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# Assessing Involvement of Central Banks in Financial Stability

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# **Assessing Involvement of Central Banks in Financial Stability**

**Paweł Smaga**

**This paper presents the results of a comprehensive survey conducted with 27 European Union (EU) central banks concerning their involvement in ensuring financial stability. The paper also introduces a novel methodology ("Financial Stability Engagement index") to measure central bank involvement in fostering financial stability. After a brief literature review, the author constructs an index to assess financial stability in the EU via publicly available information. Index construction is complemented by results from a survey of the financial stability department heads in 27 EU central banks. The highest index scores were received by De Nederlandsche Bank and Czech National Bank. The average level of involvement is similar in central banks in the EMU, as well as in non-EMU ones. Along with the recent macroprudential reforms, the index level is likely to increase over time. Assessment of central bank involvement in financial stability also points to some practical policy recommendations for the future.**

**JEL Codes: E50, E58, G28.**

## 1. Introduction

The recent financial crisis caused numerous challenges for central banks. Central banks experienced a paradigm shift with an extension of their role beyond just keeping inflation in line to safeguarding the financial system and maintaining financial stability.

There are various forms of a central bank's involvement in financial stability. Activities range from payment system oversight, to publishing Financial Stability Reports (FSR), to conducting stress tests and to serving as a microprudential supervisor. Although there are attempts to measure central banks involvement in microprudential supervision (see D. Masciandaro 2005<sup>1</sup>), level of transparency in supporting financial stability (Sotomska-Krzysztofik and Szczepanska 2006 and Horváth and Vaško 2012), to authors knowledge, there is no comprehensive (holistic) and comparable measure as for the overall degree of central bank's role in contributing to financial stability.

In this paper, the author makes an attempt to introduce a "Financial Stability Engagement index" (hereinafter "index"), consisting of 10 subcomponents, which include the most important central bank's responsibilities and actions directed towards contributing to the stability of the financial system. Apart from introducing index methodology and its construction, the aim of this paper is to provide an overview of the financial stability involvement in central banks comprising the European System of Central Banks (ESCB) - as for July 2012 - and point out different ways a central bank can contribute to financial stability, as well as provide some best practices in this regard. The index values are analyzed along with conclusions drawn from the results a survey conducted with European central banks. The index is also used to verify the thesis whether central banks in the EMU are more involved in safeguarding financial stability than their non-EMU peers. The paper concludes with policy implications comprising practical guidelines for central banks.

There are mixed views in the literature on the changing role of the central bank after entry into the euro zone. Davies and Green (2010) indicate that the need to justify their existence after euro zone entry, pushed central banks to begin publishing FSRs. But when published in such a large number (almost by all central banks in the ESCB) may cause information noise and pose a risk of redundancy or confusion or even mutually excluding conclusions. They further indicate that, following euro area accession, central banks may increase the extent of their involvement in microprudential supervision, including non-bank financial institutions, which is beneficial for the functioning of the Eurosystem (see ECB 2001).

Nevertheless, it is difficult to agree with Davies and Green's conclusion that the central bank in the euro area, with no mandate in banking supervision, serves the role of "economic observatory". Undoubtedly, entering the euro zone may limit the number of central bank's branches and lead to staff reduction, but that does not imply that central bank's authority and its hitherto role must be diminished. One way to increase the role of national central bank in the euro area is to specialize in a given area, beyond the exclusive merit of the ECB e.g. developing payment systems (such as the Bundesbank, Banque de France and Banca d'Italia) or just increase research and analysis capabilities to deliver high quality test results,

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<sup>1</sup> Update of these calculation (as for middle 2011) is provided by Căpraru and Cocri (2012), who reach similar conclusions about two distinctive models i.e. first - high concentration of supervisory powers and low central bank's involvement and second – low degree of supervisory powers concentration and high central bank's involvement. There is a tendency from 2004 (for all EU countries) to increase both the level of concentration of supervisory powers and the degree of central bank's involvement.

which may contribute to the development of macroprudential instruments and allow the ECB/ESRB effectively perform their functions.

The idea behind the thesis is that the entry into the euro area increases central bank's involvement in safeguarding financial stability. In summary, the arguments in favor of increasing the involvement (after the euro-zone entry) include:

- lack of possible conflict between the monetary policy objectives and simultaneous conduct of microprudential supervision,
- the need to effectively allocate human capital, previously used for the purpose of conducting monetary policy,
- increase of the role and scope of cooperation with the ECB in the field of analysis and research of financial stability (e.g. becoming a full member of working groups, greater frequency of participation in anti-crisis exercises, the need to analyze the impact of a single monetary policy on the condition of the domestic financial system),
- greater involvement in the stability of market infrastructure (e.g. participation in the supervision of the CLS, new tasks associated with the operation of the national "branch" of TARGET2).

Summing up, it seems that there is a need to empirically verify whether euro zone central banks are really more involved in financial stability, when losing monetary policy autonomy, than those in the EU that are outside the common currency area. Likewise, the investigation seeks to more specifically define roles and objectives for central banking activities surrounding the promotion of financial stability.

## 2. Brief Literature Review

In the literature there are very few comprehensive studies and surveys concerning the involvement of central banks in maintaining financial stability. So far, a vast stream of literature has been focused on the most important function - monetary policy, but after the outbreak of the crisis, financial stability function has received renewed attention, including central banks' role in macroprudential supervision.

According to author's knowledge of one of the first studies of the central banks' role in stabilizing the financial system was made by Healey (2001). Healey (2001) emphasized that the same functions/types of central bank involvement in financial stability can be interpreted differently (e.g. scope of participation in microprudential supervision) or misunderstood by central banks (participating in the survey), which warrants cautious interpretation of results. Among central banks, there is no consensus as for the tools used to achieve financial stability. While almost all central banks have a mandate in this regard, it was differently enshrined in legal provisions, partly deriving from payment system oversight, especially if the central bank lacked a mandate on microprudential supervision. Central banks in industrial countries have reduced their functions as payment system operators, focusing on the oversight and systemic risk prevention.

The next survey was conducted by Oosterloo and de Haan (2003), which showed that the vast majority of central banks did not have an official definition of financial stability or systemic risk. Some of them provided it informally in FSRs or in official speeches. This practice of central banks should be assessed positively as they tried to mitigate the lack of an explicit financial stability definition in the legal basis and at the same time increase their transparency. As confirmed by the study, responsibility for financial stability of most central banks' was not specified in detail in the legal basis - their role was defined only

as "contributing", "supporting" etc. and often derived from the obligation to ensure smooth and safe functioning of payment system. Research shows that about one third of responding central banks publish FSRs. The main purposes of its publication include i.e. contributing to the stability of the financial system, strengthening cooperation between the safety net institutions and increasing the transparency of actions taken in order to foster financial stability. In light of the results, publishing FSR can be seen as the main form of fulfilling central bank's mandate in this regard. But the crisis that began in mid-2007 has revealed that fulfilling this mandate, goes significantly beyond just publication of FSR. Among the ones that do not publish FSR, they release part of financial system stability assessment as chapters, included in annual reports, various bulletins. When it comes to locating the financial stability function in organizational structure, the practice of central banks varies, i.e. separate departments are created, as well as sharing the objective among several organizational units, working together at the operational level or through a special body (a group/committee) inside the central bank. A significant part of central banks point out that the exchange of information with microprudential supervisors is formalized, while with the Ministry of Finance based on a less formal procedures.

The use of instruments to prevent financial instability may involve payment system oversight, monitoring macroeconomic variables, monetary policy and the use of microprudential supervision, as well as moral suasion. In turn, the instruments designed to restore financial stability may include market-based solutions, liquidity support (which is emphasized by the vast majority of surveyed central banks), granting capital support (by the government in consultation i.e. with the central bank) and the resolution of an entity (with negligible participation of the central bank). As part of crisis management, decision to use the tool, in the opinion of more than half of central banks, lies with the institution which holds it. Coordinating anti-crisis measures might be the responsibility of central bank or the government. But if the need to use public funds arises, the view of most central banks is that the government should decide. Forms of accountability for their financial stability function are not clear, in part due to imprecisely formulated mandate, although the majority of central banks admit that they are accountable to the government and the public e.g. in the form of regular reporting.

Also the IMF has prepared a comprehensive report on the current design and implementation challenges of macroprudential policy (hereinafter "J. Viñals Report", see IMF 2010). Questions in the survey were clearly profiled to assess the experience with macroprudential policies. Key findings of the survey highlight the growing role of macroprudential policy. It is mostly the result of decisions taken by collegial bodies (with an advisory role and issuing formal recommendations) with central bank's participation, which if not solely responsible for financial stability, plays a key role in the institutional division of responsibility for macroprudential supervision.

Effective macroprudential supervision requires close coordination between safety net institutions. There is a myriad of indicators, tools and models used to monitor and manage systemic risks. The most popular among survey respondents include credit growth rate and credit / GDP ratio. As far as tools are concerned, the most frequently mentioned include i.a. LtV and Dtl caps. Respondents preferred tools which are simple, effective and easy to implement, while imposing limited costs for financial institutions and not disrupting market competition. Main purposes of their use include limiting the pace of credit growth, reducing currency risk, leverage, and procyclicality. In the case of institutional models, macroprudential mandate is understood as synonymous to the financial stability mandate, which is one of the reasons for central bank's involvement. As for the definition of financial stability, they are in the vast majority of informal nature (given by the central bank, as indicated by Oosterloo and de Haan 2003). This should warrant creating a more precise definition in the legal basis to prevent misunderstandings

regarding the division of responsibilities within the committee responsible for macroprudential supervision. However, lack of explicit mandate and clear allocation of macroprudential policy (as confirmed by the majority of survey respondents) may partly result from the lack of universally accepted definition of macroprudential policy.

Clarifying the definition will also be associated with defining the scope of this policy. Respondents emphasized: identification, measurement and monitoring of systemic risks that can be limited (both in time and cross-sectional dimension) mainly by tools of microprudential nature. In the opinion of respondents, crisis management is beyond the scope of macroprudential policy. The vast majority of respondents underlined that the FSR is the most important policy tool used to report about macroprudential policy. Since the FSR is being published only by the central banks, this is another argument for them to play a key role in macroprudential supervision. However, it is possible that in the future, institutions participating in the committee responsible for macroprudential supervision, will participate in its preparation.

More recent surveys also include the report prepared by the Central Bank Governance Group at BIS (hereinafter “S. Ingves Report”, see BIS 2011). The report aims to answer the question - what role central banks play in promoting financial stability and how the central bank's mandate should be structured. S. Ingves Report is a valuable overview of the possible central bank's role in macroprudential supervision and illustrates the limitations of institutional allocation of this function and evaluates solutions adopted in the countries surveyed. Main conclusions of S. Ingves Report (along with some comments) are as follows:

- in order for actions aimed at achieving and maintaining financial stability to be effective, central bank's involvement is necessary, but this cannot conflict the mandate for price stability - this is particularly evident when conducting LOLR, and financial stability cannot be achieved by safety net institutions without a central bank,
- there is a need to clarify central bank's mandate for financial stability,
- assigning responsibility for financial stability should be accompanied by equipping appropriate tools and powers - lack of tools prevents central bank from effective implementation of the mandate and causes potential conflict of interests when using e.g. interest rates to stabilize the financial system,
- institutional allocation of macroprudential supervision must ensure the clarity of the tasks and responsibilities of all safety net institutions and the appropriate level of credibility and independence of the institution in charge – since the central bank already has significant independence, this may be an argument in favor of making it solely responsible for macroprudential supervision,
- the effectiveness of macroprudential supervision weights on effective cooperation and information flow between safety net institutions, involved to various degree in maintaining financial stability, depending on the stage of the crisis - regardless of the institutional allocation of macroprudential supervision, there should be a body/committee composed of representatives of all safety net institutions, which would hold frequent meetings (e.g. every quarter) and report on its actions in the field of financial stability,
- central bank should play a key role in macroprudential supervision, in order to be effective it needs direct access to microprudential data and build up analytical capacity in this area – this could also justify allocating microprudential supervision at the central bank.

The comparison of abovementioned studies (see Table 1) shows that most often analyzed are: legal basis (central bank's mandate for financial stability), FSRs and both micro- and macroprudential supervision (their scope, tools, and institutional models). In turn, there are too few attempts to explore how central bank's organizational structure reflects its tasks associated with financial stability, whether it has a financial stability index and whether it conducts and publishes the results of stress tests. This study aims to identify gaps and to verify whether the conclusions of the hitherto studies (within the scope examined by the author) are still valid.

**Table 1. Comparison of comprehensive studies on the central banks' involvement in financial stability**

	<b>Healey (2001)</b>	<b>Oosterloo and de Haan (2003)</b>	<b>Viñals Report (2010)</b>	<b>Ingves Report (2011)</b>	<b>Smaga (2013)</b>
<b>Scope of the survey</b>	37 central banks from economies at different stages of development	30 central banks from OECD countries (28 responses)	63 countries and ECB (50 responses)	13 central banks from around the world (i.a. ECB, Fed, NBP)	EU 27 central banks (16 responses)
<b>Analyzed period</b>	February and November 2000	2003	December 2010	2009	July 2012
<b>Legal basis (mandate)</b>	X	X	X	X	X
<b>Definition of financial stability</b>		X	X (definition of macroprudential policy)		X
<b>Financial stability indicators</b>			X (indicators for macroprudential policy)		X
<b>Financial stability index*</b>					X
<b>Stress tests</b>			X		X
<b>Financial Stability Report</b>		X	X	X	X
<b>Role in the payment system</b>	X			X	X
<b>Role in microprudential supervision</b>	X (including the role of supervisory data)	X		X	X
<b>Role in macroprudential supervision</b>		X	X	X	X
<b>Organizational structure</b>		X			X
<b>Liquidity support (LOLR, ELA)</b>	X	X		X	
<b>Safety net cooperation</b>		X	X (allocation of responsibility for macroprudential policy)	X	
<b>Forms of accountability for financial stability mandate</b>		X		X	
<b>Preventive instruments</b>		X	X (tools to limit systemic risk)		
<b>Instruments for crisis management</b>	X (role in crisis management)	X			

\* The financial stability index is understood as an operational definition of financial stability, an indicator that allows one to measure the stability of the financial system (or part thereof).

Source: own work.



### 3. The Methodology of “Financial Stability Engagement Index”

This section is devoted to presenting a method to verify the thesis that central banks in the euro area are more involved in taking care of financial stability than the ones (in the EU) outside the single currency area. There are different forms of central bank's involvement in fostering financial stability, from the use of "traditional" tools such as LOLR, payment system oversight and financial stability analysis, to the use of non-standard tools such as QE. Differences in degree of involvement of central banks in financial stability could:

- affect the scope and level of depth of financial stability assessment,
- affect the range of instruments available to central banks to prevent the build-up of systemic risk (e.g. the macroprudential tools),
- result in heightened degree of heterogeneity among EU central banks which would be detrimental to the cooperation in this regard.

In summary, a low level of central bank involvement (superficial analysis, scarce analytical skills and human capital, narrow set of instruments), may hinder financial stability.

Currently, central banks' involvement is changing and evolving towards macroprudential supervision and more pro-active, rather than passive approach. There is therefore a need to grasp the increasing role by means of a universal method, which could be used for any central bank and in the future to verify and assess changes in this regard. Basing on the central banks' actions, one can distinguish common features, which can characterize the varying role of central banks in contributing to financial stability. Identification of engagement forms serves as basis for construction of a novel **“Financial Stability Engagement index”** (hereinafter "index"). As an auxiliary method a questionnaire sent to central banks was used. The scope of the study covers all EU 27 central banks (as they stand in July 2012). For the purposes of study, the population of central banks analyzed is divided into three groups, namely the central banks of EU 27 countries (EU 27 group), central banks in the euro area (EA group) and the central banks in the EU which are outside the euro area (NEA group).

The design of the index illustrates the extent to which central bank analyses and promotes financial stability. The most important factor determining its value are central bank's actions, decisions taken by the parliament (e.g. formal division of tasks within the safety net) and actions of other safety net institutions in cooperation with the given central bank. The author identifies 10 criteria (index components - c1 to c10), which can describe differences in the behavior of central banks toward fulfilling its role of contributing to financial stability. Each of the EU 27 central banks has been evaluated in terms of 10 components (score if 0 or 1 for each index component) and received a total score ranging from 0 to 10 points (final index value). Such design allowed assessing the extent of heterogeneity of central banks' involvement in the care of financial stability in the EU 27.

The construction of the index can be partially derived from transparency indices for central banks actions regarding their financial stability function as developed by Sotomska-Krzysztofik and Szczepanska (2006) and Horváth and Vaško (2012). Their scope covers only central bank's transparency in this respect, while author's index has a much wider coverage and is intended to capture overall central bank's actions within its financial stability function, not just the transparency dimension. Author's index only to a limited extent includes criteria used in the transparency indices (for detailed comparison see Table 2).

Construction of the index and assessment of each component base on publicly available information. This allows further recalculating the index and makes it a universal method. Sources of information include:

- central bank acts and corresponding legislation acts,
- FSRs,
- information published in the central bank's website (e.g. statements, speeches, studies, reports etc.).

**Table 2. Comparison of financial stability transparency indices and author's financial stability engagement index**

<b>Criterion/scope of analysis</b>	<b>Transparency index (Sotomska-Krzysztofik and Szczepańska, 2006)</b>	<b>Financial Stability Transparency Index (Horváth and Vaško, 2012)</b>	<b>Financial stability engagement index (Smaga, 2013)</b>
1) the goal specified in the act on the central bank or another legal document	X	X	criterion 1
2) declaration of the goal by the central bank	X		
3) publication of the financial stability report	X	X	criterion 6
4) frequency of publication of the financial stability report	X	X	criterion 6
5) information about the function of the lender of last resort (LOLR)	X		
6) information about the terms and conditions of emergency liquidity assistance	X		
7) information about crisis management	X		
8) press release in situations of risk to the stability of the financial system	X		
9) speeches delivered by the representatives of the bank's authorities concerning the financial stability	X	X	
10) financial stability as a separate page on the central bank's website	X	X	
11) FSR is forward looking		X	
12) coverage of the FSR		X	
13) publication of stress test		X	criterion 5
14) publication of FSIs		X	criterion 3
15) macroprudential policy transparency		X	criterion 9
16) existence of a financial stability policy committee		X	criterion 9

Source: own work based on Sotomska-Krzysztofik and Szczepanska (2006) and Horváth and Vaško (2012).

The author is able to assess the degree of fulfillment of index components based on publicly available data. Therefore it is not possible to assess other aspects of central bank's involvement, if their results are not published, i.e. a high degree of central bank's involvement may also be partly due to the high level of transparency attributed to central bank actions aimed at financial stability. Publishing large number of analyzes and studies on the central bank's role in financial stability should be considered beneficial. In order to investigate if such similarity exists, author's index will be compared with the current values of Financial Stability Transparency Index by Horváth and Vaško (2012).

The author is aware of the methodological limitations involved in the construction of the index. It should be emphasized that its value cannot be unambiguously interpreted as the central bank's success in contributing to financial stability i.e. a more stable financial system. It requires not only further research, but above all developing a comparable measure of financial stability (see ECB 2005), which could be used to determine the relation between the degree of involvement (index value) and a "level of" financial stability. Higher index value represents only greater involvement, more analytical effort and devoting more human resources by the central bank, which is able to identify potential threats to financial stability in an advanced way and so should the index value be interpreted.

The proposed measure can be easily modified and expanded by other researchers. This tool also makes it possible to assign weights to individual components, yet at this stage is used as an unweighted measure. This may indicate some imperfections of its current form, because it doesn't grasp the differences in the significance of each criterion e.g. a central bank that publishes FSR is more involved than the one that only has a definition of financial stability. Not only the fact that criterion is met is important, but also the degree of its fulfillment (e.g. differences in the quality of FSR and stress tests between central banks). Unweighted construction of the index thus determines cautious interpretation and comparison of its values between central banks. Assigning specific weights given to the components would require creating such a mechanism, which fully reflect the importance of the various criteria, including country-specific institutional features and the structure of national financial systems. It has been found disputable which component of the index is more important and thus should have greater weight assigned to it (Sotomska-Krzysztofik and Szczepanska 2006). This remains a challenge to further improve the proposed measure. Undoubtedly, this would allow determining the degree of each component's contribution to the final value of the index and eliminating its present imperfections.

