The evaluation of banking stability in the European Union countries

Kristína Kočišová*
Faculty of Economics,
Department of Banking and Investments,
Technical University of Košice,
Nemcovej 32, Košice 04001, Slovakia
Email: kristina.kocisova@tuke.sk
*Corresponding author

Daniel Stavárek
School of Business Administration in Karvina,
Department of Finance and Accounting,
Silesian University in Opava,
Univerzitní náměstí 1934/3,
Karviná 73340, Czech Republic
Email: stavarek@opf.slu.cz

Abstract: Successful development of the economy is based on the effective and stable performance of credit institutions. This paper discusses some of the existing efforts to evaluate stability in the financial or banking system and brings attempts to construct the banking stability index (BSI), taking into account indicators of the financial strength of banks and major risks affecting banks in the banking system. The BSI is then used for evaluation of banking stability in the European Union (EU) countries. Results showed that in 2014 countries with the most stable banking sectors were Luxembourg and Estonia. On the opposite end of the scale were banking sectors in Spain, Portugal and Greece. The outcome of the study showed a decline of the average banking stability in EU countries during the period of 2005–2008 and its improvement since 2009. The improvement in last year’s was positively affected mainly by the development of the capital adequacy.

Keywords: FSI; financial soundness indicators; BSI; banking stability index; EU countries.


Biographical notes: Kristína Kočišová, PhD, is an Associate Professor at the Faculty of Economics Technical University of Kosice. In her research work focuses on issues of banking, diagnostics competition, efficiency of banking sector, but also the efficiency of banks or bank branches in the national economy. The achieved results apply in teaching subjects banking, central banking, management of banking operations and selected models and analysis in banking.
The evaluation of banking stability in the European Union countries

Daniel Stavárek, PhD, is a Professor and Dean of the School of Business Administration in Karviná. His research interest can be found in various issues of international finance and banking with strong accent on the European financial and monetary integration. He teaches courses in international finance and financial management in which he combines microeconomic and macroeconomic approaches.

This paper is a revised and expanded version of a paper entitled ‘Banking stability index: a cross-country study’ presented at 15th International Conference on Finance and Banking: 25 Years of Economic and Financial Transition in Central and Eastern Europe, Praha, Czech Republic, 13–14 October, 2015.

1 Introduction

Over the past decade, financial systems in all European countries have undergone several changes that have significantly affected the stability of their banks. One of the consequences of the global financial crisis, which has affected the stability of banks worldwide, was the growth of credit risk. Therefore, the theme of credit risks has attracted more attention in recent years. Several studies examined bank failures and found out that assets quality was an indicator of insolvency (Demirgüç-Kunt, 1989; Barr and Siems, 1994) since banks still had a high level of non-performing loans before bankruptcy. Those authors found out that when the volume of non-performing loans increased, the banks’ ability to increase their performance declined.

Besides credit risk, one important aspect in the measurement of bank stability is the performance. The banking sector is still the primary form of financial intermediation in the European Union (EU) countries, being the major channel for mobilisation of domestic savings and their transformation into a major source of external capital for firms. Also is still the key player in payment systems; therefore, development of banking sectors’ performance is crucial for the growth of economies in the EU countries.

As explained above, credit risk and performance are important aspects for measuring the stability of banking system. Other indicators that affect the stability of the banking systems are also indicators of liquidity, capital adequacy, indicators of currency risk, interest risk and so on. Therefore, the aim of this study is to construct the banking stability index (BSI) and analyse the level of banking stability in EU countries between the years 2004 and 2014.

Against this background, the present paper contributes to the existing literature in two ways: First, we discuss some of the existing efforts to evaluate a financial or banking stability. We try to evaluate the development of banking stability in EU countries based on the methodology prepared by the World Economic Forum (WEF). Then, we try to compare the EU countries with the final ranking method based on the data published by international monetary fund (IMF). As can be seen, these methods bring different results and have some disadvantages (e.g., subjective assessment, look only for ranking no for the indicators values, and so on). Therefore, in the second part of paper, we try to construct the BSI by using indicators of the financial strength of banks (performance and capital adequacy) and the major risks (credit and liquidity risk). Compared with the existing literature, as our benefit can be considered the use of one index when evaluating
banking stability in all EU countries. We compare information from the existing literature focused on evaluation banking stability in individual countries, modified the methodologies and used them to construct the BSI. Construction of BSI allows following the development of stability in banking system during the selected period, but also compares stability in the banking system of selected countries on a harmonised base. The BSI as a tool for qualitative measurements would allow policy-makers and financial system participants supervise level of banking stability better than in the present. The BSI can represent an important feature of monetary policy rules, namely, it covers the financial risks which threaten the efficiency of monetary policy decisions.

2 Measuring banking stability

The successful development of the economy is based on the effective and stable performance of credit institutions, mainly banks. The evaluation of stability and soundness of banks is a complex task which involves a significant number of multidimensional criteria. Choice of evaluation techniques applicable to the relevant banking market is very important.

2.1 Review of relevant literature

Financial stability is difficult to define and even more difficult to measure. Strictly speaking, a financial system can be characterised as stable if there absent the excessive volatility, stress or crises. This narrow definition is relatively simple to formulate but fails to capture the positive contribution of a well-functioning financial system to overall economic performance. Indeed, broader definitions of financial stability encompass the smooth functioning of a complex nexus of relationships among financial markets, infrastructures and institutions operating with the given legal, fiscal and accounting framework. Such definitions are more abstract but are more inclusive of the macroeconomic dimension of financial stability and interactions between the financial and real sectors. From this perspective financial stability can be defined as ‘a condition in which financial system – comprising financial intermediaries, markets, and market infrastructure – is capable of withstanding shocks and the unravelling of financial imbalances, thereby mitigating the likelihood of disruptions in the financial intermediation process which are severe enough to significantly impair the allocation of savings to profitable investment opportunities (Gadanecz and Kaushik, 2008).

Houben et al. (2004) considering financial stability as a continuum changeable over time and consistent with multiple combinations of its constituent elements, define it as the ability to help the economic system allocate resources, manage risks and absorb shocks.

The best approach according to Allen and Wood (2006) is to define the characteristics of an episode of financial instability first and then define financial stability as a state of affairs in which episodes of instability are unlikely to occur.

