

Complexity in International Economics and Finance

James Drogan

Norwich University

Abstract

International economics and finance has become and will continue to be complex. We examine the nature of this complexity suggesting that it is a major inhibitor to economic growth and well-being, provide examples to support our assertions, suggest how this complexity can be decomposed to allow understand, and recommend actions for dealing with what we consider to be a significant issue.

Complexity in International Economics and Finance

From the Bretton Woods conference after World War II emerged set of regimes and institutions intended to bring order and stability to the role of international economics and finance. The founding institutions were the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (IBRD). These institutions served in essentially an unchanged form for the next 25 years. In 1971 the United States abandoned the gold standard and the Bretton Woods system began to change in fundamental ways.

The systems of international economics and finance subsequently changed in an effort to cope with the growing complexity and speed of change in the world. New threats and opportunities emerged; new strengths and weaknesses became evident; the externalities with which the systems contended ebbed and flowed; state politics substantially influenced and, in some cases, took precedence over international needs. All these forces continue to be present.

International systems have become increasingly complex in the effort to contend with these issues and, consequently, have become less responsive and resilient. Threats go unmitigated, opportunities are not pursued with success, and the divide between the North and South grows wider.

The Structure of the International Institutions

Willetts points out that there are more or less 95 thousand political actors in the world (Willetts, 2008, p. 332). This gives rise to the potential for 9 million or so relationships affirming that the world is indeed complex. A complete examination of a system with these characteristics may well be impossible and, insofar as we can ascertain, has not been undertaken. We will not remedy that lack here. We draw, instead, upon *Intergovernmental*

Organization in the Global System, 1815-1964: A Quantitative Description (Wallace & Singer, 1970) as a basis for discussing the structure of international institutions. Added to these will be aspects of the public and private banking and finance industry, and state political systems often having a pronounced affect on international institutions. Indeed, it has been noted how the functioning of international institutions often represents the agendas of powerful states (Sachs, 2004) that are not identified by Michael Wallace and J. David Singer.

Wallace and Singer set out to measure the amount of intergovernmental organization in the international system in terms of the number of international government organizations (IGOs) in the system and the number of nation memberships in the IGOs (p. 240) over the period 1815-1964. Wallace and Singer also point out that the *Yearbook of International Organizations* published by Union of International Associations is helpful to understanding the IGOs. The 2008-2009 edition identifies some 35,000 active international organizations. For the purposes of this paper, there is little to be gained from consulting this reference inasmuch as more organizations will simply underscore the argument made herein.

The work of Wallace and Singer is, for our purposes, neatly summed up in the following figure.

