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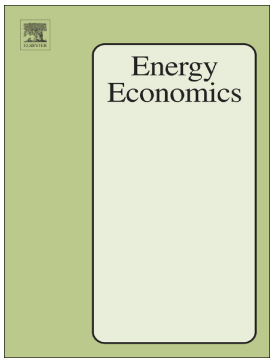

Dynamic Multilevel Modelling of Industrial Energy Demand in Europe

Akinsehinwa Sharimakin, Anthony J. Glass, David S. Saal, Karligash Glass

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ABSTRACT

Previous studies of industry level energy demand have not accounted for the hierarchical nesting of industries within a system that also adequately allows for country specific determinants of energy demand. The principal contribution of this paper is therefore to analyse energy demand for European industries over the period 1995-2007 using a dynamic multilevel model that accounts for this hierarchical data structure. Among other things, we find, firstly, that our dynamic multilevel model suggests that if industry income and the industry energy price increase by 10%, long run energy demand will increase by 8.1% and fall by 6.8%, respectively. Secondly, we find that the corresponding long run income and price elasticities are substantially larger in a standard dynamic model of industry level energy demand which does not account for the hierarchical data structure. Our results therefore suggest that not accounting for the hierarchical data structure results in unreliable estimates of energy demand elasticities. From a policy perspective we argue that it is imperative that future industry level energy demand studies account for the hierarchical structure of the data. This is to prevent energy policy making being based on industry level evidence that substantially inflates the responsiveness of long run energy demand to income and price changes.

Keywords: Multilevel modelling, Industrial energy demand, European countries, Long-run elasticities.

JEL classification:
C2
D2
Q4

* Corresponding author, School of Business and Economics, Loughborough University, United Kingdom. Email: A.Sharimakin@lboro.ac.uk

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