



An Overview on the Literature and History of Systemic Banking Crisis in Iran and Around the World

Donya Haji Shahverdi

PhD student in Financial engineering, Department of Finance, Central Tehran Branch, Islamic Azad University, Tehran, Iran
don.hajishahverdi.mng@iauctb.ac.ir

Gholam Reza Zomorodian

Department of Finance, Central Tehran Branch, Islamic Azad University, Tehran, Iran
(Corresponding author)
gh.zomorodian@yahoo.com

Mirfeiz Fallah Shams

Department of Finance, Central Tehran Branch, Islamic Azad University, Tehran, Iran
fallahshams@gmail.com

Farhad Hanifi

Department of Finance, Central Tehran Branch, Islamic Azad University, Tehran, Iran
hanifi_farhad@yahoo.com

ABSTRACT

Often, systemic banking crises initiate from one or more banks and affect countries by rapid spreading in the banking network, financial markets and economy of countries. According to Reinhart & Rogoff (2009) in the book titled "This time is Different," financial crises are pointed as an equal opportunity menace for high-income countries and emerging markets.

Although The International Monetary Fund (IMF) has not yet reported on systemic banking crisis for IRAN, but considering that upcoming crises and their possible consequences have a big similarity with those of crisis happened in the past, it can be expected, therefore, by studying the history of crises and assessing the causes of the occurrence and their implications, effective steps can be taken in line with the improvement of the global financial system against future potential crises and extent of their possible damage to the economic system of countries can be reduced.

In the current paper, therefore, in addition to describe the history of systemic banking crisis in the world banking system, indicators for identification of these crises and control and coping methods will be described.

Keywords:

Systemic Banking Crisis, Crisis Management Policy; Government Intervention.



1. Introduction

So far, various definitions and classifications of the financial crises have been presented. Friedman & Schwartz (1963) introduced banking crises episodes and a sudden stop in the money supply as the main cause of financial crises, using a traditional and limited approach. Subsequently, Minsky (1972) and Kindleberger (1978), by emphasizing on the effects of market efficiency and information asymmetry, further investigated the factors influencing financial crises episodes. In addition, The International Monetary Fund (IMF) in 1998, and as a result, a number of scientists¹ categorized financial crises based on the origin of financial crises and scope of application (geographical scope involved). Reinhart & Rogoff (2009) and Qian et al (2010) also promoted the classifications presented for financial crises with a

different perspective and assessed financial crises in two general groups of quantitative thresholds crisis (quantitative crisis) and crises due to the manifestation of certain events.

A group of researchers including Portes (1999) and Sachs (1998), also, typologically identified financial crises based on the causes of financial crisis. All categories presented above can be summarized and presented in the form of a comprehensive classification based on the three main indicators namely the origin, the extent and the cause of financial crises in the description of the diagram (1), in which review of financial crises can be done, regarding origin, in the form of five categories namely currency, banking, public debt, balance of payments and inflation.

