

Central Bank Transparency on Financial Stability: Measurement, Determinants and Its Effects

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Abstract

We develop a comprehensive index of how transparent are central banks about their policy framework to promote financial stability for 110 countries in 2000-2011 and examine its determinants and effects. We find that the degree of transparency increased in the 2000s, but still varies greatly across the countries. Our regression results suggest that more developed countries exhibit greater transparency. The episodes of high financial stress have a negative effect on the transparency. The legal origin matters, too. Importantly, we find that the level of financial stability transparency is strongly affected by monetary policy transparency. The central banks that are used to be transparent in their monetary policy conduct are more likely to become more transparent in the area of financial stability. Our results also suggest a non-linear effect of financial stability transparency on financial stress. Unless the financial sector experiences severe distress, greater transparency is beneficial for financial stability.

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1 Introduction

The recent theoretical literature on the welfare effects of public information has put forward some skepticism about the benefits of central bank transparency (Morris and Shin, 2002). The results of Morris and Shin (2002) have been strengthened by James and Lawler (2011), who show that transparency unambiguously decreases welfare regardless of model parameters. However, the predictions about adverse effects of central bank transparency of these theoretical models are in sharp contrast with actual data. The central banks around the world increased the transparency of their monetary policies in the last two decades. Based on their monetary policy transparency index for 110 countries in 1998-2006, Dincer and Eichengreen (2009) find that there is almost no occasion when central banks decrease the degree of their monetary policy transparency. In this paper, we construct the central banks' financial stability transparency index for 110 countries in 2000-2011, update the monetary policy transparency index by Dincer and Eichengreen (2009) until 2011 and find that central banks have been continuously increasing the transparency both in the monetary policy and financial stability frameworks. The reversals in the trend towards greater transparency have been extremely rare.

Therefore, to contribute to this literature, we try to explain what has caused central banks to increase the transparency in their frameworks to promote financial stability (for simplicity, we call it financial stability transparency). Next, we also address whether greater financial stability transparency is in fact beneficial. Although several studies investigated the determinants and effects of monetary policy transparency (Dincer and Eichengreen, 2009, among others), this evidence is missing for financial stability transparency. Oosterloo et al. (2007) and Cihak et al. (2012) focus on the particular aspect of financial stability transparency, the publication of financial stability reports. In addition, Cihak et al. (2012) provides a framework to evaluate the quality of financial stability reports but the evidence of the effect of quality ratings give only some support that the financial stability transparency is beneficial. In contrast to these two studies, we develop a comprehensive financial stability transparency index, which focuses not only on the coverage of financial stability reports but also on other communication channels, decision-making procedure and underlying legal aspects.

In addition, we focus on the effect of central bank transparency in a fuller manner. To our knowledge, previous literature examined solely the effects of

monetary policy transparency. We explore the interactions between the transparency in monetary policy and financial stability, as there are several plausible reasons why transparency in these two areas are likely to be related. Monetary policy transparency increased substantially during the last two decades, and this trend in monetary policy transparency preceded the one on financial stability. The first central banks have been assigned the role in safeguarding financial stability in the late 1990s or later. If central bank makes a decision to communicate more openly about monetary policy, this may create impetus to increase transparency other areas of central bank activities such as in promoting financial stability. Clearly, the underlying reason can be the ambition of central banks to communicate consistently (Blinder et al., 2009).

Our results suggest that most central banks have continuously become more transparent in their communication on issues related to financial stability. In general, more developed countries especially with Nordic or German legal origin exhibit more transparent communication about financial stability. The degree of financial stability transparency depends strongly on the previous experience of transparent communication about monetary policy. Periods of high financial stress in the past are found to have a negative effect on financial stability transparency. These results are robust to a number of sensitivity checks such as those addressing the sample selection issues or using an alternative measure of financial stability transparency. Importantly, our results suggest that financial stability transparency is beneficial in 'normal' times and is associated with lower financial stress and less bad loans. On the other hand, we find evidence that transparent dissemination of information about financial stability risks has adverse effects on the stability of financial system during the periods of severe financial distress. In this case, increasing transparency of communication on financial stability may help escalate the crisis.

This paper is organized as follows. Section 2 discusses the reasons why central banks publish financial stability reports, develops the financial stability transparency indexes and presents the resulting indexes. Section 3 presents the regression results on the determinants of financial stability transparency. Section 4 gives empirical evidence on whether greater financial stability transparency helps reduce the risks to financial stability. Section 5 concludes. Appendix with additional regression results follow.

2 Central Bank Transparency Index on Financial Stability

First, this section focuses on the financial stability reports published by central banks. as they are an integral part of financial stability communication and strongly influence the degree of central bank transparency on financial stability issues. Second, this section provides the details on the construction of our financial stability transparency index.

2.1 Financial Stability Reports: Why to Publish Them?

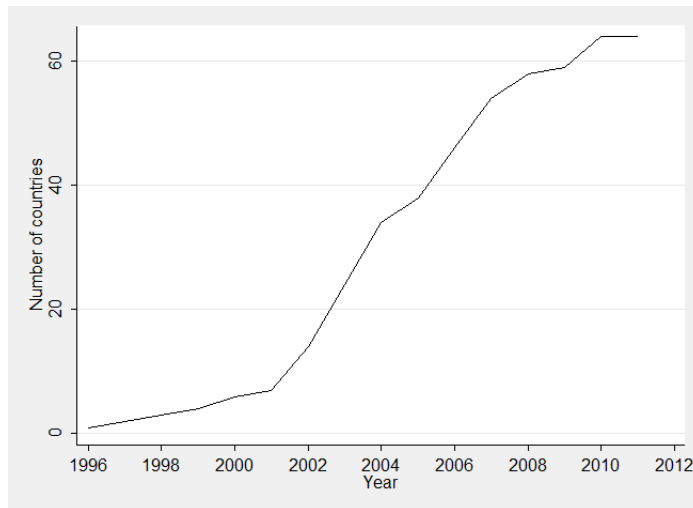
Many central banks around the world publish FSRs and use them as the main communication channel on financial stability. The Bank of England characterizes the purpose of its FSR as to identify the major downside risks to the UK financial system and thereby help financial firms, authorities and the wider public in managing and preparing for these risks. The Swedish Riksbank states that: "... *FSRs present the overall assessment of risks and threats to the financial system and an evaluation of the capacity for coping with them [. . .] By making the analysis available to financial market participants and other interested parties we can share our viewpoints and contribute to the debate on this subject.*" Therefore, Born et al. (2012) put forward that one of important reasons why FSRs are published is to effectively guide the markets and to reduce noise.¹

The first countries to publish FSRs were the UK and Scandinavian countries, especially Sweden and Norway. In 1997, Sweden became the first country that published a separate document about financial stability, later called the FSR. Andersson (2008) states that the main reason to start publishing the FSR was related to the financial crisis from the early 1990s.

Figure 1 presents the number of countries publishing the FSRs in 1996-2011. It shows that the first FSRs appeared in the late 1990s. The publication of FSRs by central banks became more common in the 2000s and currently, more than 60 countries publish FSR. The FSRs are published by vast majority of developed countries. Except Ireland, Greece and USA, all OECD countries currently publish the FSRs. The inavailability of FSR in the USA is related

¹Interestingly, some central banks during the current global financial crisis decided not to publish some parts of financial stability reports such as those on stress tests during the current financial crisis as not to escalate the crisis.

Figure 1: **The Number of Countries Publishing the Financial Stability Report**



to the institutional setting of financial sector supervision.² As regards Ireland and Greece, the FSRs reports used to be available. but central banks stopped publishing these reports during the current global financial crisis.

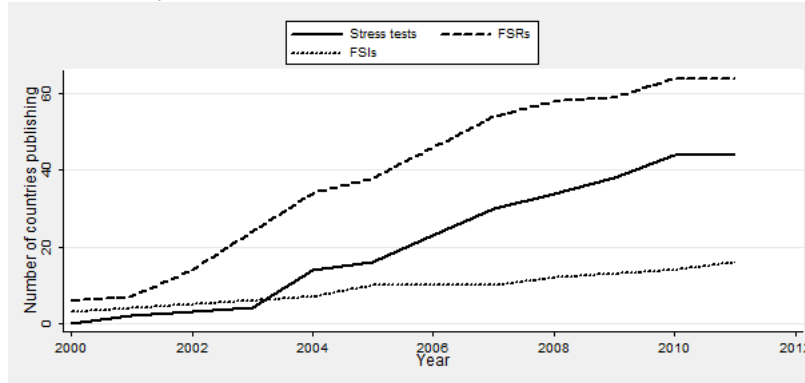
Cihak (2006) documents that most of the assessments in the FSRs before the crisis have been positive (96% of FSR assess the financial sector as "in good shape". "solid shape". or "improving"). Born et al. (2012) examines the optimism of FSRs, too, and find that the degree of optimism was rising during the 2000s up to the outbreak of financial crisis. Therefore, Breuer et al. (2011) and Franta et al. (2012) put forward that sufficiently adverse scenarios for financial sector stress tests are needed in order to evaluate financial stability credibly and propose methods how to quantitatively assess to what degree the stress tests are conservative.

