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RESEARCH NOTES

AN INVESTIGATION OF ELECTRICITY TARIFF REFORM ON HOUSEHOLDS WELFARE

Fouzia SOHAIL*

Over the past few years, the Government of Pakistan has implemented significant reforms in the energy sector that directly impact the well-being of households in the country. These reforms include changes in electricity tariffs, resulting in a reduction of electricity subsidies and a gradual increase in prices for end-consumers. However, adjusting the policy to raise subsidized electricity tariffs is complex. Such an increase in tariffs reduces affordability for consumers and affects the overall welfare of households.

Despite the importance of this issue, there is limited research on the welfare implications of the recent rise in electricity tariffs caused by the gradual elimination of subsidies. A study titled 'Household Energy Poverty in Pakistan' was conducted to address this research gap. This study was supported by the 'Research for Social Transformation and Advancement' (RASTA), an initiative of the Pakistan Institute of Development Economics (PIDE), through the Competitive Grants Programme Award. Its main objective was to examine the crowding-out effect of increased electricity tariffs on the allocation of household resources at different income levels. The following research note is derived from the same study, which indicates that an increase in electricity tariffs negatively affects individuals by reducing the amount of income available for spending on other goods and services.

This research aimed to compare the affordability of electricity for households during two periods characterized by low and high tariff rates. To achieve the objective, data from the Household Integrated Economic Survey (HIES) of 2013-14 and 2018-19 were utilized because electricity tariffs were relatively lower in 2013-14 compared to 2018-19. The HIES 2018-19 survey was the most recent available at the time of the study.

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I. Background on Residential Electricity Tariff Reforms in Pakistan

Based on recent electricity consumption statistics provided by the Economic Survey (2020-21), the residential sector emerges as the largest consumer of electricity, accounting for 49.1 per cent of the total, followed by the industrial sector at 26.3 per cent. A report from the World Bank in 2014 revealed that approximately half of the subsidies in 2012-13 were allocated to the residential sector, with one quarter going to manufacturing and industrial sectors and the remainder distributed among other sectors. These statistics highlight the significant share of electricity consumption attributed to residential households, indicating that tariff reforms would have a profound impact on their well-being. Thus, it is essential to examine the gradual reform process implemented since 2008 before delving into the crowding-out effects of increasing electricity tariffs on household welfare.

According to data from the Ministry of Energy, before September 2008, residential households were subject to the highest standard tariff slab once their electricity consumption exceeded 1000 units. However, after September 2008, the highest tariff slab was implemented when consumption surpassed 700 units. This reduction of 300 units in the threshold for the highest tariff had a significant impact on household electricity expenditures.

Furthermore, in 2013-14, a notable structural modification was introduced, replacing the 'all-slab benefit' with the 'previous-slab benefit' policy. Under this new policy, households were subject to only two rates based on their electricity consumption.

According to data from K-electric and the Economic Survey, tariff rates are rising in correlation with the consumption of electricity units. However, Table 1 highlights a significant concern: the lowest slab, which represents the lifeline tariff slab, has experienced the highest growth in electricity tariff at 97 per cent between 2019 and 2021. This substantial increase is alarming. Furthermore, from 2008 to 2021, the lifeline slab witnessed the highest tariff rate increase at 182 per cent, which is a matter of concern. This tariff hike is particularly concerning because the lifeline tariff is intended to protect the poorest individuals. Existing literature suggests that even though

TABLE 1

Growth in Tariff Structure for the Residential Sector (per cent)

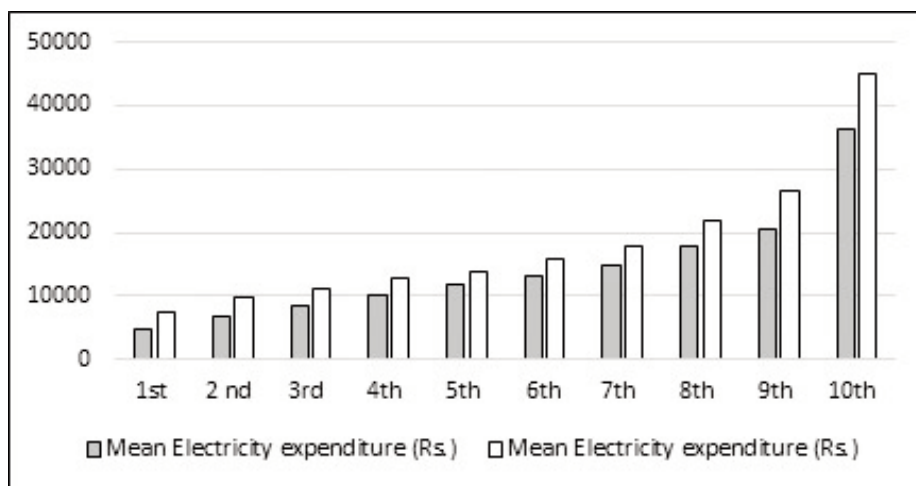
Slabs	≤ 50	1-100	101-200	201-300	301-700	≥700	Peak	Off-peak
From 2008-2021	182	140	105	148	166	143	166	223
From 2019-2021	97.5	34	24	19	10	8.7	8.7	12

Source: Authors' estimation using K-electric and Economic survey data.

lower-income groups consume less electricity, an increase in electricity prices would disproportionately impact their well-being, as argued by the World Bank in 2017.

