

Complexity Theory, Asymmetric Shock, and the Emergence of Previously Hidden Subsystems

within the 2008/2009 Global Financial Crisis

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## **Abstract**

This paper analyzes the causes and effects of the 2008/2009 global financial crisis from the time of the Bretton Woods System to the recent calls for the establishment of a new economic order following the crisis. Using complexity theory, this paper highlights the changes in the global socio-technical infrastructure as a product of it being a complex system. By identifying the self-organizing and emerging properties within the global financial system this, paper presents a case study of Iceland as a prototypical example of a new vulnerability to external constraints. Furthermore, this paper examines the international response to the crisis using a hyperglobalist perspective.

# **Asymmetric Shock and the Emergence of Previously Hidden Subsystems: With a Case Study of Iceland within the Context of the 2008 World Financial Crisis**

## **Introduction**

Hidden subsystems have emerged as a result of the 2008 mortgage-led asymmetric shock to the financial system in the US had highlighted financial subsystems that had been previously unidentified as critically linking national economies. Not only are we not financially autarchic, but this shock has exposed the global exposure to a single unexpected variable. While unintended consequences stemming from financial crisis are nothing new, never before in the post-Bretton Woods system has there been a global shock of this magnitude and reach.

Fueling the crisis was a significant amount of neglect of the risks and ambiguities of bundling questionable assets and selling them in an already complex global economic system. Thus, 2008 witnessed the world economy begin to slide into the largest and most unpredictable recession in at least a generation. What initially began as a “popped” global housing bubble, sending housing prices in freefall, provided an asymmetric to the economy of the United States as mortgage-back securities (MBS) could no longer be valued as they had been due to the significant change in value of the underlying assets and rapid increase in variance of price. Furthering the ambiguities in pricing these assets was the fact that there was a general lack of understanding on how these heavily leveraged derivatives would react given these new market conditions. Ultimately, the significantly increased risk from the inability to properly value these MBS furthered the forces driving down their values.

This paper focuses on the case study of these unexpected reactions as found in Iceland as a poster child state within the framework of complex and under-inspected financial networks

underpinning the global socio-technical infrastructure (GSTI). What at first appeared to be an American problem by the rest of the world, quickly threw the global economy into chaos. Iceland's neo-liberal economic policies generated subsystems that offered both great rewards and obscured hidden exposure to toxic MBS. These subsystems became awake following the collapse of the housing bubble in the US and seemed to have bankrupted the country nearly overnight (and later led to the collapse of the government).

Iceland is not a unique situation and much of the world is ultimately a connected network of possible Icelands. In a surface view, the world is a system composed of what appears to be isolated countries with regular and apparent financial connections. In reality however, the global community is intertwined within hidden subsystems that only become apparent given an asymmetric shock to a segment in the system. Furthermore, there exists a tipping point at which a country's vulnerability to the global market causes a run-on-country and brings down the national economy.

Not only has the extent of this hidden global interdependence proven surprising and destabilizing, it has also generated unprecedented calls for a deliberate restructuring of the global financial system (GFS) out of the hands of the United States. The international realization of the effect of exposure to external financial conditions has generated substantial amounts of rhetoric from prominent members of the international community suggesting that the US is at fault for the current financial conditions and the world needs to take a new approach in order to mitigate national exposure. No where has this rhetoric been stronger than in France where France's President Nicholas Sarkozy went as far as to suggest designing a new economic order that the US is not leading. So far there has been no concrete movement towards this new economic order. Furthermore, the content of rhetorical declarations does not suggest these leaders fully

understand the integrated extent of the global framework in accordance with global socio-technical infrastructure (GSTI).

This piece addresses the question of how could these cascading effects have brought down a whole nation and undermine the global financial system (GFS). The paper will review the formation of the Bretton Woods System and the evolution of the world financial system, complexity theory and its relevance in financial systems and the global socio-technical infrastructure (GSTI), the 2008/2009 global financial crisis with a case study of Iceland, and will detail the emergence of changes in the world financial system and GSTI due to the 2008/2008 global financial crisis. Ultimately, this paper argues that by identifying changes within the structure of the GSTI, states and individuals will be able to respond more effectively to changing international market conditions in order to meet their unique objectives.

