EUROPEAN CENTRAL BANK

WORKING PAPER SERIES

WORKING PAPER NO. 76

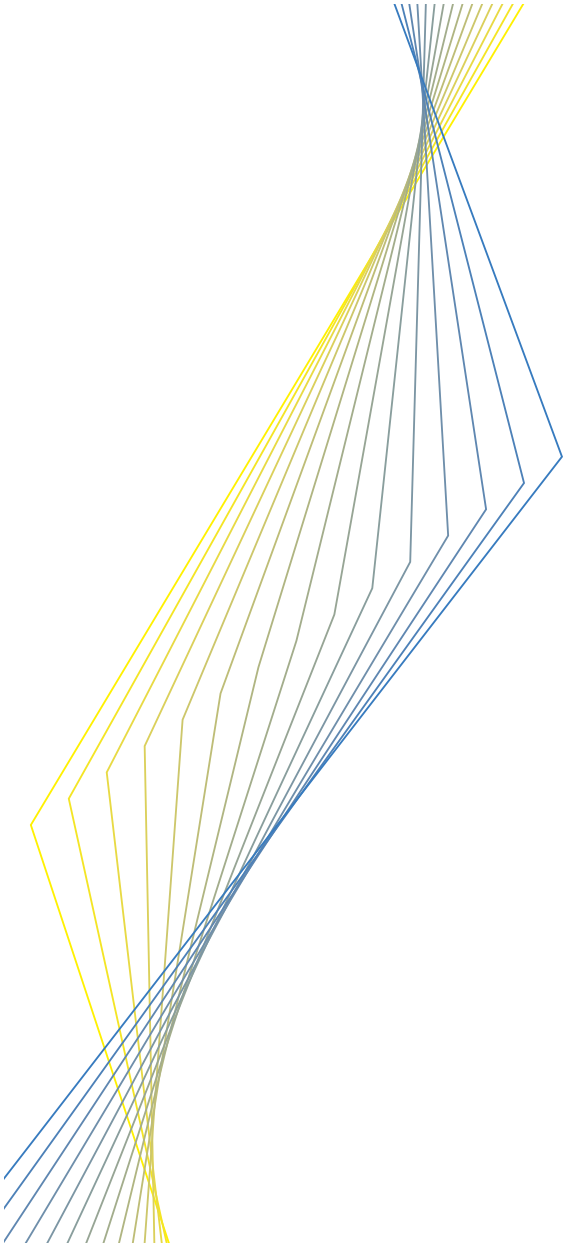
RATING AGENCY ACTIONS AND THE PRICING OF DEBT AND EQUITY OF EUROPEAN BANKS: WHAT CAN WE INFER ABOUT PRIVATE SECTOR MONITORING OF BANK SOUNDNESS?

BY REINT GROPP AND ANTHONY J. RICHARDS

August 2001

EUROPEAN CENTRAL BANK

WORKING PAPER SERIES



WORKING PAPER NO. 76

RATING AGENCY ACTIONS AND THE PRICING OF DEBT AND EQUITY OF EUROPEAN BANKS: WHAT CAN WE INFER ABOUT PRIVATE SECTOR MONITORING OF BANK SOUNDNESS?

BY REINT GROPP AND ANTHONY J. RICHARDS[1]

August 2001

1 *European Central Bank and International Monetary Fund, respectively.* *The views expressed in this paper are strictly those of the authors and not those of their respective institutions. Research assistance by Sandrine Corvoisier and Peter Tran is gratefully acknowledged. We are grateful to an anonymous referee, Paola Bongini, Vitor Gaspar, Patrick Honohan, Alessandro Prati and participants at the "Conference on Capital Adequacy Requirements: Impact and Evolution" at the Banca Monte dei Paschi di Siena in December 2000 and at the European Central Bank for comments.*

Address	**Kaiserstrasse 29**
	D-60311 Frankfurt am Main
	Germany
Postal address	**Postfach 16 03 19**
	D-60066 Frankfurt am Main
	Germany
Telephone	**+49 69 1344 0**
Internet	**http://www.ecb.int**
Fax	**+49 69 1344 6000**
Telex	**411 144 ecb d**

ISSN 1561-0810

Contents

Abstract

The recent consultative papers by the Basel Committee suggest an explicit role for external rating agencies in the assessment of the credit risk of banks' assets. In this context, an assessment of the information contained in credit ratings is important. We address this issue via an event study of rating change announcements by leading international rating agencies, focussing on a sample of European banks. We find no evidence of announcement effects on bond prices. We are largely able to exclude lack of liquidity as an explanation for this puzzling result and suggest some alternatives, such as "too-big-to-fail." For equity prices, we find strong effects of unexpected ratings changes and confirm prior evidence that stock prices may react very differently to ratings downgrades, depending on the underlying reason. Overall, our results suggest that ratings agencies may perform a useful role in summarising and obtaining non-public information on banks, at least for stockholders.

JEL classification system: G21, G14, G18

Keywords: bond ratings; event study; banks; abnormal returns

Non-technical Summary

The changes to the regulatory framework proposed by the recent consultative papers of the Basel Committee on Banking Supervision include as part of the "standardised approach" the introduction of banks specific ratings as a basis for risk weights in the calculation of regulatory capital. In this paper, we examine the information content of changes in ratings for a sample of European banks. We estimate abnormal returns for stock and bond prices, controlling for expected versus unexpected ratings changes, contaminating information and consensus versus diverging ratings changes. For equity prices, we find strong effects of unexpected, consenting ratings changes, although some of our results may suffer from contamination by other contemporaneous news events. If we make the distinction between a ratings change motivated by a change in the earnings outlook of a bank versus an increase in volatility, we find strongly negative abnormal returns in the first case. In contrast, a downgrade motivated by an increase in risk results in a positive abnormal return in the second. We also find a much larger price reaction to ratings changes that establish a consensus than vice versa. We do not detect any significant relationship between ratings changes and bond returns, both overall and for any of our subgroups. We caution, however, against concluding that ratings have little or no impact on bond prices and therefore, ratings may contain little or no informational value. We explore a number of alternative explanations. One, our data may suffer from a infrequent trading or stale price quotes. If this were the case, actual, unobserved bond prices would adjust to the event instantaneously, but the data would exhibit a pattern that would suggest that the adjustment takes place over an extended period of time as price quotes only slowly adjust. We find little evidence of this in the data. Second, pre-announcement leakage would suggest that the absence of announcement effects is due to information about the ratings change or about the factors that prompted the change becoming public before the ratings change is announced. This could explain the absence of announcement effects. We, however, find pre-announcement leakage that is small and insignificant and of the wrong sign for both upgrades and downgrades. Further, we divided our sample of bonds in three different ways in an attempt to focus on more liquid bonds. We concentrated, first, on bonds from the 10 largest banks in the sample, second, on ratings changes that occurred in 1999 and 2000, based on the conjecture that liquidity may have improved more recently, and third we concentrated on bonds included in the corporate bond indices of a major bond database, since such indices focus on the larger and more liquid issues. All three attempts did not provide any evidence of price impacts from ratings announcements. To provide further evidence on data quality we also tested whether or not our estimates of abnormal returns may be affected by nontrading effects, due to infrequent trading

or infrequent updating of prices. While we do not find any evidence of non-trading effects for stock data, we did find some evidence of such effects in bond data, but a re-estimation of the market model including a one-period lag of the market return yielded no change in the lack of response in bond prices. Given the strong results for stock prices, we offer two explanations for the failure of bonds to respond to ratings changes. One, bond prices do not react to ratings changes, because bondholders believe –rightly or wrongly- that they would be bailed out in any event, if the bank were to run into serious problems. Given that the banks in the sample are all large, we cannot rule out that "too big to fail" is the driving force behind our "non-result." Second, we cannot exclude the possibility that the reason for the result is that all banks in our sample were quite far away from the default point. It has recently been suggested that bond prices stay stable in the face of considerable stock price volatility and only react close to default. If this is the case, the evidence in this paper would not necessarily suggest that implicit safety net prevents meaningful monitoring by bondholders. Although inconclusive, the apparently relatively weak monitoring by bondholders raises some doubts regarding the effectiveness of a subordinated debt requirement as a supervisory tool in the European context. The workability of subordinated debt requirements would be strongly dependent upon to what extent bondholders believe that banks can fail, in addition to a careful implementation of the other features of Calomiris' [1999] proposal. Our paper also raises the possibility that, in the context of stock markets, due to relatively lax disclosure requirements of banks in some European countries, rating agencies can perform an important role in bringing information to the market.

1. Introduction

The changes to the regulatory framework proposed by the recent consultative papers of the Basel Committee on Banking Supervision[2] include as part of the "standardised approach" the introduction of banks specific ratings as a basis for risk weights in the calculation of regulatory capital. Under the rules currently in place, the weights for claims on banks are entirely determined by whether the bank is based in an OECD or a non-OECD country. This has been widely criticised as too broad-brush, giving incentives for regulatory arbitrage, and ultimately inducing additional instability into the banking sector. The consultative paper attempts to address some of these criticisms by proposing two options under the standardised approach to the calculation of regulatory capital. Under option 1, the risk weight of banks would be determined by the bank's country of incorporation, with the bank receiving a risk weight one category worse than the country. Under option 2, the bank's risk weight is determined by its own rating.[3] This proposal, however, also raises a number of questions, including the relatively favourable treatment of unrated banks relative to poorly rated banks. In this paper we focus on the informational relevance of bank ratings, in the sense of how much additional information a rating by a major ratings agency conveys relative to the information already contained in bank bond and stock prices.