In this paper, we examine the FSRs published by central banks.³ The FSRs typically start with an executive summary of the general assessment of finan-

²FED is not responsible for financial stability. This role is delegated to Financial Stability Oversight Council (FSOC) operating under the Treasury. FSOC publishes an annual report with the content very similar to the FSRs published by central banks. Since we focus on central bank communication on financial stability, we do not examine this report further (see Cihak et al., 2012, for further discussion of US experience). Nevertheless, our econometric framework addresses the sample selection issues related to the fact that some central banks are not assigned the responsibility to promote financial stability.

³FSRs are sometimes called Financial Stability Review or Financial Market Report. The financial stability reports by international organization or private firms are not considered.

Figure 2: The Number of Countries Publishing Stress Tests and Financial Stability Indicators



cial stability and potential risks. The FSRs continue with the core analytical part, which covers macroeconomic environment and risks and contains also information about various type of institutions (such as deposit takers) and markets important for financial stability. Some FSRs also publish several policy-oriented articles about financial stability. There are some central banks that cover only the analytical part (e.g. Norway), while others publish only articles (e.g. France), although the analytical part is more common than articles. The FSRs almost always contain the analysis of banking sector. Nonetheless, other financial sectors such as non-bank financial sector, real estates, corporates and households are covered frequently.

The analytical part typically contains three types of indicators to assess stability: soundness indicators, stress tests and market based indicators. Using these indicators, the report should cover all main risks (credit risk, contagion risk, interest rate risk, liquidity risk, exchange rate risk, payment or settlement risk) present in the financial markets. The soundness indicators are a set of macro-prudential indicators, describing the financial health by aggregating indicators from individual financial institutions. Usually, the (sub)set of financial soundness indicators proposed by the IMF is used. An increasing number of central banks also publish stress tests in their FSRs to assess the stability of financial system. Figure 2 reports the number of central banks publishing the stress tests and financial stability indicators within their FSRs. The number of these central banks has been continuously increasing during the 2000s.

Market based indicators are covered in the FSRs, too, as they provide useful forward-looking information about possible risks. This group of indicators typically comprises of stock market prices of financial institutions, volatility in share prices, distance to default, probability of default or distance to insolvency, various ratings, bond prices or option prices.

Clearly, one way to evaluate the quality of FSRs is to focus on clarity, consistency and coverage of these reports (Cihak. 2006 or Cihak et al.. 2012). In this paper, we mainly focus on the coverage of the FSRs because it requires less subjective assessment and at the same time, it is more tractable, as we want to evaluate the FSRs for a wide set of countries.

2.2 Financial Stability Transparency Index - Construction

This sub-section presents the construction of our FST index and its main descriptive statistics. We propose the newly constructed Financial Stability Transparency index to be the sum of following 12 items (with the number of points granted for each category in the parenthesis):

1. The publication of FSR (0 - not published, 1 - published)
2. The publication of FSR - the frequency (0 - not published, 1/2 - published annually, 1 - published semi-annually or more often)
3. FSR forward looking (0 - not forward looking, 1 - includes outlooks and forecasts of risks)
4. The coverage of FSR (in total max. 1.5 points)
 - (a) Macroeconomic environment and its risks (1/2 if included)
 - (b) Deposit takers information and its risks (1/2 if included)
 - (c) Other subjects or markets information and risks (1/2 if included)
5. The goal of financial stability is explicitly stated in central bank act (0 - not stated, 1 - explicitly stated)
6. The publication of stress test (0 - stress test not published, 1/2 published annually, 1 - published more often)
7. The publication of FSIs (0 - not published, 1/2 - core set of FSIs published, 1 - both core and encouraged set published)

8. Macroprudential policy transparency (0 - not described, 1/2 - general strategy and co-operation described, 1 - detailed policy and crisis management described)
9. The existence of Financial Stability (Policy) Committee (0 - no committee, 1 - committee with regular meetings and clear strategy)
10. The separate section on financial stability on the central bank's website (0 - no separate page (section) on web, 1 - separate page on the web)
11. The separate section (database) on speeches about financial stability on the central bank's website (0 - no separate section, 1/2 separate section)

An important component of our index is the periodicity and coverage of the FSRs (items 1-4 of our index) and it can earn 4.5 points out of 11 index points, which is a maximum value of the index. While at the beginning of our sample (e.g. in 2000) only a minority of central banks published the FSRs, the number of central banks publishing this report increased to about one half of our sample in 2011 (see also Figure 1). If the FSR is published, it is typically published once or twice a year. A few central banks publish the report more frequently. In the case of more frequent FSRs, we decided to assign one point to the value of index, as for the semiannual frequency, for two reasons. First, we do not think that more frequent FSRs increase the transparency substantially and second, these reports are usually more concise. In total, 64 countries published FSRs in 2011, out of which 31 countries published FSRs annually and 33 semi-annually or more often.

As for the forward looking feature of the report (item 3), we assigned the value of one in case the FSR features the forecasts about the most important risks towards financial stability. The coverage of FSRs (item 4) is evaluated according to whether all important segments of financial sector are covered. Half point is assigned for each separate chapter in the FSRs about macroeconomic environment and risks, deposit takers information and its risks and other subjects information and its risks (such as households, corporates etc.), respectively. The average score in 2011 for the contents of the report is 0.72 out of 1.5 points.

As for the goal of financial stability in central bank act (item 5), country is given one point in the case that it is clearly stated in the act that the central bank is responsible to promote financial stability. Interestingly, there are many central banks, which publish financial stability report, but the act does not

stipulate that central bank should contribute to financial stability. As of 2011, 48 countries out of 110 have financial stability mentioned in the central bank act. In addition, 28 central banks do not have financial stability mentioned in the central bank act and also score zero points for all other variables underlying the FST index. In our regression analysis, we examine whether our results are robust, if we exclude these 28 countries and if we formally address sample selection issues using Heckman estimator.⁴

The publication of stress tests is an important feature of transparency (item 6), as it gives a quantitative assessment of the ability of financial sector to withstand large negative shocks. The value of 0 is given, if the stress tests are not published. One half is for the stress tests published annually and the value of one is assigned, when stress tests are published more often than annually. Our results show that 33 countries scored one point in 2011 for this item and more than 40 central banks publish stress tests (see Figure 2).

We include the financial soundness indicators (item 7) since we consider the publication of FSIs important due to the fact that it offers a unique standardised measure of current conditions of the financial institutions.⁵ The IMF classifies the FSIs into two categories: 1) core set and 2) encouraged set. We assign the value of one half to those central banks, which published the core set and the value of one, which publish both the core as well as the encouraged set. Some central banks publish these indicators on their website, but do not include them (or include only selected indicators) into the FSR. Only 12 countries published the core set in 2011 and half of them also published the encouraged set on the central bank website.

The transparency about macroprudential policy is an additional element of our index (item 8). If macroprudential policy framework is described on the central bank's website, the country earns 0.5 points for the index. To obtain one point, the policy has to contain information about crisis management with

⁴On the one hand, the value of 0 in the FST index suggest that central bank is not responsible for financial stability. On the other hand, the ambition of all central banks is to contribute to price and economic stability. Clearly, both price and economic stability are influenced by financial stability, so it can be argued that central banks are at least indirectly concerned about financial stability. This view is supported by Kevin Warsh, who states in his speech delivered at the New York State Economic Association Annual Conference, October 5, 2007 that: *"It is worth emphasizing that the Federal Reserve's concern with financial stability stems largely from the adverse implications of financial instability for overall economic performance. The Fed's interest in promoting financial stability is thus intimately connected with its macroeconomic objectives: maximum sustainable employment and price stability."*

⁵The study by Oosterloo et al. (2007) use the FSIs as the indicator of the quality of FSRs.

precise roles of all participating institutions. The score of the countries for this item is rather low with an average of 0.17 in 2011.

