# The complexity of the International Monetary and Financial System

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**Abstract:** The international monetary and financial system (IMFS), being by its nature a complex one, cannot be perceived outside the theory of complex systems. To understand the complexity of IMFS, we will try to investigate it in this study from this perspective. The economy of complexity sees the economic science not as a mechanistic, static, timeless, and perfect one, but as an organic one, always creating itself, alive and full of disordered vitality. These characteristics, in a way, complicate the IMFS research and require the substantiation of a methodological platform.

#### Keywords: International Monetary and Financial System, Economic Complexity Index, financial openness.

## 1. Introduction

History is constantly qualitatively evolving, research is discovering new phenomena, and scientists are developing new theories. However, despite its importance, ideas about reality in the social field are rarely analyzed, studied, and revised - they seldom even receive distinct formulations. Indeed, as long as the tools offered by the existing paradigm prove capable of solving current problems, science advances by using these tools.

In the 21st century, the systemic nature of real-world phenomena can no longer be questioned. The rule of modern scientific research has become the consideration of objects and processes as systems, i.e., in all their components, connections, and relationships, including relationships with the environment. The problem of using the systemic methodology and complexities are caused, firstly, by the fact that, in systemic studies, a generally accepted opinion has not yet been developed on many essential aspects, from a methodological point of view and, secondly, by the vague of many fundamental concepts, including the concept of system.

Nowadays, when profound changes are felt everywhere, from technologies to how we perceive reality, discoveries and new theories begin by becoming aware of significant and profound anomalies about the growing recognition that reality has deceived the expectations induced by the theories that have governed so far. At present, behavioral and evolutionary economics, statistical physics, the emerging interdisciplinary science of complex systems, and new agent-based models contribute to a better understanding of the global economic order. The crucial question for the coming years will be whether and how researchers' ideas will emerge in shaping finance and economic policy and whether it will succeed in developing a sustainable global economic and social model capable of minimizing risks, withstanding crises, and allowing future generations to lead a fulfilling life on our planet.

From this perspective, we will analyze the complexity of the international monetary and financial system in the present study.

Next, this paper will be organized as follows. The second section will present a literature review on the complex nature of the international monetary and financial system. The third section of the document will be dedicated to the systemic paradigm of the international monetary and financial system. The influence of complexity on the development of IMFS will be analyzed in the fourth section. Finally, the conclusions will be presented in section five.

The fundamental objective of the study is to highlight the analysis of the international monetary and financial system from the perspective of complexity.

#### 2. Literature review

In recent decades, complexity has emerged as a powerful approach to understanding the most relevant factors influencing economic development. Economic complexity has been applied to studying various economic problems, such as economic growth, technological change, and inequality, financial system development.

Since the mid-2000s, due to several authors' theoretical and empirical contributions, the complexity has also been attributed to the significance of the product, production, or, more broadly, economic complexity. In this context, complexity is a set of technological knowledge and capabilities and organizational and managerial skills through which different countries can develop different production systems and give rise to development trajectories. Following the global financial crisis outbreak in 2007-2008, the concepts of system complexity and the complexity of financial products were primarily applied to the international monetary and financial system study to understand better the origin and development of the financial crisis itself. On the one hand, economists have begun to apply the main pillars of complexity theory to the study of financial systems to highlight how boom and bust cycles, tipping points, and contagion phenomena can emanate from the interaction between heterogeneous agents in complex financial networks, as well as from the positive (hence destabilizing) endogenous feedbacks that such interactions can give rise.(Battiston, S. et al., 2016) On the other hand, an expanding group of researchers emphasized the increasing complexity of some financial products and (e.g., securitized assets) as a relevant source of increased risk, both at the level of the single (underlying) asset and as a whole system.(Ghent, A. C. et al., 2016)

#### 3. The systemic paradigm in the research of the international monetary and financial system

To highlight the importance of complexity in studying IMFS, using bibliometric analysis, we studied the publications presented in the international database Dimensions, which are dedicated to this topic. The compiled bibliometric profile allows the evaluation of trends in this field of knowledge, thus allowing the identification of ideas about the main work areas.



Figure 1.Network view of the term "international monetary system complexity" and quotes using the Dimensions database

Source: developed through VOSviewer (accessed March 3, 2021)

The visualization of the resulting conceptual network is presented in Figure1. On this map, the size of the circle reflects the frequency with which the term appears, i.e., the larger its area, the more often this word or phrase appears in the general list of keywords of the author. The distance between circles is a measure of terms connection: the smaller it is, the stronger the connection, which is understood as the frequency of standard terms. Colors are used to indicate individual clusters. The concept map shows that the terms form a network in which four thematic clusters can be distinguished. The first cluster (marked in green) is associated with the analysis of IMFS components (often from a cultural-analytical approach). The second group (red) is associated with the analysis of the concept of complexity. The concepts of the third group (blue) are the implications of IMFS on the ecosystem. The concept linking all three clusters is the (yellow) group, which is associated with the pandemic crisis caused by COVID 19.

