Skin in the game: The performance of insured and uninsured municipal debt

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Abstract

One criticism of the credit rating industry has been that ratings agencies have no 'skin in the game.' The ratings agencies, in offering their ratings, place only their reputational capital at risk. Financial guarantors provide an interesting counterpoint to ratings agencies – they 'rate' a bond by taking exposure to the issuer's credit risk. In this paper, we investigate the performance of these insurer 'ratings' in the municipal marketplace by comparing the performance of insured and uninsured municipal bonds. We find that insured bonds have had substantially better underlying rating transition performance than uninsured bonds. In other words, the pure security selection ability of the financial guarantors appears to have been positive. We estimate that the financial guarantors' outperformance on their portfolio of insured municipal issues amounted industry-wide to a value of about $7.5 Billion between December 2007 and December 2012.

Keywords: Bond insurance, municipal bonds.

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One persistent criticism of the credit rating industry has been that the ratings agencies have no 'skin in the game,' in the sense that they place only reputational capital at risk when rating bonds and issuers. Financial guarantors represent, in that sense, a polar opposite from credit rating agencies. In guaranteeing the coupon and principal payments for municipal bonds, they 'rate' a bonds and issuers by taking direct exposure to issuers' credit risk. In this paper we ask a very simple question about the financial guarantors: how good were they at selecting which municipal issuers to insure?

Financial guarantors played a central role in the credit crisis. At their peak, they insured approximately half of all municipal issues as well as billions of dollars of structured products based on residential mortgages. The collapse of the monoline insurance industry has had an impact throughout the financial system, and the financial guarantors have earned their place among the magnets of blame for the entire crisis. But our conclusions lead us to have some sympathy for the embattled guarantors. Although the guarantors were highly levered, and as an industry they made an unfortunate detour into insuring non-municipal products, their pure security selection ability with respect to municipal issues appears to have been positive.

This conclusion is based on an assessment of the underlying credit quality of the municipal portfolios that the guarantors have insured. We find that, controlling for the underlying rating, the bonds insured by financial guarantors have better ratings transition performance than uninsured bonds. We use the underlying ratings of the municipal bond issuers, rather than the enhanced ratings of the bonds. The underlying rating reflects that credit quality of the municipal issuer, while the enhanced bond rating reflects the joint credit quality of the financial guarantor and the issuer. In other words, controlling for the underlying issuer credit

quality at the time that bonds have been issued, the subsequent changes in issuer credit quality have been better for insured bonds than for bonds that were not insured.

The default performance between insured and uninsured debt is not distinguishable, a fact attributable to the very small default frequency among municipal issues. Using ratings transitions, however, we can place a dollar magnitude on the value of the guarantors' outperformance: we estimate that the financial guarantors' outperformance between December of 2007 and December of 2012 amounted to about $7.5 Billion across the industry, or about 57 basis points of the $1.3 Trillion insured portfolio. Scaled differently, security selection has amounted a total equivalent to 41 percent of the S&P-estimated $18 Billion in guarantors' capital as of December 2007.

These numbers, based on transitions in the underlying credit quality of the insured and uninsured portfolios, don't necessarily tell us about the profitability of the bond insurers' municipal finance businesses. We do not know, bond by bond, how much the guarantors charged for the insurance they provided.[1] But our results do allow us to reject some interesting hypotheses. For one thing, the period since the credit crisis has seen a particularly persistent phenomenon where the yields on insured debt, controlling for credit rating, have exceeded the yields on uninsured debt (see Bergstresser et al, 2013). One potential explanation for this phenomenon would be that the credit quality of insured debt, controlling for rating, has been lower than the credit quality of uninsured debt. By this argument, low-quality issuers would have been more likely to need to get insurance, or to have their investors demand it (see Butler et al, 2009, who find that issuers in more corrupt locations are more likely to get insurance) Our

[1] Bonds issued by issuers within Texas are an exception to this rule. We explore these bonds in the final analysis of this paper.

results suggest that, on net, controlling for rating, the opposite result seems to hold. The ratings transition performance of the insured bonds has been better than the uninsured.

Because insurance status predicts subsequent ratings transitions, our results also allow us to reject the hypothesis that credit ratings conveyed all information available to market participants. Similar to analyses by Adelino (2009) and Ashcraft et al (2010) who analyze the market for MBS, we find that additional information, available at the point of bond issuance, has some predictive power for subsequent bond performance. Ashcraft et al find evidence that observable characteristics of mortgage pools – for example the fraction of low-documentation loans – predicted MBS performance during the credit crisis. We find that insurance status of issued bonds predicts the ratings transition performance of underlying issuers.

The performance of the insured bonds over the crisis period leads us to conclude that this 'skin in the game' matters, and that the credit ratings by themselves lack information for subsequent performance that was captured somehow by the financial guarantors. This result highlights a limitation in the quality of existing credit ratings, relative to the implicit 'rating' provided by financial guarantors. The limitations of credit rating agencies whose incentives are based purely on reputation have been highlighted recently using a dynamic model in work by Mathis et al (2009). Bongaerts (2012) explores the circumstances in which rating agency coinvestment can ameliorate some of these limitations.

Originators of MBS and other asset-backed securities have come under similar criticism related to their lack of direct exposure to the performance of the financial products that they sold to investors, and one of the central achievements of the Dodd-Frank Wall Street Reform and

Consumer Protection Act has been to force some originators of asset-backed securities to retain at least some direct exposure to the risk of securities that they structure. .

The monoline insurance industry has been criticized from many different sides recently. Critical accounts of the industry have highlighted accounting practices, investment policies, and practices with respect to off-balance sheet activities. We don't challenge any of this criticism, and we acknowledge that the bond insurance industry has now shrunk significantly from its heyday of the mid-2000s. We simply ask and answer a very narrow question – albeit one with some broader implications. The answer, plainly stated: we find that the financial guarantors, when it came to insuring municipal securities, appear to have had some security selection ability.

This paper proceeds in four sections. Section 1 describes the credit rating and financial guarantee industries. Section 2 describes our hypothesis tests. Section 3 describes our data. Section 4 presents our results. A brief final section concludes.

1. The credit rating and financial guaranty industry

Financial guarantors, in exchange for a payment from issuers, stand ready to cover interst and principal payments on insured debt in the event that an issuer is unable to pay. Ideally, issuers of municipal bonds will use financial guarantors when the total cost of a debt issue – including insurance – is lower than if the bonds had been sold without insurance. A variety of reasons for the existence of the monoline insurance industry have been proposed. Pirinsky and Wang (2011) suggest that the financial guarantors, which operate nationally, are a market solution to the regional market segmentation that characterizes the municipal market. Nanda and Singh (2004) propose a rationale based on taxes: bond insurance allows investors to retain the benefits of the tax exemption in the event that a municipal bond defaults.

The financial guarantors go back to 1971, when the American Municipal Bond Insurance Corporation, a predecessor of Ambac, insured a local bond issue in Alaska. MBIA, a successor to which now operates as National Public Finance Guarantee Corporation, began operation in 1975. The growth of the industry was boosted by the 1975 New York City default crisis and the 1983 default at the Washington State Public Power Supply System. The industry, at its peak in the mid-2000s, insured roughly half of the municipal debt being issued, with MBIA, Ambac, FGIC, CFIG, FSA, AGC, and ACA insuring the bulk of the debt.

Table 1 shows the total municipal universe, and the amounts insured by different issuers. The top panel shows data for September 2010, the middle panel shows data as of February 2013, and the bottom panel shows data as of May 2015. Of the $3.4 Trillion in municipal debt that was outstanding in September 2010, approximately $1.3 Trillion was insured. Bond insurance has been a broad phenomenon – issuers at all levels and throughout the country have chosen to issue bonds with bond insurance attached. California issuers, in 2010, were the largest users of bond insurance, with $239 Billion worth of bonds insured. Although insurance penetration in the primary market fell off between 2010 and 2015, the stock of insured bonds remains large. As of May 2015 the par value of insured municipal debt was $571.62 Billion, or over 17 percent of the entire market. Although the penetration of bond insurance in the new issue market has fallen significantly, it remains part of the market. In 2014, $18.54 Billion of the $334.43 Billion worth of newly issued municipal bonds were sold with insurance.

The decline in the bond insurance market has been tied, at least part, to their venture out from their traditional business of insuring municipal debt into the new business of insuring structured products, particularly those based on residential mortgages. The rapid growth of

structured finance in the middle part of the 2000s coincided with explosive growth in guarantor exposure to structured products. As of December 2006, on the eve of the crisis in structured finance, the bond insurers collectively insured $823 Billion worth of structured finance instruments. Of this total, $200 Billion were directly tied to mortgages, whether in the US or abroad. This exposure adversely impacted the financial guarantors, leading to ratings downgrades and even bankruptcies. **Tables 2, 3, 4, and 5** show the deterioration in the S&P Financial Strength Ratings assigned to the major insurers between 2007 and 2014. With the exception of Radian (which was AA-rated), all of the major guarantors carried AAA ratings as of December 2007. As of December 2012, none of these legacy guarantors carried a rating of AAA. Only FSA and Assured Guaranty (now merged) carried financial strength ratings higher than BBB. There have been some ratings upgrades more recently; in May of 2013 National Public Finance Guarantee Corp, a successor in the municipal insurance business of MBIA, was upgraded from BBB to A. In March of 2014 Assured Guaranty Corp. and Assured Guaranty Municipal (the successor to FSA) were upgraded to AA ratings by Standard and Poor's.

