# The crisis as a wake-up call. Do banks tighten screening and monitoring standards during a financial crisis?

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# The crisis as a wake-up call. Do banks tighten screening and monitoring standards during a financial crisis?

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**Abstract**

We examine whether the global financial crisis has prompted banks to take corrective action with regard to their screening and monitoring. By analyzing almost 15,000 syndicated loans to private borrowers across 65 countries over the period 2005-2009, we find that banks stepped up their screening and monitoring efforts in response to the crisis. This is evidenced by a significant increase in retention rates among syndicate arrangers. These higher retention rates ('more skin in the game') were only partially caused by increased borrower risk. They mainly reflect a more fundamental shift towards more stringent screening and monitoring during the crisis: the wake-up call effect.

**JEL Classification**: D82, G15, G21

**Keywords**: bank lending, financial crisis, retention rates, screening and monitoring, syndication

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## 1. Introduction

Between 2001 and the first half of 2007 large parts of the world experienced a prolonged period of high economic growth. Risk perceptions came down and the global financial system was characterized by abundant liquidity. All of this changed with the outbreak of the global financial crisis in August 2007. The crisis affected banks across the world through increased uncertainty about borrower quality and a decline in funding. Some banks reacted by significantly reducing their volumes of new lending. For example, in 2008 global syndicated lending fell by 41 per cent, to USD 2.9 trillion (Dealogic Loan Analytics).

Many believe that the relaxation of banks' screening and monitoring contributed to the financial crisis. Some recent studies back up this idea. For example, Dell'Ariccia, Igan and Laeven (2008) find evidence of an erosion of screening standards in the US mortgage market in the period leading up to the crisis. Likewise, Keys, Mukherjee, Seru and Vig (2009) show for the US subprime mortgage market that widespread securitization reduced the incentives of lenders to adequately screen prospective borrowers. Berndt and Gupta (2009) find that borrowers whose loans were sold in the secondary syndicated loan market tended to under-perform their peers, suggesting that the move to the originate-to-distribute model contributed to a relaxing of credit standards. And Jiménez, Ongena, Peydró and Saurina (2008) find that lower short-term interest rates induced Spanish banks to lend to more risky borrowers.

It is possible that the disruption of the global financial system has brought about a reversal of these practices and motivated banks to step up their screening and monitoring efforts over and above the level warranted for by increased borrower risk. As depicted in Figure 1, banks can intensify screening and monitoring because underlying borrower risk increases (arrow *a*) or because of a more fundamental correction in the relationship between borrower risk and screening and monitoring intensity: a 'wake-up call' (arrow *b*). [1] In this paper we explicitly test whether there was a correction in banks' screening and monitoring intensity *given the level of borrower risk*. Hence, we examine whether the crisis acted as a wake-up call for banks to reverse a trend of too lax screening and monitoring in the years leading up to the crisis.

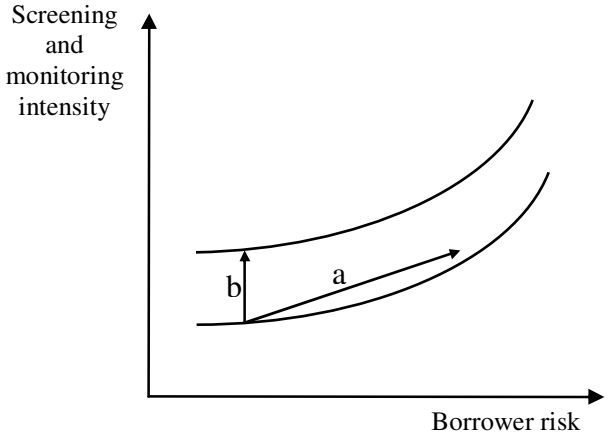
Theory provides several reasons why banks would tighten their screening and monitoring during a crisis or business cycle downturn for reasons other than increased borrower risk. Ruckes (2004) shows that if the average default probability of borrowers increases lenders have a stronger incentive to screen as the payoff of screening is higher. In the model of Dell'Ariccia and Marquez (2006) adverse selection problems that stem from informational asymmetries among lenders induce banks to screen applicant borrowers unknown to *all* banks to avoid financing borrowers rejected by competitors. During a downturn the proportion of unknown borrowers decreases which increases the risk that a

[1] See Allen (1990), Broecker (1990), and Diamond (1984) on the economics of screening and monitoring.

borrower is rejected by another bank. This increased probability induces banks to intensify their screening. Rajan (1994) shows that when a common negative shock hits the economy, bank managers are less concerned about their reputation and thus less concerned about hiding bad loans. As a result they tighten lending standards for new loans.

**Figure 1**
**Borrower Risk and Screening and Monitoring during the Crisis**

Arrow 'a' shows an increase in screening and monitoring due to higher borrower risk during the crisis. Arrow 'b' shows an increase in screening and monitoring due to an increase in screening and monitoring intensity ('wake-up call') during the crisis




Although banks' screening and monitoring effort is unobservable, we are able to test for the existence of a wake-up call effect by exploiting detailed information on a large number of syndicated loans. Syndicated loans are provided by a group of financial institutions – the syndicate – to a single borrower.[2] They have become a major source of external finance for a variety of firms in both the developed world and in emerging markets (DTCC, 2008). An interesting feature of lending syndicates that we exploit in this paper is that their structure reveals information about the importance that the participant banks attach to the screening and monitoring of borrowers. To understand why, a short primer on syndicated lending is called for.

A typical syndicate consists of two tiers: arrangers and participants. The arrangers comprise the senior tier and negotiate the lending terms with the borrower, who gives the arrangers a mandate to structure, organize, and market the loan. Although arrangers usually retain a part of the loan on their own books, they allocate most of it to the second, junior tier of syndicate members, the participants. Participants have a more passive role: they buy part of the loan but are neither involved in its organization nor in the screening and monitoring of the borrower. For their internal credit approval processes participants rely on the borrower information that is provided by the arranger(s) in the form of an information

[2] Through syndication loans can be spread across several institutions, allowing each bank to better diversify its loan portfolio (Simons, 1993). Dennis and Mullineaux (2000) and Fight (2004) provide extensive descriptions of the syndicated loan market.

memorandum (Fight, 2004). Participants usually do not perform additional screening or due diligence of the borrower. For monitoring the participants rely on the arrangers as well, who provide them with periodical audited and unaudited accounts and information on the observance of loan covenants.

This short primer underlines a crucial characteristic of syndication: the participants use one or more arrangers as a delegated monitor (Diamond, 1984). While this functional division prevents coordination failures within the syndicate, it also entails a separation between the loan arranger – responsible for screening and monitoring the borrower – and the institution that provides the funding and ultimately bears the risk. Compared to a bilateral lending relationship, where a bank bears the full risk of its loan, arranging banks have a reduced incentive to screen and monitor the borrower.

One way to resolve this agency problem is for the arrangers to retain a sufficient loan portion on their own balance sheet. Loan retention is an efficient incentive-compatible mechanism to ensure that arrangers sufficiently screen and monitor (Pennacchi, 1988; Gorton and Pennacchi, 1995). In the agency model of Holmström and Tirole (1997) uninformed lenders (the participants) cannot observe the (costly) screening and monitoring effort of informed lenders (the arrangers) and hence require the arrangers to retain a portion of each loan. With enough 'skin in the game' screening and monitoring incentives are not distorted too much. This is why arrangers are normally legally not allowed to sell their stake in a syndicated loan (Sowerbutts, 2009). Several empirical studies provide evidence of a clear relationship between the retention rate of arrangers and the need to monitor and screen the borrower as proxied by its opaqueness (Dennis and Mullineaux, 2000; Jones, Lang and Nigro, 2005; Sufi, 2007).[3]

On the basis of the above we expect that to the extent that banks become more concerned about adequate screening and monitoring of new loans during the crisis, this should result in a significant increase in the retention rates among syndicate arrangers. Partly this may reflect increased borrower risk, which makes screening and monitoring of (certain types of) borrowers more urgent. Yet, the main hypothesis we test is not – as in Sufi (2007) – that higher borrower risk is associated with higher retention rates. Our main interest is in testing whether *when correcting for individual borrower and loan risk* there exists a separate and more general crisis-related increase in retention rates, the so-called wake-up call effect. Such an effect would show up in our data as an increase in the loan share that arrangers individually and jointly retain during the crisis.[4,5] Higher loan retention also means that

[3] A related literature analyses similar issues in the context of underwriters' retention rates during an IPO (Chen, Jhou and Yeh, 2007, and Corwin and Schultz, 2005).

[4] Arrangers generally try to syndicate most of each loan as this frees up space on their balance sheet and allows them to take on new syndication mandates and earn the related fee income. It also allows them to diversify their exposure to individual borrowers (Pennacchi, 1988). Sharp increases in retention rates are thus unlikely to be voluntary but instead reflect pressures from participants. Ivashina (2009) finds that arrangers that need to retain a larger loan portion in order to reduce agency problems within the syndicate, charge a higher spread to the borrower in order to compensate for the reduced ability to optimally diversify their loan portfolio.

loans are to a lesser extent spread among various participants. The wake-up call effect would thus also lead to more concentrated syndicates.

We find that during the crisis banks not only cut their lending but also systematically step up their screening and monitoring. This wake-up call is evidenced by a significant increase across the board in arrangers' retention rates and the concentration of lending syndicates. In addition, and in line with the earlier literature on the relationship between borrower risk and syndicate structure, we find that during a crisis retention rates increase more for loans where information asymmetries are high: loans to first-time borrowers, to borrowers without collateral, and to financial-sector borrowers in high-income countries (which were the focal point of uncertainty about subprime-related losses). Finally, relatively experienced arrangers need to increase their retention rates less than less reputable arrangers.

Our findings have important implications for the current debate about regulatory measures to set minimum 'skin in the game' retention rates for originating banks. Our results show a strong, broad-based and market-driven increase in retention rates among syndicate arrangers during the crisis. This suggests that regulatory retention requirements may not be necessary for syndicated lending. However, when liquidity fully returns to the market, and hence the market power of participants subsides, no market dynamic exists that will be able to force arrangers to keep retention rates at a level high enough to guarantee sufficient screening and monitoring of borrowers. As such, it is likely that without the existence of mandatory retention rates the market will return to its old practices. In case this happens it would be prudent to put regulation in place that not only covers securitizations but also syndicated lending.

