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Pages 1-30

Should Automobile Fuel Economy Standards be Tightened?

By Carolyn Fischer (Resources for the Future), Winston Harrington (Resources for the Future) and Ian W.H. Parry (Resources for the Future)

Abstract

This paper develops analytical and numerical models to explain and estimate the welfare effects of raising Corporate Average Fuel Economy (CAFE) standards for new passenger vehicles. The analysis encompasses a wide range of scenarios concerning consumers' valuation of fuel economy and the full economic costs of adopting fuel-saving technologies. It also accounts for, and improves estimates of, CAFE's impact on externalities from local and global pollution, oil dependence, traffic congestion and accidents. The bottom line is that it is difficult to make an airtight case either for or against tightening CAFE on pure efficiency grounds, as the magnitude and direction of the welfare change varies across different, plausible scenarios.

Pages 31-46

Oil Shocks and Real U.S. Income

by Hillard G. Huntington (* Executive Director, Energy Modeling Forum, Stanford University, Stanford, CA)

Abstract

The analysis explains how previous oil shocks have affected real U.S. income. Real income differs from aggregate economic output (GDP) because it includes the purchasing power losses associated with more expensive imported

petroleum. Real income declines immediately during the same quarter as the oil price shock as opposed to the output effects, which are lagged over several quarters. These immediate losses can be significant, reaching as much as 1.7% of the baseline value in the same quarter, for a doubling of crude oil prices. Expanding coverage to include purchasing power losses allows policy analysts to evaluate a range of different policy instruments that can influence oil prices, such as the building and release of the strategic petroleum reserve.

Pages 47-72

The Efficiency and Robustness of Allowance Banking in the U.S. Acid Rain Program

By A. Denny Ellerman (Center for Energy and Environmental Policy Research (CEEPR) and the Sloan School of Management, Massachusetts Institute of Technology (MIT)) and Juan-Pablo Montero (Department of Economics, Pontificia Universidad Catolica de Chile, and visiting professor at Sloan School of Management)

Abstract

This paper provides an empirical evaluation of the efficiency of allowance banking in the nationwide market for sulfur dioxide (SO₂) emission allowances that was created by the U.S. Acid Rain Program. We develop a model of efficient banking, select appropriate parameter values, and evaluate the efficiency of observed temporal pattern of abatement based on aggregate data from the first eight years of the Acid Rain Program. Contrary to the general opinion that banking in this program has been excessive, we find that it has been reasonably efficient. We also identify the erroneous assumptions underlying the earlier view and the conditions required for efficient banking to exist independently of changes in the counterfactual, an attribute we call robustness. These results show that firms use banking provisions in a rational and predictable way and that, at least in the US Acid Rain Program, there is no support for the often expressed concern that banked permits will be used all at once to create emissions spikes.

Pages 73-100

A Quantitative Analysis of the Relationship Between Congestion and Reliability in Electric Power Networks

by Seth Blumsack (Tepper School of Business, Carnegie Mellon University, Pittsburgh PA), Lester B. Lave (Tepper School of Business and Department of Engineering and Public Policy, Carnegie Mellon University) and Marija Ilic (Departments of Electrical and Computer Engineering, and Engineering and Public Policy, Carnegie Mellon University)

Abstract

Restructuring efforts in the U.S. electric power sector have tried to encourage transmission investment by independent (non-utility) transmission companies, and have promoted various levels of market-based transmission investment. Underlying this shift to “merchant” transmission investment is an assumption that new transmission infrastructure can be classified as providing a congestion-relief benefit or a reliability benefit. In this paper, we demonstrate that this assumption is largely incorrect for meshed interconnections such as electric power networks. We focus on a particular network topology known as the Wheatstone network to show how congestion and reliability can represent tradeoffs. Lines that cause congestion may be justified on reliability grounds. We decompose the congestion and reliability effects of a given network alteration, and demonstrate their dependence through simulations on a 118-bus test network. The true relationship between congestion and reliability depends critically on identifying the relevant range of demand for evaluating any network externalities.

