Differential Effects of Natural Gas Prices on Electricity Consumers

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ABSTRACT

1 Introduction

This paper analyses the differential effects on electricity consumers of the shale gas revolution in the United States, which reduced the delivered price of natural gas to the US power sector by about 60 percent. The reduction in the price of natural gas improved the competitiveness of natural gas-fired power plants. This increase in competitiveness of the gas powered plants leads to fuel switching by US power plants, which reduced the cost of electricity production. Because of considerable differences in the regulation of the electricity markets across states, the retails price effects of the cost reduction is expected to differ among states with different regulatory regimes.

This paper analyses the effects of the electricity retail prices of the shale gas revolution among states with different regulatory regimes. We compare the changes in retail residential, commercial, and industrial prices among states with wholesale markets access, states with both wholesale market access and retail choice, and states with a tradition vertically-integrated provider (rate-of-return regulation) to study the differential effects of the shale gas revolution on consumers.

2 Data and Empirical Method

We use annual electricity retail price, revenue, and sales data for residential, industrial, and commercial customers for the 50 states in the United States and the District of Columbia. We combine this data with generation and energy source data for each state. Both data were obtained from the Energy Information Administration (EIA) website. Data on electricity wholesale and retail market restructuring were obtained from the EIA, the Federal Energy Regulation Commission (FERC), and many literature on electricity market restructuring (e.g., (Craig and Savage, 2013)).

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3 Model

We present a difference-in-difference model of the average electricity price by customer class – residential, industrial, and commercial – in each state. There are two treatment variables. The first treatment group is made up of states with only access to the wholesale market ("partial competition") defined by the presence of RTO’s or ISO in the wholesale electricity marketplace. The next treatment group includes states with wholesale market access and retail choice ("full competition") allowing consumers to decide whether to buy from the main utility company or a competitive fringe. The control group is made up of states with a monopoly vertically-integrated provider regulated under rate-of-return regulation.

4 results and conclusion

The results of the empirical analysis reveal significant retail price reduction for states with both wholesale market and retail market access ("full competition") compared to states with a vertically-integrated provider. There is, however, no significant difference in price changes between states with only wholesale competition and states with a monopoly vertically-integrated provider. The analysis, therefore, shows that the FERC’s main reason for electricity market restructuring, to "remove impediments to competition in the wholesale bulk power marketplace and bring more efficient, lower cost power to the Nation’s electricity consumers" may not be achieved under "partial competition". The cost reductions and the improvement in efficiencies at the power plants as a result of restructuring might not be passed on to consumers in the form of lower prices if states have only wholesale market restructuring. Retail choice is essential if cost reductions at the power plants are to be passed on to final consumers.

References