

CAUSES AND CONSEQUENCES OF BOOM-BUST CYCLES IN NATURAL GAS PRODUCTION ASSETS INVESTMENTS

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Abstract

Global energy markets have recently experienced a series of major disruptions. Among them, the natural gas sector has shown significant market developments through the structural transformation occurring in the United States. There, the exploitation of shale gas resources leads the country toward a possible energy self-sufficiency, a situation which was hardly imaginable a couple of years ago. While the Henry Hub spot price recently hit historical lows, the return to more regular market conditions is of great interest for the whole natural gas industry. This evolution raises legitimate questions about the relevance and the efficiency of current market modeling tools to generate reliable forecasts to ensure the medium and long term sustainability of investments made in recent times.

Up to now, most of natural gas models used to generate market forecasts by preliminary assuming that this market stands in a static state of equilibrium. By construction, these models are unable to foresee or at least to analyze situations where the market would deviate from the assumed static equilibrium. Nevertheless, recent efforts have conducted to the development of innovative theories and models which endeavor to exceed these limitations. This paper relies on an innovative simulation model combining the concepts of path-dependence and independent agent behaviors in order to represent the natural gas market as a dynamic and complex evolving system. In particular, this approach provides the necessary framework to exhibit emergence phenomenon such as business cycles in natural gas production assets.

The paper describes the step by step characterization of a series of successive boom-bust cycles in natural gas production assets investment by providing an accurate and quantitative analysis of their causes and consequences. The results reveal in which extent choices made by independent economic agents may lead the market toward oversized periods of expansion and, therefore, the contraction periods which follow.

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Nevertheless, the model shows that the intelligent reading of these market dynamics may allow a minority of players to capture the value lost by the majority within these harsh business cycles.

The model highlights the fact that the combination of choices made by independent economic agents might inherently engender market disequilibrium. Thus, this kind of study aims at helping decision makers in the natural gas sector and political leaders to better understand their economic environment. Lastly, by generating endogenous market disequilibrium, this approach tends to complete other market modeling systems which focus on the dynamic market reaction and adaptation to exogenous shocks.

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