

Framework for Microfoundation of Crisis Analysis¹

Suggestions from the Cases of the 2007-8 US Financial
Crisis and 2011 Fukushima Nuclear Plant Accident

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Abstract

Various crises are the results of behaviors and decisions of individual managers and other actors involved in organizations. The author conducted empirical research on the 2011 Fukushima Dai-ichi Nuclear Plant Accident and 2007-8 US Financial Crisis, and found that various actors' behaviors were the causes of these crises. Many researchers and policymakers focus on the defects of various regulations, rules and regulatory institutions as the major causes of these crises and try to establish new rules and regulations to avoid similar crises, but in vain. They neglect the underlying problems of various actors, organizations and institutions involved in these risks. In this paper, the author reviews the theoretical framework of microfoundational research in social science in general, and organization study in particular, and attempts to extend the initial framework for microfoundation used in management research to crisis analysis.

1. Introduction

Financial crises occur periodically, and after each crisis, regulatory bodies investigate the reasons behind it and often conclude that relaxed regulations are its main cause. As a result, regulations are severely tightened, and more recently, internationally harmonized regulations have also been established because of the globalization of financial markets. However, no matter how strict these new

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regulations are, they are soon eased and crises are repeated. Past research on financial crises have mostly focused on macro issues regarding regulations and macroeconomic policies, neglecting the underlying problems of various actors, organizations and institutions involved in these crises, and very few research have focused on institutional issues (Davies, 2016; Munir, 2011).

There are always micro-level factors behind macro-level problems, and the author believes more attention should be paid to these micro-level factors in order to resolve such problems. The author conducted a research on various financial institutions involved in the 2007-8 US Financial Crisis and found that the behaviors of various actors were the cause of the crisis (Kuhara, 2008, 2011). The author also analyzed the 2011 Fukushima Dai-ichi Nuclear Plant Accident which occurred after the Great East Japan Earthquake, and similarly concluded that various misconducts by actors, mostly unintended, were its major cause (Kuhara, 2013).

These massive accidents and crises provide us with a great opportunity to analyze the microfoundation of crises. There are many official reports as well as individual reports of actors during the crises, and it is necessary to have a theoretical framework in place to analyze these cases. The author believes that it is imperative to conduct such research to prevent another crisis, and in this paper, proposes a framework for analyzing crises from a microfoundational perspective which is unique in management studies.

2. Framework for Microfoundation and Micro-Macro Links

This discussion leads to the microfoundational analysis of crisis. Various crises are the results of behaviors and decisions of individual actors involved. Problems of and misconducts by these actors lead to small errors, which can develop into a large crisis. It is therefore important to establish a theoretical framework for microfoundational analysis. The question is, what is microfoundation, and how does it link to macro crises?

The author reviews and expands on Coleman's framework of micro-macro issues and its applications to management research.

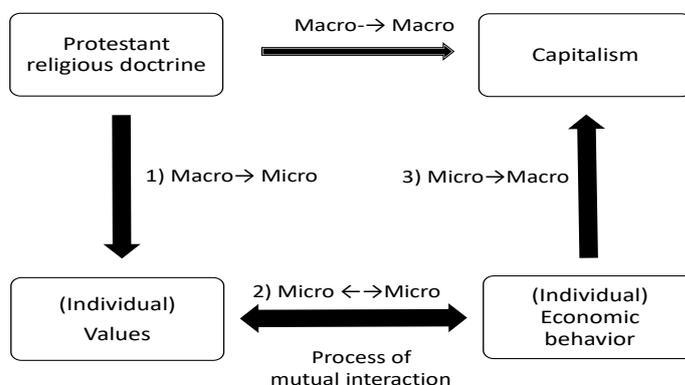
(1) Coleman's Microfoundation Model

John Coleman is a sociologist who made contributions to link micro and macro issues in sociology. He proposed the framework of microfoundation and micro-macro links as the base for research on capitalism and social institutions

(Coleman, 1990). Coleman initially questioned the fact that “social theory continues to be about the functioning of social systems of behavior, but empirical research is often concerned with explaining individual behavior” (Coleman, 1990, pp.1). He attempted to fill the gap between macro-level social systems and micro-level individual behaviors by using the framework of microfoundation and micro-macro links.