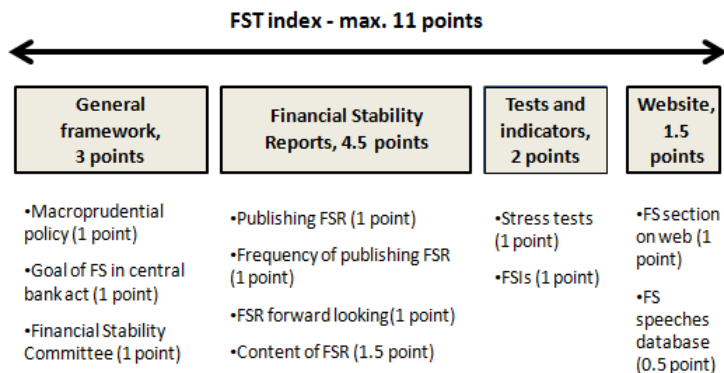
A stand-alone financial stability committee with regular meetings is another variable underlying our FST index (item 9). Central banks, which establish the financial stability committee, signal transparently to the markets who is responsible for taking the decisions related to financial stability. However, only UK, Ireland and Portugal scored a non-zero value for this item by having a separate committee with regular meetings. It is important to note that the composition of financial stability committee is not necessarily identical to the monetary policy committee. For example, the financial stability committee of the Bank of England includes several senior managers, which are not members of monetary policy committee.

Next, the value of one to our index is assigned to those central banks, which use their website effectively for the communication about financial stability (item 10). We operationalize this issue by examining whether central banks have a separate webpage (or webpages) solely dedicated to financial stability. This page(s) should contain all important information on financial stability such as the definition of financial stability, its importance for economic development or FSRs. Interestingly, only 38 countries have a separate section on financial stability on their webpages.

Last but not least, we assign a half point for those central banks, which have a database of speeches (item 11) of central bank representatives divided according to topic, including financial stability. Only 5 countries received the half point for the speeches database. Figure 3 summarizes the construction of our FST index.

Clearly, we are aware that there are many issues when constructing the indexes. The well-known issue is the choice and normalization of underlying indicators that form the aggregate index. We opted for simple averages given their transparency. In addition, we want to produce an index, which is at the same time comprehensive, but not extremely difficult to replicate and update. We are aware that there might be some cases when the index does not have to fully grasp the changes in transparency. For example, the central bank may be less transparent about the analytical background behind the stress tests or the stringency of stress tests. One way to try to put aside the concerns about the choice and normalization of underlying indicators is to explain the financial stability transparency index. If we cannot find plausible determinants of FST index then the critics might be right.

Figure 3: **Financial Stability Transparency Index: An Overview**

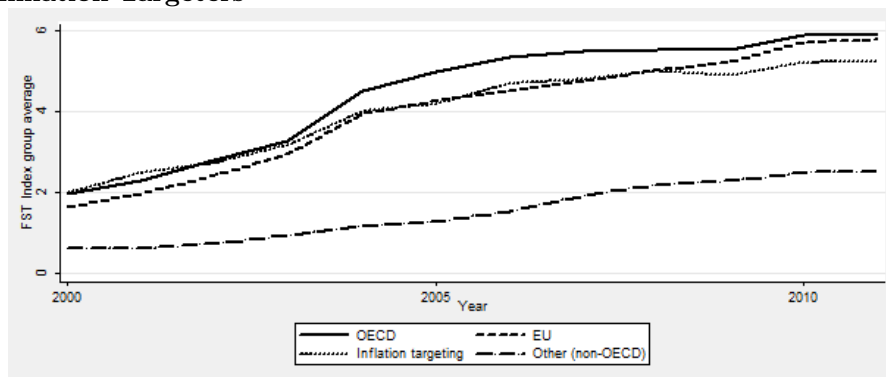


For the selection of countries, we follow Dincer and Eichengreen (2009), who develop the monetary policy transparency index. We choose an identical set of 110 countries with the yearly frequency of the index. This allows us evaluating our hypothesis about the transparency culture in central banks. More specifically, one of our hypothesis (more on this in the following section) is that central banks, which are already used to be transparent, are more likely to become transparent in the area of financial stability. To examine this hypothesis, we use the monetary policy transparency index to proxy for the prevailing transparency culture in the central banks (the monetary policy transparency has become issue in central banks in the 1990s, i.e. well before the considerations about transparency on financial stability issues). Since the Dincer and Eichengreen (2009) monetary policy transparency index is available only up to 2006, we update their index up to 2011 and double-checked their results (our updated index is available upon request).

2.3 Financial Stability Transparency Index - Results

The detailed country-level results for the FST index are available in the Appendix to this paper. Some figures summarizing the main results are available below. Figure 4 shows that according to our index, transparency about the ways central banks try to promote financial stability has been continuously increasing over time. The transparency was rather low in 2000. The average score for FST index was about 2 out of 11 points. In contrast to monetary policy transparency, the communication on financial stability is a new phenomenon

Figure 4: **FST Index. OECD vs. non-OECD Countries. EU and Inflation Targeters**



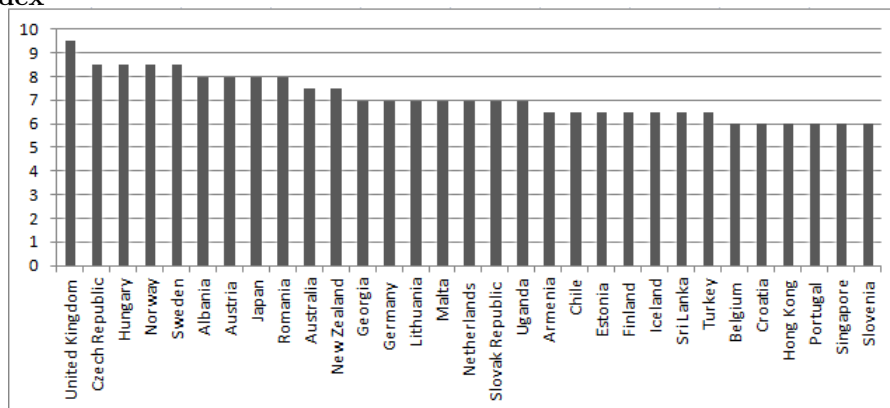
rising in importance during the last decade. We find that the EU, OECD and inflation targeting countries are the most transparent and the transparency gap between them and non-OECD countries has somewhat increased over time.

Figure 5 presents a list of top performers. Not surprisingly, developed countries score very high. The U.K. is top performer with 9.5 points out of 11, followed by several Central European and Nordic countries. Interestingly, there are many Central and Eastern European countries appear in the list of top performers. This is not so surprising since this group of countries nowadays exhibit a very high degree of monetary policy transparency as well (Siklos, 2011). U.K. and Nordic countries score very high in terms of monetary policy transparency (Dincer and Eichengreen, 2009) and according to Liedord et al. (2011), who provide an index of banking supervision transparency for 24 countries, have very transparent bank supervision, too.

Next, we also compare the FST index with respect to legal origin, as in Dincer and Eichengreen (2009). It seems that the countries with Nordic legal origin, followed by German legal origin, typically exhibit a high values of the index between 4 and 5. On the other hand, the countries with French, English and Socialist origin display the values between 2 and 2.5.

As argued above, one of our hypothesis is that the central banks that are transparent in their other activities such as in monetary policy conduct are more likely to be transparent about financial stability issues. In our opinion, there are two underlying factors - consistency in communication and culture. The ambition of central bank is to communicate consistently. Clearly, it would be difficult to explain to the public why the communication is transparent in some

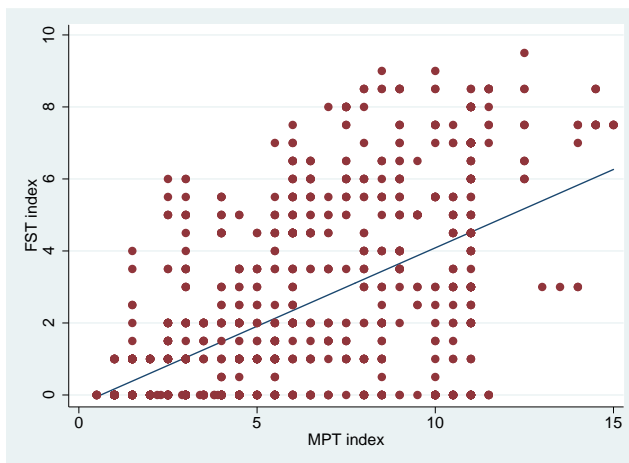
Figure 5: Countries with Highest Financial Stability Transparency Index



areas. but not in others. The central bank culture might play a role, too. In some countries, there is established culture of accountability of central bankers, which is closely related to transparency and therefore, central banks might be used to communicate and act transparently. It is well known that central banks were increasing their monetary policy transparency in the 1980s and 1990s, i.e. well before that the discussions about financial stability transparency appeared. For this reason, we use the monetary policy transparency index to proxy for the effects of central bank transparency culture as well as for the consistency in communication, and examine the effect of monetary policy transparency on financial stability transparency.

