

ELECTRICITY EXPENSES AND FOOD INSECURITY IN BRAZILIAN HOUSEHOLDS

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Overview

Despite advances in access to modern energy through the implementation of public electrification policies and increased income levels, Brazil still faces challenges related to energy access [1]. A significant number of Brazilian households encounter difficulties in accessing basic energy services, which is linked to a higher proportion of this type of expense in their budgets. Families in this situation become more susceptible to the correlation between increased energy expenditure and reduced calorie intake [2] [3].

The cost of residential electricity in Brazil has continuously risen since 2014, attributed to a combination of crises, climate factors, and the characteristics of the Brazilian electricity sector. Alongside this context of escalating prices, there is an increase in household electricity consumption due to public policies and the economic improvement experienced in the country in recent decades [1].

The primary objective of the paper is to assess the extent to which people's nutrition can be impacted due to the substantial share of electricity expenses in family income. Seeking to contribute to the literature by establishing this relationship we use the Brazilian Consumer Expenditure Survey data. With around 36% of the population in a condition of food insecurity¹, Brazil is an interest case study as the country has a nature of the energy expenditures which, unlike other countries, is not primarily due to the effects of high energy demands in winter and summer but is predominantly a structural economic issue involving the evolution of household income and expenditures and the rise in electricity prices.

Methodology

The correlation between the share of electricity expenses and food insecurity can be delineated through three channels: i) Causality – greater expenditure on electrical energy leads to a reduction in expenditure on food; ii) Reverse causality – families with food insecurity tend to have a lower level of income; iii) Lack of causality – the relationship between electricity expenses and food insecurity is due to other potential sources that affect both variables.

This study aims to present diverse perspectives on the impact of the portion of electricity expenditure on the household disposable income and the food basket choices. Probability models, incorporating both binary and multinomial categorical dependent variables, are employed. Multinomial models are specifically designed for dependent variables with more than two categories that a hierarchical order is absent. Given the inherent stratification in food insecurity, the chosen multinomial model is the ordered logit, categorising the phenomenon into four distinct levels ($M = 4$): food security, mild food insecurity, moderate, and severe food insecurity.

Food insecurity is classified across various degrees [2], ranging from mild to severe². Mild cases involve uncertainty in access and inadequate food quality. Moderate instances manifest as adults experience a quantitative reduction and disrupted eating patterns. In severe situations, the reduction extends to children, culminating in hunger becoming a household experience. Furthermore, it cannot be asserted with absolute

¹ Consumer Expenditure Survey (POF) from 2017-18.

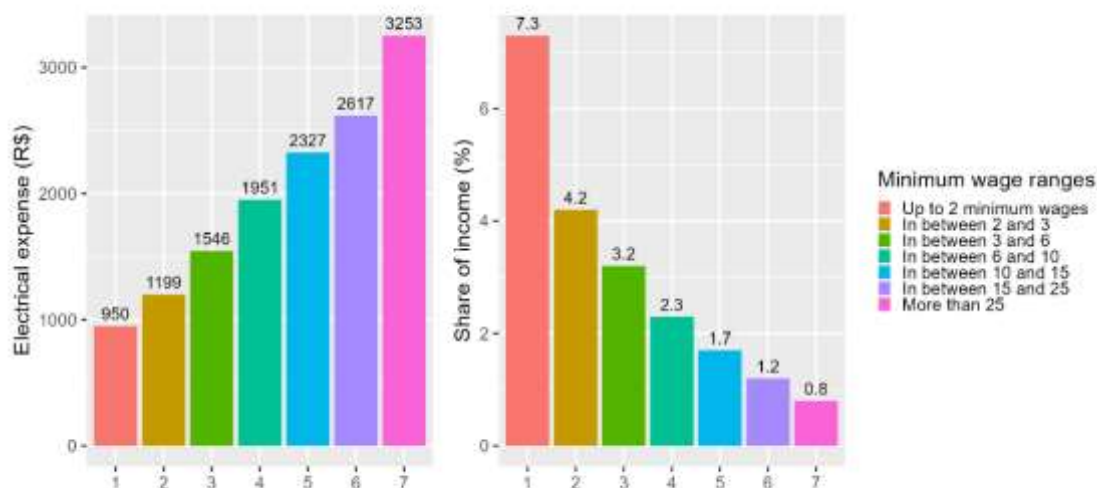
² Definition accordingly to IBGE (Brazilian Institute of Geographic and Statistics) Pesquisa de Orçamentos Familiares 2017-2018: Nota técnica 01/2021 - Análise da segurança alimentar no Brasil. Rio de Janeiro: IBGE, 2021.

certainty that control variables, which may be influenced by the dependent variable under study (food insecurity), can be selected without introducing bias into the estimated coefficients in logistic models. The use of the Instrumental Variables (IV) method becomes imperative, with the price of electricity serving as the instrumental variable.

Expected results

The expenditure and the proportion of electricity costs within the family budget vary significantly based on the income levels of Brazilian families, as illustrated in the Figure 1:

Figure 1: Average annual expense and electricity's share of income in Brazilian households



Source: Consumer Expenditure Survey (POF) from 2017-18.

The lower the family income³, the lower the electricity consumption, and the greater the share of this expense type in the budget. In such circumstances, families encounter a trade-off between essential expenditures, often resorting to strategies that maintain their energy expenditure, even if it means reducing the quantity and/or quality of food consumed [2] [3]. Unlike the electricity market, the food market faces fewer restrictions, offering opportunities for bargains and lower prices, even if this results in a deterioration of food supply [3]. Therefore, from various perspectives, the anticipated outcomes should reveal a positive and significant impact of energy vulnerability on food insecurity in Brazil.

By employing the selected methodology, it becomes possible to discern how food insecurity may be influenced by the energy vulnerability of families. This approach considers diverse angles on food insecurity while addressing the issue of endogeneity.

Conclusions

Brazil continues to grapple with a significant number of families vulnerable to energy challenges. These households are more prone to a trade-off between electricity and food. Anticipated results suggest that these families are more susceptible to experience food insecurity. This underscores the necessity to implement targeted public policies with the aim of reducing the proportion of electricity expenses within the budgets of energy-vulnerable families without jeopardizing access.

References

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³ The minimum wage for 2018 in Brazil was R\$954.00/month (US\$281.60/month; 20 April 2018).