Bond ratings are designed to measure default risk only, not the risk of price changes due, for example, to shifts in expectations about monetary policy or inflation. There are two alternative views of the information about default risk in the ratings produced by agencies. One view is that the rating agencies have access to publicly available information only and that the agencies generally lag the market in processing that information. According to this view, bond ratings should not affect market prices, if capital markets are efficient in semi-strong form. Proponents of this view argue that the frequency with which rating agencies review companies is too low even to generate timely summaries of relevant public information. An alternative view is that rating agencies are specialists at obtaining (including from the management of the rated companies) and processing information, and thereby generate information on default risk that was not previously in the public domain. Consequently, based on this view, rating changes should affect security prices. Clearly, there is a much stronger case for the use of ratings in bank supervision if the latter rather than former view is correct.

Our examination of the information content of bank ratings is in part motivated by Altman and Saunders [2001], who raise a number of issues regarding the use of ratings systems in the reformed capital adequacy framework as proposed in the consultative papers. Altman and Saunders [2001] criticise the use

[2] See Basel Committee on Banking Supervision [2001].
[3] The second option would also allow for lower risk weights on short-term claims on banks. The risk weights would rang from 20 percent for claims on banks in countries rated AAA or AA, 50 percent for banks in countries rated A, 100 percent for banks in unrated countries or countries rated BB or B, to 150 percent for banks in countries rated CCC or below.

of ratings, arguing that ratings agencies move slowly and that their ratings are often inflexible. Their results suggest that the ability of ratings to predict default is poor and, hence, that their usefulness as a basis for the calculation of risk weights is limited. They (and others) have also noted that credit ratings tend to be cyclical, falling during recessions and after credit quality has already declined. This implies that banks would be required to increase capital (or cut lending to borrowers) when the economy and health of borrowers are most fragile—this clearly falls short of the ideal whereby banks would build-up capital prior to declines in the credit quality of their portfolios. They also argue that credit spreads are much more accurate leading predictors of default rates. Their arguments suggest that rating agencies provide little if any new information to the market, but rather reflect information already incorporated in market prices. This paper attempts to test this question for a sample of European banks.

The paper is also related to recent proposals (e.g. U.S. Shadow Financial Regulatory Committee [2000], Calomiris [1999]) to replace or supplement mandatory capital requirements with mandatory subordinated debt requirements. Calomiris [1999] argues that a subordinated debt requirement would expose banks to the discipline of the market, especially if the subordinated debt requirement were to be supplemented by a requirement that the bank is to issue new subordinated debt on a regular basis. If the issuing banks' asset quality is perceived to have deteriorated, the spread that the bank's debt would increase, giving strong disincentives to take on additional risk.[4] It is difficult to provide empirical evidence on Calomiris' proposal. This paper may have insofar a bearing on the issue in that it provides a test of the responsiveness of bond prices to news, although we use secondary market data, rather than primary market data as envisaged by Calomiris. If bond prices do not react to ratings changes, because banks are perceived to be implicitly insured ("too big to fail"), the effectiveness of a subordinated debt requirement would depend on re-assurances that a bail out will not take place under any circumstances. Of course, Calomiris embedded his subordinated debt proposals in a new and quite different regulatory and supervisory environment, which we are obviously unable to replicate.

A further motivation for the paper comes from the fact that there are no studies using European data analysing the impact of ratings changes on bond or stock prices. A test for European banks is a useful sensitivity test to the earlier studies using U.S. data. Further, the question of the role of external ratings has been especially criticised in the European context on the grounds that the penetration of ratings in Europe is much lower than in the Anglo-Saxon world. Hence, the use of external ratings in bank supervision may create a playing field that is unfairly tilted towards countries with a longer tradition of external ratings. This suggests that event studies of the sort conducted in this paper may be of particular relevance in Europe.

[4] Alternatively or in addition, bondholders may step in and assume managerial responsibility, when the bank's condition deteriorates (Dewatripont and Tirole [1993])

In this paper we examine the information content of changes in ratings for a sample of European banks. We estimate abnormal returns for stock and bond prices, controlling for expected versus unexpected ratings changes, contaminating information and consensus versus diverging ratings changes. For equity prices, we find strong effects of unexpected, consenting ratings changes, although some of our results may suffer from contamination by other contemporaneous news events. In contrast, we find little announcement effects on bond prices and examine a large number of alternative reasons for this finding. We also test for pre-announcement and post announcement effects, but find little evidence of either. Overall, our results suggest that ratings agencies may perform a useful role in summarising and obtaining non-public information on banks, although bond prices do seem to react to this information. We offer a number of explanations for this finding.

The remainder of the paper is organised as follows. In section 2 we summarise the relevant previous literature. In section 3, we present some of the conceptual issues in the context of analysing the effect of ratings on bond and stock prices. Section 4 describes the data and the empirical methodology. In Section 5 we present the results, and we assess the robustness of the results in Section 6. Section 7 concludes.

2. Previous Literature

This paper is related to a number of related strands of literature. There is a voluminous body of literature investigating the effect of ratings changes on corporate stocks and bonds—though not specifically banks as in our paper. Early studies (e.g. Pinches and Singleton [1978]) using monthly data tended to find mixed evidence on the announcement effect of ratings changes. Studies using daily data have been more successful at detecting impacts. For example, the results of Hand et al. [1992] suggest that bond prices respond negatively to downgrades and positively to upgrades. These results apply both to actual ratings changes and prospective ratings changes, which are signalled by putting the company on "credit watch." This study would imply, therefore, that ratings agencies' assessment matter for market participants and that ratings agencies produce analysis and information that was not previously fully in the public domain. Goh and Ederington [1993] analyse the impact of ratings announcements on stock prices rather than bond prices, using a sample of U.S corporates. They find that ratings downgrades associated with deteriorating firm prospects result in a negative effect on stock prices. In contrast, downgrades associated with an increase in leverage result in positive effects on stock prices, as an increase in leverage shifts wealth from bondholders to shareholders.

Most recently, in a very interesting paper, Kliger and Sarig [2000] make use of Moody's refinement of its ratings system in 1982. The refinement, which introduced sub-partitions to their previous ratings system

was not associated with any fundamental change in issuers' risk and was carried out simultaneously for all bonds. The authors find that this purely technical refinement resulted in abnormal returns around its announcement date, which would suggest that ratings per se contain some informational value. It also suggests that market participants tend to believe that ratings agencies have access to some non-public information or have a comparative advantage in processing public information.

There are also at least two U.S. studies, which investigate the question of whether ratings changes matter specifically for banks. As Schweitzer et al. [1992] argue, there are reasons to think that ratings changes might have a different impact on banks as highly regulated entities, as opposed to corporates. They note that the regulation of an industry may increase the amount of information available to the market. If so, the informational value of firm-specific events may be less for highly regulated firms. Indeed, Wansley and Dhillon [1989] and Plonchek et al. [1989] find that the announcement effect of new security issues is smaller for banks than for industrial firms, and Asquith and Mullins [1986] report analogous findings for equity issues made by public utilities. On the other hand, Schweitzer et al. [1992] note that bank regulators may withhold adverse information in order to sustain depositor confidence in a troubled bank and avoid bank runs and/or because the existence of a troubled bank may reflect badly upon the regulator's performance. If so, abnormal returns associated with unfavourable bank debt rating changes would be more pronounced than those for industrial firms.

Against this background, for a sample of U.S bank holding companies Schweitzer et al. [1992] find statistically significant effects around the announcement date of ratings changes. While the effects are statistically significant, they are small, as ratings downgrades are associated with abnormal returns of about 1.5 percent. This is small in comparison to pre-announcement abnormal returns in the order of magnitude of 10-20 percent. They find even smaller abnormal returns for upgrades, of around 1 percent. The authors also test whether the effect of ratings changes on banks is statistically different from those on corporates. While for upgrades they find no statistically significant difference, for downgrades banks appear to react significantly more than corporates. This lends credence to the hypothesis that bank regulators do indeed withhold negative information from market participants, and that bond rating agencies perform some role in bringing adverse information about banks to the capital market. Billet et al. [1998], also in a sample of U.S. bank holding companies, confirm the negative announcement effect of downgrades. Interestingly they argue that the share of insured deposits in total liabilities is the most important variable in explaining abnormal returns and conclude that banks can shield themselves from the full costs of market discipline through increases in insured deposits. Finally, a recent paper by Richards and Deddouche [1999] analyses the effect of ratings changes for banks in emerging markets and finds that stock prices do not respond or respond counterintuitively to announcements of ratings changes.