## **The Global Financial System**

### **The Bretton Woods System and the Evolution of the World Financial System up to 2008**

To understand the structure of the global financial system (GFS) and the global socio-technical infrastructure (GSTI) at the time of the 2008/2009 global financial crisis, one must first look at foundation agreements of the modern global financial system, such as the Bretton Woods Agreement. The Bretton Woods Agreement and the implementation of the Bretton Woods System (BWS) laid the foundation for the international monetary regime from post-WWII to the early 1970s. The BWS was defined through the agreements of the 1944 conference that fostered in a new economic order. This new economic order was supposed to be a system of legally

binding obligations, multilateral decision making international organizations, and supranational limitations. While these were the supposed objectives of this new economic order, the BWS in practice was just an outreach of American policy highlighting its power in truly defining the world economy.

What is important is that this type of system is “self organizing” through its development and evolution from the original structures (Anderson 1988). It is not sufficient to analyze history of the BWS or its implicit function, but rather to see the BWS as a basis for the analysis of the evolution of the GFS up to 2008. After the demise of the BWS in the early 1970s and the movement towards a market regulated system, the intricate complexity of the world’s financial systems grew exponentially. In particular, it became exceptionally interconnected and thus complex.

This interconnectedness spreading throughout the global marketplace was also reflected in a “path dependent” product of the growth of the global economy. This means that the structures of a large connected system tend to channel future possible evolutionary paths and constrain the direction of future outcomes (Arrow 2000; 174-178). Between 1970 and 2008 the aggregate of the global economy grew rapidly. This economic development is a testament to the success of the world’s financial system which was fundamentally led by the United States and its corresponding guiding principle within the World Bank and the IMF. Following the 1987 stock market crash, these subsequent policies became institutionalized which became known as the Washington Consensus. These liberalization policies kept up the world’s needed liquidity of capital and further spurred development, and again furthered the interconnectedness within the global market place.

This interconnectedness increased international capital flows and the use of financial derivatives to hedge and speculate on underlying assets and asset components. This trading of risk and increased leverage positions came to define the global market place. As technology came increasing globally assessable, and interconnectivity itself, there was now a market place in which subsystems had developed hidden below the surface trades of the global market place. As with the BWS, the global market place was being driven by the US and a shallow layer of organization, regulation, and superficial market stability.

Industry and government largely left the GFS alone to develop these subsystems. While this ignorance is largely due to the veiled aspects of the subsystems, it is in part due to a general notion that large organizations will engage in a behavior that ignores what they please. By ignoring the complexities of their own systems, financial and governmental institutions further levered their holdings on the potentially volatile nature of these underlying subsystems. Furthermore, organizations will continue to move in their directions until acted upon by an opposite force. This continued movement is known as a “positive feedback cycle” and this cycle is increasingly vulnerable to be caught in the positive loop given increased complexity and decreased predictability of a given system (Demchak 1991; 36).

The increased interconnectedness of world markets was not, however, a secret and it has been the subject of great analysis over the past half century. In terms of financial stress resulting in unexpected consequences, the Asian Financial Crisis of 1997 has probably been the most significant shock to the world financial system until the 2008 crash. What began as a currency revaluation by Thailand ushered in a series of unexpected consequences that spread throughout Asia, then triggered in the 1998 Russian Financial Crisis, which inadvertently sparked increased market volatility and led to the collapse of the US hedge fund Long-Term Capital Management

causing a Federal Reserve infusion to keep stability in the global market place. The significance of the interconnectedness within global market places has been previously identified, but has greatly increased due to increased financial derivative use and further expansion of the global economy.

Economic responses to growth in the GFS have produced fundamental changes in the modern implementation of the production function over the past half century given the changing socio-economic landscape. Using the simple case of the Cobb-Douglas production function as the basis for productivity we see the fundamental relationship between labor and capital forms the basis for economic production within the macro economy:

$$Y = AL^{\alpha}K^{\beta}$$

*Where Y is the output, A is the total factor productivity, L is labor input, K is capital input, and  $\alpha$  and  $\beta$  are the output elasticities of labor and capital which are constant (Cobb 1928; 139-165)*

Rapid globalization and the co-product of the growth in the GFS have changed the relative weighting of capital versus labor in today's implementation of this model. Ultimately, capital has become increasingly fungible. The implications of instantly movable capital contrasting to a more stagnate labor structure is unidentified, especially during times of financial crisis. By identifying the world as a system of potentially instantaneous moving capital intertwined with free market liberal policies, we see that there is potential for a vacuum of capital to exist given cases where capital outflows are coordinated.