To do so, Coleman cited Max Weber’s “The Protestant Ethic and the Spirit of Capitalism” as an example. As shown in Chart 1, the relationship between Protestantism and capitalism can be broken down into three parts. The first, according to Coleman, links an independent variable characterizing society (Protestantism) with a dependent variable situated at the individual level (values). This relation results in the proposition that the Protestant religious doctrine generates a value of frugality among its followers (1 Macro→Micro). The second relation links two individual factors: the value of frugality, and a self-oriented economic behavior characterized by anti-traditionalism and a sense of duty to one’s occupational calling (2 Micro→Micro). In the third relation, an independent individual variable (self-oriented economic behavior) produces a dependent social variable (a capitalist economy) (3 Micro→Macro)(Coleman,1990, pp.6-10). As will be discussed later, Coleman assumes that individual behaviors are based on individuals’ rational choices (Coleman, 1990, pp.421-451). The chart makes a distinction between the macro-level and micro-level, where the macro-level concerns organizations whilst the micro-level concerns individuals.

Chart 1 Coleman’s microfoundation propositions
(Coleman ,1990, pp.8 Figure 1.2)



(2) Development of Microfoundation Framework in Management Theories

In management studies, research on strategy and organizations has typically been conducted separately from those on individual behaviors. More specifically, research on strategy and organizations are conducted at the macro-level, while research on psychology, ethnography, sociology and behavioral economics are conducted at the micro-level. Recently, however, there has been some development to connect micro- and macro-level theories in strategy and organizational studies (Felin & Foss, 2005; Barney & Felin, 2013; Van de Ven & Lifchitz, 2013), and to establish proposals for behavioral strategy (Greve, 2013). In developing these theories, it becomes critical to clarify micro-macro links and the dependence of macro-level outcomes on micro-level assumptions using Coleman's scheme (Raub, Buskens, and Van Assen, 2011).

The author introduces several important researches in management theory that leverage on a microfoundational perspective.

Felin and Foss argued that there is a lack of attention on individuals in strategy and organizational studies, and that it is necessary to conduct microfoundational analyses to explain strategies and organizations (Felin and Foss, 2005).

Barney and Felin point out the ineffectiveness of the role that firm-level capabilities play in management strategy theory, and emphasize the role of specific actors in building firm-level capabilities. They also emphasize the link between firm-level capabilities and individual-level ones. Furthermore, they propose new areas of research such as behavioral strategy and multi-level human capital research (Barney and Felin, 2013).

Greve notes that organizational scholars are exploring strategies based on momentum, feedback, inference and anticipation, and that such studies reflect how individuals' decisions based on bounded rationality can form collective reasonable actions at different levels of an organization. He proposes that such behavioral strategy studies can be the microfoundation in management studies (Greve, 2013).

The framework for microfoundation in management theory can be divided into three parts: 1) how the macro system and institutions surrounding industries and firms affect the behavior of individuals in the firm (macro-micro link); 2) how each individual acts and behaves independently and toward each other based on values and incentives (micro individual actions); and 3) how such individual-level actions become aggregated into firm-level, industry-level

and social system-level phenomena (micro-macro links and the overall picture). In Part 3, the author applies this framework of microfoundational analysis to specific case studies of crises.

(3) Assumption of Individual Actions and Behaviors

Under Coleman's framework, individual actors' actions are assumed to be rational. In both microeconomic theory and sociology theory, people are assumed to take rational actions. However, in the real market, people take actions with bounded rationality (Simon, 1945).

In an organization study, Van De Vin and Lifchitz propose "individual rational behavior and collective reasonable behavior as the microfoundations of market and institutions" (Van De Vin & Lifchitz, 2013). According to the two, reasonable behavior represents a collective institutional standard of the norms, values, and rules that society views as fair and just, and legitimate behavior of a person in a given role and situation. This additional perspective provides more width to the framework of behavioral strategy theory.

In the following case studies, the author will show that collective rational behaviors of individuals can provide further insights on how crisis can be avoided.

3. Case Studies of Crises and Framework for Microfoundation of Crisis Analysis

This section summarizes the findings from case studies of the 2007-8 US Financial Crisis and 2011 Fukushima Dai-ichi Nuclear Plant Accident conducted by the author, and shows that these findings conform with the framework for microfoundational analysis.

(1) Case Study of the Fukushima Dai-ichi Nuclear Plant Accident ²

The author conducted a case study analysis of the Fukushima Dai-ichi Nuclear Plant Accident based on accident investigation reports. (Kuhara, 2011).

The operator of Fukushima Nuclear Plant, Tokyo Electric Power Company (TEPCO) was a bureaucratic sectional organization which collectively believed the myth that severe accidents at nuclear plant would never happen. This made it difficult for them to respond to problems in a flexible and swift manner. As such, TEPCO failed to adapt to changes in the environment, causing them to underestimate risks.

² For details of the case study, see Kuhara (2013).

