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# Dynamic-cognition of Strategic Mineral Commodities; An Empirical Assessment

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**Abstract :** Strategic mineral commodities (SMC) both energetic and metals have long been fundamental for human beings. There is a strong and long-run relation between the mineral resources industry and society's evolution, with the provision of primary raw materials, becoming one of the most significant drivers of economic growth. Due to mineral resources' relevance for the entire economy and society, an understanding of the SMC market behaviour to simulate price fluctuations has become crucial for governments and firms. For any human activity, SMC price fluctuations are affected by economic, geopolitical, environmental, technological and psychological issues, where cognition has a major role. Cognition is defined as the capacity to store information in memory, processing and decision making for problem-solving or human adaptation. Thus, it has a significant role in those systems that exhibit dynamic equilibrium through time, such as economic growth. Cognition allows not only understanding past behaviours and trends in SCM markets but also supports future expectations of demand/supply levels and prices, although speculations are unavoidable. Technological developments may also be defined as a cognitive system. Since the Industrial Revolution, technological developments have had a significant influence on SMC production costs and prices, likewise allowing co-integration between commodities and market locations. It suggests a close relation between structural breaks, technology and prices evolution. SCM prices forecasting have been commonly addressed by econometrics and Gaussian-probabilistic models. Econometrics models may incorporate the relationship between variables; however, they are statics that leads to an incomplete approach of prices evolution through time. Gaussian-probabilistic models may evolve through time; however, price fluctuations are addressed by the assumption of random behaviour and normal distribution which seems to be far from the real behaviour of both market and prices. Random fluctuation ignores the evolution of market events and the technical and temporal relation between variables, giving the illusion of controlled future events. Normal distribution underestimates price fluctuations by using restricted ranges, curtailing decisions making into a pre-established space. A proper understanding of SMC's price dynamics taking into account the historical-cognitive relation between economic, technological and psychological factors over time is fundamental in attempting to simulate prices. The aim of this paper is to discuss the SMC market cognition hypothesis and empirically demonstrate its dynamic-cognitive capacity. Three of the largest and traded SMC's: oil, copper and gold, will be assessed to examine the economic, technological and psychological cognition respectively.

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