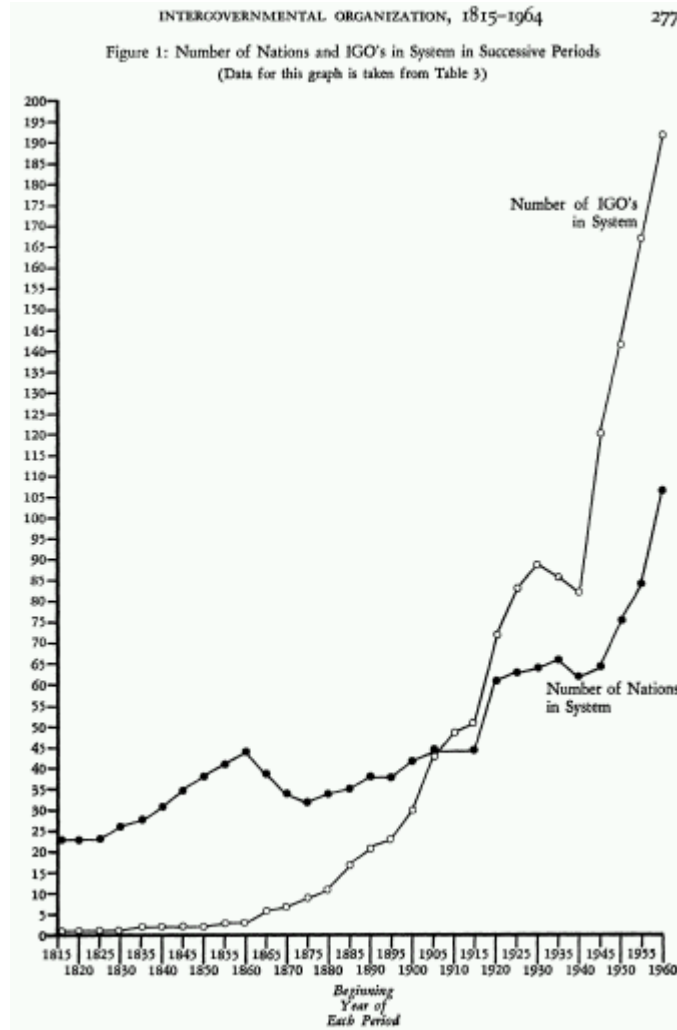


Figure 1 Count of IGOs and Nations

At the end of the five-year period beginning in 1960, the number of IGOs in the system was 192 and the number of nations in the system stood at 107. These two numbers provide the opportunity for about 44 thousand relationships. This is substantially less than the number associated with Willets' 95 thousand political actors, yet still an overwhelming number. The hypothesis we make is that the larger the number of IGOs, states, and

relationships the greater the heterogeneity (e.g., culture, capabilities), the less the homogeneity, and thus the interaction costs (e.g., time, money) of managing the heterogeneity increase. The conclusion is that the international system provides the opportunity for complexity.

Characteristics of Complex Systems

The assertion is that international economics and finance is a complex system. Complex systems exhibit characteristics that can enable or inhibit the ability of the system to meet its designed goal. Complex systems can be described in terms of structure and behavior.

Structure

Structure in systems comprises the components (e.g., people, processes, and information) and the manner in which command, communications, and control is implemented between these components (e.g., face-to-face, electronic). For example, the structure of Economics and the International System course in the Norwich University School of Graduate Studies comprises the professor and the students using a set of learning processes, chiefly discussions and papers, and drawing upon information from assigned and supplementary readings as well as other reading and existing knowledge and thinking brought to bear by the students. Command, communication, and control is mainly implemented through the on-line learning system. This is a relatively simple structure.

Complex system structures are characterized by some of the following:

- “A system is complicated when it is composed of many parts interconnected in intricate ways” (Joel Moses in Sussman, 2000, p. 4). There is no number of parts or interconnections above which a system is declared complex and

below which it is declared simple. One can declare systems complex relative to one another. We assert that the international system would be declared complex by most practitioners in the field of complex systems.

- “Complex situations are often partly or wholly unobservable, that is, measurement is noisy or unachievable (e.g., any attempt may destroy the integrity of the system). It is difficult to establish laws from theory in complex situations as there are often not enough data, or the data are unreliable so that only probabilistic laws may be achievable. Complex situations are often soft and incorporate values systems that are abundant, different and extremely difficult to observe or measure. They may at best be represented using nominal and interval scales. Complex situations are ‘open’ and thus evolve over time -- evolution may be understood to involve a changing internal structure, differential growth and environmentally caused adaptation” (Flood and Carson in Sussman, 2000, p. 7). In general, as a system grows in complexity it becomes increasingly difficult to see its structure which, in turn, compromises the understanding that can be developed.
- “...physical systems are shaped by unchanging natural laws, whereas social systems are subject to intervention by cognizant agents, whose behavior is essentially unpredictable at the individual level. Investigations of economic time series by chaos theorists have usually assumed that relationships among economic actors are fixed over time. In reality, methods of macroeconomic management have changed from the use of the gold standard to Keynesian demand management and, later, to monetarist controls. Human agency can

alter the parameters and very structures of social systems; indeed, one of the main purposes of management is to limit the gyrations of chaotic systems, reduce their sensitivity to external shocks, and, in the case of Demming's lean management systems (Womack and Jones, 1990), ensure that behavior is non-chaotic by reducing variability throughout the system" (David Levy in Sussman, 2000, p. 13). International economics and finance are, at their center, social systems subjected to all the vagaries of such systems. The understanding one worked so hard to obtain yesterday may well be obsolete today.

