

# Bank stability and transparency

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A number of recent policy initiatives have called for enhanced transparency of banking firms. While the hope is that enhanced transparency may improve incentives *ex ante*, it is less clear whether transparency is necessarily a good thing *ex post*, when a bank might have hit hard times and provision of information could have a destabilising effect. This article provides a synopsis of these different effects and also provides some new evidence in an attempt to clarify empirically whether in the long run, taking *ex ante* and *ex post* effects together, transparency is likely to reduce or increase bank stability. The analysis suggests that, on balance, transparency reduces the chance of severe banking problems and thus enhances overall financial stability.

**IN THE WAKE** of the experience of the banking crises in Mexico (1994) and the south east Asian and east Asian economies (1997), official bodies, including the IMF (see Fischer, 1999) and the Basel Committee on Banking Supervision (2003) have called for increased transparency of banking firms. These calls relate to the suspicion that 'recent crises owe some of their intensity to a general lack of transparency about the sizes of positions that had been built up by both borrowers and lenders' and that 'practices and policies responsible for the depth of recent crises would not have been undertaken, had they been required to be made public' (Fischer, 1999, page 563). As a policy response, the stated aim of Pillar 3 disclosures introduced by the revised Basel Accord is to provide incentives for banks to 'more prudently manage their risks'.

However, there could be an important trade-off relating to increases in transparency. In particular, while the hope is that enhanced transparency may improve incentives *ex ante*, it is perhaps less clear whether transparency is necessarily a good thing *ex post*, when a bank might have hit hard times and provision of information could perhaps have a destabilising effect. This article provides a synopsis of these different effects and also provides some new evidence in an attempt to clarify empirically whether 'net', transparency is likely to reduce or increase bank stability.

## Ex ante effects of transparency

A number of papers have explored the idea that transparency could be beneficial *ex ante*. The main

idea is that increased transparency enhances market discipline on banks.<sup>1</sup> In particular, the key argument is that bank transparency increases the sensitivity of the bank's funding terms to the risk it takes and that this in turn can create incentives for the bank to control its risk (*ex ante* discipline). For instance, in Boot and Schmeits (2000) the degree of transparency determines the likelihood that investors in bank liabilities learn the extent of the monitoring and screening effort invested by the bank. This effort in turn determines the bank's risk of default, as increased monitoring is assumed to be associated with a lower probability of failure. Since effort is costly, in the absence of transparency the bank will choose low levels of monitoring, resulting in high risk. As transparency increases, monitoring effort and thus risk become more easily observable, implying that the bank will face a higher short-term funding cost for low levels of screening effort. Consequently, at high levels of transparency, the bank will choose a higher expected monitoring effort and thus a lower risk profile. Similarly, Cordella and Yeyati (1998) present a model where a bank's funding terms are more favourable if the bank chooses lower levels of risk. In this model the funding terms are determined after the bank has chosen its risk of default. When depositors can observe the level of risk chosen by the bank, the bank chooses low levels of risk since it would otherwise be punished by a high required interest rate on its funds. By contrast, when the level of risk cannot be observed by lenders, the bank has no way to commit to a low level of risk. In equilibrium lenders assume that the bank will choose a high level of risk and charge an interest rate appropriate to that. The

(1) See, for example, Cordella and Yeyati (1998), Boot and Schmeits (2000), Hyytinen and Takalo (2005).

bank, in turn, knows that it will not be rewarded for a low level of risk and chooses a high level of risk in equilibrium.

These arguments, relating transparency to improved *ex ante* incentives, have also started to be documented empirically. In particular, a paper by Baumann and Nier (2003) showed that banks that disclose more information about their risk profile tended to choose a lower risk of default.

### Ex post effects of transparency

While these studies suggest that increasing the level of transparency may reduce bank risk-taking and improve bank stability *ex ante*, it may be less clear whether transparency is a good idea *ex post*, ie when an adverse shock has occurred and the bank is already in difficulty. There are two arguments here.

On the one hand, transparency could be 'bad' *ex post* if it further destabilises banks that are hit by exogenous shocks. In particular, one may be concerned that market responses may aggravate the position of a bank which is suffering from temporary and recoverable weakness and that market responses are more accentuated when more information is provided.<sup>1</sup> Indeed, in their paper, Cordella and Yeyati (1998) show that when the bank's risk profile is hit by a shock outside of the bank's control – such as a macroeconomic shock – bank transparency reduces bank stability since it results in investors demanding higher yields in response to the shock, compounding the bank's problems. But since the shock to the bank is assumed to be exogenous, there is no offsetting 'dividend' in terms of a lower choice of risk *ex ante*. In a similar spirit, Furman and Stiglitz (1998) suggest that 'greater transparency would have greatly aggravated the banking crisis in the United States in the 1980s, because many major banks would have had to shut down, greatly curtail their lending or receive substantial injections of equity' (page 69).

