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ABSTRACTS

An Empirical Study of Electricity Theft from Electricity Distribution Companies in Pakistan

FAISAL JAMIL and EATZAZ AHMAD

Electricity theft is a common problem in many countries and energy worth billions of dollars is stolen annually from electricity grids. The problem has socioeconomic, political, environmental and technical roots, but the solution is generally sought solely through technical measures. This paper empirically investigates the effects of various factors including electricity price, per capita income, probability of detection, fines collected from offenders, weighted temperature index and load shedding, that may explain the theft. The study employed annual panel data obtained from nine electricity distribution companies in Pakistan for the period 1988–2010. The study estimates the Fixed Effects models through the least squares dummy variable (LSDV) technique and Generalised Method of Moments (GMM). Our results indicate that per capita income has significant negative and electricity price a positive effect on electricity theft with sufficiently high coefficient values. The probability of detection variable appears with a positive sign in both estimations indicating a poor deterrence. The results of LSDV show a positive impact of fine on conviction on electricity theft. But in GMM estimation, this variable appears with a right sign. The results from both models are robust in the case of load shedding and temperature variables. The findings show that economic variables are most significant in explaining electricity theft. The findings may also be applicable in other developing countries where hefty amounts of revenues are lost due to electricity theft.

Keywords: Electricity Theft, Fixed Effects Model, Pakistan

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Macro-economic Policies and Energy Security—Implications for a Chronic Energy Deficit Country

INAYAT U. MANGLA and JAMSHED Y. UPPAL

The paper assesses the energy sector's foreign exchange requirements for meeting energy consumption and for capital expenditures, and identifies its implications for the country's macroeconomic policy and management. We develop a conceptual model for projecting the energy sector's long-term requirements for foreign exchange. The model indicates that the country's chronic dependence on oil imports is likely to expose the economy to high and volatile oil prices. A fundamental issue for Pakistan is how the energy projects requiring large inflows of foreign capital and technology will be financed. The main implication of our analysis is that there will be continuing pressure on the country's foreign exchange resources. The demand for foreign exchange by the year 2024-25 is projected to be US$ 20-21 billion without the FDI in new power generation. However, when we include the requirements of foreign exchange for capital expenditure, the total FX requirements are in the range of US$ 23-24 billion. An implication of the country's chronic energy deficiency is that the macroeconomic policies, particularly the foreign exchange rate policy, need to be redefined to reflect the projected demands on hard currencies and their expected scarcity value. It is likely that Pakistan will remain dependent on foreign imports to meet its energy requirements for a long time and will need to generate commensurate foreign exchange resources to ensure long-term energy security.

JEL classification: E66, F37, Q43
Keywords: Macroeconomic Policy, Exchange Rate Policy, Energy Security

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Burning of Crop Residue and its Potential for Electricity Generation

TANVIR AHMED and BASHIR AHMAD

This paper identified the factors influencing the rice crop residue burning decision of the farmers and the potential of the burnt residue to generate electricity. For this study, data were collected from 400 farmers in the rice-wheat cropping system. Effects of different variables on the burning decision of rice residue are investigated through logit model. A number of factors had significant effects on the burning decision of crop residue. These included farming experience of the farmer, Rajput caste, farm size, owner

operated farm, owner-cum-tenants operated farm, silty loam soil type, livestock strength, total cost associated with the handling of residue and preparation of wheat field after rice, availability of farm machinery for incorporation, use of residue as feed for animals, use of residue as fuel, intention of the respondent to reduce turnaround time between harvesting of rice and sowing of wheat, convenience in use of farm machinery after burning of residue and the geographic location of farm. The overall quantity of rice straw burnt is estimated to be 1704.91 thousand tonnes in the rice-wheat cropping areas with a potential to generate electric power of 162.51 MW. This power generation from crop residues would be a source of income for the farmers along with generation of additional employment opportunities and economic activities on sustainable basis. In order to minimise the cost of haulage of rice straw, installation of decentralised power plants at village level would be a good option. Further, use of rice crop residue as an energy source can help in reducing foreign exchange requirements for import of furnace oil.

JEL Classification: O44, Q12, Q16, Q42, Q48
Keywords: Bioenergy, Crop Residue, Electricity, Energy, Growth, Rice

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Mitigating Vulnerability to Oil Price Risk—Applicability of Risk Models to Pakistan's Energy Problem

JAMSHED Y. UPPAL and SYEDA RABAB MUDAKKAR

The paper examines the prospects of reducing the price risk of Pakistan's oil imports through hedging in the oil futures market. The paper evaluates the ex-ante cross hedge strategies over the 1990–2013 period using 1–4 months futures NYMEX in order to see how to reduce price risk? Our results indicate that in all cases except one, ex-ante hedging would have been effective in reducing price risk. We provide quantitative estimates of the return/risk trade-offs from hedging Pakistan's oil imports, and find that futures hedging offers the country significant risk-reduction potential.

Keywords: Risk-return Trade-off, Hedging, Oil Prices
JEL Classification: G100, G130

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