This capital vacuum would essentially undermine the specific implantation of the production function of a given country and incapacitate its ability to function to the extent it was networked into the GFS and dependent on its easy capital flows. This causality effect was

potentially surprising, but not difficult to foresee if one visualizes the GFS as a complex system operating under the rules reflected by complexity theory. The next section provides a brief overview of the key principles that could have helped frame such a change in the general cost structure.

## **Complexity Theory within Financial Systems, Subsystem Development, and Crisis and Crashes**

### **Complexity Theory**

The most important aspect of complexity is that it produces surprise within tightly connected and interdependent systems. This piece uses definition of “complexity” which is defined as representing the structural intricacy of relations within a system (Demchak 1991; 17). One must analyze systems as self-organizing and evolving with emergent properties that follow from the nonlinear interaction of agents (McDaniel 2005; 3). For the purposes of efficiency, this paper will streamline a working definition of complexity to fall within the components of self-organization, emergence, and surprise. Furthermore, one must accept that complex systems are naturally vulnerable to uncertainty, and rather than avoid understanding and dealing with this behavior we need to accept that it is ultimately unavoidable.

Self-organization within complex systems is defined by Capra as “the spontaneous emergence of new structures and new forms of behavior in open systems far from equilibrium, characterized by internal feedback loops and described mathematically by nonlinear equations (Capra 1996:85).” Self-organization is thus simply an organizations response to external and

internal action such that efficient outcomes can be generated without respect to a specific directional objective as controlled by an external managerial force.

Emergence is a significant behavioral property of complex systems. Emergent properties are properties such that the aggregate of behaviors within a system does not define the behavior of the system as an entity (McDaniel 2005; 6). While this aggregation shows differences between the part and the whole it is essential to clarify that emergent properties are unpredictable themselves. What remains important for the analysis of complexity is not that emergent properties are by definition unpredictable, but that they can be identified at the macro level as trends distinguished from their component micro behaviors.

A distinctive feature of surprise within complex systems is uncertainty (Galbraith 1977:36). Uncertainty differs from surprise in that the latter is an emotional response by humans while the former is a statement about a lack of knowledge. Uncertainty rises in complex systems and has the potential to lead to undesirable unknown outcomes. With increased complexity there is an increased set of “rogue outcomes” that can shock a system. As a result, it is a general goal for managers of these complex systems to control uncertainty and we can define organizations to be an inherent response to uncertainty (Demchak 1991; 31). While there is incentive to control for uncertainty, there are inherent costs imposed on organizations due to their responses to complexity. In terms of risk, it can be seen as a definition of decreasing marginal returns to scale for controlling uncertainty in complex organizations.

A system which is complex contains these elements of being a self-organizing system; it contains emergent properties, and has elements of surprise. The intersection of these attributes makes the study of complexity relevant to so many disciplines. To understand the actual ramifications of the 2008/2009 Global Financial Crisis with respect to the GFS and GSTI, we

need to analyze how the development of hidden sub-systems directly contributed to the magnitude of this “extreme event.” In order to do this, we must project this case as a general application of complexity theory. Here we can generalize the situation and claim that these properties are not unique to financial or even social systems, but rather are common within nature. It is through this that extreme events come to characterize complex systems and thus financial systems (Sornette 2003; XV).

## **Complexity Theory and the Marketplace**

Applying complexity theory to global financial markets requires that the marketplace be viewed through the lenses of a system’s self-organization, emergence, and properties producing cascading surprise. Through this analysis we can start to define the complex marketplace as required to analysis the case of complexity within the GTSI.

To analyze emergence within the marketplace, the infamous Keynes quote about expectation formation in valuation “what average opinion expects the average opinion to be” shows a case of emergence within valuation (Arthur 1995; 8). In Arthur’s paper *Complexity in Economic and Financial Markets* (1995) the complex nature of valuation shows precariousness within the marketplace and defines aggregate value to be instable which by definition is in accordance with the emergent behavior of complex systems.

For financial markets, the prototypical example of emerging surprises in a self organizing system is a crash. While market movement can be assessed on an information or behavior economics level, there is a definitive dissimilarity between regular market movements and crashes. These crashes are identified to be significant and are essentially outliers within the fundamentals of financial markets (Sornette 2003; 26). The extent of the 2008 “crash” is the

strongest indicator that the GFS is now a globally critical subsystem linked to a myriad of the critical subsystems of the GSTI.

