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SYSTEMIC RISK

*The Myth of Rational Finance
and the Crisis of Democracy*

campus

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1 Introduction: Systemic Risk Revisited— Steps to an Integrated Approach

Two of the most compelling and intriguing papers on systemic risk have been published, surprisingly, in a law journal. It raises the question: What's law got to do with it? We will touch on this question later in this text and first of all focus on a second perplexing observation. These two seminal papers argue from opposite vantage points, comprehend and conjecture systemic risk in fundamentally different ways, but they contribute in exemplary ways to an enhanced understanding of the problem of systemic risk. The two texts actually lay the groundwork for a more comprehensive understanding of the causes and consequences of systemic risk. The core controversy is exemplified by the following two positions: (1) "Systemic risk is an economic, not a political, definition" (Schwarcz 2008: 204); (2) "Systemic risk must be conceived in terms of political accountability and legitimacy." (Levitin 2011: 438)

These, then, are the crucial research questions: What are the reasons for conceiving systemic risk primarily as an *economic* problem or primarily as a *political* issue? And what are the arguments for an integrated approach which puts a framework of *political economy* center stage in delineating the context for understanding systemic risk? The different approaches, obviously, have serious consequences for the role of law. A predominantly economic approach reduces the role of law to basic premises for acceptable economic behavior, whereas a predominantly political approach calls for a dominant role of politics in safeguarding the common goods involved in financial risk taking. A political economy approach presupposes a more complicated and more sophisticated role of policy and law, at the same time accepting the limits of the regulatory power of law and the limits of the self-organizing capabilities of markets. It may turn out that systemic risk is one more instance of a variety of exceedingly complex and multifaceted societal problems which are testing the limits of democracy and of normative regulation (Ferran and Kern 2011). They

challenge politics and law to develop more complex and responsive governance modes and a cognitive mode of legal authority: “A legally oriented, rule-enforcing regulator is ill-equipped to cope with a systemic crisis caused by a financial system that has outgrown the existing set of rules.” (French et al. 2010: 37)

In order to investigate these questions we will—after a short general introduction—first reconstruct a working definition of systemic risk. We will present the economic approach to systemic risk, then the political approach and finally expound our own political economy approach. In the course of our argument we will take advantage of the fact that the global financial crisis of 2007-2009 and the ensuing economic and fiscal crises, including the Euro-crisis, have exhibited stark instances of systemic risk and thus catapulted the topic to high priority on the agendas of major powers such as the United States (US) and the European Union (EU), global actors, institutions and organizations such as the International Monetary Fund (IMF), the Basel Committee on Banking Supervision (BCBS), the Financial Stability Board (FSB) or the International Institute of Finance (IIF). We will analyze a few of the most important responses of these actors to the challenge of systemic risk and then focus on two institutional innovations which represent protracted activities of the US and the EU in efforts to improve their capacities to review and handle systemic risk—the creation of systemic risk oversight boards in the US as well as in the EU.

The formation, the proceedings and the operations of these two boards should give us an empirical-practical vantage point in assessing policy responses to systemic risk. Not surprisingly, the global financial crisis and its aftermath have provoked a tsunami of analyses, reports, position papers and a broad spectrum of research of all kinds which, instead of creating more clarity and insight, now threaten to obfuscate the core problem, which is a better understanding of systemic risk as a qualitatively new feature of global finance, as an emergent property of a highly integrated and concatenated global financial system. By adding small case studies of these new institutions which directly respond to an increased awareness of systemic risk, we aim at enriching the necessary conceptual clarifications and contestations with the complexities of real-world policy processes which try to tackle a phenomenon that is quite special insofar as it is mainly constituted and characterized by non-knowledge. Opacity, uncertainty, guesswork, ignorance and surprise are core ingredients of

systemic risks. We are dealing here with variations of the *black swan* category since the global financial crisis in general and its embedded systemic risks in particular carry all the features of highly improbable events that have extreme impacts on entire systems and, surprisingly, seem quite obvious and predictable *after* the fact. However, before the fact systemic risks are subject to the dire logic of *black swan* events, meaning that “what you don’t know [is] far more relevant than what you do know” (Taleb 2007: XXIII). Or in the words of the physicist Richard Feynman: “It is not what we know, but what we do not know which we must always address, to avoid major failures, catastrophes and panics.” (Feynman, cited by Haldane and Madouros 2012: 2)

Herein lies a complication of analyzing systemic risk which is still almost unnoticed in the debate—the relevance of the distinction between risk and uncertainty as originally outlined by Frank Knight (1965). According to Knight, risk is defined by uncertain outcomes in spite of certainty about the probabilities of different possible future outcomes. In contrast, uncertainty “exists in situations where we not only face variations in future outcomes, but the probabilities associated with possible future outcomes—indeed, possibly even the nature of future outcomes—are not known *ex ante*” (Stout 2012: 1180). Taken seriously, this consequential distinction would force us to speak of *systemic uncertainties* rather than of systemic risk, since *systemic risk* as understood in the broad discussion includes areas of risk and areas of uncertainty. In particular, the possible consequences of major risk propensities of big financial firms for the economy at large and even for political systems by definition are uncertain and not just risky. The acute difficulty of looming systemic *risk* for policy and political decision-making is exactly the fact that “we simply do not know” (Keynes 1937, cited by Stout 2012: 1180) what the implications and impacts of an exploding financial infection might be.

