Banking crises and transparency

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Abstract:

This paper assesses empirically the effect of disclosure on bank stability. In doing so it offers a new approach for assessing the marginal effect of structural factors on the likelihood of crises that involves panel-data techniques applied to bank-level data. Our dataset covers more than 500 banks in 32 different countries over the years 1994-2000. Using this dataset we assess the likelihood of a bank experiencing a dramatic fall in its stock price in any given year and relate the likelihood of such a "bank crisis" for any particular bank and in any particular year to both the existence of a deposit insurance scheme and to bank transparency, while controlling for macro- as well as bank-level factors that might also play a role in affecting the likelihood of such an event. We find evidence that bank transparency reduces the likelihood of bank crises, while the effect of deposit insurance depends on the particular design features of the regime.

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1. Introduction

A key concern for policymakers is that the banking sector is prone to systemic crises. In an attempt to stem off potential banking crises, a large number of countries rely on explicit deposit insurance schemes that aim to reduce the likelihood of depositor runs. However, paradoxically, such schemes may actually increase the likelihood of crises by increasing the incentive for banks to take excessive risks. An alternative to bank safety nets may be to improve bank transparency. Indeed, in the wake of the experience of recent banking crises, a number of policy initiatives have called for increased disclosure and transparency (IMF, Basel Committee, 1998).

There is a growing body of cross-country research on the structural factors that may impact the likelihood of banking crises. However, whether or not bank transparency can play a role in preventing or mitigating banking crises remains an open empirical issue. Attempts to relate the incidence of banking crises to transparency in a cross-country setting run into a number of difficulties. First, cross-country differences in transparency are hard to measure. Second, transparency is only one of many structural factors that may impact the likelihood of crisis. Other institutional differences - such as differences in the supervisory and regulatory regime, and the extent of deposit insurance - may well be correlated with the degree of bank transparency across countries. Third, while the likelihood of a crisis developing may be partly determined by such structural factors, macroeconomic influences - such as rapid drops in aggregate demand or realignments in exchange rates – have been shown to play an important part in determining the incidence of banking crises. In the face of these difficulties, cross-country research suffers from a small sample problem that makes it hard to detect the marginal effect of transparency.

This paper offers a new approach for assessing the marginal effect of structural factors on the likelihood of crises that involves panel-data techniques applied to bank-level data. Our dataset covers 550 banks in 32 different countries over the years 1994-2000. Using this dataset we assess the likelihood of the bank experiencing a dramatic fall in its stock price in any given year and relate the likelihood of such a "bank crises" for any particular bank and in any particular year to structural factors, while controlling for macro- as well as bank-level factors that might also play a role in affecting the likelihood of such an event. Using bank-level data and exploiting the time dimension in a panel data set-up results in a dramatic increase in the number of observations as compared with cross-country studies. This enables us to isolate the effects of both deposit insurance and transparency. In particular, we make use of bank-level information on disclosure that is based on whether a bank discloses a number of dimensions of its risk exposure, covering 17 categories related

to interest rate risk, credit risk, liquidity risk and market risk. This information enables us to measure transparency bank by bank and in each year of the sample.

The remainder of this paper is organised as follows. Section 2 offers some conceptual background and section 3 describes prior literature. Section 4 outlines our research strategy. It then describes the way we measure structural factors, such as transparency and deposit insurance design features and also discusses other factors that are likely to affect the likelihood of a bank crisis. Section 5 presents the empirical results on the association between structural factors and bank crises, controlling for those other factors. Section 6 discusses a number of robustness checks. Section 7 summarises our findings and concludes.

2. Conceptual background

The idea that banks are fragile and may be susceptible to runs has first been modelled in the seminal paper by Diamond and Dybvig (1983). In this model banks invest in long term assets but issue deposits redeemable on demand. In the presence of a sequential service constraint, depositors may have an incentive to demand cash early even if their preferences are such that they re prepared to wait until the long-term asset comes to fruition. In particular, a belief that other depositors will run the bank creates a self-full-filling incentive for all depositors to run, resulting in costly early liquidation of the long-term asset. In this model, deposit insurance can eliminate the bank-run equilibrium, increasing the stability of the bank.

On the other hand, it is well known that flat-rate deposit insurance may result in risk-shifting incentives for the bank, which might destabilise the banking system. When banks are subject to the threat of a run, they might behave more prudently than they would if that threat was removed by a comprehensive deposit insurance scheme. More generally, deposit insurance may reduce the link between a bank's risk of default and its funding cost, creating an incentive for the bank to increase default risk at the expense of depositors or the deposit insurance fund[2]. Merton (1977) showed that flat rate deposit protection schemes create a subsidy that is more valuable if a bank engages in riskier activities. A number of theoretical studies have since shown how the incentive to take risk created by deposit insurance may depend on a number of other factors, such the charter value of the bank, eg

[2] In principle, the funding charge adopted in deposit insurance schemes could be linked to a bank's relative riskiness. But in practice, this proves difficult, not least because banking risk is not easily observed or measured. As a result, the funding charge of the overwhelming majority of schemes is independent of a bank's riskiness. See Demirguc-Kunt and Kane(2002)for more detail.

Herring and Vankudre (1987), Bhattacharya et al (1998), and Hellmann, Murdock and Stiglitz (2000).

A relatively small theoretical literature analysed the effect of transparency on bank stability, eg Cordella and Yeyati (1998), Boot and Schmeits (2000), Hyytinen and Takalo (2003). The main intuition in these papers is that bank transparency increases the sensitivity of the bank's funding terms to the risk it takes and that this can create incentives for the bank to control its risk (ex ante discipline). This logic goes through if deposits are not fully insured. But it also applies more generally to the part of a bank's funding that is not covered by deposit insurance, such as subordinated debt and inter-bank liabilities. 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 higher effort is associated with a lower probability of failure. The authors show that the degree of transparency determines the sensitivity of the bank's funding cost to its risk-taking behaviour. 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 lower risk.