Behavior

Behavior is the response of the system to external and internal inputs according to the formal, informal, and *ad hoc* rules defining the manner in which the components are to interact over the links in order to achieve objectives. Returning to the example of the Economics and the International System course in the Norwich University School of Graduate Studies we find that students respond to the objectives as stated in the Graded Requirements. For example, students participate in discussions of assigned issues. They prepare essays and papers. While we considered this a simple system, we consider the behavior to be complex and sophisticated.

Complex system behavior is characterized by some of the following:

- "A system is complex when it is composed of a group of related units (subsystems), for which the degree and nature of the relationships is imperfectly known. Its overall emergent behavior is difficult to predict, even when subsystem behavior is readily predictable. The time-scales of various

subsystems may be very different (as we can see in transportation -- land-use changes, for example, vs. operating decisions). Behavior in the long-term and short-term may be markedly different and small changes in inputs or parameters may produce large changes in behavior” (Sussman, 2000, p. 5). It strikes us it may never be possible to characterize the behavior of international economics and finance for the reasons given here by Sussman.

- “Perrow argues that our systems have become so complex and closely coupled that accidents are ‘normal’ and cannot be assured against. He discusses the idea of components being joined by complex interactions, so that the failure of one affects many others” (Sussman, 2000, p. 21).

These characteristics have been extracted from Sussman’s paper because of their relevance to thesis of this paper.

Examples of Factor Contributing to Complexity

We were unable to uncover comprehensive research analyzing relationships in the international system in the context of complexity. We turn, as a consequence, to examples of relationships. We hold that economics and finance is profoundly shaped by politics. Hence, we start with political examples.

MS. ALBRIGHT: Well, I think it [Iran] is one of the more delicate situations, frankly, because I can tell you from the past various things that have happened. When I was in office, it was also the time that President Khatami had been elected and we thought that it was a moment that really could find a period of contact and reform. Our history with – the U.S. history with Iran is deeply complicated.

But we thought that this was a time – and President Khatami wanted to have a dialogue of civilizations. We were trying to figure out ways to meet. And I think one of the things that I've been told happened is that by his being somebody that we thought we could kind of have a good relationship with was not really helpful to him.

And so, I think President Obama and Secretary Clinton are walking a very delicate line in showing support for – as President Obama said, that people should be allowed to voice their views and at the same time not have us be part of it because I think that we don't want to get involved in a way that undermines the process that's going forward.

I think it's fascinating and it does show that people, if they have a will and a combination of desire can get something done, but I think we have to be really, really careful– I look at Robert Hunter here – we went through the hostage crisis and various things that were very difficult to try to figure out exactly what to say when. Right, Robert? So we have to be careful (Albright, 2009).

Ms. Albright's comments strongly relate to Levy's view that "...social systems are subject to intervention by cognizant agents, whose behavior is essentially unpredictable at the individual level" (Sussman, 2000, p. 13). The characteristics of the system components and the nature of their relationship constantly change based upon feedback loops that are "...are often partly or wholly unobservable..." (Sussman, 2000, p. 7).

Complexities do not occur just with one's potential adversaries.

I have to say that I was the first secretary of state that took NATO to war. We did in Bosnia and Kosovo, and it wasn't simple in terms of how the military committee worked and all the coordination, and that was a NATO that was at 19. And so, with a NATO that is now much – nine countries more, it is a complicated process. But I do think that there has to be some architecture that allows NATO to move forward in a decision-making way (Albright, 2009).

Relationships can be as complicated between friends as they are between parties who are not so friendly towards one another. Friendship is likely to lead to less heterogeneity, but that does not translate in more homogeneity, less complexity, and lower interaction costs.

We turn next to examples relating more directly to economics and finance.

The fund's governance starts with some basic arithmetic. The IMF operates on a voting system based on each country's quota at the fund, rather than a system of one person, one vote (or one country, one vote). The United States, with 5 percent of the population of IMF member countries, controls 17 percent of the vote. Europe has a remarkable 40 percent of the IMF vote, with just 13 percent of the population. China and India comprise 38 percent of the world's population, and just 5 percent of the vote at the fund. Little surprise that the United States and Europe jealously guard their voting powers.