Our paper contributes to three main strands of research. First, we use data on a particular type of bank lending to provide novel insights into how banks respond to financial crises. The literature on the impact of financial crises mostly deals with the influence of crises on the *amount* of bank lending. Calomiris and Wilson (2004) show that during the Great Depression of the 1930's New York-based banks were forced to substitute loans with riskless assets in order to prevent deposit withdrawals. Demirgüç-Kunt, Detragiache and Gupta (2006) find similar evidence for a broader country sample. As a result of such 'deleveraging', bank lending tends to contract substantially during a financial crisis (De Haas and Van Lelyveld, 2006; 2009). Also for the current crisis empirical evidence of a reduction in the supply of bank credit is emerging. Ivashina and Scharfstein (2008) show that U.S. banks sharply reduced their supply of new corporate lending and Cetorelli and Goldberg (2009) document how U.S. banks also reduced their credit to emerging markets during the crisis. For

[5] Increasing the number of arrangers could lead to duplication of monitoring efforts or, on the contrary, to free-riding among arrangers (Esty and Megginson, 2003). However, in most syndicates an agent bank performs the practicalities of monitoring on behalf of all arrangers. To the extent that this effectively centralizes the monitoring process, adding more arrangers will be less of a problem.

Germany, Puri, Rocholl, and Steffen (2009) provide evidence of a crisis-related reduction in bank lending to retail customers.

A few empirical studies do explore the impact of crises on underlying bank behavior. For example, Rajan (1994) and Berger and Udell (2004) show that lending standards are relaxed during business cycle upswings, while they are tightened during a negative economic shock. In addition, Steffen and Wahrenburg (2008) find that during recessions banks not only tighten credit standards but also exploit their information monopoly over borrowers by charging higher loan spreads. Gertler and Gilchrist (1994) show that when banks have to reduce lending due to limited funding, they will do so in particular for relatively opaque firms. Our paper is the first to study the impact of a financial crisis on screening and monitoring standards in the syndicated loan market. Moreover, by explicitly controlling for an increase in screening and monitoring due to higher borrower risk we test whether the crisis has brought about a fundamental correction in the relationship between screening and monitoring and borrower risk.

Second, our results contribute to the ongoing debate about the costs and benefits of securitization and the role of loan retention (see for instance Shleifer and Vishny, 2009). Although the legal structures surrounding loan syndication and loan securitization are different[6], the potential agency problems – adverse selection and moral hazard – are the same. Our study adds to this literature by providing insights in how retention rates adjust to market pressures as a result of a financial crisis.

Finally, this paper adds to the broader and expanding literature on syndicated lending. Earlier papers have studied the structure of lending syndicates to analyze how banks deal with asymmetric information (Dennis and Mullineaux, 2000; Lee and Mullineaux, 2004; Sufi, 2007), with weak creditor rights (Esty and Megginson, 2003), with the risk of strategic defaults (Preece and Mullineaux, 1996) and with intra-syndicate cultural differences (Giannetti and Yafeh, 2008). We contribute to this literature by analyzing how the financial crisis and the associated increase in risk and uncertainty have impacted the structure of lending syndicates

The remainder of this paper is structured as follows. Section 2 describes our data and empirical methodology. Sections 3 and 4 explain our basic results, after which section 5 explores further the impact of the crisis on the screening and monitoring of different borrower types. Section 6 concludes.

[6] A loan sale or securitization does not change the contract between the borrower and the original lender. Instead a new contract is created by the lender and a third party to sell the cash flow from the underlying loan. In a syndicated loan, all lenders are and remain part of one loan contract with the borrower.

## 2. Data and methodology

### *2.1 Data and summary statistics*

We obtain our data from the Dealogic Loan Analytics database, which provides comprehensive data on virtually all global syndicated loans. Lenders have a strong incentive to report deals to Dealogic as this database is used by the financial press to generate league tables of the most successful arrangers. Our dataset contains detailed information on 14,474 syndicated loans to private borrowers in the United States, Western Europe, various other high-income countries, and a number of emerging economies (see the Annex for the geographical break-down of the dataset).[7] All loans were signed between January 2005 and end-April 2009. Just over sixty per cent of the loans in our sample consist of multiple tranches. In those cases we compute weighted averages for our variables at the loan level, weighing each tranche by its amount. The tranches of a syndicated deal are negotiated at the same point in time and are part of one contract and as such cannot be treated econometrically as individual observations (Sufi, 2007). Using the loan as the unit of observation also prevents oversampling.

Our dataset includes information about the borrower (country of incorporation, industry, and credit rating), about the loan terms (maturity, volume, currency, spread, fee structure, and loan purpose), and about the structure of the syndicate (number of arrangers and participants). For each loan we categorize all syndicate members as either arrangers or participant banks. We define arrangers as those financial institutions with the title of mandated lead arranger or book runner and classify all other syndicate members as participants.[8,9] For a sub-sample of the data we also have information on the share of the loan held by each lender. Our initial data download consists of 36,397 loans. For each loan we check the availability of information on the identities of all syndicate members and only keep loans with complete and consistent information. We exclude loans to (quasi-) government entities, loans where an international financial institution (such as the EBRD or the IFC) is a syndicate member, and project finance loans (see also Section 3.2). We also exclude loans for which no spread information is available, such as virtually all Japanese loans, since we need this information to construct one of our main borrower risk variables. Our final, cleansed dataset with complete information consists of 14,474 loans.

Our main independent variable is a crisis dummy that is 'zero' for syndicated loans signed between January 2005 and September 2007 and 'one' for loans signed during the crisis period, which we define as October 2007-April 2009 (the latter date is the cut-off date of our dataset). We let the crisis start in October 2007 rather than August 2007 to take into account that there is a time lag between

[7] We exclude countries without significant syndicated lending (less than 25 loans over the sample period).
[8] Book runners sell the loan to participants but are not involved in negotiations with the borrower.
[9] We believe this is the best way to distinguish between banks that are actively involved in the loan structuring and marketing and those that only provide funds. However, occasionally banks are given the title of mandated arranger or book runner due to the amount they provide, even though they do not do any arranging work.

starting loan negotiations and signing the deal. The negotiation and arrangement process takes on average almost eight weeks (Godlewski, 2008). Almost thirty percent of all observations concern loans signed during the crisis period; the remainder was signed pre-crisis. Figure 2 depicts the very significant decline in the total volume of syndicated lending during the crisis.[10]

**Figure 2**
**Total Syndicated Lending Before and During the Crisis (quarterly)**

The figure shows the development of syndicated lending volumes over the period January 2005 - April 2009. Loans to (quasi-) government entities, loans where an international financial institution is a syndicate member, and project finance loans are excluded.

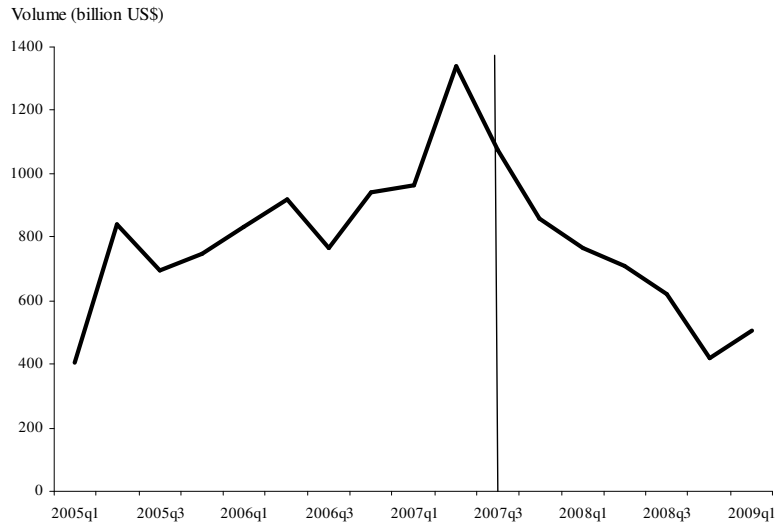



Table 1 provides summary statistics for the variables that we use in the empirical analysis. Before the crisis, the average loan amounts to USD 634 million and has an average maturity of four years and eight months. During the crisis, loans become on average 4 per cent smaller and the average maturity shortens by almost 10 months. We create three dummy variables that single out loans with the purpose of refinancing an existing loan, acquiring a company (acquisition finance), or for general corporate purposes (such as working capital). Before the crisis, 27 per cent of all syndicated loans are used to refinance existing loans compared to only 17 per cent during the crisis. We also include two risk mitigant dummies. The first one indicates whether a loan is secured through collateral and the second one whether repayment is guaranteed by a third party. Pre-crisis only 3 per cent and 20 per cent of all loans are guaranteed by a third party or secured by collateral, respectively. During the crisis the percentage of secured loans drops to 13 per cent, suggesting that banks partly move away from relatively risky loans (which in general are secured).

[10] Due to reporting lags we may somewhat underestimate the loan volume in the first quarter of 2009 as our final data download was conducted at the beginning of May 2009 (cf. Ivashina and Scharfstein, 2008).

