

Currency Wars and A Possible Self-Defense (I): How Currency Wars Take Place

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Abstract

Going along with the common knowledge that money can easily destroy a person, a family, and a healthy business enterprise, this work investigates the nature of currency wars in two parts. The first part shows, by making use of the systemic yoyo model and Bernanke-Gertler model of fundamental value of capital, how money can be purposefully and strategically employed as a weapon of mass destruction. Based on how a currency war could be potentially raged against a nation, the second part of this work makes use of the results of feedback systems to develop a self-defense mechanism that could conceivably protect the nation under siege.

Keywords systemic yoyo, foreign investment, financial crisis, financial liberalization, speculative attack

1 Introduction

The main focus of this work is on financial crises that are caused and/or created purposefully by certain group(s) of people in order to acquire economic and political gains. Here, financial crises include all those crises with respect to either respectively or jointly currency, credit, bank, debt, and the markets of stocks, bond, and financial derivatives, etc. They generally mean severe fluctuations and chaos that appear in the financial area of a nation, interfering very negatively with the operation of the real economy. Each of these crises is accompanied by sudden deterioration of all or most financial indexes, stock market crash, capital flight, credit destruction, extremely tight money supply, rising interest rate, bank runs, bankruptcy of a large number of financial institutions, major decrease in the official reserves, inability to repay the interest and principal of maturing debt, currency devaluation both internally and externally, etc.

Because the modern-day national economies have been closely intertwined with each other to a high degree of globalization, when a nation or geographic region suffers from economic and financial crises, in terms of their damaging effects and adverse impacts, the crises tend to possess international and global characteristics. Since the 1920s, there had appeared many large scale financial crises. The

most noteworthy of these crises include

1) The global stock market crisis that started on October 28, 1929, in the New York Stock Exchange and spread to other nations quickly, leading to a worldwide financial and economic crisis until 1933;

2) Six US dollar crises one after another during the time period from 1960 to 1973;

3) A bank bankruptcy wave that started with the failure of the United States National Bank in San Diego and quickly spread to many other western countries during 1973-1975;

4) The debt crisis that broke out in August 1982 and quickly involved over 50 developing countries from around the world;

5) The international stock market crisis that started with the plummet of the Dow Jones Industrial Average on October 19, 1987; the consequent chaos of the Wall Street momentarily spread throughout all the major stock exchanges of the western world;

6) The British pound crisis of 1992;

7) Mexican financial crisis of 1994;

8) The southeast Asian financial crisis of 1997;

9) The Russian currency, financial crisis of 1998;

10) The Brazilian currency, financial crisis of 1999;

11) The Argentinean currency, financial crisis of 2001.

This work makes use of the systemic yoyo model and Bernanke-Gertler model of fundamental value of capital to show that when a large amount of foreign investments gathers in one place over either a long period or a short period of time and then leaves suddenly and massively, that local economy has to suffer through a positive bubble, caused by the increased money supply as a consequence of the foreign investments, and then a following negative, disastrous bubble, caused by the sudden dry-out of the money supply. Because a large number of economic activities are either unexpectedly delayed or totally impossible to complete, the local investors are actually unable to continue to collect their originally expected dividends for many time periods to come. In other words, foreign investments can be employed as a weapon of mass destruction, if they leave strategically and suddenly, no matter whether they come quickly in a short period of time or slowly over a relatively longer period of time.

With the conclusion that money can be employed as a weapon of mass destruction is established, this work then is turned to design a self-defense mechanism for the purpose of eliminating or greatly reducing the disastrous aftermath of such currency warfare.

This work is organized as follows: In the first part, with relevant concepts systematically gathered in Section 2, recent speculative attacks and currency crises

are compared in Section 3. By focusing on the analysis of the fundamental value of capitals, Section 4 shows that how potentially currency wars can be launched purposefully. In the second part we present a possible way to build up a national defense against possible currency wars. Then a few final remarks conclude this presentation.

2 The Basic Concepts and Systemic Intuition

The general concept of financial crises includes the following four classes of crises: currency, bank, foreign debt, and systems. Here, by currency crisis it represents such a situation that due to purposeful and targeted speculative activities against a nation, the nation's currency suffers from drastic devaluation, or the nation's government is forced to drastically increase its interest rate or spend a large amount of the foreign reserves to defend its currency. By bank crisis, it means actual and/or potential bank runs or such a scenario that a number of banks stop repaying their debts because of their falling into bankruptcy or the government is forced to interfere by providing large amounts of support. By foreign debt crisis it implies such a case that a nation can no longer repay its foreign debts on time, no matter whether the debtors are governments or private individuals. By systematic financial crisis, it stands for the destructive effects on the real economy due to severe damages of the financial infrastructure so that the efficiency of the financial markets is greatly affected. The connotation of systematic financial crises might overlap with those of other kinds of crises, while currency and bank crises might not lead to severe damages to a nation's payment system. So, neither currency crises nor bank crises can be identified with systematic financial crises.

In many circumstances, the specific definition of financial crises simply means currency crises. The early investigation of currency crises can be traced back to at least [1]. Paul Krugman treats a currency crisis as an international balance-of-payments crisis. He believes that in order to prevent their currencies to devalue, countries with either a fixed exchange rate system or pegged exchange rate system would pay the price of either spending their international reserves or increasing inflation due to their raising domestic interest rates; when the governments give up on the fixed exchange rate system or the pegged exchange rate system, their currencies experience drastic drops in value, leading to currency crises. Currency crises are generally indicated by the collapse of the fixed exchange rate system or forced adjustment to the system, such as official devaluation of the local currency, expanded floating range of the exchange rate, drastic decrease in international reserves, noticeable rise in the interest rate of local currency, etc.