Davis (2003) identifies three generic types of financial instability. The first is centred on ‘bank failures’, typically following loan or trading losses, the second involves extreme ‘market price volatility’ after a shift in expectations and the third being the one that is linked to the second, involves protracted collapses of market liquidity and issuance.
The issue of financial stability is quite organically linked with banking stability. Banking stability is a yardstick to determine whether an economy is adequately strong enough to withstand both the internal and external shocks. On the other hand, financial stability is a by-product of stability conditions prevailing in the banking system, financial markets, and the real economy and amongst them, banking stability appears to be a vital ingredient to financial stability. Banking stability in itself depends on the efficacies of the several parameters of individual banks, e.g., asset quality, liquidity, capital adequacy and profitability, etc. Since banking stability gets affected positively or negatively by the prevailing conditions in the financial market and the real economy; ultimately, it determines as to what extent financial stability is ensured in the economy by its ability to absorb the shocks. As such, banking stability can be treated as a forerunner of financial stability in an economy.

Accordingly, Swamy (2014) takes into consideration a constructive viewpoint and defines banking stability as a state of affairs in which the financial system can; achieve efficient allocation of resources; access and manage financial risks; absorb the emerging shocks; ensure smooth payments and remittances; enhance equilibrium by managing asset and price volatility; and lead the economy towards benefits of economic welfare.

In recent years researchers, including those of central banks, have been trying to identify conditions that would ensure financial and banking stability. For this purpose, there were used various statistical indicators that characterised and described vulnerability of the financial system. Many central banks in their financial stability reports (FSR) try to evaluate financial and banking stability related risk extensively focusing on various market segments and banking related variables. Banking ratios are widely analysed in most of such reports although there are some differences. Some reports seem to concentrate on the banks’ performance and risks in considerable detail while the others take account insurance and other forms of non-bank financial intermediation. However, where banking is the main form of intermediation, the available information largely depends on the level of regulatory input in preparing the report. Some central banks compute a BSI using a weighted average of sub-indicators of banking sector soundness (e.g., Central Bank of the Republic of Turkey, 2008; Bank of Albania, 2010). On the other hand, some central banks calculate a financial strength index as a weighted average of partial indicators of the financial soundness. The indexes usually combine six areas of soundness indicators, namely capital adequacy, profitability, liquidity, asset quality, interest rate risk and exchange rate risk.

The growing interest of central banks in monitoring and analysing risks and threats to the stability of the financial system has resulted in the publication of FSR. According to Oosterloo et al. (2007), there are three main incentives for publication of FRS: increasing the transparency of authorities responsible for financial stability, contributing to financial stability and strengthening cooperation between the various authorities involved in maintaining financial stability.

Some authors focus on constructing an aggregate indicator for the banking sector, which is the most important part of the financial system. In the literature, a variety of methodologies for constructing financial or BSI has been developed. For example, financial stability was analysed in works of Albulescu (2010, 2013), Jakubík and Teply (2001), Teply and Tripe (2015), and banking stability was analysed in works of Geršl and Heřmánek (2007, 2008), Maudos (2012), Ginevičius and Podviežko (2013), Laznia (2013), Mishra et al. (2013), Petrovska and Mihajlovska (2013), Roman and Sargu (2013).
and Altan et al. (2014). A detailed description of methods used in works of these authors can be seen in Kočišová and Stavárek (2015).

The banking sector is regarded as an important sector for the stability of financial systems as the banks play a major role in money creation, investment for economic growth, finance for businesses and households and in payment systems. Hence, faltering banking systems are found to be associated with hyperinflations and depressions in the economic history. Global financial crisis has drawn the attention of the policy-makers’ of advanced and emerging economies towards banking stability and placed it on the top of their agenda. While some analysts view banking stability to be related in part to the size and ownership structures, some others observe point to the failure of private banks as evidence of the fragility of short-term and profit-oriented banking. A stable macroeconomic environment is essential for banking sector stability, mainly because uncertainty about macroeconomic policies and wavering fundamentals, such as economic growth and inflation, renders it challenging for banks to assess credit risks accurately. Subdued economic growth, due to macroeconomic uncertainty or for other reasons, may impair bank soundness as it reduces the debt servicing capacity of firms and households (Swamy, 2014).

2.2 Alternative indicators used in practice

One of the available information comparing the stability of the banking sectors is a regular Global Competitiveness Report prepared by the WEF. The competitiveness within the meaning of WEF is defined as the set of institutions, policies, and factors that determine the level of productivity of the country. The level of productivity, in turn, influences the level of prosperity in the economy. Therefore is very important to have more competitive economies which will be capable of achieving higher economic growth.

The report presents the ranking of the global competitiveness index (GCI). This index is used for measurement of national competitiveness, which captures the microeconomic and macroeconomic foundations. The GCI is captured as a weighted average of many components, which can be grouped into 12 pillars of competitiveness:

1. institutions
2. infrastructure
3. macroeconomic environment
4. health and primary education
5. higher education and training
6. goods market efficiency
7. labour market efficiency
8. financial market development
9. technological readiness
The evaluation of banking stability in the European Union countries

These 12 pillars of competitiveness are evaluated separately, but this should not cover over the fact that they are not independent. They are not only related to each other, but they tend to support each other. For example, innovation (12th pillar) cannot be performed in countries with poorly educated and poorly trained labour force (4th and 5th pillar), and will never take place in economies with inefficient markets (6th, 7th and 8th pillars) or without extensive and efficient infrastructure (2nd pillar) (Kočišová, 2009).

The financial and economic crisis has highlighted the central role of sound and well-functioning financial sector for economic activities. An efficient financial sector allocates the resources saved by nation’s citizens, as well as those entering the economy from abroad, to their most productive uses. It channels resources to those entrepreneurial or investment projects with the highest expected rates of return. Careful and accurate risk assessment is, therefore, a key component of a sound financial market.

The productivity of economy is also affected by business investment. Therefore, economies require sophisticated financial markets that can make capital available for investment of private sector from such resources like loans from a sound banking sector, well-regulated securities exchanges, venture capital and other financial products. In order to perform all those functions, the banking sector needs to be trustworthy and transparent, and in the financial markets must be adopted the appropriate regulations for the protection of investors and other actors in the economy as a whole.