**Table 1**
**Summary Statistics for Syndicated Loan Deals - Pre-Crisis and Crisis**

The table shows summary statistics for our sample of 10,560 syndicated loans signed between January 2005 and April 2009. The pre-crisis period starts January 2005 and ends September 30th 2007, the crisis period includes the rest of the sample period. T-test shows whether the mean of the variable in the pre-crisis period differs significantly from the mean in the crisis period.

| | Pre-Crisis | | | Crisis | | | T-test |
|---|---|---|---|---|---|---|---|
| | No. | Mean | St. Dev. | No. | Mean | St. Dev. | |
| *Syndicated loan characteristics* | | | | | | | |
| Volume (US$ million) | 10,560 | 634.29 | 1675.98 | 3,914 | 606.19 | 1869.02 | 0.39 |
| Maturity (years) | 10,560 | 4.66 | 2.18 | 3,914 | 3.85 | 2.23 | 0.00 |
| Loan is guaranteed | 10,560 | 0.03 | 0.18 | 3,914 | 0.03 | 0.17 | 0.51 |
| Loan is secured | 10,560 | 0.20 | 0.40 | 3,914 | 0.13 | 0.33 | 0.00 |
| Loan for refinancing purposes | 10,560 | 0.27 | 0.45 | 3,914 | 0.17 | 0.37 | 0.00 |
| Loan for acquisition purposes | 10,560 | 0.22 | 0.41 | 3,914 | 0.21 | 0.41 | 0.53 |
| Loan for general corporate purposes | 10,560 | 0.39 | 0.49 | 3,914 | 0.48 | 0.50 | 0.00 |
| *Syndicate structure characteristics* | | | | | | | |
| Number of arrangers | 10,560 | 3.10 | 2.53 | 3,914 | 3.02 | 2.48 | 0.07 |
| Number of participants | 10,560 | 4.64 | 5.49 | 3,914 | 3.79 | 4.69 | 0.00 |
| Total share held by arrangers | 2,044 | 0.56 | 0.28 | 615 | 0.64 | 0.29 | 0.00 |
| Average share held by arrangers | 2,035 | 0.22 | 0.17 | 601 | 0.24 | 0.16 | 0.17 |
| Concentration: share of five largest lenders | 2,044 | 0.73 | 0.25 | 615 | 0.78 | 0.23 | 0.00 |
| Concentration: Herfindahl index | 2,044 | 0.20 | 0.16 | 615 | 0.22 | 0.16 | 0.01 |
| *Borrower and lender characteristics* | | | | | | | |
| Borrower has investment grade rating | 10,560 | 0.15 | 0.36 | 3,914 | 0.14 | 0.35 | 0.05 |
| Borrowed at least once in 5 years prior to loan signing | 10,560 | 0.53 | 0.50 | 3,914 | 0.59 | 0.49 | 0.00 |
| Located in USA | 10,560 | 0.66 | 0.47 | 3,914 | 0.70 | 0.46 | 0.00 |
| Located in an emerging market | 10,560 | 0.12 | 0.32 | 3,914 | 0.13 | 0.34 | 0.05 |
| Rating of sovereign (numerical, D=1 & AAA=18) | 10,560 | 16.93 | 2.99 | 3,914 | 16.82 | 3.26 | 0.05 |
| Residual risk | 10,560 | -1.43 | 97.78 | 3,914 | 2.44 | 120.20 | 0.05 |
| Average market share of arrangers at time *t-1* | 10,560 | 1.34 | 1.03 | 3,914 | 1.31 | 1.17 | 0.13 |

As dependent variables we create a number of measures of loan syndicate structure. These include the number of arrangers, the number of participating banks, and the average share and the total share of the loan held by the arrangers. We measure the concentration of the syndicate by the Herfindahl-Hirschman Index (HHI), which is the sum of the squared loan shares held by all syndicate members, and by the combined loan share of the five largest syndicate members. The structure of the lending syndicate changes during the crisis.[11] While the average number of arrangers stays at about 3, the average number of participants declines from 4.6 to 3.8. The average percentage of the loan that the arrangers jointly retain increases by 14 per cent to 64 per cent, while the average share kept by each individual arranger increases slightly. Lending syndicates also become more concentrated. The share held by the five largest lenders increases by 7 per cent and the HHI by 10 per cent. Unfortunately, complete information on the distribution of the loan among the syndicate members is only available for 18 per cent of the sample (2,659 loans). The characteristics of the loans in the full sample and of those for which we have information on arranger shares and concentration ratios are, however, similar. The main difference between the two samples is that loans in the full information sub-sample are on average smaller.

[11] Note that these are basic descriptive statistics where we do not correct for changes in loan size.

As independent variables, we measure a set of borrower and lender characteristics. The first dummy variable captures whether the borrower has an investment grade rating of either Standard and Poors or Moody's. In general, these borrowers are the most solid companies. The share of investment grade rated borrowers drops slightly from 15 to 14 per cent during the crisis. We also create regional dummy variables that indicate whether the borrower is incorporated in the USA or an emerging market. Over 60 per cent of all borrowers are US firms and some 12 per cent are based in an emerging market. There are no major changes in the geographical distribution of the borrowers during the crisis.

We also construct a dummy variable that proxies the reputation of borrowers. It is 'one' if the borrower has at least once successfully raised a syndicated loan during the five years preceding the signing of the current loan. Reputation can attenuate the information asymmetries between borrowers and lenders or between arrangers and participants (Gorton and Pennachi, 1995). We expect that information asymmetries between repeat borrowers and lenders are smaller than between first-time borrowers and lenders (Diamond, 1991). During the crisis there is a significant increase in the percentage of repeat borrowers from 53 per cent to 59 per cent. This increase is not caused by an increase in refinancing deals – which decline significantly during the crisis – but rather by banks providing independent, new loans to borrowers that are already known in the syndications market.

While we include various control variables in our baseline specification, some loan and borrower characteristics are unobservable to us (such as loan covenants). We therefore calculate a variable that proxies for each individual loan the unobserved risk: the risk that is not captured by our measurable borrower and loan characteristics. (Esty and Megginson, 2003). This loan risk variable is the residual of an auxiliary OLS regression in which we regress the loan spread on the independent variables that we use in our baseline regression. Positive residuals (expressed in basis points) imply unmitigated – or at least unexplained – risks associated with a specific loan. As expected, compared to the pre-crisis period, residual loan risk increases significantly during the financial crisis.

Finally, we construct an arranger reputation variable that captures the experience and skills of the arranger group of a particular loan (Sufi, 2007; Goplan, Nanda and Yerramilli, 2007). Arrangers with a lot of prior experience know that the reputation they have built up over time is valuable as it helps them to be involved in future deals as well. They are thus less inclined to mislead participants as this may jeopardize their reputation and future deal flow. Indeed, Dennis and Mullineaux (2000) and Lee and Mullineaux (2004) find that arrangers with a long history of repeat transactions are able to sell off larger parts of a loan. Champagne and Kryzanowski (2007) find that the probability of a participant joining a syndicate is higher in case of more reputable arrangers.

We first calculate for each year the market share of the top 200 arrangers in the global syndication market. For a loan in year *t*, we then add the market shares in year *t-1* of all arrangers of that loan. For each syndicated loan we thus approximate the joint market share of all arrangers in the previous year.

In case an arranger is not in the previous year's top 200, the market share for that arranger is set to zero. The joint market share of arrangers is a good proxy for their reputation since the financial press regularly publishes league tables in which the top arrangers – worldwide and for individual geographical regions – are ranked according to the total loan volume they arranged in the previous year. Higher rankings in league tables thus imply increased exposure and a better reputation in the financial community. During the crisis arranger reputation remained virtually unchanged.

### *2.2 Empirical methodology*

Throughout the paper we report regressions in which the dependent variable is one of our measures of syndicate structure ($SS_i$): the number of arrangers, the number of participants, the total share held by the arrangers, the average share held by the arrangers, the share held by the five largest syndicate members, or the Herfindahl index. To measure the impact of the crisis on syndicate structure, the wake-up call effect, we use our crisis dummy ($crisis_i$), either as a stand-alone independent variable or – in Section 5 – to create interaction terms. As explained in the previous sub-section, we also include loan-specific ($L_i$), borrower-specific ($B_i$), or arranger-specific ($A_i$) variables that we expect to have an impact on the structure of syndicates. Loan-specific variables such as maturity, amount and collateral are usually decided upon before the syndication process (during the negotiations between the arrangers and the borrower) and as such are exogenous to the syndicate structure. We experiment with sector dummies but these turn out to be mostly statistically insignificant and we thus exclude them to preserve degrees of freedom. However, including sector dummies does not change any of our results. Our basic regression specification thus looks as follows:

$$SS_i = \alpha + \beta \cdot crisis_i + \gamma_1' \cdot L_i + \gamma_2' \cdot B_i + \gamma_3' \cdot A_i + \varepsilon_i \quad (1)$$

We estimate Tobit regressions since our dependent variables are either censored at one side (number of participants and arrangers) or on both sides (share variables). Throughout all tables the coefficients are marginal effects and all standard errors are heteroskedasticity robust and clustered at the borrower level. We obtain very similar results when clustering at the sector level and when using an OLS regression technique or – in the case of discrete and non-negative dependent variables like the number of arrangers or participants – a Poisson regression technique (results are available upon request).

## 3. The financial crisis and banks' screening and monitoring standards

### *3.1 Basic empirical results: the wake-up call effect*

Table 2 provides the results of our basic regression estimates to examine the impact of the global financial crisis on various measures of syndicate structure. The first two columns show regressions for the full sample with the number of arrangers and participants as dependent variables, respectively. Columns three to eight show regressions for the sub-sample for which we have full information on the distribution of the loan among the lenders, which allows us to create the share and concentration variables. Columns three and four replicate the first two columns but now for the sub-sample only. The overall similarity between the results in the first two columns and those in columns three and four adds further confidence to our earlier conclusion that there are no systematic differences between the loans in our full and in our partial sample.

Even when taking into account loan size and numerous other control variables, our results indicate a clear decrease in the number of participants during the crisis of about 44 per cent of the pre-crisis mean. There is no significant change in the number of arrangers in the full sample, while we find a small increase of about 7 per cent of the pre-crisis mean on the basis of the partial sample. Arrangers have reacted to the crisis by jointly retaining an additional 10 per cent of each loan on their own balance sheet, while the average share retained by each arranger increased with 2 per cent. The total loan share held by the top 5 lenders goes up by 6 per cent. As a result of the reduced number of participants and the increased retention rate of the arrangers, lending syndicates become more concentrated during the crisis, as evidenced by the significant increase in the Herfindahl index.

These empirical findings confirm our hypothesis that banks significantly stepped up their screening and monitoring efforts during the crisis, even when controlling for the underlying borrower risk. The fact that arranging banks keep significantly more of each loan on their own balance sheet during the crisis suggests that (prospective) participants demand stronger assurances that borrowers have been adequately screened and will be effectively monitored. The crisis provided for a 'wake-up call' that made syndicate members increase their screening and monitoring effort across the board. To a certain extent the crisis also partially reverses the typical pyramid structure of loan syndications, in which a small number of arrangers distributes a loan to a broad group of participants.

Our various control variables, which proxy for the level of information asymmetry between borrower and lenders, tell an interesting story as well.[12] Unsurprisingly, larger loans are distributed among larger syndicates as each lender needs to take account of exposure limits to individual borrowers. As a result, lending syndicates for large loans are on average less concentrated, which is in line with earlier findings by Lee and Mullineaux (2004) and Sufi (2007).

[12] Section 5 provides details on how the crisis impacted different loan and borrower types differently.