According to the literature, there are four main criteria for judging currency crises: (1) Sudden and large scale changes in exchange rate; (2) the weighted average of exchange rate and foreign reserves fluctuates widely; (3) the weighted

average of exchange rate, foreign reserves, and interest rate vibrates wildly; (4) Import drops drastically. The second criterion was established by Kaminsky, Lizondo and Reinhard who believe that a currency crisis represents such a scenario that is caused by either devaluation of the nation's currency or drastic drop in the nation's international reserve or both as a consequence of an attack on a nation's currency [2]. Because of this reason, currency crises can be verified afterward by using the index named exchange market pressure (EMP). This index stands for a weighted average between the monthly percentage change in the exchange rate of the local currency and that of the international reserves. Because this index increases with the devaluation of the local currency and the loss of international reserve, major increases in this index indicate a strong pressure to sell off the local currency. Because this second criterion possesses very practical operability, it has been employed most widely among these four criteria.

Most of the financial crises that occurred since the 1990s have brought along with them clear characteristics of currency crises; and another outstanding feature of recent currency crises is that they have been accompanied by bank crises. Such scenarios are referred to as twin crises.

Since the 1980s, along with the gradual strengthening of globalization of the capital markets, international flows of capital have been developed unprecedentedly with ever increasing magnitude, velocity, and accompanying dangers and risks. Large amounts of short-term capitals that are not under the watch of any national government and international financial organization have been moving freely in the international financial markets for pursuing profit opportunities by making use of various new financial tools, trading platforms, and advanced trading technologies. These new characteristics of the international capital have led to frequent occurrence of turmoil in the international financial markets; speculative attacks happen often with ever increasing strength and duration of impact. The Asian currency crises that started in 1997 further indicate that the currency crises caused by speculative attacks can also possibly develop into full scale financial crises and deepening social crises of large magnitude.

The so-called international speculative capital or hot money represents such capital that is frequently moved within and between various markets in pursuit of short-term, high levels of profits without any particular fields of investment focus. Speculative capital tends to be short term even though there are exceptions to this rule of thumb. One of the modern characteristics of international speculative capitals is their camouflage. At the same time, these capitals can also go along with the market cycles by pursuing mid- and long term investments. Additionally, not all short-term capitals are speculative. For example, the short-term capitals involved in the financial intermediation and settlement of international trades, short-term interbank funds, banks' short-term positions for allocation, etc., are

not speculative in nature.

Along with the expansion in the size, circulation speed, and coverage of the international capital markets have international speculative capitals grown. Based on their predictions on the changes in exchange rate, interest rate, security prices, gold price, or the prices of certain commodities, speculative capitals could be suddenly involved in large scale in both long and short trades in a short period of time. By substantially altering the composites of their portfolios and by affecting the confidence of the holders of other assets, these speculative capitals cause severe instability in the market prices so that short-term high profit opportunities could be created. Such market behaviors that disturb the market prices and appear suddenly are known as speculative attacks. As limited by the constraint of pursuing after quick gains, international speculative capitals generally choose to attack such economic sectors and geographic areas that can hold large amount of capitals and allow fast movements of funds with expected high returns, and few financial regulations. These economic fields include (foreign) currencies, futures, options, precious metals, real estates, etc.

From what has happened empirically in the past, it seems that international speculative capitals have been fond of attacking the currency of one nation or the currencies of several nations at the same time. Most often seen speculative attacks are those that assault either fixed exchange rate systems or regulated exchange rate systems. Speaking generally, when a nation either employs a fixed exchange rate system or pegs a target exchange rate, the speculators often make their judgment that as long as the official parity or the target exchange rate does not conflict with the fundamental conditions and states of the economy, the official exchange rate will be maintained. However, if the speculators believe that the fundamental states of the current economy could not sustain the prevalent level of exchange rate for long, they would launch a speculative attack in order to speed up the dissolution of the fixed exchange rate system so that opportunities of quick profits would be generated.

Under the conditions of either fixed or pegged exchange rate system, as long as there appears either a domestic inflation or recession accompanied with sustained current account deficits, the governmental promise on the fixed exchange rate would lose its reliability. It is because in these situations there is a heavy pressure to devalue the local currency; in order to maintain the promised exchange rate, the government will be forced to mobilize and spend its international reserve. Even with the support of the international financial markets, the fundamental imbalances existing in the economic states still cannot be corrected, which can most likely delay the occurrence of the devaluation of the local currency, although the devaluation will sooner or later happen inevitably. If speculators predicted this forthcoming event, they would mobilize their capitals ahead of

time and launch their speculative attack in order to position themselves for quick profits. By making use of the spot and forward transactions, futures contracts, options trades, and swaps of various financial tools, speculators carry out their multi-dimensional speculative strategy by positioning their capitals at the same time on the markets of foreign exchanges, securities, and all different forms of financial derivatives. Because of the fixed exchange rate or the promise that the government would maintain the rate fixed, the risk to the speculators is actually quite low, because the direction along which the exchange rate would move is clear. To say the least, even if the prediction is incorrect, the worst is that the exchange rate parity did not change so that the most the speculators could lose is their minimal amounts of trade costs. Hence, once a speculative wave is started, the magnitude in general is large, leading to the expected consequences, as a self-fulfilling prophecy of a humongous scale.

