

The Asymmetric Effects of Changes in Price and Income on Energy and Oil Demand

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Abstract

This paper estimates the effects on energy and oil demand of changes in income and oil prices, for 96 of the world's largest countries, in per-capita terms. We examine three important issues: the asymmetric effects on demand of increases and decreases in oil prices; the asymmetric effects on demand of increases and decreases in income; and the different speeds of demand adjustment to changes in price and in income. Its main conclusions are the following: (1) OECD demand responds much more to increases in oil prices than to decreases; ignoring this asymmetric price response will bias downward the estimated income elasticity; (2) demand's response to income decreases in many non-OECD countries is not necessarily symmetric to its response to income increases; ignoring this asymmetric income response will bias the estimated income elasticity; (3) the speed of demand adjustment is faster to changes in income than to changes in price; ignoring this difference will bias upward the estimated response to income changes. Using correctly specified equations for energy and oil demand, the long-run elasticity for increases in income is about 0.55 for OECD energy and oil, and 1.0 or higher for Non-OECD Oil Exporters, Income Growers and perhaps all Non-OECD countries. These income elasticity estimates are significantly higher than current estimates used by the US Department of Energy. Our estimates for the OECD countries are also higher than those estimated recently by Schmalensee-Stoker-Judson (1998) and Holtz-Eakin and Selden (1995), who ignore the asymmetric effects of prices on demand. Higher income elasticities, of course, will increase projections of energy and oil demand, and of carbon dioxide emissions.

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