

# ESMT Working Paper

## GOVERNMENT GUARANTEES AND BANK RISK TAKING INCENTIVES

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# Abstract

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## Government guarantees and bank risk taking incentives<sup>+</sup>

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This paper analyzes the effect of the removal of government guarantees on bank risk taking. We exploit the removal of guarantees for German Landesbanken which results in lower credit ratings, higher funding costs, and a loss in franchise value. This removal was announced in 2001, but Landesbanken were allowed to issue guaranteed bonds until 2005. We find that Landesbanken lend to riskier borrowers after 2001. This effect is most pronounced for Landesbanken with the highest expected decrease in franchise value. Landesbanken also significantly increased their off-balance sheet exposure to the global ABCP market. Our results provide implications for the debate on how to remove guarantees.

**Keywords:** Government guarantees, exits, risk taking, franchise value, financial crisis, loans

**JEL Codes:** G20, G21, G28

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Governments and central banks around the world have reacted to the financial and sovereign debt crisis by providing guarantees and injecting liquidity and capital into the financial system. The main motivation has been the fear of a systemic meltdown with substantial consequences for the economy as a whole. The related academic literature dates back at least to the question of credit rationing in Stiglitz and Weiss (1981) and the work on non-monetary transmission in Bernanke (1983) and Bernanke and Blinder (1992, 1998). This transmission has become of particular interest in the wake of the crisis when liquidity and solvency problems of banks led to a contraction in lending. Ivashina and Scharfstein (2010) and Puri, Rocholl, and Steffen (2011) show that banks decrease credit supply to corporate and retail borrowers, which in turn leads to a decrease in investment, as shown by Duchin, Ozbas, and Sensoy (2010). Still, it is wide consensus that the interventions by governments and central banks - despite their negative externalities (e.g. a reduction of market discipline and lower funding costs as in Flannery, 2010) and substantial costs to taxpayers - have avoided much more detrimental consequences.<sup>1</sup>

It is less clear what happens when interventions and guarantees are withdrawn and how banks subsequently change their risk taking behavior. Theory suggests that the removal of the guarantee and the associated loss in franchise value, i.e. the present value of future profits, increases incentives for banks to take risks (“franchise value effect”). However, without a guarantee a bank’s creditors have higher monitoring incentives as their investments are now at risk. This in turn could decrease the bank’s risk taking (“market discipline effect”).<sup>2</sup> We use the announcement of the removal of explicit government guarantees for German Landesbanken in July 2001 to study the effect on bank risk taking. Importantly, the removal came into effect only in July 2005, i.e. after a transition period of four years over which Landesbanken were still

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<sup>1</sup> The President of the United States, Barack Obama, summarized in 2009: “... *(T)he unprecedented intervention of the federal government to stabilize the financial markets and prevent a wider collapse...*”

<sup>2</sup> Both effects are described in detail in section 1.2

allowed to issue state guaranteed debt. The franchise value effect thus materializes immediately, while the market discipline effect only becomes effective with a considerable time lag. This event thus provides an ideal and unique laboratory to analyze various novel questions. How does borrower risk change after the removal of government guarantees? How do lending rates adjust? Do we observe an increase in bond origination volume during the transition period? Is there a relation between a bank's likelihood to default and the change both in lending behavior and in bond issuances?

In a first step, we analyze whether there is a change in lending behavior, using a comprehensive loan-level dataset of bank loans to corporate customers. In particular, we examine whether Landesbanken change their lending practices after July 2001 relative to all other banks. We concentrate on two measures to capture the lending practices by these banks. The first measure is the riskiness of a borrower as measured by the Z-Score (as adapted by MacKie-Mason, 1990).<sup>3</sup> The second measure is the interest rate charged to each borrower as measured by the All-In-Spread-Drawn (AISD). Using a difference-in-difference approach and controlling for a number of borrower and loan characteristics, we find that Landesbanken do not differ from other banks in their lending behavior before July 2001. The riskiness of borrowers and the interest rates they are charged are not significantly different. In contrast, after July 2001, the riskiness of borrowers at Landesbanken is significantly higher than that at other banks. At the same time, this higher riskiness is not accompanied by an increase in interest rates charged to these borrowers. Rather to the contrary, Landesbanken now charge significantly lower interest rates in comparison to other banks. These results suggest that the removal of state guarantees results in a substantial increase in Landesbanken's risk taking.

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<sup>3</sup> In the robustness section 5., we use other measures of customer riskiness.

Second, we test the lending behavior of Landesbanken dependent on their anticipated change in ratings and thus franchise value after the removal of the guarantees. In particular, we analyze whether the change in behavior is most pronounced among those Landesbanken that are hit hardest. We thus divide Landesbanken into two groups: The first group comprises those Landesbanken with a large anticipated rating change and the second group those Landesbanken with a small anticipated change. We then analyze again the riskiness of customers and the interest rates charged to these customers in the first group of banks before and after July 2001 relative to those in the second group. We find that loans of both groups do not differ significantly before July 2001. However, Landesbanken with a large decrease in franchise value grant loans to significantly riskier borrowers after July 2001 than Landesbanken with a small decrease. Furthermore and similar to the results before, this increase in borrower riskiness is not accompanied by an increase in interest rates. In fact, the interest rates charged to borrowers of Landesbanken with a large decrease in franchise value dropped after 2001 relative to before and in comparison to those charged by Landesbanken with a small decrease. These results suggest that in particular Landesbanken with the highest decrease in franchise value change their lending practices and start lending to riskier borrowers and at lower rates.

Third, we analyze how the four-year transition period affects the risk taking behavior of Landesbanken. We document that Landesbanken substantially increased their bond issuance volumes. Their main motivation was to exploit the funding cost advantage, which often outweighs the carry cost of keeping excess liquidity.<sup>4</sup> The increase was particularly strong for Landesbanken with the highest expected loss in franchise value.

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<sup>4</sup> As noted by Fitch Ratings (2006): “Fitch estimates the additional expense from holding excess liquidity to be between around 0.5 percent and 8 percent of published net income... However, at most banks this cost is more than compensated for by having to issue less unguaranteed (and more expensive) long-term bonds...”

Finally, we analyze additional investment opportunities apart from the lending business. We find a significant increase in the activities in the Asset Backed Commercial Paper (ABCP) market. Virtually all Landesbanken participated as sponsors of Special Investment Vehicles (SIVs) which purchased mortgage backed securities as well as other asset backed securities and were financed almost entirely with short term debt.<sup>5</sup> On average, 7% of the global ABCP volume was sponsored by seven Landesbanken, the share increases to 8.4% in 2006.

In sum, our analysis suggests that the removal of guarantees leads to more risk taking by banks. This effect is most pronounced for banks with the largest decrease in franchise value. The results are robust to loan and borrower control variables as well as different measures of customer riskiness. Moreover, our results indicate that banks' behavior is linked to the way in which guarantees are withdrawn. In particular, they suggest that governments should not grant long transition periods for ending guarantees.

Our paper makes contributions to several strands of the literature. First, it relates to the literature that analyzes banks' risk taking. An increase in risk taking has been documented for example in the context of the S&L (savings and loan) crisis, e.g. Kane (1989), Dewatripont and Tirole (1994), Cole, McKenzie, and White (1995), and Hellwig (1995), in the case of large commercial banks in the U.S. (Boyd and Gertler, 1994), for Swedish banks (Berglöf and Sjögren, 1998), and for a large subprime mortgage originator (Landier, Sraer, and Thesmar, 2011). We focus on the removal of explicit guarantees as the consequence of a legal decision and analyze its effect on banks' risk taking. Second, it contributes to the literature that examines the role of government guarantees. Implicit government guarantees have been shown to affect access to credit (Puri, Rocholl, and Steffen, 2011) as well as risk taking of banks (e.g. Gropp, Hakenes,

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<sup>5</sup>Acharya and Schnabl (2010) report that Ormand Quay, the SIV sponsored by Sachsen LB, was financed with 99.7% short-term debt.

and Schnabel, 2010; Kacperczyk and Schnabl, 2013). Puri, Rocholl, and Steffen (2011) find that savings banks significantly reduce lending once their implicit guarantees to the Landesbanken have been utilized. Gropp, Hakenes, and Schnabel (2010) assess the effect of implicit future bail-out guarantees and find an elevated risk taking behavior of competitor banks, however, not of the banks subject to the guarantee.<sup>6</sup> Kacperczyk and Schnabl (2011) analyze implicit guarantees granted by financial institutions that own mutual funds. Their evidence suggests that these implicit guarantees reduce risk taking. We, in contrast, study the case where an explicit guarantee is replaced by an implicit one.

Körner and Schnabel (2013) and Gropp, Gründl and Güttler (2013) use the same event for identification. They both investigate German *savings* banks which are, besides the federal government, the owners of the Landesbanken in their region and together form a banking network in which the Landesbanken serve as a liquidity pool. The closest paper to ours is Körner and Schnabel (2013). They show that savings banks with a high downgrade Landesbank face a higher increase in refinancing costs which is consistent with the idea that the removal of the government guarantee spreads within the banking network. Gropp, Gründl and Güttler (2013) argue that government guarantees induces savings banks to take higher risk before 2001. We investigate the risk taking behavior of Landesbanken which are particularly affected through this institutional change because of their reliance on funding from public bond markets.<sup>7</sup> Importantly, we also investigate the transition period between 2001 and 2005 during which Landesbanken could still issue government guaranteed debt.

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<sup>6</sup> Acharya, Drechsler, and Schnabl (2011) provide a different view on the effect of bank bailouts and model a feedback effect from the sovereign to the financial sector. In their model, if the sovereign has sufficiently large legacy debt, additional bank bailouts lead to a reduction in the value of outstanding sovereign debt and a reduction in the value of government guarantees, i.e. the risk of the financial sector increases if sovereign risk increases.

<sup>7</sup> The Sachverständigenrat (2004), a group of economists officially advising the German government and Parliament on economic policy issues, points out that savings banks should not be affected directly by the legal change because they refinance themselves mainly through deposits that are covered by deposit insurance.

Finally, our paper is related to the literature on the effects of bank ownership. Dinc (2005) shows that government-owned banks that are protected by an explicit guarantee increase lending in election years relative to private banks. Sapienza (2004) finds that government-owned banks charge lower loan rates to otherwise identical firms. We provide evidence that government-owned banks charge interest rates that are not different from those charged by private banks and lend to firms that are similar in risk. However, after the removal of the government guarantee, government-owned Landesbanken lend at lower rates and to riskier firms.

The rest of the paper is organized as follows. Section 1 describes the institutional background and the methodology for our empirical analysis. Section 2 provides the data description and summary statistics. Section 3 offers the empirical results. Section 4 discusses the impact of the transition period. Section 5 presents robustness checks, and Section 6 concludes.

## **1. Institutional Background and Methodology**

### **1.1 Institutional Background**

The German banking system is a three-pillar system, consisting of private commercial banks, cooperative banks, and public banks which comprise Landesbanken and savings banks. Lending to medium-sized and larger companies represents a major activity of both private banks and Landesbanken. Their market shares in the credit market between 2000 and 2007 amount to 27% and 19%, respectively (Deutsche Bundesbank, 2009a). In 2001, eleven Landesbanken cover Germany's 16 federal states (see Figure 1 for more details).<sup>8</sup> Each Landesbank is owned by at least one federal state and by the savings banks domiciled in these states. Landesbanken and savings banks were characterized by the guarantor's liability ("Gewährträgerhaftung") and the maintenance obligation ("Anstaltslast"). The guarantor's liability implies that the government

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<sup>8</sup> Note that only eight of them are in our sample as the others are not active on the syndicated loans market.



guarantees all of the banks' liabilities. Under the maintenance obligation, the government is obliged to capitalize the bank such that it can conduct its business as long as it exists. The risk of default of public banks was thus extremely low, providing a competitive advantage through high credit ratings and low funding costs.