Within the eight pillar ‘Financial market development’ there is also evaluated the parameter ‘Soundness of banks’. This parameter is assessed on the basis of an opinion poll, where respondents evaluate the stability of the banking sector in their country. There can be added score from 1 to 7. The value equal to 1 means, that the soundness of banks is extremely low and banks may require recapitalisation. The value equal to 7 means that the soundness of banks is extremely high and banks are generally healthy with sound balance sheets. The country with the highest score is assessed as the best. On the other hand, country with the lowest score is assessed as the least sound.

Figure 1 displays the score added to the banking sectors of all EU countries on the basis of indicator ‘Soundness of banks’ which regularly publish WEF within the Global Competitiveness Report. According to scores in 2014, Finland was the country with the soundest banks. Finland banking sector was followed by the banking sectors of Malta, Luxembourg, Czech Republic and Slovakia. On the other end of the scale, at least sound banks were in Slovenia, Cyprus, Greece, Ireland and Spain. When we look at 10 countries that in 2004 joined EU (Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovenia and Slovak Republic), we can see that the soundest banks were in Malta, Czech Republic, and Slovakia and the last sound banks were in Slovenia, Cyprus, Greece and Lithuania.

The main disadvantage of this method is that the score is assigned according to the subjective assessment of the respondents in the survey which can lead to different results than the assessment of soundness based on financial indicators. The survey captures the opinions of business leaders around the world on a broad range of topics. The 2014 edition of the survey used opinions of 13,264 business leaders in 144 economies. The administration of the survey was carried out through the network of 167 partner
institutions worldwide. Partner institutions are asked to follow detailed sampling guidelines to ensure that the sample of respondents is the most representative and is comparable across the globe and in a specific timeframe. The survey is administered in a variety of formats, including face-to-face or telephone interviews with business executives, mailed paper forms, or online survey.

**Figure 1** Soundness of banks in EU countries according to the WEF in 2014

Source: Prepared by authors based on World Economic Forum (2015)

Many of authors mentioned in the literature review used selected quantitative indicators of the set of basic financial soundness indicators (FSI) compiled by the IMF. For a long time, central banks had no standard framework to analyse financial and banking stability. In an effort to improve the quality and ensure comparability of stability level in different countries, the IMF has developed a set of FSI in order to calculate the level of stability on an internationally harmonised basis. These indicators (40 indicators) are divided into two sets: core set and encouraged set. Core set includes statistics on the health and performance of deposit takers and consists of main indicators related to the banking sector (12 indicators). The core indicators relate to five basic areas relevant from the point of view of banking business and are compatible with so-called CAMELS methodology for the assessment of the soundness of individual financial institutions (C-Capital adequacy, A-Asset quality, M-Management soundness, E-Earnings, L-Liquidity and S-Sensitivity to market risk). The encouraged set includes additional statistics (28 indicators) on deposit takers as well as statistics related to households and corporate sectors, real estate markets, and non-bank financial institutions. The inclusion of non-banking sector indicators in the FSI reflects the interconnection of the financial and real sectors, as for example, unfavourable developments in the corporate sector pass through to the loan portfolio of banks and may thus have a negative impact on financial stability. The whole set of FSIs is dominated by deposit takers’ health. According to Maliszewski (2009), many of indicators are also focused on banking sector stability. This is due to the fact, that financial systems in most countries are rather banking-oriented than market-oriented.

The main goal of the FSIs is international comparability, which should be guaranteed by the fact that all countries that assess the stability of the banking sector using FSIs, using the same methodology. International comparability is, however, still limited by some differences in accounting standards and in data collection formats at the national level.
The evaluation of banking stability in the European Union countries

Given the different results of the individual countries for various indicators, it is not easy to make an overall evaluation of the financial soundness of the banking sector. One of the methods allowing us to compare the financial soundness of selected banking sector is to determine the ranking of the individual countries for the individual indicators and then somehow aggregate this ranking for the individual countries. According to this method, each country is assigned a ranking for the various indicators based on the comparison with other countries in the sample. The individual rankings for each indicator are then summed for each country. The country with the lowest total is then assessed as the best and is assigned an overall ranking of 1. We used this methodology of overall evaluation to construct the final ranking on the sample of all available EU countries and the core FSIs (excluding sectoral distribution of loans and net open position in foreign exchange, whose effect on banking stability cannot be simply assessed). All banking sectors were first individually ranked based on the indicators of each category. Based on the average ranking for each indicator they were determined the final ranking for each category and for each banking sector. The final ranking for each banking sector was determined on the basis of the average ranking in each category. Figure 2 shows the overall results of the ranking method in all EU countries in 2014. According to final ranking values in 2014, Luxembourg was the country with the most stable banking sector. Luxembourg banking sector was followed by the banking sectors of Sweden, Czech Republic, Estonia and Germany. On the other end of the scale, at least stable were Italian, Portuguese, Greece, Cypriot and Spanish banking sectors. Results of ranking method suggest that within the countries that joined EU in 2004 the most stable banking sectors were in the Czech Republic, Estonia, and Slovakia. On the other end of the scale, at least stable banking sectors were in Cyprus, Hungary, and Malta.

Figure 2 Final rankings of EU countries according to the IMF’s Core FSI in 2014

The average ranking method was also used in the paper of Altan et al. (2014) in assessing the stability of individual banks in Turkey, or in work of Roman and Sargu (2013) in assessing the financial soundness of the commercial banks in Romania. It is important to say, that one of the disadvantages of this method is that minimal differences between values and also big differences have the same weight.

Therefore, in literature, there exist other methods for evaluation of stability. One of them is driven by an effort to construct an aggregate BSI reflecting the main financial
indicators. This method can be seen in a study of, e.g., Geršl and Heřmánek (2007, 2008), Ginevičius and Podviežko (2013), Laznia (2013), Mishra et al. (2013) and Petrovska and Mihajlovska (2013).