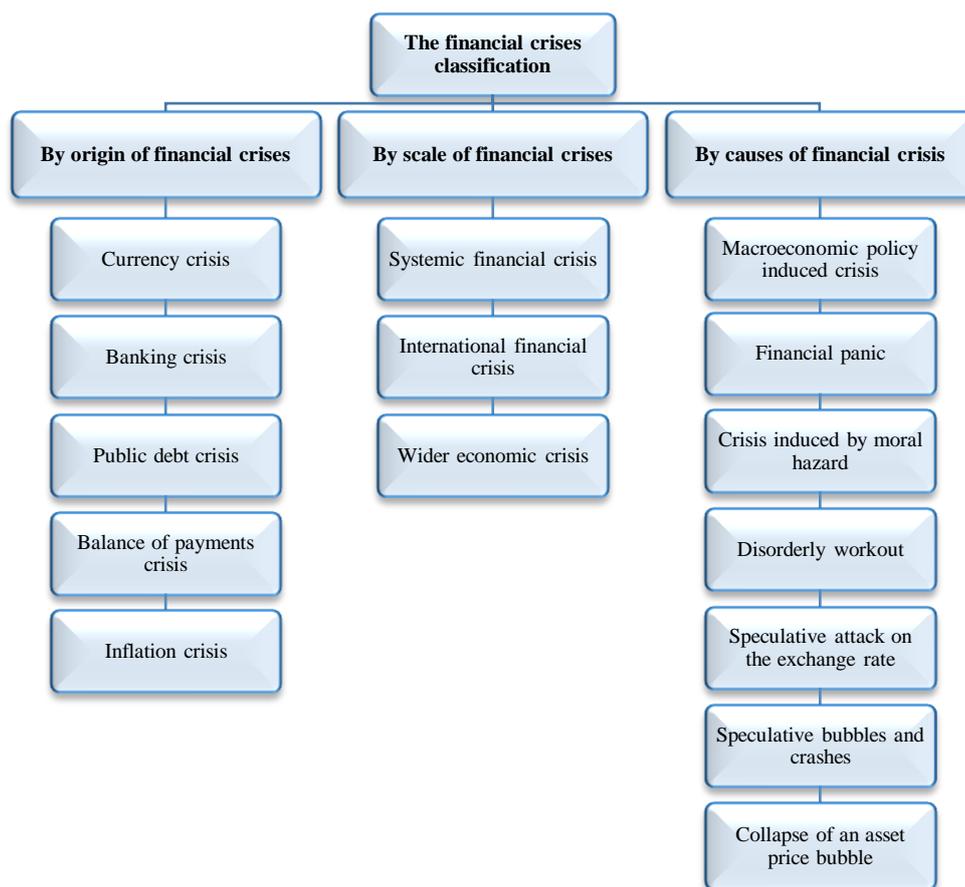


Diagram (1). General Classification of Financial Crises

Laeven & Valencia (2018) reviewed the history of financial crises during the period of 1970 to 2017, the results of which are illustrated by the following diagram states that the three crises of currency, banking and public debt are, respectively, the most frequent crises episodes.

In general, in the 1980s and early 1990s, the public debt and currency crises were widespread. After that, in the middle of this decade, the number of banking crises episodes were increased and the economy of countries experienced banking crises episodes were more than of other periods, during the decade.

Each type of financial crisis can occur individually or engage in economic simultaneously. Sometimes, the occurrence of a crisis can cause another type of crisis to emerge or multiple crises to occur, simultaneously. For example, following the occurrence of a banking crisis from 1981 to 1982, the debt crisis also affected the economy of Argentina and Chile. In the wake of

the banking crisis in Venezuela and turkey in the 1990s, these countries were also involved in a currency crisis. In the crisis episode of Russia from 1997 to 1999, the general market policies resulted in a currency and public debt crises, by causing delays in capital flows. In the crisis of Bulgaria in 1996 and Turkey in 2001, extensive liquidity support aimed at controlling the crisis episode caused speculator influx and currency crisis occurrence. In the following sections, considering the history of the crisis episodes, and focusing on three types of banking, currency and public debt crises, the overlap and possible sequencing of crises will be examined.

The currency and banking crises are considered to be the most frequent financial crises episodes, with shares of 51% and 32%, respectively. In addition, the distribution of these crises over the period from 1970 to 2017 is described at the following table.

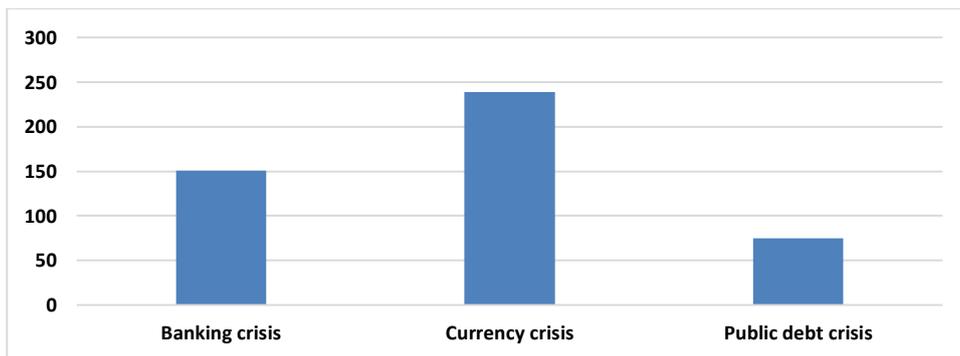


Diagram (2). Frequency of Financial Crises around the World, 1970–2017
(Laeven & Valencia, 2018)