Some related evidence on the role of market discipline in bank behaviour is provided by Simons and Cross [1991], who show that stock market returns gave little advance warning to regulators in case of 22 U.S. bank holding companies, whose CAMEL ratings were downgraded by regulators between 1981 and 1987. On the other hand, Berger and Davies [1998] find that in the eight-week window following (unannounced) CAMEL rating downgrades, the stocks of affected banks on average showed cumulative negative abnormal returns of nearly 5 percent. This finding is consistent with the notion that supervisors uncover information during examinations, which subsequently either leaks to the markets or is reported via the normal reporting process. Further, Berger et al. [2000] show that confidential supervisory assessments have explanatory power with respect to rating agency assessments. However, they also find that bond ratings can help predict supervisory assessments, and that both combined are more accurate in predicting future bank performance than supervisory assessments alone. Overall, Berger et al. conclude that all parties—supervisors, rating agencies and the market—produce valuable complementary information, which may improve corporate governance of banks. In the European context, Sironi [2000] analyses the predictive power of ratings for credit spreads on subordinated debt using a unique dataset of subordinated debentures credit spreads. He finds that credit ratings are a more powerful predictor of credit spreads than accounting variables.

3. Theory and Hypotheses

In addition to outright changes in ratings, Hand et al. [1992] have stressed that it is important to also consider the information contained in the "credit watch list." Companies are added to the credit watch list, if the rating agency believes that a rating change is likely. This information is supplemented by the expected direction of the change, e.g. there may be "indicated upgrades", "indicated downgrades" or "developing." The credit watch would indicate "developing," if a ratings change of unknown direction is likely. In this paper, we follow Hand et al. [1992] and use credit watches in two ways. First, we examine abnormal returns around credit watches, testing whether they contain market relevant information. Second, we use them as a means of distinguishing between anticipated and unanticipated ratings changes. As in Hand et al. [1992] we argue that a ratings change that is preceded by a ratings watch in the same direction should be largely anticipated and, hence, should not necessarily be associated with a reaction in market prices.

Insofar as bond ratings convey new information to the market, the expected effect of a ratings downgrade (upgrade) on bond prices is clear: In case of a downgrade (upgrade), the bond price should fall (rise). However, Goh and Ederington [1993] point out that the issue is less straightforward for equity prices. They argue that a rating downgrade would be expected to have a negative impact on stock prices if the ratings agency possesses new negative information about the firm's earnings or sales. A downgrade should be good news for stockholders, however, if it reflects the anticipation that the firm will take

actions that transfer wealth from bondholders to stockholders. In particular, one would not expect a negative reaction if a bond were downgraded in response to an anticipated increase in leverage. Hence in our empirical analysis we will examine the reaction of stock prices to ratings changes conditional on the reason for the ratings change.

We also follow the previous literature (e.g. Hand et al. [1992], Richards and Deddouche [1999]) in distinguishing between "contaminated" and "uncontaminated" ratings changes. We consider a ratings change as contaminated, if there were earnings announcements or other relevant news stories around the announcement. Our definition then would consider a ratings change uncontaminated when no such news occurred during this short period. We make this distinction, in order to ensure that the stock or bond price reaction is in fact due to the ratings change and not due to the confounding event (including another rating change that immediately precedes).

Finally, we analyse the issue of deviating and consenting ratings changes. In our empirical analysis we use the ratings of three major ratings agencies, Standard and Poor's, Moody's and Fitch IBCA. We consider a ratings change to be deviating, if after a consensus rating of all agencies, one of the agencies deviates from this consensus. In contrast, a ratings change will be considered as consenting, if a rating is changed by one of the agency towards the already existing ratings by the other two. Our expectation is that a deviating ratings change may have a larger impact on prices than a ratings change that aligns one agency with the other two.

In summary, we test the following hypotheses:

- Are unexpected downgrades (upgrades) associated with positive (negative) abnormal returns in bond prices?
- Do bond prices react differently to expected versus unexpected ratings changes?
- Do bond and stock prices react differently to rating downgrades than upgrades, i.e. is the information contained in external ratings particularly relevant in the context of bad news?[5]
- Are unexpected downgrades (upgrades) associated with positive (negative) abnormal returns in stock prices, conditioning on the fact that the reason for the ratings change is a change in the bank's financial prospects or performance?
- Are unexpected downgrades (upgrades) associated with negative (positive) abnormal returns in stock prices, conditioning on that the reason for the ratings change is a potential shift in wealth from bondholders to stockholders?

[5] A major reason for testing this is the notion that management has strong incentives to announce good news to the market but may be less likely to convey bad new to the market: hence there is a potentially greater role for rating agencies in discovering negative news about the bank.

- Is there a statistically significant difference between the effect on bond and stock returns of "consenting" and "diverging" ratings changes?

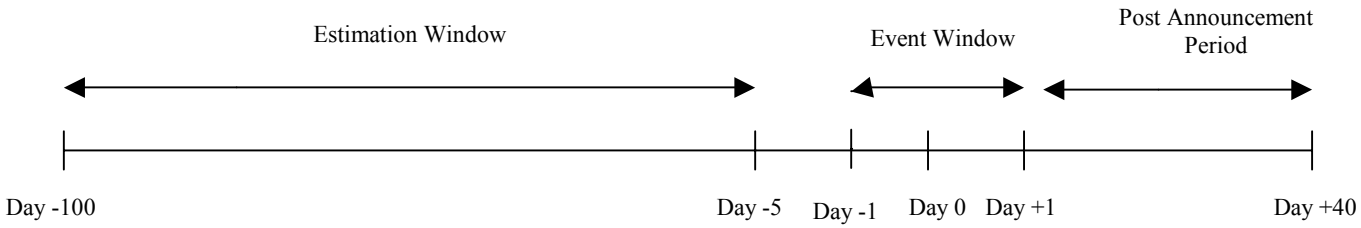
4. Data and Estimation Method

We started compiling our data set by using the Bloomberg database to identify banks that experienced ratings changes, were listed at a major European stock exchange, and also had a major subordinated debt instrument outstanding. We concentrated on the long term bond rating of Moody's and Fitch/IBCA and Standard and Poor's local and foreign currency long term bond ratings. We attempted to focus on subordinated bonds with larger amounts outstanding, in order to ensure some liquidity in the trading of the instrument and we limited ourselves to analysing straight debt instruments.[6] Whenever feasible, we aimed for bonds of at least five years in remaining maturity and focussed on fixed rate rather than variable rate bonds. We supplemented this information by data contained in the databases of ratings agencies themselves, as Bloomberg's coverage of ratings and ratings changes turned out to be incomplete. Once appropriate events were identified, we obtained daily stock and bond price data for 100 trading days before the ratings change and 40 days after. In order to distinguish between expected and unexpected events, we identified whether the ratings change occurred after a ratings watch in the same direction, i.e. whether a downgrade (upgrade) occurred after a negative (positive) outlook notice. If so, we designate the ratings change as expected. We also analyse the ratings watches as separate events. Further, in order to identify contaminated ratings changes, we scanned news stories in Bloomberg one day before, one the day of the event and one day after the ratings change for news regarding the bank. If we identify a story, which revealed the reasoning for the ratings change, we consider the event as contaminated. Finally, as discussed above, the reason for the ratings change may matter for the effect of ratings changes on stock prices. Hence, for each ratings change we attempted to identify its reason, as given by the ratings agency, which we also obtained from Bloomberg.

With the event specified as day 0, we defined the period from –1 to +1 as the event window, the period from –100 to –6 as the estimation window and the period from +2 to +40 as the post-announcement period. This set up gives us about five months of data to estimate the market model. Including data after the event allows us to analyse the post-announcement performance of the bonds and stocks in the sample.

[6] There is, of course, the general problem that bonds are typically less liquid that stocks, and that the reported prices are often indicative quotes rather than actual trades. Even in the United States, which has a very active corporate bond market, corporate bonds are relatively illiquid and it can be hard to get accurate up-to-date pricing of all but a few benchmark issues. The prices we use are the midpoint of the bid and ask closing prices reported by Bloomberg. Because the prices reported by any particular market maker may not be exactly current, Bloomberg calculates indicative prices based on the quotes from several different market makers. In searching for prices, we encountered the problem, which has previously been mentioned by Goh and Ederington [1992] that some bond prices reported in Bloomberg are not market prices, but rather are actually predicted prices. The calculation is performed using, inter alia, ratings as an input. We carefully checked our data in order to avoid this problem and are reasonably confident that none of the prices in this paper are in fact imputed.

We defined the event window somewhat wider than just one day, because we do not have information on the announcement time and, hence, it is impossible for us to determine whether the announcement was done before trading, during trading or after trading on a given day.



We use the estimation window to estimate a standard market model, in which we use the respective stock market index (for stock returns) and the government bond index (for bond returns) of the country as the market indicator.[7] We considered using a multifactor model, which would have included the sector specific stock market index for bank stocks in the respective country, but were unable to obtain consistent data for all countries.[8] In addition, we were concerned that other banks may be affected by the event that we are studying, in which case the results would be biased against finding significant abnormal returns.