3 Methodological issues of the banking stability index

In this section, we try to construct a BSI which is subsequently used for evaluation of banking stability in the EU countries. The BSI for EU countries uses selected quantitative indicators from the database of IMF (IMF eLibrary Data, 2015). The indicators were selected from the core set of the IMF indicators. As we know the core set contains 12 indicators related to five basic areas relevant from the point of view of banking business which is compatible with so-called CAMELS methodology for the assessment of the soundness of individual financial institutions. In the process of BSI construction, we used ten of them. We decide not to use the indicator of foreign exchange risk as the data were not available for all countries during the whole analysed period. For the same reason, the indicator of the sectoral distribution of loans was not also used. The selection of variables from IMF database allows us to compare banking stability in different countries, as these indicators are published on harmonised base. In the process of index formulation, the other indicators used in the studies of other authors were also tested, but different methodologies of their construction and collection led to significantly different values, which negatively influenced the BSI values.

The calculation of BSI is realised for the period from 2004 to 2014, on a yearly basis. The BSI is constructed as a weighted sum of selected indicators and includes only the data of commercial banks. We try to construct a BSI, taking into account indicators of the financial strength of banks (performance and capital adequacy) and the major risks (credit risk and liquidity risk) affecting banks in the banking system. On the basis of the literature studied four sub-indices capturing the risks and fragilities of the banking sector were selected. They were used to form the BSI with certain weights. The four main categories and their weights, selected indicators and their expected impact on the BSI are presented in Table 1.

Table 1 Banking stability index (BSI)

<table>
<thead>
<tr>
<th>Category</th>
<th>Weight</th>
<th>Adjustments</th>
<th>Indicators</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital adequacy</td>
<td>0.25</td>
<td>Mean of normalised values</td>
<td>CAR</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>T1 CAR</td>
<td>+</td>
</tr>
<tr>
<td>Asset quality</td>
<td>0.25</td>
<td>Mean of adjusted and normalised values</td>
<td>NPL/TL</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(NPL-P)/C</td>
<td>–</td>
</tr>
<tr>
<td>Earnings and profitability</td>
<td>0.25</td>
<td>Mean of adjusted and normalised values</td>
<td>ROA</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ROE</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IM/GI</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NIE/GI</td>
<td>–</td>
</tr>
<tr>
<td>Liquidity</td>
<td>0.25</td>
<td>Mean of normalised values</td>
<td>LA/TA</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>LA/STL</td>
<td>+</td>
</tr>
</tbody>
</table>

Source: Prepared by authors
Nowadays, the capital adequacy forms one of the most important instruments of banking regulation. The fundamentals of capital adequacy lie in the fact that the banks are obliged to maintain a certain amount of capital in order to absorb potential losses and thus prevent their insolvency. Therefore, the capital adequacy indicators can be considered as a good indication of how resilient the banks are and whether they are able to withstand stressful events. Bank’s capital adequacy shows its capacity to deal with potential risks and determine the robustness of bank to shocks to its balance sheet. Aggregate risk-based capital ratios (CAR – Regulatory capital to risk-weighted assets; T1 CAR – Regulatory Tier 1 capital to risk-weighted assets) are the most common indicators of capital adequacy, based on the methodology agreed by the Basel Committee. Capital adequacy measures banks’ buffer size to address expected or unexpected losses. Excessively low levels of this ratio point to potential failures and may indicate forthcoming banking crisis.

Asset quality is assessed through indicator related to credit risk of the banks. Lack of diversification in the loan portfolio and loan concentration in a specific economic sector signals an important vulnerability of the financial system. The rate of non-performing loans to total loans (NPL/TL) is the key indicator to measure the level of credit risk. It identifies problems with the loan portfolio quality, whereas captures the value of loans for which the bank expects that it will have difficulty to collect. Asset quality can be also assessed through the level of provisions. Provisions can be general (for possible losses not yet identified) or specific (for identified losses e.g., loan-loss reserves). The share of non-performing loans net of provisions to capital ((NPL-P)/C)) measure the share of bad loans for which reserves have not been created. It is an important indicator of the capacity of bank capital.

Return on equity (ROE) and return on assets (ROA) are profitability indicators intended to measure deposit takers’ efficiency in using their capital and total assets. In addition, non-interest expenses to gross income ratio (NIE/GI) measures the size of administrative expenses within gross income, and this way it measures the efficiency of deposit-takers’ use of resources. Differences in capital structure among banks must be considered in analysing of bank performance. Banks with higher equity will generally report higher operating assets ratio (such as ROA), but lower operating equity ratios. Also, operating income ratios may be affected by the value of equity. The interest margin ratios (e.g., IM/GI – Interest margin to gross income) and net income ratios will be higher while the non-interest income and non-interest expenses ratios will be lower for banks with higher equity. The reason for this is that banks with higher equity need to borrow less to support a given level of assets and thus have lower interest expenses, what results in higher net income.

The level of liquidity influences the ability of a banking system to withstand shocks. Common measures of liquidity include liquid assets to total assets (LA/TA). This indicator reflects the maturity structure of asset portfolio and can highlight excessive maturity mismatches and a need for more careful liquidity management (Sundararajan et al., 2002). The second liquidity ratio (LA/STL – Liquid assets to short-term liabilities) measures banking sectors’ readily available short-term resources that can be used to meet short-term liabilities.

Before the final aggregation, the data passed through a process of adjustment, normalisation and process of the weights’ allocation. The aim of this process is to place the values of the indicators to the same scale and to ensure that the development of adjusted indicators had the same effect on the index’s development.
First, indicators were adjusted in order to lead to an increase of banking stability (i.e., the BSI). This adjustment ensured that increase (higher value) of all individual indicators means an improvement in banking stability and decrease means deterioration. Therefore, in case of indicators with expected negative impact on banking stability (NPL/TL; (NPL-P)/C; NIE/GI see in Table 1) the reciprocal value were taken.

Secondly, indicators were normalised to have the same variance. For example, if one variable is 100 times larger than another (on average), then the model may be better behaved if we normalise the two variables to be approximately equivalent. In literature, there are two main methods for normalisation: statistical and empirical normalisation.

Statistical normalisation converts indicators to a common scale with an average of zero and standard deviation of one. The zero average avoids introducing aggregation distortions stemming from differences in indicators’ means. The scaling factor is the standard deviation of the indicator. Thus, an indicator with extreme value will intrinsically have a greater effect on the composite indicator. This might be desirable if the intention is to reward exceptional behaviour, i.e., if an extremely good result on a few indicators is considered to be better than a lot of average scores. By this approach, the range between minimum and the maximum should be varied among the normalised indicators (Cheang and Choy, 2009).

