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Complexity and endogenous instability

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ABSTRACT

The global financial crisis proved the critical impact of the gap between individual rationality and group rationality. This gap is not supposed to arise in a Neoclassical world, but it frequently arises in a world as complex as ours. The paper explores how endogenous instability might arise due to such a gap, and what behavioral rules might help to mitigate its impact.

1. Introduction

In November, 2008, shortly after the collapse of Lehman Brothers and the outbreak of the global financial crisis, Queen Elizabeth II of England was visiting London School of Economics. She asked the group of eminent economists attending: "Why nobody noticed that the credit crunch was on its way?" Later, in June, 2009, the British Academy organized a forum to discuss the subject, and based on that, British Academy Fellows, Tim Besley and Peter Hennessy, prepared a letter to the Queen to provide the answer (Besley and Hennessy, 2009). Toward the end of the letter, the authors note:

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> So where was the problem? Everyone seemed to be doing their own job properly on its own merit. And according to standard measures of success, they were often doing it well. The failure was to see how *collectively* this added up to a series of interconnected imbalances over which no single authority had jurisdiction. This, combined with the psychology of herding and the mantra of financial and policy gurus, lead to a dangerous recipe. *Individual risks may rightly have been viewed as small, but the risk to the system as a whole was vast.* (Emphasis added.)

The letter concludes:

> In summary, Your Majesty, the failure to foresee the timing, extent and severity of the crisis and to head it off, while it had many causes, was principally a *failure of the collective imagination* of many bright people, both in this country and internationally, to understand the *risks to the system as a whole*. (Emphasis added).

So one main reason behind the crisis was the well known "fallacy of composition:" to infer that what is true for an individual bank or institution is also true for the whole market or economy. The fallacy arises due to failure to understand "the fact that the way the parts relate, interact, or affect each other often changes the character of the whole" (Damer, 2009, p. 140). Early economics textbooks used to illustrate the fallacy, mainly through the paradox of thrift. But it has been gradually de-emphasized in later texts (Lutz, 1999, p. 7).

In Neoclassical theory, such fallacy is not supposed to arise, at least not seriously. The "invisible hand" is supposed to coordinate self-interested agents and produce the good for the whole group. Self-interest is sufficient to satisfy group-interest. But we know that this is frequently not the case, the crisis being the most visible example. The fallacy has many applications in various economic activities, including growth, development, and trade (e.g. Mayer, 2003). It shows that the representative agent model cannot be warranted due to divergence of macro phenomena from micro behavior (Caballero, 1992). The fact that the whole in many ways differs from the parts is a major point of departure of Complexity Economics from Neoclassical theory (Al-Suwailem, 2010).

Standard macroeconomic models assume that the source of variability is exogenous; endogenous instability is assumed out (Buiter, 2009). Prior to the crisis, economic models assumed "crash-free" markets, which itself contributed to the crash (Bouchaud, 2008). Not only did these models fail to provide answers to questions of insolvency and illiquidity, they did not allow these questions to be asked in the first place (Buiter, 2009).

The crisis proved how volatility could arise endogenously from traders' and bankers' actions. Turner (2009), governor of Financial Services Authority, UK, remarks:

> . . . indeed, there are good reasons for believing that the financial industry, more than any other sector of the economy, has an ability to generate unnecessary demand for its own services—that more trading and more financial innovation can under some circumstances create harmful volatility against which customers have to hedge, creating more demand for trading liquidity and innovative products; that parts of the financial services industry have a unique ability to attract to themselves unnecessarily high returns and create instability which harms the rest of society.

This paper aims to examine how fallacy of composition in financial markets may lead to endogenous instability. Section 2 documents the endogenous volatility of financial markets. Section 3 presents game-theoretic models of fallacy of composition, and discusses some examples of fallacious behavior, particularly in the run up to the financial crisis. Section 4 discusses roots of fallacious behavior and related remedies. The conclusion is presented in Section 5.

2. Endogenous instability

It has been long-observed that financial markets show "excess volatility", as demonstrated by Shiller (1989) and others. Shiller finds that volatility of stock market (S&P500) is much higher than would have been predicted by efficient market hypothesis, particularly for the latest part of the twentieth century.