This expansion into guaranteeing CDOs and RMBS was ill-timed, and may even have been ill-considered. The bond insurers have been criticized from all sides, and even blamed for the severity of the ongoing credit crisis. In this paper we neither challenge nor add to any of this criticism. We ask a very simple question: when it came to their selection ability with respect to their municipal portfolios, were they able to do better than a ratings-matched dartboard approach.

2. Hypotheses

We test the null hypothesis that the distribution of transitions in the underlying credit quality does not differ between insured and uninsured municipal debt. Our measure of underlying credit quality is based on the SPUR, or Standard and Poor's Underlying Rating. For

bonds that are sold with insurance, Standard and Poor's constructs both a credit rating for the insured bond and also a SPUR, which represents the standalone credit quality of the issuer. **Figure 1** shows the official statement from a recent municipal issue, where the first lines highlight both the rating of the instrument (AAA) and the S&P rating of the credit quality of the underlying credit (A). Bond insurance from FSA leads the credit rating assigned to the issue to exceed the credit rating of the issuer. We take the S&P underlying rating as a measure of issuer credit quality, and for issues that are not insured we impute a SPUR equal to the rating of the issuer. We also test the hypothesis that default probabilities are the same between insured and uninsured debt. This test has much less power: while ratings transitions are rather common among municipal issuers, at least to this point defaults have been rare.

3. Data

We compile data for this study from several sources. The first source is the Mergent Fixed Income Database. From this source we get data on the bond characteristics, including the issuer, the issuance and maturity dates, whether the bond was insured, and the identity of the insurer. Mergent also identifies whether the bond was insured in the primary or secondary market; most municipal debt that is insured is sold with insurance at issuance, but there is also a much smaller secondary market for insuring municipal debt. All of our results that follow include only bonds identified by Mergent as being insured in the primary market rather than the secondary market. Our rationale for this restriction is that purchasing bond insurance in the secondary market potentially reflects events that have happened to the issuer since issuance. Because excluding the bonds that Mergent lists as secondary market-insured is likely to exclude a large set of bonds that were issued without insurance but then subsequently insured after

negative events, we view this exclusion as conservative with respect to our conclusion that the insurers collectively have good security selection at bond issuance.

We combine the Mergent data with ratings data from Standard and Poor's. As mentioned above, the Standard and Poor's ratings include both ratings for the instrument, and for many issuers of insured instruments, ratings for the underlying issuer (SPURs, or Standard & Poor's Underlying Ratings.) For uninsured issues, we impute a SPUR equal to the rating of the instrument.

Table 6 describes the sample of bonds used in the analysis. The analysis starts with the Mergent sample of 3,066,500 bonds. The entire Mergent sample includes bonds issued through December of 2012. Mergent's coverage of the municipal bond universe appears to be comprehensive starting with bonds issued in the 1990s, and our later analysis is based on ratings transitions of bonds for the period starting in January 1990. Our transition analysis includes some bonds that were issued as early as 1957, but the vast majority of the observations in our dataset were issued starting in the 1990s.

The average size of the bonds in our sample is $2.8 million, and the average maturity is 9.82 years. The average yield at issuance was 4.063 percent. We calculate a spread measure by matching the month and maturity of issuance of the bond to the Bloomberg-reported AAA-rated municipal yield curve; the average spread for all bonds in the sample was 42.2 basis points over that benchmark. 43.5 percent of the bonds were unlimited-tax General Obligation bonds, meaning that the bonds were backed by the taxing ability of the local or state authority that issued them. 20.4 percent of the bonds were revenue bonds, where the instruments were backed only by the revenue from a specific project. The residual bonds include limited-tax GO bonds, bonds backed by tobacco settlements, loan agreements, education loans, and other types of

municipal borrowing. Of the bonds in the sample, 61.8 percent of bonds were new-issue bonds, the remainder were refunding bonds issued to retire existing debt.

42.0 percent of the bonds in the sample are insured. Comparing the insured and uninsured bonds, the insured bonds have an average spread of 26.6 basis points while the uninsured were issued at an average spread of 54.9 basis points. The insured bonds tended to be smaller in size than the uninsured bonds, and the average maturity of the two subsamples is the same. Our analysis, based on ratings transitions, is limited to the sample for which we have S&P rating data. For this subsample, we must be careful to be specific about the credit rating of the instrument versus the credit rating of the issuer. 180,370 bonds were issued by AAA-rated issuers. Of these, only 1,938 were sold with bond insurance. The mean spread of insured bonds issued by AAA-underlying issuers was 17.8 basis points, significantly lower than the 28.9 basis point mean spread of uninsured bonds issued by AAA-underlying issuers. The sample of AAA-rated bonds is much larger – these 645,146 bonds include both the bonds who owed their AAA rating to the underlying credit quality of the issuer and the bonds that owed their AAA rating to the insurance wrap. This sample includes almost all of the bonds that were insured and rated by S&P, since the main monoline insurers carried AAA ratings for the bulk of their active histories.

The remainder of the sample includes 517,941 bonds issued by AA-rated underlying issuers, 439,349 bonds issued by A-rated underlying issuers, and 85,284 bonds issued by BBB-rated underlying issuers. Not surprisingly, the wedge between the average spread of insured and uninsured issues goes up at the lower credit ratings – among the BBB-rated underlying issuers the average spread on uninsured issues is 114.1 basis points and the average spread on insured issues was 39.1 basis points. The A-rated and BBB-rated underlying issuers were much more likely to sell bonds with insurance than the AAA-rated and AA-rated underlying issuers. There

is some evidence that market spreads at issuance reflect both insurance and the credit quality of the issuer: spreads on the insured bonds average 23 basis points for AA-rated underlying issuers, 32 basis points for A-rated underlying issuers, and 39 basis points for BBB-rated underlying issuers.

4. Tests

Our first empirical analysis looks at monthly ratings transitions for the underlying credit ratings of the issuers. As noted above, we analyze ratings transitions over the period between 1990 and December 2012. We take our sample of S&P-rated bonds and issuers and construct an unbalanced panel of 75,720,450 monthly observations. An bond is in our sample with a separate observation for each month that the bond was outstanding, so a bond that was issued in January of 1990 and called in December of 1999 would represent 120 separate monthly observations.

We divide these observations into three buckets, upgrades, no-change observations, and downgrades. Our results are not sensitive to condensing the set of transitions to three; our estimation of the empirical magnitude of the insurer outperformance that follows in Table 13, discussed later in the paper, is based on the entire transition matrix – including multi-notch ratings transitions. **Table 7** shows what these data look like for a specific bond: FSA-insured bonds issued by Stockton, California in 2007 with a 2017 maturity. Stockton eventually defaulted, and this default is reflected in the SPUR, which goes to D at the time of default.

Table 8 shows the results of our exercise comparing the post-issuance issuer rating transition experience between insured and uninsured bonds. Among the entire sample, 99.18 percent of monthly observations were associated with no change in the credit rating assigned to the underlying issuer. 0.241 percent of month-bond observations saw a downgrade, and 0.580

percent of observations saw an upgrade. Months with upgrades were 70.6 percent of all of the months with changes. Among the uninsured bonds, 0.404 percent of observations saw an upgrade in the rating assigned to the underlying credit – and therefore, since the bonds are uninsured, and upgrade to the rating of the bond. Among uninsured bonds, 0.271 percent of observations saw a downgrade. The upgrade ratio was 59.9 percent versus 70.6 percent in the entire sample. For bonds that are insured, the upgrade ratio was 79.6 percent. We separately consider bonds that were insured by the subset of insurers that have turned out to be the most troubled. This troubled insurer subset includes all of the insurers except for Assured Guaranty, FSA, and Berkshire Hathaway Assurance Corp. For bonds insured by one of the troubled insurers, the ratio was 79.9 percent.

To assess both the economic and the statistical significance of this insurer outperformance, we regress the monthly change categorical variable on a dummy variable for uninsured status. The bottom panel of Table 8 shows the coefficients and t-statistics from models with different sets of additional controls. The first model has no covariates other than the dummy for uninsured bonds, and the coefficient estimate is 0.0046. Assuming that all changes are by one notch, this coefficient estimate implies that over a 5-year (60-month) period the issuer of an uninsured bond, in expectation, would have 60*0.0046 = 0.276 notches worth of downgrade relative to the underlying credit rating of an insured bond. We view this as a rather significant difference between the rating trajectories of insured and uninsured debt.

Model 2 includes controls for month. Downgrades are concentrated in time in certain months, and our goal here is to make sure that our result is not merely an artifact of time variation in the share of bonds that are insured combined with concentration of downgrades in certain months. Controlling for the month reduces the coefficient on the insurance dummy from

0.0046 to 0.0040 – our results do not appear to be driven by this potential effect. Controlling for the interaction of month and bond type (General obligation bond, revenue bond, and so forth) leads to a coefficient of 0.0034. We view this result – that over a 5 year period uninsured bonds, in expectation, are associated with 0.276 notches worth of downgrade – to be highly economically significant.