The proposed measure gives the possibility to compare results between different groups of central banks (e.g. in terms of size/type of financial system) and may serve as a tool that can be used and developed by other researchers. The construction of index may be in the future easily modified e.g. by adding new criteria, which will allow a more detailed evaluation of central bank's degree of involvement in financial stability. Additional components of the index may include:

- dividing the microprudential supervision criterion into two: over the banking system and over the whole financial system,
- comparison of the validity of central bank's stress tests conclusions with the ex-post soundness of the financial sector during the period of turbulence;
- central bank's role in crisis management,
- dividing criterion for macroprudential oversight into scope of macroprudential tools at central bank's disposal,
- information policy in the field of financial stability e.g. compared between the period before, during and after the financial crisis,
- how the central bank acts as lender of last resort,
- the scope of central bank's transnational cooperation in the field of financial stability,
- the type and extent of use of non-standard monetary policy tools to stabilize the financial system,
- assessing the quality and contents of FSR.

Another way to develop the indicator may be to change the scoring system for each component from "0 or 1" to e.g. "0 or 0.5 or 1", etc. This would determine more accurately the degree of central bank's involvement. Currently, the index takes a point-in-time approach, but also it would be valuable to calculate it in terms of continuum (time-series approach), which might be used to assess how much has the degree of central banks' involvement in financial stability changed after the crisis (as compared with period before the crisis). Such study and index calculation can therefore be repeated in the future and the results compared to this one. In addition, the index may be used for analysis of an extended scope of central banks i. e. outside the EU. Additionally, a backward looking analysis using this index might help grasp how central bank's role in financial stability evolved over time.

The survey (see Annex 1) is used as an auxiliary method, which aims to investigate the opinions of central banks given in response to questions strictly corresponding to index components. Survey responses serve as a support for index calculation and indicate the desired (by the central banks) changes and possible extension of their role in contributing to financial stability. However it should be noted, that the calculation of the index is possible on the basis of the abovementioned sources only and without the need of a survey. On one hand, this reflects the universal construction of the index (possibility of its recalculation in the future). On the other hand, answers in the questionnaires will be used to complement index values, since central banks' opinions, cannot be easily obtained from official and publicly available sources.

The survey was sent to heads of financial stability departments in the EU 27 central banks. More than half<sup>2</sup> responded with completed questionnaires. The response deadline expired on 30 July 2012. The design of each of the 10 questions in the survey was twofold: part A and B. In Part A respondents were able to give a yes/no answer, while in Part B they were asked to give reasons and explain the answer from part A, provide arguments and justify it or propose changes in the given area.

#### 4. The Components of "Financial Stability Engagement Index" – Results

The following section describes index components and justifies their selection, while assessing scores in analyzed groups of EU central banks concerning their involvement in the care of financial stability. Analysis of each index component is done in two stages:

- I. The degree to which the criterion is fulfilled on the basis of publicly available information (all the central banks of the EU-27).
- II. A summary of 16 EU central banks' opinions on the given component (basing on the survey results not publicly available).

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<sup>2</sup> In total 16 completed (out of 27) surveys were returned (59.3%). In NEA group, respondents accounted for 70% of the whole group - completed the questionnaire were received from seven central banks (Bank of England, Czech National Bank, Danmarks Nationalbank, Bank of Lithuania, Bank of Latvia, Magyar Nemzeti Bank and National Bank of Romania). In the EA group, responses constitute 52.9% of group population i.e. nine central banks responded (Oesterreichische Nationalbank, National Bank of Belgium, Eesti Pank, De Nederlandsche Bank, Central Bank of Malta, Bundesbank, National Bank of Slovakia, Banca d'Italia and Suomen Pankki). Among those who didn't reply, no central bank stated a reason for doing so.

### **1) Does the central bank have a legal financial stability mandate?**

0 - no explicit reference (e.g. only price stability mandate)

1 - central bank has in the legal basis a clearly indicated purpose of monitoring/supporting/ contributing to financial stability

There are different ways of defining central bank's financial stability mandate in regulations governing the functioning of the central bank. If the mandate is explicitly stated, central bank has more freedom of action and his actions don't have to be explained only as stabilizing inflation in the medium term. Clarity of purpose in the legal basis makes central bank give more attention and prominence to financial stability function, conduct more in-depth analysis (than merely limited for monetary policy purposes) and devote more resources (human capital) – all of which can be seen as beneficial for central banks involvement in financial stability. Lack of explicit mandate might limit central bank's tools and measures needed for crisis management purposes and would make it harder to justify policy actions that would be not directly aimed at achieving price stability. The evolution of central banks' mandates is further discussed by García-Herrero and del Rio (2005) and Frisell et al. (2008).

Out of analyzed 27 central banks, only four of them do not have explicitly given financial stability mandate in the legal act (statute) - Banque de France, Bundesbank, Sveriges Riksbank and Bank of Latvia. This however doesn't mean that they are in practice not involved in contributing to financial stability - the criterion in component 1 takes a legal point of view. Bundesbank's financial stability mandate stems from the art. 127 (5)<sup>3</sup> of the TFEU and participation in the responsibility for microprudential supervision, which is shared with Bafin. In the opinion of Sveriges Riksbank, its role in this area consists of i.a. issuing banknotes and coins, ensuring robust and efficient payment system, data collection and analysis, dissemination of knowledge about the financial system to prevent building up of threats to financial stability and warning against risks, as well as crisis management. Similarly, Banque de France and the Bank of Latvia interpret the responsibility to safeguard payment system as contributing to overall financial stability.

Among the central banks, whose mandate is explicit, it takes the following forms: monitor all circumstances that may have an impact on safeguarding financial stability (Oesterreichische Nationalbank), regulate and supervise other banks' activities in this country for the purpose of ensuring the stability of the banking system (Bulgarian National Bank), contribute to the stability of its financial system as a whole (Czech National Bank), to promote (...) the stability of the financial system (Eesti Pank), participate in maintaining the reliability and efficiency of the payment system and overall financial system and participate their development (Suomen Pankki), acting to sustain stability of Poland's financial system (NBP), strive for financial stability, while taking into account the principles of an open market economy and free competition (Bank of Slovenia).

After the outbreak of the crisis in mid-2007, there has been significant strengthening of EU central banks' mandates in terms of their involvement in contributing to of the financial stability: NBP (given an explicit mandate in 2008 - along with the establishment of Financial Stability Committee), Banque Centrale du Luxembourg (strengthening of mandate at the end of 2008, which includes the supervision of the liquidity of the financial market and its participants), Bank of England (strengthening of the mandate in

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<sup>3</sup> "The ESCB shall contribute to the smooth conduct of policies pursued by the competent authorities relating to the prudential supervision of credit institutions and the stability of the financial system."

2009), Central Bank of Ireland (strengthening of the mandate in 2010), Bundesbank (given an explicit mandate in 2013 basing on the *Finanzstabilitätsgesetz*), similarly as in the case of Banque de France (in 2010 and reform of the *Financial Regulation and Systemic Risk Council* in 2013). In addition, due to the introduction of the euro in 2014 in Latvia, Bank of Latvia was given at the beginning of 2013 a mandate to contribute to financial stability, basing on the TFUE ("contribute to the smooth conduct of policies pursued by the competent authorities relating to the prudential supervision of credit institutions and the stability of the financial system").

***Survey: Is the scope of the current mandate sufficient or should it be widened?***

The survey revealed that in EA group the majority of central banks based their commitment to financial stability on a formal mandate set out by law, and one of them mentioned microprudential supervision as a goal compatible with the contribution to financial stability. In this group, most central banks pointed out that the extent of the mandate is sufficient, while at the same time it needs extending with a clearly specified macroprudential approach, in response to the Recommendation of the ESRB of 22 December 2011 on the macroprudential mandate of national authorities and the implementing the CRD IV/CRR package. In the NEA group, some central banks have no explicit obligation to take care of financial stability, but base their commitment on the payment system oversight function. Also in the NEA group it was mentioned that the mandate of the central bank is rather sufficient, but there is a need to clarification as abovementioned, which would be beneficial for the functioning of the central bank.

***2) Does the central bank have a financial stability definition?***

0 - not at all or it is not given explicitly

1 - the central bank officially states the adopted definition and it is publicly available<sup>4</sup>

The second index component is closely associated with the first one, because if the central bank is given the financial stability mandate, then it must know exactly for "what" it is responsible. There is a wide range of different financial stability definitions, and it creates a need for the central bank to determine what it understand under this term. This determines the extent of financial stability analysis and (both preventive and emergency) measures taken to safeguard it. The definition indicates what central bank considers a sign of instability and therefore is likely to intervene to prevent it. Lack of explicit financial stability definition doesn't foster transparency of central bank's policy. However, lack of formally adopted definition could be due to constrictive ambiguity reasons or in order not to limit central bank's discretion in times of crisis to the extent of the defined scope.

Financial stability can be defined broadly or narrowly. The first approach bases on presenting the characteristics of the state of the financial system and economy, which can be considered as stable. The second approach takes a more simplified view and defines financial stability *a contrario* by determining what is financial instability. The absence of a single definition may be due to different and often evolving nature of financial crises, as well as the characteristics of national financial systems, despite the increasing globalization and liberalization of financial markets. The disadvantage of the first approach arises from describing financial stability in too broad terms while using mostly theoretical, hardly measurable concepts. This can adversely affect the clarity and transparency of the financial stability as a policy objective and hinder working out an operational version of the definition, which could be used in

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<sup>4</sup> For example on the website or in the FSR.

practice by the central bank. The second approach emphasizes occurrence of financial crisis, therefore is not just a theoretical concept. This facilitates the understanding of financial instability by the policymakers by giving a tangible example. While the first approach tries to include the multidimensional nature of this concept, the second approach often limits perception of financial stability strictly to the lack of financial crisis. This is not always true, since asset bubbles can build up and systemic risk can accumulate in the absence of visible signs of the crisis. Further analysis on central banks' financial stability definitions can be found in Čihák (2006b) and IMF (2011).

Apart from broad and narrow approach, Schinasi proposes also a noteworthy *continuum* approach. Since the financial system is in a perpetual state of flux and transformation, the concept of financial stability does not refer to a single, sustainable position or time path to which the financial system returns after a shock but rather a range or a continuum. This continuum is multidimensional: it occurs across a multitude of observable, measurable variables that can be used to quantify (albeit imperfectly) how well the financial system is performing its facilitative functions (see Schinasi 2005).

In order to compare the definitions present in the literature and adopted by central banks, the most frequent features of those were used (see Table 3 and 4). A comparison of financial stability current definitions in the literature (see Table 3) proves that emphasis is placed primarily on proper fulfilling of functions by the financial system, in particular the efficient allocation of resources. Equally often the impact of financial instability on the real economy is emphasized. On the other hand, too little attention is paid to the risks arising from misalignments in assets prices and interrelationships between various elements of the financial system, through which contagion may spread. Financial stability definitions began to appear in the literature of the late twentieth century and early twenty-first century. After bursting of the dot-com bubble, this process has somewhat intensified. In the literature, before the outbreak of subprime crisis, most definitions pointed to the impact of the financial (in)stability on the real economy. After the crisis began, focus shifted to financial stability understood as proper fulfillment of financial system's functions.

**Table 3. Comparison of financial stability definitions in the literature**

Author / Feature	Resilience to shocks	Performing basic functions by the financial system	Efficient allocation of resources (financial intermediation)	Interlinkages between elements comprising financial system	Impact on the real economy	Asset price misalignments
A. Crockett (1997)				X	X	X
F. Mishkin (1997)	X		X			
J. Lager (1999)	X				X	
W. F. Duisenberg (2001)		X		X		
R. W. Ferguson (2002)		X			X	X
T. Padoa-Schioppa (2002)	X	X	X			
M. Kiedrowska and P. Marszałek (2002)			X		X	
N. Wellink (2002)	X	X	X		X	X
M. Foot (2003)				X	X	X
J. Chant (2003)				X	X	
O. Issing (2003)		X	X			
A. Large (2003)	X			X		X
J. G. Schinasi (2005)	X	X	X		X	
A. Weber (2008)		X	X		X	
A. Matyszek-Jędrych (2008)		X			X	X
A. M. Jurkowska-Zeidler (2008)		X		X		
L. Papademos (2009)	X	X	X	X		
K. Jajuga (2009)	X	X				
L. E.O. Svensson (2010)		X	X			
M. Capiga (2010)	X	X				
J. Koleśnik (2011)	X	X	X		X	X
A. Sławiński (2011)		X			X	
W. Rogowski and C. Mesjasz (2012)	X				X	
A. Houben (et al. 2012)	X	X	X			
A. Alińska (2012)		X	X			X
H. Żukowska (2012)	X	X	X			X
P. Smaga (2013)	X	X			X	
<i>Frequency</i>	14	19	13	7	14	9

Source: own work.



Analysis of financial stability definitions adopted by central banks in the EU 27 (see Table 4) leads to following conclusions:

- 21 central banks do, and 6 don't have a financial stability definition (e.g. Banca d'Italia, Bulgarian National Bank, Bank of Latvia, Suomen Pankki<sup>5</sup>);
- All definitions take the broad approach and those are often placed in the first editions of the FSR (e.g. National Bank of Belgium, Banco de Portugal) or on webpage (e.g. Danmarks Nationalbank, Czech National Bank, Bundesbank). In addition, some central banks regularly place it in each FSR (e.g. National Bank of Poland, Czech National Bank, Magyar Nemzeti Bank, Oesterreichische Nationalbank), which can be considered a "best practice", fostering transparency of central bank's involvement in financial stability;
- Most central banks have their own definition, while others use definitions available in the literature (e.g. Central Bank of Cyprus has adopted the definition proposed by the ECB, while Banco de Portugal bases it on the definition proposed by A. Crockett, see Banco de Portugal 2004);
- For central banks in the EU 27, financial stability is usually associated with the financial system that properly fulfills its functions (as in the literature), even in case of adverse shocks, which is in the literature underlined a little less frequently. On the other hand, insufficient attention is paid to threats of build-up of asset bubbles (as in literature) and the negative impact of financial system instability on the real economy, ultimately affecting price level - which further justifies the need to promote financial stability by the central bank;
- Taking into account the selected features, it is Central Bank of Malta's definition that best defines the nature of financial stability, incorporating most of its features.

Central banks focus on the providing definitions of financial (in)stability rather than definitions of financial crisis and systemic risk (see Oosterloo and de Haan 2003) - this conclusion is still true. The very few EU central banks providing definitions of financial crisis include Central Bank of Cyprus, Banque Centrale du Luxembourg, Central Bank of Malta and NBP. When defining financial crisis they emphasize strong disturbance in the process of financial intermediation, liquidity problems, insolvency with negative impact on the real economy. On the other hand, in the case of systemic risk it is very often defined narrowly, i.e. risk at the level of the entire financial system, risk of instability of the financial system as a whole (Czech National Bank, Bank of Canada, Sveriges Riksbank) or as risk that the failure of a participant in a payment system to meet his financial obligations in the system will result in other participants being unable to meet their obligations (Banque Centrale du Luxembourg, Bank of Greece). A complete definition of systemic risk is given by the ECB<sup>6</sup> i.e. systemic risk can be described as the risk that financial instability becomes so widespread that it impairs the functioning of a financial system to the point where economic growth and welfare suffer materially applies to a situation where financial instability, through various channels to spread so widely that negatively affects the real economy, disrupting the functioning of the financial system (see ECB 2010b).

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<sup>5</sup> Suomen Pankki in FSR only gives a general description what is meant by a stable financial system, but doesn't provide an explicit financial stability definition.

<sup>6</sup> Similarly Eesti Pank provides a wide definition of systemic risk on its website i.e. a systemic risk is a threat to the whole of or part of the financial system, where the difficulties caused could seriously disrupt or even block the supply of financial services. If a systemic risk develops into a financial crisis, it has a major negative impact on the real economy.

**Table 4. Comparison of financial stability definitions adopted by central banks in the EU 27**

Author / Feature	Resilience to shocks	Performing basic functions by the financial system	Efficient allocation of resources (financial intermediation)	Interlinkages between elements comprising financial system	Impact on the real economy	Asset price misalignments
Oesterreichische Nationalbank	X	X	X	X		
National Bank of Belgium		X	X		X	
Central Bank of Cyprus	X		X	X		
Czech National Bank	X				X	
Danmarks Nationalbank		X		X		
Eesti Pank			X	X		
Banque de France	X			X		X
Bank of Greece	X	X	X	X		
Banco de España		X	X			
De Nederlandsche Bank	X	X	X		X	
Bank of Lithuania	X		X	X		
Central Bank of Malta	X	X	X	X	X	
Bundesbank	X	X	X			
National Bank of Poland	X	X	X		X	
Banco de Portugal	X	X		X		X
National Bank of Romania	X	X	X			
National Bank of Slovakia	X	X		X		
Bank of Slovenia	X	X		X		
Sveriges Riksbank	X	X	X			
Magyar Nemzeti Bank	X	X	X	X		
Bank of England		X	X			
<i>Frequency</i>	<i>16</i>	<i>16</i>	<i>15</i>	<i>12</i>	<i>5</i>	<i>2</i>

Source: own work based on the information contained on websites or in publications of central banks, as of 30th June 2012. Central banks' definitions are available in Annex 2.

Allen and Wood (2005) propose 6 desirable features (criteria) that would have to be met by a good definition of financial stability:

- a) A good definition of financial stability should clearly be related to welfare.
- b) Financial stability should be an observable state of affairs, so that those who are responsible for maintaining financial stability can know whether they are succeeding or not.
- c) Financial stability should be subject to control or influence by the public authorities.
- d) Financial stability should be a property of a clearly defined politically-significant entity.
- e) The definition and analysis of financial stability (or instability) should be broad enough to embrace all cases (that also collapse of non-financial institutions and sovereigns can cause economic damage), even though the public institutions assigned to resolve the problems may be quite different.

f) The definition of financial stability should not be so rigorously demanding that it stigmatizes virtually any change as evidence of instability.

Having assessed financial stability definitions present in the literature and those used by central banks, one can conclude that there is generally a low degree of fulfillment of the abovementioned features elaborated by Allen and Wood. Definitions found in the literature include to the widest extent feature a) - the impact of financial system on the economy, and thus welfare, but this cannot be said about definitions of EU central banks. However, many definitions do not limit their scope, operating on broad concepts, which partially fulfills the last feature f).

Due to the heterogeneity of the definitions, there seems to be a need to develop a single, universally accepted definition of financial stability. Therefore author proposes the following definition, taking the wide approach. **Financial stability is a condition of the financial system, which has the following characteristics:**

- **the system fulfills its functions properly,**
- **systemic risk or macro-financial imbalances are limited,**
- **it is resistant to shocks (both internal and external),**
- **it possesses the ability to restore its functioning on its own,**
- **it resists transfer of negative impulses within the system and between the financial system and the real economy.**

The proposed financial stability definition is an attempt to contribute to a consensus in formulating and evaluating this phenomenon. It can be viewed as a methodology of financial system stability assessment in terms of fulfilling the enumerated features and analyzing the deviations (along with the reasons) from the ideal state. One should bear in mind that this definition is an attempt to present an ideal state of financial system stability, which is to be pursued, yet not at all costs. However, financial stability is a multidimensional phenomenon and its abovementioned characteristics may interact with each other, including in opposite directions, giving rise to trade-offs. For example, performing the function of financial intermediation in the banking system most effectively could be related to its high profitability, but potentially lower liquidity - the impact on the stability of the financial institution could be therefore ambiguous. In addition, creating a system highly resistant to shocks may be achieved at the expense of over regulating it (potentially stimulating growth of shadow banking) and followed by a decrease in the effective performance of its functions, while increasing costs of financial services. Author's definition in relation to the features outlined by Allen and Wood, contains a reference only to two of them: welfare, which is reflected in its last part, and the build-up of systemic risk, which takes into account the possibility of instability arising outside the financial system.