While these studies suggest that increasing the level of transparency may reduce bank risk-taking and improve bank stability ex ante, there may be a question as to whether transparency is a good idea ex post, ie when the crisis has struck and the bank is already in difficulty. In particular, one may be concerned that market responses may aggravate the position of a bank which is suffering from temporary and recoverable weakness. Indeed, in their paper, Cordella and Yeyati (1998) show that when the bank's risk is hit by an exogenous shocks, bank transparency reduces bank stability since it results in investors demanding higher yields, compounding the bank' problems.

On the other hand, even ex post, bank transparency may enhance stability when it helps markets, including 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 limited information, increasing the risk that a crisis spreads from one bank to another (informational contagion). For instance, in the model by Gorton and Huang (2002), 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, depositors run all the banks in the system. In this model, if banks were transparent enough to allow depositors to observe the idiosyncratic shock, only a fraction of the banks would be hit by a run.

3. Prior empirical literature

A large number of prior empirical studies examined the implications of deposit insurance on bank stability, eg Demirguc-Kunt and Detragiache (1998), Demirguc-Kunt and Detragiache (2002) and Hovakimian, Kane and Laeven (2003), among others. Demirguc-Kunt and Detragiache (1998) analysed the likelihood of systemic banking crises during the period 1980 to 1994 for a sample of 65 countries. Using a logit analysis, they found that the existence of deposit insurance increased the likelihood of crises in their sample, controlling for a number of macro-variables. Demirguc-Kunt and Detragiache (2002) extended this analysis to examine in more detail various design features of deposit insurance schemes, as well as the interaction of deposit insurance with other features of the institutional environment. They found that the adverse impact of deposit insurance on bank stability was stronger when the institutional environment was weak. Also, the impact of deposit insurance on bank stability tended to be stronger the more extensive was the coverage offered to depositors. Hovakimian, Kane and Laeven (2003) found similar results in a study of risk-shifting, using a sample of 390 banks from 56 countries for the period 1991 to 1999. In particular, they found that while deposit insurance resulted in significant risk-shifting on average, the tendency for explicit deposit insurance to exacerbate risk-shifting was tempered by incorporating loss control features such as risk-sensitive premia and coverage limits. In addition, introducing explicit deposit insurance has had adverse effects in environments that were low in political and economic freedom and high in corruption.

While the effect of deposit insurance on bank stability appears relatively well understood, to date there is hardly any evidence on the association between transparency and bank stability. In a recent paper, Barth, Caprio and Levine (2002) analysed the implications of various features of the regulatory and supervisory regime, including an index of private monitoring, for the likelihood of banking crises. The private monitoring variable was constructed as a summary measure that included information on a number of features relating to transparency:[3] In a sample of 51 countries the authors

[3] These were (i) whether banks' accounts were required to be audited, (ii) the percentage of a countries' 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.

studied the cross-sectional link between the score on the private monitoring index and the incidence of banking crises during the 1990s and late 1980s, using a logit approach that controlled for inflation prior to the onset of the crisis as well as for other features of the regulatory regime. The authors did not find a significant effect of the private monitoring variable in these regressions. As the authors point out, one of the difficulties for their analysis is that the private monitoring variable relates to the 1998-2000 period, while many of the crises occurred throughout the 1990s. Another problem may be that the cross-country measure of disclosure could be correlated with numerous other country characteristics. Finally, the marginal impact of transparency on the incidence of crises may be difficult to isolate using a cross-country approach that offers a relatively small number of observations.

4. Research Design

We use annual data on 550 listed banks from 32 countries[4] over the years 1994-2000. A number of the countries in our sample experienced a banking crisis during the sample period – eg Argentina, Brazil, Indonesia, Japan, Korea, Malaysia, Taiwan, Turkey and Thailand, but most banks in our sample are from countries that did not experience a banking crisis during the period under study. Rather than analysing crises at the country level, this paper defines crisis at the bank-level. In particular we use changes in a bank's stock price as a *market indicator* of financial distress and say that a bank is experiencing a crisis when its stock price drops dramatically in any given year. It turns out that the annual equity return – ie the annual percentage change in the stock price - is lower than –50% in some 5% of all cases in our sample. A return that is worse than -50% can therefore be thought of as a tail event that would indicate a severe problem. We thus define a bank to be in crisis if its stock return falls into the lowest 5% of the unconditional distribution of returns for all banks and years in our sample. Using this we define a dummy variable $c(i,t)$ 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 2 at the end of the paper provides an analysis of the distribution of this variable across countries and time.

We then study the likelihood that a bank experiences a crisis in any given year and relate this likelihood to structural factors, while controlling for macro- as well as bank-level factors that might also play a role in affecting the likelihood of such an event. In particular, we hypothesise that

[4] These are Austria, Australia, Argentina, Belgium, Brazil, Canada, Chile, Finland, France, Germany, Greece, Indonesia, Ireland, Israel, Italy, Japan, Korea, Malaysia, the Netherlands, Norway, Poland, Portugal, Singapore, Spain, Sweden, Switzerland, Thailand, Taiwan, Turkey, the UK and the US.

$$\Pr[c(i,t)=1]=F(X,\beta)$$

where F is the normal distribution function, X is a vector of explanatory variables and β is a vector of parameters. The vector of explanatory variables X can be written as

$$X=(M,B,S,)$$

It includes macro-economic control variables (M), bank-specific control variables (B) as well as structural determinants of the likelihood of crises that are the focus of the analysis. The parameters are estimated using a probit estimator that is applicable to panel data[5].

