Modelling Underlying Trends in OECD Energy Demand: Deterministic Vs Stochastic?

Lester C. Hunt

Surrey Energy Economics Centre (SEEC)
Department of Economics
University of Surrey,
Guildford, Surrey
GU2 7XH, UK
Tel: +44(0)1483 686956
Email: L.Hunt@surrey.ac.uk

Frederick L. Joutz*

Research Program in Forecasting
Department of Economics
George Washington University
Washington, DC
20052-0001, USA
Tel: + 1 202-994-4899
Email: bmark@gwu.edu

(* = Corresponding Author)

Abstract

1. Overview

The way 'technical progress' (or an improvement in 'energy efficiency') is captured when modeling energy demand has been debated in the literature for some time (see for example Beenstock and Willcocks, 1981& 1983, Kouris, 1983a & 1983b, Jones, 1994, Hunt, et al., 2003a & 2003b). A key aspect of this debate is whether a deterministic trend is an adequate vehicle for capturing technical progress. More recently a stochastic trend framework based on the Structural Time series Model (STSM) of Harvey (1989) has been advocated as an alternative way of capturing technical progress (and other exogenous factors).

In a recent paper Al-Rabbaie and Hunt (2005) found non-linear underlying trends when using the STSM for estimating energy demand functions for a number of OECD countries. However, only limited testing was undertaken to see if the stochastic trends were statistically superior to the more traditional deterministic trends. This paper attempts to correct this by estimating energy demand relationships for a number of OECD countries (Austria, Belgium, Canada, Denmark, France, Greece, Ireland, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, the UK and the USA) over the period 1960 – 2003 and 'formerly' testing between the deterministic and stochastic trend formulations.

Lester C. Hunt is Professor of Energy Economics and Director of the Surrey Energy Economics Centre (SEEC) in the Department of Economics, University of Surrey, UK. He has previously held academic posts at the University of Essex, University of Wales Swansea, and the University of Portsmouth and has also worked as an Economic Advisor at the U.K. Treasury and as an Energy Analyst and Economist for the former electricity company Midlands Electricity plc..

Frederick L. Joutz is Professor of Economics and Director of the Research Program on Forecasting at The George Washington University. He contributes quarterly forecasts of nearly 25 U.S. macroeconomic variables to the Survey of Professional Forecasters (formerly the ASA/NBER Quarterly Outlook) and the Economic Survey International ESI by the CES/IFO Institute. In addition, he has been an associate editor of Energy Economics and the International Journal of Forecasting. He has served as a consultant and technical expert to the U.S. Energy Information Administration, American Gas Association, IMF, and private firms.