***Survey: How does the way the definition is constructed determine the scope of financial stability analysis?***

In the survey responses, central banks from the EA group indicated that if there was no definition specified in legal act, they adopted their own. It was pointed out that operational dimension of the definition can be obtained by means of macroprudential supervision. Additionally, some argued financial stability is such a complex phenomenon, that the lack of a strict scope of the definition leaves the necessary flexibility in its analysis (allows to grasp new forms of instability) and does not limit the spectrum of analysis, making it possible to identify potential sources of risk. Moreover, one mentioned

that elements of the definition have a direct impact on the structure of the financial stability department. Another in turn, indicated that it is the organizational structure that determines the extent of the financial stability analysis. Central banks in the EA group have a wide scope of ongoing financial stability analysis, partly associating it with effective safety net activities at national and international level. One central bank has indicated that a greater emphasis on macroprudential supervision extends the existing range of analysis and allows it to focus on systemic risk indicators and calibration of macroprudential tools. In the NEA group, one central bank without a formal mandate, has adopted a financial stability definition for internal needs. Some central banks of the NEA group indicated that the definition determines the scope of the analysis, with particular focus on the condition of the financial system as a whole, and for one of them also on the dangers of excessive credit outflow.

### **3) Does the central bank publish financial stability indicators?<sup>7</sup>**

0 - does not publish or data is not updated regularly or publicly available

1 - yes, the data is updated and published regularly and publicly available

Calculating and publishing financial stability indicators proves higher awareness of central bank's role in analyzing financial stability. Indicators allow conducting structured analyzes, serve as a valuable source of data for further research, modeling and stress testing. Often it is only the central bank, which has access to supervisory data and it should take advantage of this unique source to assess the health of the banking sector. FSIs could be also used for construction of aggregated financial stability index. Computing FSIs improves the process of financial stability analysis and enhances contents of FSR, while making it easier for others (institutions, researchers etc.) to analyze the financial sector. Lack of publishing FSIs could lead the central banks to imprecise assessment of financial system stability and as a consequence improper calibration of measures used for financial stability purposes. Additional discussion on FSIs can be found in Sundararajan et al. (2002), Moorhouse (2004), Mörttinen et al. (2005) and Agresti et al. (2007).

However, only 9 central banks in the EU 27 regularly publish financial stability indicators (e.g. according to IMF's methodology or a similar one) and make them available on the website - these include Central Bank of Cyprus, Czech National Bank, De Nederlandsche Bank, Bank of Lithuania, Banque Centrale du Luxembourg, Bank of Latvia, Central Bank of Malta and Bundesbank). Czech National Bank is an example to follow, because it not only calculates the core and encouraged set, but also publishes them on the website and in the FSR. Also Bundesbank makes FSIs readily available on the website, with underlying data used for their calculation (except for data compiled for supervisory purposes only). Some banks did not meet the criterion, although make efforts towards FSIs' calculation. National Bank of Romania publishes some very basic indicators regarding the condition of the banking sector, which however differ significantly from the methodology recommended by the IMF. At the same time NBP published FSIs in a FSR 2008, but in subsequent FSRs ceased to do that.

***Survey: Are FSIs based on the methodology by IMF or ECB? Are they useful when analyzing financial stability? In what way can they be expanded?***

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<sup>7</sup> Understood as Financial Soundness Indicators according to IMF's methodology, macroprudential indicators (MPIs) according to ESCB's methodology or central bank's methodology (yet similar to the methodology of the IMF or the ESCB). Publishing other types of indicators and naming them as FSIs does not fulfill the criterion.

In EA group, central banks signaled the fulfillment of reporting obligations to the IMF for purposes of FSIs' calculation (and sometimes also publish them in FSR, on the website or produce for internal purposes only). Nevertheless they often also calculated financial stability indicators to greater extent based on wider and their own methodology (which is being constantly improved) that takes into account unique characteristics of the national financial system. One central bank created a "risk dashboard" for internal macroprudential analysis, which includes not only financial system indicators, but also indicators of economic activity, thus allowing more effective identification and assessment of threats to macro-financial stability, which is also for used as input for high-level meetings. Another central bank also stressed the need of further development of indicators for macroprudential policy e.g. that could be used as triggers for activating the use of macroprudential tools. One also drew attention to limited effectiveness of FSI according to IMF methodology, mainly because of their retrospective nature and believes that unlimited expansion of indicators appears not to be fruitful – instead one should focus on core indicators, while the other pointed out that qualitative information and discretion should also be used when making financial stability assessments.

In the NSE group, only some central banks publish FSIs and indicate reporting data to the IMF. To a greater extent FSI are calculated on the basis of their own methodology, which is only partly similar to that used by the IMF or the ESCB. In addition, one central bank in NSE group stressed that it does not attach special importance to financial stability indicators in its analysis, while the other considers them useful in evaluating vulnerabilities of the financial system and said that more frequent use of distributions can probably complement their efficiency.

#### **4) Does the central bank publish its own financial stability index?**

0 - does not have or does not provide a methodology<sup>8</sup>

1 - yes, it does, even if it is not regularly published, the methodology is provided

Development of financial stability index marks a higher degree of central bank involvement in measuring and analyzing financial stability than simply calculating FSIs. This is an attempt to make financial stability definition operational and develop an index with early warning characteristics. Such measure would be also extremely helpful to clearly describe the current condition of the financial system and make it possible to justify policy measures that had been taken by the central bank. Such aggregated index could be a powerful tool to strengthen market discipline when published regularly. Should the index have reliable forecasting power, economic agents by following its development could anticipate the future financial stability and adjust their actions accordingly. A detailed comparison of composite financial stability indicators in selected FSRs was made by Gadanez and Jayaram (2009) and the conclusion is that central banks' research in this domain is still in development and each aggregate measure should be used along with other instruments. For a thorough review of systemic risk indicators see Bisias et al. (2012).

Analysis of EU 27 central banks shows that only 8 of them (Czech National Bank, Danmarks Nationalbank, Suomen Pankki, Bank of Greece, De Nederlandsche Bank, Bank of Latvia, National Bank of Slovakia and Sveriges Riksbank) have their own financial stability indices. Czech National Bank and Suomen Pankki may serve as good examples, as they compiled a *Banking stability index* (Czech National Bank, see Geršl

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<sup>8</sup> Simply informing about the fact that central bank has its own index and it is being used, is not enough to meet the criterion.

and J. Heřmánek 2006) and the *Stress index for the banking sector* (Suomen Pankki, see Bank of Finland 2007), which are accompanied by the complete methodology and regular publication in the FSR. De Nederlandsche Bank also developed the *Financial stress index* measuring the current condition of the financial system, based on the index by Bank of Canada (see Illing and Liu 2003), while adjusting it to specific characteristics of the national banking system and publishing it in the FSR (*Overview of Financial Stability*) since 2011. Simple *Financial stress index* is presented by the Bank of Latvia (2010) and its structure can be used as a first step for the central bank, who aims at creating such measure. National Bank of Slovakia (see Červená 2011) expands the scope of its index outside the financial system, including instability in the real economy (*stress indicator*), which however is not (yet) sufficiently advanced to draw far-reaching conclusions. At the same time, Banque Centrale du Luxembourg (2007) only indicates that in 2006 it created a quarterly index (*vulnerability index*), but does not provide its level or methodology.

After the outbreak of the financial crisis in mid-2007, one can observe an increase in the involvement of the EU central banks in safeguarding financial stability - here understood as an developing an aggregated index of financial stability - in 2010 (Bank of Latvia and Bank of Greece) and in 2011 (Bank of Slovenia, Sveriges Riksbank, De Nederlandsche Bank and National Bank of Slovakia).

***Survey: Does the central bank have its own financial stability index? Please explain why yes or no and give its brief description. Is it regularly published or for internal purposes only? Does it have a satisfactory forecasting power?***

In the surveyed EA group, vast majority of central banks do not have their own financial stability index. Almost half of them indicated that research (at the beginning for internal purposes) is being undertaken to combine a number of indicators into a single one (or small group), but they also stressed that a sound financial stability analysis must be flexible and take into account multiple indicators/sources of data and their heterogeneity. Other central banks prefer to have a wide set of indicators with clear interpretation of thereof, than an aggregated indicator, the construction of which requires adopting certain assumptions which could lead to misleading conclusions. In the NSE group, only one central bank has (and two are in the process of creating their own) financial stability index<sup>9</sup> and determine its usefulness. As the main obstacle is regarded lack of operational dimension of financial stability definition. One central bank that doesn't have its own index argues that a change in its value would not be sufficient to justify actions taken by the central bank, intended to avoid risks identified as a result of analysis, not arising from the mere change in index value. On the contrary, the other one underlines potential usefulness of a single index, which would aggregate different indicators, often moving in opposite directions, be easy to interpret and serve as a comparable, continuous measure of the financial system condition (e.g. based on the number of standard deviations above its average level).

***5) Does the central bank carry out and publish its own stress tests results of the banking/financial sector?***

0 - does not perform stress tests or did it only once<sup>10</sup>

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<sup>9</sup> One central bank indicates that it is difficult to construct a single index and is therefore working on three indices: early warning, financial distress indicator and the financial system contribution to economic growth. Their values are not currently published.

<sup>10</sup> The criterion is not considered met also when a single stress test was carried out during an IMF's FSAP mission and when the central bank only participated in the conduct of CEBS/EBA stress tests.

1 - yes, carries them out and publishes detailed results / methodology even if it is not done on a regular basis

Stress tests carried out by the central bank allow determining the degree of financial system resilience to shocks and map weak spots, as well as make it possible to preemptively prepare measures to be taken in case of negative scenario materialization. It is one of the key methods for analyzing financial stability. Publishing results can limit moral hazard in case of most vulnerable financial institutions and serve as a basis for further actions (e.g. if central bank is also a supervisor, this also can justify requiring such institutions to improve their capital adequacy). Publishing results fosters market discipline and allows to flexibly assess financial system's resilience. Stress tests may serve as a complementary tool to early warning systems e.g. would the financial system absorb shocks which early warning system indicate? An overview of methodologies can be found in Sorge (2004), for comparison of credit risk stress testing frameworks see Foglia (2008), in case of stress testing for liquidity risk see Schmieder et al. (2012) and for macrofinancial stress testing see IMF (2012).

In the EU, 16 central banks meet the criterion for conducting and publishing results of stress tests. Oesterreichische Nationalbank serves as an example to follow, since it conducts regular stress tests and publishes their results in the FSR. Also, Czech National Bank does that four times a year. Similarly, Eesti Pank does so regularly every six months in the FSR. A good example is also Bank of Lithuania, which places stress test results on the website along with methodology and publishes regularly in the FSR detailed assumptions and results. At the same time, Bank of Latvia regularly publishes the results and methodology in the FSR, like Central Bank of Malta, Bundesbank, National Bank of Slovakia, Sveriges Riksbank and Magyar Nemzeti Bank. De Nederlandsche Bank, Bank of Slovenia and National Bank of Romania carry out stress tests and publish their results in the FSR, but do so irregularly. It is possible that central banks which do not publish the results and methodology of stress tests, still carry them out but only for internal purposes or in cooperation with the microprudential supervisor (Suomen Pankki). Stress tests can also be carried out by systemically important banks themselves and reported to the central bank (bottom-up) as in the case of Central Bank of Cyprus (2012), which very succinctly informs about it and only indicates that it conduct its own top-down stress tests.

In the case of Eesti Pank, one can observe that it began to carry out stress tests of financial institutions and publish their results in a FSR after the outbreak of the financial crisis in mid-2007, as in the case of the NBP since 2007.

#### ***Survey: Is stress testing the most effective tool in financial stability analysis?***

In EA group, majority of surveyed central banks regularly conduct stress tests - the aggregate results are published, while other (e.g. those relating to individual financial institutions) are used only for internal purposes, though can be made available to microprudential supervisor and particular financial institutions. The financial stability analysis through stress tests is in the opinion of most central banks a very important method, but still one of many effective tools. Some central banks also highlight the role of stress testing as a complementary tool for ongoing monitoring of financial institutions, assessment via FSIs and early warning indicators. The use of complementary methods of analysis is important, as emphasized by some central banks, because of the stress tests' flaws ("blind spot"). Those include difficulties in quantifying the complexity of scenarios, not taking into account negative feedback effects, while focusing only on selected types of risk and adopting strict assumptions. Most central banks surveyed in the NEA group, carry out and publish the results of stress tests (mainly top-down), while

additional ones are also prepared for internal purposes. Also some central banks in the NEA group indicate that stress tests are one of many (not necessarily the most effective) methods of financial stability analysis. One central bank emphasized stress tests are most effective especially during periods of instability. Another points to the need of including in stress tests not only solvency, but also liquidity risk.

**6) Does the central bank publish reports on financial stability?<sup>11</sup>**

0 - no or publication of the report is currently discontinued

1 – yes

Financial Stability Report can be considered a "flagship" product of each central bank presenting the results of financial stability analysis and including recommendations aimed at strengthening the resilience of the financial system. Its preparation requires advanced analytical background and experienced staff. FSR fosters cooperation with other safety net institutions, stimulating discussions on threats to the stability of the domestic financial system. In addition, FSR is the basis for further analysis carried out by private entities. Research (see Born et al. 2011) suggests that publication of FSR may have a significant impact on the financial market by reducing its volatility. FSR recommendations can have a positive impact on market discipline and often include central bank's policy stance on current financial stability issues. Analysis in the FSR limits information asymmetry and increases central bank's transparency. The role of FSR is discussed extensively by Čihák (2006b), Christensson et al. (2012) and Čihák et al. (2012a).

23 EU central banks publish FSRs<sup>12</sup> (in the light of adopted definition) - 14 in the euro area and 9 outside it. Central Bank of Ireland did meet the criterion - it published FSRs in 2004-2007 and then stopped, but since March 2012 started to publish *Macro-Financial Review*, which contains a combination of macro-financial analysis i.e. of macroeconomic conditions and the ways in which they affect the health of the financial system. This could be a new approach to preparing such reports by the central bank, acting also as a macroprudential supervisor. This does not mean, however, that four other EU central banks do not carry out analyzes of the financial sector condition. Bulgarian National Bank publishes quarterly reports *Banks in Bulgaria*, which contain only a simple analysis of the banking sector condition, without any indication to threats to its stability and recommendations (as typically in the FSRs published by central banks in the "old EU countries") and also includes financial statements of the biggest banks operating in Bulgaria. While this publication may be a first step towards the creation of a "standard" FSR, the criterion cannot be considered as met. Central Bank of Cyprus publishes its financial stability assessment as a part of bi-annual publication *Economic Bulletin*, which is largely devoted to economic analysis of the Cypriot economy. At the same time the Central Bank of Cyprus announced in June 2012, that it plans to separate the part concerning financial system condition into a stand-alone publication which will be published annually. Banque de France, publishes a FSR two times a year, which however does not contain financial

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<sup>11</sup> For the purposes of the study, the author adopts the following definition of financial stability report: stand-alone, regular publication by the central bank, regardless of the name, published once or twice a year, which includes an analysis of the banking / financial system condition.

<sup>12</sup> According to *World Bank Bank Regulation and Supervision Survey* (see Čihák et al 2012b), which covered period 2008-2010 and provided data for 143 countries (of which 37 are advanced economies and 106 are emerging markets and developing economies - EMDEs), about two-third of supervisory agencies in EMDEs are responsible for publishing a financial stability report - this ratio is less than half for advanced economies.



stability analysis<sup>13</sup>, but ever since 2007 it is only a collection of articles on the given topic (e.g. “FSR” of April 2012 was devoted to the links between financial stability, monetary policy and public debt). Despite the fact that before 2007, in addition to articles in the FSR, Banque de France did include the analysis of financial sector and financial markets condition, the criterion cannot be considered as met. Similarly, the criterion was not met in case of Bank of Greece, which in 2009 issued two FSRs, one in 2010 and then discontinued the publication.

Among the central banks that publish FSR, 10 do so once a year, and 13 two times a year. In EA group central banks on average publish FSR more often (twice a year - 64%), while in NEA group is a slightly lower proportion (56%). As shown in Table 5, there is no statistically significant relationship between the publication of the FSR for the first time and the date of euro zone entry<sup>14</sup>.

**Table 5. Date of first FSR publication vs. date of euro zone entry**

	Publication of first FSR	Euro zone entry
Oesterreichische Nationalbank	2001	1999
National Bank of Belgium	2002	1999
Banque de France	2002	1999
Banco de España	2002	1999
Banque Centrale du Luxembourg	2002	1999
Eesti Pank	2003	2011
Suomen Pankki	2003	1999
Bundesbank	2003	1999
National Bank of Slovakia	2003	2009
De Nederlandsche Bank	2004	1999
Central Bank of Ireland	2004	1999
Banco de Portugal	2004	1999
Bank of Slovenia	2004	2007
Central Bank of Malta	2008	2008
Bank of Greece	2009	2001
Banca d'Italia	2010	1999
Central Bank of Cyprus	does not publish FSR	2008

Source: own work, as of 30th June 2012.

From analysis of Figures 1, 2 and 3, one can conclude that in the case of the EA group, significant increase in number of FSRs published was observed after 2002, which may be associated with the increased focus on financial stability, after the dot-com bust. In the NEA group, the increase in number of central banks publishing FSR was more gradual and began in 2000. In sum, in the EU 27 central banks, the increased in number of FSR published started after 2000, but since 2006 has been less dynamic (for number of FSRs published worldwide see Čihák et al. 2012a). In EA group, first to publish FSR was Oesterreichische Nationalbank in 2001, and in the NEA group - Bank of England in 1996.

After the outbreak of the global financial crisis in mid-2007, increased involvement in the care of the financial stability of the EU central banks, understood as a starting publishing FSR can be observed in the

<sup>13</sup> It is probably carried out only for internal purposes, as suggested by Čihák et al. (2012a).

<sup>14</sup> On average, central banks did so almost 2.5 years after euro zone entry. Exceptions include the Banca d'Italia (11 years after euro area entry), Bank of Greece (8 years after) and Suomen Pankki (8 years before).

case of: Central Bank of Malta (since 2008), Bank of Greece (in 2009 and 2010) and Banca d'Italia (since 2010).

***Survey: What are the reasons behind (aims of) publishing FSRs? Are they being achieved?***

Central banks that replied to the survey from both EA and NEA groups, as main aims of publishing FSR mentioned:

- a form of communicating an assessment (not predictions of) risk in the financial sector by central bank to experts, the media and a wide audience,
- increasing awareness (and the degree of understanding) among economic agents of issues relevant to financial stability,
- contributing to financial stability (influencing behavior of market participants, acting as the "first line of defense" and strengthening the resilience of the system) by means of systemic risk assessment and providing recommendations,
- answering questions about the interactions between financial system and the real economy and highlighting the role of central banks in promoting financial stability,
- promoting discussion and cooperation between the micro- and macroprudential supervisors, as well as with market participants,
- an essential input to the decision-making process at the central bank.

Most frequently mentioned was the objective of increasing awareness and influencing the behavior of economic agents by means of recommendations contained in the FSR and fostering market discipline. Central banks consider the given objectives achieved (to a large extent), although this is based on expert judgment and they not provide specific methods for assessing the achievement of particular objectives. However, one central bank in EA group mentioned that the impact of the FSR on the behavior of market participants has been limited.

***7) Does the central bank act as payment systems overseer?***

0 - no

1 - yes, it conducts oversight function

The central bank is often responsible for supporting safe and efficient functioning of payment and securities settlements systems. Payment system is a main channel of flow of funds, a system of intertwined and interrelated elements (infrastructure, participants and rules of settlement) and its safety is vital for the proper functioning of not only the financial system, but the entire economy. Trust placed in money is not only based on a stable price level, but also certainty that payments made will reach the recipient. Central bank performing oversight functions contributes to providing such public good and ensures monetary policy channels function without impairment – therefore its commitment to safeguarding proper functioning of the payment system is fully justified. Additionally, payment system data available to the overseer makes it possible to study contagion effect, use them in network analysis or identify systemically important financial institutions (interconnectedness). Apart from conducting oversight, central bank can act as a catalyst for changes supporting payment system's effective development which would lead to reduction of transaction costs and improved safety of payments. The role of central banks in payment system oversight is discussed in NBP (2004) and Haldane and Latter (2005). For detailed description of central bank's roles in payment system see also Kokkola (ed.) 2010.