Table (1). The Distribution of Financial Crises, 1970 -2017

Total	Public debt crisis	Currency crisis	Banking crisis	Decade
36	7	25	4	1970-79
152	41	72	39	1980-89
173	7	92	74	1990-99
104	20	50	34	2001-17
465	75	239	151	Total

(Laeven & Valencia, 2018)

2. Overlap and Possible Sequencing of Crises

When two crises engage in an economy over a period of time, a kind of crises overlap occurs which is referred to as twin financial crisis. For example, Turkey 1978, Ecuador 1982, Lebanon 1990, Bulgaria 1996 and Iceland 2008 experienced twin crisis. In addition, if this synchronization is related to three crises, it is referred to as triple crisis. The experience of Mexico 1981, Philippines 1983, Jordan 1989, Russia 1998, Ukraine 1998 and Uruguay 2002 are examples of the triple crisis of banking, currency and public debt.

For the recognition of the twin and triple crises, defining the overlap time interval is necessary. If a crisis occurs at the year t , and another financial crisis occurs in the time period of $[t-1, t+1]$, they consider the two crises to be overlapped and as twin crisis. Also, the definition of triple crises follows this framework. The following diagram illustrates the possible overlapping of the banking crisis with two

public and currency crises in the form of twin and triple crises.

According to the above diagram, the overlap of the currency crisis with the banking and public debt crises are considered as the most common cases of the twin crises. In most cases, the banking crisis plays a leading role in currency and public debt crises. In many situations, the sequencing of crises also occurs in addition to the occurrence of overlap. To examine the sequencing of crises, as well as their probable overlap, we first need to consider a certain period for examination of this phenomenon. In many studies, this period is considered to be 3 years. So that, if a different kind of crisis begins in three years before or after a crisis, it can be said that the sequencing of crises has occurred. Considering this period in more than 16% of the crisis episodes, currency crises, and the banking crisis, in 20% of cases, had a leading role. In general, a review on the background of financial crises suggests the leading role of the banking crisis in the occurrence of overlap and crises' sequencing and the emergence of twin and triple crises.

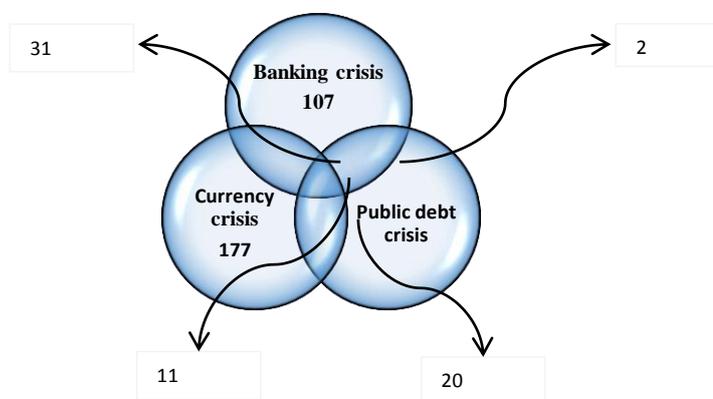


Diagram (3). Financial Crises Overlapping
(Laeven & Valencia, 2018)

3. Systemic Banking Crisis and Crisis Contagion

The European Central Bank (ECB), in 2010, introduced systemic risk as a financial instability risk, which is capable of damaging the economic growth and social welfare by creating a disruption in the function of the financial system. To assess the

systemic financial crisis, from the viewpoint of this institution, in addition to determine the factors affecting the crisis becoming systemic, the internal connection of the financial system with other active financial systems in a system and super-system and the degree of alignment of the financial systems' performance with the business cycle must be examined. According to the Bank for International

Settlements (BIS), this risk also can have a destructive impact widely on the real sector of the economy by putting a stop in the financial services supply chain and disrupting the operation of financial systems.

In general, if a crisis is transferred from one institution or firm to another, crisis contagion (systemic risk) has occurred, implying a severe disruption in the function of financial markets. This type of financial crises can occur in any part of the economy. Reduction in the performance of markets, the occurrence of long-term destructive effects, broad scope of application and transmissibility are among the most important features of systemic financial crises (Antczak, 2000).

In the current decade, due to the increased use of information technology and the acceleration in the information transfer process, the emergence of modern financial instruments, the increasing complexity of interactions between financial institutions, the ever-increasing expansion of financial markets, and other factors of this kind, the number of systemic financial crisis episodes, in particular the systemic banking crises, has been increased.