In order to remain comprehensible within the ongoing debate, however, we stick to the dominant usage of the term systemic risk and simply note that we include the element of uncertainty, as our definition will show.

An adequate analysis of systemic risk, we surmise, must be heedful of the special features of its object. The next manifestation of systemic risk will come as unexpected as the previous one. It would be preposterous to assume that a lucid analysis of systemic risk will prevent any future occurrences of systemic risk. What might be achieved by way of analysis,

however, is a more refined understanding of some of the conditions, contextual features, causal relationships as well as operational and functional specifics of constellations which may produce systemic risks. This *caveat* is particularly important with regard to legal scholars (and the law) which are trained to deal with and offer solutions to problems. In the US the *Dodd-Frank Wall Street Reform and Consumer Protection Act* (Dodd-Frank Act or DFA) of 2010 is a major piece of legislation aiming at rebuilding the legal foundations of a governance regime for the financial system. But of course, this is by no means a solution for the financial crisis since all depends on the specifics of interpretation, implementation and political exploitation. There is no solution to the problem of systemic risk—as there is no solution to the problem of non-knowledge. What can and should be achieved, including a role for law, is to render the problem of systemic risk operational in the sense of establishing a *modus vivendi* in handling and managing a pressing perennial problem.

A pernicious trait of systemic risk lies in the fact that by definition it cannot be restricted to internal transmissions of the financial system. The scariest part of systemic risk is its unpredictable impact on society at large and on the political system in particular. When governments topple because of financial scandals and mismanagement, when simplistic populist policies prevail and threaten to derail sound democratic discourse, when ministers and entire governments are replaced by experts, important policies are decided by central banks instead of parliaments, and when public debt increases to unfathomable amounts, then systemic risk becomes a problem for democracy. “The great challenge is to devise a system to identify risks that threaten market stability before they become a danger to the general public.” (Sheila Bair, cited by Johnson 2012: 2)

This is an essential point: Bankruptcy of a financial firm, a local financial crisis or the breakdown of a large investment fund are *normal accidents* and normal events in a competitive financial market characterized by ups and downs and by successes and failures. As long as these volatilities do not impinge on the economy at large (by way of feedback loops and vicious circles, creating an imminent economic crisis, unemployment and public turmoil), and as long as they do not impinge on the political system, these financial crises can strictly be seen as results of market dynamics. *Only when a financial crisis is threatening the political system and thus forces politics to save private firms with public money, the term systemic risk comes into play.* The mother of all questions concerning system risk, therefore, is

the question: Is this financial firm/institution in question too big, too central or too interconnected to fail—and is it thus able to take the political system hostage?

Beginning in 2007 the global financial crisis has had and is still having devastating effects across the globe and in many areas of society. The political fallout of the crisis will continue to be more consequential than financial losses, particularly as long as the worst losses are socialized and turned into public debt and tax payers' liabilities. A wicked chain of events leads from crises of financial institutions and financial systemic risk to economic troubles and downturns which in turn demand political crisis management under conditions of siege which in turn endangers democratic decision-making and the legitimacy of government policies. The public (i.e. the famous 99 percent) sees itself and its political representatives taken hostage by a small minority of reckless gamblers which takes home huge bonuses in good times and asks for unconceivable amounts of public money in bad times. The term *taken hostage* has to be understood literally: Financial institutions have been able to convince politicians that without public bailouts the financial system would crash, then the economy, and then there would be insurmountable problems for politics and government. The red circle in the following figure shows the threatening precipice of falling share prices of major financial firms (green Morgan Stanley, orange Goldman Sachs, blue S&P 500) in September 2008 which, if continued, would bring the financial system to a halt.

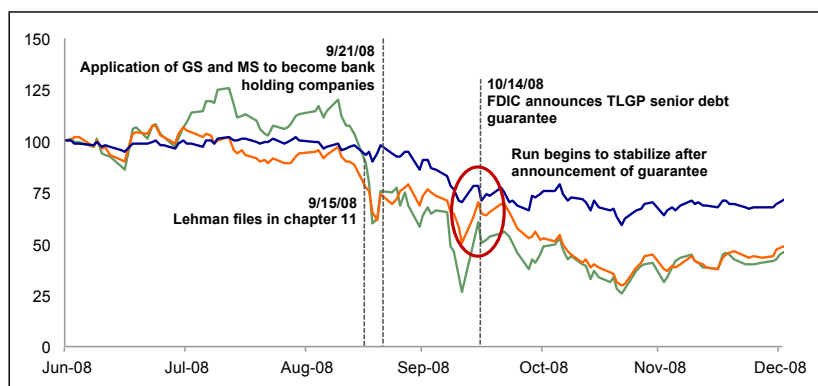


Figure 1: Morgan Stanley and Goldman Sachs — Share Price Evolution.

