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

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We introduce a dispatch model of Colombia's independent system operator (XM) in order to study the relative merits of self-commitment vs. centralized unit comment. We capitalize on the transition that took place in 2009 from self-unit commitment to centralize unit commitment and use data from Colombia 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. We compare the differences between the competitive benchmark and self-commitment for the period 2006-2009 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 support the claim that dispatch efficiency has improved after the transition.

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