## **Complexity With Regard to the Global Socio-Technological Infrastructure (GSTI)**

For ease of analysis this paper defines the real world networks that ultimately combine to form the functional supports for modern societies as the GSTI. It is an increasingly complex, densely connected, transnational system with five critical features of real world networks. These critical features are scale-freeness, small-worldness, nestedness, weak-linkedness, and the existence of a giant component. Understandably, these critical features are essential for analyzing the influence of the GSTI in the 2008/2009 global financial crisis.

The GSTI is a scale-free network. This is in contrast to networks with defined nodes and hubs which provide low levels of efficiency but are very resilient to cascading failures. Other examples of scale-free networks such as natural power grids and the Web exemplify the general scale-free properties of being efficient in movement, but ultimately robust to random failures or accidents.

Network structures definable importance to influencing network outcomes requires a focus on the idea of control within the 'evolving processes' of complex networks. The concept of "topological phase transactions" (TPTs) is at the forefront of network theory. TPTs are measurable changes in the structure of networks in response to changes in the abundance of resources available to make links. Mathematical analysis proves that as the 'temperature' of a given network varies, there exists a change in configuration at discrete points in the phase space network. This change moves from scale-free to star(s) to isolated sub-graphs. The transitions

are defined through the number and type of 'selected' links through the dynamics of this process (Derenyi 2004).

What this suggests in terms of the GSTI is that a change in the structure of inputs would change the configuration of the entire GSTI. Also significant is the idea put forth by structural theorists is that there is a pivotal role for weak links within the stability of complex networks given structural changes suggesting that changes in the GSTI may have undermined its stability (Csermely, 2006). Dwork and Herlihy have suggested that a further implication of the change in TPTs from random to scale-free to stars to isolated sub-graphs is suggestive of hegemonic power transitions within the field of international relations.

The following section takes complexity theory approach to analyze financial markets self organizing into the GSTI prior to the 2008 financial crisis. The formation of the GSTI as a complex system was ultimately not recognized prior to 2008. When recognized one must expect, and thus can prepare, for a high likelihood of surprise. The actors most fundamentally intertwined in the system did not. The defining characteristic in networks forming a complex system translates into the perpetual expectation of surprises within GSTI (Demchak, 1991: 15).

## **The 2008/2009 Global Financial Crisis & Iceland**

### **The Crisis Develops**

While the full extent of the financial crisis is not quantifiable at this time, it is clearly evident that this is the largest financial crisis since the depression of the 1930s. Even more, it is the first time since the end of the World War II that the global economy has actually declined (Stewart 2009). That being said, there is more significance to this crisis than its magnitude. The

2008 Financial crisis is unique in its true global reach, which was unexpected and unprecedented, and in its potential to truly revolutionize the GSTI.

The beginnings of the 2008 global financial crisis indirectly stems from the influx of investors into the newly introduced low-cost speculative vehicles which included stock index futures, options, and other financial derivatives. The introduction of these financial instruments fostered in a new era of market volatility and financial underpinnings between different markets (Miller 1991). In itself, the interconnectedness due to the financial instruments did not cause the financial crisis, but rather they served as a catalyst to do such.

The direct beginnings of the global financial crisis are found within the housing bubble which began in the US, but was undoubtedly a global housing bubble by the time it hit its peak in 2005. The housing bubble popped and some property prices started their decent as early as late 2005. As the losses in property values declined further, defaults began to rise ever more sharply with the obvious leader in defaults being sub-prime mortgages. In addition to sub-prime mortgages, mortgages for 100-120% of the property value were not uncommon. These sub-prime mortgages and low down payment mortgages carried little risk if it continued that property values were constantly increasing, but with the popping of the housing bubble homeowners often found it cheaper to walk away from their home than pay off their loans.

One of the types of financial instruments that had become increasingly popular in the US among the GFS was mortgage-backed securities (MBS). While MBS ultimately defines a vast array of different instruments, in the general form they derive their value from an underlying asset which is tied to mortgage payments. Some of these MBS were very exotic and sold off to investors in bundles which were highly leveraged and used to back other securities. With such

deep reaches into the global marketplace, these MBS often were in portfolios of investors which did not conceive their true reaches.