On the other hand, transparency could be 'good' *ex post* if it limits informational contagion to banks that are not exposed to the same shock. That is,

transparency could help markets and depositors distinguish between those banks that are insolvent and those banks that are fundamentally sound. With poor transparency depositors need to make such a distinction based on a limited set of information, increasing the risk that a crisis spreads from one bank to another. With high transparency the problem may be more easily contained. This point can be made more formally using the model by Gorton and Huang (2002). In this paper, there are many banks that are hit by both a systematic (macroeconomic) shock and a bank-specific (idiosyncratic) shock. Depositors can observe the former, but not the latter. This means that for a bad enough realisation of the common macroeconomic shock, all the banks in the system face a depositor run. In this model, if banks were transparent enough to allow depositors to observe the idiosyncratic shock – which might be favourable for some banks – only a fraction of the banks would be hit by a run. In a similar vein, Giannetti (2003) has formalised the idea that international capital flows are subject to contagion as a result of asymmetric information between international investors and emerging market banks.<sup>2</sup>

### Empirical evidence

In sum, both theory and evidence suggest that transparency is 'good' *ex ante*, but it is less clear whether transparency might potentially be 'bad' *ex post*. This begs the question: what is the *net* effect? In particular, what is the effect of transparency on the likelihood and depth of banking problems and crises?

In a recent paper, Barth, Caprio and Levine (2002) analysed the cross-sectional link between transparency and the incidence of banking crises in a cross-country sample of 51 countries during the late 1980s and 1990s. Across countries, the incidence of a banking crisis was defined using an account of crises compiled by Caprio and Klingebiel (2003), while transparency was measured at the country level as a summary variable that included information on a number of features relating to the market's ability to monitor banks.<sup>3</sup> The

(1) Morris and Shin (2002) formalised the idea that provision of public information may lead markets to overreact to potentially noisy public signals.

(2) In the context of the recent emerging market crises, Ferguson (1998) suggested that: 'Standards for the transparency of and disclosure of private financial information were extremely lax. Once problems arose, it was difficult for creditors to distinguish good risks from bad and this caused them to withdraw their funds indiscriminately.'

(3) These were (i) whether banks' accounts were required to be audited, (ii) the percentage of a country's top 10 banks that were rated by a rating agency (iii) whether or not the country had an explicit deposit insurance scheme (iv) whether banks were required to disclose off-balance-sheet items, risk management procedures and non-performing loans and (v) whether subordinated debt counted as regulatory capital.

authors did not find a significant effect of transparency in these cross-country crises regressions. This could suggest that *ex ante* and *ex post* effects cancel each other out.

However, such cross-country analysis faces a number of difficulties. First, whether or not a country experienced a banking crisis in a given year is hard to define with precision and requires judgement.<sup>1</sup> Second, transparency of banks is a concept that is very difficult to measure. Third, the incidence of banking crises is likely to be affected by a large number of factors, including macroeconomic influences.<sup>2</sup> Fourth, in the face of these difficulties, the marginal impact of structural factors such as transparency is likely to be difficult to isolate in a cross-country set-up that offers only a small number of observations.

### Bank-level approach

Recent research carried out at the Bank of England<sup>3</sup> addresses some of these difficulties. This research used annual data on 550 listed banks from 32 countries<sup>4</sup> over the years 1994–2000. A number of the countries in the sample experienced a banking crisis during the sample period – eg Argentina, Brazil, Indonesia, Japan, Korea, Malaysia, Taiwan, Turkey and Thailand – but most banks in the sample are from countries that did not experience a banking crisis during the period under study. However, rather than analysing stability at the country level, this research defined crisis at the bank level, resulting in a large number of observations.

### A market indicator of bank crises

In this study, large changes in banks' stock prices were used as a *market indicator* of financial distress. Arguably, a bank is experiencing a crisis when its stock price drops dramatically in any given year. And crucially, the stock price response not only measures the extent to which risk has materialised, but should also incorporate the effect of any resulting

responses in credit spreads the bank might be subject to.