Through the process so-called empirical normalisation all indicators are placed on the same scale in the interval from zero to one. This way each indicator is compared with its limit values (minimum and maximum) in the analysed period and its normalised value represents the deviation from the limit values. According to the empirical normalisation, the approximation of the index value to 1 (max), means lower risk, while movement towards 0 (min) means higher risk exposure.

The advantage of empirical normalisation is that the different values of indicators are located within the small interval <0; 1>. On the other hand, in case of statistical normalisation the values of indicators are located within the interval depending on average value and standard deviation. As in the case of empirical normalisation the values of all indicators are located within the same interval the explanatory power of index increases. Therefore, we have decided to use empirical normalisation in the case of our study.

In the third step, the means for four main categories for each banking sector in each year were calculated. The means values were calculated as the simple arithmetic average of adjusted and normalised values of indicators in selected category.

In next step, the average values of the four main components (categories) were weighted in order to emphasise the significance on the stability of the banking system. In the literature (e.g., Illing and Liu, 2003; Maliszewski, 2009) there are multiple ways of assigning weights to sub-indices, including the following: expert judgement, standardisation (variance equal weights), the size of the market segment, coefficients of the first factor from factor analysis, estimation of a logit model and so on. The weights represent the significance of individual risks on banking stability. In our paper was applied the variance equal weights method. This method generates an index that assigns identical weights to all sub-indices, which indicates equal importance to each variable. The method of non-equal weights was also tested in the process of index construction. But the results were approximately the same, therefore, we decide to present only the results with variance equal weights as this method is the most common weighting method used in literature.
In the final step, the BSI was calculated for each banking sector (28) in each year (11) as a sum of weighted values for four individual components.

4 Estimations and results of the BSI

The BSI was calculated according to described procedure. The increase in the index means an improvement of banking stability while the decrease denotes stability worsening. In the analysis, BSI was calculated for 28 EU banking sectors for the period since 2004 to 2014, on a yearly basis (see Table 2). We observed no dramatic changes in the average banking stability during the analysed period, but we can see notable differences among observed countries. The results by country shows, that average BSI ranged from 0.3169 in the case of Spain to 0.5183 in the case of Luxembourg. In case of thirteen countries (Luxembourg, Romania, Netherland, Bulgaria, Estonia, Denmark, Slovakia, Czech Republic, Belgium, France, Croatia, Germany and Sweden) were average BSI higher than the average in whole sample (0.3907), in other fifteen countries the average BSI were lower than the average in the whole sample during the whole analysed period. The greatest decreased between the years 2004 and 2014 was occurred in the case of Romania, where the BSI decreased from 0.5365 to 0.4853. On the one hand, the greatest increased took place in Sweden, where BSI increased from 0.3313 to 0.4794. The most stable development can be seen in Austria. On the other hand, the highest volatility can be seen in Ireland, where the BSI fell down from the value 0.4156 in 2005 to 0.2194 in 2010.

In the next part of our study, were determined four main European ‘regions’ (Northern, Western, Southern and Eastern Europe) and we analysed the banking stability within them. The United Nations defines Northern Europe as consisting of the following eight European Union countries: Denmark, Estonia, Finland, Ireland, Ireland, Lithuania, Latvia, Sweden and the UK. The Western Europe is created of next six EU countries: Austria, Belgium, France, Germany, Luxembourg and Netherlands. Countries that are part of the Southern Europe are Croatia, Greece, Italy, Malta, Portugal, Slovenia and Spain. The Eastern Europe is defined as consisting of seven countries: Bulgaria, Cyprus, Czech Republic, Hungary, Poland, Romania and Slovakia.

As can be seen in Table 3, levels of average banking stability in case of Western European (0.4289) and Eastern European (0.4006) banking sectors were higher than the average in the whole sample (0.3907); on the other hand, the average BSI in case of Northern European (0.3835) and Southern European (0.3564) banking sectors were under the total average. The banking sectors in Western Europe appeared as the most stable. On the other hand, the last place was mainly occupied by banking sectors from Southern Europe. The explanation of generally lower stability of banking sectors in Southern Europe can be found in a couple of factors. Above all, imprudent mortgage lending, non-performing loans of the past, lack of transparency and accountability in mortgage financing, shadow banking activities, failure of risk management systems, no systematic risk regulations and other reasons which led to the financial crisis in American and European financial markets. The development of the BSI in four groups of banking sectors indicates an increase in banking stability in all regions. The greatest increased between the years 2004 and 2014 has occurred in the case of banking sectors in Northern Europe, where the average BSI within the region increased from 0.3806 to 0.4348.
On the one hand, the insignificant increased took place in banking sectors in Eastern Europe, where BSI increased from 0.4210 to 0.4225. The development in this region can be also considered as most stable. On the other hand, the highest volatility can be seen in Northern Europe, where the BSI increased from the value 0.3515 in 2010 to 0.4348 in 2014.

The values of BSI in individual countries were used to calculate the average BSI in all EU countries (BSI) and the average BSI in the banking sectors of 10 countries, which joined the EU in 2004 (BSI_EU2004). We try to analyse the development of average BSI in all EU countries and we try to compare it with the development of average stability in the banking sectors of ten countries, which joined the EU in 2004. Figure 3 shows the development of average values of BSI and BSI_EU2004 during the whole analysed period. As can be seen, the tendency of development in accession countries is the same as in all EU countries, except the last year of the analysed period, when the average value of the index in the accession countries exceeded the average value of BSI in all EU countries. This significant increase of banking stability in the last year of the analysed period was positively influenced mainly by higher values of capital adequacy and liquidity components.

The analysed period (2004–2014) can be divided into two stages. The first stage covers the period from 2004 until 2008. During this period, the average value of indexes decreased to their minimal values in 2008. The lowest values of indexes in this year mirrored the negative effects of the financial crisis which hit the banking sectors in all EU countries. The second stage covers the period from 2008 until 2014 when can be monitored a gradual increase in the average banking stability. Positive development in banking stability during this second stage was influenced mainly by the growing demand for rising capital adequacy, which was related to the gradual implementation of Basel III. Another factor with the positive impact was the growth of liquidity component. Trends of the other components (asset quality, earning and profitability) can be considered as stable.