German private banks had tried repeatedly without success to remove these mechanisms. In December 1999, the private banks argued at the European Commission that the guarantee constitutes state aid and therefore violates Art. 87 of the EU treaty (Grossman, 2006). The detailed arguments were presented in July 2000. The Commission opened a formal investigation procedure in January 2001, with the first meeting between bank representatives, the German Ministry of Finance and the Commission taking place in June 2001. Very surprisingly and way ahead of the planned schedule, a compromise was reached on July 17, 2001 (Grossman, 2006).<sup>9</sup> This compromise replaced the maintenance obligation and abolished the guarantor's liability, which means that an explicit guarantee was replaced by a (weaker) implicit one.<sup>10</sup> However, a transition period of four years applied. Liabilities issued between July 19, 2001 and July 18, 2005 and maturing no later than December 31, 2015 were still covered by the guarantor's liability. Liabilities that were assumed after the transition period or during the transition period but maturing after December 31, 2015 were no longer covered. The agreement is known as "Brussels' agreement" (European Commission, 2002).<sup>11</sup> Figure 2 summarizes the details.

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<sup>9</sup> Given that in another complaint against the biggest Landesbank (WestLB) it had taken several years until a decision was made, the compromise was reached very suddenly (Grossman, 2006). Related to this, the first CEO of WestLB, Ludwig Poullain, mentioned in an interview that his successors spent all their energy to fight against the abolition of guarantor's liability and maintenance obligation and thus were taken aback by the Brussels' agreement (Frankfurter Allgemeine Sonntagszeitung, July 23, 2011).

<sup>10</sup> According to the Brussels Agreement the owners should no longer guarantee the existence of a Landesbank and, as a result, the creditors of a Landesbank should face the same risk of default as the creditors of a private commercial bank. Note that Landesbanken remained state-owned, were relatively large and, as we have learned with hindsight, were considered systemically relevant.

<sup>11</sup> This agreement is also referred to as "Brüsseler Konkordanz".

## 1.2 Hypothesis

The literature highlights two opposing effects as to how government guarantees can affect bank risk taking. On the one hand, there is the “franchise value effect”. When government guarantees are removed, a bank’s refinancing costs increase with the loss of the implicit subsidy associated with government guarantees. Consequently, the bank’s franchise value decreases (Cordella and Yevati, 2003). As a bank loses less when risks materialize and its franchise value is low, a decrease in franchise value increases the bank’s ex-ante incentives to take risks (Hellmann, Murdock, and Stiglitz, 2000).

On the other hand, there is the “market discipline effect”.<sup>12</sup> As long as the debt of a bank is guaranteed, its refinancing costs do not adequately reflect the inherent risk profile of the bank. Moreover, creditors have low incentives to monitor, leading to a lack in market discipline. However, when a guarantee is withdrawn, the bank’s creditors face the risk of losing their investment. They will thus monitor more strongly or require a risk premium and thereby curb risk taking (e.g. Flannery, 1998).

The institutional framework described in section 1.1 provides an ideal setting to derive a testable hypothesis based on this discussion. We assume that the manager of the Landesbank has an objective function that consists of the bank’s current and future profits, i.e. its franchise value. Risk taking incentives of Landesbanken change once they know that they will have to issue unguaranteed debt in the future as this announcement lowers their franchise value. However, during the four-year transition period, the banks’ refinancing costs do not change yet, thus

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<sup>12</sup> A guarantee can be interpreted as a put option which induces a bank to take risks, e.g. for the case of deposit insurance in Merton (1977).

maintaining the lack of market discipline. Therefore, Landesbanken have an incentive to use the four-year transition period to load-up on (cheap) government guaranteed bonds.<sup>13</sup>

Overall, we expect that the franchise value effect dominates the market discipline effect. Moreover, the franchise values effect will be more pronounced for Landesbanken that anticipate a higher rating downgrade. Specifically, we test the following hypothesis:

*Landesbanken increase risk taking after July 2001, and this effect is stronger for Landesbanken that expect a higher rating downgrade.*

### 1.3 Methodology

We analyze whether lending practices to corporate customers at Landesbanken change after the removal of state guarantees in July 2001 relative to those of other banks that lend to German corporate customers. We use a difference-in-differences approach to analyze two questions. First, do Landesbanken provide credit to riskier borrowers after July 2001? Second, do Landesbanken adjust the interest rates to their borrowers accordingly? We thus use two sources of identifying variation: (i) the time before and after the announcement of the removal of state guarantees in July 2001, (ii) the group of Landesbanken that are affected by the removal of state guarantees and the group of other banks (henceforth, Non-Landesbanken) that are not affected by this removal. We estimate the effects of the removal of state guarantees on lending practices using the conventional difference-in-differences methodology as in Gruber and Poterba (1994). Specifically, we estimate the following models for borrower risk and loan spreads:

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<sup>13</sup> Theoretically, Landesbanken might anticipate that their risk choice affects their refinancing costs after July 2005. However, given the large (guaranteed) bond issuances during the transition period, this effect is negligible during the transition period and also in the subsequent years.

$$(1) Z\text{-}Score_{i,t} = \delta X_{i,t} + \beta_0 + \beta_1(Landesbank) + \beta_2(After\ July\ 2001) + \beta_3(Landesbank \times After\ July\ 2001) + \varepsilon_{i,t}$$

$$(2) AISD_{i,t} = \delta X_{i,t} + \beta_0 + \beta_1(Landesbank) + \beta_2(After\ July\ 2001) + \beta_3(Landesbank \times After\ July\ 2001) + \varepsilon_{j,t}$$

Where  $Z\text{-}Score_{i,t}$  is the Z-Score (as adapted by MacKie-Mason, 1990) of loan  $i$  in  $t$ , as measured as the difference between a borrower's Z-Score from the mean value of the whole German corporate universe in the year in which the loan was granted. We use this difference in order to control for the trend of improving credit quality over our sample period (Deutsche Bundesbank, 2009b).  $AISD_{i,t}$  is the interest rate, measured as a spread in basis points over the reference rate, charged for loan  $i$ .  $X_{i,t}$  is a vector of borrower and loan characteristics, such as the borrower's total asset size, coverage ratio or the loan's maturity or the existence of covenants. *Landesbank* is an indicator variable that takes a value of one if a Landesbank is among the lead arrangers of the loan and a value of zero otherwise. *After July 2001* is an indicator variable that takes a value of one if the loan is granted after the removal of state guarantees in July 2001 and zero otherwise. Finally,  $\varepsilon_{j,t}$  is an error term.

The key variable of interest is the interaction term (*Landesbank x After July 2001*) as it captures the change in the behavior of Landesbanken after July 2001 relative to all other banks that lend to German corporate customers. Our inference is thus based on the coefficient  $\beta_3$ . Our empirical set-up is comparable to the ones in the literature (e.g., Bharath et al., 2011; Santos and Winton, 2008; Saunders and Steffen, 2011).

In a subsequent analysis, we only consider the subset of loans originated by Landesbanken to analyze whether Landesbanken that expect the largest decrease in franchise

value behave differently after 2001 relative to all other Landesbanken. Again, we have two sources of identifying variation: (i) the time before and after the announcement of the removal of state guarantees in July 2001, (ii) the group of Landesbanken with a high expected downgrade in 2005 and the group of Landesbanken with a low expected downgrade. The model specifications are similar to the ones shown above.

## **2. Data Description and Summary Statistics**

To gain insights into the loan pricing behavior of Landesbanken, we construct a unique dataset using two main data sources, the Loan Pricing Corporation's Dealscan Database (henceforth, LPC) and Bureau van Dijk's (BvD) Amadeus database (Amadeus).<sup>14</sup> Later we analyze the bond issuance behavior of German Landesbanken and therefore add information on unsecured debt issuances by Landesbanken from Bloomberg. We focus on lending behavior of Landesbanken and other banks to German firms.<sup>15</sup> To get financial statement data for our sample borrowers, we manually match the LPC database to Amadeus. Our final sample consists of 1,578 syndicated loans issued between 1997 and 2008. Panel A of Table 2 shows the calendar time distribution of loans for syndicates with and without Landesbanken as lead arranger.<sup>16</sup> Our dataset consists of 95% syndicated loans and the remaining 5% are club deals or undisclosed. Around 25% of all loans have been originated with at least one Landesbank as lead arranger in the syndicate. Panel B of Table 2 shows the industry classification of our sample firms using the 1-digit SIC code. Both loans from Landesbanken and Non-Landesbanken show concentration in

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<sup>14</sup> All variables are defined in Table 1.

<sup>15</sup> We provide a detailed discussion of other activities of Landesbanken in section 4.2.

<sup>16</sup> Similar to the patterns in other studies both in the U.S. and Europe, the number of observations is larger in later years partly also due to better data availability.

the manufacturing (SIC Codes 2 and 3) and transportation industry (SIC Code 4), thereby reflecting the composition of the German industry.

Table 3 provides descriptive statistics of loan and borrower characteristics for the whole observation period. We report both sample means as well as means for the sub-samples of Non-Landesbanken and Landesbanken loans. In the last column, we also provide t-statistics for a difference in means test. Loans from Landesbanken carry lower spreads, have shorter maturities, are less likely to be secured and less likely to include financial covenants. For example, the mean maturity of a Non-Landesbank loan is 73 months and for Landesbanken loans it is 66 months. The difference between Landesbank and Non-Landesbank is significant at the 1% level for all previously mentioned loan characteristics. However, the difference in the facility size for the two bank groups is not significant at a common level. Further, Landesbanken are more likely to invest in loans for corporate purposes, but less likely for LBO loans. Syndicate structures are also different between Landesbanken and Non-Landesbanken loans: syndicates of loans in which Landesbanken are lead arrangers are larger and have more lead lenders.

Firms borrowing from Landesbanken are more likely to be publicly-listed with a mean value of 0.39 for Landesbanken borrowers and 0.27 for Non-Landesbanken borrowers. The difference is significant at the 1% level. Borrowers from Landesbanken are less likely to have a non-investment-grade rating. Firms borrowing from Landesbanken are smaller in terms of total assets (mean: EUR 3,525 million) than firms turning to Non-Landesbanken (mean: EUR 7,072 million). Landesbanken borrower exhibit lower leverage ratios (mean: 0.23) than Non-Landesbanken borrowers (mean: 0.30) but also have lower Z-Scores compared to firms borrowing from Non-Landesbanken. The difference of both characteristics are significant at the 1% level.

### **3. Empirical Results**

#### **3.1 Removal of Guarantees and Risk Taking Incentives**

##### **3.1.1 Bivariate Results**

Table 4 presents bivariate results of the mean difference-in-differences (DiD) estimate of Z-Scores and loan spreads for Landesbanken and Non-Landesbanken deals. We report the Z-Score estimate for the full sample as well as separately for Non-Landesbanken and Landesbanken before and after July 2001. Standard errors are in parentheses and number of observations in brackets. Before July 2001, the mean difference of the Z-Score between borrowers of Landesbanken (Non-Landesbanken) and all German firms is -0.10 (-0.24), respectively. This difference is not statistically significant. After July 2001, the difference from the mean Z-Scores (-0.24) did not change relative to the period before the event in the sub-sample of Non-Landesbanken. However, the difference from the mean Z-Score decreased significantly to -0.63 in the sub-sample of Landesbanken. Thus, the average Z-Score of firms borrowing from Landesbanken decreased by -0.52 relative to those firms borrowing from Non-Landesbanken after July 2001 and the DiD estimate is significant at the 1% level implying that Landesbanken lend to riskier borrowers after the announcement of the removal of the guarantee. We also report mean loan spreads for Landesbanken and Non-Landesbanken and find similar patterns until July 2001. While loan spreads are not significantly different between loans originated by both types of lenders, Non-Landesbanken demand significantly higher spreads after July 2001 relative to before July 2001. Loans spreads from Landesbanken, however, did not change. Non-Landesbanken increased loan spreads relative to Landesbanken by 54 basis points (bps) after July 2001. The DiD estimate is significant at the 1% level.

Taken together, analyzing the within-group variation in Z-Scores and loan spreads suggests that the abolition of state guarantees induced Landesbanken to increase risk and simultaneously demand lower loan spreads relative to Non-Landesbanken. We implicitly assume that loan and borrower characteristics were similar before the abolition of the guarantees in 2001 (parallel trend assumption). Therefore, in untabulated statistics, we compare borrower as well as loan characteristics before July 2001. We do not find significant differences between borrowers from Landesbanken and Non-Landesbanken particularly with respect to leverage and profitability. Non-Landesbanken borrowers are, however, larger than the borrowers of Landesbanken. These findings provide further support for our methodological approach.