(i) Macroeconomic conditions (M)

The existing literature highlights a number of macroeconomic factors that are associated with increases in the likelihood of banking sector problems. These include cyclical output swings, high interest rates, as well deteriorations in the country's terms of trade (Caprio and Klingebiel, 1996, Lindgren Garcia and Saal, 1996, Kaminsky and Reinhart, 1996).

In particular, existing studies suggest that banking crises occur towards the end of an economic upturn, that may be fuelled by a lending boom. Since bank's credit decisions worsen with the time elapsed since the last downturn, such lending booms lead to fragility in that they result in banks making the wrong credit decisions towards the peak of the cycle, Berger and Udell (2003). To capture the state of the economic cycle and thus the overall health of the economy we include the rate of growth of GDP.

Other studies emphasise that banking crises may result from a materialisation of interest rate risk. For example, in the United States in the early 1980s the Savings and Loans institutions found themselves with substantial fixed-interest assets when market interest rates and consequently their funding costs, rose sharply (Mishkin, 1996). A high short term nominal interest rates may be due to various factors, such as a high rate of inflation or a restrictive monetary policy. It may also have played a role for some of the recent episodes of banking crises in emerging market economies where policy interest rates were raised to defend currency pegs. We therefore include the short-term interest

[5] We use the population-averaged gls probit estimator with robust standard errors as described in the STATA handbook

rate prevailing in each country as an explanatory variable to capture problems arising from difficulties in managing the banks' maturity mismatch.

Finally, we account for terms of trade imbalances by including the country's current account position. A current account deficit means that imports exceed exports at the prevailing exchange rate. This increases the likelihood of a depreciation, which, in turn may affect the banking system in a number of ways. First, when domestic borrower's are exposed to a depreciation, this might increase their probability of default. Second, when banks borrow in foreign currency and lend in domestic currency, an unexpected depreciation of the domestic currency threatens bank profitability, even if it does not affect the incidence of non-performing loans[6]. We thus include the lagged value of the current account balance as a reverse proxy of such currency risk.

(ii) Bank-specific control variables (*B*)

Whether or not a particular bank runs into problems not only depends on the condition of economy as a whole. It also depends on the extent to which a bank is exposed to the underlying risks relative to its peers. An indicator of a bank's risk is the bank's beta. Beta measures the correlation of a bank's stock price with the overall stock index in the bank's country of origin. It should therefore capture the bank's exposure to the macro-economic risks the country faces. In theory, as a summary measure of risk, beta measures exposure to macroeconomic risk irrespective of whether the source of risk is the banking book or the trading book. It is therefore a useful *market indicator* of both the bank's credit risk and its market risk. In addition, it may capture interest rate risk to the extent that this is a major source of macroeconomic risk in a given country. We therefore include the lagged value of each bank's beta as a bank-specific control variable.

Prior studies also found that more profitable banks were less likely to fail in the immediate future than less profitable banks, eg Logan (1999). This may imply that, on average, it takes some time before a bank's condition deteriorates sufficiently for a bank to enter financial distress. Poor current returns may then increase the likelihood of financial distress in the shorter term. Alternatively, high current profitability may be a signal of good management, reducing the likelihood of a future crisis. We follow the existing literature and include the lagged value of the bank's return on assets as a bank-specific control variable.

[6] Demirguc and Detragiache, (1996) did not find a significant effect of exchange realignments in their crises regressions. More generally, the evidence on the impact of the exchange rate regime is mixed, Eichengreen and Arteta (2000).

A final bank-specific control variable is the bank's size. A number of prior studies found that larger banks were less likely to fail than smaller banks, eg Logan (1999). This is usually attributed to better opportunities to achieve diversified loan portfolios. Indeed, size may be associated with both better sectoral as well as geographical diversification. In the context of the present study, another reason to include size is that larger banks were found to have lower stock volatility than smaller banks, making extreme return realisations less likely, Baumann and Nier, (2003). Size was measured as the lagged value of the log of total assets.

(iii) Structural variables (*S*)

We are interested in investigating the impact of structural factors on the likelihood of a bank experiencing a crisis, controlling for macroeconomic factors and observable bank-specific factors. In particular, we attempt to measure the impact of both bank transparency and deposit insurance on the likelihood of a bank experiencing crisis.

Bank transparency

Quantifying bank transparency difficult. Arguably, banks are inherently opaque institutions and marginal differences in transparency across banks are difficult to measure with any precision. Also, the degree of transparency of a bank depends on a number of disclosure policies, such as hard disclosures in annual accounts, but also more qualitative information that may be useful in order to put hard information into perspective. In this study, two different measures of bank transparency are employed.

The first measure of transparency is based on whether the bank had a listing on a primary US exchange. Firms registered outside the US and listed on a primary US exchange may provide their US shareholders with financial statements prepared under their domestic (non-US) generally accepted accounting principles. But the Securities and Exchange Commission (SEC) requires such firms to reconcile their reported earnings and shareholder's equity to US GAAP as part of a Form-20 filing. It is widely believed that the quality of statements prepared in accordance with US GAAP is superior to alternative disclosure regimes[7]. Empirical research is largely supportive of this view. Amir, Harris and Venuti (1993) find that the reconciliation of earnings and shareholder's equity in

[7] There has been a wave of accounting frauds in the USA. Typically, in these cases the published accounts did not meet the US accounting standards. These cases may not necessarily change the belief that accounts that do comply with US

Form-20 filings are value-relevant in the sense that they increase the association between accounting earnings and security returns. Leutz and Verrecchia (2000) show that German firms which have voluntarily adopted US GAAP for their reporting show lower measures of information asymmetry and higher stock liquidity compared to a control group of firms employing the German reporting regime. Apart from increasing the quality of disclosure, a US listing may also entail an increase in the quantity of disclosure as the Form 20 requires disclosure of information, which may not be required under the bank's national accounting regulations. We therefore constructed a measure of transparency based on whether the bank had a listing on a primary US exchange. The variable list takes the value one if the bank is listed on the NYSE, the NASDAQ or the AMEX.

