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## INTERNATIONAL EXPERIENCE IN USING THE METHODOLOGY FOR DETERMINING THE SYSTEMICALLY IMPORTANT FINANCIAL INSTITUTIONS: HISTORY AND PRACTICE

*This article focuses on the history and practice of central banks and supervisory authorities in identifying systemically important financial institutions and measures on their regulation. At present, the search for new ways of preventing the systemic imbalances is of great importance for central banks and regulatory authorities. The article also analyzes the number of publications on summarising the criteria for determining SIFI and the latest reports on financial stability of central banks, where the methods to determine SIFI have been specified.*

*Keywords:* systemic risk; systemically important financial institutions (SIFI); systemically important banks; regulators; central banks; macroprudential policy.

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## ДОСВІД КРАЇН У ВИКОРИСТАННІ МЕТОДІВ ВИЗНАЧЕННЯ СИСТЕМНО ЗНАЧУЩИХ ФІНАНСОВИХ ІНСТИТУТІВ: ІСТОРІЯ І ПРАКТИКА

*У статті представлено історію та практику центральних банків і наглядових органів щодо виявлення системно важливих фінансових інститутів і заходів з їх регулювання. На сьогодні в пошуках нових способів запобігання системним дисбалансам вони мають велике значення для центральних банків та регулюючих органів. Також проаналізовано низку публікацій щодо використання критеріїв визначення СЗФІ і останні звіти з фінансової стабільності центральних банків ряду країн, які підсумовують методи визначення СЗФІ.*

*Ключові слова:* системні ризики, системно значущі фінансові інститути (СЗФІ), системно значущі банки, регулятори, центральні банки, макропруденційна політика.

*Табл. 2. Рис. 2. Літ. 10.*

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## ОПЫТ СТРАН В ИСПОЛЬЗОВАНИИ МЕТОДОВ ОПРЕДЕЛЕНИЯ СИСТЕМНО ЗНАЧИМЫХ ФИНАНСОВЫХ ИНСТИТУТОВ: ИСТОРИЯ И ПРАКТИКА

*В статье представлены история и практика центральных банков и надзорных органов по выявлению системно важных финансовых институтов и мер по их регулированию. На сегодня в поисках новых способов предотвращения системных дисбалансов это имеет большое значение для центральных банков и регулирующих органов. Также проанализированы научные публикации по вопросам использования критериев определения СЗФИ и последние отчеты по финансовой стабильности центральных банков ряда стран, в которых суммируются методы определения СЗФИ.*

*Ключевые слова:* системные риски, системно значимые финансовые институты (СЗФИ), системно значимые банки, регуляторы, центральные банки, макропруденциальная политика.

**Introduction.** Today's global discussions are focused on identifying the systemically important financial institutions (SIFI) and the development of appropriate measures, known as "macroprudential" are of great importance and show their high-

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est relevance to central banks and regulatory authorities all over the world. One of the most important issues in regulation of systemic risks and ensuring the systemic stability for financial institutions is the creation of indicators and assessment methodologies of systemically important institutions, which would facilitate a regulator with relevant tools to build a policy to stabilize the financial system and under take appropriate steps to prevent financial vulnerabilities. The collapses of Bear Stearns, Lehman Brothers and AIG, and low liquidity of many major banks in the world forced to think about the social impact of interrelation of financial institutions.

**Latest research and publications analysis.** To study the issues of identifying the systemically important financial institutions and measures on their regulation the author has analyzed research publications of supranational regulatory bodies such as the Financial Stability Board, the Basel Committee on Banking Supervision and the International Monetary Fund, and locally – the experience of the Federal Corporation Deposit Insurance of USA and the Czech National Bank. To describe the method of constructing the "scale-free networks" the author investigated the works by A. Barabasi and E. Bonabeau (2003). In the theoretical part of the study on the methods of networking the works of Russian scientists I.I. Titov (2009) and P.E. Velikhov (2007), who also attributed to the scale-free network analysis technique into their studies and the importance of using this method for describing networks in biology and information technologies, respectively, have been analysed. The review of "Big Four" documentation is also important if there is a need to consider the matters of the recent post-crisis financial regulation, changing directions, thus the author has described the view of the PriceWaterhouseCoopers (2011) for this issue. The author also refers to the works of the scientists who study the problems of proliferation of financial imbalances (systemic risk) in the banking system, one of which is A. Moussa (2011). Z. Komarkova, V. Hausenblas and J. Frait (2012) have showed in their common work how to apply the method of scale-free networks for the analysis of the systemic importance of a banking sector.