The top management lapsed into moral hazard, adhering to a behavioral principle of evading responsibility and relying on administrative authorities when faced with a problem. There were communication issues within the organization, as was demonstrated during the accident when on-site employees did not follow the headquarters' directions regarding the injection of seawater into one of the reactors and the delay in the decision to use vents. The *gemba* (i.e., site where actual operations take place; in this case, the job site of Fukushima Dai-ichi Nuclear Plant) was overlooked, dangerous work was consigned to subcontractors, and *gemba* employees did not even receive training on how to operate safety devices in preparation for severe accidents. When the critical accident did occur, the headquarters were slow to respond and lost the *gemba*'s trust, leading to the lack of risk communication between the headquarters and the *gemba*.

This caused confusion in the *gemba*'s decision-making, and led to three major operational mistakes (misjudging the movement of the Unit 1 Isolation Condenser System; making an unauthorized decision to change the water supply of Unit 2 Reactor Core Isolation Cooling System; and injecting alternative water in Unit 3). Moreover, these mistakes were not reported to the headquarters immediately, supposedly impeding speedy actions and decisions regarding priorities of actions. Actions such as alternative water injections may have gone more smoothly had the headquarters grasped the *gemba*'s situation more swiftly, had there been less confusion in the chain of communication and command, had the working environment been slightly better, and had there been adequate support and directions from the headquarters.

In summary, the organizational characteristics of TEPCO influenced individuals' actions and decisions in their respective *gembas*, and led to insufficient accident responses both within and between organizations. The accumulation of such micro-level incidents led to the severe accident. In most cases, individual actors took rational behaviors; however, collectively they did not take reasonable behaviors when the accident occurred.

(2) Case Study of the 2007-8 US Financial Crisis ³

Studies by many financial scholars concerning the 2007-8 US Financial Crisis have focused excessively on analyzing macro-level issues of banking regulations and

³ For details of the case study, see Kuhara (2008, 2011).

economic policies, and not on micro-level analyses of bank management underlying the crisis.

Although few in number, there are some studies that point out that the root cause of the Financial Crisis was banks' managerial behavior, and that it is important to conduct a micro-level analysis on the state of bank management in order to avoid future financial crises (Zingales, 2015; Davies, 2016).

Below is a summary of the findings from the case study on the Financial Crisis conducted by the author (Kuhara, 2008; Kuhara, 2011).

US financial institutions have repeatedly experienced management crises. This repetition occurs because, as the economy booms, banks' reasonable managerial behavior becomes one where they pursue profits that exceed the organization's capacity. At the basis of these problems is Wall Street's culture of maximizing profit. The reasons behind the repeated collapse of financial institutions are: Wall Street's inadequate incentive mechanism to encourage excessive risk taking, deficiencies in control against such excessive risk-taking and risk management, and the conception by managers that illegal acts are merely a part of their costs, combined with the moral hazard of banks believing that in the end the government would bail them out (Kuhara, 2011).

For this case study, the author selected four major US banks and analyzed their managerial behavior before and after the Financial Crisis. Table 1 is a summary of the findings.

The case study suggests that the Financial Crisis was caused by micro-level deficiencies in managerial behavior of individual banks. Excessive diversification and scale expansion led to the development of financial institutions that were impossible to manage, and the strong incentive to pursue short-term profits led to excessive risk-taking and moral hazard of actors. As for the financial institutions that outlived the crisis, their managerial success was achieved through strong organizational cultures and high leadership qualities (Dekker, 2011), which brought collectively reasonable behaviors and they were important elements linking macro- and micro-level issues.

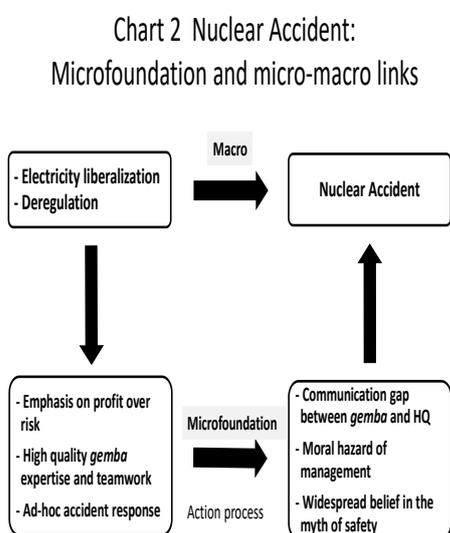
Table 1 Managerial behaviors of major US banks before and after the Financial Crisis (Kuhara,2008,2011)