The US listing variable is an indirect measure of the amount of information available to investors. A second, alternative measure of transparency is based directly on how much information on its risk profile a bank provides in its annual accounts. In particular we constructed a disclosure index 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. All of the 17 categories are related to one or more dimensions of the bank's risk-profile (interest rate risk, credit risk, liquidity risk and market risk). For each category, we have assigned a value of one if the bank provided information and zero, if the bank did not provide information. The variable disc, which is normalised to take values between zero and 1, is available bank by bank and for each year of our sample. A detailed description of this variable is provided in Box 1 (at the end of the paper) and descriptive statistics can be found in Table A2. As regards the disclosure index as a measure of transparency two caveats are in order. First, the disclosure index only measures hard, quantifiable information and does not record differences in the amount of qualitative information provided by the banks or differences with respect to quantitative information that is not comparable across banks[8]. 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.

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

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GAAP may be more informative than accounts that comply with alternative standards.

[8] 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 is not uniform across banks. As a result the numbers are not comparable across banks and the

of information contagion, on average. However, for any individual bank hit by an exogenous shock transparency may be destabilising if it results in sharper reactions by depositors than would otherwise occur.

Deposit Insurance

Demirgüc-Kunt and Sobaci (2000) provide a dataset on the existence and extent of deposit insurance schemes across countries[9]. Using this dataset, we focus on aspects that in previous research emerged as important in determining the likelihood of banking crises and we re-examine these features in the context of our analysis of the drivers of bank crises. First, we investigate the effect of whether or not the bank is from a country where there exists an explicit deposit insurance scheme. Second, we analyse the effect of the scheme specifying coverage limits for depositors. In particular, we construct two dummy variables, as follows

Explicit =1 if there exists an explicit deposit insurance scheme,
=0 otherwise
Unlimited=1 if there exists an explicit deposit insurance scheme and coverage is unlimited,
=0 otherwise

As explained above, in theory the impact of the existence of an explicit scheme is ambiguous. On the one hand, an explicit scheme may reduce the likelihood of runs and thus increase overall bank stability. On the other hand, an explicit scheme may result in bank moral hazard, decreasing bank stability. Both aspects may also be relevant to the question whether unlimited coverage may increase or decrease bank stability.

5. Results

Tables 1 to 4 contain the main results. In addition to the variables discussed in detail above, all regressions also include a time trend. This is included since the incidence of bank crises is higher in the later years than in the earlier years of the sample, see Box 2. In each table, the first column shows our preferred specification, including all control variables, the second column shows bank-specific variables only and the third column shows bank-specific variables only.

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information is not recorded in the BankScope database. See Hoggarth et al (2003) for further discussion.

All three macroeconomic variables show the expected sign, and all of them are statistically significant in most equations. Across all equations, the current account variable is assigned a significantly negative sign, suggesting that a high current account deficit increases the likelihood of bank crises. Likewise, a high short term interest rate appears to be associated with an increase the likelihood crisis. And there appears to be some evidence that crisis events are preceded by high growth rates in GDP, a finding that is consistent with prior evidence that banking problems tend to emerge close to the peak of the economic cycle.

Most bank-specific variables are assigned the expected sign and the coefficients are generally highly significant. Banks with high exposure to macroeconomic factors (beta) appear to be more at risk of a crisis. Larger banks appear less likely to experience a crisis. Finally, more profitable banks appear less crisis-prone.

The effect of bank transparency is analysed in Tables 1 and 2. In table 1 we include the lagged[10] value of the disclosure index as a measure of transparency. It appears that banks that disclose more information are less likely to experience a crisis. This result is significant at the 5 per cent level (with a p-value of 0.01, Column 1) and robust across specifications. One way of interpreting the result is that banks that disclose more information are less prone to engage in moral hazard and thus less at risk of a crisis. Note that, while the benchmark regression controls for an observable measure of risk (beta), moral hazard is associated with an increase in risk factors that are not easily observable. An example is an increase in portfolio risk due to large exposures to particular institutions or sectors, another a lack of controls against operational risk. Another way of explaining the result is that banks that disclose more information are less at risk of informational contagion that arises due to limited information on the part of depositors and investors.

Table 2 analyses the effect of the US listing variable as an alternative measure of transparency. While the coefficient appears somewhat less significant than the coefficient on the disclosure index, overall, the regressions shown in Table 2 confirm the conclusions drawn from Table 1. Again, we

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[9] Using this dataset, Demirgüc-Kunt and Detragiache (2000) provide evidence that explicit deposit insurance tends to increase the likelihood of banking crises in a sample of 61 countries over the years 1980-97.

[10] We include the lagged value rather than the contemporaneous value to avoid simultaneity problems. For instance, a large drop in the bank's equity price may prompt the bank to change its disclosure policy.

find that a greater degree of transparency is associated with a decrease in the likelihood of a bank crisis[11].

The effect of deposit insurance is analysed in Tables 3 and 4. The results in Table 3 indicate that an explicit deposit insurance scheme appears to reduce the likelihood of a bank crisis. The coefficient on explicit is negative and significant at the 1 per cent level. Demirguc-Kunt and Detragiache (2002) found a positive coefficient on the same variable in their study of systemic crisis in a sample of 61 countries. Eichengreen and Arteta (2000) examined the robustness of the Demirguc-Kunt and Detragiache (2002) finding using a different set of countries and a slightly different crisis definition. Their results show a statistically negative coefficient, in contrast with the Demirguc-Kunt and Detragiache (2002) finding. Eichengreen and Arteta (2000) conclude that, from cross-country evidence, "there is at least as much evidence that deposit insurance has favourable effects as that it destabilises banking systems". Our results confirm the Eichengreen and Arteta (2000) finding of a negative relationship using bank-level data.