**The object of this research** is the system of indicators, which identifies the systematically important banks, and how they were adapted and developed over time.

**The research objective** is to identify the key criteria for assessing the systemic importance of financial institutions, the history and current practice of central banks to develop indicators of their identification.

**The research methods** are systematic and comparative analysis of SIFI identification methods.

**The reasons why SIFIs and SIBs have become the unresolved issues of financial regulation.** Learning from mistakes, and the recent financial crisis in particular, regulators all over the globe have come to the conclusion that the identification of systemically important financial institutions and determination of the triggering causes of systemic risks is of a great importance, therefore they has shown their wider attention to the consequences and impacts of financial imbalances to the community, causing itself the problem of moral hazard. Thus, they have come to the decision on developing and improving the regulatory policies, which could effectively prevent the fragility of institutions which triggers systemic failures within financial systems. Regulators and scientists should now clearly understand and explore all the possible causes of systemic imbalances.

**Key research findings.** Financial Stability Board (FSB) defines SIFI as institutions the sudden failures of which can lead to serious disruptions in the financial system due to their size, complexity, internal organization (branch network) and the level of their systemic interconnectedness (Financial Stability Board Report, 2011).

The main criterion for assessing the systemic importance is its size, e.g. the volume of its balance sheet. Traditional regulatory framework for determining systemically important financial institutions has its historical beginning with the US banking system and the need to rank institutions within this system in terms of balance sheets size. Such rankings were first carried out in the United States for the Continental Illinois Bank in 1984, when the regulators had fears that bank default could cause systemic imbalances and crisis. The bank has suffered from several defaults in the portfolio of non-performing loans which financed the energy sector, as well as from the counterparty losses from other customers. As a result, Moody's lowered the rating of the bank's category below "Aaa". This led to a "money-run", causing the liquidity crisis. The regulators were concerned that the financial loss of the Continental Bank's 45 bln USD in assets can spread to more than a thousand of other banks, which may "catch" the bankruptcy and "move out by cascade" afterwards. Since then, the Continental Bank and another dozen of the largest US banks have to top the list of systemically important banks (SIBs) because of being "too big to fail" (Moussa, 2011).

One of the factors of being SIFI is the size of a financial institution. The size of bank's balance sheet and offbalance accounts indicate its exposure to systemic risks.

In 1998 again in the USA the Federal Reserve Bank of New York organized a rescue plan for saving the Long Term Capital Management (LTCM) hedge fund fearing that the liquidation of its assets could lead to the spread of systemic risk to its numerous counterparties. LTCM's balance sheet assets amounted to about 125 bln USD, and the capital of 4 bln USD. However, the off-balance sheet assets of the Fund were about 1 trln USD. LTCM's largest counterparties monitored its bilateral transactions entirely, even though they were not aware of all off-balance transactions and the real scope of the risk exposures of LTCM. The example of LTCM stressed the importance in assessing the level of interconnectedness of systemic risk of financial institutions and their off-balance amounts (Moussa, 2011). Thus, the size of balance sheet assets is not a most reliable indicator of the systemic risk.