As already mentioned, we use the monetary policy transparency index (MPT index) by Dincer and Eichengreen (2009). However, this index is available only until 2006. Therefore, we use their methodology and update this index for the identical set of countries for 2007-2011. The contemporaneous correlation of the MPT index and FST index is 0.59, which is statistically different from zero at 1% level. see also Figure 6. The correlation of FST index with MPT at various lags reaches similar values.

Figure 6: **Financial Stability Transparency vs. Monetary Policy Transparency**



Note: Financial stability transparency is proxied by the index developed in this paper. Monetary policy transparency is represented by the index developed by Dincer and Eichengreen (2009) and updated up to 2011 by the authors of this paper.

3 What Drives Central Bank Transparency on Financial Stability Issues?

This section investigates the determinants of the central bank transparency on financial stability issues. Oosterloo et al. (2007) examine, which factors contribute to publishing the FSR. They find that experience of a banking crisis in the past, higher income per capita and EU membership increase the likelihood of the FSR being published. We also examine the determinants of why FSRs are published. In some sense, whether the FSRs is published or not, may be considered as some crude indicator of financial stability transparency and it provides some robustness check to our baseline estimations for which we use our FST index as a dependent variable. In consequence, this extends the research by Oosterloo et al. (2007) on understanding financial stability transparency.

In addition, we also use a broader set of regressors to analyze the motive for greater transparency. Our supposition is that central bank culture matters. In particular, we analyze the effect of monetary policy transparency, assuming that a well established and transparent approach towards the communication of monetary policy is likely to lead to more transparent communication on financial stability. Monetary policy transparency preceded financial stability

transparency, as many countries around the world substantially increased the monetary policy transparency already in the 1990s (Blinder et al., 2009, Crowe and Meade, 2009).

We expect that transparency may be influenced by financial stress. The central banks may be reluctant to increase the transparency when financial markets are under severe distress not to escalate the crisis further. We use the IMF financial stress index developed by Balakrishnan et al. (2009) and Cardarelli et al. (2011) because the index is comprehensive and as compared to other financial stress indexes. has a solid country coverage.⁶

Next, as a proxy of the importance of the financial sector, we use the ratio of stock market capitalization to GDP published by World Bank. Our hypothesis is that more transparent communication towards financial markets increases in importance in financially developed economies. Inflation targeting regime is known for its high degree of transparency (Walsh. 2009) and therefore, we introduce a dummy variable for inflation targeting regime to evaluate whether there is an effect stemming from the adoption of this monetary policy regime. GDP per capita is included to proxy for the level of economic development. We also include OECD and EU dummy.

We estimate the following baseline model:

$$FSTindex_{i,t} = X_{i,t-j}\beta + \alpha_{i,t} + e_{i,t} \quad (1)$$

$FSTindex_{i,t}$ denotes our financial stability transparency index for country i in time (year) t . The explanatory variables, $X_{i,t-j}$, are lagged by j periods, as it is likely that they affect the dependent variable with a lag. For our baseline model, we assume $j = 1$. The robustness check with $j = 3$ is carried out. As discussed above, our list of explanatory variables includes monetary policy transparency index (as developed by Dincer and Eichengreen (2009) and updates for 2007-2011 by us according to their methodology), financial stress, GDP per capita, EU membership dummy, OECD membership dummy, inflation targeting regime dummy and stock market capitalization on GDP. We use the

⁶The index is available for 17 advanced and 26 emerging countries until 2009. The index comprises of the following seven components: banking sector beta (standard beta from capital asset pricing model), TED spread (3-month LIBOR minus the government short term rate), inverted term spread (government short term rate minus government long term rate), corporate debt spreads (corporate bond yields minus long term government bond yields), stock market change (month-over-month change multiplied by minus one), stock market volatility (6 month moving average of the squared month-on-month returns) and exchange market volatility (6 month moving average of the squared month-on-month growth rate of the exchange rate).

fixed effects estimator to estimate Eq. (1). Random effects estimator is not employed because the results of Hausman test (available upon request) suggest that it would be inconsistent.

Table 1: **What Determines Financial Stability Transparency?**

FST index	(I)	(II)	(III)	(IV)	(V)	(VI)
	Full sample			Restricted sample		
MP transparency	0.43*** (7.28)	0.47*** (7.34)	0.46*** (7.00)	0.50*** (7.41)	0.49*** (7.08)	0.45*** (6.26)
GDP p.c.	0.072*** (6.77)	0.072*** (6.73)	0.07*** (6.09)	0.07*** (6.31)	0.07*** (6.30)	0.06*** (5.22)
Financial stress	-0.06* (-1.89)	-0.06** (-2.05)	-0.06** (-1.98)	-0.06* (1.86)	-0.06* (1.84)	-0.07** (2.13)
IT dummy		-0.65 (-1.60)	-0.63 (-1.53)		0.05 (0.10)	0.11 (0.23)
GDP growth			0.0002 (1.05)			0.001** (2.72)
Market capitalization			9.90E-05 (0.04)			-0.002 (-0.63)
No. of observations	387	387	387	320	320	320
R-sqr. adj.	0.21	0.19	0.15	0.29	0.29	0.26

Note: The dependent variable is financial stability transparency index. Explanatory variables lagged by one year. Restricted sample denotes a sample of central banks with non-negative value of financial stability transparency index. T-statistics are shown in parentheses; ***, **, * denotes statistical significance at 1, 5 and 10 % level, respectively. Fixed effects estimation.

The regression results on the determinants of financial stability transparency index are available in Table 1. We find that monetary policy transparency contributes positively to financial stability transparency. The results suggest that central banks in developed countries exhibit higher transparency in their communication about financial stability. We also find that the episodes of high financial stress affect negatively financial stability transparency. Additional factors such as the inflation targeting dummy, GDP growth and market capitalization do not systematically influence the financial stability transparency.⁷ The insignificance of inflation targeting dummy likely reflects the fact that the plausibly higher transparency of this monetary policy regime is already captured by the monetary policy transparency index. Indeed, the correlation between the inflation targeting dummy and monetary policy transparency index is relatively high and reaches the value of 0.5.

⁷Note that OECD and EU dummy variables are not included because of multicollinearity.

We estimate our regression model both based on full sample as well as restricted sample. The countries with the zero value of FST index are excluded from the restricted sample. The zero value of FST index essentially means that the central bank does not publish the FSR. Clearly, it is important to run the regressions also for restricted sample because some central banks are not responsible for financial stability by the law and therefore, exhibit low financial stability transparency. On the other hand, there is also a rationale to estimate our regressions based on the full model because central banks are at least indirectly concerned about financial stability, as it has an effect on price stability and economic activity.

We carry out a number of robustness checks. First, may be our financial stability transparency index is too finely measured and therefore, we estimate the factors influencing the publication of FSR. If FSR is published in year t , we assign the value of one, zero otherwise. Therefore, we use a probit model to address that the dependent variable is limited. In consequence, this regression model closely resembles Oosterloo et al. (2007) but we use a wider set of determinants, as we, for example, include monetary policy transparency index. Second, we re-estimate our baseline model without a measure of financial stress. The financial stress index is available only for about a half of countries, which in consequence substantially reduces the number of observations. Third, we re-estimate our baseline regression model with explanatory variables lagged by three years instead of one year. Forth, we run the cross-sectional regression to examine the effect of legal origin. As legal origin is time-invariant, the dummies for legal origin are eliminated in the fixed effects estimation. To address endogeneity of regressors, the value of FST index is as of 2010 and the explanatory variables are lagged by one period. Fifth, we run two-step Heckman estimation to address the fact that the central bank financial stability transparency depends on whether financial stability is included as a goal in the central bank act. This decision is plausibly non-random.

All in all, the battery of robustness checks largely support our baseline results. The results are available in the Appendix (in Tables A.1-A.5). The monetary policy transparency index is statistically significant in all regression specifications and its coefficient is stable, to a large extent. More developed countries are found to exhibit more transparent communication about financial stability. The significance of financial stress index somewhat varies. It is often significant in the specifications with one year lag but never significant in the specifications in which the explanatory variables are lagged by three years. This

finding suggest that if there is an effect on FST stemming from the volatility in the financial markets, the effect takes one rather than more years. In line with our baseline regressions, the dummy for inflation targeting does not affect the financial stability transparency. The effect of GDP growth and market capitalization on FST is not stable.

