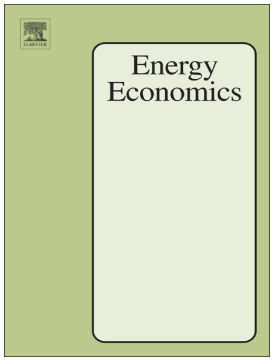
Accepted Manuscript



Capturing Natural Resource Heterogeneity in Top-Down Energy-Economic Equilibrium Models

Sebastian Rausch, Da Zhang

PII: S0140-9883(18)30268-8
DOI: doi:10.1016/j.eneco.2018.07.019
Reference: ENEECO 4098

To appear in: *Energy Economics*

Received date: 10 March 2017
Revised date: 8 May 2018
Accepted date: 20 July 2018

Please cite this article as: Sebastian Rausch, Da Zhang , Capturing Natural Resource Heterogeneity in Top-Down Energy-Economic Equilibrium Models. Eneeco (2018), doi:10.1016/j.eneco.2018.07.019

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Capturing Natural Resource Heterogeneity in Top-Down Energy-Economic Equilibrium Models

Sebastian Rausch[a], Da Zhang[b,c,*]

[a] *Center for Economic Research at ETH (CER-ETH), Department of Management, Technology and Economics, ETH Zurich, Switzerland*
[b] *Joint Program on the Science and Policy of Global Change, Massachusetts Institute of Technology, Cambridge, U.S.*
[c] *Institute of Energy, Environment and Economy, Tsinghua University, Beijing, China*

Abstract

Top-down energy-economic modeling approaches often use simplified techniques to represent heterogeneous resource inputs to production. We show that for some policies, such as feed-in tariffs for renewable electricity, detailed representation of renewable resource grades is required to describe the technology more precisely and identify cost-effective policy designs. We demonstrate the hybrid approach for modeling heterogeneity in the quality of natural resource inputs required for renewable energy production in a stylized computable general equilibrium framework. Importantly, compared to the traditional approach, the hybrid approach resolves near-flat or near-vertical sections of the supply curve and improves the precision of policy simulation. We then represent the shape of a resource supply curve based on more detailed data. We show that for the case of onshore wind development in China, a differentiated feed-in tariff design that can only be modeled with the hybrid approach requires less than half of the subsidy budget needed for a uniform feed-in tariff design to achieve the same installation targets.

Keywords: heterogeneous resource, cost curve, hybrid modeling, step curve fitting, computable general equilibrium model, China

*Corresponding author: Joint Program on the Science and Policy of Global Change, Massachusetts Institute of Technology, Cambridge, U.S. Email: zhangda@mit.edu.

Download English Version:

https://daneshyari.com/en/article/11004778

Download Persian Version:

https://daneshyari.com/article/11004778

Daneshyari.com