Nothing happens at the fund without the say-so of the United States and Europe. If decisions are by consensus, it is only because developing countries long ago learned not to lock horns with rich nations on matters of financial diplomacy. The IMF, after all, can do great financial damage to unruly countries, causing them to lose not only the resources of the fund, but also those of the World Bank, regional development banks, the Paris Club, the London Club, and private creditors, all of which are influenced by IMF judgments (Sachs, 2004, sec. Money Talks (and Votes)).

In some critical respects international institutions are not international at all. The systems which they comprise therefore exhibit realism (Morgenthau, 2004; Waltz, 2004). This suggests that the structure and behavior of international systems may be captured by analyzing a subset of the IGOs. Joseph Stiglitz echoes this sentiment in a recent article in the *Financial Times*.

There are other reasons for pessimism about quickly achieving effective global coordination. Priorities have seemed to differ: France and the UK have emphasised incentive structures; the US the dangers of proprietary trading. While Mervyn King, governor of the Bank of England, and most academics warned of the dangers of institutions that were too big to fail, too intertwined to fail or too correlated to fail, no government in the G20 wanted to annoy its big bankers by raising these issues, at least until President Barack Obama finally proposed doing something in the US, a year after taking office. There are still no effective proposals for dealing with the over-the-counter non-transparent and complex derivatives.

Moreover, each country looks at each proposal and assesses how it affects the competitiveness of its financial system; the objective too often is to find a regulatory regime that crimps competitors more than one's own companies. As the saying goes, all politics is local, and, at least in the US and many other jurisdictions, finance is a big political player. This, combined with deep philosophical differences – as remarkable as it may now seem, there are some that still believe in unfettered markets – mean the only agreements that are easy to come by are those involving the least common denominator, or small countries not at the table; and even these victories are often hard fought, as evidenced by the struggle to deal with tax havens.

Given the difficulties in achieving global co-ordination, insisting on such co-ordination may be a recipe for paralysis – just what the bankers who don't want regulations want. It is perhaps no surprise that they have become among the most vocal advocates of the need for global action (Stiglitz, 2010).

While we would agree that there is a strong political current flowing in Stiglitz's remarks, "...no government in the G20 wanted to annoy its big bankers..." catches our attention in a major way.

One set of political actors that has emerged are the transnational corporations (Strange, 1996). While the transnational corporation has been with us for some time (e.g., the Dutch East India Company was established in 1602), the distribution of capabilities between all the political actors, the governance of the relationship between the actors that

determines the ebb and flow of these capabilities, the understanding of power and security look different depending upon the characteristics of the actor, the culture that underpins their thinking, and their current and desired capabilities, needs, and desires.

The hypothesis here is that transnational corporations have become increasingly powerful and problematic components of the international system.

Conclusions and Recommendations

This paper argues that the international economics and finance system ostensibly serves to provide economic growth and well-being for societies and peoples.

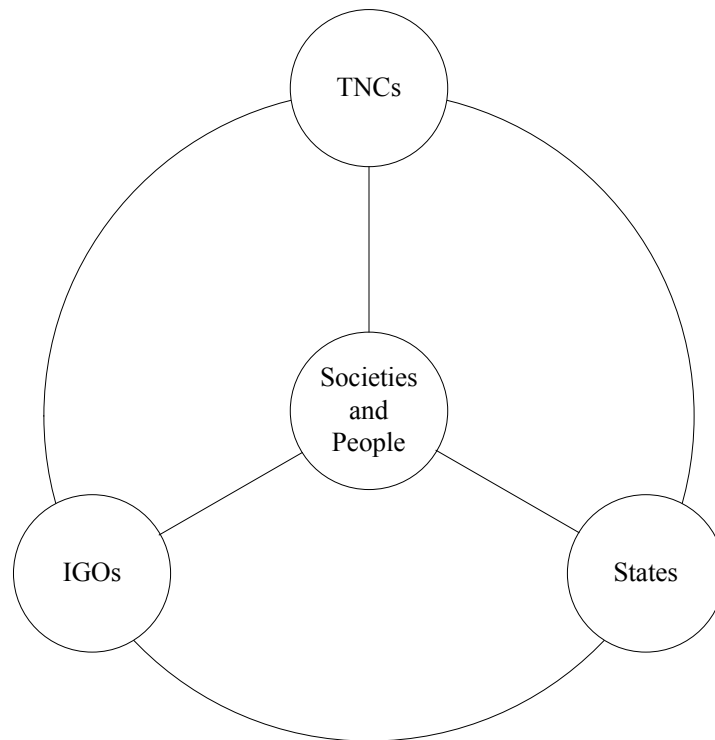


Figure 2 The International Economics and Finance System

The lines in figure 2 represent the major relationships and components in the system. This level of abstraction is useful for understanding the broad concepts of this concept, but tells us little about the actual structure and behavior such that we can gain an understanding