### **3.1.2 Regression Results**

The differences reported in Table 4 still might be due to changes in the characteristics of Landesbanken and Non-Landesbanken over time. Therefore, we further estimate OLS regression models as shown in equation (1) for Z-Scores and in equation (2) for loan spreads that control for these characteristics. Including control variables in DiD regressions might reduce the sampling variance of the DiD estimator as noted in Gruber and Poterba (1994). We report the results in Table 5 and Table 6. Our first set of control variables are loan characteristics which are commonly used in the lending literature: loan maturity, loan amount, secured, covenants, loan type, and loan purpose. In some specifications, we further include variables to control for borrower risk: total assets, tangible assets, profitability, interest coverage, leverage, and current ratio. All control variables are defined in Table 1. We also include indicator variables if the borrower is investment-grade rated or not rated at all and if the firm is listed on an exchange. In some model specifications, we further include time and industry dummies. We report Huber-



White heteroscedasticity robust standard errors.<sup>17</sup> The results for the effect of the removal of state guarantees on Z-Score are reported in Table 5. We employ different regression models with and without borrower and loan characteristics. Borrower specific factors such as asset size or profitability are used to calculate Z-Scores and, consequently, could potentially cause multicollinearity problems between our control variables. Therefore, they are not included in our regressions.<sup>18</sup> We include whether the firm is publicly listed or privately held, two dummy variables indicating whether the borrower is investment-grade rated or not rated as firm control variables as well as loan purpose controls in models (4) to (6). Non-investment-grade rated firms are the omitted group. In model (5) we add controls for loan type and purpose and model (6) additionally includes SIC-industry and year fixed effects. Throughout our models, the DiD estimate, i.e. the interaction term (Landesbank x After July 2001), ranges between -0.385 and -0.562 depending on the specification of the regression models. In other words, Z-Scores are relatively lower (and firms riskier) after July 2001 if a Landesbank is the lead arranger of a syndicated loan. This result is statistically significant at the 1% level. Before July 2001, however, there was no difference in risk between Landesbanken and Non-Landesbanken led loan deals.

We then test how the interest rate of the loans arranged by Landesbanken change after July 2001 relative to those arranged by Non-Landesbanken. Since Landesbanken increase the risk in their corporate loan portfolio, we want to know whether they adjust the interest rate on these loans accordingly. We report these results in Table 6. The dependent variable is the AISD. We employ the same models as in Table 5 and add an additional regression explicitly controlling for a wide array of borrower characteristics. Consistent with our bivariate results, we find that

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<sup>17</sup> In our robustness 5., we discuss further tests with respect to the treatment of standard errors and bank fixed effects.

<sup>18</sup> However, our results are robust to including borrower characteristics (i.e. total assets, tangibility, profitability, coverage, leverage and current ratio).

loans arranged by Landesbanken have 27 bps to 66 bps lower spreads relative to Non-Landesbanken after July 2001. This result is statistically and economically significant. We also test the null hypothesis that there have been no spread differences between Landesbanken and Non-Landesbanken loans before the removal of the state guarantee and cannot reject this hypothesis at conventional levels. Analyzing the long-term trend, we find that spreads have been increasing in the period after July 2001 by 23 bps to 52 bps. That is, Landesbanken deviate from this trend by charging significantly lower spreads. Comparing the general trend in loan spreads and the coefficient of the interaction term, we find evidence that Landesbanken demand even lower spreads compared to the pre-July 2001 period. Investment-grade and not rated loans have lower spreads compared to non-investment-grade rated loans. Loans with longer maturities, as well as LBO loans are usually more expensive. Loans to public firms and collateralized loans have lower spreads. Similarly, borrowers that are larger, have higher interest coverage ratios or are more profitable pay lower spreads. Highly leveraged borrowers pay higher spreads and our coefficients are broadly in line with the ones found in the literature (e.g. Bharath et al., 2011; Santos and Winton, 2008; Saunders and Steffen, 2011.)

Overall, we find results consistent with the ones in Table 4, namely, that Landesbanken simultaneously grant riskier loans and do not increase loan spreads on their loans after the removal of the state guarantees relative to Non-Landesbanken.

## 3.2 Variation across Landesbanken

### 3.2.1 Expected Rating Downgrade

We analyze next how the results vary across Landesbanken depending on their change in franchise value. Figure 3 presents the expected rating downgrade of the Landesbanken that have been active in the syndicated loan market before and after the removal of the state guarantee. As proxy for the expected rating, we use the first senior unsecured debt rating after the removal of the state guarantee in 2005.<sup>19</sup>

We take the rating assessments of the three major rating agencies, namely Standard & Poor's, Moody's and Fitch, and compare for each Landesbank the rating before the removal of the guarantees with the one after the removal.<sup>20</sup> Following this, we sort Landesbanken by their expected rating downgrade in notches. Figure 3 shows that the four Landesbanken with the highest expected rating downgrade are Bayern LB, Sachsen LB, LBBW, and Helaba with six, five, and four notches, respectively. The other Landesbanken are West LB, Bremer LaBa, Nord LB, and HSH Nordbank with downgrades of three or two notches. It is important to note that the rating downgrade is not caused by excessive bond issuance. To see this, we analyze the bank financial strength or stand-alone rating and do not find significant differences between 2001 and 2005 (see table below Figure 3); the difference in the senior unsecured debt ratings thus is a direct result of the removal of the guarantee.

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<sup>19</sup> Two major ratings agencies, Standard & Poor's and Fitch, also offered so-called shadow ratings for senior unsecured debt in July 2004, one year before the end of the transition period. These ratings were presented as an indication on how the Landesbanken would be rated on basis of their current condition at this point of time. These indication ratings are nearly identical to the realized ratings in July 2005. For example, the ratings of the eleven Landesbanken offered by Fitch in July 2004 and July 2005 differ only in one case and that by only one notch. However, we decide to use the realized ratings since (i) Moody's did not offer any indicative ratings before July 2005 and (ii) S&P did not offer indicative ratings for all Landesbanken.

<sup>20</sup> In the case that the three rating agencies have different ratings assigned to a single Landesbank ("split rating"), we always take the lowest available rating.

### 3.2.2 Expected Rating Downgrade and Risk Taking Incentives

We explore whether in particular Landesbanken with a large decrease in franchise value increase borrower risk after the removal of the guarantee. For this analysis, we use the same framework as before and report the results in Table 7. Panel A analyzes the change in borrower risk of high- versus low-downgrade Landesbanken after July 2001. The difference in Z-Scores of the borrowers of Landesbanken relative to all German firms is our proxy for borrower risk. We find that the average Z-Score of high-downgrade Landesbanken is 0.39 lower relative to low-downgrade Landesbanken after July 2001, while Z-Scores of borrowers have been comparable among the high-downgrade and the low-downgrade Landesbanken before July 2001. Panel B of Table 7 presents the results for the loan spreads, and the DiD estimate is 50 bps lower for high versus low-downgrade Landesbanken after July 2001.

In order to control for additional characteristics, we report multivariate DiD regression results in Table 8 and 9. Table 8 presents DiD regression results with the Z-Score as the dependent variable. *LaBa High Downgrade* is an indicator variable equal to 1 if the Landesbank has an expected rating downgrade of four or more notches. Indicator variable (*LaBa High Downgrade x After July 2001*) is the interaction term and our DiD estimate. The number of observations is lower compared to Table 5 because we only include loans originated by Landesbanken. Our DiD estimate is negative and significant which suggests that high-downgrade Landesbanken give loans to riskier borrowers compared to low-downgrade Landesbanken after July 2001.

Table 9 presents DiD regression results with the AISD as the dependent variable. Consistent with our bivariate results, we find that loans arranged by high-downgrade Landesbanken have 50 bps to 75 bps lower spreads relative to low-downgrade Landesbanken

after July 2001. This DiD estimate is statistically and economically significant. Further, in the period before July 2001, loans arranged by high-downgrade Landesbanken had spreads not different from low-downgrade Landesbanken. The long-term trend (represented by the indicator variable *After July 2001*) shows also that spreads have not been different in the period after July 2001 compared to the pre-July 2001 period for Landesbanken borrowers. The control variables have the expected signs and are broadly similar in magnitude compared to Table 6.

### **3.3 Ex-post Borrower Performance and Switching**

The analysis so far shows that Landesbanken, and in particular those Landesbanken with the largest expected downgrading, react to the removal of government guarantees with a substantial change in their lending behavior. They lend, relative to other banks, to significantly riskier customers, but do not adjust their rates compared to the period before the removal of government guarantees. In our quantitative approach, we control for borrower risk using Z-Scores and other control variables. However, it might be the case that borrowers from Landesbanken are of higher quality on an unobservable basis, e.g. a upward trend in credit quality of the borrowers, which is not reflected in our risk measures. To examine this, we analyze borrower risk over time, after the loan has been originated. The results are shown in Figure 4. The graph shows the difference in the development of borrower risk, dependent on whether a borrower receives a loan from a Landesbank or not and whether the loan is granted before or after 2001. Borrower risk is again measured by the difference in Z-Scores between the bank's borrowers and the Z-Score of all German firms. More specifically, the lines represent the development of the Z-Scores of Landesbank borrowers relative to the development of the Z-Scores of Non-Landesbanken borrowers since loan origination. The lighter green line captures

the development before 2001. It shows that the development of Z-Scores of Landesbanken and Non-Landesbanken borrowers stays rather close to each other as it can be seen from the table below the graph. After four years, the difference reaches a value of -0.18, but this value is not statistically significant. In strict contrast, the darker blue line for the comparison of borrower risk after 2001 continuously decreases and reaches a value of -0.24 already after three years. It further decreases to a value of -0.32, and both differences are statistically significant. This evidence suggests a substantially different risk development for borrowers of Landesbanken and Non-Landesbanken before and after July 2001.

We also find that the distribution of the Z-Scores for Landesbanken borrowers compared to Non-Landesbanken borrowers are getting more positively skewed over the sample period. In other words, many borrowers of Landesbanken have low Z-Scores which is partially off-set by borrowers with very high Z-Scores. This suggests that Landesbanken serve borrowers of low credit quality. Furthermore, we compare the risk profile of borrowers that switch from Non-Landesbanken to Landesbanken after July 2001 and those that do not switch. We find that borrowers that did not switch have higher Z-Scores (-0.68) compared to those that switched to Landesbanken (-1.01). The difference in Z-Scores is significant at the 1% level. We cannot distinguish whether the borrowers that switched were denied further loans from Non-Landesbanken or if they voluntarily switched to a Landesbank. However, we find that they have lower Z-Scores than firms that borrowed from Non-Landesbanken before July 2001 and obtained loans both from Landesbanken and Non-Landesbanken after July 2001. We also do this analysis for firms that exclusively relied on Landesbanken before the announcement of the removal. Both borrowers staying at Landesbanken and borrowers switching to Non-Landesbanken show a

deterioration in Z-Score but the difference of these two scores is not significant. These results provide further evidence consistent with theories on bank gambling.

### **3.4 Do Landesbanken Keep Riskier Loans on their Balance Sheets?**

It could be argued that Landesbanken may distribute a major portion of these riskier loans to syndicate participants, such as participating banks or institutional investors, without increasing the riskiness of their own loan portfolio. To test this, we employ a similar DiD framework and compare the loan share retained by each lead arranger for Landesbanken versus Non-Landesbanken loans before and after July 2001. Dealscan provides information on the loan share retained by various members of the syndicate for a subset of the data. The data for loan shares are available for 1,205 loans in our sample. We report the results in Table 10. Before July 2001, we do not find a statistically significant difference between Landesbanken and Non-Landesbanken. However, the DiD estimate shows that, after the removal of the guarantee, Landesbanken retain a 2.61% larger share of the loan relative to Non-Landesbanken and relative to before July 2001. This estimate is significant at the 1% level suggesting that Landesbanken retain a substantial portion of these riskier loans on their balance sheets.<sup>21</sup>

## **4. The Impact of the Transition Period**

### **4.1 Transition Period and Bond Issuances**

The four-year transition period for the removal of the guarantee provides a unique opportunity to analyze the behavior of banks, as it provides them with an incentive to issue bonds due to lower costs of carry to finance their gambles. We thus expect to find a larger

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<sup>21</sup> In unreported tests, we identify a larger change in volume of loans originated by Landesbanken versus Non-Landesbanken (the CAGR of Landesbanken is 0.46% relative to 0.13% for Non-Landesbanken) during the transition period. This is consistent with Landesbanken aiming to expand their market share in the corporate loan market.

increase in bond issuances by Landesbanken with the largest decrease in franchise value. Figure 5 shows that the total volume of bond issuance by Landesbanken started to increase in the second half of 2002 and peaked in the first half of 2005, right before the end of the transition period. Afterwards, the volume almost decreased to levels where it had been before the removal of guarantees was announced.<sup>22</sup> The eight light-green bars on the bottom of Figure 5 show the change in unsecured public debt issuances of Landesbanken in the transition period (Mid July 2001 to Mid July 2005) relative to the period before (Mid July 1999 to Mid July 2001). The Landesbanken with the highest expected rating downgrades are also the ones that issue more public debt in the transition period. For example, Bayern LB issues 14.0 times and Sachsen LB 15.8 times the amount of public debt after July 2001 compared to before. Nord LB or HSH Nordbank with only three and two notches downgrades issue 7.3 and 8.9 times the amount, respectively. We analyze this more formally and calculate the correlation between public bond issuance and expected rating downgrade. We find a correlation of 0.83 which is significant at the 1% level. This is exactly what we would expect under the gambling hypothesis.