Experts and scholars have noted that an important factor in the financial crisis of 2007–2009 was the interrelation of financial systems. As it became known, the recent crisis was caused by the collapse of the housing market in the US in 2007 and an increase in interest rates, which have led homeowners to be in debt under the subprime mortgage obligations and to the cascaded wholesale of their collateral. As a result, collateralized securities (such as mortgage-backed securities (MBS) and collateralized debt obligations (CDO)) led to owners facing huge losses, which disrupted the financial stability of banks that operated with them. Several major institutions then started to be acquired by other institutions, as well as to receive government aid. Among these financial institutions are: Lehman Brothers, Merrill Lynch, Fannie Mae, Freddie Mac, Washington Mutual, Wachovia, and AIG. The lack of liquidity and the collapse of the stock market contributed to the rapid spread of financial problems from one institution to another, in the style of domino. So regulators should also assess the potential negative impact of a financial institution on a financial system and

the real economy. These criteria should take into account both direct and indirect contagion channels (FSB, IMF and BIS, 2011). From January 2008 to the present day the US banks have been declared bankrupt by the Federal Deposit Insurance Corporation (FDIC) because of the systemic risk. The list of banks exposed to systemic risk updated weekly, for 2013 they counted to 496, which everybody can check from the page for failed banking list on the FDIC's official web-site.

Thus, the most recognized global approaches of identifying systemically important financial institutions are based on 3 criteria: the size and the amount of activities (the volume of financial services provided to an individual financial institution), the substitutability (i.e. the extent to which other financial institutions can provide the same service in the event of failure of the first), and the interrelation with other financial institutions in the system. However, the recent financial turmoil has shown that institutions of the relatively small size may also represent a significant "risk of injury" to the system. Therefore, another important criterion is a behavioral one, when small banks may also be systemically important because the collective action with other similar small banks could expose them to a shock at the same time by their similar behavioral responses to the shock. This can happen if institutions are exposed to common risk factors (e.g., due to similar business models of banks). In addition, from the regulators' perspective, a bank holding companies with 50 bln USD in assets and more shall be automatically designated as systemically important bank (SIB). The most clear-cut criteria have been published in November 2011 by the Basel Committee on Banking Supervision and the FSB (Table 1.)

**Table 1. The comparison of methods of assessing SIFIs**

Regulator	The Basel Committee on Banking Supervision	FSB
Determination of SIFI	Size is determined by the importance of the institution of systemic change at the stock market, using the analysis of changes as the main component.	The size of the systemic importance of an institute is determined by fundamental indicators (factors). Balance sheet indicators are used mostly.
Data and calculations	This methodology includes: - the determination how deeply a financial institution is interrelated with other institute(s) in the system - determination of an institution subject to bankruptcy - what types of risks may enter into the institution because of interrelation	Types of indicators and their weights: - interfinancial system assets (10%); - interfinancial system obligations (10%); - exposure to risk under Basel III (20%); - financial market requirements (6.67%); - obligations at financial market (6.67%); - the cost of attracting non-deposit liabilities (6.67%); - custodial assets (6.67%); - payments through the clearing system (6.67%); - the value of the secured debt and equity instruments (6.67%); - the estimated value of OTC derivatives (6.67%); - 3 <sup>rd</sup> level assets (6.67%); - the value of assets held for trading and selling (6.67%)
Revaluation	Weekly	Every 2 years

Note: composed on the basis of the measures presented by the Basel committee on banking supervision (2011) and FSB (2011).

Analyzing the number of publications on the analysis criteria for determining SIFIs and recent financial stability reports by central banks, it is fair to say that the