## Table 2
## Impact of Crisis on Syndicate Structure: Wake-up Call Effect

This table shows the results of Tobit regressions estimating the impact of the crisis on the structure of loan syndicates. *Crisis* is a dummy which is one for the crisis period (October 2007 until April 2009) and zero for the pre-crisis period (January 2005-September 2007). *Volume* equals the log of the loan amount in dollars. *Maturity* is the log of the maturity of the loan in days. *Loan residual risk* is the unobserved loan risk derived from an auxiliary regression. *Borrower reputation* is a dummy which is one if the borrower borrowed at least once in the five years prior to loan signing. *Investment grade* is a dummy which is one if the borrower is investment grade rated. *Secured* is a dummy which is one if the loan is secured. *Guaranteed* is a dummy which is one if the loan is guaranteed. *Arranger reputation* measures the average market share of the arrangers in the year prior to loan signing. *Refinancing, Acquisition* and *Corporate* are loan purpose dummies which are one if the main loan purpose is refinancing, acquisition or general corporate purpose, respectively. The omitted loan purpose group is "Other". *Sovereign rating* is the (numerical) rating of the country in which the borrower is located at time of signing (higher value implies lower risk). *USA* is a dummy which is one if the borrower is located in the United States. Full sample includes all loans. Partial sample includes only those loans for which the amount held by each syndicate member is available. Standard errors are heteroskedasticity robust and clustered by borrowing firm. All regressions include a constant and coefficients are marginal effects. Robust p-values appear in brackets and ***, ** and * correspond to one, five and ten percent level of significance, respectively.

| | Full Sample | | Partial Sample | | | | | |
|---|---|---|---|---|---|---|---|---|
| | No. Arrangers | No. Participants | No. Arrangers | No. Participants | Total Share Held By Arrangers | Mean Share Held By Arrangers | Total Share Held By Top 5 Lenders | Herfindahl Index |
| Crisis | 0.042 | -0.541*** | 0.211* | -2.064*** | 0.101*** | 0.020*** | 0.061*** | 0.028*** |
| | [0.281] | [0.000] | [0.059] | [0.000] | [0.000] | [0.001] | [0.000] | [0.000] |
| Volume | 0.777*** | 0.928*** | 1.012*** | 1.805*** | 0.000 | -0.061*** | -0.121*** | -0.053*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.992] | [0.000] | [0.000] | [0.000] |
| Maturity | 0.037 | -0.008 | 0.129 | 0.001 | -0.004 | -0.002 | 0.003 | 0.001 |
| | [0.400] | [0.915] | [0.213] | [0.997] | [0.749] | [0.683] | [0.685] | [0.735] |
| Loan residual risk | -0.002*** | -0.004*** | -0.002*** | 0.002* | -0.000* | 0.000*** | 0.000*** | 0.000*** |
| | [0.000] | [0.000] | [0.000] | [0.065] | [0.078] | [0.001] | [0.007] | [0.008] |
| Borrower reputation | 0.217*** | 0.498*** | 0.203* | 0.717*** | -0.018 | -0.027*** | -0.041*** | -0.022*** |
| | [0.000] | [0.000] | [0.070] | [0.002] | [0.154] | [0.000] | [0.000] | [0.000] |
| Investment grade | 0.939*** | 0.647*** | 0.985*** | -0.283 | 0.064*** | -0.012** | -0.025** | -0.006 |
| | [0.000] | [0.000] | [0.000] | [0.453] | [0.000] | [0.050] | [0.035] | [0.325] |
| Secured | -0.274*** | -0.913*** | -0.152 | -0.481* | 0.022 | 0.021*** | 0.034*** | 0.021*** |
| | [0.000] | [0.000] | [0.229] | [0.080] | [0.180] | [0.008] | [0.005] | [0.004] |
| Guaranteed | -0.065 | 0.356 | -0.184 | -0.157 | -0.030 | -0.008 | -0.014 | -0.009 |
| | [0.683] | [0.155] | [0.349] | [0.649] | [0.157] | [0.370] | [0.344] | [0.260] |
| Arranger reputation | -0.366*** | -0.136*** | -0.276*** | 0.583*** | -0.042*** | -0.016*** | -0.026*** | -0.017*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] |
| Refinancing | 0.349*** | 0.363** | 0.533*** | 0.934*** | -0.011 | -0.056*** | -0.084*** | -0.058*** |
| | [0.000] | [0.013] | [0.002] | [0.008] | [0.584] | [0.000] | [0.000] | [0.000] |
| Acquisition | -0.087 | -0.994*** | 0.248 | -0.862** | 0.090*** | -0.010 | 0.031 | -0.005 |
| | [0.219] | [0.000] | [0.196] | [0.046] | [0.000] | [0.395] | [0.102] | [0.624] |
| Corporate | 0.002 | -0.103 | 0.361** | 0.667** | -0.016 | -0.052*** | -0.063*** | -0.055*** |
| | [0.972] | [0.424] | [0.015] | [0.040] | [0.378] | [0.000] | [0.000] | [0.000] |
| Sovereign rating | -0.137*** | -0.122*** | -0.072*** | -0.218*** | 0.005*** | 0.005*** | 0.012*** | 0.005*** |
| | [0.000] | [0.000] | [0.000] | [0.000] | [0.003] | [0.000] | [0.000] | [0.000] |
| USA | -0.147*** | -1.302*** | -0.699*** | 0.640** | -0.067*** | 0.034*** | 0.031*** | 0.028*** |
| | [0.009] | [0.000] | [0.000] | [0.028] | [0.000] | [0.000] | [0.004] | [0.000] |
| Observations | 14,472 | 14,472 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 |
| LR chi2 | 3,157 | 1,551 | 850 | 683 | 167 | 1,599 | 1,903 | 1,572 |
| Log Likelihood | -31,051 | -39,859 | -5,808 | -7,034 | -1,018 | 1,757 | -561 | 1,895 |

Our variable that controls for residual loan risk shows that, as expected, more risky loans are provided by more concentrated syndicates where arrangers retain more of each loan. Observable loan and borrower characteristics also explain the cross-sectional variation in syndicate structure. The first of these observable risk proxies is the collateral variable. We find that loans secured by collateral are provided by more concentrated syndicates in which arrangers each hold a bigger stake of the loan (there is no effect on the joint stake that the arrangers hold). Banks monitor secured loans more

intensely, in line with Berger and Udell's (1990) observation that collateralized loans are more risky ex ante because they are granted to borrowers that need more intense monitoring.[13]

The interpretation of our findings on secured loans is further strengthened by our finding on the impact of an investment grade borrower rating. Compared to unrated borrowers and borrowers with a non-investment grade rating, loans to investment grade rated borrowers are provided by less concentrated syndicates in which each arranger holds less of the loan. When information asymmetries are low, there is less need for individual arranger banks to retain a large part of the loan to convince participants that they sufficiently screen and monitor. The arrangers jointly hold more of each loan but this is caused by the fact that investment grade loans are syndicated by more arrangers. This is in line with Lee and Mullineaux (2004) and Sufi (2007) find that loans to rated borrowers are provided by less concentrated lending syndicates that consist of more arrangers and participants.

Next, we look at the impact of borrower and lender reputation.[14] We find that syndicated loans to repeat borrowers are granted by larger, less concentrated syndicates in which each arranger retains less of the loan. Repeat borrowers are thus perceived as less risky and loans to such borrowers are plagued by fewer agency problems. We find similar and very strong results for arranger reputation: experienced and reputable arrangers can distribute a loan among a broader group of participants, while jointly and individually retaining less of each loan. Arranger reputation reduces agency problems within the lending syndicate.

Finally, we find a significant impact of the sovereign rating of the country where the borrower is based. Loans to borrowers in riskier countries (a lower rating) are spread among more syndicate members. This reflects that both arrangers and participants have to abide by internal limits on aggregate country exposure. Banks thus have a greater incentive to diversify a loan to a borrower in a risky country as in that case exposure limits are more binding. Contrary to individual borrower risk, country risk – such as the risk of government expropriation or the introduction of currency controls – cannot be alleviated by screening and monitoring but only through international diversification.

### *3.2 Robustness tests*

We perform a number of methodological tests to see whether our main results are robust to using different specifications and data samples. In each robustness test we include the full set of control variables that were also included in the baseline regressions (Table 2), although the associated coefficients are not shown in Table 3 for reasons of brevity (available upon request from the authors).

[13] Indeed, Barbosa and Ribeiro (2007) find that the presence of collateral increases interest rate spreads on syndicated loans while Dennis and Mullineaux (2000) show that the retention rate of collateralized loans is higher so that incentives to monitor are less diluted.

[14] We measure borrower reputation through a dummy variable that indicates whether the borrower raised at least one loan during the preceding five years. We find similar results when we measure borrower reputation as the log of the number of times that the borrower successfully raised a syndicated loan since 1980.

## Table 3
## Impact of Crisis on Syndicate Structure: Robustness Tests

This table summarizes the results of a number of robustness tests by showing the estimates for the crisis dummy in various models. The benchmark model is the model in Table 2, columns 7 and 9. In the first robustness test we exclude all loans identified by Dealogic Loan Analytics as club deals. In the second robustness test we exclude all loans without participants. The third robustness test includes project finance loans. In the final two robustness tests we test whether our results hold when we let the crisis start in January 2008 or when the pre-crisis period starts in January 2006. All regressions include the same control variables as the benchmark model. The regressions are estimated using Tobit. Standard errors are heteroskedasticity robust and clustered by borrowing firm. All regressions include a constant. Coefficients are marginal effects. Robust p-values appear in brackets and ***, ** and * correspond to one, five and ten percent level of significance respectively.

| | Mean Share Held By Arrangers | Herfindahl Index |
|---|---|---|
| 1) Benchmark | 0.020*** | 0.028*** |
| | [0.001] | [0.000] |
| 2) Excluding club deals (narrow) | 0.014** | 0.018*** |
| | [0.029] | [0.002] |
| 3) Excluding club deals (broad) | 0.018*** | 0.022*** |
| | [0.007] | [0.000] |
| 4) Including project finance loans | 0.021*** | 0.028*** |
| | [0.001] | [0.000] |
| 5) Start crisis January 2008 | 0.020*** | 0.028*** |
| | [0.003] | [0.000] |
| 6) Start pre-crisis period January 2006 | 0.017*** | 0.025*** |
| | [0.007] | [0.000] |

We start by making sure that our baseline results are not driven by the inclusion or exclusion of certain loan categories. We first analyze whether our results are influenced by the fact that during the crisis the proportion of club deals increases. Club deals are syndicated loans where the borrower itself selects the syndicate members, usually a group of relationship lenders. All lenders have a more or less equal standing and get an (almost) equal fee share. Club deals thus lack the typical two-tier structure of syndicated loans. Club deals are included and earmarked in the Loan Analytics database. The percentage of loans labeled as club deals increases during the crisis from 6 to 10 per cent. When we measure the number of club deals more broadly as those loans with only arrangers but without participants, the percentage increases from 15 to 19 per cent. We then re-run our baseline regressions while excluding all club deals, according to the narrow or the broader definition, and find that their exclusion does not change our earlier results (lines 2 and 3 in Table 3).