We also examine whether the legal origin have an effect on financial stability transparency. Our results suggest that Nordic, and, to a certain extent, German, legal systems are positively related to financial stability transparency, while for English and French we observe a negative or zero effect. There are many former colonies with English and French legal origin in our sample, which is likely to be behind the insignificance of these two variables. This result contrasts with Oosterlo et al. (2007), who do not find any effect of legal origin on the decision to publish financial stability reports.

Last but not least, we examine the results of the two-step Heckman two-step estimation. Clearly, the financial stability transparency depends on a government decision to include the financial stability into the central bank act. The government decision is likely to be non-random and can be influenced by the events such as occurrence of past financial stress, experience of deep recessions caused by financial instability or by inflation targeting.⁸ The legal origin may also influence government actions about financial stability. Therefore, our selection equation explains the dummy variable, which takes the value of one, if financial stability is stated as a goal in the central bank act. Our second stage regressions possess the same set of explanatory variables as in the baseline regressions. The results are presented in Table A.5 in the Appendix and confirm the baseline results, to a large extent. Monetary policy transparency and GDP per capita are positively related to financial stability transparency. On the other hand, financial stress is mostly insignificant, while economic growth and our proxy for the size of financial sector exercise positive and statistically significant effect.

⁸The current financial crisis has opened up a discussion whether the focus of inflation targeters solely on price stability is sufficient. And whether the central banks need additional goal in the form of financial stability. See Walsh (2009).

4 Does Financial Stability Transparency Have an Effect on Financial Stress?

While the previous section focused on why some central banks are more transparent than others, this section examines whether the transparency in communication about financial stability is beneficial. We estimate panel regressions to assess the effect of our financial stability transparency index on financial instability. More specifically, we focus on whether our index help explain 1) the share of non-performing loans and 2) the financial stress controlling for some economic and financial variables. Therefore, we estimate the following model:

$$Finstress_{i,t} = FSTindex_{i,t-j}\beta_0 + X_{i,t-j}\beta_1 + \alpha_{i,t} + e_{i,t} \quad (2)$$

where $Finstress_{i,t}$ stands for measure of financial instability for country i in time (year) t : the share of non-performing loans and the IMF financial stress index, respectively. j represents the number of lags and we set $j = 1$ in the baseline regressions and $j = 3$ as a robustness check. $FSTindex_{i,t-j}$ is our financial stability transparency index as defined in the previous sections and $X_{i,t-j}$ represents the control variables.

Clearly, the effects of transparent communication about financial stability might be quite different in normal times in comparison when there are substantial risks to financial system (Born et al., 2012). For this reason, we estimate the equation (2) both for full as well as restricted sample. Using the restricted sample, we examine the effect of financial stability transparency under severe financial distress, which according to our definition happens, if the value of dependent variable is greater than its 90th percentile.

Our regression results for the full sample are given in Table 2. Greater financial stability transparency is found to contribute to lower financial stress as well as to less bad loans. Our results indicate that GDP per capita is positively linked to financial instability. This is likely to be related to the fact that the recent global financial crisis hit more heavily developed (European) countries. On the other hand, more developed financial markets (as proxied by market capitalization) are found in our regressions beneficial for financial stability, as deeper financial markets are more able to absorb shocks. Although the current global financial crisis has challenged the view that price stability is sufficient for financial stability (Walsh, 2009, Born et al., 2012), we still find that the effect of inflation targeting adoption is beneficial for financial stability. To a certain de-

Table 2: **Does Financial Stability Transparency Have an Effect on Financial Instability?**

	(I)	(II)	(III)	(IV)	(V)	(VI)
	Non-perform. loans			Financial stress index		
Fin. stab. transparency	-0.35** (-2.50)	-0.35** (-2.43)	-0.26* (-1.82)	-0.24** (-2.61)	-0.22** (-2.34)	-0.20** (-2.20)
GDP p.c.	0.06* (1.93)	0.06* (1.83)	0.06* (1.88)	0.20*** (9.24)	0.20*** (9.22)	0.20*** (9.32)
Market capitalization	-0.04*** (-6.44)	-0.04*** (-6.43)	-0.04*** (-6.35)	-0.02*** (-4.21)	-0.02*** (-4.27)	-0.02*** (-4.40)
Inflation		0.01 (0.42)	-0.001 (-0.05)		0.06** (2.25)	0.05* (1.82)
IT dummy			-3.11*** (-2.52)			-1.25* (-1.80)
No. of observations	667	667	667	354	354	354
R-sqr. adj.	0.07	0.07	0.08	0.04	0.05	0.05

Note: Explanatory variables lagged by one year. t-statistics are shown in parentheses; ***, **, * denotes statistical significance at 1, 5 and 10 % level, respectively. Fixed effects estimation. The dependent variable non-performing loans is divided by total loans.

gree, the finding of positive effects of inflation targeting is also supported by the result, which shows that higher inflation increases financial stress. Nevertheless, inflation is statistically significant only in some regression specifications.

All in all, our results suggest that greater financial stability transparency is beneficial in normal times. On the other hand, when we restrict our sample only to the periods when financial systems is undergoing severe distress, our results show that greater financial stability transparency in fact increases the financial stress and thus, escalates the crisis. These results are available in Table 3. To give some perspective, severe distress, according to our definition, happens, if the ratio of non-performing loans to total loans exceeds 18.1% and when the value of IMF's stress index is greater than 2.4. Double-digit ratios of non-performing loans to total loans close to 20% have been observed in the early 2000s in many Eastern European countries before banking sector restructuring, were observed in several African countries or in China in the early 2000s. The high values of financial stress index – exceeding its 90th percentile – were measured, for example, for Argentina in the early 2000s, in many European countries and several developed countries during the current financial crisis. In fact, the Deutsche Bundesbank decided not to publish their Financial Stability Review in 2008 in the light of high financial stress (note that the

Table 3: **Does Financial Stability Transparency Have an Effect on Financial Instability? Periods of High Distress**

	(I)	(II)	(III)	(IV)	(V)	(VI)
	Non-perform. loans			Financial stress index		
Fin. stab. transparency	19.56*** (6.46)	19.34*** (4.54)	19.34*** (4.47)	1.93** (2.95)	1.14 (1.73)	1.08 (1.51)
GDP p.c.	-1.60 (-0.82)	-1.41 (-1.09)	-1.36 (-1.04)	-0.41 (-2.47)	-0.16 (-0.87)	-0.14 (-0.70)
Market capitalization		-0.04 (-0.05)	-0.04 (-0.05)		0.02** (2.19)	0.03** (2.10)
Inflation			-0.01 (-0.07)			0.08 (0.38)
No. of observations	68	56	56	36	36	36
R-sqr. adj.	0.04	0.04	0.04	0.01	0.01	0.01

Note: Explanatory variables lagged by one year. t-statistics are shown in parentheses; ***, **, * denotes statistical significance at 1, 5 and 10 % level, respectively. Fixed effects estimation. The dependent variable non-performing loans is divided by total loans. The period of high distress is defined as when the value of dependent variable is greater than its 90% percentile. IT dummy dropped from the regressions, since its variation was zero.

value of financial stress index for Germany was 6.4 in 2008, i.e. well above the 90th percentile). Similarly, the financial stability reports are not available for Ireland during the recent global financial crisis. Interestingly, we also find some evidence that more developed financial sector may have detrimental effects in this case.

In some sense, our empirical exercise is close to Cihak et al. (2012). They form the financial stability report composite quality rating for 44 countries. This quality rating is different from our financial stability transparency index. Our index does not focus so heavily on financial stability reports and is available for 110 countries. The index is less subjective, as it focuses more on the coverage of financial stability reports rather than on its quality. On the other hand, the approach presented by Cihak et al. (2012) is more ambitious in the sense that it focuses on the clarity and quality of financial stability reports and requires careful reading and expert judgment about all financial stability reports.

Cihak et al. (2012) examine whether the publication of financial stability report or the financial stability report composite quality rating influence the occurrence of banking crisis and various measures of financial market volatility. They find that the publication of financial stability report does not have an effect on financial instability. In addition, their results indicate that financial stability

report composite quality rating is negatively related to financial instability, to a certain extent. In turn, their results give some support to the supposition that clear and consistent central bank communication about financial stability is beneficial.