(Scott 2012: 135)

This prompted the US government to create a public rescue fund of 700 billion dollars. For political systems, particularly in democracies, this amounts to a lose-lose-situation. Politics cannot disregard systemic risks if they threaten to seriously disrupt the economy and hamper employment, wealth and growth; at the same time, policies to cope with systemic risk are caught in the double bind of supporting the culprits and punishing the innocent.

The structural background for this MAD-strategy (mutually assured destruction) of the largest banks is twofold: For one, since the 1970s the financial system has become considerably deeper (meaning an increasing ratio of bank assets-to-GDP, implying larger leverage of finance on economic activities) and considerably more concentrated (see figure 2).

Even more troublesome questions than those focusing on single persons and individual actors concern nodes of structural coupling between finance and democracy. This is the realm of financial governance, pitting the ideal of market self-regulation and the myth of financial rationality against the dire reality of political responsibilities when the going gets tough. To be sure, there is no reason to assume a black-and-white picture or a hero-villain relationship between financial markets and political systems. The various crises have shown as much market failure as state failure. The inability of financial markets to regulate themselves rationally is matched by the inability of democratic policies to withstand the fallacy of populism. Because of widespread misconceptions, particularly in fields of economic policy, even stable democracies are prone “to choose bad policies” (Caplan 2007), for example in the areas of public investment in common goods, public debt levels, long-term consequences of short-term decisions, influence peddling of powerful lobbying groups (Johnson and Kwak 2011) and so on.

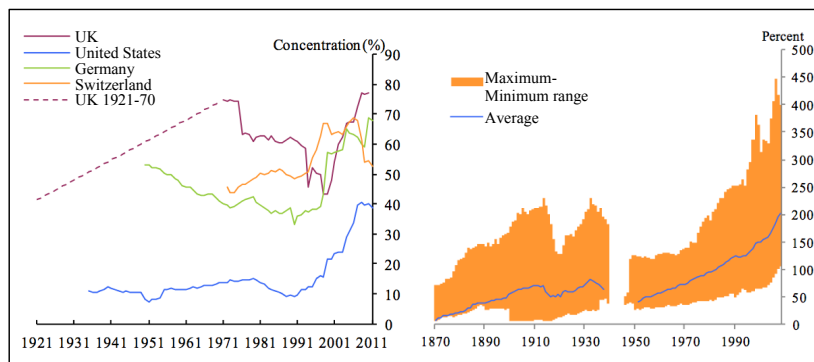


Figure 2: Banking concentration (left) and bank assets/GDP (right) in selected countries.

(Haldane 2012: 14)

The integrity of democratic policies and decision-making is severely undermined by the uncanny leverage major financial firms are able to exert on regulatory and supervisory policies. Some of that leverage is the unintended result of architectural changes in the global financial system following the demise of the Bretton-Woods arrangements. These changes, which we will describe in more detail later on, have created a tightly coupled and interdependent global system without adequate institutions of governance and with insufficient international coordination. A second part of the leverage results from the overpoweringly superior expertise of major financial firms, financial consultancies and rating agencies. Neither governments nor regulatory or supervisory institutions have been able to match this kind of expertise, in many respects leaving them at the mercy of those supposedly to be controlled.

Finally, a third type of the financial system's leverage impacting politics derives from inbuilt weaknesses of democratic politics in an emerging knowledge society (Willke 2007; Willke and Willke 2012). Increasingly, politics is confronted with problems which by far surpass the expertise and comprehension of average people, for instance the median voter. Policy arenas such as monetary policies, climate change, ecological strategies, prevention of organized crime, science or educational policies, and of course financial policies, remain arcane topics for most people and thus become domains for specialists. Politicians and political parties seeking majorities and (re-)election may appreciate the importance of these topics,

but they will not devote precious time and resources to questions which are boring or incomprehensible to a vast majority of voters. This mechanism leaves ample room for specialists and organized interest groups, thus abrogating the ideal of open democratic discourse and deliberation.

An antidote to this weakness of democracy is to build up institutional intelligence in regulatory and supervisory agencies, to outsource particularly important and sophisticated problems to autonomous institutions such as central banks or the World Trade Organization (WTO), and to support the role of independent advocacy groups such as Finance Watch which are able to balance the influence of the financial industry on financial policies and decision-making to some degree. The financial crisis and its aftermath, including the Euro-crisis, have highlighted a smoldering crisis of democracy. There have been crises of democracy before (Crozier et al. 1975) and very probably crisis is part of democracy's way of adapting to new circumstances. What sets this crisis apart, however, is its close relation to an ongoing major transformation of a nationally defined industrial society into a globally embedded knowledge society. A twofold challenge of deepening globalization on the one hand and of expertise-based sophistication of all policy arenas on the other puts serious stress on constituent components of democracy as a governance regime—on the processes of building legitimacy, on the possibilities of participation, as well as on the chances for transparency, accountability and sovereignty.

Each of these components of democracy is becoming more difficult to achieve because globalization is diffusing authority and accountability, thus demanding new ways of defining sovereignty (Agnew 2005; Grande and Pauly 2005; Keohane 1995) and legitimacy of internationally interdependent political decision-making. Many policy arenas have become opaque and highly sophisticated, preventing laypeople from participating and becoming involved. Knowledge-intensity of these arenas propagates a dominance of experts and precludes public democratic deliberation, pushing policy-making into lobbying corridors and so-called *Green Rooms*. All this amounts to serious challenges for traditional forms of democracy in spite of the fact that democracy still is the most intelligent and responsive governance regime available. Inexorably the new challenges produce a situation where democracy is the best but not good enough.