Pages 101-128

Carbon Capture Retrofits and the Cost of Regulatory Uncertainty

by Peter S. Reinelt (Department of Economics, State University of New York, Fredonia, USA) and David W. Keith (Energy and Environmental Systems Group, University of Calgary, 2500 University Drive NW, Calgary, AB, Canada)

Abstract

Power generation firms confront impending replacement of an aging coal-fired fleet in a business environment characterized by volatile natural gas prices and uncertain carbon regulation. We develop a stochastic dynamic programming model of firm investment decisions that minimizes the expected present value of future power generation costs under uncertain natural gas and carbon prices. We explore the implications of regulatory uncertainty on generation technology choice and the optimal timing of investment, and assess the implications of these choices for regulators. We find that interaction of regulatory uncertainty with irreversible investment always raises the social

cost of carbon abatement. Further, the social cost of regulatory uncertainty is strongly dependent on the relative competitiveness of IGCC plants, for which the cost of later carbon capture retrofits is comparatively small, and on the firm's ability to use investments in natural gas generation as a transitional strategy to manage carbon regulation uncertainty. Without highly competitive IGCC or low gas prices, regulatory uncertainty can increase the expected social cost of reducing emissions by 40 to 60%.

Pages 129-142

Technology Treaties and Fossil-Fuels Extraction

by Jon Strand (Fiscal Affairs Department, International Monetary Fund, Washington, DC and Department of Economics, University of Oslo)

Abstract

We consider some unintended effects of a “technology treaty” to increase the (stochastic) possibility of developing an energy alternative to fossil fuels which, when available, makes fossil fuels redundant. One implication of such a treaty is to increase the incentives for fossil-fuels producers to extract fossil fuels existing in given quantity more rapidly, under competition when the equilibrium price path for fossil fuels follows Hotelling's rule. When the treaty may result in the new technology being immediately available, the expected resource extraction path is accelerated for an initial period, in simulations for 5-10 years, despite fossil fuels being phased out when the new technology appears. When there is a minimum (10-year) lag from treaty signing to technology implementation, expected extraction is speeded up for a longer period, 12-15 years. We discuss the implications of such treaties for global carbon emissions, which are not necessarily positive.

Pages 143-170

Vehicle Ownership and Income Growth, Worldwide: 1960-2030

By Joyce Dargay (Institute for Transport Studies, University of Leeds, Leeds, England), Dermot Gately (Dept. of Economics, New York University, 19 W. 4 St., New York, NY, USA) and Martin Sommer (International Monetary Fund, Washington, DC, USA)

Abstract

The speed of vehicle ownership expansion in emerging market and developing countries has important implications for transport and environmental policies, as well as the global oil market. The literature remains divided on the issue of whether the vehicle ownership rates will ever catch up to the levels common in the advanced economies. This paper contributes to the debate by building a model that explicitly models the vehicle saturation level as a function of observable country characteristics: urbanization and population density. Our model is estimated on the basis of pooled time-series (1960-2002) and crosssection data for 45 countries that include 75 percent of the world's population. We project that the total vehicle stock will increase from about 800 million in 2002 to more than two billion units in 2030. By this time, 56% of the world's vehicles will be owned by non-OECD countries, compared with 24% in 2002. In particular, China's vehicle stock will increase nearly twenty-fold, to 390 million in 2030. This fast speed of vehicle ownership expansion implies rapid growth in oil demand.

BOOK REVIEWS

Pages 171-172

Natural Gas and Geopolitics From 1970 to 2040

by D. G. Victor, A. M. Jaffe, and M.H. Hayes (Cambridge University Press)
(Book Review by Anna Pechatnikov)

Pages 173-177

The Age of Oil: The Mythology, History, and Future of the World's Most Controversial Resource,

by Leonardo Maugeri (Westport: Greenwood Publishing Group, 2006)
(Book Review by Justin Dargin)