With the bursting of the housing bubble, the beginnings of an asymmetric shock were in place. Nonetheless, when the bubble first burst, the outside world looked on, not in awe nor in fear, but in an almost self-righteous contempt for the greed that defined the ease in getting loans and thus furthered the housing bubble's effects in the US. The world looked on unaware of the true nature of this asymmetric shock. On the surface the world expected the defaults should hurt those companies that made high risk loans based on greed, the home producers which drove up supply as fast as possible without any actual concrete sales being made, and the home speculators which bought over their heads homes that they could not afford to make a quick dollar in an industry that they did not understand or belong in. On the surface that is what was expected, but below the surface an intricate network of hidden subsystems were about to be exposed by this jolt in the housing market.

While the world waited for the guilty to be punished by the invisible hand of the marketplace, defaults on the rise shattered the valuation methods of the MBS which threw the entire market place into chaos. Now this was not an American problem focused on the greed and irresponsibility of those in the housing market, but rather this was a global problem which spanned industries and countries without regard for initial involvement or obvious exposure to the original problem.

What the world forgot was that the MBSs were not being held exclusively by those who had made these risky loans, but rather bundled throughout the global market place. Now with a systematic change in the housing market these exotic MBS could not be valued and this ambiguity led investors to jump ship. This ambiguity left worthless assets on the books of

countless financial institutions and the ripple effect resonated deeper through the GSTI than anyone had expected or prepared for. The toxic assets generated from MBS would not be the end of the surfacing of these previously hidden subsystems.

Further complicating the financial institutions troubles was the fact that they had become so highly dependent on derivatives. In this case, derivative acted as insurance for firms which was fine until the insurance was essentially called in all at once. The asymmetric shock to the system now through market volatility through the roof and the calling in of the financial derivatives further exposed the financial institutions' vulnerability to changes in the global marketplace.

This exposed vulnerability led investors to seek safety. Since the global marketplace was so advanced in its efficiency and liquidity, it was almost no trouble to abandon investments in more risky countries for the safe havens of well developed and stable countries such as Japan and, ironically, the United States. This furthered the dissent into financial chaos for many parts of the world. As the crisis continued, it became clear that nowhere was safe from an unexpected shock to the GSTI, and furthermore, the network of subsystems that define the previously unidentified links between national economies are uncontrolled and unresponsive to the surface system that had been falsely understood to be the GSTI.

Essentially, there was a difference between perception and reality. This surface network was being treated as if it were an autarchic network with levels of protection against destabilization. In reality, the surface network was just the tip of the iceberg hiding the vast and non-autonomous subsystem of financial interconnectedness that lay dormant, but required only an asymmetric shock to wake their ability to wreak havoc on the international system which has

had its foundations weakened through the changes in TPTs from the overall changes in the external environment of the GSTI during the past half century.

## **Case Study: Iceland**

The country of Iceland in early 2008 bared little resemblance to the Iceland of only 25 years ago. The island nation of Iceland was once seen as just a small fishing hub on the outskirts of northern Europe. Its fishing roots defined and dominated its economy, while its development and growth remained stagnant but stable.

Iceland began to take a new approach to its economy and began to adopt more liberal policies to its economic practices. Slowly, Iceland began moving away from its fishing centered economy and ultimately became a service based economy. Deeply rooted in financial services and banking, Iceland was much the same as most of the western liberal democracies. That being said, the hidden subsystems that emerged following the bursting of the housing bubble had severely different and abrupt consequences for Iceland than for its peers.

The beginning of the collapse of Iceland's financial system is first evident within the building of a currency bubble. The Iceland Krona was clearly overvalued. It was mispriced so much so that *The Economist* named the Krona as the world's most overvalued currency based on its version of a purchasing power index known as the Big Mac Index (*The Economist*; 01 February 2007).

Since the 2001 bank deregulation in Iceland, the banks had accumulated extremely large amounts of debt for such a small country. As external debt grew so did internal debt. Icelandic households, on average, held debt equivalent to 213% of their disposable income. Maintaining

these debt practices led to inflation which was essentially left unchecked by the Central Bank of Iceland.

Between September 2007 and September 2008 the inflation rate grew to 14% and thus Iceland paid out high amounts of interest. In response, speculators began holding deposits in Krona due to its high interest rates which had reached 400% of the Eurozone's interest rates by September 2008. Hence, monetary inflation began to grow out of control. In the year preceding the September 2008 collapse, the M3 supply grew by 56.5% further underscoring the country's bubble.

