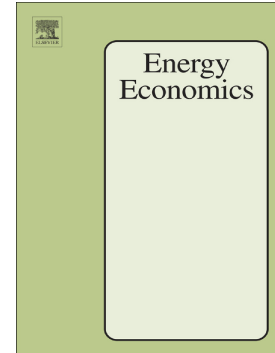


## Accepted Manuscript

A structural model to evaluate the transition from self-commitment to centralized unit commitment

Sergio Camelo, Anthony Papavasiliou, Luciano de Castro, Álvaro Riascos, Shmuel Oren



PII: S0140-9883(18)30380-3  
DOI: [doi:10.1016/j.eneco.2018.09.009](https://doi.org/10.1016/j.eneco.2018.09.009)  
Reference: ENEECO 4156  
To appear in: *Energy Economics*  
Received date: 11 December 2015  
Revised date: 2 September 2018  
Accepted date: 11 September 2018

Please cite this article as: Sergio Camelo, Anthony Papavasiliou, Luciano de Castro, Álvaro Riascos, Shmuel Oren , A structural model to evaluate the transition from self-commitment to centralized unit commitment. *Energy Economics* (2018), doi:[10.1016/j.eneco.2018.09.009](https://doi.org/10.1016/j.eneco.2018.09.009)

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.

# A Structural Model to Evaluate the Transition from Self-Commitment to Centralized Unit Commitment

Sergio Camelo  
Stanford University, USA  
and Quantil, Colombia

Luciano de Castro  
University of Iowa, USA

Anthony Papavasiliou  
Université catholique de Louvain,  
Belgium

Álvaro Riascos  
University of los Andes, Colombia,  
Quantil, Colombia and  
CEII - Banco de la República, Colombia

Shmuel Oren<sup>1</sup>  
University of California Berkeley, USA

May 23, 2017

## Abstract

We introduce a dispatch model of Colombia's independent system operator in order to study the relative merits of self-commitment vs. centralized unit commitment. We capitalize on the transition that took place in Colombia in 2009 from self-unit commitment to centralized unit commitment and use data for the period 2006-2012. In our analysis we simulate a competitive benchmark based on estimated marginal costs, startup costs and opportunity costs of thermal and hydro plants. We compare the differences between the self-commitment for the period 2006-2009 and the competitive benchmark to the differences between the bid-based centralized unit commitment and the competitive benchmark after the transition. Based on these comparisons we estimate changes in deadweight losses due to misrepresentation of cost by bidders and dispatch inefficiency. The results suggest that centralized unit commitment has improved economic efficiency, reducing the relative deadweight loss by at least 3.32%. This result could in part be explained by the observation that, before 2009, there was an underproduction of thermal energy relative to the competitive benchmark and it supports the claim that dispatch efficiency has improved after the transition.

**Keywords:** Electricity Markets, Self-commitment, Centralized Unit Commitment, Economic Efficiency, Market Power.

---

<sup>1</sup> Corresponding author. Email: [shmuel@berkeley.edu](mailto:shmuel@berkeley.edu). Department of Industrial Engineering and Operations Research, 4141 Etcheverry Hall, University of California at Berkeley, Berkeley, CA, 94720. Telephone: (510) 642-1836. Fax: (510) 642-1403

Download English Version:

<https://daneshyari.com/en/article/11032320>

Download Persian Version:

<https://daneshyari.com/article/11032320>

[Daneshyari.com](https://daneshyari.com)