A bank was thus defined to be in crisis if its stock return fell into the lowest 5% of the unconditional distribution of annual equity returns for all banks and years in our sample.<sup>5</sup> Using this, an indicator variable  $c(i,t)$  was constructed for each bank and year where  $c(i,t)=1$  if the bank is in a crisis and  $c(i,t)=0$  if it is not. Box 1 provides an analysis of the distribution of this variable across countries and time. In so doing it also explores how the frequency of bank crises, as defined here, is related to the incidence of country-wide banking crises, as defined by Caprio and Klingebiel (2003). While *a priori*, there is little reason to expect this relationship to be exact, it turns out that there is a reasonably close mapping between the frequency of bank crises in our sample and the incidence of banking crises as identified by Caprio and Klingebiel.

### Bank-level measure of transparency

The measure of transparency used in the study was based on how much information on its risk profile a bank provided in its annual accounts. In particular, a disclosure index was constructed that records for 17 categories of possible disclosure whether or not the bank provides information in its published accounts as they are represented in the BankScope database. Each of the chosen 17 categories is related to one or more dimensions of the bank's risk-profile (interest rate risk, credit risk, liquidity risk and market risk). By summing across categories a composite measure of disclosure was created which was then normalised to take values between zero and 1. This variable was evaluated bank by bank and for each year of our sample.<sup>6</sup>

As regards the disclosure index as a measure of transparency three caveats are in order. First, the disclosure index only measures hard, quantifiable information and does not record differences in the

(1) A number of lists of banking crises exist that differ in detail. Eichengreen and Arteta (2000) analysed how these differences appear to affect the results of cross-country research into the causes of banking crises.

(2) Barth, Caprio and Levine (2002) controlled for inflation prior to the onset of the crisis.

(3) Nier (2004).

(4) These are Austria, Australia, Argentina, Belgium, Brazil, Canada, Chile, Finland, France, Germany, Greece, Hong Kong, Indonesia, Ireland, Israel, Italy, Japan, Korea, Malaysia, the Netherlands, Norway, Poland, Portugal, Singapore, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, the United Kingdom and the United States.

(5) It turned out in these cases the stock price fell by some 50% or more. A return that is worse than minus 50% would therefore need to be thought of as a tail event that would indicate a severe problem.

(6) A more detailed description of this variable can be found in Baumann and Nier (2004).

## Box 1: Market indicators of bank crises and banking crises

One way of validating market indicators of banking problems is to compare how they perform against a benchmark of known cases of banking crises *ex post*. Table A provides a heat-map of the distribution of our bank crisis variable across countries and years. For each country and year it shows the average of  $c(i, t)$  or, equivalently, the frequency of a bank crisis under our measure. While the definition of crisis in this paper is based on market returns, Caprio and Klingebiel (2003) define a systemic banking crisis as a situation where much or all of bank capital in a given country is exhausted. Using some judgement in applying this definition, they provide an account of systemic and smaller banking crises across countries. According to this, systemic banking crises occurred in the following countries during our sample period: Argentina (1995), Brazil (1994–99), Finland (1991–94), Indonesia (1997–2002)<sup>1</sup>, Japan (1991–2002), Korea (1997–2002), Malaysia (1997–2002), Poland (1990s), Taiwan (1997–98), Thailand (1997–2002) and Turkey (2000–2002)<sup>1</sup>. Applying a threshold of 10 percent to the average of  $c(i, t)$ , ie 10% of banks in a country experienced stock returns of -50% or worse,

provides a reasonably close map between the market indicator we use and the account offered by Caprio and Klingebiel (2003). In particular, the market indicator catches the crises in Brazil, the south-east Asian crises in Indonesia, Malaysia and Thailand, the east Asian crises in Taiwan and Korea, as well as the European crises in Turkey and Poland. It does not, however, catch Argentina's 1995 crisis, nor the crises in Japan and Finland. The latter two crises started well before our sample period begins, which may be one reason why one does not see stock market reactions during our sample period. Moreover, in both countries banks have enjoyed continued government support, which might have limited stock market reactions: see Hoggarth, Jackson and Nier (2003). In addition, in some cases the market indicator records a crisis when there is none according to Caprio and Klingebiel (2003). For instance, Hong Kong did not, during the 1990s, experience a banking crisis, even though there was a large bank failure in 1998. High values on the market indicators for the years 1994 and 1997 and 1998 might conceivably be due to contagion in this case.