These results come with a high level of statistical significance as well. This is not too much of a surprise, given that there are 76 million monthly observations, representing 1.2 million distinct bonds, in our sample. All of our reported t-statistics are adjusted for clustering at the level of the issue. We cluster in this way because municipal debt is typically issued in a series, with multiple bonds in an issue, and downgrades often happen at the issue level rather than for just one bond. Our t-statistics remain highly significant when we cluster at the issuer level as well; the overall pattern of results is highly significant regardless of the clustering approach.

As noted above, we also focus on the 22,689,176 observations insured by the highly troubled insurers. The financial guarantors divide neatly into two groups – those whose credit ratings have been cut below investment grade, including MBIA, Ambac, FGIC, CIFG, and XL, and those who are less financially troubled. The less troubled insurers include only Assured Guaranty and FSA, which have merged since the start of the financial crisis. The Berkshire Hathaway-sponsored guarantor, BHAC, entered the market after the credit crisis had hurt the incumbents. BHAC initially had a high credit rating. The rating transition performance of the subsample of troubled insurers is similar to the transition performance of the entire sample of insurers.

Table 9 looks in detail at the performance of individual insurers. The pattern that emerges suggests that, on the whole, the troubled insurers each appear to have had some

selection ability, at least controlling for timing and bond type. Focusing on the model (model 3) that controls for month, interacted with bond type, the point estimates for the dummy variables for the insured bonds are all negative, suggesting that the security selection performance for each of the insurers were positive. These point estimates are highly significant for MBIA, Ambac, FGIC, and FSA.

We turn now to considering the ratings transition performance in samples that are partitioned by the underlying credit rating of the bond. The goal of partition of the data is to assess whether the results reported in Tables 8 and 9 are merely a consequence of different ratings trajectories by underlying rating, combined with the fact that the underlying ratings of insured bonds are generally lower than the underlying ratings of uninsured bonds. Partitioning the analysis by underlying credit rating allows us to assess the ratings trajectories in samples that are homogeneous in terms of credit quality. **Table 10** looks more closely at the underlying ratings transitions among the AA-rated subset of underlying municipal issuers. **Tables 11 and 12** look more closely at the bonds with underlying ratings of A and BBB. In each of these subsamples, no matter what pattern of controls is used, and no matter whether the subset of insurers includes all of them or just the troubled insurers, the coefficients on the insurance dummies are negative and statistically significant. These results lead us to conclude that are conclusions are not affected by any differential patterns in ratings trajectories across underlying rating categories. The coefficient estimates are much larger in the BBB sample of Table 12 than they are in the AA sample of Table 10. The coefficient of .0065 in the BBB sample implies 0.39 notches of insured bond outperformance over a five-year period, while the coefficient of 0.0018 in the AA sample implies 0.11 notches of outperformance in that sample.

Table 13 takes a slightly different empirical approach. Rather than creating monthly observations for each bond, we use one observation for each bond and use a dependent variable which reflects the lifetime transition experience (through December 2012) of each underlying credit rating. Our t-statistics still reflect clustering at the issue level, and our observation count falls to just 1,196,182, of which 485,893 are insured. Here the pattern of results is the same, and the economic magnitude of the results is similar to the earlier results as well. The lifetime outperformance of the underlying credit quality of insured bonds over uninsured bonds amounts to an average of 0.248 notches for the entire insured sample based on the model with no covariates. Model 2 in this case includes dummy variables for each year that the bond was outstanding. As described above, this specification is designed to control for the fact that exposure to certain years has carried a much greater chance of downgrade than others. Model 3 includes dummies for exposure to each year as well as dummy variables capturing bond type. Each of these models implies outperformance among the insured bonds, suggesting security selection ability on the part of the insurers.

Table 14 reflects our attempt to place a dollar value on the outperformance of the insured subsample over the period between December 2007 and December 2011. The earlier analysis also condenses upgrades to a score of '-1' and downgrades to a score of '+1', regardless of the number of notches that the issuer was upgraded or downgraded. The analysis in Table 14 controls for the magnitude of upgrades and downgrades, reflecting the entire transition matrix rather than just condensing information into 'upgrade', 'no change', and 'downgrade.' We start with the December 2007 distribution of credit ratings of uninsured bonds, listed in columns (1) and (2). We then estimate the entire transition matrix of underlying credit quality separately for the insured and uninsured bonds in our sample over the period between December 2007 and

December 2012, the last date for which we have data. Columns (3) and (4) reflect (counterfactual) outcome credit rating distribution that would have applied had the transition matrix estimated on the uninsured sample was applied to the starting distribution of insured bonds. Columns (5) and (6) apply the transition matrix estimated on the insured sample. We then take these estimated distributions, and make a value impact estimate by using the December 2012 yields for 10-year maturity municipal bonds of different credit rating. These estimates are based on observed yields on the entire sample of transactions in (S&P-rated) bonds from the MSRB trades database. We estimate a value loss versus the AAA benchmark by assuming an 8-year duration, meaning that we multiply the difference in spreads between each rating level and the AAA spread by -8 to get a hypothetical value impact. Using the AAA point as a benchmark is not terribly consequential since our goal is to compare the value impact using the insured and uninsured transition matrices to each other, rather than to any absolute benchmark. Columns (10) and (11) give a 'contribution to loss' for each transition matrix, leading us to conclude that applying the uninsured bond transition matrix to the insured bond starting point would have led to a loss 43 basis points larger than for the insured sample. With $1.3 Trillion in insured debt outstanding, 57 basis points of outperformance amounts to approximately $7.5 Billion. S&P in December 2007 estimated that the financial guarantors collectively had $18 Billion in capital; our results would suggest that the outperformance based on their municipal security selection was large relative to their starting capital – a fact that reflects both the guarantors' security selection ability and the astonishing leverage at which they operated. **Figure 2** shows this outperformance through each month up to December 2012. The outperformance reflects combination of two factors: the ratings outperformance of the insured sample (reflected in the blue dashed line, which shows the difference in numerical ratings between the insured sample

and the hypothetical insured sample, using the uninsured transition matrix) and the change in yields by credit rating. The period since 2009 has seen continuing outperformance in terms of ratings transitions. But because credit spreads have tightened over that time, the dollar value of outperformance has remained roughly unchanged – reflecting these two offsetting effects.

Table 15 explores differences in default experience over the period between the insured and uninsured bonds. We take default data from Mergent's record of defaults, a record that captures default regardless of whether a financial guarantor stepped in to cover bond payments. We fit 4 different models, each with a different set of control variables. Column 1 has no controls; column 2 controls for the initial underlying credit rating; column 3 controls for the initial rating interacted with bond type; column 4 uses the set of controls in column 3 as well as dummy variables for the periods that the bond was outstanding. All specifications report standard errors adjusted to account for issue-level clustering. Across the board, the pattern is reasonably clear. The background rate of default among municipal bonds is extremely low – the constant estimate is 0.0006775, suggesting that 0.07% of the S&P-rated bonds in the Mergent sample have defaulted by December 2012. In the specification with no controls, the coefficient on the insurance dummy is positive, and amounts to an incremental impact of 0.07%. Column (2) controls for the SPUR at the time of issue: bonds that are insured tend to have lower underlying ratings than uninsured bonds. The positive coefficient in column (1) appears to be an artifact of this effect: controlling for the original underlying rating, there is no statistically significant difference between insured and uninsured samples. Column (3) controls for the original SPUR and the type of bond, and column (4) controls for the months that the bond was outstanding. On the whole, there does not appear to be any robust relationship between

insurance and eventual default. The general message is that default is extremely unusual, across the board, among rated municipal bonds.

In the broad sample we are not able to observe the prices that issuers pay for insurance, but for bonds issued by issuers in the state of Texas, the Texas Bond Review Board reports the insurer and the cost of insurance. We focus on this subsample in **Table 16** This table shows the rating transition and default experience for insured and uninsured bonds issued by Texas issuers between 1999 and 2010. The table shows the experience by underlying rating. Similar to the larger sample, it is extremely rare for bonds issued by issuers with AAA underlying ratings to also carry insurance. Focusing on the bonds rated AA at issuance, 35.99 percent of these 16272 bonds were sold with insurance. None of these bonds – insured or otherwise – has defaulted through 2012. The mean upgrade/downgrade variable for the insured sample is -0.47, while it is -0.25 for the uninsured sample. Given that more credit-worthy credit ratings have lower numerical scores, this result means that the insured bonds had higher upgrade propensities than the uninsured bonds with natural AA ratings. The mean fee paid for bond insurance in this group was 0.26 percent of par. The mean yield spread over the AAA GO curve was 0.26 percent in this sample as well, versus 0.40 percent among uninsured bonds from AA-rated issuers. This yield difference of 0.14 basis points amounts to a price difference of 1.12 percent at a duration of 8 years, roughly the midpoint of the sample. The default rate over eleven years in the sample of insured bonds has been, in total, approximately 0.02 percent. While slightly higher than the 0.01 percent default rate among uninsured bonds, the main lesson from the result has been that municipal bond defaults in Texas during the sample period were extremely infrequent. Certainly the average bond insurance fee of 0.55 percent among the insured bonds has, during this sample period, covered the realized losses on the insured portfolio.