Figure 4 displays the contributions of individual components to the BSI in all EU countries in 2014. According to BSI values in 2014, Luxembourg was the country with the most stable banking sector. Luxembourg had the most stable banking sector since 2009. The first position gained through conservative approach (more deposits than loans and high quality of provided loans). The stability of the banking sector was also positively influenced by the relatively high liquidity ratios.

Luxembourg banking sector was followed by the banking sectors of Estonia and Romania. The strengths of the Estonian banking sector were high capital adequacy (the highest in the sample of all analysed countries) and high quality of assets. In the case of Romanian banking sector, the BSI was positively influenced mainly by the high value of liquid component (the highest value in the analysed group of countries).

On the other end of the scale, at least stable were banking sectors of Spain, Portugal and Greece. The low stability of these banking sectors was influenced mainly by the lowest value of liquid component (in the case of Spain), by the low value of asset quality component (in the case of Greece) and by the lowest value of capital adequacy component (in the case of Portugal).
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Romania</td>
<td>0.5365</td>
<td>0.5530</td>
<td>0.5024</td>
<td>0.4761</td>
<td>0.4801</td>
<td>0.4797</td>
<td>0.4823</td>
<td>0.4692</td>
<td>0.4777</td>
<td>0.4876</td>
<td>0.4853</td>
<td>0.4936</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>0.5073</td>
<td>0.4894</td>
<td>0.5424</td>
<td>0.4531</td>
<td>0.4722</td>
<td>0.5072</td>
<td>0.5202</td>
<td>0.4865</td>
<td>0.5930</td>
<td>0.5649</td>
<td>0.5648</td>
<td>0.5183</td>
</tr>
<tr>
<td>Netherlands</td>
<td>0.4736</td>
<td>0.4667</td>
<td>0.4425</td>
<td>0.4629</td>
<td>0.3584</td>
<td>0.4356</td>
<td>0.4262</td>
<td>0.4244</td>
<td>0.4263</td>
<td>0.4291</td>
<td>0.4420</td>
<td>0.4353</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>0.4467</td>
<td>0.4196</td>
<td>0.3512</td>
<td>0.3516</td>
<td>0.3620</td>
<td>0.3881</td>
<td>0.3969</td>
<td>0.3972</td>
<td>0.3912</td>
<td>0.3964</td>
<td>0.4404</td>
<td>0.3947</td>
</tr>
<tr>
<td>Estonia</td>
<td>0.4423</td>
<td>0.4708</td>
<td>0.4478</td>
<td>0.4093</td>
<td>0.3814</td>
<td>0.3764</td>
<td>0.4039</td>
<td>0.4230</td>
<td>0.4214</td>
<td>0.4318</td>
<td>0.5549</td>
<td>0.4330</td>
</tr>
<tr>
<td>Denmark</td>
<td>0.4254</td>
<td>0.4904</td>
<td>0.4415</td>
<td>0.4130</td>
<td>0.3900</td>
<td>0.4106</td>
<td>0.3777</td>
<td>0.3892</td>
<td>0.4262</td>
<td>0.3927</td>
<td>0.3804</td>
<td>0.4125</td>
</tr>
<tr>
<td>Slovakia</td>
<td>0.4183</td>
<td>0.4014</td>
<td>0.4171</td>
<td>0.3896</td>
<td>0.3939</td>
<td>0.4002</td>
<td>0.4110</td>
<td>0.4074</td>
<td>0.4281</td>
<td>0.4263</td>
<td>0.4298</td>
<td>0.4112</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>0.4176</td>
<td>0.4072</td>
<td>0.3755</td>
<td>0.3885</td>
<td>0.3894</td>
<td>0.4105</td>
<td>0.4199</td>
<td>0.4193</td>
<td>0.4317</td>
<td>0.4377</td>
<td>0.4410</td>
<td>0.4126</td>
</tr>
<tr>
<td>Ireland</td>
<td>0.4086</td>
<td>0.4156</td>
<td>0.3453</td>
<td>0.3345</td>
<td>0.3106</td>
<td>0.2920</td>
<td>0.2194</td>
<td>0.3586</td>
<td>0.3346</td>
<td>0.3472</td>
<td>0.3944</td>
<td>0.3419</td>
</tr>
<tr>
<td>Belgium</td>
<td>0.4073</td>
<td>0.3925</td>
<td>0.3797</td>
<td>0.3775</td>
<td>0.3928</td>
<td>0.4139</td>
<td>0.4399</td>
<td>0.4339</td>
<td>0.4350</td>
<td>0.4471</td>
<td>0.4295</td>
<td>0.4135</td>
</tr>
<tr>
<td>Finland</td>
<td>0.4020</td>
<td>0.4310</td>
<td>0.4333</td>
<td>0.4102</td>
<td>0.3696</td>
<td>0.3661</td>
<td>0.3562</td>
<td>0.3586</td>
<td>0.3906</td>
<td>0.3818</td>
<td>0.3978</td>
<td>0.3906</td>
</tr>
<tr>
<td>France</td>
<td>0.3947</td>
<td>0.3895</td>
<td>0.3888</td>
<td>0.3803</td>
<td>0.3713</td>
<td>0.3910</td>
<td>0.4079</td>
<td>0.4068</td>
<td>0.4188</td>
<td>0.4153</td>
<td>0.4134</td>
<td>0.3980</td>
</tr>
<tr>
<td>Poland</td>
<td>0.3907</td>
<td>0.3996</td>
<td>0.3316</td>
<td>0.3621</td>
<td>0.3529</td>
<td>0.3637</td>
<td>0.3724</td>
<td>0.3660</td>
<td>0.3798</td>
<td>0.3868</td>
<td>0.3842</td>
<td>0.3718</td>
</tr>
<tr>
<td>Croatia</td>
<td>0.3883</td>
<td>0.3687</td>
<td>0.4231</td>
<td>0.4463</td>
<td>0.4255</td>
<td>0.4263</td>
<td>0.4374</td>