3 Recent Speculative Attacks and Currency Crises

During the time period of Bretton Woods system after World War II, the strength and power of private capitals grew drastically; relevant speculative activities evolved with increasing levels of energy. Their attacks on various national currencies from around the world were mostly successful and amplified with ever-growing vigor and intensity. The most typical are the British pound crisis of the late 1967, French franc crisis of August 1969, and the U.S. dollar crisis of 1971-1973. If we say that the root problem for Bretton Woods system to eventually collapse were the defects of the system itself, then the direct triggering factor for the system's collapse would be the speculative attack of the international short-term hot money on the U.S. dollar-the base currency. When Bretton Woods system was over, the world was in a wave of deregulation, strengthening the market mechanism, promoting economic and financial liberalization. Correspondingly, the international financial markets become further liberalized and global. Along with the application of modern technology of communication and computer networks, financial derivatives and methods of trading are developed in abundance. All these political, societal, and technological advances provided the space for international capitals to grow and to be mobilized unprecedentedly. With their greatly increased speed of mobility, international capitals have launched frequent speculative attacks. Among the most typical are the attacks on the pegged exchange rate system employed by some countries of Latin America in the early 1980s, the Mexican peso crisis of 1994, and financial crises of Eastern Asia during 1997-1998. The following provides a list of recent speculative attacks. For more details please consult with Wang and Hu [3].

Case 1: The attacks on the exchange rate system of Latin American countries in the early 1980s

In 1978, Chile, Uruguay, and Argentina decided to employ a crawling peg exchange rate system. Each of these national governments established its plan to gradually depreciate its local currency against U.S. dollar. However, in their implementations, their rates of inflation were much higher than that in the U.S.A., while their degrees of depreciation were much smaller than the difference of the U.S. inflation rates. Therefore, the over-evaluations of their local currencies made the deficits of their current accounts rise. During 1981-1982, the interest rate in the international financial markets reached an historical high, making the burdens of foreign debts and the deficits of the current accounts of these three countries difficult to sustain, so that it became inevitable for the local currencies to devalue while departing from the targeted exchange rates. Under this background, these countries respectively experienced speculative attacks, corresponding currency devaluations and the consequent capital flights, and crises of domestic financial institutions' runs.

Case 2: Mexican peso crisis of 1994

In 1982 after having suffered from its debt crisis, under the supervision of the IMF Mexico implemented a comprehensive policy for economic adjustment and reform, while tightening its economy and dramatically reducing its fiscal deficit. In 1987, Mexico re-fixed its exchange rate between Mexican peso and U.S. dollar. In January 1989, Mexico started to employ a crawling peg exchange rate system, which was changed to a moving target regional exchange rate system in December 1992, while gradually expanding the floating range for peso. This series of measures of economic reform achieved a certain degree of success; the national economy steadily recovered. However, in 1994, Mexican economy once again stalled while accompanied by political instability. Therefore, the expectation and rumor for peso to depreciate grew; capitals fled one after another. Interventions of the central bank made the market interest rate rise drastically, while the national foreign reserves were depleted quickly. On December 30, Mexican government eventually had to allow peso to depreciate. However, the new exchange rate established after the depreciation immediately suffered from speculative attacks so that Mexican government had to implement a floating exchange rate system. After then, the domestic economic conditions and the political situation made foreign investors extremely nervous, causing continued capital flight, banks subjected to runs, and the economy falling into crises. In the newly adopted floating exchange rate system, peso continued to depreciate; until the end of 1995, peso had reached consecutive historical lows one after another.

Case 3: The speculative attack on the joint floating mechanism of European monetary system (1992-1993)

The national currencies within the European monetary system of the nations that were members of the European Community had followed a joint floating ex-

change rate mechanism. This mechanism had led to the creation of the European currency unit (ECU) and established the statutory central exchange rates between the individual national currencies and the European currency unit. Therefore, between these member nations a system of fixed exchange rates was employed, while externally a joint floating rate system was implemented. In the early 1990s, the member nations of the European Community experienced varied degrees of economic turmoil. Uniformities in their respective macroeconomic states, such as inflation rates, unemployment rates, fiscal deficits, economic growth rates, etc., started to be broken. Over time, it became clear that some member nations could no longer maintain their statutory exchange rates with ECU, providing opportunities for the international speculative capitals.

In the late 1992, an initial round of speculative attacks appeared. Among the first group of victims of the attacks were Finnish marks and Swedish krona. At the time, neither Finland nor Sweden was a member of the European Community. However, they all hoped to join so that they voluntarily pegged their own currencies with ECU. Under the speculative attacks, Finland quickly gave up its fixed exchange rate and drastically depreciated its currency on September 8. On the contrary, Swedish government decided to protect its krona by raising its short-term interest rate to 500% annually. That eventually defeated the speculative attacks. At the same time, British pound and Italian lira also suffered from continued attacks. On September 11, European monetary system agreed for lira to depreciate 7%. Although German central bank spent around 24 billion marks to support lira, three days later lira was still forced out of the European monetary system. By this time, the Bank of England had lost several billions of U.S. dollars to protect its pound. Even so, on September 16, the British pound was still forced to float freely. Although French franc also suffered from speculative attacks, through joint interventions with Germany and by greatly increasing the interest rate, the value of franc recovered.

