Stabilization Effect caused by Randomness: Lumpy Investment and Uncertainty

Yoshiyuki Arata[*] Yosuke Kimura[†] Hiroki Murakami[†]

April 20, 2015

Abstract This paper investigates the stability of aggregate investment in the uncertain environment with interacting heterogeneous agents. Researchers have shown that there is a considerable difference between the property of aggregate investment dynamics and the nature of individual investment behavior; the individual investment activities exhibit intermittency and lumpiness at the plant level. In addition, there exists persistent heterogeneity across firms. We demonstrate that heterogeneity in capital adjustment processes of micro-agents contributes to creating the stability of the aggregate process. We also show that this macro-stability is undermined in the uncertain circumstance in which variance of the macroscopic distribution (i.e., the degree of heterogeneity across firms) affects individual behaviors as externality. In other words, while heterogeneous behaviors always enhances the stability of aggregate investment, a coordination of interacting investors weakens the stabilizing force. As a result, a slight shock is sufficient to induce the instability when investors are highly sensitive to uncertainty over the economic environment.

Keywords: Lumpy Investment; Pseudo Compound Poisson process; Uncertainty; Collective Behavior.

JEL Classification Numbers: E22, E32, D21.

[*]The Research Institute of Economy, Trade and Industry. 11th floor, Annex, Ministry of Economy, Trade and Industry 1-3-1, Kasumigaseki Chiyoda-ku, Tokyo, 100-8901 Japan. E-mail:*arata-yoshiyuki@rieti.go.jp*

[†]Graduate School of Economics, The University of Tokyo. 7-3-1 Hongo, Bunkyo-ku, Tokyo, 113-0033 Japan.