Arguably, systemic risk is the most conspicuous exemplification of the present dilemmas of democracy. Systemic risk assembles and combines all the ingredients of systemic failure, combining a failure of capitalism

(Posner 2009) and a failure of democracy. The 2008-2009 financial crisis has been “the first example of systemic failure of the 21st century” (Goldin and Vogel 2010: 5). Features such as uncontrolled societal and political implications of seemingly isolated economic disasters, inadequate regulation and supervision and a profound inability of democratic procedures to penetrate the veil of ignorance around arcane financial business procedures and risk models coalesce to create the worst global crisis since the Great Depression. Even worse, political systems and governments appear unable to prevent being taken hostage by financial firms and their obscure global machinations of risk propensities and concatenated counterparty risk dynamics.

2 Describing Systemic Risk

Systemic risk has been a topic of finance for some time (De Bandt and Hartmann 2000; Davies 2011; Freixas et al. 2000; Hellwig 1998; Kaufman 1996), including the role of large banks (Boyd and Gertler 1994) and the *credit crunch* (Bernanke and Lown 1991). However, the dominant free-market and deregulation mood of the 1990s prevented most other academics, regulators and political actors from listening (Rajan 2010: 1). During and after the financial crisis of 2007ff. this changed abruptly and now almost every major regulator, think tank, global financial institution or foundation has discovered the topic of systemic risk (see e.g. Böhme 1986; Brender and Pisani 2009; Financial Stability Forum 2008, 2009, 2010; Schwarcz 2008; The Warwick Commission 2009; U.S. Department of the Treasury 2009; Williams 2010; and for both an overview and review of literature see Galati and Moessner 2011).

In spite of all these efforts, the terms *systemic risk*, *macroprudential* or *systemically important* are not well-established terms in financial regulation and governance. The legislating text setting up the European Systemic Risk Board (ESRB) defines systemic risk as “a risk of disruption in the financial system with the potential to have serious negative consequences for the internal market and the real economy” (European Parliament and Council of Ministers 2010: para. 27). Similarly, a recent FSB-IMF-BIS report defines systemic risk as “a risk of disruption to financial services that is (i) caused by an impairment of all or parts of the financial system and (ii) has the potential to have serious negative consequences for the real economy” (cited by Ferran and Kern 2011: 27). These are much better than purely financial definitions, but they still ignore the core element of systemic risk which encompasses the *potential political ramifications* of serious troubles in the real economy.

Following the onset of the financial crisis there has been an avalanche of reports and analyses from many disciplines and institutions, such as for

instance the FSB, the Group of Thirty, the De Larosière Report (EU), the Turner Review (GB) or the Treasury Report (USA) and the Financial Crisis Inquiry Report (De Larosière 2009; U.S. Department of the Treasury 2009; Turner and Haldane 2010). But political scientists have been hesitant in producing quick responses to the crisis (Mayntz 2010). The preparation and aftermath of the April 2008 G-20 summit in London clearly demonstrates the core dilemma of the *political governance* of global crises:

A gap had opened up between the economic and the political organization of the world. The economic world has been globalized. Its institutions have a global reach and have operated by maxims that assumed a self-regulating global order. [...] The financial collapse exposed the mirage. It made evident the absence of global institutions to cushion the shock and to reverse the trend. (Kissinger 2009: 6)

This means “that some of the more serious fault lines lie not in economics but in politics” (Rajan 2010: 5). The profound incongruence between urgent global problems and the absence of global government prevents simple solutions and hampers quick responses. The crisis is not specific to the financial system, “it is a crisis of the entire system of governing” (Miller 2008: 6). It demands intricate combinations of elements of national sovereignty, transnational coordination through policy networks (Bhagwati 2004; Börzel 1998) and supranational agenda setting in mixed forms of public and private authority (Cutler et al. 1999; Hall and Biersteker 2002; Grande and Pauly 2005; Porter and Ronit 2006) such as the FSF (Financial Stability Forum 2008) or the Group of Thirty (Tsingou 2006, 2009) and genuinely global institutions such as the BCBS.

All these activities point to the fact that “with the benefit of hindsight, there has been a fundamental lack of understanding of system-wide risk” (Galati and Moessner 2011: 3). In this situation of continuing bewilderment and confusion the two papers by Steven Schwarcz and Adam Levitin offer an excellent framework for a sophisticated description of the constellation called systemic risk. Keep in mind that a description is not an explanation and a far cry from a *solution*. A description assembles a number of observable features and components of an entity. In our case of systemic risk, we must assume that a description of this entity comprises considerable margins of error, uncertainty and non-knowledge because they are part of the very notion of systemic risk. If we knew all the ingredients it would not be systemic risk any more. Indeed, as Schwarcz points out, “there is a great deal of confusion about what types of risk are

truly ‘systemic’” (Schwarcz 2008: 196), and as a result, even the definition of systemic risk is still unsettled.