<td>0.4463</td>
<td>0.4457</td>
<td>0.4403</td>
<td>0.4558</td>
<td>0.4276</td>
</tr>
<tr>
<td>Malta</td>
<td>0.3837</td>
<td>0.3964</td>
<td>0.3804</td>
<td>0.3854</td>
<td>0.3557</td>
<td>0.3751</td>
<td>0.3733</td>
<td>0.3740</td>
<td>0.3948</td>
<td>0.3977</td>
<td>0.3942</td>
<td>0.3828</td>
</tr>
<tr>
<td>Hungary</td>
<td>0.3831</td>
<td>0.3828</td>
<td>0.3077</td>
<td>0.2759</td>
<td>0.3119</td>
<td>0.3782</td>
<td>0.3584</td>
<td>0.3558</td>
<td>0.3906</td>
<td>0.4070</td>
<td>0.3989</td>
<td>0.3591</td>
</tr>
<tr>
<td>Austria</td>
<td>0.3810</td>
<td>0.3726</td>
<td>0.3860</td>
<td>0.3863</td>
<td>0.3753</td>
<td>0.3948</td>
<td>0.3910</td>
<td>0.3941</td>
<td>0.4051</td>
<td>0.4083</td>
<td>0.3868</td>
<td>0.3892</td>
</tr>
<tr>
<td>------------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-----------</td>
</tr>
<tr>
<td>Greece</td>
<td>0.3789</td>
<td>0.4043</td>
<td>0.2655</td>
<td>0.2708</td>
<td>0.3827</td>
<td>0.4061</td>
<td>0.3849</td>
<td>0.2386</td>
<td>0.3672</td>
<td>0.3903</td>
<td>0.3769</td>
<td>0.3515</td>
</tr>
<tr>
<td>Lithuania</td>
<td>0.3740</td>
<td>0.3774</td>
<td>0.3655</td>
<td>0.3693</td>
<td>0.3560</td>
<td>0.3167</td>
<td>0.3568</td>
<td>0.3798</td>
<td>0.3845</td>
<td>0.3999</td>
<td>0.4396</td>
<td>0.3745</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.3617</td>
<td>0.3760</td>
<td>0.3671</td>
<td>0.3486</td>
<td>0.3310</td>
<td>0.3447</td>
<td>0.3551</td>
<td>0.3347</td>
<td>0.3800</td>
<td>0.3946</td>
<td>0.3693</td>
<td>0.3603</td>
</tr>
<tr>
<td>Cyprus</td>
<td>0.3539</td>
<td>0.3700</td>
<td>0.3878</td>
<td>0.3991</td>
<td>0.3820</td>
<td>0.3970</td>
<td>0.3810</td>
<td>0.3156</td>
<td>0.2869</td>
<td>0.3412</td>
<td>0.3782</td>
<td>0.3613</td>
</tr>
<tr>
<td>Slovenia</td>
<td>0.3399</td>
<td>0.3254</td>
<td>0.2691</td>
<td>0.2967</td>
<td>0.3342</td>
<td>0.3313</td>
<td>0.3281</td>
<td>0.3232</td>
<td>0.3197</td>
<td>0.2961</td>
<td>0.4163</td>
<td>0.3255</td>
</tr>
<tr>
<td>Latvia</td>
<td>0.3391</td>
<td>0.3292</td>
<td>0.3389</td>
<td>0.3043</td>
<td>0.3105</td>
<td>0.3322</td>
<td>0.3438</td>
<td>0.3949</td>
<td>0.4227</td>
<td>0.4443</td>
<td>0.4360</td>
<td>0.3633</td>
</tr>
<tr>
<td>Germany</td>
<td>0.3370</td>
<td>0.3468</td>
<td>0.3488</td>
<td>0.3502</td>
<td>0.4334</td>
<td>0.4577</td>
<td>0.4523</td>
<td>0.4544</td>
<td>0.4700</td>
<td>0.4857</td>
<td>0.4732</td>
<td>0.4190</td>
</tr>
<tr>
<td>Sweden</td>
<td>0.3313</td>
<td>0.3418</td>
<td>0.4462</td>
<td>0.4809</td>
<td>0.3341</td>
<td>0.3733</td>
<td>0.3777</td>
<td>0.3829</td>
<td>0.3831</td>
<td>0.3978</td>
<td>0.4794</td>
<td>0.3935</td>
</tr>
<tr>
<td>Spain</td>
<td>0.3243</td>
<td>0.3944</td>
<td>0.3081</td>
<td>0.3046</td>
<td>0.3064</td>
<td>0.3108</td>
<td>0.3066</td>
<td>0.3021</td>
<td>0.2876</td>
<td>0.3140</td>
<td>0.3266</td>
<td>0.3169</td>
</tr>
<tr>
<td>UK</td>
<td>0.3224</td>
<td>0.3292</td>
<td>0.2939</td>
<td>0.3241</td>
<td>0.3726</td>
<td>0.3641</td>
<td>0.3762</td>
<td>0.3774</td>
<td>0.3855</td>
<td>0.4039</td>
<td>0.3955</td>
<td>0.3586</td>
</tr>
<tr>
<td>Italy</td>
<td>0.3114</td>
<td>0.2974</td>
<td>0.2835</td>
<td>0.2843</td>
<td>0.3090</td>
<td>0.3442</td>
<td>0.3463</td>
<td>0.3447</td>
<td>0.3611</td>
<td>0.3668</td>
<td>0.3869</td>
<td>0.3305</td>
</tr>
<tr>
<td>Mean</td>
<td>0.3922</td>
<td>0.3978</td>
<td>0.3775</td>
<td>0.3727</td>
<td>0.3695</td>
<td>0.3853</td>
<td>0.3858</td>
<td>0.3842</td>
<td>0.4008</td>
<td>0.4083</td>
<td>0.4240</td>
<td>0.3907</td>
</tr>
<tr>
<td>Median</td>
<td>0.3860</td>
<td>0.3934</td>
<td>0.3776</td>
<td>0.3789</td>
<td>0.3704</td>
<td>0.3832</td>
<td>0.3794</td>
<td>0.3860</td>
<td>0.3930</td>
<td>0.4019</td>
<td>0.4148</td>
<td>0.3899</td>
</tr>
<tr>
<td>Min.</td>
<td>0.3114</td>
<td>0.2974</td>
<td>0.2655</td>
<td>0.2708</td>
<td>0.3064</td>
<td>0.2920</td>
<td>0.2194</td>
<td>0.2386</td>
<td>0.2689</td>
<td>0.2961</td>
<td>0.3266</td>
<td>0.3169</td>
</tr>
<tr>
<td>Max.</td>
<td>0.5365</td>
<td>0.5530</td>
<td>0.5424</td>
<td>0.4809</td>
<td>0.4801</td>
<td>0.5072</td>
<td>0.5202</td>
<td>0.4865</td>
<td>0.5930</td>
<td>0.5649</td>
<td>0.5648</td>
<td>0.5183</td>
</tr>
<tr>
<td>Std. dev.</td>
<td>0.0547</td>
<td>0.0568</td>
<td>0.0678</td>
<td>0.0598</td>
<td>0.0452</td>
<td>0.0494</td>
<td>0.0566</td>
<td>0.0537</td>
<td>0.0611</td>
<td>0.0533</td>
<td>0.0529</td>
<td>0.0461</td>
</tr>
</tbody>
</table>