## **4.2 Risk Taking with Grandfathered Debt**

As shown in Figure 5, Landesbanken issued billions of guaranteed (EUR) debt between 2001 and 2005. A substantial increase in risk taking did not only occur in the corporate loan portfolio of Landesbanken, but also in off-balance sheet activities. Apparently, a major proportion of these funds have been used to invest in and provide a liquidity back-stop for off-balance sheet conduits. Given the paucity of data, however, it is difficult to comprehensively measure off-balance sheet risk taking. In the following, we provide evidence consistent with this

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<sup>22</sup> The more recent increase in 2007 and 2008 is due to the bonds issued during the Landesbanken's solvency crises when many of the bonds are guaranteed by either the federal state or the central government.



behavior using structured investments in conduits as an example. The main idea is that Landesbanken used the funds issued under the guarantee to invest in conduits. The guarantee allowed them to hold significantly more conduit assets relative to (on balance sheet) total assets which significantly increased their exposure to the conduits (Acharya and Schnabl, 2010).

We collect additional information on the investments of the Landesbanken in asset backed commercial paper conduits (ABCP) and structured investment vehicles (SIVs) from S&P and Capital IQ. Overall, Landesbanken have a combined exposure to ABCP conduits and SIVs of 97 billion EUR at the end of 2006. The majority can be attributed to Sachsen LB (25 billion EUR), West LB (34 billion EUR) and Bayern LB (16 billion EUR), which translates into 37.2%, 11.8% and 4.5% of total assets, respectively.<sup>23</sup> An interesting example for the off-balance sheet activities of Landesbanken is Ormond Quay which is a conduit set up and managed by Sachsen LB in 2004. As of July 2007, Ormond Quay invested about USD 11.4 billion almost exclusively in asset backed securities (ABS) and 79% thereof in residential and commercial mortgages. These assets were almost entirely refinanced with short-term ABCPs which usually have a maturity of 30 days or less. Only 0.3% of the asset value was equity (Acharya and Schnabl, 2010). Still, the conduit was rated “P-1”, the best possible short-term rating assigned by Moody’s. Sachsen LB provided an explicit guarantee for all ABCP assumed by Ormond Quay. According to Moody’s, this top rating was only possible because of Sachsen LB’s guarantee. Landesbanken were thus able to have higher exposures to conduits relative to other banks without this guarantee. Even though these assets were off-balance sheet, explicit (or implicit) liquidity insurance by Landesbanken exposed them to the risk of providing liquidity once the maturing ABCP could not be rolled over.

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<sup>23</sup> Nevertheless Standard & Poor’s (2007) states that “*we consider that credit risk in the German banking sector from U.S. subprime mortgage exposures is limited as it is generally concentrated in the ‘AAA’ and ‘AA’ rated tranches and we consider the potential market valuation effects to be manageable.*”

Table 11 displays the time-series of the global ABCP volume using the data provided by Acharya and Schnabl (2010) and Acharya, Drechsler, and Schnabl (2013). Between 2000 and 2006, the volume of the global ABCP almost doubled from USD 494 billion to USD 1,000 billion. Table 11 also reports the volume of the entities sponsored by German Landesbanken.<sup>24</sup> For these banks, the growth rates were even higher: the volume grew from USD 30 billion in 2000 to USD 84 billion in 2006. Even more astonishing, the proportion of the global ABCP volume that was guaranteed by German Landesbanken was 6.0% in 2000 and even 8.4% in 2006 and the average proportion was 7.0% during the 2000 to 2008 period.<sup>25</sup> In other words, the few and globally small Landesbanken contributed a substantial share to the built-up of the ABCP bubble that preceded the global financial crisis which culminated in bailouts in the German Landesbanken sector from 2007 on. We observe an elevated growth rate of the ABCP volume of German Landesbanken in 2001 and 2002 immediately after the removal of the government guarantees had been announced, and again in 2005 and 2006 when the global ABCP market accelerated and the available funds of Landesbanken were highest due to the bond issuances. In these years, the growth of the ABCP of Landesbanken was more than 50% larger than that of the overall market. In sum, our analysis shows that the German Landesbanken contributed significantly to the global ABCP growth. This aspect emphasizes the significant risks Landesbanken exposed themselves to after the announcement of the removal of the guarantees and is again consistent with theories on bank gambling.

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<sup>24</sup> The dataset contains seven Landesbanken sponsors: Bayern LB, Helaba, Nord LB, West LB, Sachsen LB, HSH Nordbank, and LBBW.

<sup>25</sup> They also had high exposure relative to their book equity. For example, the exposure of Sachsen LB (West LB) was 7.4 times (4.0 times) their respective book equity. For comparison, IKB, the first bank that needed to be bailed out in 2007, had ABCP exposure amounting to 18.6 times their book equity. Countrywide, another failed US mortgage lender, had exposure of about 1.2 times book equity.

## 5. Robustness

In this section, we provide several additional analyses to test the validity of the empirical specification and the robustness of the results.

### 5.1 Excess Liquidity and Risk Taking

To ensure that our results are not driven by liquidity on the Landesbanken's balance sheets but rather by increased risk taking after the removal of the guarantee was announced, we construct a measure of liquidity of Landesbanken. We obtain information about their cash holdings (cash & cash equivalents and marketable securities) from the annual reports and include this variable as an additional regressor. Panel A of Table 12 reports the results. Column (1) shows the results for the Z-Score and column (2) the results for the loan spread. The coefficients of the interaction term are similar as before and significant at the 5% level. The coefficient of *Cash & Cash Equivalents* is insignificant, suggesting that on-balance-sheet liquidity is not a significant determinant of risk taking behavior. We further analyze this effect by exploiting the time-series variation in bond issuances. Figure 5 shows that the issuance activity of Landesbanken between 2001 and 2005 is first fairly stable, then gradually increasing and reaching its peak in the first half of 2005, when it is more than twice as large as the issuance volume in any half year before. We thus exclude the first half year of 2005 and test whether the results still hold. The results in Panel B of Table 12 show that after the removal of the guarantees Landesbanken give riskier loans and at lower loan rates relative to Non-Landesbanken and relative to the period before. Our results are thus not driven by the substantial liquidity inflow in the first half of 2005.

## 5.2 Different Credit Score Measures

We use alternative credit score measures as proxies for borrower credit risk in addition to the Z-Score as adapted in MacKie-Mason (1990) and used throughout our analysis:

$$Z\text{-Score}_i = 1.2 \times (\text{Working Capital}_i / \text{Total Assets}_i) + 1.4 \times (\text{Retained Earnings}_i / \text{Total Assets}_i) + 3.3 \times (\text{EBIT}_i / \text{Total Assets}_i) + 1.0 \times (\text{Sales}_i / \text{Total Assets}_i)$$

Specifically, these alternative proxies are: the original Z-Score (Altman, 1968), the O-Score (Ohlson, 1980) and the Zmijewski (1984) Score.<sup>26</sup> We find high correlations between our credit score and the alternative proxies. For the MacKie-Mason (1990) Z-Score and the Altman (1968) Z-Score we obtain a correlation of 0.96 which is significant at the 1% level. Regarding the correlation of the Altman (1968) Z-Score to the credit scores developed by Ohlson (1980) and Zmijewski (1984), both purely consisting of accounting data, we find correlations both significant at the 1% level of -0.35 and -0.38, respectively.<sup>27</sup> Further, for example replacing the MacKie-Mason (1990) Z-Score with the original Z-Score of Altman (1968) in Table 4, the mean DiD estimate is -0.46 and significant at the 1% level. If we use the Ohlson (1980) or Zmijewski (1984) scores, our mean DiD estimates for the Table 4 set-up is 1.47 and 0.52, respectively. Both DiD estimates are significant at the 1% level.<sup>28</sup> The risk measures thus consistently show that Landesbanken increased risk relative to Non-Landesbanken in the period after the removal of the guarantee.

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<sup>26</sup> However, since our dataset consists of publicly listed as well as privately held firms, we replace the market value of equity by the book value of equity for all firms in the Altman (1968) Z-Score.

<sup>27</sup> In the credit scores of Ohlson (1980) and Zmijewski (1984) larger negative values, represent lower risk of borrower default.

<sup>28</sup> All untabulated results are available upon request

### 5.3 Further Robustness Tests

We perform miscellaneous tests with respect to (i) a different sample period, (ii) the period design, (iii) type of Non-Landesbanken, (iv) syndicate structure, (v) clustering of standard errors, and (vi) bank fixed effects.<sup>29</sup>

(i) In our main tests, our sample spans the 1997 to 2008 period. To make sure that the results are not driven by changes in the crisis period, we repeat all tests using the 1997 to July 2007 period. The results do not change. (ii) We split our sample after 2001 into the July 2001 to July 2005 and the after July 2005 period. In other words, we cover the transition period separately. Our bivariate analysis shows that Landesbanken already offered significantly lower spreads for loans in the transition period. This lower spread effect extends to the period after July 2005. (iii) If we restrict our Non-Landesbanken sample on private banks from Germany we also find that after July 2001 the spreads from Landesbanken loans are lower than the spreads of loans arranged by other German domestic banks. (iv) Our definition of Landesbanken involvement requires that one Landesbank has to be within the group of lead arrangers. We use various definitions, i.e. we require that there is at least one Landesbank among the lead arrangers, exactly one Landesbank or more than one Landesbank. We get very similar results. In fact, the results get stronger if a larger number of Landesbanken is among the lead arrangers. (v) Possible auto-correlation of standard errors could go both ways. First, many firms have more than one loan, i.e. standard errors of the same firm might be auto-correlated. Second, Landesbanken extend loans at different points in time, i.e. standard errors of the same bank might be auto-correlated. We repeat all tests clustering standard errors either at the firm or at the bank level. Again, the results do not change. (vi) To further control for time-invariant characteristics of our sample banks as well as differences between Landesbanken and Non-

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<sup>29</sup> We do not tabulate the results for reasons of space.

Landesbanken in our DiD tests, we further include bank fixed effects in our whole sample analysis. The results again do not change.

## **6. Conclusion**

This paper studies how the removal of government guarantees affects bank risk taking incentives. We exploit a natural experiment in which the state guarantee for German Landesbanken are removed. This removal results in a deterioration of their credit rating, higher funding costs, and a loss in franchise value.

We analyze the lending behavior of Landesbanken around the announcement of the removal of the guarantees relative to private banks and find that Landesbanken do not differ in their lending behavior from other banks before the removal of guarantees. In contrast, after the removal Landesbanken lend to significantly riskier borrowers but do not accordingly adjust the interest rates. Consistent with banks starting to gamble before they lose their funding cost advantage, we show that this change in risk taking is particularly pronounced for Landesbanken that face the highest expected rating downgrade and therefore the highest loss in franchise value. Further, empirical evidence from the off-balance sheet activities of Landesbanken in the conduit market suggest that Landesbanken significantly increased their risk taking.