latest studies have already summarized all the methods and criteria for determining SIFIs, which were proposed by the Basel Committee and the FSB. The report on the financial stability of the Czech National Bank for 2012 has attracted our particular attention, since it characterized all previously existing approaches to determining the SIFIs. For the analysis of the systemic importance of financial institutions the Czech researchers used several methods, one of which is a composite quantitative index. Composite quantitative indices are supplemented by the two indicators obtained from the analysis of the network. In order to approach the Basel criteria, the standard classification of 11 indicators was grouped into 5 categories: the size of a bank (gross exposure to credit risk, income size), cross-border activities (requirements for non-residents, the liabilities of non-residents), interrelation (requirements for credit institutions due to credit institutions, the average value of the index of centrality in the network at the interbank market), substitutability (customer asset management, payment clearing and settlement in the payment system, the average value of central network CERTIS<sup>2</sup>), complexity of a bank (the value of a trading bank and the assets held for sale). Separate figures were calculated for each bank individually. The unit of measurement for each indicator as a whole is calculated by dividing the sum of the relevant variables for individual banks to the total amount of the system. Finally, the composite index of systemic importance is calculated as a weighted average of these indicators (Komarkova, Hausenblas and Frait, 2012). Analyzing the systemic importance units of Czech banking system, the researchers initially gave equal weight to each category and equal weights for the indicators in each category. Thus, each class was given the weight of 20%, which was further divided into smaller weights depending on the number of indicators. Then the categories were reorganized so that they better reflect the conservative nature of Czech banking sector and their weight changed as the following: substitutability (33.33%), activities volumes (26.67%), interrelation (20%), cross-border activities (13.33%) and the complexity of the structure (6.67%).

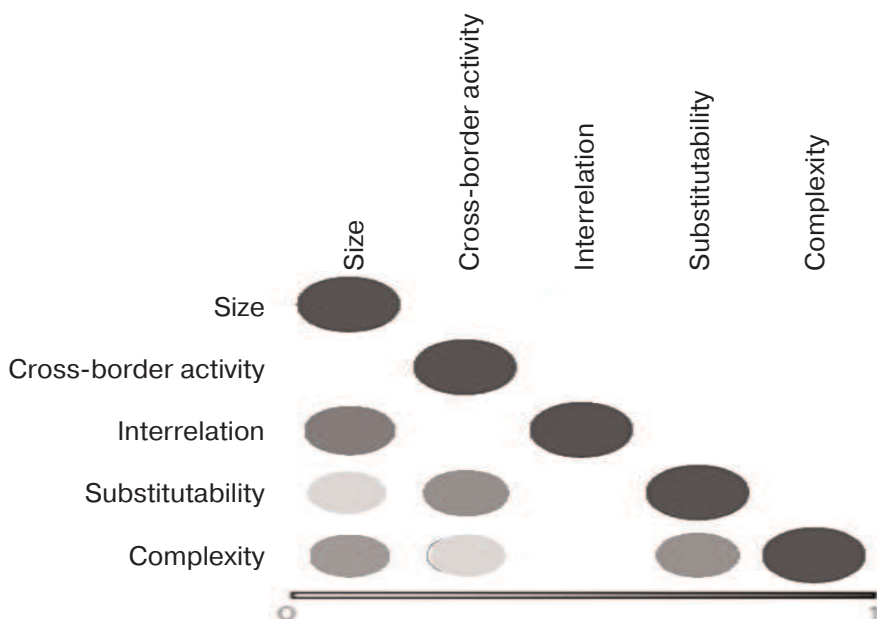
For the second alternative assessment, Czech researchers analyzed the average term of the growth phase of Czech economy and found that the return on assets of the financing of economy is very low. In this regard, the greatest weight was given to the categories as interrelation, cross-border activities and structural complexity (each – by 26%) and less weight to the categories of size and substitutability (both – by 11%). On the basis of these analyses, each category (factor) of systemic importance, it turned out that for Czech economy in addition to the size factor, the interrelation and complexity factors are also important to be explored and assessed (Figure 1).