We therefore propose to start out with some basic observations pertaining to systemic risk in order to proceed to a working definition of the term. Closely related topics such as *too big to fail* (TBTF) and *systemic relevance* or *systemically important financial institutions* (SIFIs) need to be included in a first conceptual clarification before we then embark on a discussion of the three major approaches to understanding systemic risk: The economic, the political and the political economy approach.

2.1 Basic Features of Systemic Risk

“The human mind is excellent in its ability to observe the elementary forces and actions of which a system is composed. The human mind is effective in identifying the structure of a complex situation. But human experience trains the mind only poorly for estimating the dynamic consequences of how the parts of a system will interact with one another.”

(Jay Forrester)

Many people misread and misunderstand systemic for systematic because the latter is the term they are familiar with. Schwarcz actually refers to the *Oxford Dictionary* explaining that systemic means something like pertaining to a system. Now, this is very rudimentary and probably misleading. Systemic is a core term of systems thinking and systems theory, thus carrying the weight of an extended theoretical background which contradicts—or at least challenges—core assumptions of mainstream theorizing, particularly in economics and finance. It is crucial for our argument to be very clear about the fact that the discovery of systemic risk by economists and finance scientists introduces a completely strange element in traditional economic and financial thinking which, therefore, is not at all connected to other strands of theorizing. In many cases we have to assume that usage of the term systemic is simply a case of conforming to a new important catchword and has nothing to do with a reflected incorporation of systems thinking.

Without at least a faint background in systems thinking and, hopefully, some acquaintance with systems theory, it appears to be very improbable

that the term *systemic risk* can be constructed and used except in a merely metaphorical way. The point of systemic risk is *not* that the system (whatever the system may be) might crash. Systems thinking teaches that the point of systemic risk is that *the completely normal, regular operational mode of the system, as it is, can lead to the self-destruction of the system*. This clarification of the term *systemic* has major implications for understanding systemic risk. Indeed, as Alan Greenspan—not a systems thinker—says, systemic risk might be called *market failure* or *harsh* market outcomes or whatever, if there is no clear conception of what *systemic* actually means within the context of systems thinking. After all, at least the Office of Financial Research (OFR) has realized that “even absent external shocks, financial activity can generate threats to financial stability” (OFR 2012a: 2).

Systemic properties are holistic features of a system which can only be explained by referring to the overall operational logic of this system. Here, we are concerned with social (including social-technical) systems, but it also applies to complex, operationally closed natural and biological systems. For example, Ilya Prigogine has discovered the holistic property of *order through fluctuations* in complex chemical reaction systems, or Humberto Maturana has developed the concept of *autopoiesis* as a striking systemic property of living systems. Social systems on the other hand may be groups, organizations, societies or functional subsystems of society such as an economy, a legal or a financial system. The difficult part of understanding social systems is that they develop properties beyond the mere interaction of people. Without going into detail we ask the reader to think, for example, of a family tradition (*system family*), an organizational culture (*system organization*) or national styles (*system society*) as manifestations of systemic qualities which cannot be attached to single persons, but instead must be understood as *emergent properties* of an evolving historical system. Robert Jervis has called these properties “system effects” (Jervis 1997), pointing out that the entire system exhibits properties and behaviors that are different from those of its parts.

2.1.1 Systemic Risk as an Emergent Property of Global Finance

The idea that there is a logic of emergent properties of complex systems resulting from the non-trivial interaction among its elements is not exactly new (Minsky 1988). From the intuition that *the whole is more than the sum of its parts* to the elaborated concept of the emergence of life from concatenated

hyper-cycles of auto-catalytic processes (Eigen 1971, 1979), from the *invisible hand* as an explanatory principle of emergent properties of the market (Adam Smith) to the idea of *systemic risk* emanating from an opaque interplay of layered and leveraged components (Eatwell 2004), systemic thinking has at its disposal a vast array of notions of the emergence of new levels of organized complexity or new levels of concatenated events that produce “a particular pattern that closes itself through a cycle of operations” (Allport 1954: 288) and thus produces properties which cannot be explained by the properties of its components.

A systemic reframing of the old idea of emergence offers two advantages. On the one hand, a systemic view avoids the unfruitful *micro-macro-distinction* which implies a rather misleading focus on a *micro-determination* of emergent properties (for a discussion of these traditions see Heintz 2004; and for a more innovative approach Schröder 2004). On the other hand, the more pertinent distinction of parts and wholes can now be specified as relational orderings of elements and systems. The overarching question for understanding emergence is: How can a coherent systemic context that has evolved per chance be stabilized as an ongoing reproductive order and emerge as a viable system? To give an example: How can a complex of auto-catalytic processes (involving myriads of macro-molecules) that have evolved to the level of a viable self-reproducing entity by pure stochastic variation and in processes of evolutionary bricolage, be maintained as a stable order of a system that establishes itself on a new level of complexity as a living cell? There must be a governance regime of sublime efficacy within the cell to reestablish an order that started as pure chance.