Our results show that the removal of government guarantees has substantial consequences for the banks' risk taking incentives. During the financial crisis, governments and central banks provided unprecedented guarantees to stabilize the financial system, raising the question how they shall communicate their exit strategy and what is an optimal transition period. Our analysis suggests that governments should not grant long transition periods for ending guarantees.

Possible avenues for future research are to analyze how bank supervision and governance can mitigate the increased risk taking incentives of banks.

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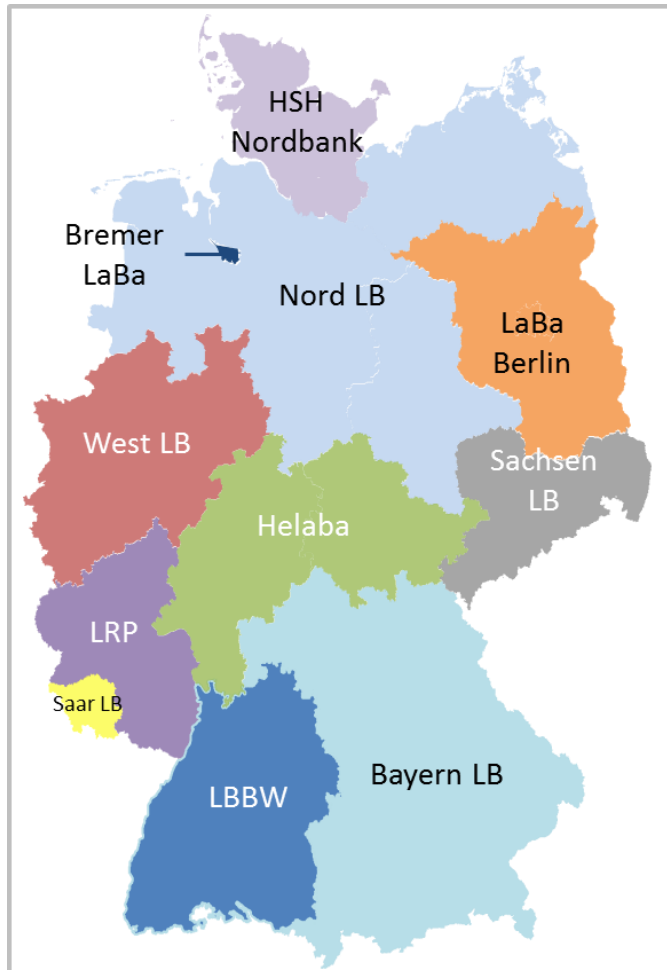
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### Figure 1. Landesbanken in 2001: Geographical Overview

Figure 1 provides a geographical overview of the Landesbanken in Germany. The associated table reports some specific characteristics of some Landesbanken as to ownership or appearance in our loan sample.



Landesbank	Comments
Bremer LaBa	– Subsidiary (92,5%) of Nord LB
HSH Nordbank	– Founded in 2003 as a merger between Hamburgischen Landesbank and Landesbank Schleswig-Holstein.
LaBa Berlin	– Renamed from Bankgesellschaft Berlin AG in 2006. – No loans arranged after July 2001.
LRP	– Fully owned subsidiary of LBBW since 2005. – No loans arranged after July 2001
Nord LB	– Since 2005 no longer Landesbank for Mecklenburg-Western Pomerania.
Saar LB	– Subsidiary (75%) of Bayern LB since 2002. Shareholder (25%) since 1993. – No loans arranged after July 2001.
Sachsen LB	– Fully owned subsidiary of LBBW since 2008.

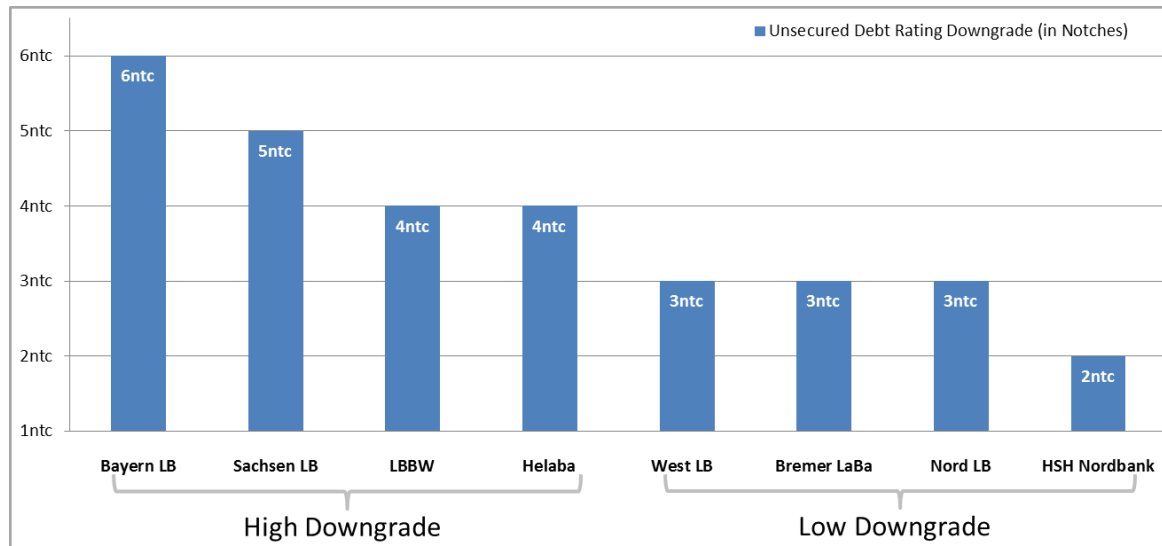
## Figure 2. Brussels' Agreement

Figure 2 provides a graphical overview of the “Brussels’ Agreement”. Yes / No indicates whether public debt issued by German Landesbanken is still guaranteed by the German government. Date of Issuance of public debt is separated into three periods: (1) Until July 18<sup>th</sup>, 2001; (2) July 19<sup>th</sup> 2001- July 18<sup>th</sup>, 2005; (3) After July 18<sup>th</sup>, 2005. We separate the maturity of public debt issues into Until Dec 31<sup>st</sup>, 2015 and After Dec. 31<sup>st</sup>, 2015. The Brussels’ Agreement requires that debt issued during the July 19<sup>th</sup> 2001- July 18<sup>th</sup>, 2005 period has to mature before Dec. 31<sup>st</sup>, 2015 to be guaranteed by grandfathered government guarantee.

Date of Issuance	Maturity	
	Until Dec. 31, 2015	After Dec. 31, 2015
Until July 18, 2001	Yes	Yes
July 19, 2001 – July 18, 2005	Yes Due to Grandfathering Clause	No
After July 18, 2005	No	No

### Figure 3. Landesbanken Unguaranteed and Guaranteed Credit Ratings and Bond Issuance Behavior

We compare each Landesbank's credit rating before the abolition of state guarantees ("Rating Before") and the expected rating after the abolition of state guarantees ("Rating After"). We look at the senior unsecured debt rating of all three major credit rating agencies (i.e. Standard & Poor's, Moody's and Fitch) and take the lowest rating for each Landesbank. We only consider Landesbanken active in the syndicated loan market before 2001 and after 2001.

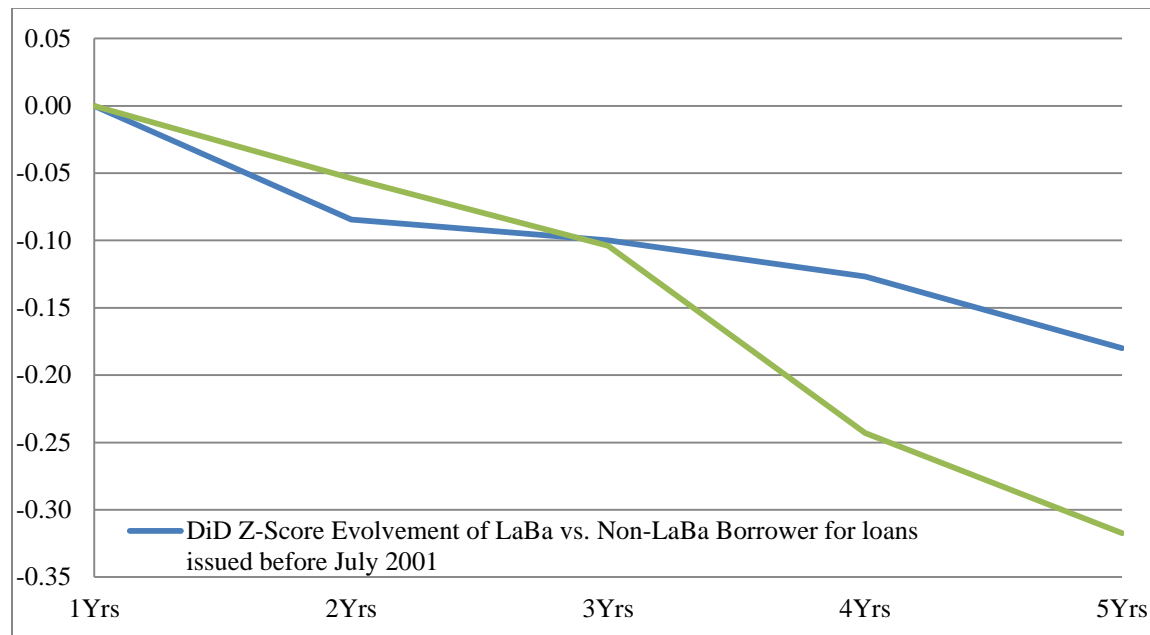


Individual Ratings (Fitch) or Financial Strength Ratings (Moody's) assess how a bank would be viewed if it were entirely independent and could not rely on external support. Again we list the lowest rating of these two rating agencies, i.e. Moody's or Fitch.

Landesbank	Individual Rating 2001	Individual Rating 2005	Change in Notches
Bayern LB	C	D+	-2
Bremer Landesbank	C	C	0
HSH Nordbank	C	C	0
LBBW	B	B	0
Helaba	C+	C	-1
Sachsen LB	C	C	-1
Nord LB	C	C	-1
West LB	D+	D	-2

#### Figure 4. Ex-post Borrower Performance – Difference Non-Landesbank vs. Landesbank

This graph shows the relative performance - as measured by the difference-in-differences in the Z-Score - of borrowers after the loan was issued. We track the borrowers' performance up to four years after the initial issuance of the loan and subdivide the sample into whether the lender is a Landesbank or not. Further, the sample is split between loans issued before and after July 2001. The relative performance is defined as the difference between the score of a Non-Landesbank (Non-LaBa) and a Landesbank (LaBa) borrower relative to the score at loan issuance. Heteroscedasticity-robust standard errors are shown in parenthesis. \*, \*\*, \*\*\* denotes significance at the 10%, 5% and 1% level, respectively. The difference-in-differences estimate corresponds to the vertical distance between blue (green) line and the x-axis.