We estimate for each event i

$$R_{it} = \alpha_i + \beta_i R_{cmt} + \varepsilon_{it} \qquad (1)$$

where R_{it} denotes the log return of asset (bond or stock) i in period t and R_{cmt} denotes the log return of the market portfolio *m*, in country *c*, in period *t*. (1) is estimated using the data from –100 to –6.[9] Using the data for the event widow, (-1 to +1), we then calculate the abnormal return as

$$AR_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_{cmt} \qquad (2)$$

Using the abnormal return obtained in (2) we calculate the average abnormal return as

$$AAR_t = \frac{1}{n}\sum_{i=1}^{n} AR_{it} ,$$

[7] For bonds, the market indices that we used were the JP Morgan government securities total return index or the corresponding Morgan Stanley indices, typically for maturities of 3-5 or 5-7 years.
[8] See MacKinlay [1997] for a comprehensive overview over the different estimation methods.
[9] As we estimate the model with daily data, it is likely that non-normality, for example in the form of excess kurtosis is present in the data. Cable and Holland [2000] point out that robust estimation will not necessarily solve this problem, but that averaging over events, as we do, will generally remove it.

where n represents the number of events and $\hat{\alpha}_i$ and $\hat{\beta}_i$ are the estimated coefficients from (1). We follow the previous literature and calculated the average abnormal return for the event window (AAR) across events and the cumulative average abnormal return (CAAR).[10] In order to evaluate the statistical significance of the average abnormal returns in the event window, we use the standard deviation of the average abnormal return in the estimation window, which is denoted by

$$s(AAR_t) = \sqrt{\frac{1}{94}\sum_{t=-100}^{-6}(AAR_t - \overline{AAR})^2}, \forall t \in [\tau_1, \tau_2] \ ,$$

where τ_1, τ_2 is the time interval under consideration. Under the assumption of i.i.d. normally distributed abnormal returns, the ratio of the average abnormal return to the standard deviation is distributed as a Student's t with n degrees of freedom. Further, under these assumptions, the standard deviation of the CAAR is given by $s(AAR_t)$ multiplied by the square root of the number of periods in the cumulated return.

5. Descriptive Statistics

Our sampling procedure yielded a sample of 186 events, of which bond data were available for 129 events and stock data were available for 163 events.[11] The events involve a total of 32 banks and span the period from 1989 to 2000. This relatively small number of banks in our sample relative to the universe of European banks of about 8000 highlights a number of salient features of European banking. First, ratings penetration is relatively limited. Second, significant segments of the banking sector did not enter our analysis, because they did not experience a ratings change. For example, the entire savings banks sector ("Sparkassen") in Germany is rated AAA, as it continues to enjoy a full government guarantee.[12] And third, while we were able to obtain ratings for more banks than reflected in this sample, the availability of bond data, which satisfied our requirements in terms of liquidity and size, was severely limited.

Table 1 gives a breakdown of the sample by country. The sample includes banks from all 15 European Union members, except Luxembourg, Sweden, Greece and Portugal. The larger countries are represented with 3 (Italy) to 7 (France) banks and with up to 31 events (France). While we were concerned about the

[10] Using the abnormal return obtained in (2) we calculate the average abnormal return as

$$AAR_t = \frac{1}{n}\sum_{i-1}^{n} AR_{it} \ ,$$

where n represents the number of events. Then summing across time, we obtain the cumulative average abnormal return for any time period τ_1 to τ_2 or

$$CAAR_{\tau_1,\tau_2} = \sum_{i=\tau_1}^{\tau_2} AAR_t \ .$$

[11] For a number of events, we were able to either obtain bond data but no stock data or vice versa.

[12] The guarantee currently faces a legal challenge in a European court. The suit was brought forward by private sector competitors, on the grounds that it gives the "Sparkassen" an unfair advantage, in particular in terms of funding.

relatively small sample size, our sample size is well in line with those reported in the literature. In Richards and Deddouche [1999], for example, the estimation is performed with 219 ratings changes, in Schweitzer et al. [1992] it is only 18. Note, however, that when considering some of our refinements, i.e. when we look at the effect of an expected downgrade on stock prices, where the downgrade is motivated by a deterioration in earnings (as opposed to an increase in leverage), sample sizes may be further reduced.

Table 2 provides additional information on our sample by providing a breakdown by year, upgrade/downgrade/credit watch and also gives some information on relevant characteristics of the events. The increase in the number of events over time is primarily a reflection of the increasing coverage of ratings agencies in Europe during the 1990s. In total, the sample consists of 112 downgrades and 74 upgrades, including 43 "negative" ratings watches and 31 "positive" watches, respectively. The frequency of ratings watches also increases greatly over time. Our sample is relatively balanced with regards to its composition by ratings agency, with events driven by a change in ratings of Moody's somewhat in excess of one third of all events and Standard & Poor's and Fitch IBCA splitting the remainder.

Of the 112 downgrades, about twenty percent are expected, where we define an expected downgrade as one which was preceded by a "negative" ratings watch.[13] The proportion of upgrades that were preceded by a ratings watch is somewhat smaller, at about 15 percent. The data presented in Table 2 also highlight that ratings agencies have a tendency to move relatively carefully. Of the total of 186 events, ratings were adjusted by more than one notch only 6 times, five times in case of downgrades and only once in case of upgrade. We were also interested in the proportion of cases, in which a ratings agency decided to move away from an established consensus. Recall that we defined a consensus as the agreement of two or more ratings agencies on the rating. If in such a case one of the ratings agencies decided to change its rating, we called that a diverging ratings change. Our sample contains 39 such cases, involving 23 downgrades and 16 upgrades.

As discussed above, when analysing the effect of ratings changes on stock prices, it may be important to understand the reasoning behind the change. We were able to ascertain the reason for the ratings change in 131 of the 186 events from Bloomberg. Of the 131 cases we attempt to distinguish between a ratings adjustment that is based on a deterioration or improvement in the earnings outlook and a ratings adjustment that is based in an increase or reduction in the riskiness of the bank's overall strategy. We

[13] It should be noted that the agencies also assign "outlooks" to their ratings. Whereas ratings watches indicate a substantial probability of a rating change in the near future, rating outlooks merely indicate a possible direction for the rating in the medium term. We do not include changes in outlooks as events in this paper.

found that the Bloomberg story (or other sources) about the ratings change did not always contain enough information to make this distinction in a fully accurate manner. Hence, we decided to code all ratings changes due to merger activity as events which reflect a change in the riskiness of the bank's strategy and therefore may be good news for shareholders and bad news for bondholders, or vice versa. Using this criterion we found that of the 131 ratings changes, 50 were due to a merger announcement. The remaining 81 events were prompted by a change in the earnings outlook.

Finally, in the empirical analysis it is quite important to ensure that there are no contaminating news stories in the event window. If there are, the estimates of the information content of ratings changes may be biased upward, as asset prices may have reacted to the other news rather than to the ratings change. We used Bloomberg to check whether in the event window (i.e. from –1 to +1), there were relevant news stories in Bloomberg. We found a relevant news story in 70 of the 186 events in our sample. Note that by excluding all contaminated events we may introduce a downward bias into the results, in the sense that the release of this information may have been prompted by the expectation of the downgrade or upgrade of the firm. Put differently, the bank may not have made this information public had it not known that the ratings agency would be releasing the information in any event. In this regard, ratings agencies may perform a useful public service, by "forcing" banks to release information, especially negative news. Our analysis is, however, not able to determine how important or prevalent this function is.

6. Results

The results are reported in Tables 3 and 4. Table 3 contains average abnormal returns for the event day only, while Table 4 reports cumulative average abnormal returns for a slightly extended event window (days -1 to +1). Both tables break the results down by bond and stock returns. We report results for upgrades and downgrades separately, as well as together[14], partially motivated by our objective to maintain more reasonable sample sizes. In addition, there are breakdowns by the reason for the ratings change for stocks and by a number of different categories, such as expected vs. unexpected, contaminated vs. uncontaminated and diverging vs. consenting for both bonds and stocks. For all groups and sub-groups we report the sample size.

We do not detect any significant relationship between ratings changes and bond returns, both overall and for any of our subgroups. The estimated abnormal returns (or price impacts) associated with ratings changes are always very small, and although the standard error of average abnormal returns is low (which

reflects the low volatility of daily bond returns), the estimated abnormal returns are never statistically significant. One is tempted to conclude that ratings have little or no impact on bond prices and therefore, ratings may contain little or no informational value. Markets apparently do not react to ratings changes when pricing bonds. However, we would caution against drawing firm conclusions from the results, as they may equally well be explained by a number of other factors. These may include poor data quality, widespread implicit safety nets or may be the result of the generally relatively thin and illiquid bond markets in Europe during segments of our sample period. Further, we can also not exclude the possibility that bond prices only react close to the default point to information. This possibility has been raised recently in the literature, for example in market reports (e.g. Credit Suisse First Boston [2001]) and in the academic literature (Gropp, Vesala and Vulpes [2001]).[15] Some of these candidate explanations will be further explored below.

Taking the signs and magnitudes of the estimates at face value (and abstracting from the issue of significance), we do find some sensible results for the three-day event window. For example, upgrades are associated with a positive abnormal return of 3 basis points during our event window, while downgrades are associated with a negative abnormal return of 3 basis points during the same period. Further, grouping the upgrades and downgrades together, the results would imply a small impact for unexpected ratings changes, but none for expected changes.