This type of question helps to realize that emergence cannot be explained by looking at parts or elements from a micro perspective. Rather, it is the systemic context, established by whatever means of incremental evolution and chance variations, that, once established, exerts exactly those influences that are necessary to form and select parts as components of the emergent system. “Elements are elements only for those systems that use them as elements, and they are elements only through this system.” (Luhmann 1984: 43, translation H. W.) Again, a self-referential cycle lies at the heart of the forms of concatenation of parts and wholes leading to the emergence of a novel system level. It is neither sufficient for emergence to assume that elements interact in a way that somehow produces a new systemic order with emergent properties—for nothing in the elements

themselves can explain the capacity to continuously reproduce the new order of structuring of elements or events. Nor is it sufficient for emergence to assume that the (new) system has been miraculously created by some higher power—for then the higher power needs an explanation as well. A systemic view needs no metaphysical and no transcendent explanation. It is strictly based on naturalistic reasoning in that it relies on evolutionary chance to be the only and sufficient cause for a first realization of new systemic order.

Any system, regardless at what level, be it a cell, organism, mind, language or social system, needs to come into being through evolutionary processes, that is: On the basis of sheer chance, tinkering and contingency. Only those concatenated contexts will survive as *systems* that, against all odds and against all probabilities, establish within the specific network of ongoing processes the rules of interaction and ordered processes that organize the continuous recreation of precisely the system which includes those rules. An emergent system then can be seen as an *improbable order*. It depends on mechanisms, for instance communication, memory and resilience, which extend a momentary per chance order in time and resist the immediate breakdown of an improbable constellation of elements. An example is the organization of the human brain:

This is because the developmental assignment of neural functions to different regions of the brain is in many respects systematically determined. In a very real sense, the brain as a whole participates in designing its parts. The implications of this unusual developmental logic are only beginning to be appreciated for brain evolution. (Deacon 1997: 194)

Another crucial example is the organization of a market. Its capacity of organizing locally distributed knowledge into emergent systemic knowledge has bewildered many observers from Adam Smith to Friedrich von Hayek (v. Hayek 1945).

Communication in a very broad sense, including all kinds of signaling, appears to play a crucial role in stabilizing a systemic order that at first sight seems highly improbable. Communication between and along the elements at the same time provides the glue and the procedural sequencing of events that eventually and per chance permit operational cyclicality, a hyper-cyclical ordering of processes and operational closure. At this very point, emergence coincides with constitution in the sense that a systemic order with emergent properties is constituted. Not just the elements constitute the system. Rather, a specific informational connecting of ele-

ments into patterns, processes and structures, according to *remembered* rules, creates cycles of operations that withstand the normal course of entropy and disintegration. In this sense emergence is primarily a consequence of established and confirmed (i.e. remembered) rules of information flows and communication. An informational coding of procedures complements the material interaction of elements and the informational coding that eventually evolves as being viable is guided by the functional requisites and exigencies of the system as a coherent whole.

Unfortunately, emergent communicative patterns—particularly in complex organizations—can lead to conceptual biases and intellectual hazard by substituting erroneous or misleading operating procedures for simple clear thinking, sometimes causing disastrous mistakes. “The mistakes were elementary—so elementary that if a single person had been carrying out the task, rather than a complex team, they never would have happened.” (Miller and Rosenfeld 2010: 809)

This line of reasoning points to a clearer description of emergent properties: Those properties lie in the specific patterns of informational pathways that connect elements to operative cycles. These cycles constitute and reproduce the system. For example, in the case of the financial system these are sequences such as credit or asset price cycles which characterize the dynamic of finance and which change according to the components involved and new components added to the cycle, as depicted in figures 3 and 4.

And it is the specific pattern of concatenation, including structures, procedures and rules that build a system’s distinct identity. Interestingly, those informational patterns of concatenation are restrictive factors, limiting the option space of the elements according to the procedural and self-reproductive needs of the system.

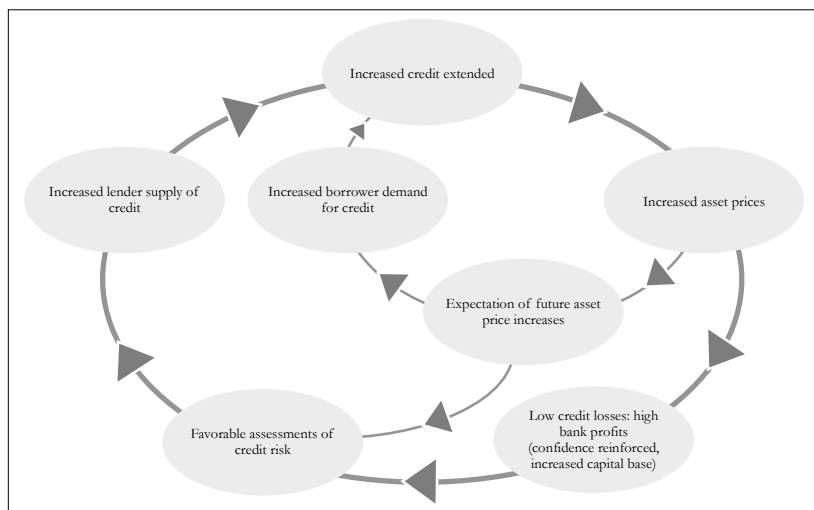


Figure 3: Credit and asset price cycles.