One potential explanation for the negative coefficient is that, in line with Diamond and Dybvig (1983) explicit insurance helps to avoid depositor runs and that this beneficial effect dominates the potential adverse effects arising from increased moral hazard incentives. There could however, be an alternative explanation. As Demirguc-Kunt and Kane (2002) point out, many countries that do not provide an explicit scheme provide an implicit form of deposit insurance. Without an explicit scheme, depositors may exert political pressure to force taxpayers to supply unlimited deposit guarantees in the case of bank failures. In this case, an explicit scheme may be a way of limiting the government's pay-out to depositors. This in turn could imply that an explicit scheme may limit rather than exacerbate banks' risk-shifting incentives when compared to an implicit scheme.

Table 4 suggests that unlimited coverage increases the likelihood of a bank to experience a crisis. This result appears statistically strong, with the coefficient significant at 5 per cent in the benchmark model. This result is in line with existing cross-country evidence, such as Demirguc-Kunt and Detragiache (2002) and underscores the moral hazard incentives resulting from unlimited coverage. In particular, with unlimited coverage, depositors are not at risk of loss when the bank defaults. Consequently, there is little incentive for depositors to monitor bank activities. In addition, the yield

[11] All US banks in the sample have a US listing. The result could thus be driven by US banks being less likely to experience a crisis than banks from other countries. However, the results shown in Table 2 are robust to the inclusion of a US dummy.

that depositors demand will not depend on the risk taken by the bank, creating strong moral hazard incentives for the banks.

6. Robustness checks

One potential concern with our analysis is that the disclosure variable might be endogenous. We include the lagged value of disclosure to counter potential simultaneity resulting from banks that are hit by a crisis deciding to reduce their level of disclosure. But there could be a remaining endogeneity problem if there is an unobservable, or latent variable, that determines both the decision to disclose information this period and the likelihood of crisis next period. 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 we run instrumental variables regressions, as follows: In a first step, the disclosure variable is 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, is used in the probit regression[12].

Table 5 reports the second stage regression using the predicted value of the first stage regression in lieu of the disclosure variable. The results in Table 5 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.

This begs the question as to how much of the explanatory power of the disclosure variables relates to cross-country differences in disclosure levels – which, in turn may be related to differing degrees of peer pressure, governance structures and regulatory standards - and how much of the explanatory power may relate to within-country differences across banks, as well as differences in the disclosure levels across time. In order to gauge this we perform regressions of the crisis variable on disclosure

[12] 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.

variables, including a set of country dummies. One would expect the effect of disclosure on the likelihood of a bank crisis to be the weaker in these regression, the more the benchmark effect of disclosure relates to these cross-country differences. Table 6 shows the results of this exercise, where estimation is based on simple OLS with robust standard errors[13]. While without country dummies, Table 6, Column (2) the coefficient of disclosure is -0.73, the size of the coefficient is reduced to -0.45 when country dummies are included, Table 6, column (1). Moreover, while without country dummies, the coefficient is significantly different from zero at the one per cent level, including country dummies results in the disclosure variable being just insignificant at the 10 per cent level (P-value 0.11). This suggests that cross-country variation in disclosure is important for the benchmark result, but that within country differences in disclosure also contribute to the overall finding of a negative influence of disclosure on the likelihood of crises. A similar conclusion can be drawn from comparing Table 6, Colums (3) and (4), where when country dummies are included, the listing variable retains its negative sign, but turns just insignificant at the 10 per cent level (P-value 0.19).

7. Conclusion

This paper offers a new approach for assessing the marginal effect of structural factors on the likelihood of crises that involves panel-data techniques applied to bank-level data. Our dataset covers more than 500 banks in 32 different countries over the years 1994-2000. Using this dataset we assess the likelihood of a bank experiencing a dramatic fall in its stock price in any given year and relate the likelihood of such a "bank crisis" for any particular bank and in any particular year to both the existence of a deposit insurance scheme and to bank transparency, while controlling for macro- as well as bank-level factors that might also play a role in affecting the likelihood of such an event. In this set-up we find evidence consistent with the hypothesis that bank transparency reduces the likelihood of bank crises. Our results also indicate that the effect of deposit insurance will depend on the particular design features of the scheme. Deposit insurance per se appears to reduce the likelihood of crisis, when compared to a regime with implicit deposit insurance. On the other hand, schemes that afford unlimited coverage to depositors appear to increase the likelihood of crises.

[13] Standard errors take account of the panel data structure of the dataset, utilising a cluster option. The reason for using OLS rather than probit is that the probit estimator no longer converges when the country dummy set is included.

Tables:

Table 1: Probit regressions

	(1) Probit	(2) Probit	(3) Probit
Dep. Variable	**c(i, t)**	**c(i, t)**	**c(i, t)**
L1disc	-0.5644 **	-0.5020 ***	-0.6021 ***
year	0.1710 ***	0.0902 ***	0.1712 ***
logsize	-0.0797 **	-0.0819 ***	
L1beta	0.2717 *	0.3442 ***	
L1roa	-7.2689 **	-3.5110 ***	
L1current	-0.0030 *		-0.0018
L1interest	0.0001		0.0000
L1gdp_g	5.1397 *		2.6073
constant	-341.9816 ***	-180.4627 ***	-343.4534 ***
No. of obs.	2531	3004	2597
No. of banks	537	562	546
Wald chi2	60.78	44.81	47.93
Prob > chi2	0	0	0

*** Statistical significance at the one percent level
** Statistical significance at the five percent level
* Statistical significance at the ten percent level