In general, when a depositors' influx for receiving funds deposited spreads from a bank to another, a systemic banking crisis has occurred. In addition, the banking crisis is considered as systematic if the problems of the banking crisis episodes in one country spread to their trading partners in other countries. In these crises, the default level of banking facilities paid is often increased, so that much of the banking network capital is compromised. In this case, the ability of a bank to perform obligations is heavily influenced by the surprise and inadequacy of available financial resources. In many cases, the occurrence of a systemic banking crisis accompanied by a sharp fall in the price of assets such as stocks and housing, a sharp rise in interest rates and slowness or reversal of capital inflow (Laeven & Valencia, 2012).

In a banking crisis episode, the increased pressure on engaged banks results in increased credit default. The default of a financial institution means the failure of other institutions to meet their demands from the crisis-stricken institution. In this situation, financial problems are also transferred through the payment system to other institutions. In addition, by the financial problems of an institution being transferred to depositors and creditors, the problem will also be socially reflected. In general, in the event of a crisis

episode, as the relationships and interactions between active financial institutions in a network with a crisis-stricken institution become stronger, the likelihood of a crisis contagion will be stronger. Also, as the number of depositors and creditors of the financial institution become more, the risk of the loss of public trust in the banking network and the likelihood of bank run will be greater. In such a situation, in addition to the payment system, the news propagation of the financial inability of a bank in the social communications chain can also result in the increased likelihood of a crisis contagion to the banking network.

Systemic banking crises often start with a small shock, and a defective cycle including a lack of trust in the community results in the influx of depositors, and a decrease in the liquidity. With the emergence of a systemic banking crisis and reduction of the public trust in the banking network, the means for deposit run off and withdrawal of capital from the banking system will be provided, which disrupt the credit granting procedure and increase the likelihood of financial disability or bankruptcy of economic enterprises.

As mentioned earlier, the occurrence of banking crises in the 1990s has been prevalent, with 74 bank crisis episodes in this decade reported, of which 13 banks are characterized by a systemic banking crisis. The systemic banking crisis is based on two principles, the need for central bank intervention in response to heavy losses on the banking network and the emergence of significant signs of tension in the banking system. In the following, the indicators for identification of this type of crisis and the methods of government intervention in the process of controlling and coping will be discussed.

4. Systemic Bank Crisis Identification Indicators

To identify and predict systemic banking crises, yet, a wide range of indicators have been defined, in which macroeconomic variables and developmental structures of countries are of great importance. The amount of credit granted and defaulted claims, interest and currency rates and financial regulations are of the most important indicators guiding the systemic banking crisis. Abnormal behavior of these variables can be interpreted as a warning of a crisis episode (Laina et al., 2015)

In addition, the IMF also identified six key indicators for identifying these crises, given the need for governments to intervene in managing systemic banking crises. According to this supervisory institution, any banking crisis whose management requires at least three of the following six indicators is considered as systemic. In the table of appendix, a summary of the statistics belonging to systemic banking crises occurred and the information about the following six indicators are presented.

- **Extensive Liquidity Support:**

Extensive liquidity support is the strategy of the crisis-stricken government to cope with the depositors' influx and repayment of bank system debt in a crisis episode.

A review on the history of crises indicates that the peak of extensive liquidity support in the systemic banking crises is 20.2% on average. In some crises, this value has also increased by 28%. Based on this, IMF has also introduced extensive liquidity support of over 5% of total unpaid deposits and foreign bank commitments as one of the indicators for identifying a systemic banking crisis.

- **Restructuring Costs:**

IMF has provided another indicator for identifying systemic banking crises based on the assessment of the costs incurred for the restructuring capital of the suffered banks.

According to this supervisory institution, if the reconstruction of the cost structure and the reorganization capital of suffered bank during the banking crisis imposes a cost of more than 5% of GDP on the economy, the crisis occurred will be considered as systemic. In some crises such as in Chile, Argentina, Indonesia, Iceland, and Ireland, this cost has exceeded 40%.

- **Bank Nationalization:**

The nationalization of suffered banks is another strategy of government intervention in the process of managing the systemic banking crisis, which IMF also presented, accordingly, another indicator for identifying systemic banking crises. According to this supervisory authority, if the government of the crisis-stricken countries widely engaged in bank nationalization, banking crisis episode will be systemic.