5. Conclusion

This paper compares the performance of insured and uninsured municipal bonds by looking at changes in the bonds' underlying credit quality. We focus on transitions in the Standard and Poor's ratings of the underlying municipal issuers. The results suggest that insured bonds have had substantially better underlying rating transition performance than uninsured bonds. In other words, the pure security selection ability of the financial guarantors appears to have been positive. We estimate that the financial guarantors' outperformance on their portfolio of insured municipal issues has amounted industry-wide to a value of about $7.5 Billion since December 2007.

The financial guarantors operated at high levels of leverage, poor levels of disclosure, and collectively made an astonishing and ill-starred departure into guaranteeing structured products based on residential mortgages – a departure that has now sunk or is sinking most of the industry. They appear to have rightly earned a leading place among the magnets for blame for the current credit crisis. In this paper, however, we find some evidence that in at least one activity they seem to have beat the dartboard test (and the rating agencies as well) – they appear to have had positive security selection ability in their choice of which municipal securities to insure.

The future of the financial guarantee industry is cloudy at best. But with all of the criticism of the rating agencies for their lack of 'skin in the game', it is interesting to find that the financial guarantors – who if anything had excessive levels of skin in the game – appear to have outperformed the rating agencies in evaluating municipal debt at issuance.

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Figure 1. Municipal issue official statement, with both insured and uninsured (SPUR) rating.

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2007 TAXABLE PENSION OBLIGATION BONDS, SERIES B

Dated: Date of Delivery **Due: September 1, as shown on inside cover page**

The City of Stockton (the "City") is issuing $125,310,000 aggregate principal amount of City of Stockton 2007 Taxable Pension Obligation Bonds, consisting of $96,985,000 principal amount of 2007 Taxable Pension Obligation Bonds, Series A (the "Series A Bonds") and $28,325,000 principal amount of 2007 Taxable Pension Obligation Bonds, Series B (the "Series B Bonds," and together with the Series A Bonds, the "Series 2007 Bonds") pursuant to the provisions of Articles 10 and 11 (commencing with Section 53570) of Chapter 3 of Part 1 of Division 2 of Title 5 of the Government Code of the State of California (the "Bond Law") and an Indenture of Trust dated as of April 1, 2007 (the "Indenture"), by and between the City and Wells Fargo Bank, National Association, as trustee (the "Trustee") to: (i) refund a portion of the obligation of the City to the California Public Employees' Retirement System ("PERS") evidenced by its contract (the "PERS Contract"), and (ii) pay certain costs associated with the issuance of the Series 2007 Bonds.

The Series 2007 Bonds will be issued to refinance the obligation of the City to make payments to PERS for retirement benefits accruing to its employees and retirees. The obligation of the City to make payments with respect to the Series 2007 Bonds is an absolute and unconditional obligation of the City imposed upon the City by law. Payment of the principal of and interest on the Series 2007 Bonds is not limited to any special source of funds and is payable from any legally available moneys or funds of the City. The City is not empowered or obligated to levy or pledge taxes to make payments with respect to the Series 2007 Bonds. See "PLAN OF FINANCE" and "SECURITY AND SOURCES OF PAYMENT FOR THE SERIES 2007 BONDS."

The Series 2007 Bonds will bear interest at the rates per annum set forth on the inside cover page, payable on March 1 and September 1, commencing September 1, 2007. See "THE SERIES 2007 BONDS." The Series 2007 Bonds are being issued in fully registered form, and when issued will be registered in the name of Cede & Co., as nominee of The Depository Trust Company ("DTC") in the United States. DTC will act as securities depository for the Series 2007 Bonds. Individual purchases will be made in book-entry form only in denominations of $5,000 or any integral multiple thereof. Purchasers will not receive certificates representing their beneficial ownership interest in the Series 2007 Bonds purchased. See APPENDIX G–"DTC AND THE BOOK-ENTRY ONLY SYSTEM."

The Series 2007 Bonds are subject to optional and mandatory sinking fund redemption prior to maturity as described herein. See "THE SERIES 2007 BONDS–Redemption Provisions."

The scheduled payment of principal of and interest on the Series 2007 Bonds when due will be guaranteed under an insurance policy to be issued concurrently with the delivery of the Series 2007 Bonds by FINANCIAL SECURITY ASSURANCE INC. See "MUNICIPAL BOND INSURANCE."

FSA.

THE SERIES 2007 BONDS DO NOT CONSTITUTE AN OBLIGATION OF THE CITY FOR WHICH THE CITY IS OBLIGATED TO LEVY OR PLEDGE ANY FORM OF TAXATION OR FOR WHICH THE CITY HAS LEVIED OR PLEDGED ANY FORM OF TAXATION. NEITHER THE SERIES 2007 BONDS NOR THE OBLIGATION OF THE CITY TO PAY THE PRINCIPAL OR REDEMPTION PRICE OF OR INTEREST ON THE SERIES 2007 BONDS CONSTITUTES AN INDEBTEDNESS OF THE CITY, THE STATE OF CALIFORNIA OR ANY OF ITS POLITICAL SUBDIVISIONS WITHIN THE MEANING OF ANY CONSTITUTIONAL OR STATUTORY DEBT LIMITATION OR RESTRICTION.

This cover page contains information for general reference only. It is *not* intended to be a summary of the security or terms of this issue. Investors are advised to read the entire Official Statement to obtain information essential to the making of an informed investment decision. Capitalized terms used on this cover page not otherwise defined shall have the meanings set forth herein.

Maturity Schedule
(See inside cover)

The Series 2007 Bonds will be offered when, as and if issued and received by the Underwriter, subject to the approval as to their validity by Jones Hall, A Professional Law Corporation, San Francisco, California, Bond Counsel, and certain other conditions. Certain legal matters will be passed upon for the Underwriter by its counsel, Quint & Thimmig LLP, San Francisco, California, for the City by the City Attorney and by Lofton & Jennings, San Francisco, California, Disclosure Counsel. It is anticipated that the Series 2007 Bonds, in book-entry only form, will be available for delivery through the DTC book-entry only system in New York, New York in the United States, and through the Euroclear System and Clearstream, Luxembourg in Europe on or about April 5, 2007.

LEHMAN BROTHERS

Dated: March 26, 2007

Figure 2. Magnitude of insured bond outperformance, 2007-2011

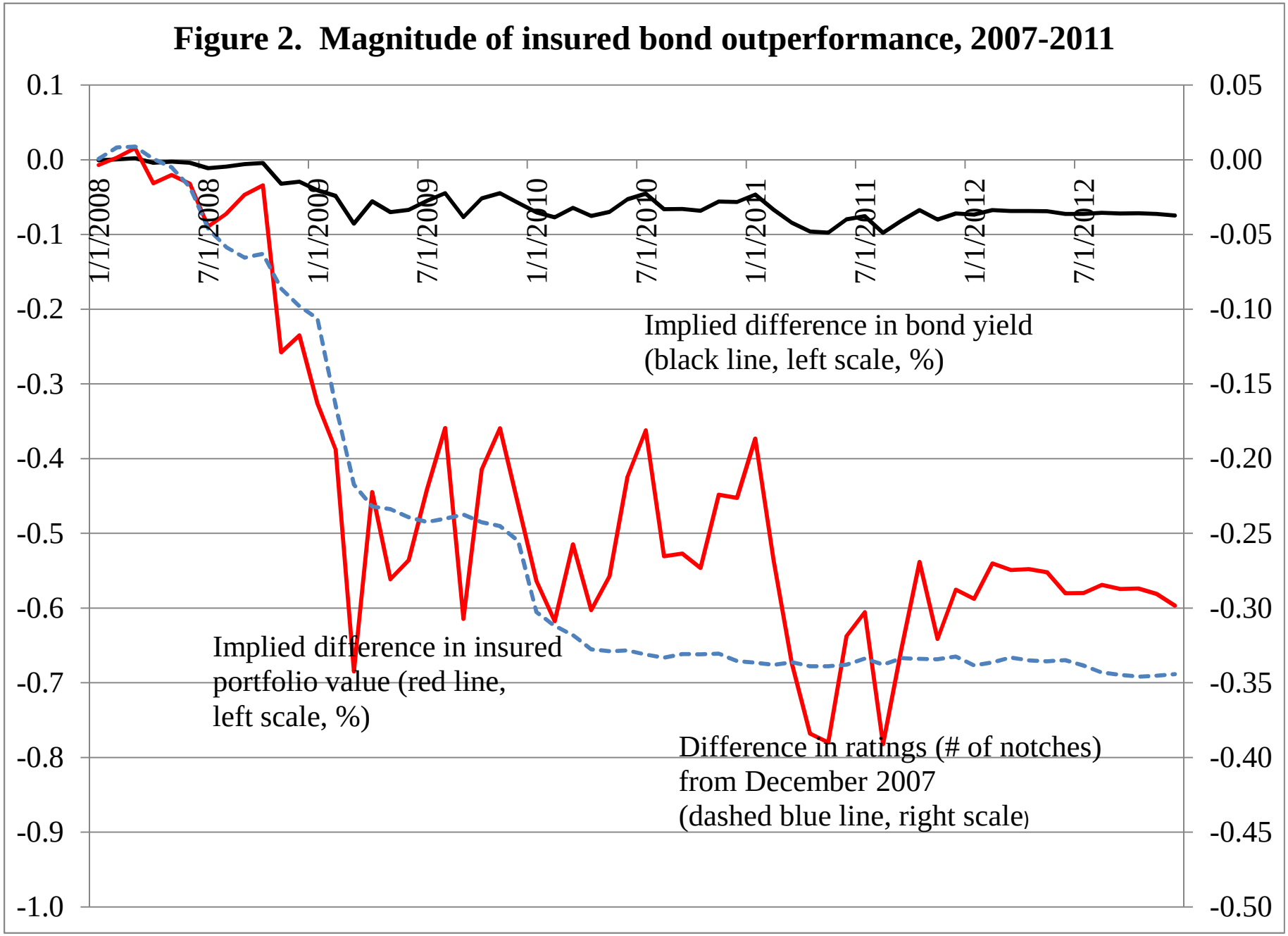

Table 1. Total and Insured Municipal Debt ($Billions), by State and Insurer.