To maintain this disequilibrium, banks needed to continue receiving loans and external (foreign) deposits. Meanwhile, the bursting of the US housing bubble, downward spiraling prices of real estate, and corresponding shock to the financial system based on the toxic MBS spurred a global credit crunch as it became evident investors sought to freeze their portfolios due to the need to revalue and adjust in order to account for the new market ambiguities. The Icelandic banks were then unable to effectively refinance their short-term debts. This inability to refinance coupled with a run on deposits from external (foreign) depositors undermined Iceland's financial system. By October 6, 2008 Iceland potentially faced bankruptcy and all three of Iceland's major banks had collapsed.

By the end of 2008, Iceland's new economy, built over the previous decade, was gone. Global vulnerability had stripped the national economy of anything that resembled itself just a year earlier. The state of affairs was so bad in the financial services industry that there began a revival of Iceland's traditional core industry of fishing by former financial professionals. By January 2009 Iceland's government had collapsed due to a cascading MBS borne shock to the global system which resonated through the GSTI.

What is significant is that the Iceland case is not inherently unique. In fact, one could define the world as a string of Icelands. The ramifications of such a claim are a highlighted risk that any given country is subject to the same outcome that Iceland unexpectedly faced in 2008. It can be thus concluded that increased vulnerability to catastrophic events is an identifiable structural constraint of the new GSTI.

Iceland was merely acting as a node in a complex system. Its collapse was a product of the linkages that made up its network connections becoming active as a result of an asymmetric shock elsewhere within the global system. By the time anyone could have identified the consequences of such unexpected and extreme events, it was too late to take any sort of preventative action. Due to the relative small size of Iceland's economy, there was nothing to dampen the severity of its financial collapse.

## **Globalization through a Hyperglobalist Lens: The Emergence of Structural Changes in the GSTI and the Threat/Promise of a New Economic Order?**

The hyperglobalist thesis defines globalization through being a new age in human history in which "traditional nation-states have become un-natural, even impossible business units in a global economy" (Ohmae 1995; 5. Wriston 1992). Under this hyperglobalist argument, complex systems have come to define the framework of the new global network.

While globalization has moved along unabated and the subsurface complex global networks developed and further encouraged by the adoption of liberal economic policies, the surface network of political organization did not fully reflect the changes beneath. The changes brought forth by globalization have created a single global marketplace which has attempted to be governed by the traditional state. The state's ineffectiveness is rooted in the rise of globalization's movement towards a single global network as defined by the new GSTI. This has become evident through the rise of regional and global organizations to which states relinquish power. Within this process one can theorize that the ultimate decline of the nation state is underway and that regionalism will emerge as the preeminent method of state organization.

So far within the recent history of globalization the world had remained complacent through a gilded age of market stability. A “golden” surface of well organized and controllable systems which hid a hidden subsystem of intricate globally interconnected markets was ruptured by an asymmetric shock led by the collapse of the US housing bubble. The 2008/2009 global financial crisis can be identified as a “significant event” within the course of globalization. By using the term “significant event” the crisis is being identified as a key factor that will fundamentally change the surface network of political governance such that it more accurately reflects the realities of the complex network of subsystems. The nature of this crisis has called into question many of the values of the GSTI. The market reaction to the financial crisis also underscores the potential for change in the global economic system. The interdependence of financial systems and true vulnerability of the global economy to changes in the United States has been revealed. Again consider the case of Iceland, where, what began as a housing bubble in the United States nearly bankrupt an entire country. The question remains- what will the implications be for the future of the global economic system?

To identify the emergence of structural changes within the GSTI we need to look at how the world has reacted to the financial crisis. First of all, the global perception is that it was American recklessness and greed that brought the system down. This perception has directly created a movement, led by France's President Nicholas Sarkozy, to change the system by mitigating the power of the US. This rhetoric has called for a New Bretton Woods System or to be more blunt, a new economic order (Leicecester 2008).

While there has been no shortage of rhetoric, tangible evidence of actual action or even attempts at action to change the status of the world financial system have been blatantly absent. Any foreign action to the financial crisis, such as stimulus plans, has been merely a reaction to US action. Even at the World Economic Forum in Davos, Switzerland, there was no movement towards actual action. Further underscoring the world's inability (and unwillingness) to actually generate a new Bretton Woods has been disintegration and movement to protectionism within the EU (again France's Sarkozy is leading the movement). Continuing policies of reaction to US policy and drives towards protectionism suggest that there is an opening of regional political economic cleavages which directly contrast to the publicized policy recommendations of the global economic community leaders.