This crisis of European monetary system started in 1992 and lasted until 1993, during which speculative attacks often occurred. At the end of 1992, Portuguese currency escudo depreciated; Spanish currency pesetas was devalued once again, while Swedish krona and Norwegian krone started to float. In the early part of 1993, Ireland's pound depreciated, Portuguese escudo depreciated another time, and Spanish pesetas experienced its third round of depreciation. On the other side, French franc and Danish kroner successfully stood against the sporadic speculative attacks.

Case 4: 1997 currency crises of East Asia (1997-1998)

In the 1980s and early 1990s, nations in Southeast Asia sped up their steps toward financial liberalization by completely opening up their domestic financial markets to attract maximal scales of foreign investments. Such fast-speed

liberalization led to drastic economic growth, which was known as “Southeast Asia miracle”. However, after entering the mid-1990s, the rising labor costs were translated into the decreased international competitiveness in their products so that deficits began to appear in the current accounts of some Southeast Asian countries. Because these countries did not in a timely basis upgrade their industrial structures in order to keep pace with the increasing competitiveness of their products, the continued influx of the foreign capitals together with domestic investments led to the formation of economic bubbles and overheated sector of real estates. For example, in 1996, Thailand’s balance of foreign debts had reached over 90 billion U.S. dollars with more than 40 billion dollars of short- and mid-term foreign debts, both of which surpassed the corresponding levels of foreign reserves at the start of 1997. Additionally, because of the overheated investments, particularly the overheated investments in real estates, the bad debts of Thai financial institutions had amounted to more than 30 billion U.S. dollars in early 1997. Therefore, the public and foreign investors started to worry about the economic conditions and financial order in Thailand, which inevitably helped to consolidate the expectation for baht to depreciate. At the same time, international speculators were also building up their monetary energy and preparing to launch their large scale attacks. On February 14, Thai currency baht depreciated 5% against U.S. dollars, making the covered speculative attacks public. After then, baht suffered from ever increasing pressure to depreciation further; and interventions of Bank of Thailand were quickly exhausting the national foreign reserves. After mid-May, speculative capitals launched their new rounds of attacks, creating an eleven-year new low for the exchange rate of baht. Several nations in Southeast Asia jointly intervened in the foreign exchange markets by buying in baht, while Bank of Thailand sacrificed 5 billion U.S. dollars of foreign reserves and once again raised its short-term interest rate. However, all of these still could not rebuild the public confidence and drive off the speculative attacks. Eventually on July 2, Bank of Thailand was forced to allow baht to float freely in the exchange markets, causing baht to depreciate 20% against U.S. dollar on that single day. Subsequently, the speculative attacks quickly spread over to the neighboring nations and regions so that Philippines, Malaysia, Indonesia, Singapore, Hong Kong, and Taiwan were all affected. Other than Hong Kong, the local currencies of these countries and regions all depreciated against U.S. dollar with different scales. At the same time, all these nations and regions except Singapore and Taiwan fell into deep financial and economic crises. After October of the same year, the crises spread over to South Korea, causing South Korean currency won to depreciate deeply against U.S. dollar and making the economy of South Korea fall deeply into an economic crisis.

Case 5: Russian currency crisis (1998)

At the early stage of Russian economic transition, large amounts of international capitals entered Russia. As of July 1, 1997, the accumulated foreign investments totaled 18 billion U.S. dollars, about 10 billion dollars of which were short-term capitals and invested in the securities markets. Although the economic growth of the real economy was nearly zero, the stock market rallied rapidly in the first half of 1997; bubble expansion appeared in the prices of financial assets. When the currency crises of Southeast Asia broke out and started to spread toward the regions of Northeast Asia, the probability for Russia to experience a similar currency crisis was very big, considering the market long-term expectation of instability for Russian economy. Starting in November 1997, speculators launched their attack on ruble with many others followed. During the end of 1997 and early part of 1998, Russian government and central bank sacrificed foreign reserves to purchase ruble, while expanding rubles floating range and increasing the interest rate from 21% to 35%. Although the situation was temporarily stabilized, large amounts of foreign reserves were lost. However, after May, another wave of speculation started, causing rubles exchange rate to fluctuate severely again. Though Russian government raised the interest rate to 150% and sought for international assistance in order to counter the attack, the situation was never successfully under control. On August 17, Russian government had to expand ruble floating exchange corridor; that is, allowing ruble to depreciate. However, unexpectedly, the situation continued to worsen. Eventually on September 2 without a choice the exchange corridor was abandoned. That meant that Russian government gave up its over-two-year old managed target floating mechanism of ruble.

Case 6: Brazilian currency crisis (1999)

The currency crises that appeared in East Asia and Russia increased the market expectation for Brazilian currency to depreciate, causing large amounts of capital leaving Brazil since September 1998. At the end of 1998, Brazilian Congress did not pass the bills to increase the benefit taxes of civil servants and those of retired civil servants as contained in the fiscal adjustment plan, while the 1998 deficits of the fiscal balance, trades, and current accounts exceeded the expected levels. So, along with the decreasing market confidence, speculative attacks were triggered, forcing Brazilian central bank to allow its real to float freely against U.S. dollar.