Panel A: September 2010

State	Total	Insured	Ambac	MBIA	FGIC	FSA	Radian	Assured	XL	BHAC*	Other
California	541.60	239.23	42.83	90.68	35.84	51.65	1.28	10.09	5.20	0.23	1.46
New York	339.63	110.50	19.11	38.78	16.84	26.16	0.74	3.87	2.98	0.37	1.66
Texas	293.39	91.71	17.87	28.94	10.64	19.90	2.25	8.56	2.11	0.46	0.99
Florida	173.89	92.99	18.71	34.62	12.16	17.93	0.58	5.76	2.07	0.41	0.75
Illinois	157.38	88.76	13.49	31.45	13.71	23.18	0.42	3.44	2.10	0.17	0.81
Pennsylvania	139.43	66.79	9.48	16.40	9.29	21.85	1.11	5.15	2.06	0.25	1.19
New Jersey	124.05	66.45	11.72	24.71	7.50	17.73	0.31	2.71	1.25	0.00	0.53
Ohio	102.23	33.06	5.81	10.75	4.97	8.16	0.35	1.96	0.72	0.00	0.35
Massachusetts	94.64	33.83	7.53	10.21	3.68	9.54	0.36	1.12	0.94	0.00	0.46
Puerto Rico	85.95	25.93	5.66	9.04	4.37	4.60	0.00	0.97	0.48	0.00	0.81
Other	1376.72	512.47	90.32	175.20	66.15	125.14	4.90	26.18	15.87	2.47	6.22
Total	3428.91	1361.72	242.53	470.78	185.15	325.84	12.30	69.81	35.78	4.36	15.23

Panel B: February 2013

State	Total	Insured	Ambac	Natl (formerly MBIA)	FGIC	FSA	Radian	Assured	XL	BHAC*	Other
California	552.87	193.88	39.89	64.88	26.57	46.08	1.02	9.86	4.41	0.22	0.94
New York	360.69	74.64	12.46	23.25	10.97	19.62	0.39	3.78	2.6	0.37	1.2
Texas	303.14	64.6	11.4	18.73	5.83	16.19	1.38	8.19	1.65	0.56	0.66
Florida	153.05	61.44	11.87	20.47	6.89	14.13	0.26	5.17	1.8	0.4	0.45
Illinois	151.86	63.38	7.49	22.6	9.89	17.75	0.29	3.14	1.63	0.16	0.45
Pennsylvania	132.08	48.34	6.16	8.52	4.58	22.03	0.78	4.32	1.24	0.25	0.46
New Jersey	119.94	46.21	8.39	16.31	4.22	13.78	0.18	2.15	0.95	0	0.22
Ohio	103.3	22.15	3.49	6.37	3.06	6.38	0.26	1.72	0.65	0	0.22
Puerto Rico	95.14	22.93	5.07	8.02	3.73	4.32	0	1.16	0.38	0	0.26
Massachusetts	92.97	23.4	6.23	5.95	2.91	6.19	0.23	0.87	0.69	0	0.33
Other	1303.5	343.74	55.49	108.77	43.5	91.88	3.09	23.32	12.11	2.46	3.07
Total	3368.52	964.71	167.94	303.89	122.18	258.36	7.88	63.71	28.12	4.41	8.25

Table 1. Total and Insured Municipal Debt ($Billions), by State and Insurer (continued from previous page.)

Panel C: May 2015

State	Total	Insured	Ambac	Natl (formerly MBIA)	FGIC	AGM (formerly FSA)	Radian	Assured	XL	BHAC*	Other
California	528.69	118.47	21.57	41.68	2.95	38.58	0	9.77	3.03	0.21	0.67
New York	367.82	41.67	6.71	12.99	1.62	14.43	0	3.48	1.46	0.28	0.72
Texas	307.65	38.15	5.49	9.12	0.46	13.43	0	7.71	1.05	0.55	0.34
Illinois	153.73	42.36	4.86	17.88	0.38	14.72	0	3.06	1.08	0.15	0.23
Florida	137.66	34.06	7.02	9.79	0.42	9.34	0	5.31	1.44	0.39	0.34
Pennsylvania	123.65	31.45	3.54	5.03	0.27	18.2	0	3.06	0.72	0.24	0.4
New Jersey	118.7	30.55	6.06	10.91	0.02	11.09	0	1.75	0.67	0	0.04
Puerto Rico	104.31	24.8	10.47	7.56	1.59	3.74	0	0.91	0.31	0	0.21
Ohio	103.67	11.71	1.9	3.02	0.51	4.57	0	1.26	0.4	0	0.05
Massachusetts	94.23	14.69	4.5	4.04	0.2	4.62	0	0.75	0.38	0	0.21
Other	1242.9	183.71	29.1	58.11	4.07	61.37	0.01	20.34	6.78	2.08	1.92
Total	3283.01	571.62	101.22	180.13	12.49	194.09	0.01	57.4	17.32	3.9	5.13

Source: Bloomberg, accessed September 2010. Totals for states include issuance at state level and by jurisdictions within each state.

* Berkshire Hathaway Assurance Corp.

Table 2. Monoline Insurers' Financial Strength Ratings History, 2007-2008.

Table shows Standard and Poor's Financial Strength rating for primary public finance insurance subsidiary of each firm, as of end of each month. Rating of R means 'under regulatory supervision,' NR means 'Not rated.'

	2007											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Ambac[1]	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
Assured Guaranty[2]	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
CIFG[3]	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
FGIC[4]	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
FSA[2]	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
MBIA[5]	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
Radian	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
Syncora	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA

	2008											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Ambac	AAA	AAA	AAA	AAA	AAA	**AA**	AA	AA	AA	AA	**A**	A
Assured Guaranty	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
CIFG	AAA	AAA	**A+**	A+	A+	**A-**	A-	**B**	B	B	B	B
FGIC	**AA**	**A**	**BB**	BB	BB	BB	BB	BB	BB	BB	**CCC**	CCC
FSA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
MBIA	AAA	AAA	AAA	AAA	AAA	**AA**	AA	AA	AA	AA	AA	AA
Radian	AA	AA	AA	AA	AA	**A**	A	**BBB+**	BBB+	BBB+	BBB+	BBB+
Syncora	AAA	**A-**	A-	A-	A-	**BBB-**	BBB-	BBB-	BBB-	BBB-	**B**	B

1 Ambac filed for Ch. 11 bankruptcy protection in November of 2010.

2 FSA was acquired by Assured Guaranty in July of 2009.

3 CIFG's rating was withdrawn by Standard and Poor's in February of 2010 at CIFG's request.

4 FGIC's rating was withdrawn in April of 2009.

5 The municipal guaranty business of MBIA was spun out into the subsidiary National Public Finance Guarantee in 2009; ratings post-2009 reflect NPFG financial strength.

Table 3. Monoline Insurers' Financial Strength Ratings History, 2009-2010.

Table shows Standard and Poor's Financial Strength rating for primary public finance insurance subsidiary of each firm, as of end of each month. Rating of R means 'under regulatory supervision,' NR means 'Not rated.'

	2009											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Ambac[1]	A	A	A	A	A	**BBB**	**CC**	CC	CC	CC	CC	CC
Assured Guaranty[2]	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
CIFG[3]	**BB**	BB	BB	BB	BB	**CC**	CC	CC	CC	CC	CC	CC
FGIC[4]	CCC	CCC	CCC	**NR**	NR	NR	NR	NR	NR	NR	NR	NR
FSA[2]	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA
MBIA[5]	AA	**BBB+**	BBB+	BBB+	BBB+	**BBB**	BBB	BBB	BBB	BBB	BBB	BBB
Radian	BBB+	BBB+	BBB+	**BBB-**	BBB-	BBB-	BBB-	BBB-	BBB-	BBB-	**BB**	**BB-**
Syncora	**CC**	CC	CC	**R**	R	R	R	R	R	R	R	R

	2010											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Ambac	CC	CC	**R**	R	R	R	R	R	R	R	**NR**	NR
Assured Guaranty	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	**AA+**	AA+	AA+
CIFG	CC	**NR**	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
FGIC	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
FSA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	AAA	**AA+**	AA+	AA+
MBIA	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
Radian	BB-	BB-	BB-	BB-	BB-	BB-	BB-	BB-	BB-	BB-	BB-	BB-
Syncora	R	R	R	R	R	R	**NR**	NR	NR	NR	NR	NR

1 Ambac filed for Ch. 11 bankruptcy protection in November of 2010.

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4 FGIC's rating was withdrawn in April of 2009.