World leaders have created a landscape of diverging actions which highlights that either they do not truly understand the consequences of the GSTI or that they think that the ability to alter the current global financial system and establish a new economic order. Global actions, or inactions, to this crisis generate new linkages within international political economic relationships and it also furthers the desire for unincorporated countries, which are potentially vulnerable to unforeseen extreme events within the global financial system, to join Regional Economic Communities (REC) such as the European Union's Eurozone.

The fall of Iceland serves as a message to these unincorporated countries that they are more vulnerable to extreme events than their REC neighbors and thus reinforces their desires to join these communities. In Eastern Europe, Hungary proposed speeding up its adoption of the Euro during the steep decline of its currency and the fall of its stock market. Furthering this rise of regionalism is the general move towards protecting oneself and generally avoiding helping other countries through financial incentives. German Chancellor Angela Merkel led a refusal to bail out East European countries at a March 2009 meeting of European leaders while just a few weeks earlier had declared, “A clear message and concrete action are necessary to engender new confidence in the markets and put the world back on a path towards more growth and employment.”

The March 2009 G20 Summit meeting continued the global economic communities focus on the global financial crisis. US President Barak Obama reiterated the calls for joint action saying “it’s very important to make sure that other countries are moving in the same direction, because the global economy is all tied together.” This concept was again highlighted through UK Chancellor Alistair Darling who noted, “we must work together not as a small group of advanced economies but globally, including the emerging and developing economies.” Again this rhetoric was met with no definitive action.

There has been no collectively directed change in the global financial system thus far and calls for a new economic order will not be realized if the current trend of political action continues. Real changes to the global order are changes of a move towards regionalism and the further establishment of large RECs which through their size and diverse internal networks serve to hedge against systematic risks in complex systems. The US dominated international economic organizations (ICO) will continue to play a leading role in linking the most advanced economies

to the lesser developed and emerging ones. These ICOs will thus continue to serve as extensions of established economic policies and again leave the economic order untouched.

A further question is whether it is even possible to force, unilaterally or collectively, changes in the GSTI? Noting that network theory suggests that it is not without the will of the given actors is strong enough to redesign the system; this suggests that in the near future the status quo of a United States centered global economy will almost certainly remain. In fact, the financial crisis may even help to temporarily strengthen the United States' role as an economic hegemonic power. The world has been looking to the United States as a leader and example of how to overcome the financial crisis. This is most evident in the vast array of stimulus packages from diverse types of countries all of which are based on the precedent set by the US's stimulus packages. In the long run a more diverse and regulated economic system may appear as a result of intervention by states. If they seek to mitigate external risks to their own economies, the Euro (EUR) may emerge as a global alternative to the Dollar (USD)<sup>1</sup>. China could conceptually exploit the financial crisis as a way of becoming a stronger regional player and possibly later a global economic player.

That being said, never has a coordinated global effort been more necessary, and there will be a renewed focus on the effect globalization has had on the global economy. Continued analysis of the recovery process needs to take note of the role that the US plays. If the US continues to dictate the global recovery process on its terms we can expect a replay of the Bretton Woods lead goose model of development, but if the US begins to be left behind, a new economic order could be in store.

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<sup>1</sup> Though the financial crisis has also highlighted some faults in the European Union and calls into question its long-term potential as an economic superpower.

## **Conclusion**

Vulnerability to catastrophic events is ultimately unavoidable in a complex system. In this case Iceland acted merely as the ‘canary in the mine’ for the world’s vulnerable nations. In the future, for someone to directly see this coming, they would have to question the traditional indicators used in the economy today. Given the unambiguous impossibility of identifying Iceland, states must seek to act in accordance with mitigating the risks associated with being intertwined in the global network of financial systems and subsystems.

This financial crisis will pass. Ultimately, the financial markets will correct themselves and the GSTI will again return to a relative “normalcy.” With this assertion it is reasonable to ask why we should spend so much time and energy rigorously identifying and analyzing the intricacies of this or any financial crisis. Ultimately, we seek to further our understanding of the GSTI in order to mitigate risk and make the global marketplace more efficient and effective. Both the private and public sector can, and should, use the lessons learned from these failures to develop the strategies needed to further their individual goals.

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