All the speculative attacks that were launched since the 1980s have shown a good number of new characteristics, including amplifying scales and forces, enhancing dimensionality in terms of their strategies of attack, covering larger geographic areas, increasing publicity of planned attacks, etc. In particular, the main reasons for the amplifying scales and forces of the speculative attacks include:

1. The size of the international speculative capital has been increasing con-

stantly. Since the 1980s, the economic growth of the main industrialized nations has been slowed, while the reform for financial liberalization of various countries has been strengthened. That caused large amounts of capitals to enter into the international financial markets to look for new opportunities. Such continuous accumulation of international speculative capitals, together with the multiplying effect of international credit, makes the available speculative capitals increase multiple times. Based on the relevant estimates of the International Monetary Fund, there were at least 7,200 billion U.S. dollars of speculative capitals currently floating around the international financial markets. That amount is equivalent to 20% of the world GDP; and each day, over 1,200 billion U.S. dollars of speculative capitals are looking for various profit opportunities. That is nearly one hundred times more than the amount of trades of real consumable goods.

2. The capitals available for speculation purposes have shown the tendency to collaborate and to take actions jointly. Along with the rapid development of communication technology and the expanding availability of internet, a 24/7 operational system for the globalized exchange markets has appeared so that capitals can be transferred from one exchange market to another instantly. That makes the once stragglers and disbanded international speculators develop into powerful speculation assemblages. As a third force different from various national currency authorities and international financial organizations, they have constituted a major threat to the stability of each nation's exchange system and the normal operation of the international currency system.

3. The introduction of financial derivatives provided a leveraged platform of trading for the speculators. Since the 1970s, financial innovations have led to the profligate development of new financial derivatives and their trades. Because of the characteristic of high leverages of the financial derivatives, speculators can trade such financial products that are valued tens or even hundreds of times of the little amounts of capital they mobilized. That enables a hedge fund to embark on trades worth several hundreds of billions of U.S. dollars with a small amount of capital, affecting the entire international financial markets.

Since the 1990s, the strategies of speculative attacks have been further developed. The traditional speculator would simply use the price differences between spot and future trades, while the current strategies of speculative attacks have been quite complicated. By utilizing all kinds of available financial tools, the speculator gets involved in various markets of the traditional tools and derivatives. It can be said that current speculative attacks make use of the inherent linkages among the prices of various financial products, traded in different markets, to make comprehensive and profitable arrangement of capitals.

Traditional speculative attacks have been isolated and scattered in different geographic regions. However, along with the recent deepening globalization

of the international financial markets, and along with the further unification of regional economies, speculative attacks have also showed clear regional characteristics. No matter whether it is the Latin American currency crisis of the early 1980s, the Mexican crisis of 1994, the European monetary system crisis of 1992, or the Southeast Asian crisis of 1997, each started with the initial shocks in such a market that contained the most concentrated imbalances. Then, the initial shocks spread over to other neighboring markets, displaying a dynamic process of mutual influences.

Traditional speculations used to be hidden or semi-public arbitrage activities. However, since the 1990s, along with the deregulation and financial liberalization of the international financial markets and the widening use of information and network technologies, originally speculative activities have been gradually evolved into open and purposeful attacks on specified currencies. Such openness and publicity could be and have been strengthening the market expectation of depreciation of the target currency. For example, at the end of 1997, George Soros published an article to openly declare that he and associates would launch another attack on Hong Kong dollars. After that, he announced in newspapers that the next currency crisis would appear in Russia, which was later shown to be accurate. Soon after then, Soros commented that Brazilian currency was evaluated too high so that Brazilian real would be his next target of attack, which was indeed what happened next.

Before we start to develop and present our main results, let us first look at the systemic intuition that lies underneath this work.

When Von Bertalanffy pointed out that the fundamental character of living things is its organization [4], the customary investigation of individual parts and processes cannot provide a complete explanation of the phenomenon of life, this holistic view of nature and social events has spread over all corners of science and technology [5]. Accompanying this realization of the holistic nature, in the past 80 some years, studies in systems science and systems thinking have brought forward brand new understandings and discoveries to some of the major unsettled problems in the conventional science [6-7].

Similar to how numbers are theoretically abstracted, systems can also be proposed out of any and every object, event, and process of concern. For instance, behind collections of objects, say, apples, there is a set of numbers such as 0 (apples), 1 (apple), 2 (apples), 3 (apples), ...; and behind each organization, such a regional economy, there is an abstract, theoretical system within which the relevant whole, component parts, and the related interconnectedness are emphasized. And, it is because of these interconnected whole and parts that the totality is known as an economy. In other words, when internal structures can be ignored, numbers can be very useful; otherwise the world consists of dominantly systems

(or structures or organizations).

Historically speaking, on top of numbers and quantities has traditional science been developed; and along with systemhood comes the systems science. That jointly gives rise of a 2-dimensional spectrum of knowledge, where the classical science, which is classified by the thinghood it studies, constitutes the first dimension, and the systems science, which investigates structures and organizations, forms the genuine second dimension [8]. The importance of the systems science, the second dimension of knowledge, cannot be in any way over-emphasized. For example, when there are difficulties in studying dynamics in an n -dimensional space, one can conveniently get help from a higher-dimensional space. In particular, when a one-dimensional flow is stopped by a blockage located over a fixed interval, the movement of the flow has to cease. However, if the flow is located in a two-dimensional space, instead of being completely stopped, the 1-dimensional blockage would only create a local (minor) irregularity in the otherwise linear movement of the flow (that is how nonlinearity appears [9]. Additionally, if one desires to peek into the internal structure of the 1-dimensional blockage, he can simply take advantage of the second dimension by looking into the blockage from either above or below the blockage. That is, when an extra dimension is available, science will gain additional strength in terms of solving more problems that have been challenging the very survival of the mankind since the start of history.