Among the EU 27, all central banks have mandates giving them responsibility for payment system oversight i.e. promoting its efficient and safe functioning. Differences exist in the division of responsibility for the oversight over various payment and settlement systems, payment institutions and e-money institutions.

***Survey: In what way does overseeing payment system developments enhance the financial stability analysis?***

In the surveyed groups of EA and NEA, most central banks emphasized the importance of payment system oversight for financial stability. It comprises not only authorization of new payment and settlement systems, on-going monitoring and assessing systems in terms of their systemic importance, but also introducing international standards/principles in this area (and verifying degree of compliance), identifying potential sources of systemic risk, while supporting the development of the payment system and its legal framework to ensure the safety confidence in the functioning of payment system. In the opinion of central banks, the assessment of payment system functioning is part of financial stability assessment and their involvement is aimed at reducing the risk of contagion. Efficient and safe functioning of payment system is essential for the stability of the financial system, and (confidential) payment systems data allow analyzing interlinkages between participants, conducting network analysis and can serve as an early warning signal of instability, especially when combined with other micro- and macroprudential observations<sup>15</sup>.

***8) Does the central bank act as a microprudential supervisor of the banking/financial system?***

0 - no

1 - yes, only central bank is solely responsible for microprudential supervision, has a dominant role in the supervision or it is a shared responsibility

Central bank's involvement in microprudential supervision can be beneficial in terms of contributing to financial stability (see Peek et al. 2009), This involvement allows more profound analysis of financial system condition, which not only makes it possible to more precisely determine the scale and scope of monetary policy operations, but also to determine the degree to which the system and its elements are stable and identify potential threats. Allocating microprudential supervision at the central bank allows for potential economies of scale, synergies and cost savings. Responsibility for microprudential supervision allows central bank to choose the type of measure best suited for the given situation (e.g. open market operations, standing facilities or non-standard measures). Microprudential supervision in the central bank makes this function enjoy more independence than otherwise. Supervisory data enhances the effectiveness of central bank's other functions (e.g. like LOLR) and separating central bank from microprudential supervision could reduce this effectiveness. This might have been the case in the recent financial crisis, therefore strengthening the argument for the increased central bank's involvement in microprudential supervision. However, in cases where central bank is not directly

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<sup>15</sup> Interestingly, in the NSE group, one central bank indicated that although the role of payment system is important, but it is not an indispensable part of the financial stability analysis, while the other one said it has little relevance for systemic risk in the domestic financial system. At the same time, one central bank from EA group mentioned that his oversight activity moves in three main directions: 1) completion of monetary integration; 2) maintenance of financial stability; and 3) promotion of technological innovation.

involved in microprudential supervision, it can still provide (via cooperation within the safety net) a valuable contribution providing wider macroprudential perspective, which contributes to the quality of microprudential oversight. The role of central banks in prudential supervision is further discussed among others by Goodhart and Schoenmaker (1995), Noia and Giorgio (1999), Hawkesby (2000), Masciandaro et al. (2010) and Eichengreen and Dincer (2011).

A review of EU 27 central banks' involvement in microprudential supervision leads to a division into three groups (models): central bank only<sup>16</sup>, shared-responsibility model and outside the central bank. Although the degree of central bank's involvement varies across those three models, the highest engagement can be attributed to a central bank in the first model. In Austria, the responsibility for microprudential supervision is shared between Oesterreichische Nationalbank and the *Financial Market Authority*. Oesterreichische Nationalbank is responsible for supervisory data collection, reporting, analyzing the condition of financial institutions and on-site inspections, while the *Financial Market Authority* is a decision-making institution taking supervisory action (based on Oesterreichische Nationalbank's analysis). In Belgium, beginning April 2011 a twin peaks model was established - National Bank of Belgium is responsible for microprudential supervision (the majority of financial institutions), the supervision of SIFI and macroprudential supervision, while the *Financial Services and Markets Authority* for the microprudential supervision of institutions like insurance brokerage institutions, financial market (and products) supervision, education, consumer protection and conduct of business supervision. Similarly, the twin peaks model operates in the Netherlands. A shared-responsibility model also operates in Germany, where microprudential supervision is exercised by the Bundesbank (the operational tasks in relation to the banking sector i.a. including on-site inspections, assessment of the financial statements and condition of individual institutions, audit) and the *Bundesanstalt für Finanzdienstleistungsaufsicht* (BaFin). BaFin is responsible for taking supervisory action in relation to banks, licensing and monitoring them, bank resolution and full supervision of other sectors of the financial system and consumer protection. Bulgarian National Bank is fully responsible for the microprudential supervision of the banking sector, while the supervision of non-bank financial institutions is a responsibility of a separate institution (*Financial Supervision Commission*), which also deals with consumer protection on the financial market. Similarly, in the case of Central Bank of Cyprus, which in addition to banks, supervises payment and e-money institutions, while supervision over the rest of the financial system is performed by separate institutions.

Responsibility for supervision of all sectors of the financial system is fully integrated in Czech National Bank (since April 2006), Central Bank of Ireland (since 2010), Bank of Lithuania (since 2012) and National Bank of Slovakia (since 2006). Different institutional solution has been adopted in Denmark, Estonia, Finland, Latvia, Malta, Poland, Sweden, Hungary - an institution independent from the central bank is fully responsible for integrated supervision. Also in the UK, the supervision of all parts of the financial market was (as of 30 July 2012) still integrated in the FSA, independent from Bank of England. Since April 2013, the role of Bank of England increased significantly (twin peaks model), when within its structure a *Prudential Regulation Authority* began operating, responsible for the prudential supervision of the

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<sup>16</sup> According to *World Bank Bank Regulation and Supervision Survey* (see Čihák et al 2012b), in more than 60 percent of jurisdictions, central banks are the agencies that supervise commercial banks for prudential purposes. There is, however, a differentiation here between the countries in the two income groups. While central banks are the supervisory bodies in about 75 percent of EMDEs, only about 40 percent of advanced economies have central banks as supervisory bodies for commercial banks. Instead, about 50 percent of advanced economies use a separate bank supervision agency.

financial sector, while a separate *Financial Conduct Authority* monitors the conduct of business by financial institutions and deals with consumer protection.

Banque Centrale du Luxembourg is not involved in the microprudential supervision and only responsible for overseeing the general state of market liquidity and evaluation of its participants in this regard. In France, an integrated supervision is conducted by *Prudential Control Authority* created in early 2010, which is independent, yet supported by Banque de France (e.g. PCA is chaired by the Governor of the Banque de France). Bank of Greece is responsible for supervising banking and insurance sectors, while the supervision of the capital market is the task of a separate institution. Banco de España and Bank of Slovenia supervise only banking sectors, while with supervision of insurance sector and capital markets deal two other institutions. The same applies to the Banco de Portugal, which (in addition to supervising financial intermediaries and payment institutions) is responsible for supervising conduct of business of credit institutions. Also, National Bank of Romania supervises the banking sector and non-bank financial institutions, but the supervision of the capital market, insurance companies, and pension sector is exercised by three separate institutions respectively. In the case of the Banca d'Italia, it supervises banking sector, investment firms and financial intermediaries, while all other segments of financial markets and conduct of business is the responsibility of other institutions<sup>17</sup>. In sum, 16 central banks in the EU 27 are involved in the supervision of banking sector or the whole financial system, either solely or in the form of a shared-responsibility model (12 in EA group and 4 in NEA group) and 11 of them have no microprudential powers supervision (5 in EA group and 6 in NEA group). The results are summarized in Table 6.

After the outbreak of the crisis in mid-2007, there has been a significant increase in the involvement in microprudential supervision in the following EU central banks: Oesterreichische Nationalbank (since 2008), Central Bank of Ireland (since 2010), Banque de France (in early 2010), Bank of Greece (extension of supervisory scope - including insurance sector in 2010), Bulgarian National Bank (mid-2011), National Bank of Belgium (early 2011), Bank of Lithuania (since 2012), Banca d'Italia (the strengthening of the mandate in case of supervision of the insurance sector in 2013), Bank of England (since April 2013).

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<sup>17</sup> Since 2013 supervision of insurance sector has been joined into new independent institutions (IVASS), although associated with the Banca d'Italia (both at operational and decision-making level).

**Table 6. Involvement of central banks in the EU 27 in microprudential supervision**

Central bank fully responsible for microprudential supervision	Shared-responsibility model (e.g. twin peaks)	Microprudential supervision outside central bank's mandate
Bulgarian National Bank (banking sector) Central Bank of Cyprus (banking sector) Czech National Bank (entire financial system) Bank of Greece (banking and insurance sector) Banco de España (banking sector) Central Bank of Ireland (entire financial system) Bank of Lithuania (entire financial system) Banco de Portugal (banking sector) National Bank of Romania (banking sector) National Bank of Slovakia (entire financial system) Bank of Slovenia (banking sector) Banca d'Italia (banking sector)	Oesterreichische Nationalbank National Bank of Belgium De Nederlandsche Bank Bundesbank	Danmarks Nationalbank Eesti Pank Suomen Pankki Banque de France Banque Centrale du Luxembourg Bank of Latvia Central Bank of Malta National Bank of Poland Sveriges Riksbank Magyar Nemzeti Bank Bank of England

Source: own work, as of 30th June 2012.

***Survey: What are the benefits for financial stability policy of the current engagement in microprudential supervision and whether the central bank would like to see its mandate widened in this respect?***

The majority of survey respondents in the group EA (and to much lesser extent in the NEA group), emphasized the importance of a clear division of responsibilities, cooperation within the safety net in the context of microprudential supervision and its effective coordination with macroprudential supervision. At the same time they underlined benefits of access to supervisory data (and expert knowledge on systemic institutions stemming from on-site inspections, as well as strong economies of scope), especially from the perspective of a central bank acting as a macroprudential supervisor. Most central banks of EA and NEA groups did not consider it necessary to expand their current level of involvement (scope of mandate) in the microprudential supervision, while one central bank from EA group said this separation from central bank prevents the potential conflicts of interests. In the opinion of one central bank of the EA group, in the case of a shared-responsibility model and the division thereof between the central bank and a separate institution, supervised institutions have a perspective of a unified supervisory process, and sharing duties only enhances their effectiveness. In the NEA group, two central banks clearly showed the benefits of better integration of microprudential supervision within the central bank: full information, true capacity to take immediate, decisive and more coordinated action, clear division of responsibilities and homogeneous principles of supervision for financial market participants.

### 9) Does the central bank act as a macroprudential supervisor?

0 - macroprudential mandate of the central bank is not explicitly regulated

1 - yes, it is to (even if limited) extent central bank's responsibility or central bank states to play a key role in macroprudential supervision

The main concern of central bank acting as macroprudential supervisor is the stability of the whole financial system, not just its elements. Macroprudential supervision is analogous to the oversight of the forest, while microprudential supervision is analogous to the oversight of individual trees (see Lastra 2012). Its main objectives include identifying and reducing the build-up of systemic risk and contagion. The central bank, out of all safety net institutions, is best suited for this function because it has an extensive analytical and research capabilities, serves as the payment system overseer (which is one of the channels for the contagion effect) and has experience in analyzing the functioning of the economy and the financial system through various approaches - and such a broad approach is crucial to successfully identify sources of potential systemic risk. Central bank also has a reputation and could use *moral suasion* to increase the efficiency and effectiveness of macroprudential tools used (especially in case of "act-or-explain" recommendations), which further justifies the need for its involvement.

The mandate for macroprudential supervision is not explicitly included in the responsibilities of the Oesterreichische Nationalbank, Banque Centrale du Luxembourg, Bank of Latvia, Bundesbank, National Bank of Poland and Banca d'Italia. Although they conduct macroprudential analysis, they do not have (as of June 30 2012) the explicit power to directly use macroprudential tools. National Bank of Belgium is solely responsible for macroprudential supervision and may curb actions of specific (national) SIFIs (which it identifies) if they jeopardize financial stability and may impose additional obligations concerning i.a. principles of risk management, liquidity and solvency ratios. National Bank of Belgium is also responsible for crisis management and can advise the government to take specific action to eliminate risks to financial stability.

The Bulgarian National Bank and Central Bank of Cyprus combine the responsibility for supervision at the micro and macro level, using microprudential instruments to fulfill its mandate of contributing to the stability of the entire financial system. Similarly, this is the case of Czech National Bank. Banco de España, being also responsible for banking system supervision, introduced in 2000 an anticyclical macroprudential tool called *dynamic provisioning* for credit risk (see Garcia-Herrero and de Lis 2008), which however (after reforms of the system's rules) proved to be insufficient to effectively buffer the results of boom-bust cycle. In Central Bank of Ireland, as a result of the Central Bank Reform Bill in 2010, a *Financial Stability Committee* was established, as an internal macroprudential body tasked with monitoring and analyzing the domestic financial system stability.

In France, a *Financial Regulation and Systemic Risk Council* was set up in 2010, chaired by the Minister of Finance (comprising all safety net representatives), which is responsible, among others for monitoring and exchange of information within the safety net, analyzing and assessing the condition of the financial sector and systemic risks (including dealing with ESRB's recommendations) and cooperation in implementing the standards and recommendations to the financial sector. Sweden in early 2012 established a council for cooperation on macroprudential policy, which involved the Sveriges Riksbank and the integrated supervisor. The council serves as a forum for joint assessment of threats to financial stability and for taking necessary preventive measures. Despite its creation, the two independent

institutions will continue to make their own decisions, which however will be better coordinated. Functioning of the council (meets at least two times a year) is based on MoU and may be terminated if the responsibility for macroprudential supervision will be regulated in a different way.

Similarly, in Germany from 2013 a Financial Stability Board (*Ausschuss für Finanzstabilität*) started operating based on the existing good cooperation between BaFin and Bundesbank. It also includes representatives from Ministry of Finance and the *Bundesanstalt für Finanzmarktstabilisierung* (agency dealing with i.a. SoFFin), but without voting rights. In the Board, acting under the leadership of the Ministry of Finance, Bundesbank plays a major role (with veto right) and is responsible for analyzing, monitoring and identifying risks to financial stability and was given the power to request data directly from financial institutions. The Board, conveying meetings at least once a quarter, is able to issue non-binding warnings and recommendations (addressed to the government, BaFin or the relevant government institution) and addresses the recommendations of the ESRB. The reform also clarified Bundesbank's macroprudential mandate and strengthened the independence of BaFin. Bundesbank is also responsible for verifying the degree of compliance with recommendations and warnings issued.

In the structures of Bank of England in early 2011 a Financial Policy Committee was created, which ran on an interim basis till April 2013. Then it will fully embraced its role in the macroprudential supervision (with a secondary objective - supporting economic policy, including economic growth and employment). FPC task is to identify, monitor and draw attention to the risks to financial stability and suggest preemptive actions. FPC will most likely have direct power to apply macroprudential tools - determining counter-cyclical capital requirements, sectoral capital requirements and leverage ratio. FPC meets at least four times a year and consists of safety net institutions, with the leading role of the Bank of England. Such organization of macroprudential supervision might serve as an example for other EU countries.

Most central banks perform macroprudential supervision through the use of available tools that are of microprudential nature, but their responsibility for macroprudential supervision in many cases needs to be clarified and given formal permission to use macroprudential toolkit. On the other hand, the lack of explicit mandate can result from a conscious decision to leave more flexibility in the choice of tools used and their scope, what can be justified by the changing nature of threats to financial stability. In addition, one can expect an increase of central banks' role in microprudential supervision. EU countries aim at clarifying institutional responsibility for macroprudential supervision (e.g. in 2013 reform plans to strengthen the Czech National Bank role in this regard, establishing Systemic Risk Boards in Denmark, Poland and in Slovenia), according to the third recommendation of the ESRB concerning the macroprudential mandate of national authorities, as the implementation deadline expires on June 30th 2013. Regardless of whether legislators opt for more or less direct involvement of their central banks, they all agree on benefits from the expertise and experience of central banks in this field. Even where macroprudential decisions are not left wholly to the central bank, NCBs are expected to carry out necessary underlying analysis. It is widely recognized that, in order to carry out these new functions, central banks must have improved access to supervisory data, including information on individual financial institutions that are potentially systemically important. Conferring new macroprudential tasks on central banks seems to be an even more natural choice in countries where the central banks have already been carrying out microprudential supervision (see Gluch et al. 2013). Making the mandate explicit will probably also require central banks be given permission to obtain such information and supervisory data (e.g. to prepare macroprudential analysis), not only indirectly from the microprudential supervisor, but directly from the supervised institutions (especially SIFIs). When the central bank is not a



microprudential supervisor, this may be associated with increased reporting burden of financial institutions.

**Table 7. The division of responsibility for macroprudential supervision in the EU 27 central banks**

<b>Central bank is fully responsible for macroprudential supervision</b>	<b>Macroprudential supervision exercised by a council/body composed of safety net institutions</b>	<b>Central bank's macroprudential mandate is not explicitly regulated*</b>
National Bank of Belgium Bulgarian National Bank Central Bank of Cyprus Czech National Bank Danmarks Nationalbank Eesti Pank Suomen Pankki Bank of Greece Banco de España De Nederlandsche Bank Central Bank of Ireland Bank of Lithuania Central Bank of Malta Banco de Portugal National Bank of Romania National Bank of Slovakia Bank of Slovenia Magyar Nemzeti Bank	Banque de France (Financial Regulation and Systemic Risk Council) Sveriges Riksbank (council for cooperation on macroprudential policy) Bank of England (interim Financial Policy Committee)	Oesterreichische Nationalbank Banque Centrale du Luxembourg Bank of Latvia Bundesbank National Bank of Poland Banca d'Italia

\* e.g. central bank is obliged to contribute to the stability of the entire financial system, but does not have the right to use macroprudential tools

Source: own work, as of 30th June 2012.

Basing on the experience of central banks of EU 27, the involvement of central bank in macroprudential supervision can be divided into three criteria (see Table 7). In three countries (France, Sweden and England), a macroprudential supervision is exercised by a body consisting of safety net representatives, and in 18 countries, central banks are solely responsible for macroprudential supervision, while in six their responsibilities also require further clarification, although this division is not clear-cut.

In conclusion, after the outbreak of the financial crisis in mid-2007, followed an increase in the involvement of EU central banks in financial stability, understood as greater participation in macroprudential supervision in the following central banks: Central Bank of Ireland (strengthening of the mandate in 2010), National Bank of Belgium (since March 2011), Bank of England (early 2011), Banque de France (since 2010), Sveriges Riksbank (in early 2012), Bank of Greece and Magyar Nemzeti Bank (strengthening of mandates in 2012), De Nederlandsche Bank (creation of Financial Stability Committee at the end of 2012, comprising of safety net institutions and able to issue recommendations), Bundesbank (in 2013), Central Bank of Malta<sup>18</sup> (2013) and Danmarks Nationalbank (creation of Systemic Risk Council in early 2013).

<sup>18</sup> Also Central Bank of Malta and the MFSA have established a Joint Financial Stability Board (JFSB) and have agreed on a Memorandum of Understanding (MoU) to stipulate clearly the mandate of the Board. The MoU was signed on 25 January 2013, concurrently with the first meeting of the Board.

***Survey: Does the macroprudential oversight have to be within central bank objectives? What would be the benefits? How to formulate the macroprudential mandate?***

Among the surveyed central banks of EA group, one proposes to clarify his macroprudential mandate by granting him right to issue non-binding warnings and recommendations to microprudential supervisor or assigning those functions to new committee consisting of safety net institutions. Many central banks in this group indicate that the institutional framework for macroprudential supervision (at the time of the survey) is subject to review and revision in the context of the aforementioned ESRB recommendation, while clearly indicating the need for the clarification of the mandate, also with the participation of microprudential supervisor. As the main benefit of the reform, some central banks surveyed EA and NEA group point to merging and achieving of synergy effects between micro- and macroprudential supervision "under one roof" i.e. in the central bank, which excludes collective responsibility and dilution thereof. In the opinion of many respondents from both EA and NEA groups, central bank is an indispensable element of macroprudential supervision, but it need not be exclusively central bank's responsibility (yet one central bank in the NEA excludes involvement of other safety net institutions). In turn, two central banks from EA and one from NEA believe that the central bank's obligation to contribute to financial stability already includes serving as macroprudential supervisor, so is not necessary to further clarify the mandate in this context (only organizational changes are needed). Lastly, one respondent in EA group emphasizes that although macroprudential supervision should be granted a central role within central bank's objectives, it ought to be done without interfering with existing objectives, especially ensuring price stability, while the other points out that the optimal roles of different authorities in macroprudential policy depend on the structure of national financial system, legal traditions etc.

