

Facturación Mínima: 45 kWh/Bim

Residencial 2 (entre 300 y 599 kWh/Bim)

	Sin Plan Estímulo ni Tarifa Social	Plan Estímulo (Ahorro >=20%)	Electrodependiente salud <600
Cargo Fijo $/Bim	35,681	35,681	35,681
Cargo Variable $/kWh	0,6636	0,6636	0,6636

	Tarifa Social Con Plan Estímulo	Tarifa Social Sin Plan Estímulo
Cargo Fijo $/Bim	35,681	35,681
C. Var. hasta 300 kWh bim $/kWh	0,6636	0,6636
C. Var. a partir de 301 kWh bim $/kWh	0,6636	0,6636

Residencial 3 (mayor igual a 600 kWh/Bim)

	Sin Plan Estímulo ni Tarifa Social	Plan Estímulo (Ahorro >=20%)
Cargo Fijo $/Bim	219,052	219,052
Cargo Variable $/kWh	0,7083	0,7083

	Tarifa Social Con Plan Estímulo	Tarifa Social Sin Plan Estímulo
Cargo Fijo $/Bim	219,052	219,052
C. Var. hasta 300 kWh bim $/kWh	0,7083	0,7083
C. Var. desde 301 hasta 600 kWh $/kWh	0,7083	0,7083
C. Var. a partir de 601 kWh bim $/kWh	0,7083	0,7083

	Electrodependiente cuestiones de salud
Cargo Fijo $/Bim	219,052
Cargo Variable $/kWh	0,7083

GENERAL (G)

	T1 G
Cargo Fijo $/Bim	151,764
Cargo Variable $/kWh	1,2246

ALUMBRADO PUBLICO (ALP)

	T1 ALP
Cargo Variable $/kWh	0,7761

Tarifa 2 (T2) - GRANDES DEMANDAS (Potencias mayores a 10 kW)

CONECTADO A LA RED DE DISTRIBUCIÓN y BORNES DEL TRANSFORMADOR

	T2 R BT		T2 B MT/BT		T2 R MT		T2 B AT/MT		T2 R AT	
	Pot. entre 10 kW y 300 kW	Pot. desde 300 kW	Pot. entre 10 kW y 300 kW	Pot. desde 300 kW	Pot. entre 10 kW y 300 kW	Pot. desde 300 kW	Pot. entre 10 kW y 300 kW	Pot. desde 300 kW	Pot. entre 10 kW y 300 kW	Pot. desde 300 kW
CARGO COMERCIALIZACIÓN $/mes	323,001	323,001	477,538	477,538	4755,003	4755,003	6418,719	6418,719	20948,435	20948,435
USO DE RED $/kW-mes	478,862	478,862	402,803	402,803	375,549	375,549	288,969	288,969	207,086	207,086
CONSUMO DE POTENCIA $/kW-mes	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
CONSUMO DE ENERGÍA										
-PICO (P) - 18 a 23hs. $/kWh	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
-RESTO (R) - 05 a 18hs. $/kWh	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
-VALLE (V) - 23 a 05hs. $/kWh	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000

	T2 Especial
Cargo Comercialización $/mes	172,429
Cargo Fijo $/mes	63,962
Cargo Variable $/kWh	1,4164

Tarifa - RIEGO AGRICOLA (RA)

	Tarifa de Referencia (1)(2)				Pago DISTRIBUIDORA (3)			
	TRA BT		TRA MT		TRA BT		TRA MT	
	Pot. hasta 300 kW	Pot. desde 300 kW	Pot. hasta 300 kW	Pot. desde 300 kW	Pot. hasta 300 kW	Pot. desde 300 kW	Pot. hasta 300 kW	Pot. desde 300 kW
CARGO FIJO $/mes	---------	---------	---------	---------	379,941	379,941	3619,897	3619,897
USO DE RED $/kW-mes	---------	---------	---------	---------	48,293	48,293	31,246	31,246
CONSUMO DE ENERGÍA								
-Alta (de 14 a 23 hs.) $/kWh					0,6336	0,6336	0,3847	0,3847
-Baja (de 23 a 14 hs.) $/kWh					0,0000	0,0000	0,0000	0,0000

(1) - [illegible]

(2) - [illegible]

(3) - La "Tarifa Pago a Distribuidora" es la que recibe la distribuidora por prestar el servicio eléctrico.

Tarifa - PEAJE

CONECTADO A LA RED DE DISTRIBUCIÓN y BORNES DEL TRANSFORMADOR

	TP BT		TP MT/BT		TP MT		TP AT/MT		TP AT	
	Pot. mayores a 10 kW y menores a 300	Pot. desde 300 kW	Pot. mayores a 10 kW y menores a 300	Pot. desde 300 kW	Pot. mayores a 10 kW y menores a 300 kW	Pot. desde 300 kW	Pot. mayores a 10 kW y menores 300	Pot. desde 300 kW	Pot. mayores a 10 kW y menores 300	Pot. desde 300 kW
USO DE RED $/kW-mes	478,862	478,862	402,803	402,803	375,549	375,549	288,969	288,969	207,086	207,086
CONSUMO DE POTENCIA $/kW-mes	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
TRANSP. DE OTROS AGENT $/kW-mes	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
CONSUMO DE ENERGÍA										
-PICO (P) - 18 a 23hs. $/kWh	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
-RESTO (R) - 05 a 18hs. $/kWh	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
-VALLE (V) - 23 a 05hs. $/kWh	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000

BT: Baja Tensión; MT: Media Tensión; AT: Alta Tensión.