In order to make some attempt at distinguishing between the explanations for the non-response of bond prices to ratings changes, we analysed whether the data exhibit any post-event drift. If our data suffer from a infrequent trading or stale price quotes, we would expect to see evidence of post-event drift. Actual, unobserved bond prices would adjust to the event instantaneously, but the data would exhibit a pattern that would suggest that the adjustment takes place over an extended period of time as price quotes slowly adjust to the new equilibrium price that reflects the ratings announcement. We examined this by calculating mean abnormal returns in the period following our event window. For the period of day +2 to day +40 (i.e., around two months), we find cumulative abnormal returns of –27 basis points for downgrades and zero for upgrades. Neither estimate is statistically significant, however. Although the lack of statistical significance is a major caveat, the estimate for downgrades (which one would expect should probably be larger than any effect from upgrades) is consistent with the idea that the data may indeed be subject to non-trading problems.

[14] When combining upgrades and downgrades we are essentially treating downgrades as negative upgrades, with an expected positive (negative) sign for the abnormal return if the rating change is considered as good (bad) news for the holders of the asset (debt or equity).
[15] Gropp, Vesala and Vulpes [2001] estimate a proportional hazard model on bank defaults and find that bond spreads react only in very close proximity to the actual default.

In addition, we also estimated preannouncement leakage by calculating cumulative abnormal returns in the period from day –40 to day –2.[16] Preannouncement leakage would suggest that the absence of announcement effects is due to information about the ratings change or about the factors that prompted the change becoming public before the ratings change is announced. This could explain the absence of announcement effects. We, however, find preannouncement drift that is small and insignificant and of the wrong sign for both upgrades and downgrades. We find this surprising in light of other studies that has shown substantial preannouncement drift of the expected sign and take it as further evidence of the potentially relatively low quality of the bond data in our sample. We address the question of data quality further in the following section on robustness.

Turning to stock prices, we find that overall, ratings changes have statistically significant and economically substantial effects. We find that upgrades are associated with positive abnormal returns of 1.2 percent on the day of the upgrade and of 1.5 percent in the event window (days -1 to +1). Similarly, we find that downgrades are associated with an abnormal return of –0.5 percent on the day of the downgrade, although they do not have a significant effect on stock prices when looking at the broader event window. In contrast to some of the previous literature (e.g. Schweitzer et al. [1992]), we do not find that prices react more strongly to downgrades, which might have suggested that banks and supervisors are more reluctant to reveal negative information to the market than positive information.

The results are event stronger when we follow Goh and Ederington's [1993] intuition that the reason for the ratings change may matter. If we make this distinction, we find a negative abnormal return of –0.8 percent on the day of the event for a downgrade motivated by a deterioration in the earnings outlook of the bank. In contrast, a downgrade motivated by an increase in risk results in a positive abnormal return of +1.7 percent. Considering the slightly longer period from day –1 to day +1, we find similar results—a downgrade motivated by a deterioration in earnings outlook (an increase in risk) is associated with a negative abnormal return of –1.1 percent (+1.9 percent). These findings support the notion that stock prices react favourably to an increase in volatility of the underlying assets and that rating agencies have access to private information or at least perform a useful role in summarising public information.

We can also examine the information content of ratings changes in a broader context by testing for abnormal returns over longer pre- or post-announcement periods. For the pre-announcement period, we calculate cumulative abnormal returns over days –40 to –2, differentiating between rating changes that occurred for profitability as opposed to risk reasons. For both cases, we find little evidence of substantial drift, with either the upgrades or downgrades taking the "wrong" sign, and the cumulative abnormal

[16] For both bonds and stocks, we calculate preannouncement drift in the period from days –40 to -2 using parameter estimates from a market model estimated using data for days –100 to –41 and also for days +2 to +40: the latter data are included (as in other studies) in an attempt to improve the precision of estimates of market model parameters.

return for the combined sample of upgrades and downgrades being less than one percent. For the post-announcement period, we calculate cumulative abnormal returns for days + 2 to +40. Again we find little evidence of substantial drift, although there is some modest evidence of post-announcement drift of the expected direction for the ratings changes that were associated with changes in risk. Overall, the most striking result from this analysis of pre- and post-announcement abnormal returns is with respect to the pre-announcement period. If rating agencies are merely acting in response to information in the public domain, then assuming that they do so on a reasonably timely basis, we would expect to see cumulative abnormal returns of the expected sign in the two months before the rating announcement. Given that we do not see this, but that we do see significant returns in the announcement window, it would seem reasonable to conclude that there is news in the ratings announcements that was not already in the public domain.

We hypothesised earlier that unexpected events should elicit a larger response from asset prices than expected ones. We find this hypothesis strongly supported in our stock market data. None of the expected ratings changes are associated with a significant stock price reaction. While this may in part be explained by the relatively low number of expected events (only 31 events were expected), the magnitude and sign of average and cumulative average returns is largely also strikingly different. For example, looking at upgrades and downgrades combined, cumulative event-window abnormal returns (Table 4) for an expected event are only 0.1 percent, whereas they are close to 1 percent for unexpected events. For downgrades that are associated with an increase in risk, the expected event has the wrong sign and is insignificant, whereas we estimate a large abnormal return of 2.2 percent for unexpected events.

Of course, at least some of the abnormal returns are contaminated by news stories and the release of information about the bank, which became public information simultaneously to the ratings change. We noted earlier that if this is the case, the asset price reaction may in fact be due to this information and not due to the ratings change itself. It turns out that about half of all events in our sample were contaminated. Reporting the estimated abnormal returns separately for contaminated and uncontaminated events, we find that in for upgrades the average abnormal returns become insignificant for uncontaminated events. However, we cannot reject the presence of significant abnormal returns for downgrades, both in for the event day and the larger event window. This suggests that although the failure to control for contamination may overstate the effects of ratings changes, there also appears to be information contained in the rating changes per se, in particular in case of downgrades.[17]

[17] This is consistent with the previous literature (e.g. Schweitzer et al. [1992]), which also finds larger effects of ratings changes on downgrades than on upgrades.

Finally, we were interested in whether it is important for rating agencies to agree. To test this we divided the sample into events which were associated with a diverging ratings change, i.e. a ratings agency diverging from an existing consensus and events which were associated with a ratings change establishing consensus, i.e. a ratings agency moving towards to the rating of the other two. We find a much larger price reaction to ratings changes that establish a consensus than vice versa. This is somewhat contrary to our earlier intuition that diverging ratings changes should have a larger impact on market prices. If it is robust, it would imply that markets value a consensus view of a bank. Note as before, however, that we are faced with very small samples in case of diverging ratings changes, which may affect both the size and significance of our estimated abnormal returns.

7. Robustness

The estimates of only modest reactions of asset prices to ratings changes in the case of bonds contrast with some of the previous literature and with our strong results for stocks. We were concerned that explanation or these puzzling results may be simply data problems, including the possible impact of nontrading effects due to low liquidity. We have attempted to address this possibility in a number of different ways.

We divided our sample of bonds in three different ways in an attempt to focus on the more liquid bonds and potentially improve the quality of the data. First, we concentrated on bonds from the 10 largest banks in the sample (from the United Kingdom, France and Germany and the Netherlands), based on the notion that bonds for larger banks may be traded more frequently, improving data quality. In this case we obtained results that were even less encouraging. Second, we concentrated only on ratings changes that occurred in 1999 and 2000, based on the likelihood that liquidity may have improved more recently, for example in response to the introduction of the euro in 1999. In this case, the estimated impact for upgrades and downgrades were little different to the full sample estimates. Third, we concentrated on bonds included in the corporate bond indices of a major bond database (the Merrill Lynch Global Index database) since such indices focus on the larger and more liquid issues. The results in this case remained insignificant and were again not encouraging. Overall, our attempts to focus on a more liquid set of bonds provide no evidence of larger price impacts from ratings announcements.

The failure to see any change in the results when focussing on more liquid segments of the bank bond markets led us to consider the possibility that our data source may not be providing us with accurate and reliable data. Towards this end, we compared data for the bonds in the sample obtained from Datastream to those we were using in the paper, which were obtained from Bloomberg. Overall the coverage in Datastream appeared worse than the one in Bloomberg and in those cases where a comparison was

feasible, Datastream data typically appeared to be a less suitable price series, in particular as regards the frequency with which prices appeared to be updated.

To provide further evidence on data quality we also tested econometrically whether or not our estimates of abnormal returns may be affected by nontrading effects, due to infrequent trading or infrequent updating of prices. For both bonds and stocks, the basic results shown in Tables 3 and 4 were based on a market model (equation 1) which regresses the daily return for the individual security on the contemporaneous daily return for the relevant market index. To assess the possible impact of nontrading effects, we also estimated a model where we included the previous day's return on the market index as an additional explanatory variable—this allows for nontrading effects in the individual security. As an additional test, we also ran regressions, which included both the previous day's market return and the subsequent day's market return. The latter is included to allow for the possibility that nontrading effects may be more of a problem for the market index than for the individual bank securities.