Table 2: Probit regressions

	(1) Probit	(2) Probit	(3) Probit
Dep. Variable	**c(i, t)**	**c(i, t)**	**c(i, t)**
list	-0.1926 *	-0.3252 ***	-0.1616
year	0.1664 ***	0.0807 ***	0.1627 ***
logsize	-0.0972 ***	-0.1004 ***	
L1beta	0.2874 *	0.3699 ***	
L1roa	-7.0400 **	-3.2729 ***	
L1current	-0.0029 *		-0.0018
L1interest	0.0003 **		0.0002 *
L1gdp_g	5.9436 **		3.3120
constant	-332.9417 ***	-161.3727 ***	-326.8047 ***
No. of obs.	2555	3030	2621
No. of banks	541	566	550
Wald chi2	52.96	47.37	44.92
Prob > chi2	0	0	0

*** Statistical significance at the one percent level
** Statistical significance at the five percent level
* Statistical significance at the ten percent level

Table 3: Probit regressions

	(1) Probit	(2) Probit	(3) Probit
Dep. Variable	**c(i, t)**	**c(i, t)**	**c(i, t)**
explicit	-0.4839 ***	-0.5072 ***	-0.7117 ***
year	0.1681 ***	0.0861 ***	0.1720 ***
logsize	-0.0852 ***	-0.0795 ***	
L1beta	0.2113	0.2688 **	
L1roa	-6.2043 **	-3.0297 **	
L1current	-0.0031 **		-0.0025 **
L1interest	0.0003 **		0.0003 **
L1gdp_g	4.5097 *		2.3232
constant	-336.1291 ***	-172.1200 ***	-344.8911 ***
No. of obs.	2555	3030	2621
No. of banks	541	566	550
Wald chi2	63.08	65.36	57.82
Prob > chi2	0	0	0

*** Statistical significance at the one percent level
** Statistical significance at the five percent level
* Statistical significance at the ten percent level

Table 4: Probit regressions

	(1) Probit	(2) Probit	(3) Probit
Dep. Variable	**c(i, t)**	**c(i, t)**	**c(i, t)**
unlim	0.2718 **	-0.0456	0.1109
year	0.1669 ***	0.0806 ***	0.1601 ***
logsize	-0.1105 ***	-0.0898 ***	
L1beta	0.2952 *	0.3377 ***	
L1roa	-7.1742 **	-3.4914 ***	
L1current	-0.0030 *		-0.0017
L1interest	0.0003 **		0.0002 **
L1gdp_g	6.4484 **		3.1392
constant	-333.8718 ***	-161.3370 ***	-321.6375 ***
No. of obs.	2555	3030	2621
No. of banks	541	566	550
Wald chi2	47.31	37.16	41.93
Prob > chi2	0	0	0

*** Statistical significance at the one percent level
** Statistical significance at the five percent level
* Statistical significance at the ten percent level

Table 5: Instrumental variables (IV) probit regressions

	(1) Probit	(2) Probit	(3) Probit
Dep. Variable	**c(i, t)**	**c(i, t)**	**c(i, t)**
L1discg(IV)	-1.0483 **	-1.2922 ***	-0.9528 **
year	0.1796 ***	0.0933 ***	0.1814 ***
logsize	-0.0629 **	-0.0633 **	
L1beta	0.2793	0.3665 ***	
L1roa	-8.0971 *	-4.2163 **	
L1current	-0.0035 *		-0.0019
L1interest	0.0001		0.0000
L1gdp_g	4.1358		1.5007
constant	-359.0691 ***	-186.2674 ***	-363.5694 ***
No. of obs.	2466	2912	2522
No. of banks	519	544	527
Wald chi2	59.94	40.64	52.43
Prob > chi2	0	0	0

*** Statistical significance at the one percent level
** Statistical significance at the five percent level
* Statistical significance at the ten percent level

Table 6: OLS regressions including country dummy variables

	(1) OLS	(2) OLS	(3) OLS	(4) OLS
	c(i, t)	c(i, t)	c(i, t)	c(i, t)
L1discg1	-0.0454	-0.0730 ***		
list			-0.0241	-0.0227 **
year	0.0121 ***	0.0133 ***	0.0113 ***	0.0124 ***
logsize	-0.0022	-0.0106 ***	-0.0026	-0.0129 ***
L1beta	0.0086	0.0394 **	0.0088	0.0412 ***
L1roa	-0.6924 ***	-1.1009 ***	-0.7053 ***	-1.0874 ***
L1current	0.0001	-0.0002	0.0001	-0.0002
L1interest	0.0000	0.0000 *	0.0000	0.0000
L1gdp_g	0.4848	0.4766 **	0.4975	0.5937 **
Dummy Argentina	0.0213		0.0354	
Dummy Australia	-0.0362 **		-0.0237 *	
Dummy Austria	0.0237		0.0292	
Dummy Belgium	0.0039		0.0194	
Dummy Brazil	0.0887 *		0.0762	
Dummy Chile	-0.0371 *		-0.0224	
Dummy Finland	-0.0398		-0.0398	
Dummy France	0.0145		0.0215	
Dummy Germany	-0.0159		-0.0041	
Dummy Greece	0.0390		0.0534	
Dummy Ireland	-0.0195		-0.0296	
Dummy Italy	-0.0061		-0.0028	
Dummy Netherlands	-0.0252		-0.0096	
Dummy Norway	-0.0095		-0.0136	
Dummy Poland	0.0134		0.0176	
Dummy Portugal	0.0142		0.0184	
Dummy Spain	-0.0203 *		-0.0167	
Dummy Sweden	-0.0195		-0.0249	
Dummy Switzerland	-0.0031		0.0035	
Dummy Turkey	0.3432 ***		0.3570 ***	
Dummy UK	-0.0067		0.0021	
Dummy Canada	-0.0308 **		-0.0035	
Dummy Israel	0.0349		0.0355	
Dummy US	0.0112		0.0354	
Dummy Hong Kong	-0.0341		-0.0342	
Dummy Indonesia	0.4247 ***		0.4282 ***	
Dummy Korea, Rep	0.1043 ***		0.1077 ***	
Dummy Malaysia	0.1529 ***		0.1524 ***	
Dummy Singapore	-0.0302		-0.0268	
Dummy Thailand	0.1493		0.1516	
Constant	-24.0285 ***	-26.2490 ***	-22.5615 ***	-24.6299 ***
No. of obs.	2531	2531	2555	2555
Adj R-squared	0.1238	0.0538	0.1224	0.0534