Additional to the afore-described strong promise of systems science, on the basis of the blown-up theory [10], the systemic yoyo model, Fig.1, is formally introduced by Lin for each and every system [11], be they tangible or intangible, physical or intellectual.

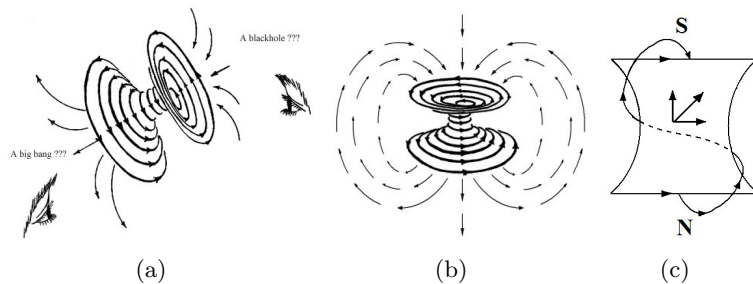


Fig.1 The eddy motion model of the general system

In particular, on the basis of the blown-up theory and the discussion on whether or not the world can be seen from the viewpoint of systems [12-13], the concepts of black holes, big bangs, and converging and diverging eddy motions are coined together in the model shown in Fig.1. In other words, each system or object

considered in a study is a multi-dimensional entity that spins about its either visible or invisible axis. If we fathom such a spinning entity in our 3-dimensional space, we will have a structure as shown in Fig.1(a). The side of black hole sucks in all things, such as materials, information, energy, profit, etc. After funneling through the short narrow neck, all things are spit out in the form of a big bang. Some of the materials, spit out from the end of big bang, never return to the other side and some will (Fig.1(b)). For the sake of convenience of communication, such a structure as shown in Fig.1(a), is referred to as a (Chinese) yoyo due to its general shape. More specifically, what this systemic model says is that each physical or intellectual entity in the universe, be it a tangible or intangible object, a living being, an organization, a culture, a civilization, etc., can all be seen as a kind of realization of a certain multi-dimensional spinning yoyo with either an invisible or visible spin field around it. It stays in a constant spinning motion as depicted in Fig.1(a). If it does stop its spinning, it will no longer exist as an identifiable system. What Fig.1(c) shows is that due to the interactions between the eddy field, which spins perpendicularly to the axis of spin, of the model, and the meridian field, which rotates parallel to axis of spin, all the materials that actually return to the black-hole side travel along a spiral trajectory.

To show this yoyo model can indeed, as expected, play the role of intuition and playground for systems researchers, literature [5, 9] have successfully applied it to investigate Newtonian physics of motion, the concept of energy, economics, finance, history, foundations of mathematics, small-probability disastrous weather forecasting, civilization, business organizations, the mind, among others.

Now, what is important to our work in hand here, which constitutes the necessary intuition for our reasoning, is that the systemic yoyo model implies that each economy is a system so that it can be investigated as a pool of rotational fluids of information, knowledge and money. And when the world economy is concerned with, we really have a theoretical ocean of rotational pools (of fluids) that interact with other. With time, some regional pools are destroyed while some stronger, more powerful spin fields are formed. In other words, the so-called speculative attacks, as described earlier, are natural phenomena that appear along with the globalization of the world economy. So, one natural question is how such attacks appear and how their damaging effect can be maintained at the theoretical height first and then at the level of real life practice. In the rest of this work, we will address this question by using some of the recent results of systems research.

4 One Possible Form of Currency Wars

According to literature[14], the fundamental value of a particular capital is equal to the present value of the dividends the capital is expected to generate throughout the indefinite future. Symbolically, the fundamental value Q_t of a depreciable

capital in period t is given by

$$\begin{aligned}
 Q_t &= E_t \left(\sum_{i=0}^{\infty} \left[\frac{(1-\delta)^i D_{(t+1+i)}}{\prod_{j=0}^i R_{t+1+j}^q} \right] \right) \\
 &= E_t \left(\frac{D_{t+1}}{R_{t+1}^q} + \frac{(1-\delta) D_{t+2}}{R_{t+1}^q R_{t+2}^q} + \frac{(1-\delta)^2 D_{t+3}}{R_{t+1}^q R_{t+2}^q R_{t+3}^q} + \dots \right)
 \end{aligned} \tag{1}$$

where E_t stands for the mathematical expectation as of period t , δ the rate of physical depreciation of the capital, D_{t+i} the dividends and R_{t+i}^q the relevant stochastic gross discount rate at t for dividends received in period $t + 1$. Then, we can rewrite equ. (1) as follows:

$$Q_t = E_t \left(\frac{D_{t+1} + (1-\delta)Q_{t+1}}{R_{t+1}^q} \right) \tag{2}$$