5 The municipal guaranty business of MBIA was spun out into the subsidiary National Public Finance Guarantee in 2009; ratings post-2009 reflect NPFG financial strength.

Table 4. Monoline Insurers' Financial Strength Ratings History, 2011-2012.

Table shows Standard and Poor's Financial Strength rating for primary public finance insurance subsidiary of each firm, as of end of each month. Rating of R means 'under regulatory supervision,' NR means 'Not rated.'

	2011											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Ambac[1]	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Assured Guaranty[2]	AA+	AA+	AA+	AA+	AA+	AA+	AA+	AA+	AA+	AA+	**AA-**	AA-
CIFG[3]	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
FGIC[4]	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
FSA[2]	AA+	AA+	AA+	AA+	AA+	AA+	AA+	AA+	AA+	AA+	**AA-**	AA-
MBIA[5]	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
Radian	BB-	BB-	BB-	BB-	BB-	BB-	BB-	BB-	BB-	BB-	BB-	**B+**
Syncora	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

	2012											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Ambac	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Assured Guaranty	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-
CIFG	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
FGIC	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
FSA	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-
MBIA	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB	BBB
Radian	B+	B+	B+	B+	B+	B+	B+	B+	B+	B+	B+	B+
Syncora	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

1 Ambac filed for Ch. 11 bankruptcy protection in November of 2010.

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3 CIFG's rating was withdrawn by Standard and Poor's in February of 2010 at CIFG's request.

4 FGIC's rating was withdrawn in April of 2009.

5 The municipal guaranty business of MBIA was spun out into the subsidiary National Public Finance Guarantee in 2009; ratings post-2009 reflect NPFG financial strength.

Table 5. Monoline Insurers' Financial Strength Ratings History, 2013-2014.

Table shows Standard and Poor's Financial Strength rating for primary public finance insurance subsidiary of each firm, as of end of each month. Rating of R means 'under regulatory supervision,' NR means 'Not rated.'

	2013											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Ambac[1]	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Assured Guaranty[2]	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-
CIFG[3]	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
FGIC[4]	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
FSA[2]	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-	AA-
MBIA[5]	BBB	BBB	BBB	BBB	A	A	A	A	A	A	A	A
Radian[6]	B+	B+	B+	B+	B+	B+	B+	B+	B+	B+	B+	B+
Syncora	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

	2014											
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Ambac	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Assured Guaranty	AA-	AA-	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
CIFG	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
FGIC	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
FSA	AA-	AA-	AA	AA	AA	AA	AA	AA	AA	AA	AA	AA
MBIA	A	A	A	A	A	A	A	A	A	A	A	A
Radian	B+	B+	B+	B+	B+	B+	B+	B+	B+	B+	B+	B+
Syncora	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

1 Ambac filed for Ch. 11 bankruptcy protection in November of 2010.

2 FSA was acquired by Assured Guaranty in July of 2009.

3 CIFG's rating was withdrawn by Standard and Poor's in February of 2010 at CIFG's request.

4 FGIC's rating was withdrawn in April of 2009.

5 The municipal guaranty business of MBIA was spun out into the subsidiary National Public Finance Guarantee in 2009; ratings post-2009 reflect NPFG financial strength.

6 In December 2014 Assured Guaranty, Ltd. Agreed to acquire Radian Asset Assurance.

Table 6. Characteristics of municipal bond sample.

Sample starts with Mergent municipal bond database, which provides data on bond size, maturity, yield, security (general obligation, revenue, etc), insurance status and insurer. Rating data for the bond and underlying issuer come from S&P. For uninsured bonds for which S&P reports only the instrument credit ratings, we impute an underlying rating equal to the instrument rating.

Group	Count	Average size ($M)	Average maturity	Average yield	Average spread*	GO bond	Revenue bond	New bond	Insured bond	Bond has SPUR**
All bonds	3066500	2.800	9.820	4.063	0.422	0.435	0.204	0.618	0.420	0.399
Insured	1288826	2.127	9.910	4.168	0.266	0.465	0.218	0.606	1.000	0.391
Uninsured	1777674	3.287	9.750	3.978	0.549	0.413	0.194	0.626	0.000	0.405
AAA underlying	180370	4.244	10.810	3.858	0.289	0.535	0.155	0.620	0.011	1.000
AAA underlying + insured	1938	5.438	12.650	4.142	0.178	0.542	0.197	0.635	1.000	1.000
AAA underlying, uninsured	178432	4.231	10.790	3.855	0.291	0.535	0.155	0.620	0.000	1.000
AAA-rated bonds ***	645146	3.248	10.380	3.961	0.270	0.452	0.208	0.627	0.705	0.999
AA underlying	517941	4.040	9.650	3.721	0.364	0.443	0.206	0.612	0.302	1.000
AA underlying, insured	156586	3.555	10.370	3.968	0.230	0.433	0.207	0.626	1.000	1.000
AA underlying, uninsured	361355	4.250	9.340	3.605	0.428	0.447	0.205	0.606	0.000	1.000
AA-rated bonds****	398656	3.956	9.410	3.566	0.457	0.450	0.203	0.590	0.097	0.998
A underlying	439349	3.061	9.910	3.928	0.445	0.369	0.244	0.602	0.668	1.000
A underlying, insured	293506	2.319	10.150	3.916	0.317	0.409	0.243	0.608	1.000	1.000
A underlying, uninsured	145843	4.552	9.430	3.955	0.740	0.288	0.245	0.591	0.000	1.000
A-rated bonds****	145963	4.384	9.610	3.998	0.733	0.284	0.249	0.593	0.051	0.995
BBB underlying	85284	2.902	10.560	4.349	0.670	0.383	0.204	0.641	0.599	1.000
BBB underlying, insured	51124	1.888	10.560	4.085	0.391	0.490	0.182	0.651	1.000	1.000
BBB underlying, uninsured	34160	4.420	10.540	4.782	1.141	0.224	0.238	0.626	0.000	1.000
BBB-rated bonds****	36704	4.071	11.000	4.771	1.067	0.253	0.235	0.630	0.107	0.963

* spread calculated against Bloomberg-reported fair-value AAA curve for matching maturity in month of bond issuance

** includes imputed SPURs; for observations with no bond insurance and with a S&P rating for the instrument, we assume that the SPUR is equal to the S&P rating for the instrument.

Table 7. Stockton, California example

Table shows ratings (numerical and letter, SPUR and bond) for cusip 861361AA1, Stockton California Pension Obligations (Taxable) Series A, issued 04/05/2007 with maturity 09/01/2017. Bond was insured at issuance by FSA.

	Bond rating		SPUR			
Date	Letter	Numeric	Letter	Numeric	Upgrade/ Downgrade variable	Event
200704	AAA	1	A	6	0	Bond issued 4/5/2007
201006	AAA	1	A-	7	1	Stockton SPUR downgraded 6/15/2010
201010	AA+	2	A-	7	0	FSA downgraded 10/25/2010
201107	AA+	2	BBB+	8	1	Stockton SPUR downgraded 7/22/2011
201112	AA-	4	BBB+	8	0	FSA downgraded 12/1/2011
201202	AA-	4	CC	18	1	Stockton SPUR downgraded 2/29/2012
201206	AA-	4	C	19	1	Stockton SPUR downgraded 6/27/2012
201209	AA-	4	D	20	1	Stockton default 9/4/2012

Table 8. Monthly probability of upgrade and downgrade of underlying credit rating by insured status, 1990-2012.

Sample includes monthly observations of all bonds that have S&P underlying ratings, including imputed underlying ratings for uninsured bonds. Table shows the count of monthly observations, as well as the monthly probability of upgrade and downgrade and the ratio of upgrades to downgrades. The bottom half of the table shows coefficients from regressions of an upgrade (-1)/no change(0)/downgrade (+1) categorical variable on dummy variables for insurance status. Model 1 includes no covariates; model 2 includes dummy variables by month; model 3 includes dummy variables by month interacted with a full set of controls for bond type (revenue, general obligation, limited general obligation, etc.) Reported t-statistics adjusted for issue-level clustering. Insured bonds include all bonds insured by financial guarantors; the troubled insurers include all insurers except for Assured Guaranty, FSA, and BHAC. Sample excludes bonds identified by Mergent as having been insured in the secondary insurance market.

Sample: All bonds	All bonds	Uninsured	Insured	Insured - troubled insurers*
Observation count	75,720,450	41,870,555	33,849,895	22,689,176
Upgrade %	0.580	0.404	0.797	0.824
No change %	99.179	99.325	98.999	98.968
Downgrade %	0.241	0.271	0.204	0.208
Upgrades/Changes	0.706	0.599	0.796	0.799
Coefficients and t-statistics from regression of upgrade (-1) no change (0) downgrade (+1) indicator variable on insurance status				
Model 1: no covariates		coef:	-0.0046	-0.0040
		t-stat:	-59.8972	-44.7783
Model 2: Month dummy variables		coef:	-0.0040	-0.0033
		t-stat:	-52.4065	-37.8609
Model 3: Month X bond type (GO, etc) dummy variables		coef:	-0.0034	-0.0028
		t-stat:	-44.5957	-31.9169

* Troubled financial guarantors all guarantors except BHAC, Assured Guaranty, and FSA.

