Residential Electricity Demand in Germany

by

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Estimates of residential demand for electricity have been rather neglected in recent years in developed countries such as Germany. To a some extent this development can be explained by the deregulation process in these electricity markets, which led to fundamental changes and induced researchers to focus on supply side issues rather than on the demand for electricity (see Pickhardt 2005; Niederprüm and Pickhardt 2002). Yet, for at least two reasons demand side issues should receive some attention with respect to the German electricity market: (i) the long run need for an efficient use of primary and secondary energy makes it necessary to reconsider the demand for electricity with a view to identify potentials for savings in electricity consumption, (ii) the political agreement to replace all German nuclear power plants in the foreseeable future and a growing share of renewables as a primary energy source for electricity generation may cause future load planning problems, so that demand side management (load management, smart metering, etc.) is bound to play an increasingly important role in the foreseeable future.

In general, two approaches for estimating residential electricity demand can be distinguished. The first uses aggregate data and the second microeconomic data at the household level (see Halicioglu 2007, for a brief overview of recent studies). Following Erdogdu (2007), Narayan and Smyth (2005), Kamerschen and Porter (2004) and others, I use an aggregate or macro approach. In particular, I estimate the residential demand for electricity in Germany with annual data for the period 1974 to 2006 and address the issue of cointegration with an ARDL error correction model. The short term model passes all relevant diagnostic tests. Based on these estimates I also forecast residential electricity demand up to 2020.

Conclusions are drawn in the final section of the paper. Among other things, they include that the variable ‘unemployment’ is significant in determining electricity demand in Germany

and that ‘income per capita’ is the most important variable for residential electricity demand in Germany. Also, the error correction coefficient suggests that about 35 percent of a shock is absorbed in the first year, which points to a rather fast adjustment process.

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