# Fractional-Order Shapovalov Mid-Size Firm Model: Dynamical Analysis, Chaos Control and Synchronization

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**Abstract:** This paper presents a novel fractional-order formulation of the Shapovalov mid-size firm model incorporating Caputo derivatives, offering a more flexible framework for capturing memory effects in economic dynamics. The fundamental dynamical properties of the system are analyzed. Stabilization of the model is achieved through the design of both linear and nonlinear feedback control strategies. In addition, the complete synchronization problem is investigated using a simple linear control law. Numerical simulations confirm the effectiveness and feasibility of the proposed methods. Beyond theoretical insights, the approach enhances forecasting reliability and enables precise tuning of the economic mechanism, thereby improving the overall efficiency of decision-making processes in complex economic systems.

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