Table 9. Monthly probability of upgrade and downgrade of underlying credit rating by insured status and insurer, 1990-2012.

Sample includes monthly observations of all bonds that have S&P underlying ratings, including imputed underlying ratings for uninsured bonds. Table shows the count of monthly observations, as well as the monthly probability of upgrade and downgrade and the ratio of upgrades to downgrades. The bottom half of the table shows coefficients from regressions of an upgrade (-1)/no change(0)/downgrade (+1) categorical variable on dummy variables for insurance status. Model 1 includes no covariates; model 2 includes dummy variables by month; model 3 includes dummy variables by month interacted with a full set of controls for bond type (revenue, general obligation, limited general obligation, etc.) Reported t-statistics adjusted for issue-level clustering. Sample excludes bonds identified by Mergent as having been insured in the secondary market.

					Troubled guarantors					Less troubled guarantors		
Sample: All bonds		MBIA	Ambac	ACA	CIFG	FGIC	Radian	XL	Other	AGC	FSA	BHAC
Count		8,704,161	6,442,750	65,348	298,476	6,715,523	393,690	59,255	4,865	1,905,595	9,233,475	21,649
Upgrade %		0.804	0.847	0.739	1.126	0.815	0.872	0.672	0.925	0.370	0.818	0.573
No change %		98.977	98.971	99.065	98.728	98.969	98.870	99.197	98.890	99.486	98.974	99.427
Downgrade %		0.220	0.183	0.196	0.146	0.216	0.258	0.132	0.185	0.145	0.208	0.000
Upgrades/Changes		0.785	0.823	0.791	0.885	0.790	0.772	0.836	0.833	0.719	0.797	1.000
Coefficients and t-statistics from regression of upgrade (-1) no change (0) downgrade (+1) indicator variable on insurance status												
Model 1:	coef:	-0.0028	-0.0036	-0.0020	-0.0064	-0.0029	-0.0028	-0.0020	-0.0040	0.0012	-0.0031	-0.0023
	t-stat:	-20.9467	-23.5749	-1.6784	-9.8005	-19.3214	-4.1379	-3.5187	-1.2610	5.7053	-25.0050	-1.2136
Model 2:	coef:	-0.0022	-0.0030	-0.0016	-0.0052	-0.0025	-0.0025	-0.0012	-0.0031	-0.0006	-0.0025	-0.0028
	t-stat:	-16.8971	-19.9973	-1.3358	-7.9886	-17.2033	-3.7587	-2.1493	-1.0424	-3.1332	-20.7189	-1.4073
Model 3:	coef:	-0.0018	-0.0022	-0.0029	-0.0041	-0.0024	-0.0028	-0.0008	-0.0032	-0.0002	-0.0023	-0.0025
	t-stat:	-13.8247	-14.9494	-2.3481	-6.4338	-16.4259	-4.5448	-1.3359	-1.0646	-0.9344	-18.9021	-1.2496

Table 10. Monthly probability of upgrade and downgrade of underlying credit rating by insured status, AA-rated underlying issuers, 1990-2012.

Sample includes monthly observations of all bonds that have AA+, AA, or AA- S&P underlying ratings, including those with imputed underlying ratings for uninsured bonds. Table shows the count of monthly observations, as well as the monthly probability of upgrade and downgrade and the ratio of upgrades to downgrades. The bottom half of the table shows coefficients from regressions of an upgrade (-1)/no change(0)/downgrade (+1) categorical variable on dummy variables for insurance status. Model 1 includes no covariates; model 2 includes dummy variables by month; model 3 includes dummy variables by month interacted with a full set of controls for bond type (revenue, general obligation, limited general obligation, etc.) Reported t-statistics adjusted for issue-level clustering. Sample excludes bonds identified by Mergent as having been insured in the secondary market.

Sample: AA-rated bonds	All bonds	Uninsured	Insured	Insured - troubled insurers*
Observation count	32,812,763	19,708,873	13,103,890	8,866,320
Upgrade %	0.585	0.515	0.691	0.710
No change %	99.169	99.238	99.064	99.061
Downgrade %	0.247	0.248	0.245	0.229
Upgrades/Changes	0.703	0.675	0.738	0.756
Coefficients and t-statistics from regression of upgrade (-1) no change (0) downgrade (+1) indicator variable on insurance status				
Model 1: no covariates		coef:	-0.0018	-0.0020
		t-stat:	-14.8733	-14.3570
Model 2: Month dummy variables		coef:	-0.0013	-0.0015
		t-stat:	-11.0459	-10.9971
Model 3: Month X bond type (GO, etc) dummy variables		coef:	-0.0008	-0.0010
		t-stat:	-7.1614	-7.4011

Table 11. Monthly probability of upgrade and downgrade of underlying credit rating by insured status, A-rated underlying issuers, 1990-2012.

Sample includes monthly observations of all bonds that have A+, A, or A- S&P underlying ratings, including those with imputed underlying ratings for uninsured bonds. Table shows the count of monthly observations, as well as the monthly probability of upgrade and downgrade and the ratio of upgrades to downgrades. The bottom half of the table shows coefficients from regressions of an upgrade (-1)/no change(0)/downgrade (+1) categorical variable on dummy variables for insurance status. Model 1 includes no covariates; model 2 includes dummy variables by month; model 3 includes dummy variables by month interacted with a full set of controls for bond type (revenue, general obligation, limited general obligation, etc.) Reported t-statistics adjusted for issue-level clustering. Sample excludes bonds identified by Mergent has having been insured in the secondary market.

Sample: A-rated bonds	All bonds	Uninsured	Insured	Insured - troubled insurers*
Observation count	24,561,006	7,343,010	17,217,996	11,373,004
Upgrade %	0.786	0.697	0.823	0.865
No change %	99.004	98.944	99.030	98.970
Downgrade %	0.210	0.359	0.147	0.165
Upgrades/Changes	0.789	0.660	0.849	0.840
Coefficients and t-statistics from regression of upgrade (-1) no change (0) downgrade (+1) indicator variable on insurance status				
Model 1: no covariates		coef:	-0.0034	-0.0023
		t-stat:	-22.1918	-16.0538
Model 2: Month dummy variables		coef:	-0.0022	-0.0014
		t-stat:	-14.5142	-9.7208
Model 3: Month X bond type (GO, etc) dummy variables		coef:	-0.0018	-0.0013
		t-stat:	-11.5320	-9.5078

Table 12. Monthly probability of upgrade and downgrade of underlying credit rating by insured status, BBB-rated underlying issuers, 1990-2012.

Sample includes monthly observations of all bonds that have BBB+, BBB, or BBB- S&P underlying ratings, including those with imputed underlying ratings for uninsured bonds. Table shows the count of monthly observations, as well as the monthly probability of upgrade and downgrade and the ratio of upgrades to downgrades. The bottom half of the table shows coefficients from regressions of an upgrade (-1)/no change(0)/downgrade (+1) categorical variable on dummy variables for insurance status. Model 1 includes no covariates; model 2 includes dummy variables by month; model 3 includes dummy variables by month interacted with a full set of controls for bond type (revenue, general obligation, limited general obligation, etc.) Reported t-statistics adjusted for issue-level clustering. Sample excludes bonds identified by Mergent as having been insured in the secondary market.

Sample: BBB-rated bonds	All bonds	Uninsured	Insured	Insured - troubled insurers*
Observation count	4,700,661	1,963,910	2,736,751	1,931,697
Upgrade %	1.090	0.781	1.311	1.257
No change %	98.632	98.872	98.460	98.508
Downgrade %	0.278	0.347	0.229	0.236
Upgrades/Changes	0.797	0.692	0.851	0.842
Coefficients and t-statistics from regression of upgrade (-1) no change (0) downgrade (+1) indicator variable on insurance status				
Model 1: no covariates		coef:	-0.0065	-0.0036
		t-stat:	-17.8720	-9.2831
Model 2: Month dummy variables		coef:	-0.0040	-0.0019
		t-stat:	-10.8376	-4.9158
Model 3: Month X bond type (GO, etc) dummy variables		coef:	-0.0017	-0.0008
		t-stat:	-4.7873	-2.1179

Table 13 Bond lifetime probability of upgrade and downgrade by insured status and credit rating, 1990-2012.

Sample includes one observation per bond, for all bonds that have S&P underlying ratings, including imputed underlying ratings for uninsured bonds. Table shows the count, as well as the lifetime probability of upgrade and downgrade and the ratio of upgrades to downgrades. The bottom half of the table shows coefficients from regressions of an upgrade (-1)/no change(0)/downgrade (+1) categorical variable on dummy variables for insurance status. Model 1 includes no covariates; model 2 includes dummy variables for each year the bond was outstanding; model 3 includes dummy variables for each period the bond was outstanding as well as a full set of controls for bond type (revenue, general obligation, limited general obligation, etc.) Reported t-statistics adjusted for issue-level clustering. Insured bonds include all bonds insured by financial guarantors; the troubled insurers include all insurers except for Assured Guaranty, FSA, and BHAC. Sample excludes bonds identified by Mergent as having been insured in the secondary market.