Estimates of the alternative market model provide no evidence of nontrading effects for bank stocks. The median adjusted R-squared is 0.384 for the model with only the contemporaneous value of the market return, 0.383 when the lagged market return is included, and 0.392 when the subsequent day's market return is included. The fact that the median (and average) R-squared does not rise following the inclusion of the lagged market return suggest that there is no evidence of nontrading effects in our bank stocks. However, the model that also includes the one-period lead of the market index shows a slight increase in the median (and average) adjusted R-squared which suggests that there may be some modest nontrading effects in our market indices. This is not surprising—bank stocks tend to be among the larger stocks within national stock markets so it is not surprising that they might respond more quickly than some other stocks to news that affects the entire market. However, the impact on goodness of fit is typically very limited, so it appears unnecessary to correct for nontrading effects in the equity market.

By contrast, we find some evidence of nontrading effects in the bond data. For the model with only the contemporaneous market return, we obtain a median adjusted R-squared of 0.487, surprisingly high in light of the possible data problems that we were concerned about. The addition of a lagged market return to the market model has a larger impact than in the case of equities, increasing the median R-squared to 0.528 (with a similar increase for the average R-squared). This suggests that there are at least some bonds in our sample that may have been subject to some nontrading problems, and suggests the need to correct for possible biases. The addition of a one-period lead of the market return results in a minor further increase in R-squared, but would not suggest the need for any correction for nontrading effects in the market indices.

In light of the evidence of possible nontrading effects in the bank bonds, we reestimated the market model including a one-period lag of the market return. The event-day average abnormal returns remained completely insignificant, as in Table 3. However, the three-day event period returns for both upgrades and downgrades both now show the "wrong" sign, and the pooled sample of upgrades and downgrades shows an impact of 7 basis points which is actually statistically significant. We interpret the rejection more as a Type I error rather than as an indication that bond prices actually respond counterintuitively to bond ratings changes. More generally, it suggests that our failure to find announcement effects (of the expected signs) is robust to a correction for a simple form of nontrading bias.

Finally, we would have liked to test the conjecture that bond prices only move once the quality of the bank has deteriorated for some time and is close to the default point, as suggested in Credit Suisse First Boston [2001] and Gropp, Vesala and Vulpes [2001]. Given the methodology employed in the paper, this essentially amounts to testing whether a ratings change that moves a bank into or out of investment grade has a particularly powerful effect on asset prices. However, there were no such cases in our data. All banks enjoyed long-term bond ratings of investment grade or above for the entire sample period.[18]

8. Conclusion

The recent consultative paper by the Basel Committee on Banking Supervision has raised the possibility of an explicit role for external rating agencies in the assessment of the credit risk of banks' assets, including interbank claims. Any judgement on the merits of this proposal calls for an assessment of the information contained in credit ratings and its relationship to other publicly available information on the financial health of borrowers. We have assessed this issue via an event study of rating change announcements by leading international rating agencies, focussing on rating changes for European banks for which data on bond and equity prices are available. In total our sample consists of 186 ratings changes during 1989 to 2000.

The evidence regarding whether bank ratings convey new information to bond and stock markets is mixed. For equity prices, we find strong effects of ratings changes, although some of our results may suffer from contamination by other contemporaneous news events. We also find strong evidence that the reason for the ratings is of central importance when analysing the impact of bond ratings on stock prices. Our results suggest that downgrades are associated with abnormal positive returns of up to 5 percent, if an increase in risk, rather than a deterioration of earnings motivated the downgrade. This confirms earlier

[18] This is not necessarily a reflection of the excellent credit standing of the banks in the sample, but at least in part reflects the safety net and "too big to fail". This can be seen when considering the "financial strength" ratings, which Moody's and Fitch/IBCA assign to banks in order to rate the inherent strength of the bank in the absence of a safety net. Based on this rating, a number of banks were rated C or below. This issue is further explored in Gropp, Velsala and Vulpes [2001].

findings for U.S. stock prices in Goh and Ederington [1993]. Interesting, we estimate much higher abnormal returns for consenting ratings changes than for diverging ones. Although our findings have to be considered somewhat preliminary due to the relatively small sample size in case of diverging changes, they could be interpreted to suggest that markets value consensus. We also test for pre-announcement and post-announcement effects, and we interpret the absence of pre-announcement drift as evidence that there is news in the ratings announcements that was not already in the public domain.

In contrast to the results for stocks, we find little evidence of announcement effects on bond prices. Although we cannot rule out the possibility that this is a reflection of data problems that result from the low liquidity in corporate bond markets in Europe for most of our sample period, we perform a substantial number of tests to this effect, all suggesting that data problems or low liquidity are not convincing candidates to explain the result.

Given the strong results for stock prices, we are left with two potential explanations. One, bond prices do not react to ratings changes, because bondholders believe –rightly or wrongly- that they would be bailed out in any event, if the bank were to run into serious problems. Given that the banks in the sample are all large, we cannot rule out that "too big to fail" is the driving force behind our "non-result." Second we cannot exclude the possibility that the result is due to the fact that all banks in our sample were quite far away from the default point. It has recently been suggested (e.g. Credit Suisse First Boston [2001] and Gropp, Vesala and Vulpes [2001]) that bond prices stay stable in the face of considerable stock price volatility and only react close to default. If this is the case, the evidence in this paper would not necessarily suggest that implicit safety net are preventing meaning monitoring by bondholders. This conclusion receives some further support from Gropp and Vesala [2001], who present some indirect evidence that bondholders perform a useful monitoring role in Europe in a sample very similar to the one in this paper.

Although inconclusive, the apparently relatively weak monitoring by bondholders raises some doubts regarding the effectiveness of a subordinated debt requirement as a supervisory tool in the European context. The workability of subordinated debt requirements would be strongly dependent upon to what extent bondholders believe that banks can fail, in addition to a careful implementation of the other features of Calomiris' [1999] proposal. Our paper also raises the possibility that, in the context of stock markets, due to relatively lax disclosure requirements of banks in some European countries, rating agencies can perform an important role in bringing information to the market.

Literature

Altman, E. and A. Saunders [2001] "An Analysis and Critique of the BIS Proposal on Capital Adequacy and Ratings" **Journal of Banking and Finance** 25, pp. 25-46.

Asquith, P. and D. Mullins [1986] "Equity Issues and Offering Dilution" **Journal of Financial Economics** 15, pp. 61-89.

Basel Committee on Banking Supervision [2001] **The Standardized Approach to Credit Risk** Consultative Paper, Basel January.

Berger, A. and S. Davies [1998] "The Information Content of Bank Examinations" **Journal of Financial Services Research** 14, pp. 117-144.

Berger, A., S. Davies and M. Flannery [2000] "Comparing Market and Supervisory Assessments of Bank Performance: Who Knows What When?" **Journal of Money, Credit and Banking** 32, pp. 641-667.

Billet, M., J. Garfinkel and E. O'Neal [1998] "The cost of Market Versus Regulatory Discipline in Banking" **Journal of Financial Economics** 48, pp. 333-358.

Cable, J. and K. Holland [2000] "Robust vs. OLS Estimation of the Market Model: Implications for Event Studies" **Economics Letters** 69, pp. 385-391.

Calomiris, C. [1999] "Building an Incentive-Compatible Safety Net" **Journal of Banking and Finance** 23, pp. 1499-1520.

Credit Suisse First Boston [2001] **The Global Credit Strategist** March 27, 2001.

Dewatripont M. and J. Tirole [1993] **The Prudential Regulation of Banks**, Editions Payot, Lausanne.

Goh, J. and L. Ederington [1993] "Is a Bond Rating Downgrade Bad News, Good News, or No News for Stockholders?" **Journal of Finance** 48, pp. 2001-2008.

Gropp, R. and J. Vesala "Deposit Insurance and Moral Hazard: Does the Counterfactual Matter?" **ECB Working Papers** No. 47.

Gropp, R., J. Vesala and G. Vulpes [2001] "Equity and Bond Market Signals as Leading Indicators of Bank Fragility in Europe" **Mimeo** European Central Bank, August.

Hand, J., R. Holthausen and R. Leftwich [1992] "The Effect of Bond Rating Agency Announcements on Bond and Stock Prices" **Journal of Finance** 57, pp. 733-752.

Kliger, D. and O. Sarig [2000] "The Information Value of Bond Ratings" **Journal of Finance** 55, pp. 2879-2902.

MacKinlay, C. [1997] "Event Studies in Economics and Finance" **Journal of Economic Literature** 35 pp. 13-39.

Pinches, G. and J. Singleton [1978] "The Adjustment of Stock Prices to Bond Rating Changes" **Journal of Finance** 33, pp. 29-44.

Polonchek, J., M. Slovin and M. Sushka [1989] "Valuation Effects of Commercial Bank Security Offerings: A Test of the Information Hypothesis" **Journal of Banking and Finance** 13, pp. 443-461.

Richards, A. and D. Deddouche [1999] "Bank Rating Changes and Bank Stock Returns—Puzzling Evidence from the Emerging Markets" **IMF Working Paper No WP/99/151**, November.

Schweitzer, R., S. Szewczyk and R. Varma [1992] "Bond Rating Agencies and Their Role in Bank Market Discipline" **Journal of Financial Services Research** 6, pp. 249-263.

Simons, K. and S. Cross [1991] "Do Capital Markets Predict Problems in Large Commercial Banks?" **New England Economic Review**, May/June, pp. 51-56.