(figure based on Turner 2010: 80)

In that sense, in an emergent system the whole is less than the sum of its parts. However, the systemic coupling of the elements creates new properties of the system (emanating from selective reduction) and in this respect, the system is more than the sum of its elements. It is here where Nassim Taleb, the protagonist of the *black swan* errs with his own categories. He states that the crisis of 2008 “was a lot of things, but *not* a Black Swan, only the result of fragility in systems built upon ignorance” (Taleb 2007: 321). He disregards that something completely new has indeed happened: The interplay of partial crises (which were indeed known and not new) resulted in *emergent properties* of the system of global finance which nobody had intended or foreseen: “The financial system had changed in ways that nobody fully appreciated.” (Krugman 2009: 152)

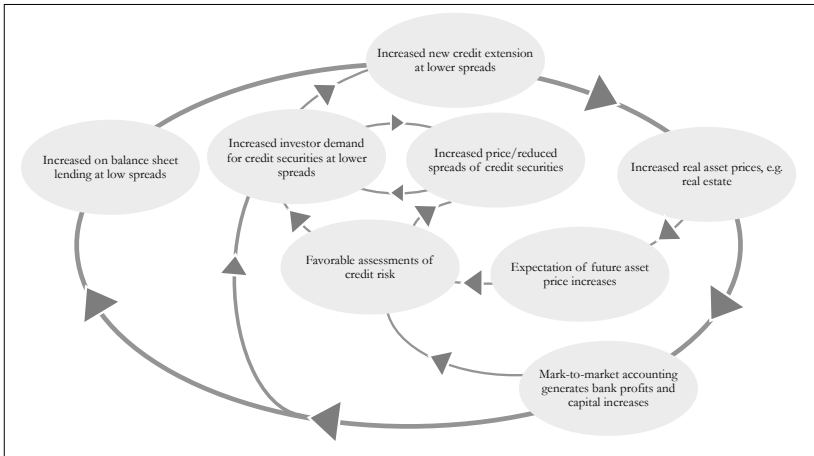


Figure 4: Credit and asset prices: With securitized credit and mark-to-market accounting.

(figure based on Turner 2010: 85)

A lack of focus on the changing system characteristics of the international financial system has characterized the international regulatory developments of the past few years (Eatwell 2004: 1), thus ignoring emergent properties in general and the fact that after the end of the Bretton-Woods agreements the global capitalist system has slowly and incrementally changed from a loosely to a tightly coupled system in particular (IOSCO 2011: 25). On a systemic basis, the U.S. Treasury observes, “regulators did not take into account the harm that large, interconnected, and highly leveraged institutions could inflict on the financial system” (U.S. Department of the Treasury 2009: 5), and the Financial Crisis Inquiry Commission concludes in its 2011 report that “the Federal Reserve realized far too late the systemic danger inherent in the interconnections of the unregulated over-the-counter (OTC) derivatives market and did not have the information needed to act” (Financial Crisis Inquiry Commission 2011: 308). Very few authors see that regulation at the level of individuals or individual firms misses the point of reaching the systems part of systemic risk:

- No behavioral regulation can have an impact on the working of the economic system as a whole [...] contrary to widely held beliefs, the ultimate origins of

the 2007-9 huge financial crisis were not behavioral but structural. (Rossi 2011: 62 and 75)

- Simply asking bankers to behave differently will not work; the solution can only come by changing the rules of the financial system, which requires government action. (Johnson and Kwak 2011: 190)
- Financial regulations are typically designed to ensure the health of individual institutions rather than the financial system as a whole. (French et al. 2010: 26)

Daniel Tarullo, board member of the Federal Reserve Bank, has summarized the core factors succinctly, pointing to the crucial connection between single firm risk and systemic risk:

- Let me start by detailing how distress in a financial firm can create risks to overall financial stability, as a prelude to suggesting how an understanding of those dynamics should inform prudential regulatory policies. There are basically four ways:
- First is the classic domino effect, whereby counterparties of a failing firm are placed under severe strain when the firm does not meet its financial obligations to them. Their resulting inability to meet their own obligations leads, in turn, to severe strains at their other significant counterparties, and so on through the financial system.
- Second is a fire-sale effect in asset markets, when a failing firm engages in distress sales in an effort to obtain needed liquidity. The sudden increase in market supply of the assets drives down prices, often substantially. As we saw in the recent crisis, this effect transmits not only to firms that must sell assets to meet immediate liquidity needs but, because of margin calls and mark-to-market accounting requirements, to many other firms as well. The result is an adverse feedback loop, as these steps force still more sales.
- Third is a contagion effect, whereby market participants conclude from the firm's distress that other firms holding similar assets or following similar business models are likely themselves to be facing similarly serious problems.
- Fourth is the discontinuation of a critical function played by a failing firm in financial markets when other firms lack the expertise or capacity to provide ready substitutes.
- Indeed, the failure of almost any financial firm could bring about systemic problems if markets believe that failure reveals heretofore unrecognized problems with one or more significant classes of assets held by many financial actors, especially where the assets are associated with considerable degrees of leverage, maturity transformation, or both.