As a field of study, the world financial phenomenon does not have a separate disciplinary house because it is a social, political, historical, economic, and even geographical phenomenon. Thus, there are distinct advantages in the multidisciplinary approach to international monetary and financial relations. The use of comparative strengths of different disciplines - including various conceptual tools, theoretical perspectives, and methodological techniques - offers different and more diverse approaches from which to draw them. In addition, leveling the boundaries between different areas can help to establish a common ground between different, sometimes competing, perspectives.

## 4. The complexity impact on the international monetary and financial system

Because IMFS is a subsystem of the world economy, its complexity cannot be analyzed separately from economic complexity.

Economic complexity is calculated by Harvard University's Center for International Development using the Economic Complexity Index (ECI). This index is a measure of a company's productive knowledge and illustrates the complexity of savings based on the quantity and complexity of exported products and the frequency of exports.

Complex economies are those that can weave large amounts of relevant knowledge together into large networks of people to generate a diverse mix of knowledge-using products. In contrast, simpler economies have a smaller knowledge base and produce fewer and simpler products, requiring smaller interaction networks. Because individuals are limited in what they know, the only way societies can expand their knowledge base is by facilitating individuals with different sets of knowledge in increasingly complex networks of organizations and markets. Increased economic complexity is needed for a society to own and use more product knowledge. Because of this, we can measure the complexity by looking at the combination of products that countries are able to produce. (Hausmann, R. et al., 2013)



# Figure 2. Interdependence between GDP per capita (log) and Economic Complexity Index (ECI), 2018

Source: developed by the author based on: World Development Indicators; The atlas of economic complexity.

Therefore, economic complexity is linked to a country's level of prosperity. As such, it can be considered that it is only a correlation between the two variables. The relationship between GDP per capita and complexity is, however, more profound than mere interdependence. To see this, we must remember that this relationship is close but not perfect (variance 71.4%). From Figure 2, we can see that some countries are above the red line and others are below it. The question that may arise is whether the gaps are just a mistake of theory or contain information about the direction countries are heading.

Countries whose economic complexity is higher than we would expect, given their current income level, tend to grow faster than those that are "too rich" for their current level of economic complexity. In this sense, economic complexity is not just a symptom or an expression of prosperity: it is a determining factor. (Hausmann, R. et al., 2013)

Figure 2 shows in red the relationship between per capita income and the Economic Complexity Index (ECI) for countries where exports of natural resources are higher than 10% of GDP, and in blue are the countries where exports of natural resources are less than 10% of GDP (blue). For the last group of countries, the Economic Complexity Index represents 78% of the variance. Countries where natural resource export levels are relatively high tend to be significantly more affluent than expected, given the complexity of their economies; however, ECI also correlates with revenues for that group.

To understand the interconnections between the complexity of the world economy and the complexity of IMFI, we will try to calculate the interdependence between the index of economic complexity and the index of financial openness of world economies.



# Figure 3. Relationship between the Financial Opening Index and the Economic Complexity Index (ECI), 2018

Source: developed by the author based on: The Chinn-Ito Index; The atlas of economic complexity.

The relationship between financial openness and economic complexity is close, with a variance of 74.4%. Thus we can see that countries with a more complex economy also have a greater financial openness (figure 3).

In conclusion, it is necessary to mention the systemic impact of the increasing complexity of both the financial system and its financial products on economic growth, macroeconomic stability, and inequality. However, it should be noted that higher financial complexity may in some cases be to the detriment of increased financial fragility, a more crisis-prone economic system, and rising levels of income and wealth inequality. At the same time, some researchers argue that increasing complexity does not always have positive consequences for the economy's well-being. This is especially true when it comes to financial innovations and financial complexity.(Botta et al., 2019)

# 5. Conclusion

Most paradigms, which focus on society, use static models as tools, even because of methodological difficulties. There are no researchers who are not aware that everything in society is constantly changing. What distinguishes the thinking of those who approach the systemic paradigm is that they are interested in the significant changes and the remarkable transformations. The fundamental question of the followers of the theory of complex systems is: what decomposition processes occur within a system to end and give way to another system. Another question that needs to be answered is how a transition from one system to another or a standard version of an excellent system occurs. Thus, the analysis of the IMFS perfectly fits into this concept, and in order to answer the above questions, it is necessary to create a logical framework for the analysis of the IMFS evolution under the incidence of shocks generated by its dysfunctions.

Complex realities define our daily lives: complex processes work in nature, and complex structures define our social environment. Complexity is inherent in decision-making and connected behaviors, and complexity issues revolve around technologies; complexity is embedded in different policies. The nature of complexity also applies

to how the world economy system works, as it consists of complex actions and interactions between individual institutions, national and international companies, entire societies, and the policies that govern them.

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