Comparing our results to Cihak et al. (2012), our results are more pro-transparency during normal times, as our results unequivocally suggest that greater transparency reduces financial stress in normal times. We also give richer perspective on the effect of financial stability transparency because we show that the effects of financial stability transparency may differ substantially in normal vs. turbulent times.

As a robustness check, we re-estimate our results presented in Tables 2 and 3 for the sample, in which we include only central banks with a non-negative financial stability transparency index. These results are available in Tables A.6 and A.7 in the Appendix. Again, these results largely confirm our findings presented in the main text.

5 Concluding Remarks

In this paper, we develop a central banks' financial stability transparency index for 110 countries in 2000-2011. The index consists of several items such as the coverage of financial stability reports and forward-looking orientation of these reports, availability of stress tests and financial stability indicators to the public, the clarity about the role of central bank in safeguarding financial stability and decision-making procedure. Since as we argue in the paper, we think that the degree of financial stability transparency is related to monetary policy transparency, we also update the monetary policy transparency index by Dincer and Eichengreen (2009) up to 2011 for an identical set of 110 countries. Using these indexes, we first investigate what determines the financial stability transparency. Second, we examine whether greater financial stability transparency is beneficial for the stability of financial markets.

Our results suggest that the financial stability transparency has been continuously rising in the 2000s but it still varies greatly across central banks. Financial stability transparency is greater in more developed countries especially in those with Nordic and German legal origin. We find some evidence that past episodes of financial stress tend to have a negative effect on how transparent central banks are about their framework to promote financial stability. Next,

our results show that central bank with more transparent monetary policy exhibit greater financial stability transparency. This result, although new, is not surprising. It is plausible that central banks, if assigned the role to safeguard financial stability, which are used to communicate transparently in some areas of their activities (e.g. about monetary policy) will transmit transparency to other areas of their business, too.

Next, we find that the consequences of greater financial stability transparency on financial stress depend on the degree of financial stress. In normal times when financial stress is low, our results suggest that greater transparency is beneficial. Nevertheless, this finding does not hold for periods of high financial stress. In this case, increasing financial stability transparency has adverse effects on financial stress.

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Appendix

Table A.1: **What Determines the Publication of Financial Stability Reports?**

FSR dummy	(I)	(II)	(III)	(IV)	(V)	(VI)
	Lagged by one year			Lagged by three year		
MP transparency	0.45*** (5.22)	0.43*** (4.76)	0.42*** (4.66)	0.43*** (3.68)	0.41*** (3.40)	0.44*** (3.64)
GDP p.c.	0.06*** (3.61)	0.07*** (3.69)	0.08*** (3.93)	0.04 (1.53)	0.04* (1.66)	0.07** (2.12)
Financial stress	-0.10* (1.84)	-0.09* (1.81)	-0.10* (1.85)	-0.001 (-0.01)	0.002 (0.03)	0.04 (0.51)
IT dummy		0.39 (0.78)	0.28 (0.53)		0.38 (0.59)	0.003 (0.01)
GDP growth			-0.0002 (-1.63)			-0.0005** (-2.28)
Market capitalization			-0.004 (-1.10)			0.01 (0.88)
No. of observations	387	387	387	345	345	345
Pseudo R-sqr.	0.78	0.78	0.78	0.84	0.85	0.85

Note: The dependent variable is financial stability report dummy. Explanatory variables lagged by one year and three years, respectively. Restricted sample denotes a sample of central banks with non-negative value of financial stability transparency index. T-statistics are shown in parentheses; ***, **, * denotes statistical significance at 1, 5 and 10 % level, respectively.

Table A.2: **What Determines Financial Stability Transparency? Explanatory Variables Lagged by 3 Periods**

FST index	(I)	(II)	(III)	(IV)	(V)	(VI)
	Full sample			Restricted sample		
MP transparency	0.35*** (6.36)	0.37*** (6.28)	0.36*** (4.82)	0.39*** (6.44)	0.38*** (4.78)	0.34*** (5.32)
GDP p.c.	0.02** (2.33)	0.02** (2.29)	0.01* (1.69)	0.02** (2.01)	0.02** (2.19)	0.01 (0.95)
Financial stress	0.001 (0.004)	0.001 (0.004)	0.01 (0.03)	-0.03 (-1.03)	-0.03 (-1.22)	-0.02 (-0.95)
IT dummy		-0.38 (-1.07)	-0.36 (-0.95)		0.16 (0.35)	0.19 (0.47)
GDP growth			0.0002* (1.81)			0.0005* (2.41)
Market capitalization			0.02 (1.31)			0.001 (0.50)
No. of observations	345	345	345	294	294	294
R-sqr. adj.	0.18	0.16	0.06	0.24	0.24	0.18

Note: The dependent variable is financial stability transparency index. Explanatory variables lagged by three years. Restricted sample denotes a sample of central banks with non-negative value of financial stability transparency index. T-statistics are shown in parentheses; ***, **, * denotes statistical significance at 1, 5 and 10 % level, respectively. Fixed effects estimation.

Table A.3: **What Determines Financial Stability Transparency? The Effect of Legal Origin**

FST index	(I)	(II)	(III)	(IV)	(V)	(VI)
	Full sample			Restricted sample		
MP transparency		0.36***	0.36***		0.33***	0.34***
		(6.57)	(6.04)		(5.69)	(4.17)
GDP p.c.			0.001			-0.010
			(0.08)			(-0.03)
Legal origin - French	-0.61	-1.38**	-1.39**	0.15	-0.81	-0.80
	(-1.11)	(-2.42)	(-2.34)	(0.26)	(-1.36)	(-1.34)
Legal origin - German	1.82***	0.58	0.57	1.28***	0.68	0.68
	(2.65)	(0.92)	(0.87)	(2.64)	(1.06)	(1.02)
Legal origin -English	-0.78	-1.32**	-1.24**	-0.01	-0.67	-0.67
	(-1.34)	(-2.25)	(-2.24)	(0.01)	(-1.18)	(-1.16)
Legal origin - Nordic	3.27***	1.56**	1.53*	3.27***	1.71**	1.71*
	(3.89)	(2.02)	(1.70)	(3.87)	(2.14)	(1.83)
No. of observations	91	91	91	74	74	74
R-sqr. adj.	0.25	0.49	0.48	0.20	0.42	0.41

Note: The dependent variable is financial stability transparency index. Cross-sectional regression with dependent variable averaged over 2001-2011. Explanatory variables as of 2000. Restricted sample denotes a sample of central banks with non-negative value of financial stability transparency index. T-statistics are shown in parentheses; ***, **, * denotes statistical significance at 1, 5 and 10 % level, respectively. Robust standard errors.

Table A.4: **What Determines Financial Stability Transparency? Financial Stress Index Excluded**

FST index	(I)	(II)	(III)	(IV)	(V)	(VI)
	Full sample			Restricted sample		
MP transparency	0.57*** (16.10)	0.58*** (14.72)	0.63*** (13.89)	0.70*** (15.30)	0.67*** (13.55)	0.66*** (12.47)
GDP p.c.	0.06*** (9.53)	0.06*** (9.50)	0.06*** (7.78)	0.06*** (7.72)	0.06*** (7.76)	0.05*** (6.92)
IT dummy		-0.10 (-0.34)	0.127 (0.39)		0.56 (1.60)	0.57 (1.59)
GDP growth			0.0001 (0.77)			0.0002 (1.21)
Market capitalization			0.001 (0.70)			0.001 (1.21)
No. of observations	1189	1189	955	780	780	683
R-sqr. adj.	0.33	0.33	0.28	0.35	0.36	0.31

Note: The dependent variable is financial stability transparency index. Explanatory variables lagged by three years. Restricted sample denotes a sample of central banks with non-negative value of financial stability transparency index. T-statistics are shown in parentheses; ***, **, * denotes statistical significance at 1, 5 and 10 % level, respectively. Fixed effects estimation.