Second, we check whether including project finance loans changes our results. Project finance loans are syndicated loans to fund a legally independent project. They are to be repaid with the cash flows of that specific project without any recourse to assets of the project sponsors (the equity investors). The project companies involved are often highly leveraged. On the one hand, this combination of high leverage and limited recourse means that lenders take extra care in screening and monitoring the borrower (Esty and Megginson, 2003). On the other hand, findings based on project finance alone are difficult to generalize to bank lending more generally. Kleimeier and Megginson (2000) provide detailed evidence on how project finance and non-project finance syndicated loans differ in terms of

syndicate structure, loan pricing and other loan attributes and conclude that "*project finance loans differ rather fundamentally from non project finance loans in almost every important aspect* (p. 87)". For this reason we chose to focus on general syndicated loans. However, when we include project finance loans in our sample – and use a project finance dummy in the regressions – our results remain quantitatively and qualitatively the same (line 4 in Table 3).

As a third methodological check we experiment with a different crisis definition and sample period. While August 2007 is generally regarded as the start of the crisis[15], the negative impact on financing conditions progressively increased during the following months. This means that our 'early start' of the crisis is a conservative approach when estimating the crisis impact on bank behavior. Our results are robust to starting the crisis at a later point in time (January 2008) and they also remain the same when we start our pre-crisis period in January 2006 instead of January 2005 (lines 5 and 6 in Table 3).

## 4. Changing syndicate structures during the crisis: alternative interpretations?

In the preceding section we document a significant positive impact of the financial crisis on arranger retention rates and syndicate concentration. We interpret this finding as evidence of a fundamental correction between borrower risk and screening and monitoring intensity: a wake-up call. Before we continue our analysis, we use this section to examine a number of alternative explanations.

### *4.1 Changing participant liquidity*

A first concern is that our findings partly reflect changes in the liquidity of participants. During the crisis participants may have become less liquid and thus less able to buy parts of syndicated loans, leaving arrangers with bigger loan portions. There are a number of arguments why such a leftward shift of the supply curve of participant funding is unlikely to drive our results. First, in case of such a shift we would expect to see many transactions in which arrangers tried to reduce the loan volume during the syndication process. However, information on loan reductions – available from Loan Analytics – shows that during the crisis the loan amount was scaled back in only 1 per cent of all transactions (compared to 0.2 per cent before the crisis) while it was actually *increased* in 5 per cent of the loans. It may still be the case that arrangers, unable to sell a sufficient portion of a loan to (less liquid) participants, decide to keep a larger share on their balance sheet without renegotiating down the borrower mandate. Renegotiation could harm their reputation and lower future fee income. However, while an arranger might once make the mistake to underwrite a loan that turns out to be too

[15] On Thursday August 9th 2007, the European Central Bank and the US Federal Reserve injected substantial amounts of liquidity into their banking systems. Other central banks soon followed suit. That week also saw the TED spread – the difference between the three-month T-bill rate and three-month LIBOR, an indicator of perceived credit risk – spike above 100 basis points for the first time.

large to sell down, she is unlikely to do so persistently. The syndicated loan market is transparent and information on increased difficulties to sell down loans spreads easily.

To further check whether our results are partly driven by reduced participant liquidity, we measure for each loan the proportion of participants that are deposit-taking institutions (commercial banks, cooperative banks, etc). Gatev and Strahan (2008) show empirically that compared to other financial institutions, such as hedge funds and investment banks, banks have a comparative advantage in liquidity management. In particular during crisis periods, when market liquidity declines and non-banks see their funding erode, banks are relatively well-placed to continue lending since their – government guaranteed – deposit base tends to increase. Syndicates in which banks dominate the participant group may thus be less liquidity constrained during a crisis compared to syndicates with many non-bank participants. An increase in the proportion of non-bank participants during the crisis could thus be an indication of a decrease in average participant liquidity. Yet, we find little variation in the composition of participants before and during the crisis. Before the crisis 84 per cent of participants is deposit-taking, whereas during the crisis this percentage slightly *increases* to 87 per cent. This suggests that, if anything, the composition of lending syndicates has shifted towards institutions with better, not worse, access to liquidity.

As a further check we create a participant liquidity variable that measures for each loan the share of liquid participants. We assume that before the crisis all participants were liquid; the share of liquid participants is thus 100 per cent for all pre-crisis loans. During the crisis we consider an individual participant to be liquid if the number of loans it participates in does not drop by more than 56 per cent compared to the pre-crisis period (56 percent is the decline in lending in the syndicated loan market as a whole).[16] The mean of this participant liquidity variable during the crisis is 76 per cent and the median is 79 per cent. There exists a negative correlation between the number of participants in a syndicate and their liquidity during the crisis: illiquid participants form larger participant groups. We add this variable and rerun our baseline regression (Table 4, Columns 2 and 3, other controls not shown for reasons of brevity). [17]

[16] The number of loan participations during the crisis compared to the pre-crisis period reveals the ability and willingness of each participant to stay engaged in the syndications market. Therefore it is a better variable to capture liquidity of participants than balance sheet variables. After all, balance sheet variables do not capture any strategic decisions of a lender. For example a liquid lender could have decided to pull out of the syndicated market and concentrate on bilateral lending while an illiquid lender could have done exactly the opposite. Comparing actual lending in the crisis with the pre-crisis period captures both the strategy as well as the ability of the lender.

[17] Given the assumption of full liquidity before the crisis, we do not need to interact this variable with a crisis dummy.

## Table 4
## Alternative Explanations: Participant Liquidity and Arranger Concentration

This table presents evidence on whether changes in the liquidity position of participants or changes in the concentration in the arranger market are driving our basic results. The crisis dummy is interacted with a variable that proxies the liquidity of the participant group (column 2 and 3) or the concentration in the arranger market (column 4 and 5). *Crisis* is a dummy which is one for the crisis period (October 2007 until April 2009) and zero for the pre-crisis period (January 2005-September 2007). *Arranger concentration* measures the concentration in the arranger market for each country in each year as the Herfindahl-Hirschman Index, i.e. the sum of the squared loan shares held by each arranger active in a particular country in a particular year. *Participant liquidity* equals the share of liquid participants in a syndicate. All participants are considered to be liquid before the crisis, while during the crisis a participant is considered liquid if its lending during the crisis (in terms of number of loans) does not drop by more than 56%, which is the decline in lending in the market as a whole. All regressions include the same control variables as the baseline model (Table 2). The regressions are estimated using Tobit. Standard errors are heteroskedasticity robust and clustered by borrowing firm. All regressions include a constant. Coefficients are marginal effects. Robust p-values appear in brackets and ***, ** and * correspond to one, five and ten percent level of significance respectively.

| | Participant liquidity | | Arranger Concentration | |
|---|---|---|---|---|
| | Mean Share Held By Arrangers | Herfindahl Index | Mean Share Held By Arrangers | Herfindahl Index |
| Crisis | 0.033*** | 0.058*** | 0.035** | 0.043*** |
| | [0.000] | [0.000] | [0.027] | [0.008] |
| Participant Liquidity | 0.059** | 0.132*** | | |
| | [0.041] | [0.000] | | |
| Crisis*Arranger Concentration | | | -0.177 | -0.177 |
| | | | [0.289] | [0.293] |
| Arranger Concentration | | | 0.174* | 0.058 |
| | | | [0.076] | [0.471] |
| Observations | 2,494 | 2,494 | 2,495 | 2,495 |
| LR chi2 | 1,600.82 | 1,614.04 | 1,594.57 | 1,567.51 |
| Log Likelihood | 1,759.03 | 1,913.68 | 1,758.55 | 1,896.03 |

We find that our result on the positive and significant impact of the crisis on retention rate and concentration is robust. Moreover, there is a significant *positive* impact of participant liquidity on both arranger share and concentration. In the case of relatively illiquid participants, arrangers thus need to retain *less*. This is opposite to what one would expect in case participant illiquidity would force arrangers to keep more of each loan. Illiquidity does not lead participants to require arrangers to retain more, but instead leads them to form larger participant groups (and thus less concentrated syndicates). Controlling for this liquidity effect, we still find a strong impact of the crisis on arranger retention rates. This supports our claim that the crisis acted as a wake up call to intensify monitoring and screening.

### *4.2 Changes in the competitiveness of the arranger market*

A second alternative explanation of our results involves the arranger tier of the syndicate rather than the participant tier. To the extent that during the crisis a number of investment banks and other arrangers withdrew from the market, this may have made the arranger market less competitive, allowing the remaining arrangers to keep bigger loan portions. To test for the impact of crisis-related changes in the competitive environment of arrangers, we construct a Herfindahl-Hirschman Index (HHI) for each year and country that measures the concentration of the arranger market. The arranger

market is quite competitive, with an average index of 13 at the country level. These findings are in line with Gatti, Kleimeier, Megginson and Steffanoni (2008) who show that the arranger market for syndicated project finance loans is relatively competitive and non-concentrated. On the global level, the concentration level is as expected smaller at 4 per cent. In a majority of countries there is a slight *decrease* in concentration of the arranger market during the crisis. This likely reflects that during the crisis some of the dominant arrangers reduced their business and focused more on their home markets, which created opportunities for local banks to start arranging deals (The Banker, 2008).[18] When we include our time-variant and country-specific arranger concentration measure to our basic regressions, we find that our results are robust for this correction (Table 4, Columns 4 and 5).