As mentioned earlier, the occurrence of bank crises can lead to widespread problems, such as long-term bank closures or holidays, bank merging, and nationalization. The review on the history of systemic banking crises during the period from 1800 to 2017 indicates that in 39 of the crisis occurred, suffered governments used a bank nationalization strategy to manage the crisis episode.

- **Significant Bank Guarantees:**

Often, the crisis-stricken government, with the goal of effectively managing stressful conditions resulting from the banking crisis episode, engage in offering guarantees based on a commitment to repay bank debts and accept liabilities of suffered banks. According to IMF, if the governments provide significant guarantees with the goal of managing the banking crisis, the banking crisis can be considered as systemic.

- **Bank Asset Purchases:**

Purchasing assets of crisis-stricken banks is another strategy for managing crisis episodes. In this way, most of the assets of the suffered banks are bought by the central bank, the government and the treasury, or asset management companies are established with the aim of buying bad assets (distressed loans). According to the IMF, if the implementation of the strategy for crisis-stricken countries exceeds 5% of GDP, the bank crisis episode can be considered as systemic.

- **Deposit Freeze and Bank Holidays:**

Deposit freeze and bank holidays is another strategy to cope with bank crisis, which is also the basis of defining indicators for identifying a systemic banking crisis. Bank holidays due to the banking crisis episode is a rare phenomenon. In the period from 1970 to 2017, only 6 bank holidays were reported as a result of banking crises, which in all cases resulted in the deposit freeze. On average, the time-span for this type of activity freeze or holiday is 4 to 8 days, although it reached 24 days at the case of the crisis in Greek.

5. Effective Management Policies of the Systemic Banking Crisis

In general classification, banking crises can be addressed, regarding the scope of application, at three

levels of native crises, macroeconomic epidemics, and macroeconomic inefficiencies. Management of systemic banking crises plays a major role in limiting the scope of application and reducing the subsequent consequences of their occurrence as a macroeconomic epidemic (Johnson, 2002).

Various opinions are presented regarding the causes of banking crises and effective management methods. In the meantime, some researchers, regarding the majority of views from the period of the 1930s and 1940s, are looking for the roots of the crisis episode in the imbalances found in the financial markets. These people introduce the government's intervention and support from suffered banks as the most effective way of treating this banking system from illness, other groups of researchers not only do not see the government as a treatment, they hold it as the main cause of the bank crisis episodes and the resulting negative consequences.

According to them, the incompatibility of governments' macroeconomic policies, the imposition of specific requirements on the banking network and the imposition of inappropriate interventions on the crisis management process, are the main contributors to this problem (Allen, 2007).

Caprio et al. reviewed the history of systemic banking crises occurred during the period from 1970 to 2007 and evaluated information on the occurrence of 42 systemic banking crises in 37 countries. Later, these studies were completed by other researchers and the history of the 65 systemic banking crisis episodes during the periods of 1980 to 2011 was evaluated. The results of this research indicate that crisis-stricken countries often use a range of supportive policies, such as extensive liquidity support, significant bank guarantees, tax policies enforcement, and reallocation of wealth between banks and debtors to manage the banking crisis episodes, in terms of economical, political and social conditions, banking system structure and financial affordance.

In general, bank crisis management policies can be studied in terms of the execution time in two parts of the containment phase and resolution phase as follows.

5.1. Containment Phase

The main goal of the containment phase is to restore the peace and trust to depositors and prevent further contagion of the crisis episode. Implementing these policies usually does not require the formation of

a new organization or the definition of a complex process. Policies such as suspension of convertibility of deposits, regulatory capital forbearance, emergency liquidity support and government guarantee of depositors will be expressed in this section:

➤ Regulatory Capital Forbearance for Suffered Banks

The government's purpose of designing and implementing this policy is to facilitate regulatory issues and to reduce the costs imposed on suffered banks during the crisis episode. Usually, governments are applying assistance on capital adequacy requirements with the goal of supporting suffered banks by the crisis and facilitating their recovery process for a short-term or medium-term. Although this supportive method is part of the containment phase, most of their execution continues within the framework of resolution phase until the recovery of the affected bank activity.