Sample: All bonds	All bonds	Uninsured	Insured	Insured - troubled insurers *
Observation count	1,196,182	710,289	485,893	291,876
Upgrade %	25.82	16.259	39.796	44.989
No change %	66.65	75.679	53.454	47.556
Downgrade %	7.53	8.062	6.751	7.456
Upgrades/Changes	0.774	0.669	0.855	0.858
Coefficients and t-statistics from regression of upgrade (-1) no change (0) downgrade (+1) indicator variable on insurance status				
Model 1: no covariates		coef:	-0.248	-0.255
		t-stat:	-67.300	-55.550
Model 2: Dummy variables capturing original SPUR		coef:	-0.146	-0.161
		t-stat:	-33.390	-33.280
Model 3: Dummy variables for each year outstanding + dummy variables for bond type, interacted with original SPUR		coef:	-0.040	-0.053
		t-stat:	-8.720	-10.280

* Troubled financial guarantors all guarantors except BHAC, Assured Guaranty, and FSA.

Table 14. Economic magnitude of insured portfolio outperformance, December 2007 through December 2012.

Table presents calculations behind estimated economic magnitude of the insured portfolio outperformance between December 2007 and December 2012. Starting point (columns (1) and (2) is the December 2007 underlying rating distribtion for the uninsured bonds in our sample. Sample excludes bonds identified by Mergent as having been insured in the secondary market. Columns (3) and (4) apply the underlying rating transition matrix estimated on uninsured bonds to column (1); Columns (5) and (6) apply the underlying transition matrix estimated on insured bonds. Estimated yields by credit rating column (7) are from Bloomberg (at AAA, AA+, AA-, and BBB) and imputed. Value loss versus hypothetical AAA yield is estimated for 8-year duration bond, roughly sample median.

			Apply estimated transition matrix							Contribution to loss	
	Dec. 2007 underlying distribution (insured)		Estimated on uninsured bonds		Estimated on insured bonds		December 2012 estimated yield	Spread over AAA yield	Percent loss versus AAA	Uninsured transition matrix	Insured transition matrix
	PDF	CDF	PDF	CDF	PDF	CDF					
Rating	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	=8*(8); (9)	(3)*(9); (10)	(4)*(9); (11)
AAA	1.82%	1.82%	3.5%	3.5%	3.4%	3.4%	2.4%	0.00%	0.0%	0.00%	0.00%
AA+	4.46%	6.29%	9.8%	13.3%	11.6%	15.0%	3.0%	0.61%	4.9%	0.48%	0.57%
AA	17.85%	24.14%	18.1%	31.4%	18.8%	33.8%	3.1%	0.75%	6.0%	1.08%	1.12%
AA-	18.76%	42.90%	19.3%	50.7%	20.7%	54.5%	3.4%	1.03%	8.2%	1.59%	1.70%
A+	17.71%	60.61%	14.2%	64.9%	18.9%	73.4%	4.2%	1.82%	14.6%	2.07%	2.75%
A	20.56%	81.17%	14.7%	79.6%	15.1%	88.5%	4.0%	1.66%	13.2%	1.95%	1.99%
A-	9.63%	90.80%	10.6%	90.2%	5.9%	94.4%	4.1%	1.79%	14.3%	1.52%	0.85%
BBB+	4.12%	94.91%	4.9%	95.1%	2.6%	97.0%	4.8%	2.44%	19.5%	0.95%	0.51%
BBB	3.14%	98.05%	2.5%	97.6%	1.7%	98.7%	4.5%	2.16%	17.3%	0.43%	0.30%
BBB-	1.65%	99.70%	1.5%	99.1%	0.7%	99.4%	5.2%	2.86%	22.9%	0.35%	0.15%
BB+	0.02%	99.73%	0.3%	99.4%	0.2%	99.6%	6.0%	3.64%	29.1%	0.08%	0.05%
BB	0.12%	99.85%	0.2%	99.6%	0.2%	99.8%	6.9%	4.58%	36.6%	0.08%	0.07%
BB-	0.02%	99.87%	0.1%	99.7%	0.0%	99.8%	7.2%	4.81%	38.5%	0.02%	0.01%
B+	0.00%	99.87%	0.0%	99.7%	0.0%	99.8%	5.0%	2.63%	21.0%	0.00%	0.00%
B	0.10%	99.97%	0.1%	99.8%	0.1%	99.9%	7.8%	5.40%	43.2%	0.06%	0.04%
B-	0.02%	99.99%	0.0%	99.9%	0.0%	99.9%	8.5%	6.11%	48.9%	0.02%	0.01%
CCC	0.00%	99.99%	0.1%	99.9%	0.0%	99.9%	8.8%	6.44%	51.5%	0.03%	0.01%
CC	0.00%	99.99%	0.0%	100.0%	0.0%	99.9%	21.3%	18.97%	151.7%	0.01%	0.02%
C	0.01%	100.00%	0.0%	100.0%	0.0%	100.0%	6.4%	4.01%	32.1%	0.00%	0.02%
D	0.00%	100.00%	0.0%	100.0%	0.0%	100.0%	14.2%	11.86%	94.9%	0.02%	0.01%
Sum								0.57%		10.75%	10.18%
Difference											0.57%

Table 15. Regressions of default on bond insurance dummy

Table shows coefficient estimates from linear probability model regression of bond default dummies on insurance status. Default data from Mergent and reflect default of underlying issuer, regardless of whether guarantor stepped in to make payments to bondholers. Ratings data from S&P, Standard & Poor's underlying rating at time of bond issuance. SPURs direct from S&P; for uninsured bonds with bond rating data but no direct SPUR data we impute SPUR, setting it equal to the instrument's rating. Bond type dummy variables include GO, limited GO, revenue, etc. Standard errors adjusted for clustering at the issue level.

Sample: bonds with SPURs	(1)	(2)	(3)	(4)
Insured dummy	0.0006122**	-0.0001531	0.0002889	-0.0000458
	(0.0002434)	(0.0002916)	(0.0002738)	(0.0002978)
Constant	0.0006775***	0.0009868***	0.0008081***	0.0005221***
	(0.000117)	(0.0001614)	(0.0001394)	(0.000156)
N	1208806	1208806	1208806	1208806
r2	0	0.0048	0.0454	0.0458
Controls	None	Initial SPUR	Initial SPUR X bond type	Initial SPUR X bond type, dummy variables for period bond was outstanding
Standard errors clustered by	Issue	Issue	Issue	Issue

Table 16. Texas bonds: insurance fees, rating and default experience, and spreads.

Letter rating (SPUR)	Count, all bonds	Insured bond count	Share insured (as % of total at that SPUR)	Share of insured bonds defaulting (%)	Insured bond average rating change (-1 for upgrade over life, +1 for downgrade, 0 for no change)	Bond insurance fee (% of par)	Insured bond mean spread over Bloomberg AAA GO curve	Uninsured bond count	Share uninsured (as % of total at that SPUR)	Share of uninsured bonds defaulting	Uninsured bond average rating change (-1 for upgrade over life, +1 for downgrade, 0 for no change)	Uninsured bond mean spread over AAA GO curve
AAA	49201	94	0.19%	0.00%	0.64	0.35%	0.38%	49107	99.81%	0.00%	0.07	0.27%
AA+	7201	1303	18.10%	0.00%	-0.58	0.21%	0.30%	5898	81.91%	0.00%	-0.33	0.34%
AA	16272	5857	35.99%	0.00%	-0.47	0.26%	0.26%	10415	64.01%	0.00%	-0.25	0.40%
AA-	13878	8815	63.52%	0.00%	-0.60	0.29%	0.31%	5063	36.48%	0.00%	-0.14	0.50%
A+	16072	13612	84.69%	0.00%	-0.53	0.36%	0.33%	2460	15.31%	0.00%	-0.22	0.59%
A	15795	13126	83.10%	0.00%	-0.52	0.44%	0.32%	2669	16.90%	0.19%	-0.22	0.65%
A-	9624	7634	79.32%	0.00%	-0.61	0.56%	0.32%	1990	20.68%	0.00%	-0.32	0.62%
BBB+	9561	7976	83.42%	0.00%	-0.55	0.90%	0.34%	1585	16.58%	0.00%	-0.15	0.76%
BBB	9993	7849	78.55%	0.00%	-0.55	0.87%	0.39%	2144	21.46%	0.05%	-0.20	1.03%
BBB-	6192	4969	80.25%	0.32%	-0.80	1.14%	0.37%	1223	19.75%	0.00%	-0.40	1.58%
BB+	37	24	64.87%	0.00%	-0.96	3.98%	0.98%	13	35.14%	0.00%	0.31	3.84%
BB	16	0	0	NA	NA	NA	NA	16	100.00%	25.00%	-0.50	4.22%
BB-	0	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA
B+	0	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA
B	5	0	0	NA	NA	NA	NA	5	1	0	0	NA
B-	0	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA
CCC	0	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA
CC	0	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA
C	0	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA
D	0	0	NA	NA	NA	NA	NA	0	NA	NA	NA	NA
Total	153847	71259	46.32%	0.02%	-0.56	0.55%	0.33%	82588	53.68%	0.01%	-0.06	0.38%