***10) Does the central bank have a separate department responsible for analyzing financial stability?***

0 – responsibility for financial stability function is shared within separate departments or there is a small organizational unit devoted to this function

1 - there is a separate department or financial stability plays a predominant role in the department, although there are also other, complementary divisions

Creating a separate department responsible for financial stability analysis (as opposed to having only a small team or a lack of explicit organizational allocation of this function) can be seen as an evidence of central bank's awareness of the scale of the responsibility for financial stability. There is no doubt that allocating more (human) resources will allow central bank to pursue a more advanced analysis and stress testing. As a result, it will have the necessary knowledge about broader dimensions of financial system stability and be able to better identify vulnerabilities in financial system and adequately respond to threats to financial stability. An overview of approaches to internal organization of the financial stability function of central banks can be found in Spicka (2009).

Out of 27 EU central banks<sup>19</sup>, 22 of them met the criterion, i.e. in their structures existed a financial stability department, solely responsible for this function or with divisions with complementary

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<sup>19</sup> According to *World Bank Bank Regulation and Supervision Survey* (see Čihák et al 2012b), in terms of having a dedicated department that oversees financial stability and of producing a financial stability report, EMDEs seem ahead of advanced economies. About three-quarters of respondents from EMDEs reported having specialized

functions<sup>20</sup> (e.g. microprudential supervision at the Banco de Portugal and National Bank of Slovakia), although the division was not always clear-cut. A good example is the structure of the financial stability department at the National Bank of Romania (as well as at the Bank of England), which integrates in one place analysis of individual institutions with the analysis for macroprudential purposes and payment infrastructure oversight, which allows achieving synergies between these functions. The other five central banks failed to meet the established criterion, such as organizational structure in the Banca d'Italia, where there is only a small unit responsible for financial stability and in the Bank of Latvia where financial stability division is only a part of a larger monetary policy department.

One may suspect that central banks were also establishing internal committees (consisting of the heads of major organizational units) aiming at: exchange of information and systemic risk analysis (a discussion forum), working with the ESRB (and national safety net institutions), comparison of the financial stability assessment from different perspectives (which may be regarded as particularly valuable), providing opinions and proposing macroprudential measures to be taken by the central bank, including the necessary legislative changes in this area. In January 2011 in the structures of NBP, a Systemic Risk Committee was also created, the purpose of which is to formulate opinions and recommendations to the high-level bodies of the NBP in the field financial stability. It is possible that after the crisis, changes in the organizational structure at central banks gained momentum, which is also accompanied by the formation of various bodies and forums for cooperation between safety net institutions. They are most of the times chaired by Minister for Finance, which however, may raise doubts regarding the independence of central bank. If the central bank was also responsible for microprudential supervision, organizational changes may have occurred earlier, because of the need to improve the rules, structures and weakness of hitherto supervision. The pace of such changes might have been accelerated also in countries where the financial crisis was particularly acute.

#### ***Survey: What is the best organizational solution for financial stability issues?***

The majority of central banks surveyed in EA and NEA groups have a separate department (larger organizational unit) responsible for fulfilling the function of contributing to financial stability and its analysis. More than half of the respondents from NEA group believe that the current organizational structure is sufficient. A few central banks in both groups further emphasized that the work of a single financial stability department is nevertheless supported by means of internal cooperation during the high-level meetings or interdepartmental committees. Most central banks of the EA group argue that there is no optimal organizational structure and a lot depends on the specificity of central bank mandate and its scope in the given country but more research and analysis is needed on the experiences of different countries. In summary, central banks pointed out in the survey that both organizational solutions can be efficient i.e. having a dedicated department or coordinating financial stability work between separate departments. Some (e.g. smaller) central banks may refrain from having a separate department due to costs. Nevertheless, while macroprudential mandates of central banks are being strengthened, this may induce them to create a separate department for financial stability analysis.

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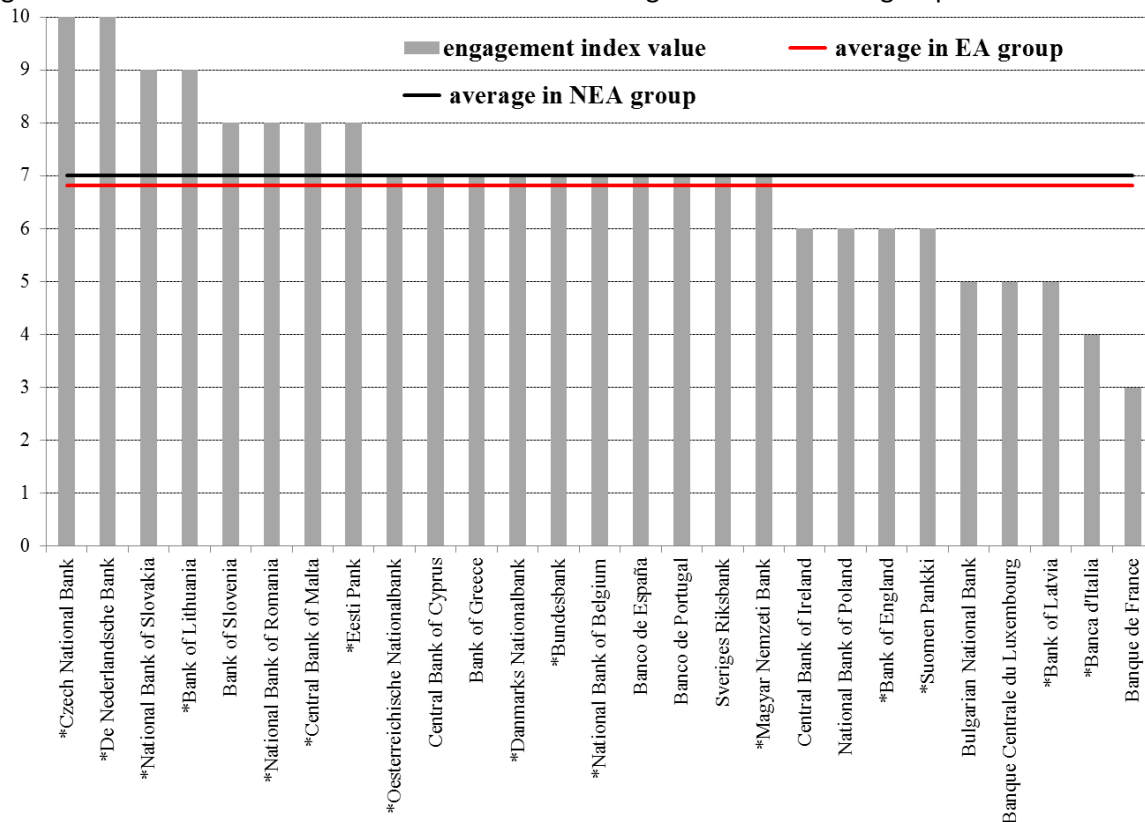
departments in their agencies dealing with financial stability and systemic supervision, while only 44 percent of respondents from advanced economies did so.

<sup>20</sup> As non-complementary functions author considers, as in the case of Danmarks Nationalbank, combination of financial stability with foreign reserves and public debt management.

## 5. Analysis of “Financial Stability Engagement Index” - Results

Aggregating 10 abovementioned criteria results in giving each central bank a score on a scale from 1 to 10 i.e. the final value of the “financial stability engagement index” (the higher the index value, the greater the engagement). Figure 4 shows that the average index value for the EA group (6.82) is slightly lower than for NEA countries (7 points), which allows to state that (given the criteria) it is not true that central banks in the euro area are on average more involved in taking care of financial stability than non-EMU central banks.

Figure 4. Index values for EU 27 central banks and averages for EA and NEA groups



\* indicates that the central bank replied to the survey

Source: own work, as of 30th June 2012.

The highest index value in the group EU 27 is 10 points, while no central bank obtained the score of less than 3 points. Values of each component for each of the EU 27 central banks are listed in Table 10. According to index values, central banks can be divided into 3 groups namely:

- high degree of engagement, with index values of 8-10 points - eight central banks (5 from EA group and 3 from NEA group),
- average degree of engagement, with index value of 7 points - ten central banks (7 in EA group and 3 in NEA group),
- low degree engagement, with index values of 3-6 points - nine central banks (5 in group EA and 4 in NEA).

In assessing the degree of index values' variation between the analyzed groups (see Table 8), coefficient of variation points out that it is rather small (23.9% for EU 27), which may support the conclusion that central banks of 27 EU countries are not characterized by strong differences in the degree of involvement in the care of financial stability.

In EA group (see Figure 5), the highest index value received De Nederlandsche Bank (10 points) and National Bank of Slovakia (9 points), both significantly above average. The lowest index value was assigned to the following:

- Banque de France (3 points), among others as a result of not publishing a typical FSR, not conducting and publishing the methodology of stress tests, FSIs, financial stability index and not having a separate financial stability department,
- Banca d'Italia (4 points), among others due to the lack of having its own financial stability definition, not conducting and publishing the methodology of stress tests, FSIs and financial stability index.

In the NEA group (see Figure 6), the highest index value received Czech National Bank (10 points) and the Bank of Lithuania (9 points) – also significantly above average. In the NEA group, the lowest index values can be observed in case of:

- Bank of Latvia (5 points), among others as a result of lack of explicit financial stability mandate, lack of financial stability definition, lack involvement in microprudential supervision and not having a separate financial stability department,
- Bulgarian National Bank (5 points), among others due to absence of the financial stability definition, not calculating FSIs nor having financial stability index and the absence of conducting regular stress tests along with the publication of their results and methodology.

The analysis of average values of index components (based on the arithmetic mean) of EA and NEA groups (see Figure 7 and Table 9), leads to following conclusions:

- the degree of involvement in carrying out and publishing the results and methodology of stress tests is on average higher in NEA group (0.8 points), than in EA group (0.47 points),
- the degree of involvement in the microprudential supervision is on average higher in EA (0.71 points), than in NSE group (0.4 points), which may partly reflect the reasoning that central banks in EA group increased involvement in the microprudential supervision results from losing their autonomy in monetary policy, though one should be aware that also political factors play an important role in the allocation of this function.

Both in EA and NEA group, the highest average component values (1 point) were observed in payment system oversight criterion. In addition, in the EA group component with the highest average is the one concerning having own financial stability definition (0.88 points), while in the NEA group it is publication of FSR (0.9 points). The lowest average values in the EA group received component concerning having own financial stability index (0.24 points) and calculation of FSIs (0.35 points), as in the NSE group (correspondingly 0.4 points and 0.3 points), in which also average level of participating in microprudential supervision was low (0.4 points).

In order to investigate the relationship between transparency, and the degree of central bank's involvement in financial stability, author's index values are compared with the current values of the Financial Stability Transparency Index by Horváth and Vaško (2012) - see Figure 8. Although the correlation coefficient is 0.545796, this does not support the conclusion that the degree of central bank's involvement in financial stability and its degree of transparency in this field are interrelated, i.e. increased involvement can usually be reflected in the increased in transparency. The similarity in the construction of the two indices is too significant to reach such conclusion. When examining the possible occurrence of self-selection bias, among EU 27 central banks, it can be observed that the average index value among those who replied to the survey (7.38 points) is slightly higher than among those who did not (6.18 points). As computing engagement index is possible without the use of survey, this may lead to conclusion that the more central bank is, on average, involved in financial stability (higher value of the engagement index), the more transparent it is (as evidenced by replying to the survey).

Index components are not entirely separable, and it is difficult to strictly limit the scope of central bank's involvement. One can suspect that the assessment of individual components is dependent on each other e.g. a central bank, which publishes FSR has its own definition of financial stability (which is included in this report). In addition, the legal basis for financial stability mandate may refer to the responsibility for safe and efficient functioning of payment system. In addition, a central bank publishing FSR may have a separate financial stability department, tasked with preparing it. Similarly, acting as a microprudential supervisor, most likely created a need for a separate financial stability department. Assessment of the correlations among index components' values and an attempt to identify the factors causing these relationships on the basis of survey results, are presented in this section.

While the high level of correlation does not clearly imply causation and relationships between index components, but it still may potentially confirm an intuitive relationship. Analysis of the correlation coefficient values<sup>21</sup> (see correlation matrices in Tables 11, 12 and 13) between different index components leads to the following conclusions:

- EU 27 central banks have an average level of correlation (0.5) between the publication of FSR, and the conduct and publication of stress tests results (correlation is stronger in the NEA group, i.e. 0.67), which may potentially confirm that the publication of FSR (starting to publishing) may be partly motivated by the presentation of the stress tests results as part of financial stability analysis;
- in NEA group there is an above average negative correlation (-0.61) between central bank having financial stability mandate and creating an financial stability index to measure it, which can potentially support the view of central banks in the NEA group, that financial stability (unlike price stability), need not be given a quantitative dimension (this correlation is not visible in the EA group);
- there is an above average correlation (0.67) in the NEA group that can potentially confirm view that publishing FSR (starting to do it) was associated with the need to adopt own financial stability definition (this is not evident in the EA group);
- there is an above average negative correlation (-0.61) in the NEA group between having an financial stability index and establishing financial stability department (this is not evident in the EA group);

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<sup>21</sup> In this paragraph, only those correlation coefficients, which passed significance tests (t-distribution, degrees of freedom N - 2, alfa 0.05) are analyzed.

- the results does not warrant stating that in either group, there was a significant correlation between the publication of FSR and the existence of a separate financial stability department, which may indicate that the publication of FSR may be the result of collective effort of separate divisions/department and efficient coordination of activities must not be less effective than the creation of FSR by a single organizational unit;
- the results does not warrant stating that if the central bank does not serve as microprudential supervisor (does not have direct access to supervisory data), than it does not perform stress tests.

Comparison of engagement index values with other variables<sup>22</sup> (see Figures 9, 10, 11, 12 and 13) i.e. to the average level and rate of growth of GDP p.c. (PPP, 1999-2011), average annual inflation in this period (HICP) for the EU 27 countries, leads to conclusion that there is no strong correlation between those variables. Correlation coefficients equal -0.24 for the level of GDP p.c., 0.19 for GDP p.c. growth rate and 0.14 for inflation, which does not support the potential causality between those variables and index value. Similarly, when comparing the index with assets of MFIs in relation to GDP (2011) and used amounts of aid to financial institutions in the years 2008-2010 (in % of GDP, 2010) - the correlation coefficients are here also inconclusive (correspondingly -0.26 and -0.24). However, a more profound analysis of causality and determinants of engagement index values would require further studies with the use of econometric methods (e.g. constructing a logit or probit model) and calculating it in terms of continuum, rather than within the current point-in-time approach.

## 5. Comparison of Results with Previous Studies

Because of differences in scope (see Table 1) between previous studies in the literature, the comparability of conclusions arising from this study should be treated with caution.

Currently, more central banks have their own definition of financial stability, than it was found by Oosterloo and de Haan (2003). Also, central banks to a wider extent base their financial stability involvement on a clear mandate, than on payment system oversight function as it was the case for some central banks, as evidenced by Healey (2001). Just as in Oosterloo and de Haan (2003), still in majority of central banks, their financial stability mandate in the legal basis is not specified explicitly, i.e. terms “caring”, “support”, “provide”, “contribute” etc. are used. Comparing with Oosterloo and de Haan (2003), number of FSRs published by central banks (in the EU 27) went up. Also, to a greater extent, than indicated in Oosterloo and de Haan (2003), central banks in the EU currently create separate departments and organizational units responsible for financial stability, which may indicate an increase in their role in this regard.

Author’s study confirms the conclusions of S. Ingves Report, that there is still a need to clarify central bank’s financial stability mandate, particularly in relation to macroprudential responsibilities and tools at their disposal (such as counter-cyclical capital buffer). Author’s study confirms to some extent (partly visible in the NEA group) conclusion from S. Ingves Report that effective supervision on both micro and macro level may result from their joint allocation in a central bank. This study only to a limited extent (in the NEA group) confirms the findings of J. Viñals Report that macroprudential mandate is understood as synonymous with financial stability mandate (e.g. care for the stability of the entire financial system).

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<sup>22</sup> None of the correlation coefficients in this paragraph has passed the significance test (t-distribution, degrees of freedom N - 2, alfa 0.05).

Study of correlations based on the analysis of FSRs made Čihák (2006a) points to its high level between publishing FSR and having a separate department responsible for financial stability (0.91), but in this study, in each of the selected groups, such correlations are rather weak and not significant. In turn, as in the study by Čihák (2006a), also in author's study, the correlation between publishing FSR and having the financial stability mandate is negligible. Moreover, the correlation between FSR publication and performing microprudential supervision, is low and negative in both studies, although in the author's NEA group slightly stronger (-0.41), yet insignificant.

## **6. Policy Implications**

As far as policy implications are concerned, central banks should strive to increase their engagement in contributing to financial stability. Beyond the forms limited to the construction of the index, central banks would benefit as financial stability efforts would:

- make them “better equipped” to analyze stability of national financial system,
- allow them to identify more efficiently growing imbalances that may lead to systemic risk,
- allow them to more precisely choose (calibrate) adequate preventive and reactive tools,
- allow them to achieve synergy effects between micro and macro prudential supervision,
- increase the role of central bank (e.g. making it responsible not only for issuing recommendations in FSR, but also implementing them) and reduce risk of shifting responsibility for financial stability within safety net institutions (limiting inaction bias).

In order to contribute to financial stability, as defined in the paper, it would help if central bank was engaged in the form of proposed index components (see Table 14). Of course this is not a tick-box list of central bank's actions, rather an indication and an attempt to join aspects of the definition with sample forms of engagement in a practical manner. Nevertheless, such allocation of engagement forms is not clear-cut since many of them overlap e.g. in order to issue FSR, central bank has to perform financial stability analysis which is likely to involve computing FSIs. Productivity of central bank's work towards financial stability, in terms of engagement index components, can be measured by e.g. number of FSR/stress tests produced per year, although it is the quality not just quantity of stress tests that matters. However, one should bear in mind that not all index components can be completely and directly influenced by the central bank. The fulfillment of components 2-6 and 10 to a significant extent depends on actions taken by the central bank, while the remaining four central bank can influence in a more limited and indirect way.



**Table 14. Financial stability definition and corresponding sample forms of central bank's engagement**

Elements of author's financial stability definition	Proposed sample forms of central bank's engagement based on index components
the system fulfills its functions properly	3 (produce FSIs), 4 (produce an aggregated index), 6 (issue FSR), 7 (payment system oversight), 9 (conduct macroprudential policy)
accumulation of systemic risk or macro-financial imbalances is limited	3 (produce FSIs), 4 (produce an aggregated index), 6 (issue FSR), 7 (payment system oversight), 9 (conduct macroprudential policy)
it is resistant to shocks (both internal and external)	5 (conduct stress tests), 7 (payment system oversight), 8 and 9 (conduct micro- and macroprudential supervision)
it possesses the ability to restore its functioning on its own	3 (produce FSI), 4 (produce an aggregated index), 5 (conduct stress tests), 6 (issue FSR), 8 and 9 (conduct micro- and macroprudential supervision)
transfer of negative impulses within the system and between the financial system and the real economy is limited	3 (produce FSI), 4 (produce an aggregated index), 6 (issue FSR), 9 (conduct macroprudential policy)

Source: own work.