*** Statistical significance at the one percent level
** Statistical significance at the five percent level
* Statistical significance at the ten percent level

Box 1: The Composite Disclosure Index and Sub-indices

We construct bank-level indices of disclosure representing whether a bank discloses one or more sources of risk (interest rate risk, credit risk, liquidity risk, market risk) in the BankScope database. These indices thus measure the level of detail which banks provide on 17 dimensions of accounting information in their published accounts. Table I below lists the indices used in more detail. For all indices, a 0 was assigned if there was no entry in any of the corresponding categories and a 1 otherwise, except for the index for securities by type and the capital index. For the securities by type index, a 0 was assigned if there was no entry for any of the categories, a 1 if there was only an entry for the coarse breakdown and a 2 if there was an entry for the detailed breakdown. For the capital index, a 0 was assigned if there was no entry in any of the categories, a 1 if there was one entry only, a 2 if there were two entries and a 3 if there were three or four entries. Note that whenever a bank provides information on three of these items, one can infer the fourth. Providing three items was therefore viewed as informationally equivalent to providing four items.

Aggregating the information of the 17 sub-indices, we construct a composite disclosure index. The composite index was defined as $\mathrm{DISC} = \frac{1}{21}\sum_{i=1}^{17} s_i$

Table I: Disclosure indices

	Subindex	Categories
Assets		
Loans	s_1 : Loans by maturity	Sub three months, three-six months, six months - one year, one-five years, five years +
	s_2 : Loans by type[(a)]	Loans to municipalities/government, mortgages, HP/lease, other loans
	s_3 : Loans by counterparty[(a)]	Loans to group companies, loans to other corporate, loans to banks
	s_4 : Problem loans	Total problem loans
	s_5 : Problem loans by type	Overdue /restructured /other non-performing
Other earning assets	s_6 : Securities by type	Detailed breakdown: Treasury bills, other bills, bonds, CDs, equity investments, other investments Coarse breakdown: Government securities, other listed securities, non-listed securities
	s_7 : Securities by holding purpose	Investment securities, trading securities
Liabilities		
Deposits	s_8 : Deposits by maturity	Demand, savings, sub three months, three-six months, six months - one year, one-five years, five years +
	s_9 : Deposit by type of customer	Banks deposits, municipal/government
Other funding	s_{10} : Money market funding	Total money market funding
	s_{11} : Long-term funding	Convertible bonds, mortgage bonds, other bonds, subordinated debt, hybrid capital
Memo lines		
	s_{12} : Reserves	Loan loss reserves (memo)
	s_{13} : Capital	Total capital ratio, tier 1 ratio, total capital, tier 1 capital
	s_{14} : Contingent Liabilities	Total contingent liabilities
	s_{15} : Off-Balance Sheet Items	Off-balance sheet items
Income statement		
	s_{16} : Non-interest Income	Net commission income, net fee income, net trading income
	s_{17} : Loan Loss Provisions	Loan loss provisions

(a) The categories chosen reflect the presentation in the BankScope database.

Box 2: 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 an account of known cases of banking crises ex post. Table II 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 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, banking crises occurred in the following countries during our sample period: Argentina (1995), Brazil (1994-1999), Finland (1991-1994), Indonesia (1994 and 1997-2002), Japan (1991-2002), Korea (1997-2002), Malaysia (1997-2002), Poland (1990s), Taiwan (1997-1998), Thailand (1997-2002) and Turkey (1994 and 2000-2002). Applying a threshold of 10 percent to the average of c(i, t), ie 10 per cent of banks in a country experienced stock returns of -50 per cent 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. High values on the market indicators for the years 1994 and 1997 and 1998 might conceivably be due to contagion in this case.

Table II: 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	Swiss	Taiwan	Thailand	Turkey	UK	USA	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	0.03	0.27	0	0	0	0.10	0	0	0	0	0	0.09	0	0	0	0.08	0.05
2000	0.03	0.55	0.20	0	0	0.13	0	0	0	0	0	0.36	0.29	0.83	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

Between 0 and 0.1
Between 0.1 and 0.5
Between 0.5 and 0.75
Greater than 0.75

Table A1: Definitions of the Variables and Data Sources

DATA SOURCE	VARIABLE	DESCRIPTION
BankScope	disc	disclosure index, as described in Box 1
	list	listing=1 if bank is listed on NYSE, NASDAQ or AMEX, otherwise 0
	roa	return on assets
	logsize	logarithm of total assets
Bloomberg	c(i,t)	crisis dummy
	beta	Beta
International Financial Statistics (IFS)	gdp_g	real GDP growth
	interest	short-term interest rate
	current	Current account