### *4.3 Increased syndicate concentration to facilitate low-cost restructuring*

Increased syndicate concentration may also reflect that during the crisis default risks increased and lenders started to streamline syndicates to facilitate debt restructuring (Bolton and Scharfstein, 1996). Although this recontracting hypothesis predicts smaller, more concentrated syndicates it does *not* predict an increase in arranger retention rates. In fact, it does not predict anything about the relative loan shares of arrangers and participants. Since we find an increase in both retention rates and concentration, our overall evidence is more in line with the screening and monitoring hypothesis. Second, if increased concentration would mainly serve to facilitate low-cost recontracting in case of unavoidable (non-strategic) defaults, this effect would likely be smaller in countries with high legal risk, where contracts are difficult to enforce. In such countries banks may even *reduce* concentration to deter strategic defaults (Esty and Megginson, 2003). Section 5 shows that our results apply to both developed and emerging countries, even though in the latter legal systems are less developed. Again, our results point to more screening and monitoring during the crisis.

### *4.4 Increased agency problems during the crisis: moral hazard versus adverse selection*

We interpret our results as evidence of an increased need to screen and monitor borrowers during the crisis. Participants want to make sure that borrowers have been adequately screened and will be adequately monitored before agreeing to participate in a syndicate. Arrangers need to keep a larger share on their books as participants are concerned about *moral hazard* with respect to arrangers' efforts. However, an alternative interpretation is that participants do not worry about arrangers' screening and monitor efforts, but rather that, since arrangers have private information about the

[18] When experienced arrangers leave the market during the crisis, participants may force the remaining or new arrangers – which are relatively unknown – to retain a bigger chunk of each loan. Note, however, that the average arranger experience did not change significantly during the crisis (Table 1). We explicitly analyze the impact of arranger reputation on syndicate structure in Section 5.

borrower, there will be *adverse selection*. In this case arrangers do not keep a larger loan share to convince participants that they adequately screen and monitor, but to convince them that they do not only sell down relatively risky loans ('lemons') (Akerlof, 1970; Parlour and Plantin, 2008). If this is the case, our results should not be interpreted as evidence that banks react to the crisis by increasing monitoring and screening. Rather, a high retention rate would mainly act as a signal or 'certification' of the borrower.[19,20] Such certification may be particularly important during financial crisis periods (Gatti, Kleimeier, Megginson and Steffanoni, 2008).

In order to distinguish between these two possible explanations of our findings, we follow Sufi (2007) and measure the number of previous relationships between the arrangers and the particular borrower. We construct two *relationship* variables. The first one equals the log of (1 plus) the number of times (one or more of) the arranger(s) in the current loan structured a loan in the past for the same borrower. The second one is a dummy which is 'one' if at least one of the arrangers in the current loan structured a loan in the past for the same borrower and 'zero' otherwise. We add these variables (one at a time) to our baseline regression and interact them with our crisis dummy. We also continue to include our standard control variables, including the number of previous loans of the borrower as a proxy for the *general* level of information that is available in the market about the borrower.

If moral hazard on the part of the arrangers is driving our results, then the fact that the arrangers keep part of the loan reflects that both arrangers and participants have imperfect knowledge about the borrower and that the participants fear that the arrangers will not sufficiently screen and monitor the borrower. In this case, we expect that if there have been previous lending relationships between the arrangers and the borrower, participants are less worried: they know that the arrangers already know the borrower quite well and that additional screening and subsequent monitoring is less crucial. This would translate into a negative coefficient for the *relationship* variable, as participants feel less need to force arrangers to retain a large portion of the loan in order to prevent shirking.

In the case of adverse selection, the existence of a previous relationship between the arrangers and the borrower implies that the arranger has an information advantage over the participants. Especially for these types of loans the arranger then has to signal to the participants that the loan is not risky. So in the adverse selection scenario, we expect a positive coefficient for the *relationship* variable: in the case of a loan to a previous client, the arrangers are forced to retain more of the loan and to form a more concentrated syndicate. The participants' main worry is not so much that the arrangers have

[19] Banks are 'special' because their screening generates proprietary information about the borrower. When a bank decides to lend to a borrower this decision is an implicit endorsement of the borrower as the bank is willing to put its own money at risk. Such a 'certification' tends to have a positive impact on the market value of the borrower (James, 1987; Cook, Schellhorn and Spellman, 2003).

[20] Note that although the model of Holmström and Tirole (1997, p. 675) explicitly deals with moral hazard, the authors mention that their model can also be thought of as one in which the monitor takes a stake in the borrower to certify that the borrower is sound.

insufficiently screened the borrower or will not monitor her adequately, but rather that the arrangers actually know the borrower quite well and will abuse this information.

The results in Table 5 show that we can interpret our findings as evidence of increased monitoring and screening by banks during the crisis (other control variables are not shown for reasons of brevity). In case of previous lending relationships between the same arrangers and a borrower, the arrangers need to retain less of the loan and the syndicate becomes more diffuse. In case of risky clients, retention rates increase and lending syndicates become more concentrated because participants fear that arrangers will shirk, not because they expect arrangers to sell bad loans.

The impact of previous relationships between the borrower and the arrangers becomes even more negative during the crisis. The increased retention rates and higher syndicate concentration during the crisis – the wake-up call – seem to be mostly due to concerns about moral hazard and not adverse selection.

**Table 5**
**Alternative Explanation: Adverse Selection versus Moral Hazard**

This table presents evidence on whether the increase in retention rates of mandated arrangers and the higher syndicate concentration are the result of adverse selection or moral hazard. The crisis dummy is interacted with two variables that capture the intensity of the relationship between borrower and arrangers. *Crisis* is a dummy which is one for the crisis period (October 2007 until April 2009) and zero for the pre-crisis period (January 2005 September 2007). *Relationship* equals the log of the number of times the arranger(s) of the current loan structured a loan for the same borrower in the past. *Relationship (dummy)* is one if the arranger(s) in the current loan structured at least one loan in the past for the same borrower. All regressions include the same control variables as the baseline model (Table 2). The regressions are estimated using Tobit. Standard errors are heteroskedasticity robust and clustered by borrowing firm. All regressions include a constant. Coefficients are marginal effects. Robust p-values appear in brackets and ***, ** and * correspond to one, five and ten percent level of significance respectively.

| | Mean Share Held By Arrangers | | Herfindahl Index | |
|---|---|---|---|---|
| | (1) | (2) | (1) | (2) |
| Crisis | 0.030*** | 0.029*** | 0.040*** | 0.039*** |
| | [0.000] | [0.001] | [0.000] | [0.000] |
| Crisis*Relationship | -0.013** | | -0.017*** | |
| | [0.020] | | [0.001] | |
| Relationship | -0.015*** | | -0.010** | |
| | [0.000] | | [0.012] | |
| Crisis*Relationship (dummy) | | -0.018 | | -0.022** |
| | | [0.118] | | [0.044] |
| Relationship (dummy) | | -0.021** | | -0.015 |
| | | [0.020] | | [0.114] |
| Observations | 2,495 | 2,495 | 2,495 | 2,495 |
| LR chi2 | 1,741.53 | 1,649.84 | 1,671.12 | 1,605.74 |
| Log Likelihood | 1,767.75 | 1,762.34 | 1,906.48 | 1,900.81 |

## 5. The financial crisis and screening and monitoring intensity: cross-sectional heterogeneity

The preceding sections provide evidence that banks reacted to the financial crisis by stepping up their screening and monitoring efforts above and beyond the level warranted for by increased borrower risk. Is this wake-up call effect identical for all borrower and lender types or does it show variation across borrowers and lenders? To this question we turn now.

Besides providing evidence of a wake-up call, our results also indicate that when information asymmetries are relatively large, such as in the case of risky loans to non-investment grade rated borrowers, the retention rate arrangers need to hold is larger. If, in the years leading up to the crisis, monitoring and screening became too lax across the board, one would expect the correction as a result of the crisis to be especially strong in situations where information asymmetries are severe and agency problems large. To analyze whether this is the case, we estimate a set of regressions in which we interact the crisis dummy with a number of variables that proxy for the importance of agency problems.

Table 6 summarizes the results (control variables are included in all regressions but not shown for reasons of brevity). We replicate our finding that arrangers retain larger loan shares and that syndicates become more concentrated during the crisis. We also find that during the crisis screening and monitoring increases in particular for financial sector borrowers (columns 1a). This is not surprising given that the financial crisis was triggered by bad assets in the financial sector. Indeed, the additional scrutiny placed on financial firms during the crisis was limited to developed (high-income OECD) countries, where uncertainties about sub-prime asset quality were concentrated (columns 1b). In contrast, in emerging markets the screening and monitoring of financial firms does not increase more than for other industries.[21]

Next, we show that the crisis impact holds for both borrowers with and without an investment-grade rating: the coefficient for the interaction term of the crisis and the rating dummies is insignificant (columns 2a and 2b). While a good credit rating reduces agency problems during normal economic times, we do not find a differentiated impact of the wake-up call effect on investment grade rated versus junk rated or unrated borrowers.

As a further step we examine whether the wake-up call effect was different for experienced borrowers, which built up a borrowing track-record over time, compared to first-time borrowers. Columns 3a provide statistically weak evidence that for borrowers with a reputation the wake-up call effect was more limited: during the crisis arrangers need to retain less of loans to repeat borrowers and form less concentrated syndicates. Interestingly, when we slice the data into developed countries

[21] As our definition of developed countries is rather narrow (only high-income OECD countries), we check whether our results also hold when we define developed countries as all high-income countries (see the World Bank website for an overview of the countries in these groupings). Our results are robust to this broader definition of developed countries.

versus emerging markets (columns 3b) we find that borrower reputation mattered only in developed countries during the crisis. Apparently, building up a reputation as a 'good' borrower reduces information asymmetries between borrowers and lenders in developed countries but not so much in emerging markets.

Next we show that during the crisis collateralized loans see a significantly smaller increase in retention rates among arrangers compared to non-secured loans (columns 4a). While monitoring and screening gain in importance during the crisis across the board, this is less the case for secured loans. This holds for both developed countries and emerging markets (columns 4b). This result seems surprising at first sight. Since during normal times collateral serves as an indicator of a loan's underlying riskiness (Table 2), one would expect the wake-up call effect to be stronger for these types of loans. Apparently another mechanism is at work here: when default rates go up, and the presence of collateral starts to matter, banks value the availability of collateral. Therefore an increase in monitoring and screening is less important.