Source: Authors’ calculations
Table 3  
Banking stability index (BSI) in European regions

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Europe</td>
<td>0.386</td>
<td>0.398</td>
<td>0.389</td>
<td>0.380</td>
<td>0.353</td>
<td>0.351</td>
<td>0.383</td>
<td>0.393</td>
<td>0.399</td>
<td>0.434</td>
<td>0.383</td>
<td></td>
</tr>
<tr>
<td>Western Europe</td>
<td>0.416</td>
<td>0.409</td>
<td>0.414</td>
<td>0.401</td>
<td>0.400</td>
<td>0.433</td>
<td>0.439</td>
<td>0.433</td>
<td>0.458</td>
<td>0.458</td>
<td>0.425</td>
<td></td>
</tr>
<tr>
<td>Southern Europe</td>
<td>0.355</td>
<td>0.366</td>
<td>0.328</td>
<td>0.333</td>
<td>0.349</td>
<td>0.362</td>
<td>0.361</td>
<td>0.337</td>
<td>0.365</td>
<td>0.371</td>
<td>0.389</td>
<td>0.356</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>0.421</td>
<td>0.419</td>
<td>0.381</td>
<td>0.377</td>
<td>0.381</td>
<td>0.402</td>
<td>0.403</td>
<td>0.390</td>
<td>0.395</td>
<td>0.411</td>
<td>0.425</td>
<td>0.400</td>
</tr>
</tbody>
</table>

*Source:* Authors’ calculations
Figure 3  Development of average banking stability index in all EU countries (BSI) and in accession countries in 2004 (BSI_EU2004)

As can be seen in Figure 4, the individual components of the BSI in analysed countries showed different trajectories. Market pressure, the requirement for higher levels of core capital and expectation of the effects of new Basel III accords led to the increase in quality and quantity of equity capital. The significant impact of capital adequacy in recent years positively affected the growth of BSI mainly in countries such as Estonia, Ireland, Croatia, Bulgaria, Lithuania and Sweden. The lowest levels of capital adequacy were recorded in case of banking systems of Portugal, Spain and Malta.

Figure 4  Banking stability index and its components in 2014

The share of non-performing loans to total loans (NPL ratio) has risen exponentially since the onset of the crisis. Whereas the loans to the clients create a substantial part of the bank’s assets, increasing the value of NPL ratio led to a decline in asset quality. Asset quality was the major component that positively affected the stability in Luxembourg banking system. The asset quality also positively influenced the BSI of Finland, Sweden
The evaluation of banking stability in the European Union countries

53

and Estonia. The worst results in terms of asset quality were recorded in banking systems of Cyprus, Greece and Italy.

The lowest volatility can be seen in the case of component earnings and profitability. This indicator was the major component which affected the stability of EU banking sector in average as evidenced by more than 40% share of that component in the overall index value. Earnings and profitability component positively influenced the BSI in banking sectors of Czech Republic, Cyprus, Malta and Slovakia. The lowest levels of this component were recorded in case of banking systems of Hungary and Portugal.

The final aspect of the banking stability is liquidity, which significantly affected the stability in the banking systems of Romania, Germany and Luxembourg. The reason for liquidity increase was primarily the growth in the volume of liquid assets, which could be the result of several movements. The lowest level of liquidity was recorded in case of the banking system of Spain.

5 Conclusion

To assess the stability of the financial and banking system become an important part of the monetary policy. In the literature, a number of quantitative indicators, stress testing and a variety of methodologies for constructing the financial or BSI has been developed. In the evaluation of banking stability, the attention is focused on four main areas: capital adequacy, asset quality, profitability and liquidity.

In our analysis, we compare information from the existing literature focused on evaluation banking stability in individual countries, modified the methodologies and used them to construct the BSI. Proposed BSI may serve as a first step towards building a more appropriate framework for assessing banking stability in EU countries using data for the period from 2004 to 2014, on a yearly basis. When we compare our results with other studies which are based on the financial indicators we can find, that our results of BSI are in line with the study of Geršl and Heřmánek (2008) who evaluated stability in selected countries based on FSI compiled by the IMF. In their study, they found out, that the most stable banking sector in 2005 (in an evaluated group of countries) was a banking sector in the Czech Republic. The results are the same at the opposite end of the scale, where both works as the least stable marked the banking sector in Slovenia. This can be influenced by the fact, that in both studies the same database and comparable index compilation methodology was used.

When we compare the results of our analysis with the results of WEF we can see that the results are different, which may be affected by the fact, that in the evaluation of ‘Soundness of banks’ the score is assigned according to the subjective assessment of the respondents in the survey which can lead to different results than the assessment of soundness based on financial indicators.

We know that our study has some limitations. Into the BSI calculation, only a few indicators have been involved. We also used the variance equal method for assigning weights. Therefore, the suggestion for next research can be considering the other indicators and analyse other methods for assigning weights. As future research directions, we intend to empirically assess the impact of macroeconomic factors and banking sector variables, on the stability of banking sectors in EU countries.
The discussion of pros and cons of our and other methodologies suggests that it cannot be used to assess banking stability without knowledge and use of other supporting instruments and indicators.

Acknowledgement

Publication of this paper was supported by the Czech Science Foundation (Project GAČR 13-03783S) and by the Scientific Grant Agency of the Ministry of Education, Science, Research and Sport of the Slovak Republic (Project VEGA Nos. 1/0446/15). The support is gratefully acknowledged.

References


The evaluation of banking stability in the European Union countries