Because of various reasons, such as fads, the market price S_t of the capital differs persistently from the capitals fundamental value Q_t . When $S_t \neq Q_t$, we say, as in literature [14], there is a bubble. However, to be more specific, when $S_t > Q_t$, we say that there is a positive bubble in the market place; and a negative bubble, when $S_t < Q_t$. In the realistic market place, asset prices mostly like deviate from the fundamental values due to various reasons, such as liquidity trading or to waves of alternating optimism or pessimism. If a bubble exists at period t with probability p to persist into the next period, then by using the mathematical expectations the difference between the market price and the fundamental value of the capital in period $(t + 1)$ satisfies the following:

$$p(S_{t+1} - Q_{t+1}) + (1-p) \cdot 0 = a[(S_t - Q_t)R_{t+1}^q] + (1-a) \cdot 0 \tag{3}$$

It means that the mathematically expected $(S_{t+1} - Q_{t+1})$ value with probability p for $S_{t+1} \neq Q_{t+1}$ to happen is equal to the expected growth of the t -period difference $(S_t - Q_t)R_{t+1}^q$ with probability $a (> p)$ for $S_t - Q_t \neq 0$. That is, what is expected is a more severe “bubbl”, since $a/p > 1$. So, if we assume $a/p < 1$, it means that the bubble in period $(t + 1)$ is expected to be less severe than in period t .

From equ.(3), it follows that we know the following expression is true:

$$p \cdot \frac{S_{t+1} - Q_{t+1}}{R_{t+1}^q} = a(S_t - Q_t) \tag{4}$$

Now by taking the mathematical expected value for in period t , we have the following:

$$E_t \left(\frac{S_{t+1} - Q_{t+1}}{R_{t+1}^q} \right) = p \left(\frac{S_{t+1} - Q_{t+1}}{R_{t+1}^q} \right) + (1-p) \cdot 0 = a(S_t - Q_t) \tag{5}$$

Equ.(2) implies that

$$\begin{aligned}
 Q_t &= E_t \left[\frac{D_{t+1} + (1 - \delta)S_{t+1} - (1 - \delta)S_{t+1} + (1 - \delta)Q_t}{R_{t+1}^q} \right] \\
 &= E_t \left[\frac{D_{t+1} + (1 - \delta)S_{t+1}}{R_{t+1}^q} - (1 - \delta) \frac{S_{t+1} - Q_{t+1}}{R_{t+1}^q} \right] \\
 &= E_t \left[\frac{D_{t+1} + (1 - \delta)S_{t+1}}{R_{t+1}^q} \right] - (1 - \delta) E_t \frac{S_{t+1} - Q_{t+1}}{R_{t+1}^q} \\
 &= E_t \left[\frac{D_{t+1} + (1 - \delta)S_{t+1}}{R_{t+1}^q} \right] - (1 - \delta)a(S_t - Q_t)
 \end{aligned}$$

Therefore, we have

$$Q_t + (1 - \delta)a(S_t - Q_t) = E_t \left[\frac{D_{t+1} + (1 - \delta)S_{t+1}}{R_{t+1}^q} \right]$$

which is the equivalent to:

$$\frac{S_t [Q_t + (1 - \delta)a(S_t - Q_t)]}{S_t} = E_t \left[\frac{D_{t+1} + (1 - \delta)S_{t+1}}{R_{t+1}^q} \right]$$

By isolating the factor in the numerator and cross multiplying the rest from the left hand side onto the right hand side produce the following:

$$\begin{aligned}
 S_t &= E_t \frac{[D_{t+1} + (1 - \delta)S_{t+1}]S_t}{R_{t+1}^q [Q_t + (1 - \delta)a(S_t - Q_t)]} \\
 &= E_t \frac{[D_{t+1} + (1 - \delta)S_{t+1}]S_t}{R_{t+1}^q [a(1 - \delta)S_t - a(1 - \delta)Q_t] + Q_t} \\
 &= E_t \frac{[D_{t+1} + (1 - \delta)S_{t+1}]S_t}{R_{t+1}^q [bS_t + (1 - b)Q_t]}, \quad \text{where } b = a(1 - \delta) \\
 &= E_t \frac{D_{t+1} + (1 - \delta)S_{t+1}}{R_{t+1}^q [b + (1 - b)\frac{Q_t}{S_t}]} = E_t \frac{D_{t+1} + (1 - \delta)S_{t+1}}{R_{t+1}^s}
 \end{aligned}$$

Therefore, we have derived at

$$S_t = E_t \frac{D_{t+1} + (1 - \delta)S_{t+1}}{R_{t+1}^s} \quad (6)$$

where the return on stocks R_{t+1}^s is related to the fundamental return of the capital R_{t+1}^q as follows:

$$R_{t+1}^s = R_{t+1}^q \left[b + (1 - b) \frac{Q_t}{S_t} \right] \quad (7)$$

If $S_t > Q_t$, then $R_{t+1}^s < R_{t+1}^q$, meaning that the expected stock return $S_t = E_t \frac{D_{t+1} + (1-\delta)S_{t+1}}{R_{t+1}^s}$ is less than the fundamental return of $S_t = E_t \frac{D_{t+1} + (1-\delta)S_{t+1}}{R_{t+1}^q}$.

From equ.(3), it follows that

$$S_t - Q_t = \frac{p}{a} \times \frac{S_{t+1} - Q_{t+1}}{R_{t+1}^q} \tag{8}$$

which implies that at period $t + 1$, there is a positive bubble if and only if there is a positive bubble at period t . Because $0 < p < a < 1$, if $S_{t+1} > Q_{t+1}$ (assuming a positive bubble), then from $0 < \frac{p}{a} < 1$, equ.(8) implies that the current bubble $S_t - Q_t$ is smaller than the fundamental return of the bubble in period $t + 1$. In other words, the bubble in period $t + 1$ gets more severe than when in period t .