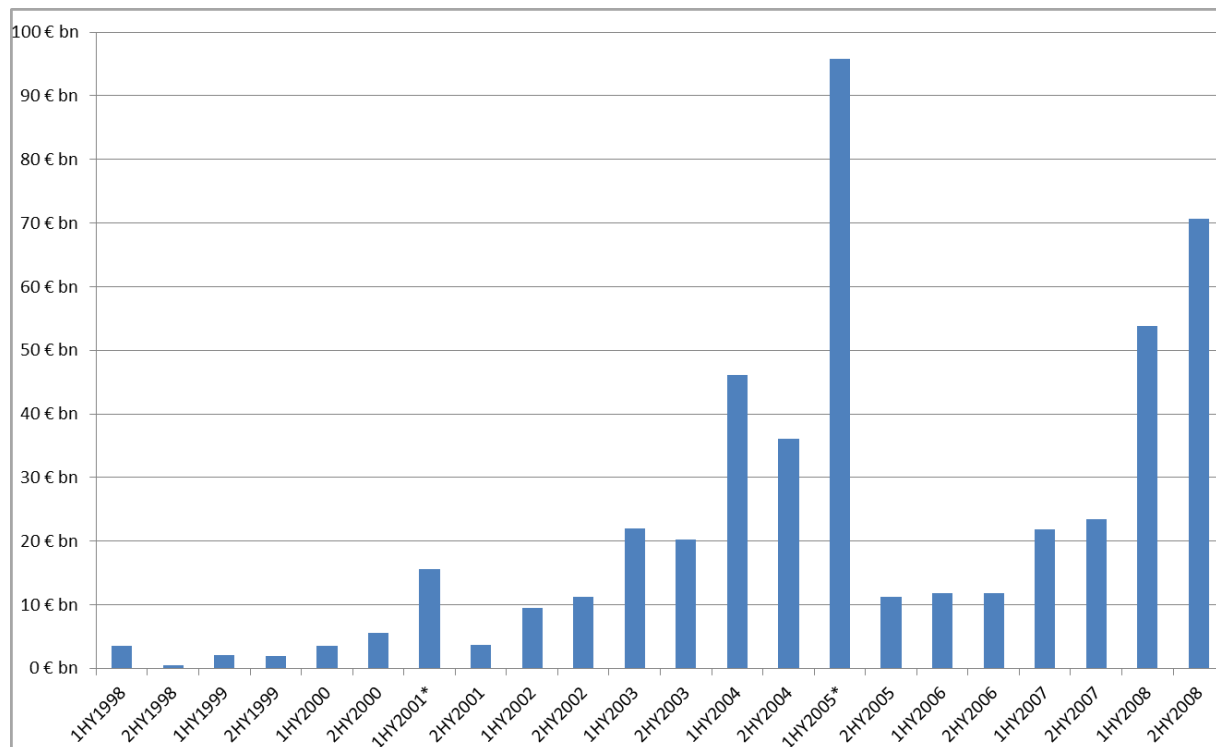


Loan Issuance Before July 2001						
Since Loan Issuances		0 Yrs	1 Yr	2 Yrs	3 Yrs	4 Yrs
LaBa	Mean	-0,10	-0,17	-0,22	-0,26	-0,31
Non-LaBa	Mean	-0,22	-0,21	-0,24	-0,24	-0,25
Difference		0,12	0,04	0,02	-0,01	-0,06
	SE	(0.11)	(0.15)	(0.15)	(0.15)	(0.14)
DiD		.	<b>-0.08</b>	<b>-0.10</b>	<b>-0.13</b>	<b>-0.18</b>
	SE	.	<b>(0.13)</b>	<b>(0.15)</b>	<b>(0.15)</b>	<b>(0.15)</b>
Loan Issuance After July 2001						
Since Loan Issuances		0 Yrs	1 Yr	2 Yrs	3 Yrs	4 Yrs
LaBa	Mean	-0,63	-0,74	-0,84	-0,97	-1,04
Non-LaBa	Mean	-0,24	-0,31	-0,35	-0,34	-0,34
Difference		-0,39***	-0,43***	-0,49***	-0,63***	-0,70***
	SE	(0.07)	(0.10)	(0.10)	(0.11)	(0.16)
DiD		.	<b>-0.05</b>	<b>-0.10</b>	<b>-0.24**</b>	<b>-0.32***</b>
	SE	.	<b>(0.09)</b>	<b>(0.10)</b>	<b>(0.10)</b>	<b>(0.12)</b>



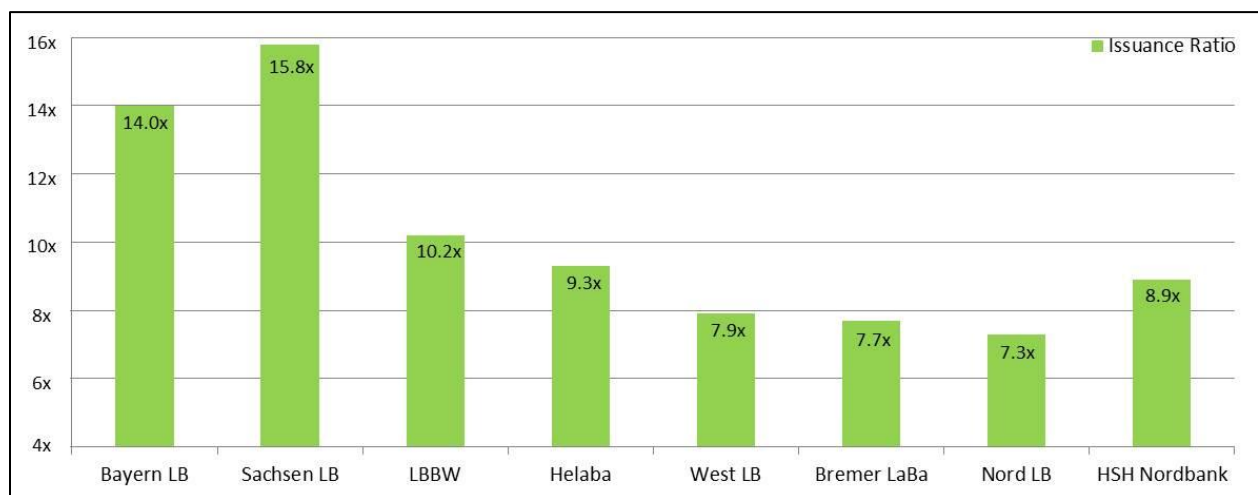
### Figure 5. Bond Issuance Behavior of Landesbanken

The histogram shows the volume of unsecured bond issuances undertaken by Landesbanken (in EUR billion) over time.



\* Issuance till July 18, 2005 (2001)

The green bars are the ratios of bond issuance in the transition period (2HY2001-1HY2005) to issuance behavior two years (2HY1999-1HY2001) prior to the start of the transition period.



**Table 1**  
**Definition of Variables**

<b>Variable</b>	<b>Description</b>	<b>Source</b>
<i>Landesbank Identifier</i>		
Landesbank (LaBa)	Dummy equal to one if at least one Landesbank (LaBa) is among the lead arrangers in the loan syndicate.	LPC Dealscan
LaBa High Downgrade	Dummy equal to one if a Landesbank's expected credit rating downgrade is in the upper half of all Landesbanken's rating downgrades.	Rating Agencies
Before July 2001	Dummy equal to one if loan was issued before July 19, 2001, i.e. after the "Brussels' Agreement."	LPC Dealscan
After July 2001	Dummy equal to one if loan was issued since July 19, 2001, i.e. after the "Brussels' Agreement."	LPC Dealscan
<i>Loan Characteristics</i>		
AISD	AISD (All-In-Spread-Drawn) is measured in basis points and is the coupon spread over LIBOR on the drawn amount plus the annual fee.	LPC Dealscan
Maturity (month)	Maturity of the loan (measured in month).	LPC Dealscan
Secured	Dummy variable equal to one if the loan is secured.	LPC Dealscan
Covenants	Dummy variable equal to one if at least one financial covenant is attached to the loan.	LPC Dealscan
Facility Size	Facility amount of the loan (in constant 2005 EUR million).	LPC Dealscan
<i>Syndicate Structure</i>		
Number of Lenders	Number of lenders in the syndicate.	LPC Dealscan
Number of Lead Arrangers	Number of lead arranger in the syndicate.	LPC Dealscan
Number of Landesbank Lead Arrangers	Number of Landesbanken as lead arranger in the syndicate.	LPC Dealscan
<i>Borrower Characteristics</i>		
Publicly Listed	Dummy variable equal to one if the borrower is listed on a stock exchange.	LPC Dealscan
Investment Grade Rating	Dummy variable equal to one if the borrower's senior debt rating is BBB- or above by Standard & Poor's (S&P).	LPC Dealscan
Not Rated	Dummy variable equal to one if the borrower's senior debt is not rated by S&P.	LPC Dealscan
Total Assets	Book value of assets (toas) of the borrower in terms of constant 2005 EUR million.	BvD Amadeus
Leverage Ratio	Ratio of book value of total debt (ltdb + loan) to book value of assets (toas).	BvD Amadeus
Coverage Ratio	Ratio of EBIT (ebit) to interest expenses (inte).	BvD Amadeus
Profitability	Ratio of Profit before Taxes (plbt) to sales (turn).	BvD Amadeus
Current Ratio	Ratio of current assets (cuas) to current liabilities (culi).	BvD Amadeus
Z-Score	Z-Score according to Mackie-Mason (1990) for measuring the financial health of a company.	BvD Amadeus
Altman Z-Score	Z-Score (Altman, 1968) for measuring the financial health of a company.	BvD Amadeus
Ohlson Score	The O-Score of Ohlson (1980) for measuring the financial health of a company.	BvD Amadeus
Zmijewski Score	The score of Zmijewski (1984) for measuring the financial health of a company.	BvD Amadeus
<i>Loan Tranche Types and Purposes</i>		
Term Loan	Dummy equal to one if the loan type is "Term Loan."	LPC Dealscan
Bridge Loan	Dummy variable equal to one if the loan type is "Bridge Loan."	LPC Dealscan
Revolver $\geq 1$ Year	Dummy equal to one if the loan type is "Revolver $\geq 1$ Year."	LPC Dealscan
Corporate Purpose	Dummy equal to one if the loan issuance purpose is "Corporate Purpose."	LPC Dealscan
Debt Repayment Purpose	Dummy equal to one if the loan issuance purpose is "Debt Repayment."	LPC Dealscan
LBO Purpose	Dummy equal to one if the loan issuance purpose is "LBO."	LPC Dealscan
<i>ABCP Market</i>		
LaBa Exposure	Total volume of ABCP sponsored by Landesbanken.	Acharya/Schnabl (2010)
Total ABCP Volume	Total (annual) ABCP volume.	Acharya/Schnabl (2010)
LaBa Exposure Growth	Year-by-year growth of LaBa Exposure.	Acharya/Schnabl (2010)
Total ABCP Volume Growth	Year-by-year growth of Total ABCP Volume.	Acharya/Schnabl (2010)

For variables constructed from the BvD Amadeus database the BvD Amadeus data item name is given in the parantheses.

**Table 2**  
**Syndicated Loans over the Sample Period**

This table reports the distribution of syndicated loans in our sample. Panel A of Table 2 reports the distribution by year for Landesbanken and Non-Landesbanken. Panel B of Table 2 reports the distribution segregated by one-digit SIC codes for the full sample as well as separately for Landesbanken and Non-Landesbanken.

<b>Panel A: Syndicated Loans over Sample Period</b>			
<b>Year</b>	<b>Non-Landesbank</b>	<b>Landesbank</b>	<b>All</b>
1997	10	4	14
1998	11	7	18
1999	26	21	47
2000	39	35	74
2001	64	14	78
2002	81	11	92
2003	101	9	110
2004	167	40	207
2005	167	62	229
2006	233	84	317
2007	197	61	258
2008	70	64	134
Total	1,166	412	1,578

<b>Panel B: Syndicated Loans and Borrower Industries</b>						
<b>Primary SIC</b>	<b>Non-Landesbank</b>		<b>Landesbank</b>		<b>All</b>	
	<b>Obs.</b>	<b>in %</b>	<b>Obs.</b>	<b>in %</b>	<b>Obs.</b>	<b>in %</b>
1	47	4%	27	7%	74	5%
2	341	29%	74	18%	415	26%
3	408	35%	147	36%	555	35%
4	171	15%	83	20%	254	16%
5	87	7%	37	9%	124	8%
7	65	6%	28	7%	93	6%
8	33	3%	12	3%	45	3%
9	7	1%	0	0%	7	0%
n/a	7	1%	4	1%	11	1%
Total	1,166	100%	412	100%	1,578	100%

**Table 3**  
**Summary Statistics**

This table provides descriptive data for loan, borrower and bank characteristics for syndicated loans granted to non-financial firms between 1989 and 2008 in Germany. All absolute values are in constant 2005 EUR million. Every facility shows up only once in the summary statistics, resulting in a maximum of 1,607 observations. Results are winsorized at the 1 percent and 99 percent level. All variables are defined in Table 1. \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% level, respectively.