Table A2: Average disclosure indices by country

	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16	s17	disc
ARGENTINA	0.71	0.71	0.00	0.36	0.00	1.43	0.63	0.71	0.71	0.71	0.38	0.71	0.59	0.54	0.54	0.71	0.71	0.48
AUSTRALIA	0.00	0.94	0.00	0.90	0.89	1.80	0.85	0.90	0.92	0.88	0.94	0.94	2.56	0.93	0.93	0.00	0.94	0.73
AUSTRIA	0.07	0.54	0.00	0.00	0.00	1.22	0.00	0.61	0.61	0.00	0.61	0.07	0.44	0.60	0.53	0.61	0.04	0.28
BELGIUM	0.56	0.13	0.00	0.09	0.00	1.13	0.25	0.44	0.56	0.38	0.56	0.00	0.38	0.19	0.19	0.56	0.38	0.28
BRAZIL	0.78	0.75	0.00	0.74	0.74	1.56	0.78	0.78	0.78	0.78	0.76	0.75	0.48	0.57	0.57	0.75	0.75	0.59
CANADA	0.53	0.26	0.16	0.54	0.03	1.38	0.79	0.26	0.60	0.61	0.26	0.30	1.53	0.75	0.75	0.00	0.73	0.45
CHILE	0.71	0.74	0.00	0.67	0.71	1.47	0.00	0.74	0.74	0.69	0.74	0.07	0.65	0.07	0.07	0.72	0.72	0.45
FINLAND	0.79	0.00	0.00	0.63	0.08	1.58	0.00	0.79	0.79	0.79	0.79	0.00	2.25	0.75	0.75	0.79	0.79	0.55
FRANCE	0.00	0.89	0.10	0.34	0.02	1.77	0.00	0.85	0.86	0.74	0.63	0.16	1.01	0.82	0.82	0.88	0.88	0.51
GERMANY	0.08	0.72	0.00	0.00	0.00	1.60	0.08	0.08	0.80	0.30	0.80	0.06	0.34	0.79	0.79	0.80	0.10	0.35
HONG KONG	0.51	0.95	0.34	0.72	0.05	1.90	0.48	0.96	0.67	0.96	0.87	0.88	0.99	0.88	0.88	0.82	0.82	0.65
INDONESIA	0.87	0.37	0.00	0.23	0.23	1.67	0.84	0.89	0.72	0.88	0.88	0.22	0.68	0.87	0.87	0.89	0.87	0.57
IRELAND	0.72	0.00	0.00	0.50	0.50	1.44	0.72	0.72	0.72	0.72	0.72	0.72	1.94	0.59	0.59	0.72	0.72	0.57
ISRAEL	0.93	0.73	0.00	0.60	0.00	1.81	0.45	0.93	0.93	0.00	0.92	0.91	1.84	0.83	0.83	0.75	0.84	0.63
ITALY	0.58	0.84	0.00	0.35	0.00	1.69	0.84	0.84	0.84	0.82	0.79	0.16	1.63	0.82	0.82	0.84	0.83	0.61
JAPAN	0.00	0.87	0.00	0.72	0.81	1.72	0.87	0.87	0.83	0.87	0.57	0.45	0.98	0.87	0.87	0.87	0.86	0.62
KOREA, REP. OF	0.86	0.80	0.35	0.16	0.01	1.35	0.79	0.54	0.54	0.79	0.78	0.81	1.54	0.29	0.29	0.88	0.54	0.54
MALAYSIA	0.53	0.65	0.00	0.43	0.35	1.42	0.67	0.65	0.65	0.58	0.71	0.65	0.69	0.63	0.63	0.49	0.49	0.49
NETHERLANDS	0.10	0.73	0.42	0.08	0.00	1.71	0.00	0.73	0.77	0.77	0.83	0.00	0.77	0.50	0.50	0.73	0.67	0.44
NORWAY	0.00	0.88	0.00	0.68	0.66	1.75	0.09	0.88	0.88	0.79	0.88	0.88	2.48	0.87	0.87	0.88	0.88	0.68
POLAND	0.76	0.00	0.00	0.53	0.06	1.39	0.71	0.77	0.76	0.57	0.72	0.47	0.91	0.58	0.76	0.76	0.74	0.50
PORTUGAL	0.96	0.00	0.00	0.73	0.82	1.93	0.00	0.96	0.96	0.96	0.96	0.21	1.36	0.88	0.88	0.96	0.96	0.65
SINGAPORE	0.84	0.45	0.18	0.39	0.39	1.68	0.39	0.00	0.79	0.75	0.80	0.39	1.04	0.82	0.82	0.75	0.54	0.52
SPAIN	0.00	0.94	0.71	0.60	0.09	1.92	0.00	0.95	0.96	0.74	0.96	0.17	1.80	0.96	0.96	0.96	0.96	0.65
SWEDEN	0.85	0.00	0.00	0.73	0.83	1.65	0.60	0.70	0.85	0.80	0.85	0.18	2.48	0.75	0.75	0.85	0.85	0.65
SWITZERLAND	0.68	0.66	0.00	0.06	0.02	1.34	0.70	0.63	0.70	0.45	0.78	0.05	0.23	0.50	0.50	0.80	0.48	0.41
TAIWAN	0.86	0.00	0.00	0.62	0.67	1.74	0.85	0.81	0.85	0.00	0.79	0.16	0.98	0.75	0.75	0.88	0.86	0.55
THAILAND	0.00	0.58	0.00	0.32	0.32	1.10	0.48	0.00	0.58	0.39	0.58	0.09	0.66	0.58	0.58	0.58	0.58	0.35
TURKEY	0.55	0.35	0.00	0.46	0.50	1.07	0.17	0.44	0.50	0.38	0.49	0.10	0.13	0.53	0.53	0.55	0.54	0.35
UNITED KINGDOM	0.31	0.66	0.09	0.56	0.52	1.67	0.21	0.86	0.88	0.72	0.87	0.59	1.55	0.51	0.51	0.85	0.88	0.58
USA	0.00	0.90	0.82	0.87	0.13	1.74	0.90	0.04	0.10	0.90	0.87	0.87	2.62	0.83	0.83	0.85	0.90	0.67

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