	Managerial effects from the crisis	Pre-crisis management characteristics	Organization structure characteristics	Compensation incentives	Organizational culture
Merrill Lynch	<ul style="list-style-type: none"> •Suffered large loss •Acquired by BOA 	<ul style="list-style-type: none"> •CEO was a former investment banker , eager to make up for the lag in investment banking 	<ul style="list-style-type: none"> •Traditionally acted as security broker but recently was more focused on investment banking 	<ul style="list-style-type: none"> •Divisional performance-based bonus for traders 	<ul style="list-style-type: none"> •Was a second mover in the market •Executed second-class investment banking
Goldman Sachs	<ul style="list-style-type: none"> •Suffered little loss •Gained profit through contrarian investment 	<ul style="list-style-type: none"> •Senior partners with expertise in trading business conducted group management 	<ul style="list-style-type: none"> •Traditionally embraced a culture of partnership •Carried many long-term employees 	<ul style="list-style-type: none"> •Consolidated performance-based pay for partners 	<ul style="list-style-type: none"> •Elite traders embraced a culture of partnership
Citigroup	<ul style="list-style-type: none"> •Suffered largest loss •Bailed out by government and underwent large restructuring 	<ul style="list-style-type: none"> •CEO was a former legal professional and had little knowledge about operation-level businesses 	<ul style="list-style-type: none"> •Was a diversified conglomerate •Executed decentralized management 	<ul style="list-style-type: none"> •Divisional performance-based pay for professionals 	<ul style="list-style-type: none"> •Executed aggressive, decentralized management
JP Morgan Chase	<ul style="list-style-type: none"> •Suffered little loss •Shifted to conservative risk management of pursuing BS quality 	<ul style="list-style-type: none"> •CEO was acknowledged as a hands-on manager with strong leadership 	<ul style="list-style-type: none"> •Maintained a balance between centralization and decentralization •Carried many long-term employees •Placed emphasis on risk management divisions 	<ul style="list-style-type: none"> •Divisional performance-based bonuses for professionals 	<ul style="list-style-type: none"> •Combined traditional banking culture with hands-on top management

(3) Framework for Microfoundation based on the Nuclear Accident Case Study

This section summarizes the Nuclear Accident case using the framework for microfoundation (See Chart 2). Against the backdrop of electricity liberalization and deregulations, the macro ideology embraced by the entire industry, ranging from the regulatory authorities to the electric power companies, was the “nuclear power village” logic which presumed that severe accidents would never happen. Under this ideology, organizations and individuals constituting such organizations tended to adhere to a behavioral principle of underplaying risks and up playing profits. The mutual interaction between such actors led to miscommunication within organizations, managers’ moral hazard, and insufficient preparations for severe accidents. This consequently led to the massive Nuclear Accident, where all the active nuclear power reactors melted down and caused radioactive contamination.

Table 2 summarizes the findings from this analysis using a framework for microfoundation.



**Table 2 Nuclear Accident:
Insights from microfoundational analysis (Kuhara, 2013)**

	Causes of crisis	Future lessons
Value of <i>gemba</i>	Prioritized short-term profits	Reduce potential disaster damages
	Neglected risks	Emphasize risk management
	Failed to prepare for crisis	Conduct drills for accidents
Actions at <i>gemba</i>	Dealt with ad-hocism	Establish a step-by-step guide
	Took rational actions on an ad-hoc basis	Take reasonable actions
Action process	Barrier existed between <i>gemba</i> and HQ	Establish interdependency and a feedback function
Micro-macro links	Embraced an organization-wide belief in the myth of safety	Establish an organization-wide sense of crisis
	Chain of command was muddled	Establish a communication chain for crises
	Lacked leadership	Establish a leadership structure for crises

(4) Framework for Microfoundation based on the Financial Crisis Case Study

This section summarizes the Financial Crisis case using the framework for microfoundation (see Chart 3). The players' behavioral principle of pursuing short-term profits and underlying risks reinforced one another, and all organizations similarly took excessive risks, while managers lapsed into moral hazard believing that in the end the government would bail them out. This led to the collapse of Lehman Brothers and ended up causing a crisis affecting the entire financial system.

Table 3 below shows the lessons learned and proposals for preventing future financial crises based on the analysis using the framework for microfoundation. In order to prevent another financial crisis, it is important to consider not only macro-level analyses regarding financial systems and governance structures of financial institutions, but also micro-level perspectives regarding culture and values of individual organizations which are collectively reasonable, as well as strong leadership. In doing so, it will be necessary to elaborate on managerial concepts such as the aforementioned "reasonable behavior" of individuals, and the "drift of culture" which creates the micro-macro link.