Now, if $S_{t+1} < Q_{t+1}$ with $0 < p < a < 1$, then equ.(8) implies that the underpricing S_{t+1} of the asset Q_{t+1} in period $t + 1$ is more severe than that in period t . Moreover, this equation also indicates that at period $t + 1$ there is a negative bubble if and only if there is a negative bubble at period t .

These two conclusions evidently contradict the efficient market hypothesis, because these analogies indicate that if in period t the market over prices the asset, then the overpricing will continue forever; and if in period t the market underprices the asset, then the underpricing will also continue forever. That is, neither positive nor negative bubble will ever crash. So there are two possibilities: (1) The model in equ.(8) does not hold true in general, or (2) The efficient market hypothesis is not ever true.

Evidence appears to show that the efficient market hypothesis holds true at least occasionally and also bubbles, both positive and negative, do burst [15-16]. So, the model in equ.(8) needs to be modified in order to describe the more realistic market situation better.

If in equ.(8) we assume $0 < p < a < 1$, then a similar analysis as above indicates that the phenomenon of overpricing or under pricing disappears over time. And, if $0 < p = a < 1$ is assumed, then the model in equ.(8) implies that the existing underpricing or overpricing stays fundamentally stable.

If $0 < p < a < 1$ and $a \approx 0$ are assumed, then equ.(8) implies that $\frac{p}{a} \approx +\infty$ so that the fundamental return $\frac{S_{t+1} - Q_{t+1}}{R_{t+1}^q}$ of the asset approaches 0, meaning that the existing bubble gradually disappears with time.

Next, let us focus on the analysis of eqs.(1) and (2). In particular, assume that in the $(t + i)$ -th period foreign investments are suddenly increased drastically due to expected appearance of activities from the current weak economic state and weak local currency. So for this period, δ (= the physical depreciation rate of capital) would increase due to the increased amount of money supply, which in turn pushes up the inflation. So $(1 - \delta)^i$ would decrease drastically if the influx of foreign investments is large. At the same time, R_{t+i}^q (= the stochas-

tic gross discount rate of the $(t+i)$ -th period) would also increase, because of the increased inflation while the dividends D_{t+i} would generally decrease due to the reason that everybody would like to reinvest much of the available capital back into the market in order to capture the rising book values, including stocks, real estate, and others with of impressive increasing prices. That is, the present value of the return of the $(t+i)$ -th period $\frac{(1-\delta)^i D_{t+i}}{R_{t+1}^q \dots R_{t+i}^q}$ would drop from the level of expectation. In reality, the investor would hold onto the increased book value by receiving less tangible returns, hoping that the book value would continue to rise drastically.

Due to the wide and conveniently availability of capital, caused by the increased money supply, the local economic activities pick up too in large quantities, while the interest rate also goes up due to the fact that the central bank, in order to control the inflation, revises the interest rate and attempts to limit the money supply.

At this very moment of financially prosperity, assume that a huge amount of foreign investments suddenly leave in the $(t+j)$ -th period, where $j > i$, because of the much higher prices in assets, in capital investments, etc., for them to take profit in order to move their capitals to other regions to capture new economic opportunities. So, in the $(t+j)$ -th period, when a huge amount of foreign investment leaves, most of the economic activities that got started because of the foreign investments become stalled and/or negatively impacted. Therefore, a good portion of the local investments is forced to be retained with the interrupted economic activities. That is, the investors of the local investments can no longer receive their expected dividends, and at the same time a large amount of the investments evaporates totally if many of the stalled activities can no longer be continued until their expected completion, or are indefinitely delayed. That of course costs additional local capital to do the cleanup of what is left behind, unfinished, and unusable ruins. In particular, in equs. (1) and (2), the dividends D_{t+j} of the $(t+i)$ -th period decreases drastically and the remaining future dividends, if they still come fortunately as expected, would have to be used to bail out (to finish up) some of the other potentially possibly profitable projects.

That is, right before the large amount of foreign investments leaves suddenly and strategically, the local economy is more active than ever before. Hence, the stochastic gross discount rate R_{t+i}^q of the $(t+i)$ -th period would be much lower than R_{t+j}^q of the $(t+j)$ -th period, because much higher returns on earlier investments are optimistically expected. So, the present ratio: $\frac{(1-\delta)^i D_{t+i}}{R_{t+1}^q \dots R_{t+i}^q \dots R_{t+j}^q}$ would in reality be very close to zero.

Summarizing what is just analyzed above, one can see that when a large amount of foreign investments gathers in one place over either a long period or a short period of time and then leaves suddenly and massively, that local e-

conomy has to suffer through a positive bubble, caused by the increased money supply as a consequence of the foreign investments, and then a following negative, disastrous bubble, caused by the sudden dry-out of the money supply. And due to a large number of economic activities that are either unexpectedly delayed or totally impossible to complete, the local investors are actually unable to continue to collect their originally expected dividends for many periods to come. That is, foreign investments can be employed as a weapon of mass destruction, if they leave strategically and suddenly, no matter whether they come quickly in a short period of time or slowly over a relatively longer period of time.

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