One can also provide other practical guidelines for central banks' (especially for nonsupervisory ones) fulfillment of the financial stability mandate, increasing their involvement in fostering financial stability, beyond fulfilling all index criteria. A central bank therefore should (see also Davies and Green 2010):

- develop a robust set of indicators of financial stress that will act as the underpinning of a frank and pointed FSR, as well as elaborate an aggregated financial stability index to measure condition of the financial system as a whole,
- coordinate its work closely with the IMF, FSB, BIS and the other central banks in systemically important centers,
- seek market intelligence from both regulated and unregulated firms,
- regularly assess the opportunities for regulatory arbitrage (a function that is much harder for supervisors, with their inevitable focus on regulated firms, to perform) thereby limiting risks arising from *shadow banking*,
- develop its own list of systemically important financial institutions, whether regulated or not, and regularly debate that list with the line supervisors,
- ensure that wholesale markets are resilient to the failure of a major counterparty, including, for example, settlement arrangements for OTC derivatives, collateral arrangements in repo markets, or margining practices,
- feed its views on financial-sector stresses into the monetary policy process; if there is no link between monetary and financial stability, the argument for a formal financial stability role for the central bank is much reduced; so stresses in the financial system, "excess" growth of credit, and the inflation of asset price bubbles need to be seen as political justification for changes in interest rates or use of targeted macroprudential tools,
- make use of wealth of payment system data to analyze potential contagion effects on the interbank market e.g. using network analysis (since as an overseer it has a unique access to such data),
- work out a sound legal and institutional basis as well as clearly defined tools for macroprudential policy,

- regularly publish stress tests results and elaborate them in FSR,
- establish an effective framework for systemic risk monitoring and prevention.

## 7. Conclusions

This study cannot confirm the thesis that central banks in the euro area are on average more involved in taking care of the financial stability than non-EMU central banks in the EU. Also central banks in EU 27 countries are not characterized by strong differences in the degree of involvement in the care of financial stability. The vast majority of central banks have explicitly given (in the legal act/statute) financial stability mandate and have their own definition of financial stability, which is placed in the (first issues of) FSR or on websites. In the survey, some central banks pointed to a sufficient extent of the mandate, while also to the need to extend it with a clearly specified macroprudential mandate. Similarly, the vast majority have in their structure a financial stability department, solely responsible for this function or as a shared task with other departments. Many surveyed central banks stressed that there is no optimal organizational structure to carry out tasks related to financial stability and much depends on national characteristics and scope of the mandate. Having a separate department is sufficient and can be supplemented by an inter-departmental cooperation. Typically, central banks in the EU, understand the term “financial stability” as financial system fulfilling its functions properly, even in case of adverse shocks. On the other hand, too little attention is paid to risks that may arise from the build-up of asset bubbles and adverse impact of financial system’s instability on the real economy (and vice versa). According to the respondents, scope of the financial stability definition may partly determine its analysis, but lack of precise definition allows central bank to have the necessary flexibility in its analysis and identify potential, yet unknown sources of (systemic) risk.

The survey also shows that few central banks calculate and publish FSIs regularly (according to IMF or ESCB methodology). Among responding central banks, most of them fulfill reporting obligations to the IMF for the purpose of calculating FSIs, but opinions on the usefulness of IMF’s FSIs (or calculated on the basis of central bank’s own methodology) for financial stability analysis are varied. There is a growing demand for further development of indicators for macroprudential policy purposes. Also, only a few central banks have their own financial stability index, which serves as the operational dimension of financial stability definition. Central banks surveyed also have mixed opinion on the need of such a measure – only in some of them its construction is actively pursued. At the same time others argue that financial stability analysis should take into account data from multiple sources and relying on a single index has its drawbacks. Just over half of the EU 27 central banks carry out and publish the results of stress tests on a regular basis (on average central banks of NEA group do it more often, than ones in EA group). Central banks that replied to the survey indicated that in addition to stress tests which results are published, they also conduct their own for internal purposes only. Stress tests are seen as very important, but not the only method of analyzing financial sector’s resilience and condition. Some respondents emphasize that they can serve as a complementary tool for ongoing monitoring of financial institutions. At the same time more than half of the EU 27 central banks are also involved in microprudential supervision over banking sector or the whole financial system. The central banks in EA group on average are more often assigned microprudential supervision responsibilities, than central banks in NEA group. Most central banks highly value a clear division of tasks/responsibilities and cooperation within in the safety net in case of microprudential supervision. Moreover, most did not consider it necessary to expand their current level of involvement in this type of supervision, although some pointed to the obvious benefits associated with it.

Almost all EU 27 central banks publish FSR (once or twice a year - no dominant frequency), but there is no connection between publication of the FSR for the first time and the date euro zone entry - the average time of first FSR publication is almost 2.5 years after the euro zone entry. As reasons for publishing FSR, most mention raising awareness of the risks and threats to financial stability and influencing/correcting behavior of economic agents through recommendations contained in the FSR. In the case of involvement in payment system oversight, all central banks in the EU27 are responsible for promoting its safe and smooth operation. Central banks surveyed also considered that the assessment of payment system functioning (the potential transmission channel for contagion effect) as an important part of assessing the stability of the financial system. Similarly, payment system data serve as a valuable source for analysis of interconnectedness among participants and network analysis (see ECB 2010a). In the EA group, the highest score received criterion concerning having a financial stability mandate, while in the NEA group it was the one reflecting the fact of publishing FSR. In turn, criteria met to the lowest degree include: having a financial stability index (group EA) and the calculation of FSI (both in EA and NEA groups). In case of macroprudential supervision, the degree of central banks' involvement is not transparent enough and it is difficult to determine clearly the criteria for their participation in this type of supervision. Therefore their mandate, as well as the range of tools and their disposal need to be clarified. Also, many central banks in the survey argued that the institutional division of responsibility for macroprudential supervision at the time of the study was subject to review and revision as a result of i.a. ESRB Recommendation (on the macroprudential mandate of national authorities) and clearly stressed the need for its clarification and strengthening. According to some respondents, central bank is an essential element of the macroprudential supervision, but need not be the only one.

On the basis of criteria that were used to construct the financial stability engagement index, most involved in taking care of financial stability are: De Nederlandsche Bank (10 points), Czech National Bank (10 points), National Bank of Slovakia (9 points) and the Bank of Lithuania (9 points), while least - Banque de France (3 points) and Banca d'Italia (4 points). Especially in the EA group one can observe positive correlation between central banks having their own financial stability definition (which testifies the awareness of its role) and devoting more human resources to fulfill this function by creating a separate financial stability department. In addition, in EU 27 central banks (particularly among NEA group), results show correlation confirming potential relationship that publication of the FSR (starting publishing it) may be partly motivated by presentation of stress tests results as one element of the analysis of the national financial system contained in FSR. In the NEA group, the correlation analysis may also support the view that the need to adopt own definition of financial stability was associated with the start of FSR publication. There were also no strong correlations between index values and GDP p.c., inflation, assets of MFIs in relation to GDP or used amounts of aid to financial institutions in relation to GDP. However, further examining the determinants of engagement index, in order to reach conclusive conclusions, requires in-depth quantitative studies, which constitutes a further research area, which may also include:

- analyzing (including calculation of the engagement index) a wider range of central banks' experiences in stabilizing financial system e.g. in emerging economies, in Asia, Africa, in the area of Islamic banking,
- analyzing the range of tools (and their effectiveness) that central banks have/need for conduct of macroprudential policy (including development of new ones),
- development of institutional models for macroprudential policy and methods of optimal coordination with monetary and fiscal policy,
- development of an interdisciplinary approach to analysis of financial stability such as network analysis to examine contagion effects,

- work out methods of effective identification of SIFIs and reducing risk to the financial system arising from their functioning,
- search for new sources of data and information needed to identify systemic risks.

The author expects that the engagement index value in the future will go up, along with the currently planned (at the time of evaluation) and future reforms aiming at increasing central bank's role in contributing to financial stability. However one cannot exclude the possibility that index values for particular central banks will decrease as e.g. in the case of separating microprudential supervision from Bank of England in the early twenty-first century (FSA began operation on 1<sup>st</sup> Dec. 2001) or bringing it back ( from April 2013). The drop in index value may also result from the behavior of central banks themselves (e.g. Bank of Greece published FSR for the period 2009-2010, and then it was discontinued). In case of challenges, especially in the EU, the creation of Single Supervisory Mechanism (SSM) under the aegis of ECB might bring benefits for financial stability, yet it also entails many potential risks and is unlikely to effectively mitigate negative feedback loops between sovereigns and banks, nor be sufficient to restore trust in the financial system in the EU in the short run. The effectiveness of task division between ECB and national central banks participating in the SSM and of the whole mechanism, as well as impact on national central banks role in contributing to financial stability remains to be seen (see also Beck ed. 2012).

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## TABLES AND FIGURES

Table 8. Basic statistics for the analyzed groups

	EA	NEA	EU 27
<b>maximum</b>	10	10	10
<b>minimum</b>	3	5	3
<b>median</b>	7,0	7,0	7
<b>arithmetic mean</b>	6,82	7,00	6,89
<b>standard deviation</b>	1,70	1,69	1,65
<b>coefficient of variation</b>	25,0%	24,1%	23,9%
<b>number of observations</b>	17	10	27

Source: own work, as of 30th June 2012.

Table 9. Index components' average levels

	EA	NEA	EU 27
<b>c1</b>	0,88	0,80	0,85
<b>c2</b>	0,76	0,80	0,78
<b>c3</b>	0,35	0,30	0,33
<b>c4</b>	0,24	0,40	0,30
<b>c5</b>	0,47	0,80	0,59
<b>c6</b>	0,82	0,90	0,85
<b>c7</b>	1,00	1,00	1,00
<b>c8</b>	0,71	0,40	0,59
<b>c9</b>	0,76	0,80	0,78
<b>c10</b>	0,82	0,80	0,81

Source: own work, as of 30th June 2012.



Table 10. Financial stability engagement index and values of its components in EU 27 central banks

	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10	Financial stability engagement index
Czech National Bank	1	1	1	1	1	1	1	1	1	1	10
De Nederlandsche Bank	1	1	1	1	1	1	1	1	1	1	10
Bank of Lithuania	1	1	1	0	1	1	1	1	1	1	9
National Bank of Slovakia	1	1	0	1	1	1	1	1	1	1	9
Central Bank of Malta	1	1	1	0	1	1	1	0	1	1	8
National Bank of Romania	1	1	0	0	1	1	1	1	1	1	8
Bank of Slovenia	1	1	0	0	1	1	1	1	1	1	8
Eesti Pank	1	1	1	0	1	1	1	0	1	1	8
Oesterreichische Nationalbank	1	1	0	0	1	1	1	1	0	1	7
National Bank of Belgium	1	1	0	0	0	1	1	1	1	1	7
Central Bank of Cyprus	1	1	1	0	0	0	1	1	1	1	7
Danmarks Nationalbank	1	1	0	1	1	1	1	0	1	0	7
Bank of Greece	1	1	0	1	0	0	1	1	1	1	7
Banco de España	1	1	0	0	0	1	1	1	1	1	7
Bundesbank	0	1	1	0	1	1	1	1	0	1	7
Banco de Portugal	1	1	0	0	0	1	1	1	1	1	7
Sveriges Riksbank	0	1	0	1	1	1	1	0	1	1	7
Magyar Nemzeti Bank	1	1	0	0	1	1	1	0	1	1	7
Suomen Pankki	1	0	0	1	0	1	1	0	1	1	6
Central Bank of Ireland	1	0	0	0	1	1	1	1	1	0	6
National Bank of Poland	1	1	0	0	1	1	1	0	0	1	6
Bank of England	1	1	0	0	0	1	1	0	1	1	6
Bulgarian National Bank	1	0	0	0	0	0	1	1	1	1	5
Banque Centrale du Luxembourg	1	0	1	0	0	1	1	0	0	1	5
Bank of Latvia	0	0	1	1	1	1	1	0	0	0	5
Banca d'Italia	1	0	0	0	0	1	1	1	0	0	4
Banque de France	0	1	0	0	0	0	1	0	1	0	3
Frequency	23	21	8	8	16	23	27	16	21	22	

EA group members

Source: own work, as of 30th June 2012.

Table 11. Correlation matrix between index components - EU 27 group

	<b>c1</b>	<b>c2</b>	<b>c3</b>	<b>c4</b>	<b>c5</b>	<b>c6</b>	<b>c7</b>	<b>c8</b>	<b>c9</b>	<b>c10</b>
<b>c1</b>	1,00									
<b>c2</b>	0,03	1,00								
<b>c3</b>	-0,15	0,00	1,00							
<b>c4</b>	-0,19	-0,04	0,06	1,00						
<b>c5</b>	-0,13	0,28	0,27	0,21	1,00					
<b>c6</b>	0,12	0,03	0,07	0,04	0,50	1,00				
<b>c7</b>	:	:	:	:	:	:	1,00			
<b>c8</b>	0,29	0,10	-0,05	-0,12	-0,07	-0,13	:	1,00		
<b>c9</b>	0,28	0,36	-0,19	0,15	-0,08	-0,22	:	0,10	1,00	
<b>c10</b>	0,34	0,43	0,13	-0,11	-0,01	0,07	:	0,19	0,20	1,00

Source: own work, as of 30th June 2012.

Table 12. Correlation matrix between index components – EA group

	<b>c1</b>	<b>c2</b>	<b>c3</b>	<b>c4</b>	<b>c5</b>	<b>c6</b>	<b>c7</b>	<b>c8</b>	<b>c9</b>	<b>c10</b>
<b>c1</b>	1,00									
<b>c2</b>	-0,20	1,00								
<b>c3</b>	-0,11	0,12	1,00							
<b>c4</b>	0,20	-0,02	-0,12	1,00						
<b>c5</b>	-0,02	0,25	0,29	0,03	1,00					
<b>c6</b>	0,31	-0,26	0,02	-0,11	0,44	1,00				
<b>c7</b>	:	:	:	:	:	:	1,00			
<b>c8</b>	0,16	0,25	-0,33	0,05	0,09	0,04	:	1,00		
<b>c9</b>	0,23	0,35	-0,17	0,31	-0,03	-0,26	:	-0,05	1,00	
<b>c10</b>	0,31	0,47	0,34	0,26	0,13	0,19	:	0,04	0,11	1,00

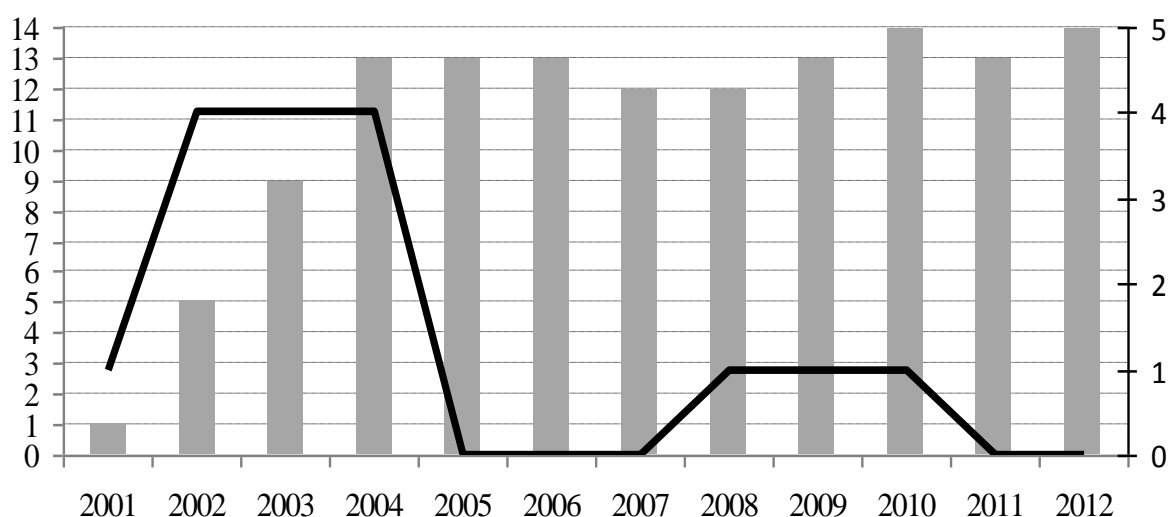
Source: own work, as of 30th June 2012.

Table 13. Correlation matrix between index components – NEA group

	c1	c2	c3	c4	c5	c6	c7	c8	c9	c10
c1	1,00									
c2	0,38	1,00								
c3	-0,22	-0,22	1,00							
c4	-0,61	-0,10	0,36	1,00						
c5	-0,25	0,38	0,33	0,41	1,00					
c6	-0,17	0,67	0,22	0,27	0,67	1,00				
c7	:	:	:	:	:	:	1,00			
c8	0,41	-0,10	0,36	-0,25	-0,10	-0,41	:	1,00		
c9	0,38	0,38	-0,22	-0,10	-0,25	-0,17	:	0,41	1,00	
c10	0,38	0,38	-0,22	-0,61	-0,25	-0,17	:	0,41	0,38	1,00

Source: own work, as of 30th June 2012.

Figure 1. The number of central banks publishing FSR in the EA group (bars, cumulative, left axis) in 2001-2012 and number of new FSR publications started (line chart, right axis)



Source: own work, as of 30th June 2012.

Figure 2. The number of central banks publishing FSR in the NEA group (bars, cumulative, left axis) in 1996-2012 and number of new FSR publications started (line chart, right axis)

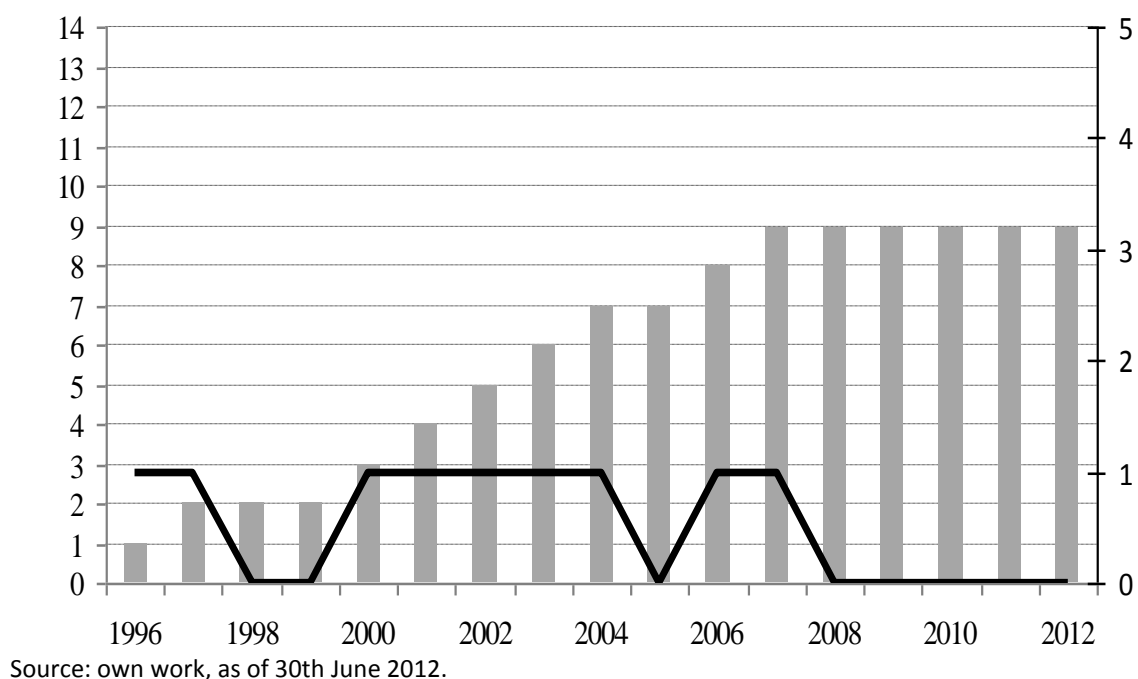


Figure 3. The number of central banks publishing FSR in the EU 27 (bars, cumulative, left axis) in 1996-2012 and number of new FSR publications started (line chart, right axis)