Scientists, who study the structure of systems and networks, point out that the analysis of a system should take its structure (topology) into account, as it provides the most vital information about the effectiveness of its operation and stability (Velikhov, 2007). Building a complex network structure of a banking system is a special case and is an example to explain scale-free networks (Barabasi and Bonabeau, 2003). Scale-free network stability is highly dependent on a few key components (i.e. important banks), but most sites do not pose a risk to their stability. Core nodes (important banks) in the network components are the stabilizing nodes for the sys-

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<sup>2</sup> CERTIS is the Interbank payment system in Czech Republic.

tem, but their separation from the system (the bankruptcy case) theoretically shows disastrous consequences for the system as a "domino effect" (Titov, 2009). So, to identify a systemic risk element and assess the degree of systemic importance we should use the analysis of central networking (Komarkova, Hausenblas and Frait, 2012). In recent years there emerged a method called central network analysis. Applying the method of analysis of network centrality to the Czech National Bank, the researchers found that the category of interrelation is essential for the 5 banks in the whole system (Figure 2). That is, the greatest degree of systemic importance of one of the five largest banks in the Czech Republic. Thus, the results confirmed that size is not the determining factor of systemic importance, however it, plays an important role. This is evidenced by the fact that resulting figures are stable in all alternative approaches of finding a systemic importance and confirmed by a close correlation between major banks. For the 4 banks the composite index has exceeded the average system value. According to the analyzed parameters, these banks represent 70% of the entire system. These banks may be subject to a systemic risk, both individually and as a group.



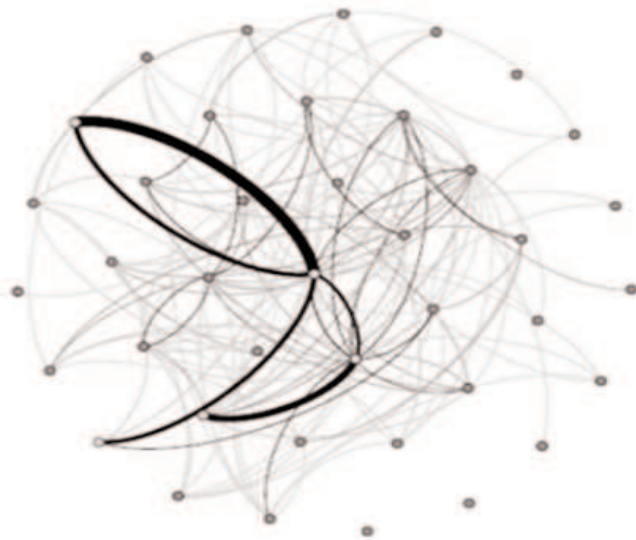
Source: Komarkova, Hausenblas and Frait (2012).

Figure 1. **Correlation matrix of indicators aggregated into categories**

One of the following approaches of assessing systemic risk is the phenomenon where a lot of small, uniform organizations can be overwhelmed as a single issue (risk) and simultaneously go bankrupt (the so called "too-many-to-fail"). Czech researchers has not stood away from using this approach and appreciate the appearance of a cluster factor of systemic risk to the banking system, and concluded that small banks in the form of a single cluster can also create a problem of systemic vulnerability, and it estimated that the total value of the composite indicator (about 30% of the system) will be greater than the highest rate of individual banks (for about 26%). Czech national bank concludes that the establishment of macroprudential



requirements for banks rests with regulators' decisions, and the empirical approaches to assessing the systemic risk can serve just as a guide for that.



Source: Komarkova, Hausenblas and Frait (2012).

*Figure 2. Structure of the interbank market network*

*Table 2. The list of the first global SIBs by the results of 2012*

1. Dexia SA	Belgium
2. Bank of China	China
3. Banque Populaire	France
4. BNP Paribas SA	
5. Credit Agricole SA	
6. Societe Generale SA	
7. Deutsche Bank AG	Germany
8. Commerzbank AG	
9. Unicredit Group SA	Italy
10. Mitsubishi UFJ FG	Japan
11. Mizuho FG	
12. Sumitomo Mitsui FG	
13. ING Groep NV	The Netherlands
14. Banco Santander SA	Spain
15. Nordea AB	Sweden
16. UBS AG	Switzerland
17. Credit Suisse AG	
18. Royal Bank of Scotland PLC	United Kingdom
19. Lloyds Banking Group PLC	
20. Barclays PLC	
21. HSBC Holdings PLC	
22. Bank of America	USA
23. Bank of New York Mellon	
24. Citigroup	
25. Goldman Sachs	
26. J.P. Morgan (JPM)	
27. Morgan Stanley	
28. State Street	
29. Wells Fargo	

Source: FSB, 2011.