Sironi, A. [2000] "Testing for Market Discipline in the European Banking Industry: Evidence from Subordinated Debt Issues" **Mimeo** Federal Reserve Board of Governors, July.

U.S. Shadow Financial Regulatory Committee [2000] **Reforming Bank Capital Regulation** Statement No. 160, American Enterprise Institute Press, Washington, D.C., March.

Wansley, J. and U. Dhillon [1989] "Determinants of Valuation Effects for Commercial Bank Security Offerings" **Journal of Financial Research** 12, pp. 217-233.

Table 1. Events by country and number of banks

	Bonds		Stocks	
	Number of events	Number of banks	Number of events	Number of banks
Austria	5	2	5	2
Belgium	2	1	6	1
Denmark	4	1	9	1
Finland	4	1	14	1
France	30	7	31	7
Germany	27	6	24	6
Greece	0	0	0	0
Ireland	6	1	10	1
Italy	12	2	18	3
Luxembourg	0	0	0	0
Netherlands	3	1	4	1
Portugal	0	0	0	0
Spain	7	2	10	2
Sweden	0	0	0	0
UK	29	6	31	6
Total	129	30	162	31

Source: Bloomberg, Moody's, Standard and Poor's.

Table 2. Number of Downgrades, Upgrades and Ratings Watches

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Total
Downgrades 1/	0	0	2	18	7	13	10	4	7	15	22	14	112
of which:													
expected	0	0	0	4	1	3	1	0	3	4	5	3	24
>1 notch	0	0	0	1	0	1	0	0	1	0	2	0	5
diverging	0	0	0	4	3	3	3	1	1	2	4	2	23
Watch	0	0	0	4	2	5	2	2	2	6	14	6	43
Moody's	0	0	1	10	5	6	2	3	5	9	12	3	56
Standard & Poor's	0	0	1	4	1	4	5	1	0	3	8	4	31
Fitch IBCA	0	0	0	4	1	3	3	0	2	3	2	7	25
Upgrades 2/	1	1	0	0	2	6	7	6	9	8	22	12	74
of which:													
expected	0	0	0	0	0	1	0	1	2	0	2	4	10
>1 notch	0	0	0	0	0	0	0	0	1	0	0	0	1
diverging	0	0	0	0	0	2	1	0	3	2	4	4	16
Watch	0	0	0	0	1	0	1	3	2	3	15	6	31
Moody's	0	0	0	0	1	2	2	1	2	4	11	8	31
Standard & Poor's	0	0	0	0	0	1	4	3	5	3	5	4	25
Fitch IBCA	1	1	0	0	1	3	1	2	2	1	6	0	18
Total number of events	1	1	2	18	9	19	17	10	16	23	44	26	186
of which:													
bond data available	0	0	0	3	4	12	13	8	11	17	35	26	129
stock data available	1	1	2	17	9	18	17	10	16	21	42	8	162

Source: Bloomberg, Moody's, Standard and Poor's.

1/ The downgrades include negative ratings watches and the removal of positive ratings watches.

2/ The upgrades include positive ratings watches and the removal of negative ratings watches.

Table 3. Average abnormal returns on event day

Estimated average abnormal returns on day 0. Standard deviations are in parenthesis. For definitions of variables and categories see text. Abnormal returns significant at least at the 10 percent level are in **bold.**

	All	Expected	Unexpected	Contaminated	Uncontaminated	Diverging	Consenting
Upgrades and Downgrades 1/							
Bonds	0.00	-0.01	0.00	0.00	0.00	0.00	0.00
	(0.02)	(0.05)	(0.03)	(0.03)	(0.04)	(0.05)	(0.03)
N	129	22	107	56	73	29	100
Stocks	0.30	-0.21	**0.43**	**1.28**	0.51	-0.21	**0.42**
	(0.20)	(0.44)	(0.23)	(0.51)	(0.69)	(0.41)	(0.24)
N	162	31	131	59	103	35	127
Reason:	**0.54**	-0.38	**0.93**	-0.92	**1.00**	-0.21	**0.63**
earnings	(0.27)	(0.65)	(0.30)	(1.08)	(0.57)	(0.61)	(0.32)
N	77	18	59	10	66	15	62
Reason:	0.51	0.73	**0.93**	**3.18**	0.30	0.58	**1.11**
risk	(0.37)	(0.95)	(0.23)	(0.59)	(0.72)	(1.02)	(0.28)
N	63	4	37	34	7	5	36
Upgrades							
Bonds	-0.01	-0.02	0.00	-0.05	0.02	0.01	-0.02
	(0.03)	(0.10)	(0.04)	(0.04)	(0.05)	(0.06)	(0.04)
N	57	6	51	23	34	13	44
Stocks	**1.24**	0.05	**1.44**	**2.62**	0.27	-0.33	**1.68**
	(0.42)	(0.93)	(0.45)	(0.39)	(0.65)	(0.43)	(0.51)
N	63	9	54	26	37	14	49
Reason:	0.52	0.80	0.47	0.23	0.60	-0.29	0.70
earnings	(0.39)	(2.12)	(0.35)	(0.84)	(0.47)	(0.86)	(0.46)
N	21	3	18	5	15	4	17
Reason:	**1.60**	0.38	**3.98**	**4.88**	**1.70**	0.00	**4.02**
risk	(0.57)	(1.55)	(0.43)	(0.48)	(0.87)	(1.56)	(0.41)
N	42	2	18	15	5	2	18
Downgrades							
Bonds	0.00	0.00	0.00	-0.03	0.02	0.01	-0.01
	(0.03)	(0.05)	(0.04)	(0.04)	(0.04)	(0.06)	(0.04)
N	72	16	56	33	39	16	56
Stocks	**-0.48**	0.32	**-0.69**	**1.34**	**-0.67**	-0.02	**-0.55**
	(0.24)	(0.54)	(0.26)	(0.30)	(0.33)	(0.53)	(0.27)
N	99	22	77	33	66	21	78
Reason:	**-0.82**	0.62	**-1.37**	**1.15**	-0.40	-0.29	**-1.00**
earnings	(0.37)	(0.72)	(0.42)	(0.63)	(0.39)	(0.86)	(0.42)
N	56	15	41	5	51	11	45
Reason:	**1.67**	1.08	**1.96**	**1.70**	**3.22**	0.96	**1.79**
risk	(0.40)	(1.27)	(0.43)	(0.40)	(1.17)	(1.31)	(0.42)
N	21	2	19	19	2	3	18

1/ Downgrades are treated as negative upgrades.

Table 4. Cumulative average abnormal returns from –1 to +1

Estimated cumulative average abnormal returns from day –1 to day +1. Standard deviations are in parenthesis. For definitions of variables and categories see text. Abnormal returns significant at least at the 10 percent level are in **bold.**

	All	Expected	Unexpected	Contaminated	Uncontaminated	Diverging	Consenting
Upgrades and Downgrades 1/							
Bonds	0.03	0.00	0.03	0.01	0.04	0.03	0.05
	(0.04)	(0.09)	(0.05)	(0.05)	(0.06)	(0.09)	(0.05)
N	129	22	107	56	73	29	100
Stocks	**0.76**	0.11	**0.92**	**2.53**	1.00	0.44	**0.88**
	(0.35)	(0.77)	(0.40)	(0.88)	(1.20)	(0.71)	(0.42)
N	162	31	131	59	103	35	127
Reason:	**0.83**	-0.54	**1.25**	-2.45	1.52	-0.03	**1.04**
earnings	(0.47)	(1.12)	(0.53)	(1.88)	(1.00)	(1.06)	(0.55)
N	77	18	59	10	66	15	62
Reason:	0.85	1.41	**1.25**	**1.80**	-1.36	-0.86	**1.56**
risk	(0.64)	(1.65)	(0.49)	(0.52)	(1.24)	(1.77)	(0.48)
N	63	4	37	34	7	5	36
Upgrades							
Bonds	0.03	-0.08	0.05	-0.07	0.10	-0.03	0.07
	(0.06)	(0.18)	(0.06)	(0.07)	(0.09)	(0.14)	(0.06)
N	57	6	51	23	34	13	44
Stocks	**1.53**	0.70	**1.67**	**3.75**	-0.02	0.32	**1.88**
	(0.72)	(1.60)	(0.78)	(0.67)	(1.13)	(0.75)	(0.89)
N	63	9	54	26	37	14	49
Reason:	0.20	-0.18	0.26	0.75	0.03	0.31	0.17
earnings	(0.68)	(3.68)	(0.60)	(1.45)	(0.81)	(1.49)	(0.79)
N	21	3	18	5	15	4	17
Reason:	**2.20**	1.31	**4.88**	**5.84**	0.59	-0.58	**5.09**
risk	(0.98)	(2.68)	(0.75)	(0.83)	(1.51)	(2.70)	(0.71)
N	42	2	18	15	5	2	18
Downgrades							
Bonds	-0.03	-0.03	-0.02	-0.06	0.00	-0.07	-0.03
	(0.05)	(0.09)	(0.07)	(0.07)	(0.08)	(0.11)	(0.06)
N	72	16	56	33	39	16	56
Stocks	-0.27	0.13	-0.39	**1.22**	**-1.02**	-0.38	-0.25
	(0.42)	(0.94)	(0.46)	(0.51)	(0.58)	(0.91)	(0.46)
N	99	22	77	33	66	21	78
Reason:	**-1.07**	0.61	**-1.69**	**3.20**	**-1.49**	0.15	**-1.37**
earnings	(0.64)	(1.22)	(0.73)	(1.10)	(0.67)	(1.38)	(0.72)
N	56	15	41	5	51	11	45
Reason:	**1.85**	-1.52	**2.20**	**2.05**	**6.23**	1.05	**1.98**
risk	(0.70)	(2.21)	(0.75)	(0.70)	(2.02)	(2.27)	(0.72)
N	21	2	19	15	2	3	18

1/ Downgrades are treated as negative upgrades.