➤ Emergency Liquidity Support

With the sudden fall and rise in the value of assets and the multiplicity of bank failures, most governments engage in emergency liquidity support to failing and crisis-stricken banks, with the aim of controlling the current banking crisis and preventing from its spread, which effective implementation of this supporting method requires the assessment of the financial position and the continuity condition of the crisis-stricken banks. The inadequacy of evaluations will result in resource support into financial institutions lacking essential ability to continue their activities, which imposes excessive costs on government and inflation to rise, meanwhile, increasing the likelihood of moral hazard and deepening maladministration in suffered financial institutions.

➤ Suspension of Convertibility of Deposits

Governments often apply restrictions on the withdrawal of deposited funds, with the aim of controlling the bank resources run from crisis-stricken banks. It is expected that the effective implementation of this policy will prevent long-term deposits convertibility into the short-term, fast and unexpected withdrawal of bank deposits.

➤ **Government Guarantee of Depositors**

With the spread of the bank-run phenomenon and lack of public trust in the banking network, most governments engage in the provision of a guarantee for deposit refunds. Expecting government support in the case of critical situations occurrence increases the likelihood of assertive behavior of bank managers and possible abuses.

Effective implementation of containment phase requires a proper understanding of the causes of the crisis episode and probability assessment of the effectiveness of selected policies. A review of the background of these crises suggest that governments take a different range of short-term policies based on the fact that a crisis episode is rooted in the depositors' influx, bank failures, mismanagement, financial market disturbances, or changes in macroeconomic variables. Failing to properly understand the causes of a banking crisis and the choice of an inappropriate method to control can result in imposing excessive costs on the economy of the countries, meanwhile, spreads the crisis episode.

In general, in cases where the systemic banking crisis occurrence is rooted in depositor's influx, governments often engage in the emergency liquidity support, guarantee of refund, suspension of depositors' rights, temporarily freezing the suffered bank activity, undertaking depositors' obligations or transferring to other banks, with the aim of controlling crisis episode.

In addition, if the failure of one or several banks is the main cause for the banking crisis episode and its contagion, most governments seek to control the crisis, by intervening at the administration of suffered bank, selling failed bank assets to other banks, holiday or freezing the crisis-stricken bank operation and even, merging them. In some cases, despite the observance of laws and regulations governing functioning of banks, the crisis is only spread due to bank disruptions occurred in financial markets such as stock prices, currency rate fluctuations and changes in macroeconomic variables, governments often use policies to facilitate rules governing the adequacy of banks capital and requirements observing liquidity reserve for controlling bank crisis episode.

5.2. Resolution Phase

Following the successful implementation of containment phase and the regeneration of public trust in the banking network, crisis-stricken governments

are struggling to retrieve the main causes of the crisis episode and the damage on the real sector of the economy. At this point in time, many financial institutions, banks, and companies were reported as bankrupt or at the risk of bankruptcy, many of which still continue their activity at the ownership of the government or regulatory agencies. In this situation, most banks liberated from the crisis are heavily indebted and lost much of their capital.

Given the high-speed of transferring the effects of the crisis through banking network to the real sector of the economy, management of these crises is of great importance. Governments often undertake to implement resolution phase aimed at maintaining the key functions of the financial system and mitigating the possible consequences of a crisis episode, which could impose excessive costs, meanwhile, inflict problems related to specialized units management on governments' body. Therefore, creating a balance between the implementation of coping policies and resulting financial costs has always been one of the concerns of governments for managing crisis episodes.

In general, there is no unit version presented for long-term policies to cope with the systemic banking crisis, and most governments design and implement specific policies based on the causes of the crisis and its future implications. In some studies, these policies are evaluated in two general categories: policies for bank recapitalization and policies controlling recapitalization. In some studies, these policies are evaluated in two general categories: policies for bank recapitalization and policies controlling restructuring. If the occurrence of a crisis is rooted in moral hazard, corruption, and maladministration, governments often use restructuring policies whose implementation is accompanied by restructuring the management and administrative structure of crisis-stricken banks, merging or nationalizing. But if the occurrence of a crisis is rooted in economic imbalances, governments often make a fundamental change in the management structure of the suffered banks, meanwhile, implement policies related to recapitalization and restoring the financial structure. This section outlines a series of long-term policies to cope with systemic banking crises.