II. Crowding-out Effect of Electricity Tariff Hikes on Households' Wellbeing

Considering the above reforms, the study reports a gradual increase in electricity consumption expenditure for income quintiles. In 2013-14, the average electricity expenditure for the lowest income quintile was less than Rs. 5000, which has increased by about 56 per cent and thus reached Rs. 7,632 in 2018-19. For the middle-income quintile, mean electricity expenditures were Rs. 12000 in 2013-14 and reached more than Rs. 14,000 in 2018-19, thus recording an 18.4 percentage point increase. While for the highest income quintile, electricity expenditure increased by more than 23 percentage points between the two periods (from Rs. 36,525 to Rs. 45,070).



Source: HIES 2013-14 & 2018-19.

FIGURE 1

Mean Electricity Expenditure by Income Quintiles

The study found the crowding out effect of increased electricity tariffs separately for urban and rural regions and various income groups.

For urban regions, an increase in the outlay of electricity leads to a fall in the budget shares devoted to health, transport, education, and restaurant. While it leads to a rise in share devoted to food & beverages, tobacco, clothing, communication, recreation, and housing & fuel (other than electricity). In rural Pakistan, an increase in electricity expenditure leads to a fall in the budget share of furniture, health, and restaurants. The results show serious implications on the quality of life and living standards of urban and rural households as expenditure on electricity leads the households to com-

TABLE 2
Crowding-in or Crowding-out by Region

Expenditure Category	Urban		Rural	
	Crowding-in	Crowding-out	Crowding-in	Crowding-out
Food & Beverages	✓		✓	
Tobacco	✓		✓	
Clothing & Footwear	✓		✓	
Furniture	✓			✓
Health		✓		✓
Transport		✓	✓	
Communication	✓		✓	
Recreation & Culture	✓		✓	
Education		✓	✓	
Restaurant		✓		✓
Housing, water & fuel	✓		✓	

Source: Authors' estimation.

promise, especially on health and education expenditure shares. The results show that household income declined in the real term because of the increase in electricity expenditure, increasing the budgetary share of most of the inelastic necessity goods like food, beverages and tobacco.

Table 3 shows the regression outcomes for the crowding out effect of electricity expenditure for various income groups. The heterogeneous crowding-out effect of electricity expenditure for various income groups is revealed. An increase in the outlay of electricity leads to a fall in the budget shares devoted to food, tobacco, recreation, and restaurant for low-income households. The crowding-out effect of electricity expenditure on middle-income households is the most significant. An increase in electricity expenditure crowded out almost all the allocated shares for various expenditures except for clothing, recreation, and education. For high-income households, increased electricity expenditure crowded out health, transport, and restaurant expenditure.

TABLE 3

Crowding-in and Crowding-out by Income Group

Expenditure Category	Low-Income Households		Middle-Income Households		High-Income Households	
	Crowding- in	Crowding- out	Crowding- in	Crowding- out	Crowding- in	Crowding out
Food & Beverages		✓		✓	✓	
Tobacco		---		✓	✓	
Clothing & Footwear	✓		✓		✓	
Furniture	✓			✓	✓	
Health	✓			✓		✓
Transport	---			✓		✓
Communi- cation	✓			---	✓	
Recreation & Culture		✓	✓		✓	
Education	✓		✓		✓	
Restaurant		✓		✓		✓
Housing, water & fuel	✓		✓			---

Source: Authors' estimation.

III. Concluding Remarks and Policy Implication

The most important point found in the study is that the size of crowding in and crowding out effects are greater for poor households. It has been demonstrated that electricity expenditures crowded out food expenditures in lower and middle-income households while crowded-in for higher-income group households. However, the size of crowding out effects is higher for the poorest percentiles. Health expenditures are crowded out at all income levels.

Hence, it is suggested that electricity tariff reforms, with the nonexistence of adequate compensatory mechanisms like health compensation, insurance, or other public

provision of finances, could lead to welfare loss, particularly among poor households. Hence, inadequate measures by the Government could adversely affect human capital investments crucial for long-term prosperity. It has also been learned from the experience of other countries that the successful implementation of reforms was accompanied by compensation packages for the poor and increased service quality and reliability for households paying higher prices.

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