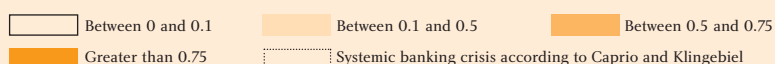
**Table A**  
Average of  $c(i, t)$

Year	Argentina	Australia	Austria	Belgium	Brazil	Canada	Chile	Finland	France	Germany	Greece	Hong Kong	Indonesia	Ireland	Israel	Italy
1994	0	0						0	0.08	0		0.60	1.00	0		0
1995	0	0			0.14	0	0	0	0.07	0	0	0.08	0	0		0
1996	0	0	0	0	0.09	0	0	0	0	0	0	0	0	0	0	0
1997	0	0.13	0	0	0.20	0	0	0	0.07	0	0	0.29	0.50	0	0	0.04
1998	0.25	0	0	0	0.22	0	0	0	0	0	0	0.07	0.60	0	0.25	0
1999	0	0	0	0	0	0	0	0	0	0	0.20	0	0.60	0	0	0.07
2000	0	0.17	0	0	0	0	0	0	0.06	0.05	0.17	0	0.75	0	0	0.03
Total	0.05	0.04			0.11				0.04	0.01	0.08	0.13	0.57		0.05	0.02

Year	Japan	Korea	Malaysia	Netherlands	Norway	Poland	Portugal	Singapore	Spain	Sweden	Switzerland	Taiwan	Thailand	Turkey	United Kingdom	United States	Total
1994	0	0	0	0	0		0	0	0.07	0	0	0	0	1.00	0	0.02	0.04
1995	0	0	0.17	0	0.13	0	0.25	0	0	0	0	0	0	0	0.09	0	0.02
1996	0	0	0	0	0	0	0	0	0	0	0	0	0.50	0	0	0.01	0.01
1997	0	0	0.67	0	0	0	0	0.17	0	0	0	0.75	0.50	0	0	0	0.07
1998	0.01	0	0	0	0	0	0	0	0	0	0	0.14	0	0.80	0	0.07	0.06
1999	0.05	0.27	0	0	0	0.10	0	0	0	0	0	0.09	0	0	0	0.08	0.05
2000	0.05	0.55	0.20	0	0	0.15	0	0	0	0	0	0.36	0.29	0.85	0	0.05	0.08
Total	0.01	0.14	0.17		0.02	0.05	0.03	0.03	0.01			0.25	0.17	0.40	0.01	0.04	0.05

Source: Bank calculations.



(1) According to Caprio and Klingebiel (2003), both Indonesia and Turkey suffered smaller or borderline systemic crisis in 1994.

amount of qualitative information provided by the banks or differences with respect to quantitative information that is not comparable across banks.<sup>1</sup> Second, the disclosure index is based on the amount of information banks provide in annual accounts and does not take into account other potential channels of disclosure, such as information provided by rating agencies and supervisors. Third, the disclosure index is based on an unweighted sum, which does not attempt to introduce a measure of the relative importance of the various components.<sup>2</sup>

### Econometric analysis

As explained above, in theory the effect of transparency is ambiguous. Transparency may temper moral hazard and thus reduce the likelihood of crisis. Transparency may also decrease the likelihood of information contagion, on average. However, for any individual bank hit by an exogenous shock transparency may be destabilising if it results in sharper market reactions than would otherwise occur.

In order to investigate the net effect, probit regressions were undertaken that analysed the link between transparency and the likelihood of a bank experiencing a crisis. The analysis accounted in addition for a number of macro- as well as bank-level factors in an attempt to isolate the effect of transparency from potentially confounding influences. In particular, the results (Table 1, Column 1) account for differences at the macro level as regards the growth rate of real GDP, the current account position and the nominal short-term interest rate and differences across banks in size, exposure to general stock market movements (Beta) and profitability (ROA).

### Regression results

The regression results shown in Table 1, Column 1 are statistically strong and suggest that more transparent banks are less at risk of crises, a finding that is statistically significant at the 5% level (with a P-value of 1%). This is consistent with the argument that banks that disclose more

information have better incentives to manage their risks (*ex ante*). But it is also consistent with the idea that transparency reduces the risk of informational contagion that arises due to limited information on the part of depositors and investors (*ex post*). Taken together these effects appear to dominate a potentially competing effect according to which (*ex post*) market reactions could be more pronounced for more transparent banks.

**Table 1**  
**Probit regressions: the effect of transparency on crises**

	(1) Probit	(2) Probit (IV) <sup>(a)</sup>
Dependent variable	$c(i, t)$	$c(i, t)$
Disclosure <sup>(b)</sup>	-0.5644 **	-1.0483 **
Time trend <sup>(c)</sup>	0.1710 ***	0.1796 ***
Log of TA <sup>(d)</sup>	-0.079 **	-0.0629 **
Beta <sup>(e)</sup>	0.2717 *	0.2795
ROA <sup>(f)</sup>	-7.2689 **	-8.0971 *
Current <sup>(g)</sup>	-0.0030 *	-0.0035 *
Interest <sup>(h)</sup>	0.0001	0.0001
GDP growth <sup>(i)</sup>	5.1397 *	4.1358
Constant	-341.9816 ***	-359.0691 ***
Number of observations	2551	2466.0
Number of banks	557	519.0

Source: Bank calculations.