In the field of SIFIs regulation, the Basel Committee is there to toughen the requirements for large financial institutions by 2016, namely it recommends the increase of the reserves size as a guarantee of protection from sudden losses. In November 2011, the FSB and the Bank for International Settlements have identified the list of G-SIBs, which number reaches 29 (Table 2). The list of G-SIBs is to be updated annually by November in which the number of banks can move in both directions, increasing and decreasing. Also in November 2011, the Cannes summit of the G20 for the first time approved the system of methods to reduce the impact of systemic risks in order to reduce the risks associated with systemically important financial institutions (G20, 2011). This was shortly after the publication of the list of measures adopted by the Financial Stability Board to address the issue of being "too big to fail" (TBTF). The set of measures was published in July 2011 (PricewaterhouseCoopers, 2011). The first of them is the counter-cyclical buffer of capital. The trend of the new recommendations of the Basel Committee is started by that. Thus, the Netherlands, Ireland and Sweden have not slowed down for this matter, and have already announced that they would introduce additional systemic capital requirements for local SIBs. The UK also plans to use a similar approach in the upcoming reforms of the banking sector.

**Conclusions and prospects for future research in this field.** Regulators believe that the new requirements of macroprudential regulation can positively affect the value of shares. On the other hand, opponents of macroprudential requirements state that barriers are harmful and can hinder the development of economic systems, because the world needs to work through the systemically important financial intermediaries in order to have a timely assistance for the global business activities, and thus help the whole geographical areas to develop their economies. But such a controversy and the division into two sides of arguments in this regard is still useless and cannot stop new developments in the regulatory processes, which have run in order to avoid the problem of "moral irresponsibility" of significant financial intermediaries in front of the community which was created because of the globalizing factor of financial corporations and their "imperial" possibilities. Therefore, regulators around the world also understands that it is necessary to take measures on controlling inter-territorial activities of financial institutions, which have to be included in the list of macroprudential policy measures in each country. The purpose of the introduction of new "systemic stability" requirements and measures at least would reduce the likelihood of a systemic crisis, and in particular, the intensity of such crises by absorbing the negative effects of defaults caused by SIFIs. And regulators will naturally continue to look for new measures of macroprudential regulation.

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## КНИЖКОВИЙ СВІТ

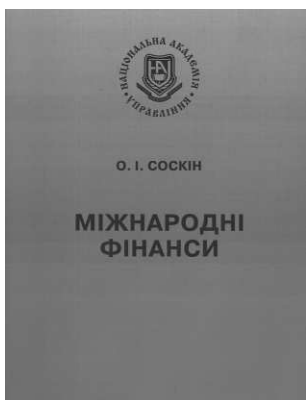


### СУЧАСНА ЕКОНОМІЧНА ТА ЮРИДИЧНА ОСВІТА ПРЕСТИЖНИЙ ВИЩИЙ НАВЧАЛЬНИЙ ЗАКЛАД **НАЦІОНАЛЬНА АКАДЕМІЯ УПРАВЛІННЯ**

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У посібнику розкриті основні положення, сутність, механізми та функції міжнародних фінансів, розвиток та сучасний стан світової валютної системи та міжнародних фінансових ринків; проаналізовані сучасні тенденції у сфері міжнародних фінансів. Посібник сформовано відповідно до вимог Болонського процесу. Видання містить комплексні тестові завдання, питання для самоконтролю, глосарій. У посібнику знайшли відображення актуальні сучасні дослідження у сфері міжнародних фінансів, матеріали фахових періодичних видань «Актуальні проблеми економіки», «Економічний часопис – XXI» та інших.

Посібник призначено для студентів та аспірантів економічних спеціальностей, а також тих, кому цікаво сформулювати власне розуміння проблематики міжнародних фінансів.