Analysis of Institutional Evolution in Circuit Breakers Using the Concepts of Replicator and Interactor

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Abstract
Following the bankruptcy of Lehman Brothers, world financial markets went through a period of economic anarchy in the latter half of 2008. Particularly in October 2008, many world stock exchanges introduced circuit breakers and frequently changed rules for implementing them. In the viewpoint of those who emphasize autonomy and efficiency of markets, these rule changes must be incomprehensible. In order to understand the institutional changes in stock markets, we introduce “replicator” and “interactor” which are key concepts of institutional and economical evolution. We show that market mechanisms such as circuit breakers were formed through evolutionary dynamics motivated by environmental changes in addition to economic efficiency. We maintain that the concepts of replicator and interactor help in understanding institutional evolution.

Keywords: circuit breaker, institutional evolution, replicator, interactor, stock market.

1. Introduction
A circuit breaker is a stock market mechanism that halts trading temporarily based on a prescribed rule when a large-scale price fluctuation occurs. The main objectives from its introduction are to directly reduce excessive price volatility and avoid market disruptions (Brady, 1988). There are four known disadvantages of introducing circuit breakers: loss of trading opportunities (Brennan, 1986), delayed price discovery (Fama, 1989), volatility spillover (Kim and Rhee, 1997), and the magnet effect (Subrahmanyam, 1994). Although much empirical research is critical of circuit breakers, they have been enacted by many stock exchanges and their rules have been frequently revised since the financial crisis of 2008. Furthermore, the effects of most recent rule changes were to make the triggering of circuit breakers more likely. In the view of those who emphasize autonomy and efficiency of markets, these rule changes must be incomprehensible. This suggests that economic and financial analyses based on such views are not sufficient for

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understanding institutional evolution.

To understand the institutional evolution in stock markets, we analyzed the actual rule changes of circuit breakers by introducing “replicator” and “interactor,” which are key concepts of institutional and economic evolution (Nishibe, 2006). A replicator is a rule of thought and behavior, represented as an “if–then proposition”, which determines people’s ways of thinking and acting and enables their social behavior. We claim that such rules are propagated, i.e., replicated, among people through social learning. An interactor is a person or actor who performs, consciously or unconsciously, the instructions in replicators. An established state of a social institution is one in which identified replicators are shared by most interactors.

To analyze institutional change, we review the development of circuit breakers at the New York Stock Exchange (NYSE) in Section 2. In Section 3, we review how world stock exchanges revised circuit breaker rules and procedures from October 2008 to December 2008. In Section 4, we analyze the institutional evolution of circuit breakers using the concepts of replicators and interactors, and show a phylogenetic tree of the replicators of circuit breakers. We also discuss the relational framework of replicators and interactors. Section 5 concludes by claiming that evolutionary dynamics, analyzed via replicators and interactors, plays an important role in forming and changing market institutions.

2. Transition of Circuit Breaker (Rule 80B) in the NYSE\(^1\)

The NYSE introduced circuit breakers on October 19, 1988, in response to the Brady Commission Report (Brady, 1988) that investigated “Black Monday”—October 19, 1987, when the Dow Jones Industrial Average fell 22%, the largest one-day decline since 1914. NYSE criteria for imposing circuit breakers are established in Rule 80B, which initially specified that trading would halt for one hour if the Dow Jones Industrial Average (DJIA, hereafter Dow) fell 250 points and would halt for two or more hours if the Dow fell 400 points. The NYSE revised both criteria in July 1996, following the Dow’s decline of 217 points on March 8, 1996. In February 1997, Rule 80B was revised to halt trading for 30 minutes if the Dow fell 350 points and for one hour if it fell 550 points.

In the NYSE, the circuit breaker was implemented on Monday, October 27, 1997, when the Dow had fallen 350 points by 2:35 p.m. The Dow fell an additional 200 points

\(^1\) We referred to Harris (1998) and Osaki (1998) for detailed information about the transition of Rule 80B in NYSE.