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The Economic Effects of Electricity Deregulation: An Empirical Analysis of Indian States

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As developing countries across the world seek to improve their economic prospects, the reform of the electricity sector has been widely viewed as a central part of this effort; millions of households in developing countries lack access to electricity, and developing economies such as India face crippling shortages of energy, severely limiting the growth of the industrial sector, and the consequent economic development of their populations. Electricity provision in developing countries has in the past typically been carried out by large, monolithic, state-owned and operated enterprises, which handled the functions of generation, transmission and distribution of electricity. Reform in the very basic sense entails the splitting up of these state-owned enterprises into smaller companies, each specifically dealing with the functions of generation, transmission or distribution; it is particularly possible to have two or more competing companies in the functions of generation and distribution, thus introducing an element of competition into the sector, and bringing in competitive prices and greater consumer choice. Reform is almost always accompanied by legislation and other specific policy measures, usually implemented in a sequence, to facilitate competitive economic outcomes. Past assessments of the outcomes of such reform have been confined to extremes, either occurring at the macroeconomic or country-wide level, or at the level of a single enterprise. There has been much less research on outcomes within the same country, at a comparative regional level. India presents a unique opportunity for the study of the outcomes of developing-country reform, as whilst its states share a common economic and political system, electricity policy is decentralised, giving each state considerable flexibility in how it implements reform, thus facilitating a comparative assessment of alternative approaches. Further, a study on India overcomes the common hurdles faced in

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cross-country studies of reform, such as cost conversions, currency conversions, and differing political systems, allowing a greater degree of control and clarity over the design of an empirical study and its results. Electricity reforms in India were initiated in 1991, the electricity sector has long been subject to political influence, that, we argue in this analysis, has tended to affect reform outcomes.

This study thus contributes to existing empirical literature through an econometric analysis of the determinants and impact of electricity reform in India, giving special regard to its political economy and regional diversity. It begins by identifying the gap in empirical assessments of reform, and goes on to review existing literature on the macroeconomic impacts of electricity reform in terms of key variables; a set of commonly-observed outcomes is drawn from this literature, in terms of changes in the efficiency with which the sector functions, in prices for end-consumers, in the pricing mechanisms used to value electricity, in the level of capital that is reinvested into the system network to improve the quality of supply of electricity, and in the response of specific consumer segments (mainly industry) to electricity sector reform by way of changes in their levels of consumption, and by extension, in their levels of investment. A set of appropriate hypotheses are put forward, for each of these commonly-observed outcomes, for the case of Indian states. Data was collected for each of these economic variables, and also for variables representing the extent of implementation of reform, for each of 29 Indian states, over a time series spanning approximately 1991-2007, which covers the entire period of reform. Techniques from the econometric analysis of panel data were then applied to the data, to investigate each of the hypotheses being proposed, as this technique allows us to analyse data across states whilst accounting for their inherent differences, and factors other than reform, which have tended to influence the outcomes on economic variables.

Results show that individual reform measures have affected key economic variables differently; thus the nature of reform in individual states would determine these economic outcomes. The outcomes were counterintuitive to those observed in developed economies, and were often adverse in the initial stages of reform; reform programmes were seen to require reaching a certain 'baseline' level of reform in order for adverse outcomes to either stabilise or improve, and our results show that this baseline possibly occurs after the implementation of more than half of the measures in a structure reform programme. These results are presented graphically. We argue that the adverse outcomes seen in the initial stages of reform can be attributed to the fact that previously hidden distortions become revealed in these initial stages, which can be traced as originating from decades of mismanagement of formerly

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state-owned electricity enterprises, and political economy of the electricity sector in India. Our methodology of assessment could be applicable to assessments of electricity reform other developing countries with similar federal structures, and our results could contribute towards policy debate.

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