sufficient to formulate an intervention strategy. This latter point is significant. The motivation of understanding is intervention that will enable new levels of effectiveness and efficiency and lead to new levels of economic growth and well-being.

We can imagine moving this abstraction to a level of concreteness inclusive of individual components and relationships. This, however, represents a density of information that, in all likelihood, cannot be understood. If we could somehow distribute the information sufficient to overcome the issue of density, then the spatial extent would be such that we would, in all likelihood, not be able to grasp the entire structure. Perhaps this reasoning explains why, as we pointed out earlier, a complete examination of this system may well be impossible and, insofar as we can ascertain, has not been undertaken.

Nevertheless, this matter of the effect of international economics and finance on societies and peoples is, as so many (Dos Santos, 2004; Naim, 2003; “Rich man, poor man,” 2007) have pointed out, critical, but, on occasion, flawed. The investigation, we suggest, should therefore be on those portions of the system where intervention can have the most significant impact. By significant impact we mean a combination of the potential value of success as defined by the societies and peoples most affected, and an estimate of the probabilities of achieve the value.

We suggest that a good starting point for deciding impact is the Quality of life Index (The Economist Intelligence Unit, 2005) for estimating potential value in combination with data from Transparency International (“Transparency International,” n.d.) for estimating the probabilities of achievement. This is an approach to deciding that cannot be delegated to any of the political actors other than the one deciding the question of intervention for itself. Only the organization deciding can properly reflect its values in the decision process.

This decision process does not obviate the need for understanding the complexity of that portion of the system in which the organization might choose to intervene. We now turn our attention to this step. We have argued that international economics and finance are components of a larger, dynamic, and complex system. There is a discipline, system dynamics, pioneered by Jay W. Forrester at the Massachusetts Institute of Technology, that is applicable to this issue .

The professional field known as system dynamics has been developing for the last 35 years and now has a world-wide and growing membership. System dynamics combines the theory, methods, and philosophy needed to analyze the behavior of systems in not only management, but also in environmental change, politics, economic behavior, medicine, engineering, and other fields. System dynamics provides a common foundation that can be applied wherever we want to understand and influence how things change through time (Forrester, 1991, p. 5).

Indeed, this discipline has been considered at some length (Chadwick, 2003; Georgantzas, Katsamakas, & Solowiej, 2009) in its applications to international systems. We also recommend that broad set of disciplines grouped as social sciences. It all starts, as Forrester reminds us, with a clear definition of the problem or, we might add, the opportunity.

The system dynamics process starts from a problem to be solved—a situation that needs to be better understood, or an undesirable behavior that is to be corrected or

avoided. The first step is to tap the wealth of information that people possess in their heads. The mental data base is a rich source of information about the parts of a system, about the information available at different points in a system, and about the policies being followed in decision making. The management and social sciences have in the past unduly restricted themselves to measured data and have neglected the far richer and more informative body of information that exists in the knowledge and experience of those in the active, working world (Forrester, 1991, p. 5).

We would like, lest anyone think that this task too daunting, too complex, too risky, too unrewarding, to close with the following lines.

One day a man was walking along the beach when he noticed a boy picking something up and gently throwing it into the ocean.

Approaching the boy, he asked, "What are you doing?"

The youth replied, "Throwing starfish back into the ocean. The surf is up and the tide is going out. If I don't throw them back, they'll die."

"Son," the man said, "don't you realize there are miles and miles of beach and hundreds of starfish? You can't make a difference!"

After listening politely, the boy bent down, picked up another starfish, and threw it back into the surf. Then, smiling at the man, he said..." I made a difference for that one" (Eiseley, 1979).

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