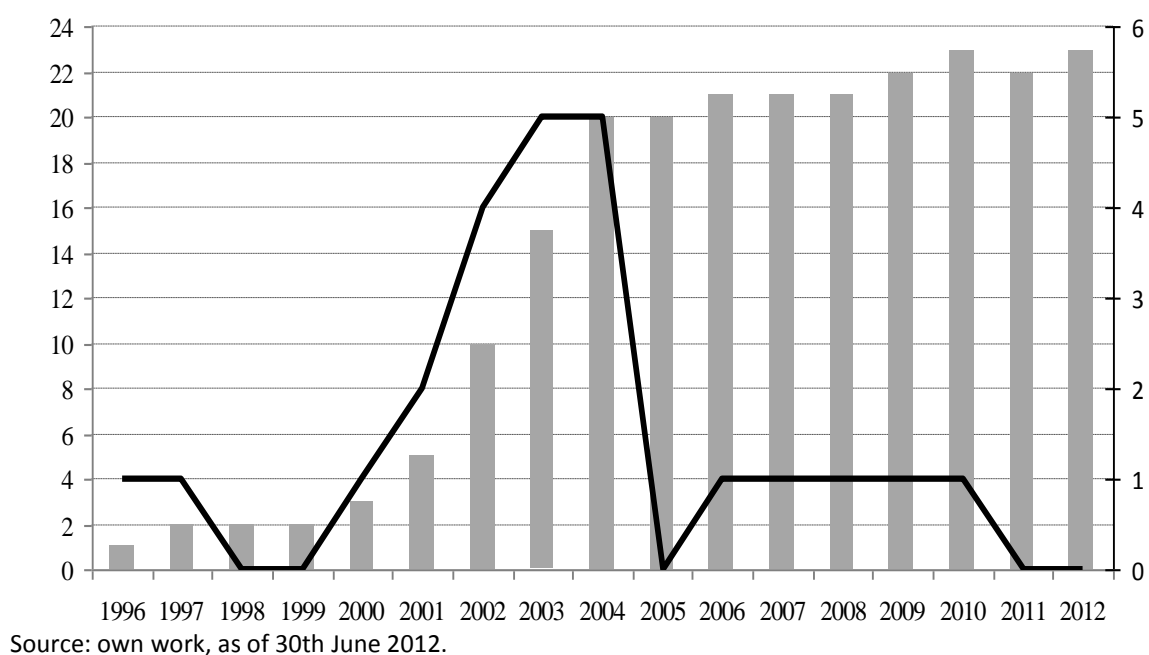
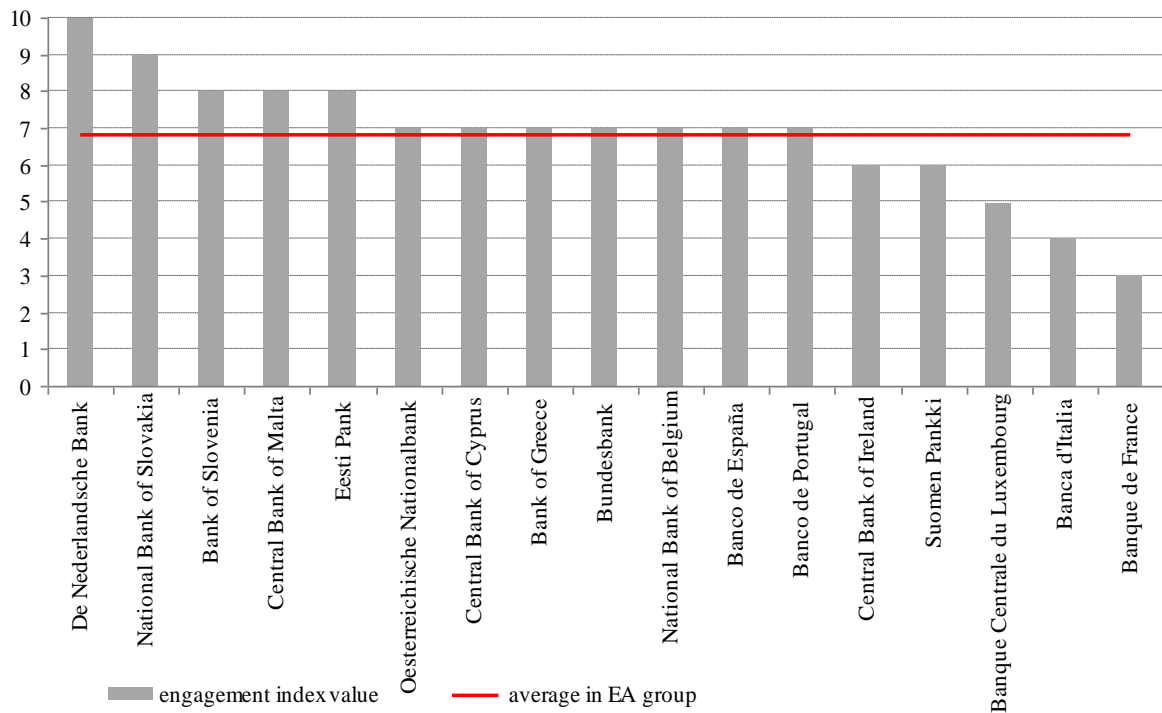
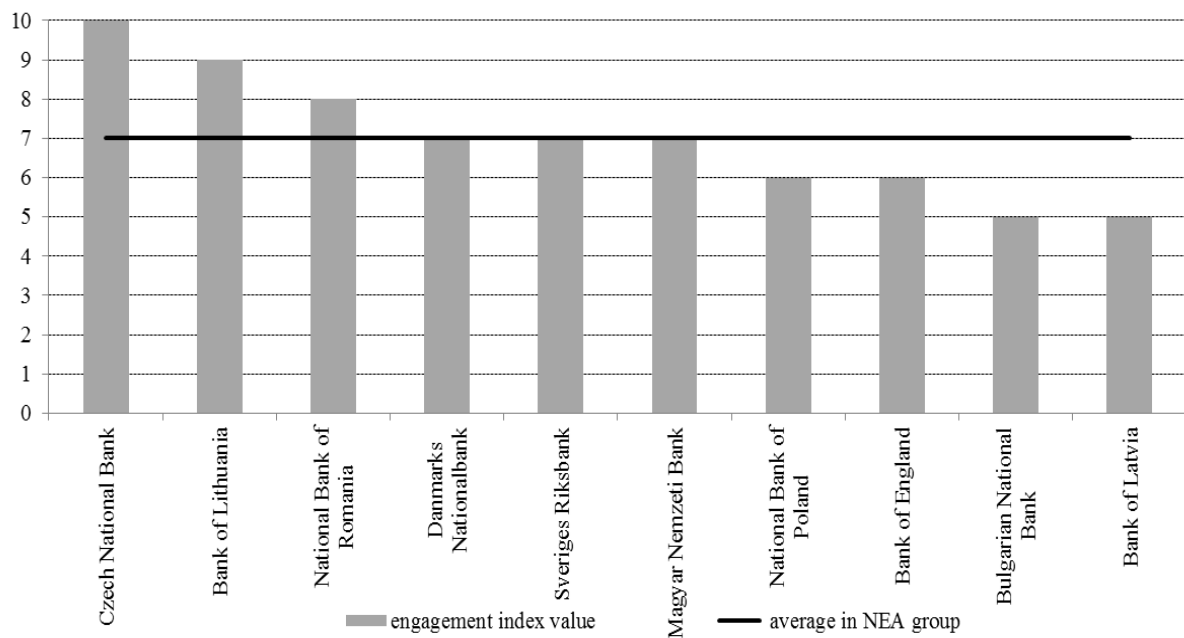


Figure 5. Index values and its average level in the EA group



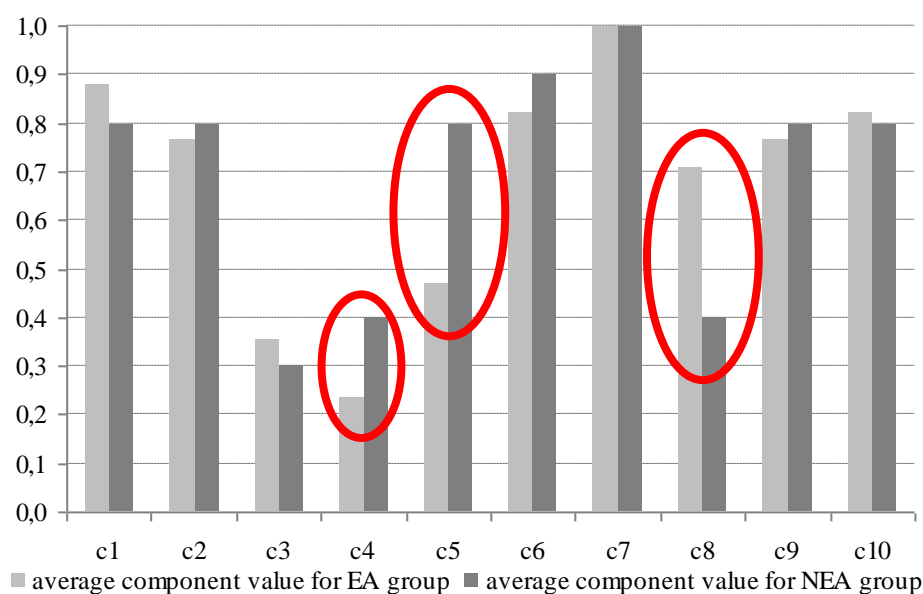
Source: own work, as of 30th June 2012.

Figure 6. Index values and its average level in the NEA group



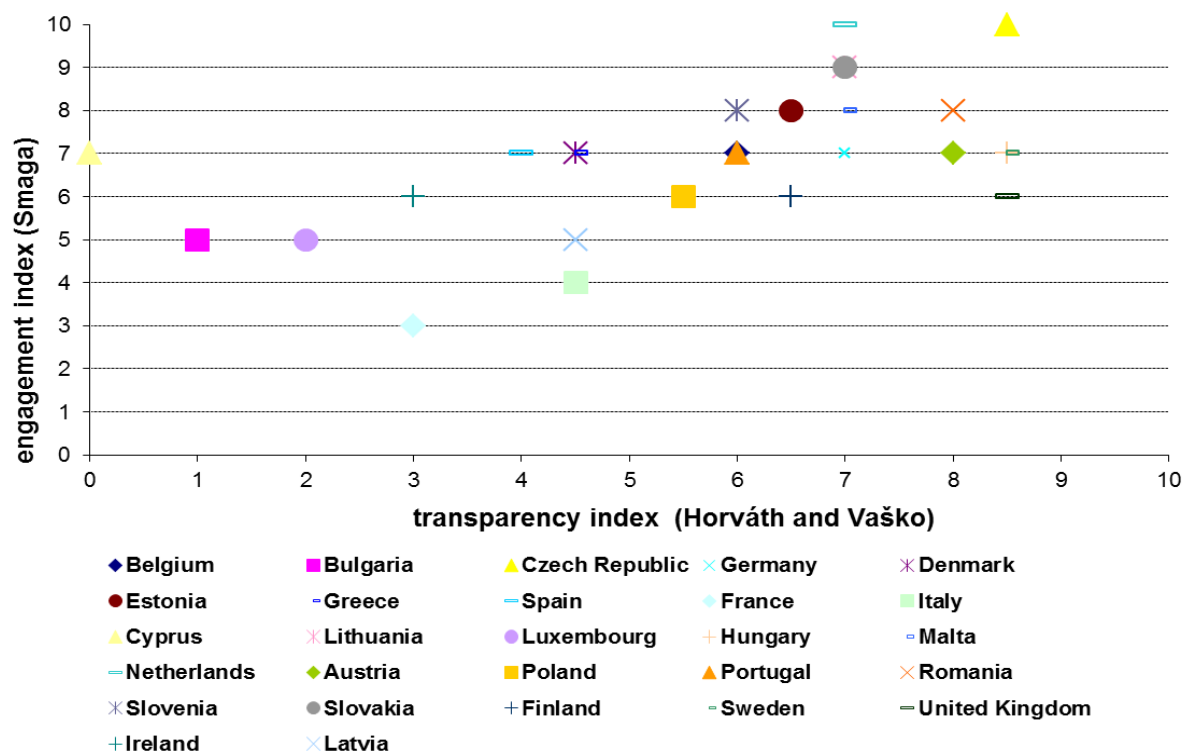
Source: own work, as of 30th June 2012.

Figure 7. Average values of index components in EA and NEA groups



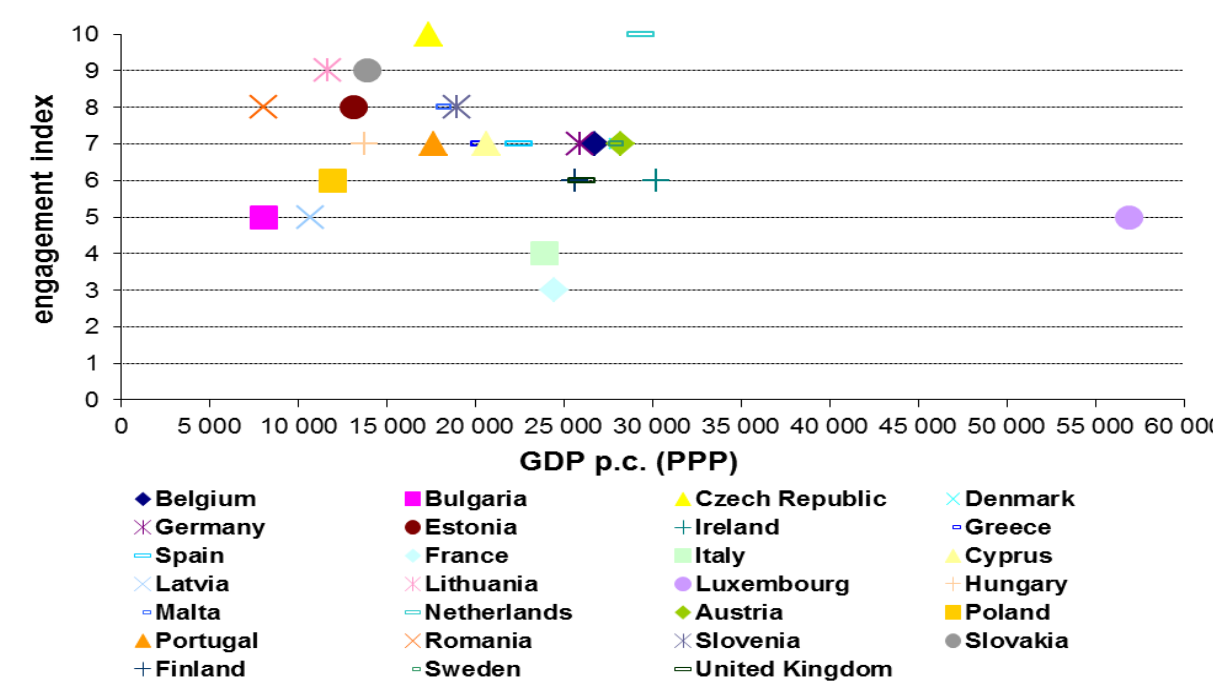
Source: own work, as of 30th June 2012.

Figure 8. Financial stability engagement index (Smaga, 2012) and Financial Stability Transparency Index (Horváth and Vaško, 2012)



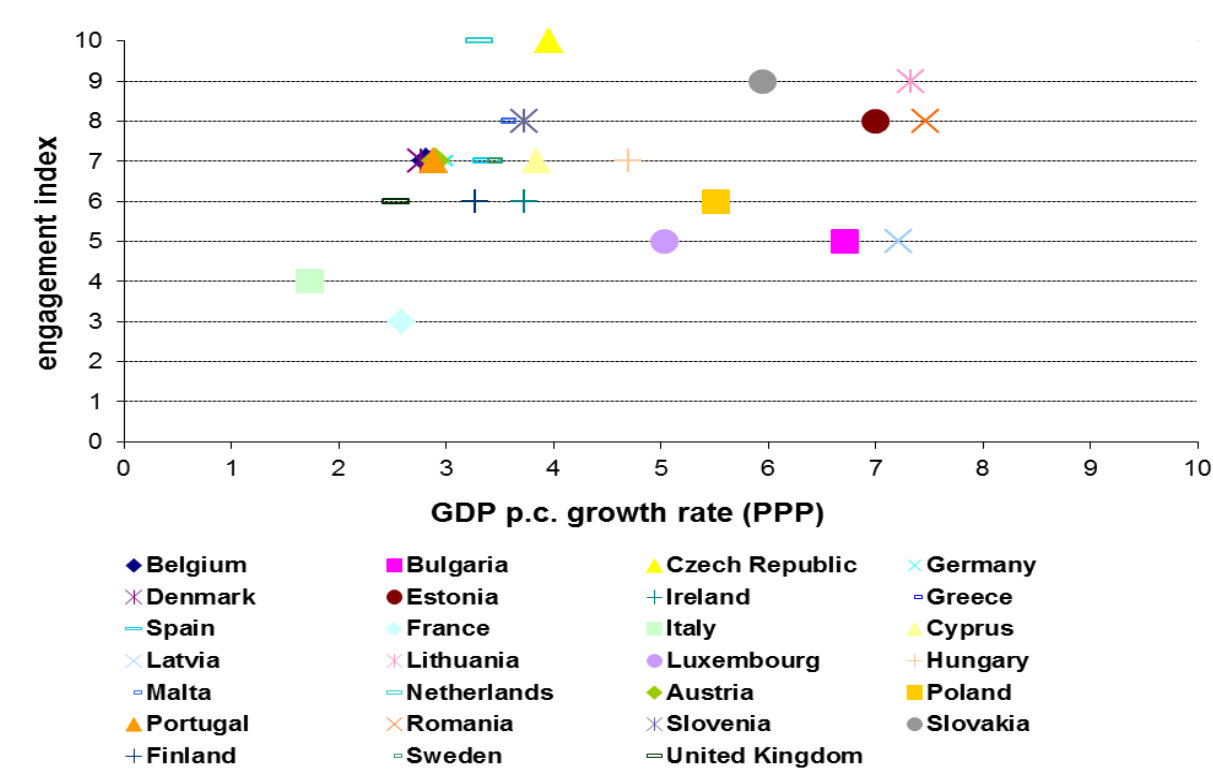
Source: own work based on Horváth and Vaško (2012).

Figure 9. Engagement index vs. average level of GDP p.c. (PPP, 1999-2011) in EU 27 countries



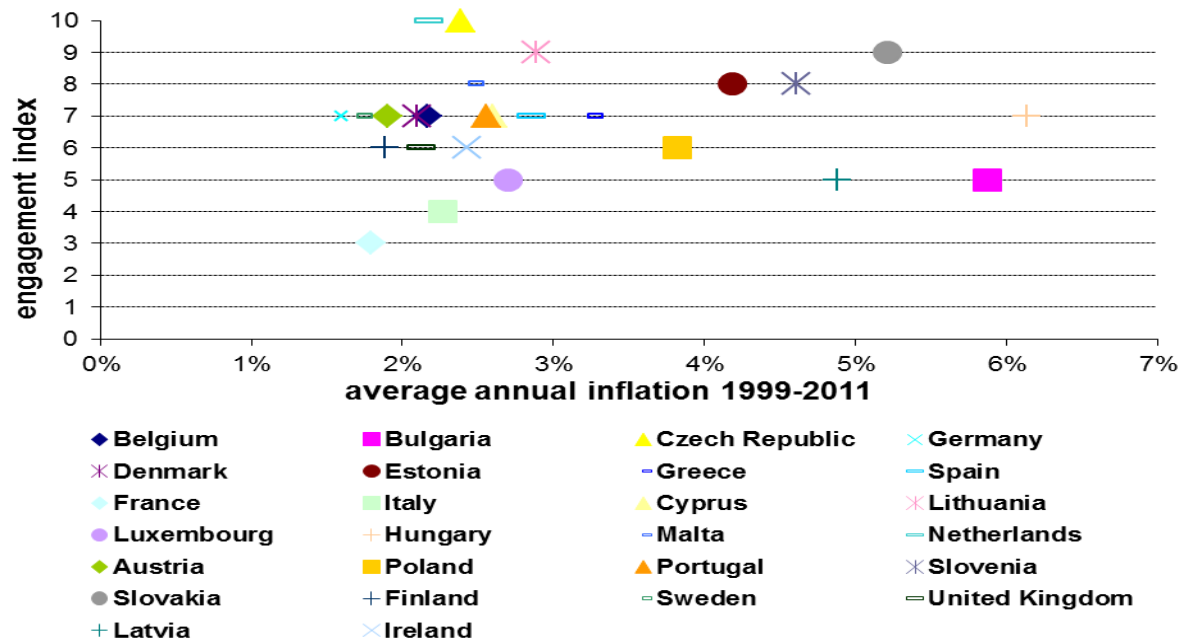
Source: own work based on Eurostat data.