Table A.5: **What Determines Financial Stability Transparency? Heckman Selection Model**

FSR dummy	(I)	(II)	(III)	(IV)	(V)	(VI)
	Lagged by one year			Lagged by three year		
	Second stage: Financial Stability Transparency					
MP transparency	0.36*** (5.00)	0.35*** (4.59)	0.31*** (4.59)	0.31*** (3.97)	0.33*** (4.11)	0.30*** (4.17)
GDP p.c.	0.04*** (3.68)	0.04*** (3.68)	0.06*** (5.61)	0.04*** (3.32)	0.04*** (3.37)	0.06*** (5.21)
Financial stress	-0.02 (-0.31)	-0.02 (-0.28)	-0.16** (-2.06)	0 (-0.02)	-0.02 (-0.13)	-0.07 (-0.55)
IT dummy		0.17 (0.41)	0.70* (1.76)		-0.34 (0.81)	0.17 (0.41)
GDP growth			0.001*** (2.85)			0.0004** (1.96)
Market capitalization			0.02*** (4.72)			0.01*** (4.99)
	First stage: Financial Stability in the Central Bank Act					
Financial stress	0.05 (1.46)	0.05 (1.46)	0.05 (1.46)	-0.06 (-1.11)	-0.06 (-1.11)	-0.06 (-1.11)
Market capitalization	-0.001 (-0.38)	-0.001 (-0.38)	-0.001 (-0.38)	-0.001 (-0.29)	-0.001 (-0.29)	-0.001 (-0.29)
GDP p.c.	-0.01** (-2.15)	-0.01** (-2.15)	-0.01** (-2.15)	-0.01* (-1.72)	-0.01* (-1.72)	-0.01* (-1.72)
IT dummy	-0.21 (-1.32)	-0.21 (-1.32)	-0.21 (-1.32)	-0.2 (-1.10)	-0.2 (-1.10)	-0.2 (-1.10)
GDP growth	-0.0003*** (-3.34)	-0.0003*** (-3.34)	-0.0003*** (-3.34)	-0.0004*** (-2.81)	-0.0004*** (-2.81)	-0.0004*** (-2.81)
Legal origin - French	-1.32*** (-4.97)	-1.32*** (-4.97)	-1.32*** (-4.97)	-1.38*** (-4.63)	-1.38*** (-4.63)	-1.38*** (-4.63)
Legal origin - German	0.27 (1.02)	0.27 (1.02)	0.27 (1.02)	0.22 (0.75)	0.22 (0.75)	0.22 (0.75)
Legal origin -English	-0.84*** (-2.90)	-0.84*** (-2.90)	-0.84*** (-2.90)	-0.81** (-2.51)	-0.81** (-2.51)	-0.81** (-2.51)
Mills ratio	-1.35***	-1.41***	-1.28***	-1.41***	-1.31***	-1.25***
No. of observations	386	386	386	301	301	301

Note: The dependent variable is financial stability transparency index. The dummy whether financial stability is included in the central bank act serves as a dependent variable in selection equation. Explanatory variables lagged by one year and three years, respectively. T-statistics are shown in parentheses; ***, **, * denotes statistical significance at 1, 5 and 10 % level, respectively. Two-step method.

Table A.6: Does Financial Stability Transparency Have an Effect on Financial Instability? Restricted Sample

	(I)	(II)	(III)	(IV)	(V)	(VI)
	Non-perform. loans			Financial stress index		
Fin. stab. transparency	-0.43*** (-2.89)	-0.40*** (-2.70)	-0.38** (-2.49)	-0.20** (-2.01)	-0.18* (-1.80)	-0.17* (-1.73)
GDP p.c.	0.09** (2.55)	0.09*** (2.51)	0.09** (2.52)	0.19*** (8.21)	0.19*** (8.23)	0.19*** (8.23)
Market capitalization	-0.03*** (-3.71)	-0.03*** (-3.77)	-0.03*** (-3.76)	-0.02*** (-3.99)	-0.02*** (-4.10)	-0.02*** (-4.12)
Inflation		0.10** (2.10)	0.09* (1.89)		0.07** (2.41)	0.06** (2.20)
IT dummy			-0.64 (-0.44)			-0.42 (-0.45)
No. of observations	487	487	487	288	288	288
R-sqr. adj.	0.04	0.04	0.04	0.06	0.06	0.06

Note: Explanatory variables lagged by one year. t-statistics are shown in parentheses; ***, **, * denotes statistical significance at 1, 5 and 10 % level, respectively. Fixed effects estimation. The dependent variable non-performing loans is divided by total loans. Restricted sample denotes a sample of central banks with non-negative value of financial stability transparency index.

Table A.7: Does Financial Stability Transparency Have an Effect on Financial Instability? Periods of High Distress, Restricted Sample

	(I)	(II)	(III)	(IV)	(V)	(VI)
	Non-perform. loans			Financial stress index		
Fin. stab. transparency	18.17*** (4.03)	16.03** (3.05)	15.96** (2.84)	0.22 (1.59)	0.29* (1.71)	0.29** (2.09)
GDP p.c.	-0.99 (-0.69)	-0.46 (-0.28)	-0.35 (-0.17)	0.02 (1.43)	0.01 (0.69)	0.01 (0.609)
Market capitalization		0.18 (1.07)	0.18 (0.99)		0.01* (1.75)	0.01** (2.04)
Inflation			-0.02 (-0.10)			-0.01 (-0.30)
No. of observations	23	23	23	32	32	32
R-sqr. adj.	0.01	0.03	0.04	0.24	0.26	0.27

Note: Explanatory variables lagged by one year. t-statistics are shown in parentheses; ***, **, * denotes statistical significance at 1, 5 and 10 % level, respectively. Fixed effects estimation. The dependent variable non-performing loans is divided by total loans. The period of high distress is defined as when the value of dependent variable is greater than its 90% percentile. IT dummy dropped from the regressions, since its variation was zero.

Table A.8: Central Banks' Transparency Financial Stability Index -
Country Level Results

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Africa	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	1.2	1.4	1.5	1.52
Eastern Africa	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	1.3	1.6	1.6	1.8
Ethiopia	0	0	0	0	0	0	0	0	0	0	0	0
Kenya	0	0	0	0	0	0	0	0	0	0	0	0
Malawi	0	0	0	0	0	0	0	0	0	0	0	0
Mauritius	0	0	0	0	1	1	1	1	4.5	4.5	4.5	4.5
Rwanda	0	0	0	0	0	0	0	0	1.5	0	0	0
Uganda	1	1	1	1	1	1	1	1	2	5.5	6	7
Zambia	1	1	1	1	1	1	1	1	1	1	1	1
Northern Africa	0	0	0	0	0	0	0	0	0	0	0	0
Egypt	0	0	0	0	0	0	0	0	0	0	0	0
Libya	0	0	0	0	0	0	0	0	0	0	0	0
Sudan	0	0	0	0	0	0	0	0	0	0	0	0
Tunisia	0	0	0	0	0	0	0	0	0	0	0	0
Southern Africa	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	2.8	2.8	2.8	2.8
Lesotho	0	0	0	0	0	0	0	0	0	0	0	0
Namibia	0	0	0	0	0	0	0	0	3.5	3.5	3.5	3.5
South Africa	4	4	4	4	4	4	4	4	5	5	5	5
Western Africa	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.7	0.7	1.5	1.5	1.5
Ghana	0	0	0	0	0	0	0	0	0	0	0	0
Nigeria	0	0	0	0	0	0	0	1	1	3.5	3.5	3.5
Sierra Leone	1	1	1	1	1	1	1	1	1	1	1	1
Americas	0.3	0.3	0.7	0.8	1.1	1.3	1.7	1.8	2.0	1.8	2.1	2.1
Latin America/Carib.	0.4	0.4	0.7	0.7	1.0	1.2	1.6	1.8	2.1	1.8	2.2	2.2
East Caribbean	0.3	0.3	0.3	0.3	0.3	0.3	0.8	0.8	1.4	1.4	1.5	1.5
Aruba	0	0	0	0	0	0	0	0	0	0	0	0
Bahamas	0	0	0	0	0	0	0	0	0	0	0	0
Barbados	0	0	0	0	0	0	0	0	0	0	0	0
Cuba	0	0	0	0	0	0	0	0	0	0	0	0
Jamaica	0	0	0	0	0	0	3.5	3.5	3.5	3.5	3.5	3.5
Trinidad and Tobago	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	5	5	5.5	5.5