We also test whether the wake-up call effect differs across arrangers with a varying amount of reputation (measured as the market share in the syndicated loan market in the previous year) (columns 5a and 5b). We find that when experienced arrangers are hired the wake-up call effect is smaller. Experienced arrangers still need to increase their retention rates during the crisis, but they need to do so far less than less experienced competitors. Arranger reputation seems to be a crucial mechanism to control agency problems within the syndicate, in particular during episodes of financial turmoil.[22]

[22] Gatti, Kleimeier, Megginson, and Steffanoni (2008) use a similar arranger reputation variable and show for a large sample of syndicated project finance loans that during the East Asian and Russian financial crises arranger reputation was a valuable loan certification mechanism. The authors focus on the impact on loan spreads and show that during a crisis reluctant participants are willing to pay for good arrangers in the form of increased arranger fees. We find that this reluctance also translates into different lending structures and that this result also holds for a broader group of syndicated loans.

# Table 6
## Information Asymmetry and Impact Crisis on Syndicate Structure

This table presents evidence on how the wake-up call effect differs across different types of borrowers and lenders and on how this differentiated effect differs between developed countries and emerging markets. *Crisis* is a dummy which is one for the crisis period (October 2007 until April 2009) and zero for the pre-crisis period (January 2005-September 2007). *Financial* is a dummy which is one if the borrower industry is "financial services" according to Loan Analytics. *EM* is a dummy which is one if the country is not a high-income OECD country. *Investment grade* is a dummy which is one if the borrower is investment grade rated. *Borrower reputation* is a dummy which is one if the borrower borrowed at least once in the five years prior to loan signing. *Secured* is a dummy which is one if the loan is secured. *Arranger reputation* measures the average market share of the arrangers in the year prior to loan signing. All regressions include the same control variables as the baseline model (Table 2). The sample includes only those loans for which the amount held by each syndicate member is available. The regressions are estimated using Tobit. Standard errors are heteroskedasticity robust and clustered by borrowing firm. All regressions include a constant. Coefficients are marginal effects. The robust p-values appear in brackets and ***, ** and * correspond to one, five and ten percent level of significance respectively.

| | Mean Share Held By Arrangers | | | | | | | | | | Herfindahl Index | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1a) | (1b) | (2a) | (2b) | (3a) | (3b) | (4a) | (4b) | (5a) | (5b) | (1a) | (1b) | (2a) | (2b) | (3a) | (3b) | (4a) | (4b) | (5a) | (5b) |
| Crisis | 0.014** | 0.003 | 0.022*** | 0.019** | 0.030*** | 0.037*** | 0.028*** | 0.024*** | 0.028*** | 0.031*** | 0.021*** | 0.003 | 0.029*** | 0.019*** | 0.039*** | 0.037*** | 0.033*** | 0.023*** | 0.042*** | 0.033*** |
| | [0.049] | [0.651] | [0.002] | [0.015] | [0.001] | [0.001] | [0.000] | [0.000] | [0.003] | [0.003] | [0.001] | [0.656] | [0.000] | [0.007] | [0.000] | [0.000] | [0.000] | [0.000] | [0.000] | [0.001] |
| Crisis*Financial | 0.025** | 0.055*** | | | | | | | | | 0.026** | 0.054*** | | | | | | | | |
| | [0.047] | [0.000] | | | | | | | | | [0.044] | [0.000] | | | | | | | | |
| Crisis*EM | | 0.030* | | 0.009 | | -0.015 | | 0.011 | | -0.018 | | 0.053*** | | 0.027* | | 0.005 | | 0.030** | | 0.010 |
| | | [0.055] | | [0.549] | | [0.424] | | [0.454] | | [0.379] | | [0.000] | | [0.056] | | [0.747] | | [0.030] | | [0.610] |
| Crisis*Financial*EM | | -0.081*** | | | | | | | | | | -0.078*** | | | | | | | | |
| | | [0.000] | | | | | | | | | | [0.003] | | | | | | | | |
| Crisis*Investment grade | | | -0.008 | -0.008 | | | | | | | | | -0.005 | -0.012 | | | | | | |
| | | | [0.501] | [0.530] | | | | | | | | | [0.666] | [0.294] | | | | | | |
| Crisis*Investment grade*EM | | | | 0.001 | | | | | | | | | | 0.027 | | | | | | |
| | | | | [0.985] | | | | | | | | | | [0.396] | | | | | | |
| Crisis*Borrower Reputation | | | | | -0.019 | -0.033*** | | | | | | | | | -0.020* | -0.035*** | | | | |
| | | | | | [0.114] | [0.010] | | | | | | | | | [0.075] | [0.003] | | | | |
| Crisis*Borrower Reputation*EM | | | | | | 0.043* | | | | | | | | | | 0.049* | | | | |
| | | | | | | [0.087] | | | | | | | | | | [0.051] | | | | |
| Crisis*Secured | | | | | | | -0.039** | -0.044*** | | | | | | | | | -0.023 | -0.036** | | |
| | | | | | | | [0.014] | [0.010] | | | | | | | | | [0.149] | [0.024] | | |
| Crisis*Secured*EM | | | | | | | | 0.008 | | | | | | | | | | 0.021 | | |
| | | | | | | | | [0.792] | | | | | | | | | | [0.509] | | |
| Crisis*Arranger Reputation | | | | | | | | | -0.009 | -0.013** | | | | | | | | | -0.015** | -0.015** |
| | | | | | | | | | [0.214] | [0.048] | | | | | | | | | [0.013] | [0.011] |
| Crisis*Arranger Reputation*EM | | | | | | | | | | 0.040 | | | | | | | | | | 0.029 |
| | | | | | | | | | | [0.145] | | | | | | | | | | [0.174] |
| Observations | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 | 2,495 |
| LR chi2 | 1,595.35 | 1,611.91 | 1,607.09 | 1,626.95 | 1,601.78 | 1,621.99 | 1,604.19 | 1,611.89 | 1,604.67 | 1,606.66 | 1,568.45 | 1,601.54 | 1,582.60 | 1,609.17 | 1,577.33 | 1,602.00 | 1,576.90 | 1,581.79 | 1,594.92 | 1,600.42 |
| Log Likelihood | 1,764.25 | 1,770.87 | 1,756.95 | 1,757.26 | 1,758.20 | 1,760.43 | 1,760.65 | 1,761.29 | 1,757.65 | 1,760.60 | 1,902.25 | 1,913.28 | 1,895.55 | 1,900.74 | 1,897.34 | 1,904.48 | 1,896.96 | 1,902.55 | 1,898.58 | 1,903.33 |

## 6. Conclusions

We analyze almost 15,000 syndicated loans to borrowers across 65 countries to examine whether banks intensified the intensity of their screening and monitoring during the current financial crisis. Our results show that, even when controlling for observed and unobserved loan and borrower characteristics, banks significantly stepped up their screening and monitoring efforts. This suggests that the crisis acted as a wake-up call that prompted syndicate participants to boost arrangers' incentives to screen and monitor. As a result, arrangers had to retain on average 10 per cent more of each loan compared to the pre-crisis boom period. Additional tests show that our results are unlikely to be driven by either reduced participant liquidity or by changes in the competitiveness of the arranger market. Finally, we use information on prior relationship between arrangers and borrowers to show that the wake-up call reflects concerns about moral hazard with respect to arranger efforts and not about adverse selection.

In addition, we find that the wake-up call effect is especially strong when information asymmetries between borrower and lender and within the syndicate are larger. During the crisis, banks stepped up their screening and monitoring of uncollateralized loans, loans to first-time borrowers, and loans to borrowers in the financial sector in particular. The last two effects are limited to developed countries. We also find that arranger reputation matters: reputable arrangers need to increase retention rates less during the crisis. These findings have implications for firms that want to minimize the risk of getting cut off from new bank funding during a financial crisis. In order to convince banks to keep lending, firms should build up a track-record of successful syndicated borrowing during times of economic calm. Once the crisis hits, firms that contemplate raising a syndicated loan may also choose to pick a relatively experienced mandated lead arranger in order to minimize agency problems within the syndicate. In contrast, having an investment-grade credit rating does little to reassure potential lenders during episodes of financial turmoil.

Our findings also bear on the current debate about regulatory measures to set minimum 'skin in the game' retention rates for originating banks. In July 2009, the European Parliament amended the Capital Requirements Directive by including a 5 per cent retention requirement for securitizations. A recent white paper published by the US Treasury Department indicates that the US may soon follow suit.[23] Earlier plans to let these minimum retention requirements not only apply to securitizations but also to syndicated loans have (at least for the time being) been shelved.

At first sight our results confirm that regulatory retention requirements may indeed not be necessary for syndicated loans. After all, we document a strong, broad-based but market-driven increase in retention rates among syndicate arrangers. Participants, concerned about arrangers' lax screening and monitoring, were in many cases able to take corrective action without regulatory intervention.

[23] See IMF (2009) and Fender and Mitchell (2009) for a critical discussion of these regulatory measures.

Although syndicated lending declined sharply, the market did not break down. This stands in contrast with the securitization market, where the link between ultimate investor and originator was too severed to make any corrective action possible.

However, it is important to realize that when liquidity fully returns to the market and loans become again oversubscribed by participants there exists no clear market dynamic that forces arrangers to keep retention rates at levels that provide them with enough incentives to screen and monitor adequately. Therefore, it is to be expected that without proper regulation the market will return to its pre-crisis practices. Putting in place mandatory retention rates that not only cover securitization but also syndicated loans can prevent this.

Our results also show that while there was a broad-based increase in retention rates during the crisis, the marginal impacts were differentiated across various borrower types. This should warn against a simplistic, one-size-fits-all approach to setting minimum retention requirements for securitizations. Uniform retention requirements, such as the 5 per cent rule, may be too high for certain borrower and asset types – and thus stifle the (re-)emergence of securitization of such loans – while at the same time they may be too low for other borrower categories – and thus insufficiently resolve agency problems.

Finally, our results show that arranger (or originator) reputation may function as a market-based mechanism to limit moral hazard within lending syndicates (or securitizations). Too crude regulatory retention requirements may undermine such market-based solutions to agency problems and thus be counterproductive.

**References**


Akerlof, G.A. (1970), The market for 'lemons': Quality uncertainty and the market mechanism, *Quarterly Journal of Economics*, 84, 488-500.

Allen, F. (1990), The market for information and the origin of financial intermediation, *Journal of Financial Intermediation*, 1, 3-30.

Banker, The (2008), *Competition for syndicated loans*, 03-11-2008.

Barbosa, L. and N. Ribeiro (2007), Determinants of spreads in syndicated loans to euro area borrowers, mimeo.