- That is, the emphasis ought to be on the direct consequences of the firm's failure. The potential for systemic risk from contagion effects really reflects the potential failure of an asset class or business model more than a firm. These risks are, at least presumptively, more effectively addressed head-on. (Tarullo 2011a)

One promising way to move beyond isolated items and gain some understanding of the operational dynamics of a specific system is to develop and apply an *agent-based model* (ABM) of this system. The core of an ABM is to analyze the actions of autonomous agents in order to predict the overall or macro-behavior of a system. Unfortunately, most applied examples involve rather simple systems such as traffic jams, patterns of flocks of birds in flight or the spread of epidemics. Using ABMs to explore the dynamics of financial systems is just beginning (OFR 2012a: 50f.). It appears to be an important step to improve the modeling of financial dynamics and to get a grip on the emergence of systemic risk. Its central analytic elements are key agents, policy levers, vulnerabilities and shocks to the system. If these elements were supplemented with genuine systemic categories describing the dynamics of complex adaptive systems, such as the quality of coupling of interdependent elements, degrees and levels of interconnectedness, venues of contagion and leverage, self-reinforcing feedback cycles and procyclical propensities, non-linear eigen-behavior and so on, then an even more appropriate model would result.

Leverage is a key source of systemic risk as it serves as an amplifier. A non-systemic risk can become systemic through the simple effect of leverage. Leveraging can occur directly using borrowed funds or indirectly via derivatives or other products that have embedded leverage. Embedded leverage also intensifies pro-cyclicality in the financial system. (IOSCO 2011: 20)

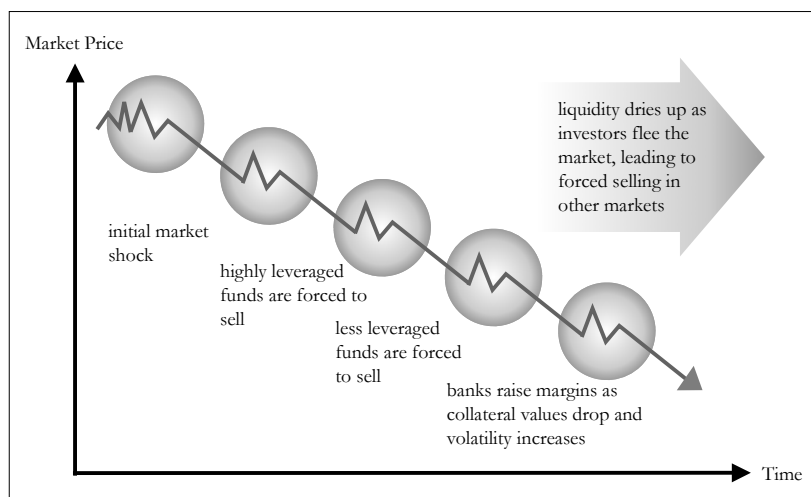


Figure 5: Fire sales (liquidity cycle).

(figure based on OFR 2012a: 56)

For example, the 2012 Annual Report of the Financial Stability Oversight Council (FSOC) singles out three major vulnerabilities of the financial system—short-term wholesale funding markets, the tri-party repo market, and the money market fund industry—which “cannot be adequately addressed only at the firm level and must be tackled at the system level” (OFR 2012a: 10). This is exactly the reason why an agent-based model may not be sufficient in spite of its value. Any agent-based model still focuses too much on individual actors and agents. Instead, the direst and most consequential deficiencies in analyses, models and data relate to overall system properties and dynamics.

A telling case in point is the dynamic of a liquidity cycle (*fire sale*) which feeds on itself in a positive feedback loop. Actually, existing bank regulation and bankruptcy laws (in the US) precipitate fire sales instead of preventing them, because banks drive their own borrowers into liquidation. This unintended consequence is created by microprudential financial regulatory policy, which “is a source of unnecessary downward pressure throughout the banking system on the value of assets, leading to potentially catastrophic increases in systemic risk and financial contagion” (Woo 2011: 1615).

The 2012 Annual Report of the OFR describes this logic as depicted in figure 6. Indeed, neither an agent-based model nor a focus on individual actors or firms is able to adequately describe the systemic logic of a self-feeding positive feedback loop. Even if *rational* actors were to understand this logic and tried to counteract its dynamic, they would find it exceedingly difficult to resist the power of a deteriorating market. In addition, it seems to be necessary to extend the OFR's chart by distinguishing specific kinds of risks. The first three stages of the dynamic pose strictly financial risks. As long as these risks are absorbed by the financial system even at the cost of some bankruptcies, we are not confronted with systemic risk. Only when the last stage is reached and liquidity is seriously drying up because the markets for the assets of leveraged funds are faltering and regular economic firms and the economy are suffering from having no access to credit, then the consequences become *politically relevant* and force political systems to intervene. This is the area of systemic risk.

Timothy Geithner, for one, has seen early on that in order to understand systemic risk one has to look at the system as a political-economic entity instead of focusing on individual items:

It probably is possible for a country with an exceptionally virtuous fiscal and monetary policy framework to experience a systemic financial crisis. But most financial crises involve a shock whose origins lie in the realm of macroeconomic policy error, often magnified by the toxic combination of poorly designed financial deregulation and an overly generous financial safety net. (Geithner 2004: 5)