➤ **Bad Asset Management**

In this method, governments try to purchase all or part of the assets of suffered banks at the aim of

coping with a systemic banking crisis episode and making a decision on bad assets of crisis-stricken banks. For this purpose, an asset management fund is often established by the government or affiliated institutions, and bad assets of crisis-stricken banks are transferred. Although, the implementation of this method can be considered as an effective step in the management of the crisis episode, but the public management of this institution and the lack of public sector expertise in banking discussions, the timely and costly process of resolving difficult facilities (bad assets of banks) and the probability of moral hazard and possible misuse occurrence, makes the implementation of the method, difficult.

➤ **Granting Financial Assistance**

Governments, with the aim of overcoming the lack of capital in the financial institutions liberated from a crisis, often purchase part of these institutions' shares, thereby engaged in financial resources support to these institutions. The identification of suffered banks from healthy banks, as well as preventing moral hazard and possible misuse occurrence are of the difficulties of implementing this supporting method. Usually, governments, with the goal of more effectively implementing the method, make capital support into a suffered bank subject to the provision of capital's equity by the shareholders, or, as the banking crisis in Chile, capital support into a suffered bank is subject to non-payment for interest.

➤ **Transferring Crisis Banks**

The transfer and sale of suffered banks is another policy of coping with banking crises, which imposes excessive costs on government for implementation. However, the emergence of foreign banks in the banking sector of crisis-stricken countries could accelerate the process of restoring the banking system and their economies return on the growth path, but the implementation of this policy could also possibly result in increased crisis contagion to other countries in the activity field of mother bank.

In some studies, these policies are categorized according to their scope of application (state intervention level) into two categories of supportive policies from the entire banking network and supportive policies from a certain financial institution. Mitigating interest rates is one of the supporting method from the entire banking network. In addition,

compensatory recapitalization, gratuitous capital injections and the purchase of bad assets at a rate higher than usual, as described above, are of supporting methods of a suffered financial institution.

In addition to the aforementioned methods, countries can also use various management methods to manage banking crisis episodes. For example, in addition to the usual government supports in the recent financial crisis in Europe, ECB supported crisis-stricken financial institutions by mitigating rates, accepting a broader list of assets for the recapitalization of central bank capital, 36-month mature extending for financial funds, and promoting asset purchase plans (ECB, 2015).

Evidence suggests that, although the implementation of government intervention methods in systemic banking crises requires allocation of excessive costs for crisis management, their implementation does not necessarily lead to the acceleration of the economic recovery process (Claessens et al, 2005)

6. Discussion and Conclusions

The International Monetary Fund (IMF) reported four currency crises in 1985, 1993, 2000 and 2013, and public debt and currency current overlapped at the time period from 1992-1993, for the country Iran. However, according to the diagram below, no systemic banking crises have been registered for Iran.

In the diagram above, an extensive map of the systemic banking crisis episodes is depicted regarding the number of occurrences. In this map, countries are categorized into five classes according to the number of systemic banking crisis episodes. Meanwhile, three countries of Argentina, Ukraine, and the Congo experienced 4, 3, 3 times, respectively, of systemic banking crisis in the period from 1970 to 2017 being placed at the top of the list, and by increasing the time period from the 1800 to 2017, England and the United States, by experiencing 13 and 12 times of systemic banking crisis, will be put on the top of list.

Although IMF has not reported the occurrence of a systemic banking crisis for Iran in the past, but given the background of systemic banking crises in developing countries, it seems that the conditions for the emergence of systemic banking crises, such as increasing bank public ownership, conflict in the policies of credit granting and absorption of deposit, lowering the ability to absorb deposits, increasing the

volume of postponed bank claims, increasing bank claims from the government, occurrence of international sanctions, and sharp currency rate fluctuations are evident in Iran. However, because of the government's support and the central bank of the Islamic Republic of Iran (IRR) from the agent banks, we have never witnessed the occurrence of this crisis in Iran's economic system.

Therefore, it is expected that by studying the history of the occurrence of these crises and examining the causes of their occurrence, necessary measures to prevent these crises will be applied. Also, studying the policies of coping and controlling systemic banking crisis episodes can play an effective role in designing a crisis management strategy and providing preparation required to cope with future potential crises.