Chart 3 Financial Crisis:
Microfoundation and micro-macro links

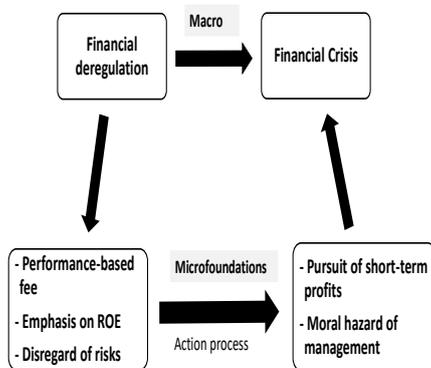


Table 3 Financial Crisis:
Insights from microfoundational analysis (Kuhara, 2008)

	Causes of crisis	Future lessons
Value of <i>gemba</i>	Provided performance-based fees and prioritized ROE	Pursue long-term profits
	Neglected risks	Emphasize risk management
	Neglected customers	Prioritize customer value
Actions at <i>gemba</i>	Pursued short-term profits	Pursue long-term values
	Took rational actions on an ad-hoc basis	Take reasonable actions
Action process	Each division pursued profits independently	Establish interdependency and a feedback function
Micro-macro links	Lapsed into moral hazard	Establish an ethical organization culture
	Carried defects in centralized risk control	Establish a communication chain for crises
	Lacked leadership	Establish a leadership structure for crises

4. New Model for Microfoundation of Crisis Analysis

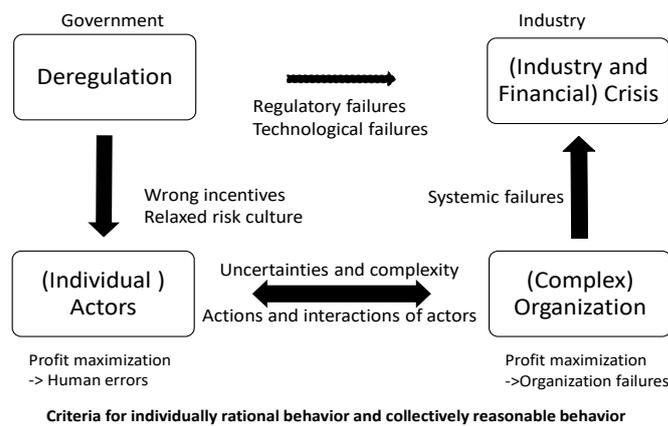
This paper uses Coleman’s framework and other previous research in areas of organizational studies. In economics, the term “microfoundation” refers to the micro economic analysis of the behavior of individual agents such as households or firms that underpin a macroeconomic theory. The same can be applied to organizational studies. The difference is that in economics, it is not so difficult to gather aggregate data of household economic behaviors because individual behaviors are translated into economic data such as the volume of consumptions savings; however, in the management realm, it is difficult to gather aggregate data of actors’ behaviors since each individual behaves independently. We should therefore rely on case studies.

The author proposes microfoundation and micro-macro links in crisis analysis based on case studies of the 2007-8 US Financial Crisis and the 2011 Fukushima Dai-ichi Nuclear Plant Accident. Chart 4 summarizes this framework. On a macro level, deregulation was the cause of these crises since banks as well as electric power companies should be regulated heavily in nature. In turn, the macro environment of deregulation influenced individual actors to embrace a culture of taking risks and pursuing profit. Under severe, uncertain and complex environments, such actors’ behaviors affected each other, and at the same time affected and were affected by their technology and organization. This led to micro organizations’ failures and systemic failures of the whole institutions. In other words, irrational behaviors of individual actors and collectively unreasonable behaviors of organizations under such

environments lead to the failure of a total system. In order to avoid such crises, we should focus on these microfoundations and micro-macro links, and analyze the incentive, culture and governance of micro structures.

The framework proposed here is a tentative one; however, it will contribute to the development of institutional analysis of crises in the future.

Chart 4 Model for microfoundation and micro-macro links in crises



5. Conclusion and Discussion

Various crises are the result of behaviors and decisions of individual managers and other actors involved in an organization. In this paper, the author reviews the theoretical framework of microfoundational research in social science in general and organizational research in particular, and attempts to extend this framework of microfoundation used in management research to crisis analysis.

The paper identifies the benefits of a microfoundational framework in crisis analysis and suggests further research in this area. Further research will be required in the following four areas in order to advance this research. 1) Accumulation of case research data of actors' behaviors in crises; 2) development of the theory of interaction process of micro individuals and organizations; 3) development of theory of micro-macro links; and 4) identification of crisis-specific macro issues different from organizational issues in general. There was no paper dealt with the framework of microfoundational analysis of crisis and this paper will contribute to the development of such studies.

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