	Obs.	All Mean	Std	Obs.	Non-Landesbank Mean	Std	Obs.	Landesbank Mean	Std	t-statistics
<b>Loan Characteristics</b>										
All-In-Spread-Drawn (bps)	1,578	150.7	166.9	1,166	163.0	179.6	412	116.0	117.4	6.01***
Maturity (months)	1,503	70.6	34.2	1,089	72.6	33.6	393	65.7	35.7	3.35***
Facility Size (EUR M)	1,546	612	1,350	1,132	640	1,440	385	533	1,040	1.57
Secured	1,578	0.35	0.50	1,166	0.38	0.51	412	0.28	0.47	3.31***
Covenants	1,578	0.14	0.35	1,166	0.16	0.36	412	0.09	0.29	3.59***
<b>Syndicate Structure</b>										
Number of Lenders	1,573	10.1	9.7	1,161	9.6	9.9	412	11.5	8.9	-3.49***
Number of Lead Arrangers	1,578	2.9	2.4	1,166	2.3	1.8	412	4.5	2.9	-14.08***
Number of Landesbank Lead Arrangers	1,578	0.3	0.6	1,166	0.0	0.0	412	1.3	0.5	-47.09***
<b>Borrower Characteristics</b>										
Publicly Listed	1,578	0.30	0.46	1,166	0.27	0.44	412	0.39	0.49	-4.38***
Investment Grade	1,578	0.13	0.33	1,166	0.14	0.34	412	0.10	0.31	1.95*
Non-Investment Grade	1,578	0.11	0.32	1,166	0.13	0.33	412	0.07	0.25	3.79***
Not Rated	1,578	0.76	0.43	1,166	0.73	0.44	412	0.83	0.38	-2.45***
Total Assets (EUR M)	1,578	968	1,775	1,166	811	1,612	412	1,411	2,110	-5.25***
Profitability	1,393	0.06	0.06	1,063	0.06	0.0	325	0.06	0.06	-0.53
Leverage	1,538	0.40	0.22	1,166	0.41	0.21	372	0.38	0.23	1.96**
Coverage	1,330	28.5	176.3	1,011	26.6	164.8	319	34.6	208.6	-0.63
Current Ratio	1,578	2.4	3.5	1,166	2.6	3.7	412	1.9	2.8	3.80***
Z-Score	1,578	2.10	1.23	1,166	2.17	1.26	412	1.88	1.11	4.42***
Z-Score (difference from yearly mean)	1,578	-0.31	1.18	1,166	-0.24	1.20	412	-0.54	1.08	4.7311**
<b>Loan Tranche Type &amp; Purpose</b>										
Term Loan	1,578	0.45	0.50	1,166	0.46	0.50	412	0.43	0.50	0.94
Bridge Loan	1,578	0.04	0.20	1,166	0.05	0.21	412	0.03	0.18	1.21
Revolver ≥ 1Yr	1,578	0.31	0.46	1,166	0.29	0.45	412	0.35	0.48	-2.32**
Corporate Purpose	1,578	0.10	0.30	1,166	0.09	0.29	412	0.14	0.35	-2.50**
Debt Repayment	1,578	0.21	0.41	1,166	0.18	0.39	412	0.28	0.45	-3.76***
LBO Purpose	1,578	0.32	0.47	1,166	0.34	0.47	412	0.29	0.45	1.86*

**Table 4****Removal of State Guarantee, Borrower Risk and Loan Spreads (Bivariate Test)**

This table reports mean difference-in-differences (DiD) estimates of borrower risk and loan spreads. Lead arrangers are classified into two groups: Landesbanken who are affected by the removal of the state guarantee of their public debt issues after July 2001, and Non-Landesbanken. Panel A reports the results for borrower risk proxied by the Z-Score. Panel B reports the results for loan spreads measured using the All-In-Spread-Drawn (AISD). All variables are defined in Table 1. Heteroscedasticity-robust standard errors are shown in parentheses. The DiD estimates are shown in bold. \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% level, respectively.

<b>Panel A: Z-Score</b>				
	<b>All</b>	<b>Non-Landesbank</b>	<b>Landesbank</b>	<b>Difference</b>
Before July 2001	-0.191 (0.05) [205]	-0.236 (0.07) [135]	-0.104 (0.09) [70]	-0.132 (0.11)
After July 2001	-0.333 (0.03) [1,373]	-0.236 (0.04) [1,031]	-0.627 (0.06) [342]	0.391*** (0.07)
Difference		0.000 (0.08)	0.523*** (0.11)	<b>-0.523***</b> <b>(0.13)</b>
<b>Panel B: AISD</b>				
	<b>All</b>	<b>Non-Landesbank</b>	<b>Landesbank</b>	<b>Difference</b>
Before July 2001	116.7 (6.8) [205]	116.6 (8.9) [135]	116.8 (10.2) [70]	-0.2 (13.5)
After July 2001	155.8 (4.7) [1,373]	169.1 (5.8) [1,031]	115.8 (6.7) [342]	53.3*** (8.8)
Difference		-52.5*** (10.6)	1.0 (12.2)	<b>-53.5***</b> <b>(16.1)</b>

**Table 5**  
**Removal of State Guarantee and Borrower Risk**

This table reports the results of an OLS regression relating borrower risk to lead arranger, loan and borrower characteristics. The dependent variable is the Z-Score. Models (5) and (6) include the full set of explanatory variables, model (6) also industry and year fixed effects. Landesbank \_ After.July.2001 is the DiD estimate under the H0 that the DiD estimate is equal to zero. Intercept, industry and year fixed effects are not shown. All variables are defined in Table 1. Heteroscedasticity-robust standard errors are shown in parentheses. \*,\*\*,\*\*\* denote significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Landesbank	0.132 (0.11)	0.177 (0.11)	0.187 (0.11)	0.154 (0.11)	0.167 (0.11)	0.119 (0.13)
After July 2001	-0.020 (0.07)	-0.042 (0.08)	-0.078 (0.08)	-0.074 (0.08)	-0.057 (0.08)	-0.287 (0.17)
LaBa*After July 2001	-0.523*** (0.13)	-0.532*** (0.13)	-0.562*** (0.13)	-0.470*** (0.14)	-0.490*** (0.14)	-0.385*** (0.15)
Maturity		0.049 (0.04)	0.019 (0.04)	0.003 (0.04)	-0.018 (0.05)	0.027 (0.05)
Facility Size (logs)		-0.134*** (0.01)	-0.124*** (0.01)	-0.100*** (0.02)	-0.100*** (0.02)	-0.089*** (0.02)
Secured			0.205*** (0.06)	0.198*** (0.06)	0.212*** (0.06)	0.337*** (0.07)
Covenants			-0.097 (0.08)	-0.028 (0.09)	-0.032 (0.09)	-0.049 (0.09)
Publicly Listed				-0.289*** (0.07)	-0.309*** (0.07)	-0.193** (0.07)
Investment Grade				0.408*** (0.12)	0.392*** (0.12)	0.351*** (0.11)
Not Rated				0.284*** (0.1)	0.267** (0.1)	0.308*** (0.1)
Dummy Term Loan					0.027 (0.09)	-0.027 (0.08)
Dummy Bridge Loan					-0.006 (0.15)	0.039 (0.14)
Dummy Revolver $\geq 1$					0.125 (0.09)	0.037 (0.09)
Dummy Debt Repay.					-0.005 (0.07)	-0.028 (0.08)
Dummy LBO Purp.					0.053 (0.08)	0.020 (0.07)
Dummy Corp Purp.					0.104 (0.1)	0.131 (0.1)
Constant	-0.236*** (0.06)	2.110*** (0.45)	2.017*** (0.45)	1.429*** (0.51)	1.435*** (0.52)	1.655*** (0.58)
Industry Fixed Effects	No	No	No	No	No	Yes
Year Fixed Effects	No	No	No	No	No	Yes
Observations	1,578	1,433	1,433	1,433	1,433	1,433
R <sup>2</sup>	0.020	0.065	0.073	0.087	0.090	0.178

**Table 6**  
**Removal of State Guarantee and Loan Spreads**

This table reports the results of an OLS regression relating loan spreads to lead arranger, loan and borrower characteristics. The dependent variable is the AISD. Models (6) and (7) include industry and year fixed effects and model (7) additionally uses the full set of explanatory variables. Landesbank \_ After.July.2001 is the DiD estimate under the H0 that the DiD estimate is equal to zero. Intercept, industry and year fixed effects are not shown. All variables are defined in Table 1. Heteroscedasticity-robust standard errors are shown in parentheses. \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Landesbank	3.23 (13.45)	6.68 (14.68)	2.50 (14.1)	2.20 (13.75)	7.68 (12.99)	9.01 (14.57)	28.62 (27.7)
After July 2001	52.48*** (10.58)	35.67*** (9.73)	38.67*** (9.46)	34.70*** (9.25)	38.15*** (8.73)	37.22** (18.18)	23.01* (13.72)
LaBa*After July 2001	-53.48*** (16.09)	-44.16*** (16.84)	-47.08*** (16.24)	-43.35*** (16.27)	-26.67* (15.56)	-39.85** (17.16)	-65.93** (30.21)
Maturity		63.76*** (6.01)	57.81*** (6.15)	48.42*** (6.06)	51.61*** (9.36)	58.88*** (9.56)	67.29*** (11.81)
Facility Size (logs)		-18.23*** (2.28)	-17.24*** (2.26)	-11.05*** (2.86)	-7.82*** (2.77)	-6.77** (2.89)	-5.91* (3.48)
Secured			-29.13*** (8.9)	-20.28** (9.24)	18.52** (9.41)	-17.43* (9.69)	-21.52* (12.79)
Covenants			44.05*** (12.34)	28.67** (12.69)	28.33** (12.05)	21.37* (12.69)	28.35* (15.36)
Publicly Listed				-18.82* (9.97)	-2.25 (8.9)	-2.14 (9.86)	-13.00 (11.43)
Investment Grade				-84.14*** (15.22)	-90.36*** (14.93)	-83.53*** (14.93)	-55.32*** (17.19)
Not Rated				-44.45*** (14.13)	-50.73*** (14.08)	-40.34*** (14.71)	-27.70* (16.31)
Dummy Term Loan					-43.76* (22.54)	-50.18** (22.73)	-66.85** (27.61)
Dummy Bridge Loan					-44.42* (23.55)	-38.88* (22.97)	-43.37* (26.01)
Dummy Revolver $\geq 1$					-80.05*** (20.05)	-86.24*** (20.43)	-99.69*** (24.76)
Dummy Debt Repay.					-60.55*** (8.96)	-65.80*** (9.68)	-70.11*** (11.07)
Dummy LBO Purp.					22.68** (11.17)	20.16* (11.26)	27.44* (14.31)
Dummy Corp Purp.					-58.72*** (10.51)	-46.99*** (10.53)	-49.63*** (11.78)
Total Assets (logs)							4.20* (2.42)
Profitability (logs)							14.05 (15.82)
Leverage							67.97*** (25.2)
Coverage (logs+1)							-3.32* (1.87)
Current Ratio							-1.38 (1.50)
Constant	116.58*** (8.84)	216.06*** (57.9)	201.74*** (56.69)	186.46*** (65.97)	172.08*** (65.57)	117.12* (70.16)	148.48* (86.65)
Industry Fixed Effects	No	No	No	No	No	Yes	Yes
Year Fixed Effects	No	No	No	No	No	Yes	Yes
Number of Obs.	1,578	1,433	1,433	1,433	1,433	1,433	1,015
R <sup>2</sup>	0.02	0.18	0.19	0.21	0.27	0.29	0.36

**Table 7****Rating Downgrade, Borrower Risk and Loan Spreads (Bivariate Test)**

This table reports mean difference-in-differences (DiD) estimates of borrower risk and loan spreads. Lead arrangers are classified into two groups: Landesbanken who expect the highest rating downgrade (upper half) of their senior unsecured debt after the removal of the state guarantee rating (“high-downgrade”) and other Landesbanken active in the loan market (“low-downgrade”). Panel A report the results for borrower risk proxied by the Z-Score. Panel B reports the results for loan spreads measured using the All-In-Spread-Drawn (AISD). All variables are defined in Table 1. Heteroscedasticity-robust standard errors are shown in parentheses. The DiD estimates are shown in bold. \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% level, respectively.