Fig. 11. Example of tables on companies' own distribution costs. EPRE.
Source: EPRE.

each jurisdiction. It is worth noting that, in line with Giuliano et al. (2020), our estimates indicate that the social tariff is relatively pro-poor, with significantly higher coverage among the poorest households. There are some exclusion errors in the low-income deciles and large inclusion errors in the medium- and high-income deciles.

A.6. Distributional incidence of VAT in Argentina

See Fig. 12.

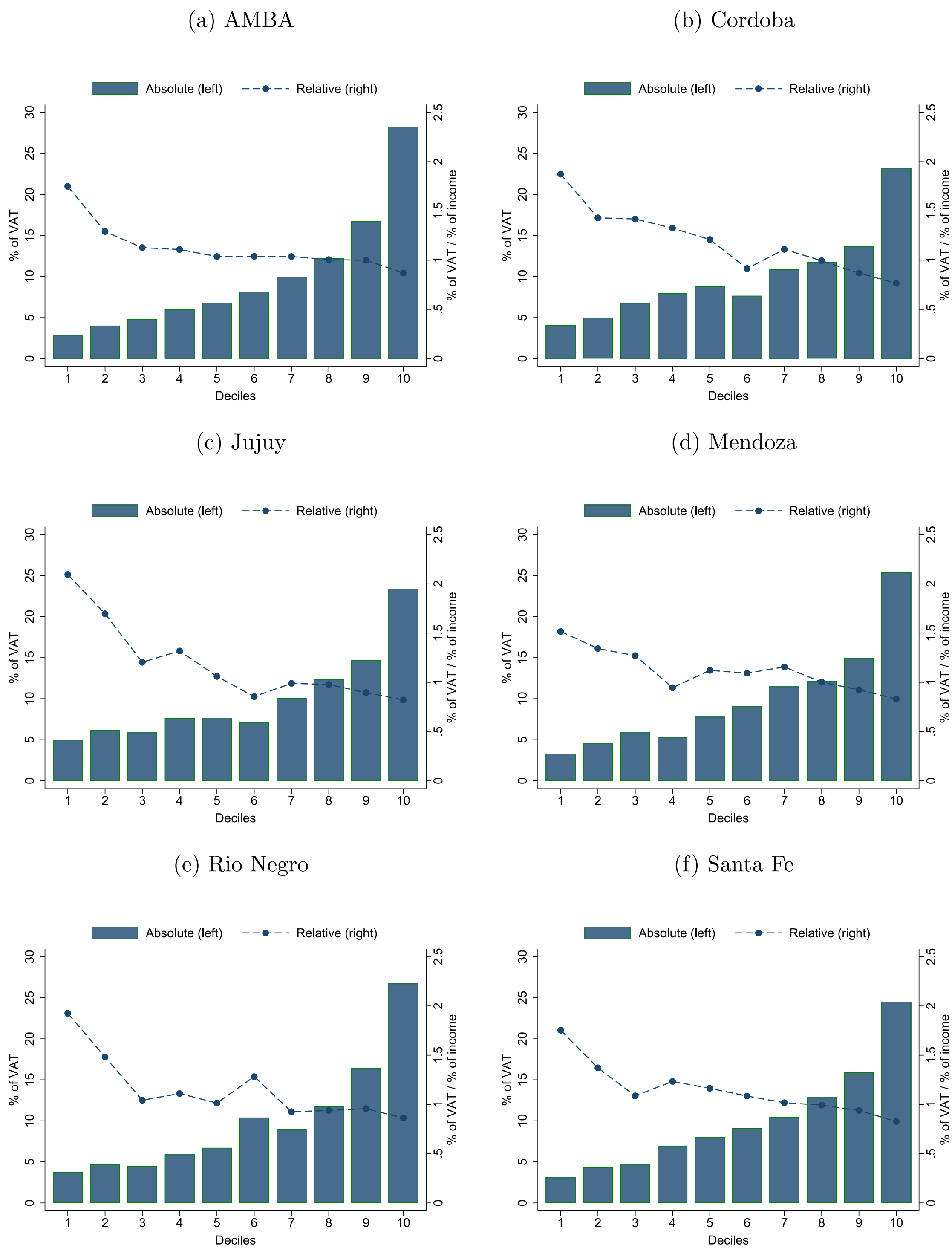


Fig. 12. Distributional incidence of the VAT in Argentina. Selected jurisdictions, 2018. In absolute and relative terms.
Notes: All values are weighted using the population expansion factor.
Source: Own elaboration based on ENGHo 2017–18 and Fernández Felices et al. (2016).

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