European Central Bank Working Paper Series

1 "A global hazard index for the world foreign exchange markets" by V. Brousseau and F. Scacciavillani, May 1999.

2 "What does the single monetary policy do? A SVAR benchmark for the European Central Bank" by C. Monticelli and O. Tristani, May 1999.

3 "Fiscal policy effectiveness and neutrality results in a non-Ricardian world" by C. Detken, May 1999.

4 "From the ERM to the euro: new evidence on economic and policy convergence among EU countries" by I. Angeloni and L. Dedola, May 1999.

5 "Core inflation: a review of some conceptual issues" by M. Wynne, May 1999.

6 "The demand for M3 in the euro area" by G. Coenen and J.-L. Vega, September 1999.

7 "A cross-country comparison of market structures in European banking" by O. de Bandt and E. P. Davis, September 1999.

8 "Inflation zone targeting" by A. Orphanides and V. Wieland, October 1999.

9 "Asymptotic confidence bands for the estimated autocovariance and autocorrelation functions of vector autoregressive models" by G. Coenen, January 2000.

10 "On the effectiveness of sterilized foreign exchange intervention" by R. Fatum, February 2000.

11 "Is the yield curve a useful information variable for the Eurosystem?" by J. M. Berk and P. van Bergeijk, February 2000.

12 "Indicator variables for optimal policy" by L. E. O. Svensson and M. Woodford, February 2000.

13 "Monetary policy with uncertain parameters" by U. Söderström, February 2000.

14 "Assessing nominal income rules for monetary policy with model and data uncertainty" by G. D. Rudebusch, February 2000.

15 "The quest for prosperity without inflation" by A. Orphanides, March 2000.

16 "Estimating the implied distribution of the future short term interest rate using the Longstaff-Schwartz model" by P. Hördahl, March 2000.

17 "Alternative measures of the NAIRU in the euro area: estimates and assessment" by S. Fabiani and R. Mestre, March 2000.

18 "House prices and the macroeconomy in Europe: Results from a structural VAR analysis" by M. Iacoviello, April 2000.

19 "The euro and international capital markets" by C. Detken and P. Hartmann, April 2000.

20 "Convergence of fiscal policies in the euro area" by O. De Bandt and F. P. Mongelli, May 2000.

21 "Firm size and monetary policy transmission: evidence from German business survey data" by M. Ehrmann, May 2000.

22 "Regulating access to international large value payment systems" by C. Holthausen and T. Rønde, June 2000.

23 "Escaping Nash inflation" by In-Koo Cho and T. J. Sargent, June 2000.

24 "What horizon for price stability" by F. Smets, July 2000.

25 "Caution and conservatism in the making of monetary policy" by P. Schellekens, July 2000.

26 "Which kind of transparency? On the need for clarity in monetary policy-making" by B. Winkler, August 2000.

27 "This is what the US leading indicators lead" by M. Camacho and G. Perez-Quiros, August 2000.

28 "Learning, uncertainty and central bank activism in an economy with strategic interactions" by M. Ellison and N. Valla, August 2000.

29 "The sources of unemployment fluctuations: an empirical application to the Italian case" by S. Fabiani, A. Locarno, G. Oneto and P. Sestito, September 2000.

30 "A small estimated euro area model with rational expectations and nominal rigidities" by G. Coenen and V. Wieland, September 2000.

31 "The disappearing tax base: Is foreign direct investment eroding corporate income taxes?" by R. Gropp and K. Kostial, September 2000.

32 "Can indeterminacy explain the short-run non-neutrality of money?" by F. De Fiore, September 2000.

33 "The information content of M3 for future inflation" by C. Trecroci and J. L. Vega, October 2000.

34 "Capital market development, corporate governance and the credibility of exchange rate pegs" by O. Castrén and T. Takalo, October 2000.

35 "Systemic risk: A survey" by O. De Bandt and P. Hartmann, November 2000.

36 "Measuring core inflation in the euro area" by C. Morana, November 2000.

37 "Business fixed investment: Evidence of a financial accelerator in Europe" by P. Vermeulen, November 2000.

38 "The optimal inflation tax when taxes are costly to collect" by F. De Fiore, November 2000.

39 "A money demand system for euro area M3" by C. Brand and N. Cassola, November 2000.

40 "Financial structure and the interest rate channel of ECB monetary policy" by B. Mojon, November 2000.

41 "Why adopt transparency? The publication of central bank forecasts" by P. M. Geraats, January 2001.

42 "An area-wide model (AWM) for the euro area" by G. Fagan, J. Henry and R. Mestre, January 2001.

43 "Sources of economic renewal: from the traditional firm to the knowledge firm" by D. R. Palenzuela, February 2001.

44 "The supply and demand for eurosystem deposits – The first 18 months" by U. Bindseil and F. Seitz, February 2001.

45 "Testing the Rank of the Hankel matrix: a statistical approach" by G. Camba-Mendez and G. Kapetanios, February 2001.

46 "A two-factor model of the German term structure of interest rates" by N. Cassola and J. B. Luís, February 2001.

47 "Deposit insurance and moral hazard: does the counterfactual matter?" by R. Gropp and J. Vesala, February 2001.

48 "Financial market integration in Europe: on the effects of EMU on stock markets" by M. Fratzscher, March 2001.

49 "Business cycle and monetary policy analysis in a structural sticky-price model of the euro area" by M. Casares, March 2001.

50 "Employment and productivity growth in service and manufacturing sectors in France, Germany and the US" by T. von Wachter, March 2001.

51 "The functional form of the demand for euro area M1" by L. Stracca, March 2001.

52 "Are the effects of monetary policy in the euro area greater in recessions than in booms?" by G. Peersman and F. Smets, March 2001.

53 "An evaluation of some measures of core inflation for the euro area" by J.-L. Vega and M. A. Wynne, April 2001.

54 "Assessment criteria for output gap estimates" by G. Camba-Méndez and D. R. Palenzuela, April 2001.

55 "Modelling the demand for loans to the private sector in the euro area" by A. Calza, G. Gartner and J. Sousa, April 2001.

56 "Stabilization policy in a two country model and the role of financial frictions" by E. Faia, April 2001.

57 "Model-based indicators of labour market rigidity" by S. Fabiani and D. Rodriguez-Palenzuela, April 2001.

58 "Business cycle asymmetries in stock returns: evidence from higher order moments and conditional densities" by G. Perez-Quiros and A. Timmermann, April 2001.

59 "Uncertain potential output: implications for monetary policy" by M. Ehrmann and F. Smets, April 2001.

60 "A multi-country trend indicator for euro area inflation: computation and properties" by E. Angelini, J. Henry and R. Mestre, April 2001.

61 "Diffusion index-based inflation forecasts for the euro area" by E. Angelini, J. Henry and R. Mestre, April 2001.

62 "Spectral based methods to identify common trends and common cycles" by G. C. Mendez and G. Kapetanios, April 2001.

63 "Does money lead inflation in the euro area?" by S. N. Altimari, May 2001.

64 "Exchange rate volatility and euro area imports" by R. Anderton and F. Skudelny, May 2001.

65 "A system approach for measuring the euro area NAIRU" by S. Fabiani and R. Mestre, May 2001.

66 "Can short-term foreign exchange volatility be predicted by the Global Hazard Index?" by V. Brousseau and F. Scacciavillani, June 2001.

67 "The daily market for funds in Europe: Has something changed with the EMU?" by G. P. Quiros and H. R. Mendizabal, June 2001.

68 "The performance of forecast-based monetary policy rules under model uncertainty" by A. Levin, V. Wieland and J. C.Williams, July 2001.

69 "The ECB monetary policy strategy and the money market" by V. Gaspar, G. Perez-Quiros and J. Sicilia, July 2001.

70 "Central Bank forecasts of liquidity factors: Quality, publication and the control of the overnight rate" by U. Bindseil, July 2001.

71 "Asset market linkages in crisis periods" by P. Hartmann, S. Straetmans and C. G. de Vries, July 2001.

72 "Bank concentration and retail interest rates" by S. Corvoisier and R. Gropp, July 2001.

73 "Interbank lending and monetary policy transmission – evidence for Germany" by M. Ehrmann and A. Worms, July 2001.

74 "Interbank market integration under asymmetric information" by X. Freixas and C. Holthausen, August 2001.

75 "Value at risk models in finance" by S. Manganelli and R. F. Engle, August 2001.

76 "Rating agency actions and the pricing of debt and equity of European banks: What can we infer about private sector monitoring of bank soundness?" by R. Gropp and A. J. Richards, August 2001.