<b>Panel A: Z-Score</b>				
	<b>All</b>	<b>Low Downgrade</b>	<b>High Downgrade</b>	<b>Difference</b>
Before July 2001	-0.103 (0.09) [70]	-0.129 (0.14) [33]	-0.081 (0.12) [37]	-0.048 (0.19)
After July 2001	-0.632 (0.06) [342]	-0.422 (0.11) [132]	-0.763 (0.07) [210]	0.341*** (0.13)
Difference		0.293 (0.17)	0.682*** (0.14)	<b>-0.389*</b> <b>(0.20)</b>
<b>Panel B: AISD</b>				
	<b>All</b>	<b>Low Downgrade</b>	<b>High Downgrade</b>	<b>Difference</b>
Before July 2001	116.8 (10.2) [70]	110.4 (14.4) [33]	122.6 (14.5) [37]	-12.2 (20.4)
After July 2001	115.8 (6.7) [342]	139.0 (10.4) [132]	101.2 (8.5) [210]	37.8*** (13.5)
Difference		-28.6 (17.8)	21.4 (16.8)	<b>-50.0**</b> <b>(24.3)</b>



**Table 8**  
**Rating Downgrade and Borrower Risk**

This table reports the results of an OLS regression relating borrower risk to lead arranger, loan and borrower characteristics. The dependent variable is the Z-Score. Models (5) and (6) include the full set of explanatory variables, model (6) also industry and year fixed effects. LaBa.High.D downgrade \_ After.July.2001 is the DiD estimate under the H0 that the DiD estimate is equal to zero. Intercept, industry and year fixed effects are not shown. All variables are defined in Table 1. Heteroscedasticity-robust standard errors are shown in parentheses. \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
LaBa High Downgrade	0.048 (0.18)	0.06 (0.19)	-0.028 (0.19)	-0.010 (0.2)	0.304 (0.19)	0.279 (0.23)
After July 2001	-0.294* (0.17)	-0.316* (0.18)	-0.264 (0.18)	-0.205 (0.2)	-0.176 (0.2)	-0.688 (0.75)
LaBa High Downgrade*After July 2001	-0.389* (0.20)	-0.536* (0.23)	-0.422* (0.23)	-0.453* (0.23)	-0.689*** (0.22)	-0.714*** (0.27)
Maturity		0.031 (0.09)	0.063 (0.09)	0.028 (0.09)	0.048 (0.11)	0.086 (0.11)
Facility Size (logs)		-0.031 (0.03)	-0.057 (0.04)	-0.031 (0.04)	-0.057 (0.04)	-0.087 (0.04)
Secured			-0.449*** (0.09)	-0.467*** (0.1)	-0.293*** (0.1)	-0.222* (0.12)
Covenants			0.042 (0.15)	0.066 (0.16)	0.1 (0.16)	-0.111 (0.19)
Publicly Listed				-0.192 (0.14)	-0.394** (0.16)	-0.401** (0.16)
Investment-Grade				0.03 (0.22)	0.045 (0.23)	0.227 (0.25)
Not Rated				0.053 (0.17)	0.09 (0.18)	0.159 (0.21)
Dummy Term Loan					0.04 (0.16)	0.017 (0.17)
Dummy Bridge Loan					-0.053 (0.27)	-0.029 (0.3)
Dummy Revolver $\geq 1$					0.08 (0.18)	0.093 (0.18)
Dummy Debt Repay.					-0.088 (0.15)	-0.172 (0.17)
Dummy LBO Purp.					-0.619*** (0.16)	-0.692*** (0.18)
Dummy Corp Purp.					0.153 (0.2)	0.109 (0.21)
Constant	0.129 (0.14)	0.348 (1.02)	0.787 (1.04)	0.428 (1.07)	0.867 (1.02)	2.156 (1.48)
Industry Fixed Effects	No	No	No	No	No	Yes
Year Fixed Effects	No	No	No	No	No	Yes
Observations	412	372	372	372	372	372
R <sup>2</sup>	0.06	0.1	0.13	0.14	0.18	0.25

**Table 9**  
**Rating Downgrade and Loan Spreads**

This table reports the results of an OLS regression relating loan spreads to lead arranger, loan and borrower characteristics. The dependent variable is the AISD. Models (6) and (7) include industry and year fixed effects and model (7) additionally uses the full set of explanatory variables. LaBa.High.Downgrade \_After.July.2001 is the DiD estimate under the H0 that the DiD estimate is equal to zero. Intercept, industry and year fixed effects are not shown. All variables are defined in Table 1. Heteroscedasticity-robust standard errors are shown in parentheses. \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
LaBa High Downgrade	12.20 (20.25)	13.58 (20.85)	16.77 (20.84)	11.14 (20.51)	16.9 (21.47)	15.72 (23.71)	11.07 (21.78)
After July 2001	28.66 (17.65)	21.43 (18.53)	21.48 (17.18)	27.86 (17.84)	22.51 (15.69)	45.28 (40.11)	55.71 (71.29)
LaBa High Down. * A. July 2001	-50.01** (24.33)	-62.42** (24.73)	-66.97*** (25.14)	-72.72*** (24.74)	-53.32** (24.55)	-49.88** (25.32)	-75.20** (32.70)
Maturity		19.63*** (7.56)	18.07** (7.32)	13.69* (7.27)	11.15* (6.48)	10.82* (6.42)	29.31* (14.10)
Facility Size (logs)		-13.43*** (3.77)	-11.41*** (3.96)	-7.18* (4.21)	-3.59 (4.43)	-5.47 (4.34)	-5.41 (4.31)
Secured			-25.54* (13.18)	-22.11* (13.4)	-10.78 (14.4)	-13.37 (13.70)	-9.32 (18.24)
Covenants			21.69 (17.52)	19.96 (17.99)	17.6 (16.91)	20.44 (22.1)	28.29 (33.08)
Publicly Listed				-25.71** (12.2)	-16.76 (10.11)	-13.13 (13.09)	-18.36 (18.75)
Investment Grade				-34.18 (22.52)	-72.89*** (25.12)	-44.66** (21.26)	-41.91** (21.15)
Not Rated				-13.93 (20.58)	-38.84* (22.72)	-21.42* (12.27)	-21.60* (13.95)
Dummy Term Loan					-33.80** (16.79)	-22.59 (13.41)	-20.68 (25.55)
Dummy Bridge Loan					14.7 (25.83)	10.34 (26.24)	9.3 (48.64)
Dummy Revolver $\geq 1$					-9.91 (16.01)	-5.43 (16.92)	-22.02 (23.84)
Dummy Debt Repay.					-38.35*** (12.37)	-56.47*** (12.7)	-64.79*** (18.68)
Dummy LBO Purp.					76.74*** (20.53)	83.85*** (19.73)	62.85* (36.19)
Dummy Corp Purp.					-21.14 (15.64)	-19.05 (17.75)	-14.97 (24.6)
Total Assets (logs)							-7.34** (2.9)
Profitability (logs)							13.59 (14.45)
Leverage							18.95* (10.39)
Coverage (logs+1)							-12.76*** (4.76)
Current Ratio							-1.54 (2.92)
Constant	110.36*** (14.22)	293.06*** (90.17)	252.45*** (94.06)	211.50** (100.29)	203.11** (100.35)	181.45 (128.34)	168.49* (100.59)
Industry Fixed Effects	No	No	No	No	No	Yes	Yes
Year Fixed Effects	No	No	No	No	No	Yes	Yes
Observations	412	372	372	372	372	372	223
R <sup>2</sup>	0.02	0.12	0.13	0.14	0.25	0.36	0.40

**Table 10****Removal of State Guarantee: Share Retained by Lead Arranger**

This table reports mean difference-in-differences (DiD) estimates of the (actual) share retained by each lead arranger. Lead arrangers are classified into two groups: Landesbanken who are affected by the removal of the state guarantee after July 2001, and Non-Landesbanken. All variables are defined in Table 1. Heteroscedasticity-robust standard errors are shown in parentheses. The DiD estimate is printed in bold. \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% level, respectively.

<b>Share Retained by Lead Arranger</b>				
	<b>All</b>	<b>Non-Landesbank</b>	<b>Landesbank</b>	<b>Difference</b>
Before July 2001	9.64% (0.66%) [304]	9.65% (0.77%) [272]	8.90% (1.11%) [32]	0.75% (1.35%)
After July 2001	12.77% (0.37%) [901]	12.43% (0.40%) [748]	14.47% (0.91%) [153]	-2.04% ** (0.98%)
Difference		-2.78% *** (0.87%)	-5.57% *** (2.05%)	<b>2.79% ***</b> <b>(0.85%)</b>

**Table 11**  
**The Activity of German Landesbanken in the Global ABCP Market**

This table reports the total volume of the global Asset-Backed Commercial Paper (ABCP) market and the activity of German Landesbanken (LaBa) within this market for the 2000 to 2008 period. Exposures are in million USD and are measured at year end. LaBa Exposure is the total volume of ABCP sponsored by Landesbanken. Total ABCP Volume is the total (annual) ABCP volume. LaBa Exposure of Total ABCP Volume is the percentage share of total ABCP volume sponsored by German Landesbanken. LaBa Exposure Growth is the year-by-year growth of LaBa Exposure. Total ABCP Volume Growth is the year-by-year growth of Total ABCP Volume.

<b>Year</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>Average (2000-'08)</b>
<b>Volume</b>										
LaBa Exposure	29,586	44,531	51,571	50,955	48,431	61,702	84,443	56,459	27,844	50,614
Total ABCP Volume	494,247	581,846	646,083	680,518	701,737	805,803	1,004,032	938,971	649,718	722,551
LaBa Exposure of Total ABCP Volume	6.0%	7.7%	8.0%	7.5%	6.9%	7.7%	8.4%	6.0%	4.3%	7.0%
<b>Growth</b>										
LaBa Exposure Growth		50.5%	15.8%	-1.2%	-5.0%	27.4%	36.9%	-33.1%	-50.7%	
Total ABCP Volume Growth		17.7%	11.0%	5.3%	3.1%	14.8%	24.6%	-6.5%	-30.8%	
<i>Difference in Growth</i>		32.8%	4.8%	-6.5%	-8.1%	12.6%	12.3%	-26.7%	-19.9%	

**Table 12**  
**Removal of State Guarantee, Borrower Risk and Loan Spreads:**  
**Until 2004 & Cash Holdings**

Panel A reports the results of OLS regressions relating Z-Score (column (1)) and AISD (column (2)) to our main inference variables controlling additionally for the ratio of “Cash & Cash Equivalents to Total Assets.” All control variables shown in the previous models are included and defined in Table I. Panel B reports mean difference-in-differences (DiD) estimates of borrower risk and loan spreads. Lead arrangers are classified into two groups: Landesbanken who are affected by the removal of the state guarantee and Non-Landesbanken. However, the “After July 2001” observation period ends in 2004 (instead of 2008). Heteroscedasticity-robust standard errors are shown in parentheses. The DiD estimate in Panel B is printed in bold. \*, \*\*, \*\*\* denote significance at the 10%, 5% and 1% level, respectively.

<b>Panel A</b>	<b>(1)</b>	<b>(2)</b>
<b>Landesbanken Only</b>	<b>Z-Score</b>	<b>AISD</b>
LaBa High Downgrade	0.219*	14.56
	(0.25)	(24.44)
After July 2001	-0.713	54.17
	(0.77)	(38.38)
LaBa High Downgrade*After July 2001	-0.0523**	-99.52**
	(0.26)	(46.42)
[...]		
Cash & Cash Equivalents to Assets	-0.025	-13.21
	(0.08)	(14.87)
Observations	367	223
R <sup>2</sup>	0.22	0.39

<b>Panel B</b>				
<b>Z-Score</b>	<b>All</b>	<b>Non-Landesbank</b>	<b>Landesbank</b>	<b>Difference</b>
Before July 2001	-0.191	-0.236	-0.104	-0.132
	(0.05)	(0.07)	(0.09)	(0.11)
	[205]	[135]	[70]	
After July 2001	-0.341	-0.290	-0.669	0.379**
	(0.05)	(0.06)	(0.13)	(0.15)
	[324]	[280]	[44]	
Difference		0.054	0.564***	<b>-0.511***</b>
		(0.08)	(0.16)	<b>(0.18)</b>
<b>AISD</b>	<b>All</b>	<b>Non-Landesbank</b>	<b>Landesbank</b>	<b>Difference</b>
Before July 2001	116.7	116.6	116.8	-0.2
	(6.8)	(8.9)	(10.2)	(13.5)
	[205]	[135]	[70]	
After July 2001	142.6	148.3	113.2	35.1**
	(8.1)	(9.2)	(15.2)	(17.7)
	[435]	[364]	[71]	
Difference		-31.7***	3.6	<b>-35.3*</b>
		(11.8)	(18.3)	<b>(21.4)</b>



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