Berndt, A. and A. Gupta (2009), Moral hazard and adverse selection in the originate-to-distribute model of bank credit, *Journal of Monetary Economics*, 56, 725-743.

Berger, A. and G. Udell (1990), Collateral, loan quality, and bank risk, *Journal of Monetary Economics*, 25, 21-42.

Berger, A. and G. Udell (2004), The institutional memory hypothesis and the procyclicality of bank lending behavior, *Journal of Financial Intermediation*, 13, 458-495.

Bolton, P. And D.S. Scharfstein (1996), Optimal debt structure and the number of creditors, *Journal of Political Economy*, 104(1), 1-25.

Broecker, T. (1990), Creditworthiness tests and interbank competition, *Econometrica*, 58, 429-452.

Calomiris, C.W. and B. Wilson (2004), Bank capital and portfolio management: The 1930s "capital crunch" and the scramble to shed risk, *Journal of Business*, 77(3), 421-454.

Cetorelli, N. and L.S. Goldberg (2009), *Globalized banks: Lending to emerging markets in the crisis*, Federal Reserve Bank of New York Staff Report No. 377, New York.

Champagne, C. and L. Kryzanowski (2007), Are current syndicated loan alliances related to past alliances, *Journal of Banking & Finance*, 31, 3145-3161.

Chen, H.C., C.J. Jhou and H.C. Yeh (2007), Signalling by underwriter retention rate in the IPO market, *Applied Economics*, 39(15), 1973-1983.

Cook, D.O., Schellhorn, C.D. and L.J. Spellman (2003), Lender certification premiums, *Journal of Banking & Finance*, 27, 1561-1579.

Corwin, S.A. and P. Schultz (2005), The role of IPO underwriting syndicates: Pricing, information production, and underwriter competition, *Journal of Finance*, 60, 443-486.

De Haas, R.T.A. and I.P.P. Van Lelyveld (2006), Foreign banks and credit stability in Central and Eastern Europe: A panel data analysis, *Journal of Banking & Finance*, 30, 1927-1952.

De Haas, R.T.A. and I.P.P. Van Lelyveld (2009), Internal capital markets and lending by multinational bank subsidiaries, *Journal of Financial Intermediation*, forthcoming.

Dell'Ariccia, G., D. Igan and L. Laeven (2008), Credit booms and lending standards: Evidence from the subprime mortgage market, IMF Working Paper No. 08/106, International Monetary Fund, Washington, D.C.

Dell'Ariccia, G., and R. Maequez (2006), Lending booms and lending standards, *Journal of Finance*, 61, 2511-2546.

Demirgüç-Kunt, A., E. Detragiache and P. Gupta (2006), Inside the crisis: an empirical analysis of banking systems in distress, *Journal of International Money and Finance*, 25, 702-718.

Dennis, S.A. and D.J. Mullineaux (2000), Syndicated loans, *Journal of Financial Intermediation*, 9, 404-426.

Depository Trust and Clearing Corporation (DTCC) (2008), *Transforming the Syndicated Loan Market. A White Paper to the Industry*, http://www.dtcc.com/downloads/leadership/whitepapers/Transforming_Syndicated_Loan_Market.pdf.

Diamond, D.W. (1984), Financial intermediation and delegated monitoring, *Review of Economic Studies*, 51(3), 393-414.

Diamond, D.W. (1991), Monitoring and reputation: The choice between bank loans and directly placed debt, *Journal of Political Economy*, 99, 689-721.

Esty, B.C. and W.L. Megginson (2003), Creditor rights, enforcement and debt ownership structure: evidence from the global syndicated loan market, *Journal of Financial and Quantitative Analysis*, 38, 37-59.

Fender, I. and J. Mitchell (2009), The future of securitization: how to align incentives?, *BIS Quarterly Review*, September, 27-43.

Fight, A. (2004), *Syndicated lending*, Elsevier Butterworth-Heinemann, Oxford.

Gatev, E. and P. Strahan (2009), Liquidity risk and syndicate structure, *Journal of Financial Economics*, 93, 490-504.

Gatti, S., S. Kleimeier, W.L. Megginson and A. Steffanoni (2008), Arranger certification in project finance, mimeo.

Giannetti, M. and Y. Yafeh (2008), Do cultural differences between contracting parties matter? Evidence from syndicated bank loans, mimeo.

Godlewski, C.J. (2008), What drives the arrangement timetable of bank loan syndications?, Laboratoire de Recherche en Gestion et Economie Working Paper No. 2008-02, Université de Strasbourg.

Gertler, M. and S. Gilchrist (1994), Monetary policy, business cycles, and the behavior of small manufacturing firms, *Quarterly Journal of Economics* CIX, 309-40.

Goplan, R., V. Nanda and V. Yerramilli (2007), Lead arranger reputation and the loan syndication market, mimeo.

Gorton, G. and G. Pennachi (1995), Banks and loan sales: Marketing non-marketable assets, *Journal of Monetary Economics*, 35, 389-411.

Holmström, B. and J. Tirole (1997), Financial intermediation, loanable funds, and the real sector, *Quarterly Journal of Economics*, CXII, 663-691.

IMF (2009), *Global Financial Stability Report: Navigating the Financial Challenges Ahead*, International Monetary Fund, Washington, D.C.

Ivashina, V. (2009), Asymmetric information effects on loan spreads, *Journal of Financial Economics*, 92, 300-319.

Ivashina, V. and D. Scharfstein (2008), Bank lending during the financial crisis of 2008, mimeo.

James, C. (1987), Some evidence on the uniqueness of bank loans, *Journal of Financial Economics* 19, 217-238.

Jiménez, G., S. Ongena, J.L. Peydró and J. Saurina, Hazardous times for monetary policy: What do twenty-three million bank loans say about the effects of monetary policy on credit-risk taking?, Banco de España Working Paper No. 833, Banco de España, Madrid.

Jones, J.D., W.W. Lang and P.J. Nigro (2005), Agent bank behavior in bank loan syndications, *Journal of Financial Research*, 28(3), 385-402.

Keys, B.J., Mukherjee, T., Seru, A. and V. Vig (2009), Did securitization lead to lax screening? Evidence from subprime loans, *Quarterly Journal of Economics*, forthcoming.

Kleimeier, S. and W.L. Megginson (2000), Are project finance loans different from other syndicated credits?, *Journal of Applied Corporate Finance*, 13(1), 75-87.

Lee, S.W. and D.J. Mullineaux (2004), Monitoring, financial distress, and the structure of commercial lending syndicates, *Financial Management*, Autumn, 107-129.

Parlour, C.A. and G. Plantin (2008), Loan sales and relationship banking, *Journal of Finance* LXIII, 1291-1314.

Pennacchi, G. (1988), Loan sales and the cost of bank capital, *Journal of Finance*, 43, 375-396.

Preece, D. and D.J. Mullineaux (1996), Monitoring, loan renegotiability, and firm value: The role of lending syndicates, *Journal of Banking & Finance*, 20, 577-593.

Puri, M., J. Rocholl, and S. Steffen (2009), The impact of the U.S. financial crisis on global retail banking, mimeo.

Rajan, R.G. (1994), Why bank credit policies fluctuate: A theory and some evidence, *Quarterly Journal of Economics*, 109, 399-441.

Ruckes, M. (2004), Bank competition and credit standards, *Review of Financial Studies*, 17, 1073-1102.

Simons, K. (1993), Why do banks syndicate loans?, *New England Economic Review*, January/February, 45-52.

Shleifer, A. and R.W. Vishny (2009), Unstable banking, mimeo, http://ssrn.com/abstract=1396805.

Sowerbutts, R. (2009), Sweetening the lemon. House prices and adverse selection in secondary loan markets, mimeo.

Steffen, S. and M. Wahrenburg (2008), Syndicated loans, lending relationships and the business cycle, mimeo.

Sufi, A. (2007), Information asymmetry and financing arrangements: Evidence from syndicated loans, *Journal of Finance*, 62, 629-668.

**Annex**

**Table A1**
**Geographic distribution of the sample**

| Region | Country | Per cent | Region | Country | Per cent |
|---|---|---|---|---|---|
| North America | United States | 67.01 | Asia and Pacific | Taiwan, China | 0.60 |
| | Canada | 2.19 | | Hong Kong, China | 0.47 |
| | Bermuda | 0.35 | | Korea, Rep. | 0.80 |
| | | | | India | 0.93 |
| Western Europe | United Kingdom | 3.39 | | Singapore | 0.39 |
| | France | 3.34 | | China | 0.70 |
| | Spain | 2.58 | | Australia | 0.19 |
| | Germany | 2.11 | | Indonesia | 0.27 |
| | Italy | 2.05 | | Japan | 0.09 |
| | Netherlands | 1.24 | | Malaysia | 0.16 |
| | Norway | 0.50 | | Philippines | 0.16 |
| | Switzerland | 0.53 | | Thailand | 0.11 |
| | Sweden | 0.47 | | Vietnam | 0.04 |
| | Denmark | 0.39 | | New Zealand | 0.03 |
| | Greece | 0.38 | | | |
| | Belgium | 0.32 | Latin America | Brazil | 0.47 |
| | Finland | 0.23 | | Mexico | 0.46 |
| | Iceland | 0.22 | | Chile | 0.26 |
| | Luxembourg | 0.20 | | Argentina | 0.10 |
| | Ireland | 0.17 | | Peru | 0.10 |
| | Portugal | 0.15 | | Panama | 0.05 |
| | Austria | 0.10 | | | |
| | | | Middle East and Africa | Turkey | 0.56 |
| Eastern Europe and Central Asia | Russian Federation | 2.03 | | United Arab Emirates | 0.36 |
| | Ukraine | 0.55 | | Kuwait | 0.25 |
| | Kazakhstan | 0.39 | | South Africa | 0.12 |
| | Hungary | 0.16 | | Saudi Arabia | 0.11 |
| | Poland | 0.14 | | Bahrain | 0.11 |
| | Latvia | 0.14 | | Qatar | 0.08 |
| | Romania | 0.13 | | Oman | 0.06 |
| | Slovenia | 0.12 | | Egypt, Arab Rep. | 0.06 |
| | Czech Republic | 0.04 | | Iran, Islamic Rep. | 0.01 |
| | Bulgaria | 0.08 | | | |
| | Azerbaijan | 0.08 | Sub-Saharan Africa | Nigeria | 0.06 |
| | Croatia | 0.06 | | Liberia | 0.01 |