Figure 10. Engagement index vs. average growth rate of GDP p.c. (PPP, 1999-2011) in EU 27 countries



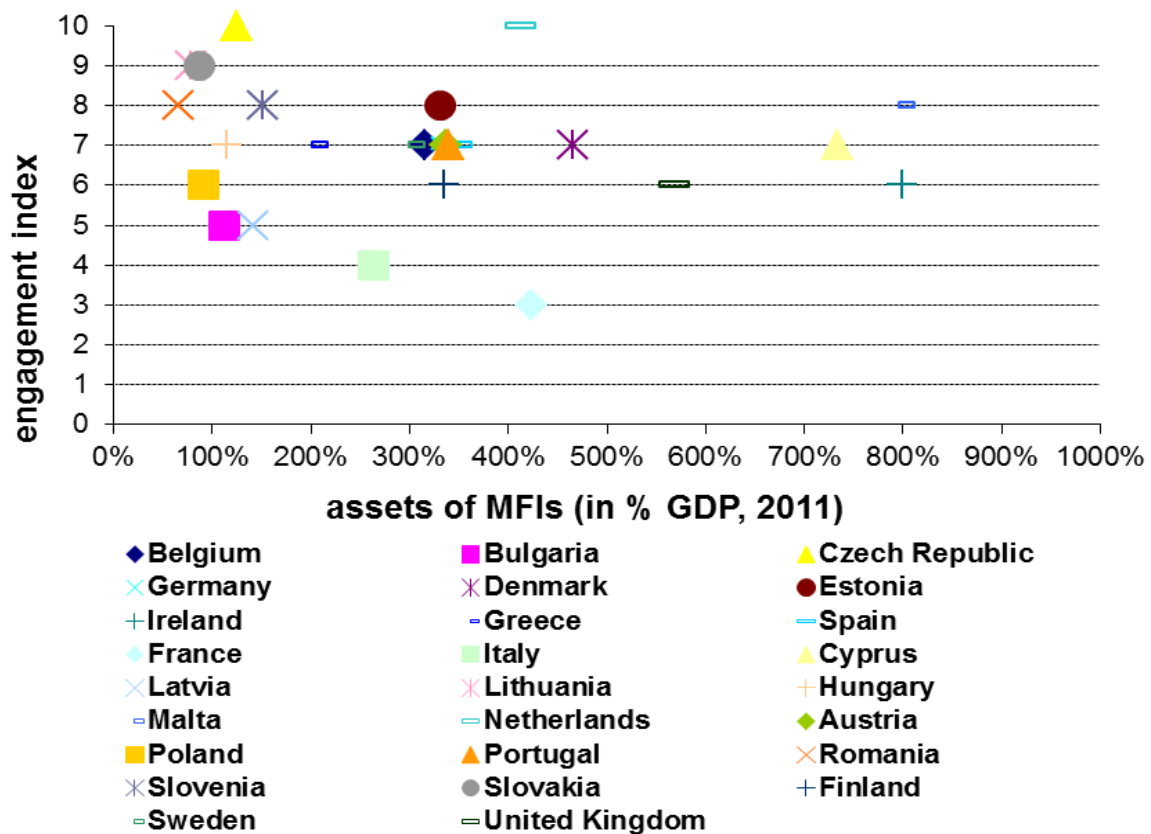
Source: own work based on Eurostat data.

Figure 11. Engagement index vs. average annual inflation (HICP, 1999-2011) in EU 27 countries



For the purposes of the clarity of the scale, Romania (17,1%; 8) was omitted  
Source: own work based on Eurostat data.

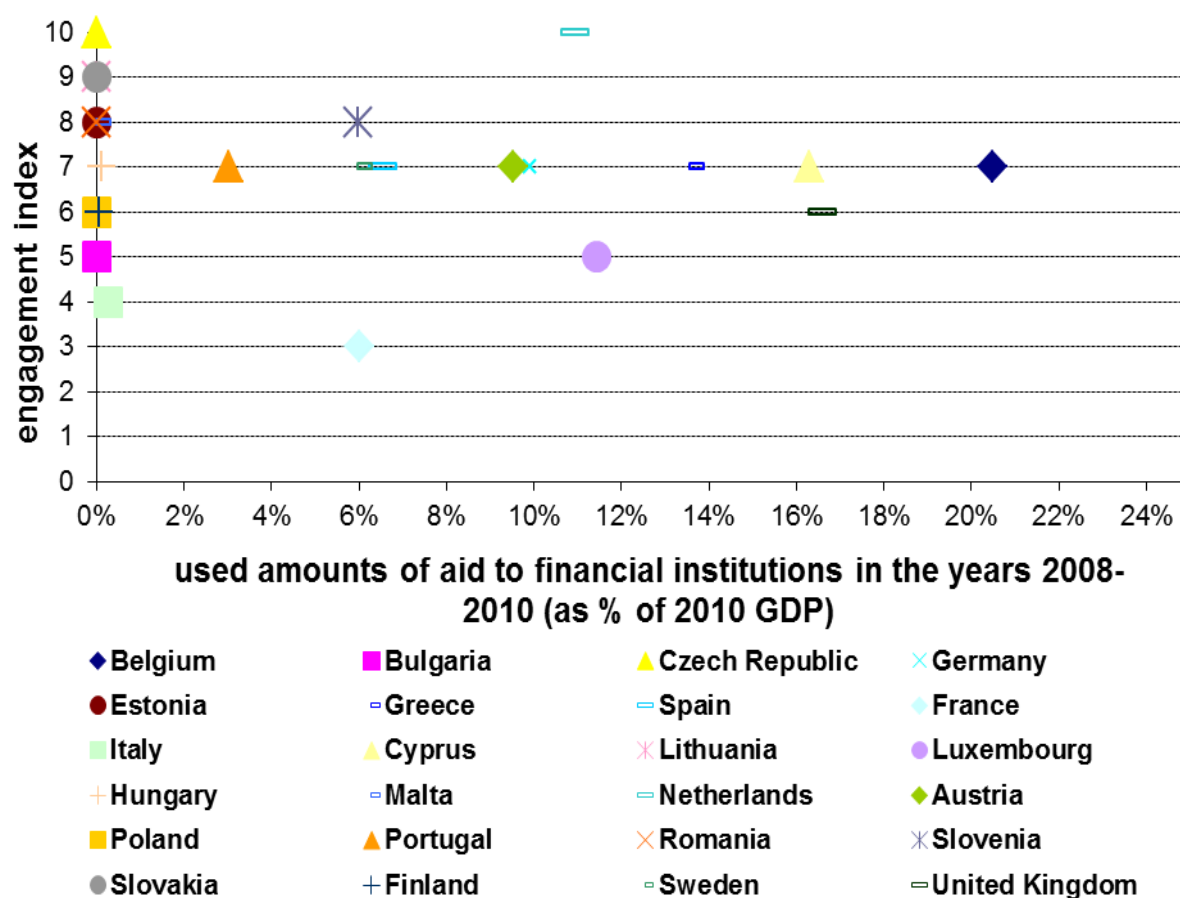
Figure 12. Engagement index vs. assets of MFIs (in % GDP, 2011) in EU 27 countries



For the purposes of the clarity of the scale, Luxembourg (2430,30%; 5) was omitted  
Source: own work based on Liikanen Report.



Figure 13. Engagement index vs. used amounts of aid to financial institutions in the years 2008-2010 in EU 27 countries



For the purposes of the clarity of the scale, Latvia (232,28%; 5), Ireland (268,47%; 6) and Denmark (66,31%; 7); were omitted; with used amounts of aid to financial institutions covers recapitalisation measures, guarantees and asset relief interventions

Source: own work based on EC (2011).

**QUESTIONNAIRE FOR COLLECTING INFORMATION TO ANALYZE THE CHANGES IN THE ROLE OF CENTRAL  
BANK IN SAFEGUARDING FINANCIAL STABILITY**

June 2012

Questions:

1.

A. How is the central bank's financial stability mandate enshrined in the regulation?

B. Is the scope of the current mandate sufficient or should it be widened?

2.

A. Does the central bank have a definition of financial stability and is it an operational one?

B. How does the way the definition is constructed determine the scope of financial stability analysis?

3.

A. Does the central bank produce and publish Financial Stability Indicators (FSIs)?

B. Are FSIs based on the methodology by IMF or ECB? Are they useful when analyzing financial stability? In what way can they be expanded?

4.

A. Does the central bank have its own financial stability index?

B. Please explain why yes or no and give its brief description. Is it regularly published or for internal purposes only? Does it have a satisfactory forecasting power?

5.

A. Does the central bank regularly conduct own stress-tests of the financial sector? Are they for internal purposes only or are their results published?

B. Is stress testing the most effective tool in financial stability analysis?

**6.**

**A. How often does the central bank publish the Financial Stability Review (or assessment of stability of the financial system)?**

**B. What are the reasons behind (aims of) publishing FSRs? Are they being achieved?**

**7.**

**A. Does the central bank act in a capacity of payment system overseer? What is the scope of the oversight?**

**B. In what way does overseeing payment system developments enhance the financial stability analysis?**

**8.**

**A. In what capacity is the central bank a financial market supervisor (microprudential oversight)?**

**B. What are the benefits for financial stability policy of the current engagement in microprudential supervision and whether the central bank would like to see its mandate widened in this respect?**

**9.**

**A. Is the central bank in any respect involved in macroprudential supervision? What would be the best form of central bank's involvement in macroprudential policy?**

**B. Does the macroprudential oversight have to be within central bank objectives? What would be the benefits? How to formulate the macroprudential mandate?**

**10.**

**A. Is there a separate department/division within the central bank exclusively responsible for financial stability analysis? If not, than where are the financial stability responsibilities allocated within the organizational structure?**

**B. What is the best organizational solution for financial stability issues?**

Annex 2. Financial stability definitions adopted by central banks in EU 27

Author	Financial stability definition	Source
<b>Oesterreichische Nationalbank</b>	<p>Financial stability means that the financial system – financial intermediaries, financial markets and financial infrastructures – is capable of ensuring the efficient allocation of financial resources and fulfilling its key macroeconomic functions even if financial imbalances and shocks occur. Under conditions of financial stability, economic agents have confidence in the banking system and have ready access to financial services, such as payments, lending, deposits and hedging.</p> <p><i>Finanzmarktstabilität liegt vor, wenn das Finanzsystem – bestehend aus Finanzintermediären, Finanzmärkten und Finanzinfrastruktur – auch im Fall finanzieller Ungleichgewichte und Schocks in der Lage ist, eine effiziente Verteilung finanzieller Ressourcen sicherzustellen und seine wesentlichen makroökonomischen Funktionen zu erfüllen. Konkret bedeutet Finanzmarktstabilität somit, dass beispielsweise das Vertrauen in den Bankensektor sowie eine stabile Versorgung mit Finanzdienstleistungen wie Zahlungsverkehr, Krediten, Einlagengeschäft und Risikoabsicherung gewährleistet ist.</i></p>	Webpage
<b>National Bank of Belgium</b>	<p>In contrast to monetary stability, which can conveniently be gauged by a quantitative objective, financial stability does not lend itself to a neat definition. More often than not, the objective is described by reference to its opposite, i.e. the absence of financial instability. The latter, in turn, is defined as a situation or an environment that makes banks and/or financial markets unable to channel funds efficiently and effectively from savers to borrowers with productive investment opportunities. As the system is no longer able to overcome asymmetric information problems and to perform risk-sharing services, there is an ensuing contraction in activity and a reduction in general economic welfare.</p>	FSR 2002
<b>Bulgarian National Bank</b>	<b>NONE</b>	n/a
<b>Central Bank of Cyprus</b>	<p>According to the European Central Bank (ECB), financial stability can be defined as "a condition in which the financial system – which comprises financial intermediaries, markets and market infrastructures – is capable of withstanding shocks and the unravelling of financial imbalances. This mitigates the likelihood of disruptions in the financial intermediation process that are severe enough to significantly impair the allocation of savings to profitable investment opportunities" [ECB, <i>Financial Stability Review</i>, December 2011].</p>	Webpage
<b>Czech National Bank</b>	<p>The CNB defines financial stability as a situation where the financial system operates with no serious failures or undesirable impacts on the present and future development of the economy as a whole, while showing a high degree of resilience to shocks.</p>	Webpage
<b>Danmarks Nationalbank</b>	<p>Danmarks Nationalbank defines financial stability as a condition whereby the overall financial system is robust enough for any problems within the sector not to spread and prevent the financial markets from</p>	Webpage

	functioning as providers of capital and financial services.	
<b>Eesti Pank</b>	Financial stability means that the operation of the financial system is not interrupted or disturbed to the extent or duration that would considerably hinder financial intermediation and thus also the central bank's primary objective – price stability. In other words, the efficiency of monetary policy largely depends on the functioning of important financial institutions and infrastructure. For ensuring financial stability Eesti Pank mainly focuses on securing a smooth and integral functioning of the financial system and minimising the threat of a systemic crisis.	Annual Report 2006
<b>Suomen Pankki</b>	<b>NONE</b>	n/a
<b>Banque de France</b>	Financial stability is itself complex. One of its possible definitions could be the situation in which the various components of system financial - capital markets, infrastructure payments, settlement marketable securities, clearing, financial institutions - operating without smooth and seamless while marking each, good resistance to potential shocks. But it is easier, and perhaps more natural to define the financial stability as a contrario the state of the financial system when there not appear to systemic disruptions: formation of financial bubbles or implosion of such bubbles, excess volatility in asset prices, decrease abnormal of liquidity in certain market segments, interruptions in the operation payment systems, runaway or excessive credit rationing, failures of financial institutions etc.	FSR 2002
<b>Bank of Greece</b>	Financial stability can be defined as a condition in which the financial system as a whole – comprising banks and other financial intermediaries, money, credit and capital markets and market infrastructures (payment and clearing and settlement systems) – is resilient and able to withstand any unexpected shocks or unwinding of imbalances, thus minimising the likelihood of disruptions which are severe enough to jeopardise the efficient allocation of savings and the smooth flow of money and credit into the socially most beneficial uses and activities.	Webpage
<b>Banco de España</b>	Financial stability, defined as when monetary and financial systems operate smoothly and efficiently, assumes that credit institutions distribute the funds received from savers to those customers requesting funds and that bank services are provided to clients normally.	Webpage
<b>De Nederlandsche Bank</b>	What do we mean by financial stability? According to our own definition at the Nederlandsche Bank, a stable financial system is capable of efficiently allocating resources and absorbing shocks, preventing these from having a disruptive effect on the real economy or on other financial systems. Also, the system itself should not be a source of shocks. Our definition thus implies that that money can properly carry out its functions as a means of payment and as a unit of account, while the financial system as a whole can adequately perform its role of mobilising savings, diversifying risks and allocating resources.	N. Wellink, <i>Central Banks as guardians of financial stability</i> , speech at the seminar 'Current issues in central banking', on the occasion of the

		opening of the new office building of the Central Bank of Aruba, Oranjestad 14 November 2002
<b>Central Bank of Ireland</b>	<b>NONE</b>	n/a
<b>Bank of Lithuania</b>	Financial system stability is defined as the state of the market, when market participants (banks, financial market intermediaries and other institutions, markets and market infrastructures) are capable of efficiently reallocating limited financial resources in time and space and are ready to withstand shocks and the correction of the emerging imbalances without substantial impact on the efficient reallocation of resources.	FSR 2011
<b>Banque Centrale du Luxembourg</b>	<b>NONE</b>	n/a
<b>Bank of Latvia</b>	<b>NONE</b>	n/a
<b>Central Bank of Malta</b>	The Central Bank of Malta defines financial stability as a condition where the financial system – comprising institutions, markets and infrastructures – is able to allocate savings into investments opportunities and facilitate the settlement of payments efficiently; manage risks that may harm or threaten to harm its performance and consequently that of the economy; and absorb shocks without allowing the formation of cumulative processes that may impair its operations.	Webpage
<b>Bundesbank</b>	Financial stability is a condition in which the financial system fulfils its central macroeconomic functions smoothly at all times, particularly in stress situations and in phases of structural adjustment. A stable financial system fulfils its central macroeconomic functions smoothly and at all times. This includes, in particular, the efficient allocation of financial resources and risks as well as the provision of an efficient and secure financial infrastructure. <i>Finanzstabilität ist ein Zustand, in dem das Finanzsystem seine zentralen gesamtwirtschaftlichen Funktionen jederzeit reibungslos erfüllt, und dies gerade auch in Stresssituationen und in strukturellen Umbruchphasen. Ein stabiles Finanzsystem erfüllt seine zentralen gesamtwirtschaftlichen Funktionen jederzeit und reibungslos. Diese sind insbesondere die effiziente Allokation finanzieller Mittel und Risiken sowie die Bereitstellung einer leistungsfähigen und sicheren Finanzinfrastruktur.</i>	Webpage
<b>National Bank of Poland</b>	Financial system stability is a situation when the system performs all its functions in a continuous and effective way, even when unexpected and adverse disturbances occur on a significant scale. Disturbances in the functioning of the financial system and in the efficiency of the provision of financial services have a	Webpage

	<p>harmful influence on the standing of enterprises and households.</p> <p><i>Stabilność systemu finansowego jest rozumiana jako stan, w którym system finansowy pełni swoje funkcje w sposób ciągły i efektywny, nawet w przypadku wystąpienia nieoczekiwanych i niekorzystnych zaburzeń o znacznej skali. Zakłócenia w pracy systemu finansowego i zaburzenia efektywności świadczenia usług pośrednictwa finansowego negatywnie wpływają na sytuację przedsiębiorstw i gospodarstw domowych.</i></p>	
<b>Banco de Portugal</b>	<p>There is no broad consensus among economists regarding the concept of “Financial Stability”. There are several definitions, most of them referring to the non-existence of “stability” or to the idea of “instability”. However, it can be said that financial stability, in addition to implying the resilience of financial intermediaries (in particular banks) to adverse shocks and the need for an analysis of the behaviour and financial situation of the key counterparties of these intermediaries, also requires “that the key markets are stable, in that participants can confidently transact at prices that reflect fundamental forces and that do not vary substantially over short periods when there have been no changes in fundamentals”.</p> <p>Andrew Crockett in “<i>Why is financial stability a goal for public policy?</i>”, Maintaining Financial Stability in a Global Economy, Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 28-30, 1997.</p>	FSR 2004
<b>National Bank of Romania</b>	<p>Moreover, central banks play a well-defined role in financial stability, broadly seen as the financial system’s capability to withstand systemic shocks in the long term and without triggering major disturbances, to efficiently allocate resources across the economy, and to effectively identify and manage risks.</p>	FSR 2006
<b>National Bank of Slovakia</b>	<p>What is financial stability? Financial stability is defined as the condition when the financial system and its various components - such as financial markets, financial institutions, payment systems, securities transfer systems, settlement systems, etc. - reliably and smoothly perform all of their basic functions and are sufficiently resistant to adverse financial and economic shocks.</p>	Webpage
<b>Bank of Slovenia</b>	<p>At the Bank of Slovenia, financial stability is defined as a situation in which the components of the financial system (financial markets, financial institutions and the financial infrastructure) function without systemic disruptions, and in which each component of the system provides the greatest possible degree of flexibility in responding to any shocks that occur.</p>	Webpage
<b>Sveriges Riksbank</b>	<p>The Riksbank has chosen to define financial stability as meaning that the financial system can maintain its basic functions and also has resilience to disruptions that threaten these functions. The Riksbank has chosen to base its definition of financial stability on the functions supplied by the financial system. It is thus important to understand what these functions are, how they are supplied and why they are important to the economy. They primarily concern the mediation of payments, converting savings into funding and managing risk.</p>	Webpage
<b>Magyar Nemzeti Bank</b>	<p>Financial stability is a state in which the financial system, i.e. the key financial markets and the financial institutional system is resistant to economic shocks and is fit to smoothly fulfill its basic functions: the intermediation of financial funds, management of risks and the arrangement of payments.</p>	Webpage

<b>Bank of England</b>	<p>The purpose of preserving financial stability is to maintain the three vital functions which the financial system performs in our economy:</p> <ul style="list-style-type: none"> <li>• providing the main mechanism for paying for goods, services and financial assets;</li> <li>• intermediating between savers and borrowers, and channeling savings into investment, via debt and equity instruments; and</li> <li>• insuring against and dispersing risk.</li> </ul>	Annual Report 2012
<b>Banca d'Italia</b>	<b>NONE</b>	n/a

Source: own work based on the information contained on websites or in publications of central banks, as of 30 June 2012.

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