

Workshop

Developments in Energy Economics

Madrid, 28 January 2016

Thursday, 28 January

- 10.00 **Welcome and introduction**
Gonzalo Sáenz de Miera, AEEE
- 10.05 – 10.50 **New methods to evaluate key variables in energy markets**
José M. Labeaga, UNED
- 10.50 – 11.35 **Output-based allocations in pollution markets under uncertainty and self-selection**
Juan-Pablo Montero, PUC Chile
- 11.35 – 12.00 Coffee
- 12.00 – 12.45 **Overlapping strategies for reducing carbon emissions from the personal transportation sector**
Carolyn Fischer, RFF and FEEM
- 12.45 – 13.00 **Presentation of the Supplemental Issue of Energy Economics (2015): 6th Atlantic Workshop on Energy and Environmental Economics**
Xavier Labandeira, Economics for Energy

New methods to evaluate key variables in energy markets | *José M. Labeaga, UNED*

This talk has two main aims: first, we describe some publicly available data with information about the evolution of energy markets; second we present some methods to deal with these kind of data (big data) in order to evaluate several key market variables. Our first exercise takes data from Global Database of Events, Language, and Tone (GDELT) to built sentiment indicators. The GDELT Project consists of over a quarter-billion event records in over 300 categories covering the entire world from 1979 to present, along with a massive network diagram connecting every person, organization, location, and issue to this event database. Nowadays, social networks are gaining in strength and are even influencing key variables in financial markets or markets of goods and services. Energy markets are not an exception. In Spain, the growing demand for affordable, reliable, domestically sourced, and low-carbon electricity is a matter of concern and it is driven by several causes including public policy priorities. Policy objectives and new technologies are changing wholesale market design. The analysis of different aspects of energy markets is increasingly on the agendas of academics, firms' managers or policy makers. Some concerns are global and are related to the evolution of climate change phenomena. Others are regional or national and they strongly appear in countries like Spain with a high dependence on foreign energy sources and high potential of domestic renewable energy sources. We can find a relevant case in Spanish solar energy policy. A series of regulatory reforms since 2010 reduce revenues to existing renewable power generators and they end up the previous system of support to new renewable generation. This policy change has altered the composition of the energy market affecting investment decisions. We feel necessary to evaluate this policy measure since the public opinion about the national energy policy may be a useful component for investment decisions. This is the first purpose of building indexes of sentiment, while the final aim is to analyze if they have any incidence on the evolution of prices or demand in energy markets. Our second exercise uses data from the Iberian Electricity Market (MIBEL), which began in 2007. We have hourly energy prices from all sources for Spain and Portugal and we are interested both in the evolution of congestion (measured through residual demand) and how this evolution has been driven by market power of the agents. We evaluate both congestion and market power using econometric methods and agent-based simulation models and we compare the performance of both methodologies.

Output-based allocations in pollution markets under uncertainty and self-selection | *Juan-Pablo Montero, PUC-Chile*

We study the design of pollution permit markets in which a fraction of permits are allocated to firms based on their output. Output-based allocations are not only receiving increasing attention ---as in the carbon markets in California and the EU--- but they can also be optimal under demand/supply uncertainty despite the output distortions they may create. The optimal design combines auctioned permits with output-based allocations increasing in uncertainty. When firms are better informed about the latter or must self select, the regulator resort to some free (i.e., lump-sum) allocations to sort firms out. Numerical exercises illustrate that the gains from considering output-based allocations can be substantial, but only if properly designed.

Overlapping strategies for reducing carbon emissions from the personal transportation sector | *Carolyn Fischer, RFF and FEEM*

Multiple federal and state policies aim to reduce greenhouse gas (GHG) emissions from light-duty vehicles: fuel economy or GHG emissions performance standards, ethanol subsidies, a renewable fuel blending mandate, and, in California, a low-carbon fuel standard. To what extent can such policies substitute for taxes on gasoline or carbon? To what extent would they be useful complements? To assess the performance of these multiple overlapping policies, we reformulate the two-stage model of Fischer, Newell, and Preonas (2013) and apply it to the personal transportation sector. Our model captures the supply of transportation fuels, including fossil fuels, conventional renewable fuels, and advanced renewable fuels, which are characterized by knowledge spillovers (i.e., learning and R&D). Our model also captures the demand for transportation fuels, which derives from the demand for miles and energy efficiency, with potential under-investment in fuel economy due to consumer myopia or other market imperfections (i.e., the "energy efficiency gap"). We parameterize this model based on EIA projections and estimates drawn from the empirical economics literature. Preliminary results imply that the current mix of overlapping policies induces behavioral changes that are highly cost-ineffective, as evidenced by wide variation

in the marginal cost of abatement across competing abatement strategies. Marginal abatement costs range from $\$0/\text{tCO}_2$ to $\$700/\text{tCO}_2$ for strategies based on fuel substitution (e.g., switching from gasoline to ethanol), while marginal abatement costs range from negative $\$45/\text{tCO}_2$ to positive $\$32/\text{tCO}_2$ for strategies based on fuel conservation (i.e., driving fewer miles or improving fuel economy). Negative abatement costs arise in this setting due to consumer under-investment in fuel economy and due to policies that implicitly subsidize the production renewable fuels, such that their marginal costs greatly exceed the value of the energy they provide.

José M. Labeaga

José M. Labeaga is PhD in Economics from the Autonomous University of Barcelona and professor of economic theory at the Spanish Open University, UNED. He has been general director of the Spanish Institute for Fiscal Studies and director of the FEDEA-BBVA research chair on new consumers. His main research interests lay in the analysis of individual behavior in consumption and labour decisions, and on the simulation and assessment of the effects of different public policies. He has served in the board of different organizations and journals, and has published the results of his research in the main academic journals of his field. José M. intensely collaborates in the research of Economics for Energy in the area of energy demand.

Juan-Pablo Montero

Juan-Pablo Montero is Professor of Economics at the Pontificia Universidad Católica de Chile (PUC Chile) and has held visiting positions at several universities including MIT (Sloan School), Harvard (Kennedy School of Government), Stanford (CLAS and Economics) and UC Santa Barbara (Bren School of Environmental Science and Management). He received a Civil Engineering degree from PUC Chile and M.Sc. and Ph.D. degrees in Economics from MIT. His research work concentrates on industrial organization, environmental and resource economics and has been published in the leading academic journals (AER and JPE). In 2007 he was named “Chilean Economist of the Year” by El Mercurio, the main Chilean newspaper.

Carolyn Fischer

Carolyn Fischer is a Senior Fellow at Resources for the Future and currently a Marie Skłodowska–Curie Fellow of the European Commission, visiting at the Fondazione Eni Enrico Mattei (FEEM) in Venice, Italy. She is also a fellow of the CESifo Research Network and a member of Environment Canada’s Environmental Economics and Policy Research Network. Previously, she has been a Visiting Professor at Gothenburg University; a Dahrendorf Visiting Fellow at the London School of Economics; a UCE3 Senior Fellow at the University of California at Santa Barbara; a Fellow at the Center for Advanced Study of the Norwegian Academy of Science and Letters; and a staff economist for the Council of Economic Advisers to President Clinton. She has served on the Board of Directors of the Association of Environmental and Resource Economists, and currently serves on the scientific board of Economics for Energy and the economics advisory board of Environmental Defense Fund. She is on the editorial board of the Review of Environmental Economics and Policy and the International Review of Environmental and Resource Economics and has been Associate Editor of Resource and Energy Economics. Fischer earned her Ph.D. in Economics from the University of Michigan at Ann Arbor in 1997 and her B.A. in International Relations from the University of Pennsylvania in 1990.

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