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Central America	0.4	0.4	0.4	0.4	0.4	0.4	1.4	2.0	2.0	1.6	2.0	2.0
Belize	0	0	0	0	0	0	0	0	0	0	0	0
El Salvador	1	1	1	1	1	1	1	3.5	3.5	3.5	3.5	3.5
Guatemala	0	0	0	0	0	0	0	0	0	0	0	0
Mexico	0.5	0.5	0.5	0.5	0.5	0.5	4.5	4.5	4.5	3	4.5	4.5
South America	0.4	0.4	1.2	1.4	2.1	2.6	2.6	2.6	2.8	2.3	3.0	3.0
Argentina	1	1	1	1	5	5	5	5	5.5	5.5	5.5	5.5
Brazil	0	0	3	3.5	3.5	3.5	3.5	3.5	3.5	0	4	4
Chile	1	1	1	1	5.5	5.5	5.5	5.5	5.5	5.5	6.5	6.5
Colombia	0	0	2.5	3	0	3	3	3	4	4	4	4
Guyana	0	0	0	0	0	0	0	0	0	0	0	0
Peru	0	0	0	0	0	0	0	0	0	0	0	0
Uruguay	1	1	1	1	1	1	1	1	1	1	1	1
Northern America	0	0	1	1.2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Bermuda	0	0	0	0	0	0	0	0	0	0	0	0
Canada	0	0	3	3.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
United States of America	0	0	0	0	0	0	0	0	0	0	0	0
Oceania	1.8	1.8	1.8	1.8	3.1	3.2	3.2	3.2	3.2	3.2	3.2	3.2
Australia/New Zealand	3.5	3.5	3.5	3.5	7.25	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Australia	4	4	4	4	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
New Zealand	3	3	3	3	7	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Melanesia	1	1	1	1	1	1	1	1	1	1	1	1
Fiji	0	0	0	0	0	0	0	0	0	0	0	0
Papua New Guinea	1	1	1	1	1	1	1	1	1	1	1	1
Solomon Islands	1	1	1	1	1	1	1	1	1	1	1	1
Vanuatu	2	2	2	2	2	2	2	2	2	2	2	2
Asia	0.8	0.9	0.9	1.2	1.4	1.6	2.1	2.5	2.6	2.7	3.2	3.2
Central Asia	0.7	0.7	0.7	0.7	1.3	1.5	2.3	2.2	2.3	2.3	2.3	2.3
Kazakhstan	2	2	2	2	2	2	4.5	4.5	4.5	4.5	5	5
Kyrgyzstan	0	0	0	0	2	2.5	2.5	2	2.5	2.5	2	2
Tajikistan	0	0	0	0	0	0	0	0	0	0	0	0
Eastern Asia	1.6	1.8	1.8	2.5	2.6	3.1	3.8	5	5	4.5	5	4.9
China	1	1	1	1	1	3.5	3.5	3.5	3.5	2	3.5	3.5
Hong Kong	1	1	1	4.5	5	5	5	6	6	5	6	6
Japan	2	3	3	3	3	3	6.5	8.5	8.5	8.5	8.5	8

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Korea	2	2	2	2	2	2	2	5	5	5	5	5
Mongolia	2	2	2	2	2	2	2	2	2	2	2	2
Southern Asia	0.5	0.5	0.5	0.6	0.6	0.6	1.3	2	2	2.2	3.4	3.4
Bangladesh	0	0	0	0	0	0	0	0	0	0	3	3
Bhutan	0	0	0	0	0	0	0	0	0	0	0	0
India	0	0	0	0	0	0	0	0	0	0	3	3
Pakistan	1	1	1	1	1	1	4.5	4.5	4.5	4.5	4.5	4.5
Sri Lanka	1.5	1.5	1.5	2	2	2	2	5.5	5.5	6.5	6.5	6.5
South-Eastern Asia	0.8	0.8	0.8	1.7	2.6	2.6	2.8	2.6	2.7	2.9	2.9	2.9
Indonesia	1	1	1	5.5	5.5	4.5	5.5	5.5	5.5	5.5	5.5	5.5
Malaysia	1	1	1	1	1	1	1	1	1	2	2	2
Philippines	0	0	0	0	0	0	0	0	0	0	0	0
Singapore	1	1	1	1	5.5	6.5	6.5	5.5	6	6	6	6
Thailand	1	1	1	1	1	1	1	1	1	1	1	1
Western Asia	0.7	0.7	0.8	0.8	0.8	1.0	1.4	1.9	1.9	2.2	2.7	2.8
Armenia	2	2	2	2	2	2.5	2.5	6	6	6	6.5	6.5
Bahrain	1	1	1	1	1	1	1	4.5	4.5	5	5	5
Georgia	2	2	3	3	3	3	5.5	5.5	5.5	6	7	7
Iraq	0	0	0	0	0	0	0	0	0	0	0	0
Israel	0	0	0	0	0	0	0	0	0	0	1	1
Jordan	0	0	0	0	0	0	0	0	0	0	3.5	3.5
Kuwait	0	0	0	0	0	0	0	0	0	0	0	0
Oman	0	0	0	0	0	0	0	0	0	0	0	0
Qatar	1	1	1	1	1	1	2	2	2	5.5	5.5	5.5
Saudi Arabia	0	0	0	0	0	0	0	0	0	0	0	0
Turkey	2	2	2	2	2	5	5.5	5.5	5.5	5.5	5.5	6.5
United Arab Emirates	0	0	0	0	0	0	0	0	0	0	0	0
Yemen	1	1	1	1	1	1	1	1	1	1	1	1
Europe	1.7	1.9	2.4	2.9	3.8	4.1	4.4	4.8	5.0	5.0	5.5	5.5
Centr./East. Europe	1.8	2.5	2.8	3.4	4.7	5.0	5.8	5.8	6.3	6.3	6.4	6.4
Bulgaria	1	1	1	1	1	1	1	1	1	1	1	1
Czech Republic	2.5	2.5	2.5	2.5	7	7	7	7	8	8	8.5	8.5
Hungary	3	7.5	9	8.5	8.5	9	7.5	7.5	8.5	8.5	8.5	8.5
Poland	0	0	0	4.5	4.5	4.5	6	5	5.5	5.5	5.5	5.5
Romania	2.5	2.5	2.5	2.5	3.5	3.5	8	8	8	8	8	8

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Slovakia	1.5	1.5	1.5	1.5	3.5	5	5.5	6	7	7	7	7
Former Soviet Union	1	1	1.6	1.8	2	2.3	2.8	3.6	2.8	2.8	2.8	2.8
Belarus	0	0	0	0	0	0	0	2	2	2	2	2
Republic of Moldova	2	2	2	2	2	2	2	2	2	2	2	2
Russian Federation	1	1	3.5	4	5	5	5	5	5	5	5	5
Ukraine	1	1	1	1	1	2	4	5.5	2	2	2	2
Northern Europe	2.9	2.9	3.3	4.2	5.3	5.6	5.8	6.5	6.1	6.2	6.4	6.4
Denmark	1	1	4.5	4.5	4.5	4.5	4.5	4.5	5.5	4.5	4.5	4.5
Estonia	1	1	1	4	4.5	4.5	4.5	5.5	6.5	6.5	6.5	6.5
Finland	3	3	3	5.5	7	7	7	7	7	7	6.5	6.5
Iceland	1.5	1.5	1.5	1.5	1.5	5	6	6	6	6	6.5	6.5
Ireland	2	2	2	2	7	7	7	7	2	2	3	3
Latvia	0	0	0	2.5	3.5	3.5	3.5	5	4.5	4.5	4.5	4.5
Lithuania	1	1	1	1	2	2	2	6	6	6	7	7
Norway	6	6	6	6.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5
Sweden	7	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	8.5	8.5	8.5
United Kingdom	6	6	6	6.5	6.5	6.5	7.5	7.5	7.5	8.5	8.5	8.5
Southern Europe	0.7	0.7	1.0	1.1	2.0	2.1	2.1	2.7	3.5	3.7	5.0	5.1
Albania	2	2	2	2	2	2	2	6.5	7.5	7.5	8	8
Croatia	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	4.5	5	6	6
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0
Greece	0	0	0	0	0	0	0	0	0	3	4.5	4.5
Italy	0	0	0	0	0	0	0	0	0	0	3.5	4.5
Malta	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.5	6	7	7	7
Portugal	0	0	0	0	4.5	4.5	4.5	4.5	4.5	2	6	6
Slovenia	1	1	2	2	6	6	6	6	6	6	6	6
Spain	0	0	2	2.5	2.5	3	3	3	3	3	4	4
Western Europe	1.6	2.2	2.9	3.8	4.4	5.0	5.1	5.1	5.3	5.3	5.4	5.4
Austria	2.5	7	7	7	8	8	8	8	8	8	8	8
Belgium	0.5	0.5	3.5	3.5	4	4	4	4	5	5	6	6
France	1.5	1.5	3	3	3	3	3	3	3	3	3	3
Germany	1.5	1.5	1.5	5	5	7	7	7	4	7	7	7
Luxembourg	1	1	1	1	1	2	2	2	2	2	2	2
Netherlands	3	3	3	3	5	6	7	7	7	7	7	7
Switzerland	1	1	1	4	5	5	5	5	5	5	5	4.5