\* Indicates significance at the 10% level.

\*\* Indicates significance at the 5% level.

\*\*\* Indicates significance at the 1% level.

(a) Probit regressions using instrumental variables (IV).

(b) Disclosure = disclosure index, lagged one year.

(c) Time trend = time trend variable.

(d) Log of TA = log of the bank's total assets.

(e) Beta = bank's beta, lagged one year.

(f) ROA = bank's return on assets, lagged one year.

(g) Current = current account position, lagged one year.

(h) Interest = nominal short-term interest rate, lagged one year.

(i) GDP growth = real GDP growth, lagged one year.

Furthermore, the sign and size of macroeconomic and bank-specific control variables appear plausible. In particular, the current account variable is assigned a significantly negative sign, suggesting that a high current account deficit – and the resulting capital inflows – tend to have a destabilising effect on banks.<sup>3</sup> Likewise, high short-term interest rates and high growth rates appear to increase the

(1) For instance, many banks publish Value at Risk (VaR) numbers relating to their market risk in annual accounts. However, there is no standard governing the presentation of this information. The key assumptions underlying the VaR calculations, such as investment horizon and confidence level are not uniform across banks. As a result the numbers are not comparable across banks and the information is not recorded in the BankScope database. See Hoggarth *et al* (2003) for further discussion.

(2) If disclosure is a noisy measure of true transparency, this would bias our findings against finding a significant effect. In other words, the effect of transparency might be stronger than is measured by the disclosure index.

(3) Further discussion of this point can be found in Radelet and Sachs (1998).

likelihood of banking problems, consistent with prior evidence that such problems tend to emerge close to the peak of the economic cycle, (Berger and Udell, 2002, Borio and Lowe, 2002). In addition, as expected, larger and more profitable banks are less at risk of crises, while banks that are more exposed to general stock market movements – ie banks with a high beta – are more likely to experience dramatic stock market declines.

The findings discussed above turned out to be robust to a number of changes to the detailed specification<sup>1</sup>. However, one potential concern with the analysis is that the disclosure variable might be endogenous. An endogeneity problem might arise if there is an unobservable, or latent, variable that determines both the decision to disclose information and the likelihood of crisis. In particular, it is conceivable that banks that are crisis-prone decide to provide little information, because they want to hide their true state, and that those same banks are more likely to experience a crisis for the same underlying reason.

In order to investigate this possibility instrumental variables regressions were run, as follows: in a first step, the disclosure variable was regressed on a number of observable exogenous regressors. In a second step, the predicted value of this regression of the disclosure variable, which is a function of observable exogenous variables only, was used in the probit regression<sup>2</sup>. Table 1, Column 2 reports the second stage regression using the predicted value of the first stage regression in lieu of the disclosure variable. The results in Table 1, Column 2 suggest that endogeneity is not a major issue for our regression. The coefficient on the instrumented disclosure variable retains both its sign and its level of economic significance, when compared to the benchmark result presented in Table 1, Column 1.

## Conclusions

Policymakers have identified increases in bank transparency as one potential way to increase bank stability. The idea is that more transparency strengthens market discipline and that this creates

beneficial incentives *ex ante*. However, policymakers might be concerned that the market discipline provided through more transparency might often be detrimental *ex post*, when market responses might tip ailing banks over the edge.

This article has attempted to clarify this potential trade-off by examining, for a large sample of banks, whether transparency increases or decreases the chance of severe banking problems. Our results suggest that to the extent that such a trade-off exists, the benefits of transparency for bank stability outweigh its costs. We have found that banks that disclose more information are less at risk of falling into crisis. This result suggests that transparency is able to improve bank stability and reduce the incidence of banking crisis. These results thus also suggest that Basel II Pillar 3 disclosures could bring major dividends for overall financial stability, which should be protected when it comes to implementing Basel II.

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(1) This is discussed in more detail in Nier (2004).

(2) The variables used in the first stage regressions include a number of bank-specific variables (loan ratio, return on equity, size, market share and the cost-income ratio). In addition, we exploit the cross-country dimension of our dataset and include country dummy variables, which would reflect the average level of the disclosure in each country. Since we know that disclosure varies through time, we also include a linear time trend as an explanatory variable. Finally, to make sure that as a result of including year we do not create a variable that has a simple time trend, we interact year with the set of country dummy variables. As a result the predicted change in the instrumented variable through time will be specific to each country and therefore mimic the actual change in that variable at the country level. Again, this approach is motivated by a finding that the average change in disclosure is very different across countries.

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