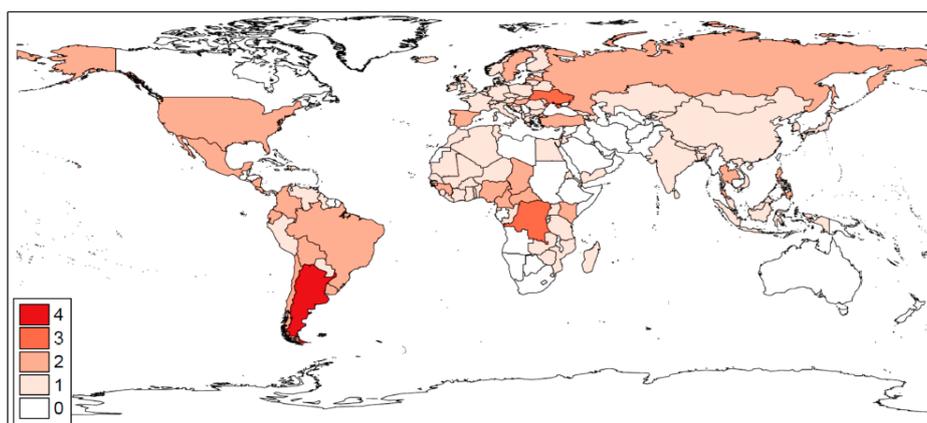


Diagram (4). Extensive Map for the Systemic Banking Crisis Episode
(Laeven & Valencia, 2018)

References

- 1) Abiad, A. (2003). "Early-Warning Systems: A Survey and a Regime-Switching Approach." IMF Working Paper No. 03/32.
- 2) Antunes, A. D. Bonfim, N. Monteiro, and P. Rodrigues (2014). "Early Warning Indicators of Banking Crises: Exploring New Data and Tools". *Economic Bulletin Banco de Portugal* April 2014.
- 3) Bussiere, M. and Fratzscher, M. (2006). "Towards a New Early Warning System of Financial Crises." *Journal of International Money and Finance*, 25, 953-973.
- 4) Davis, Philip E.; Karim, Dilruba (2008). "Comparing Early Warning Systems for Banking Crises, *Journal of Financial Stability*." Vol. 4 (2008), Iss. 2, pp. 89-120.
- 5) Demirgüç-Kunt, Asli; Detragiache, Enrica (2005). "Cross-Country Empirical Studies of Systemic Bank Distress: A Survey". IMF Working Paper, No. 96/05, Washington 2005.
- 6) Elsinger, Helmut; Lehar, Alfred; Summer, Martin (2006). "Using Market Information for Banking System Risk Assessment". *International Journal of Central Banking*, Vol. 2 (2006), No. 1, pp. 137-165.
- 7) Fabian Valencia & Luc Laeven (2012). "Systemic Banking Crises Database: An Update." IMF Working Papers 12/163, International Monetary Fund.
- 8) Kauko, Karlo (2014). "How to Foresee Banking Crises, a Survey of Empirical Literature." *Economic Systems* (forthcoming).
- 9) Laeven, L. and Valencia, F. (2018). "Systemic Banking Crises: A New Database." *International Monetary Fund*, WP/08/224.
- 10) Luc Laeven & Fabian Valencia (2012). "Systemic Banking Crises Database." *IMF Economic Review*, Palgrave Macmillan, vol. 61(2), pages 225-270, June.

- 11) Lilien, D.M.(1982).“Sectoral Shifts and Cyclical Unemployment.” *Journal of Political Economy* 90 (4), pp. 777-793.
- 12) Lin, Chin-Shien; Khan, Haider A.; Wang, Ying-Chieh; Chang, Ruei-Yuan (2006).“A New Approach to Modelling Early Warnin Systems for Currency Crises: Can a Machine-Learning Fuzzy Expert System Predict the Currency Crises Effectively?” Center for International Research on the Japanese Economy Discussion Paper, CIRJE-F-411, Tokyo, April 2006.
- 13) Reinhart & Rogoff (2009) “ This time is Different.” Princeton university press.
- 14) Rose, A. K. and M. M. Spiegel (2009).“Cross-Country Causes and Consequences of the 2008 Crisis: Early Warning.” NBER Working Paper No. 15357.

Note

¹ Antezak, 2000 - Dabrowski, 2003 - Bordeaux, 2008 - Reinhart & Rogoff, 2008 - porter, 2009 - Gartner & Jung, 2010