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# Commentary

## 1. Introduction

Bank supervision is a key policy tool for protecting a nation's banking and financial systems from systemic risks. Currently, the U.S. bank supervisory agencies conduct on-site examinations to monitor the health of banking institutions, but supervisors have also developed off-site monitoring methods to augment their on-site exams. This off-site monitoring, while not a replacement for on-site exams, is appealing for two reasons. First, off-site monitoring models are typically predictive in nature; that is, they attempt to identify problems at an early stage, when it should be easier and less costly for supervisors to address them. Second, it is increasingly obvious that bank conditions could deteriorate fast enough between on-site exams for supervisory assessments to become outdated quickly.

In this spirit of off-site monitoring, an interesting development in bank supervision has been the increased use of financial market data, such as bank equity and debt prices. A leading example is Pillar 3 of the new Basel Accord, the subject of this conference. In addition, recent studies by the Board of Governors of the Federal Reserve System (1999) as well as by the Board of Governors of the Federal Reserve System and the U.S. Treasury Department (2000) conclude that subordinated debt issuance could be a way to encourage market discipline at depository institutions and that this information could be useful for supervisory monitoring. In a broader international context, a study by the Basel Committee on Banking Supervision (Bank for International Settlements 2003) concludes that the markets for bank equity and debt securities in member countries of the Bank for International Settlements could potentially provide information useful for supervisory monitoring.

Clearly, the incorporation of securities market information into the supervisory process is an important public policy issue, and even though it has been examined by the academic literature, more research is necessary. Reint Gropp, Jukka Vesala, and Giuseppe Vulpes—both in their conference paper and in their larger working paper—make four contributions to this literature. First, the authors focus on the agency ratings of European Union (EU) banks, while most previous work has examined U.S. banks. Second, theirs is one of the few studies to examine both the equity and debt market information together within a single model specification. (Related recent studies are Berger, Davies, and Flannery [2000] and Krainer and Lopez [2003, 2004].) Third, the authors effectively introduce techniques, such as the proportional hazard model, that are new and useful to this literature. Finally, they evaluate their models with respect to in-sample fit and types of classification errors—that is, missed signals ("Type I" errors) and false positives ("Type II" errors).[1] The latter measure is probably of more interest to supervisors and policymakers.

The authors' work adds significantly to an already strong body of evidence indicating that indirect market discipline of commercial banks, as reflected by changes in their securities prices, is present and could be useful for supervisory

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monitoring purposes. More importantly, by examining the different types of classification errors, Gropp, Vesala, and Vulpes invite us to extend the supervisory debate to focus on how much additional benefit is afforded by securities market information and how best to incorporate it into supervisory monitoring. These questions are rapidly becoming the public policy topics of most concern in this field.

## 2. The Study's Four Contributions

The first contribution made by Gropp, Vesala, and Vulpes is to extend the analysis of commercial bank ratings, whether by private rating agencies or by supervisors, beyond the United States. The authors use the Fitch/IBCA ratings for EU banks over the 1991-2001 period. To date, the study by Berger, Davies, and Flannery (2000) had been the most extensive, which finds that U.S. agency ratings of bank holding companies (BHCs) help explain BHC performance variables and their supervisory ratings, known as BOPEC ratings.[2] Given the results in Gropp, Vesala, and Vulpes, it may be reasonable to assume that the results of Berger, Davies, and Flannery would hold for EU banks as well. This would be an interesting area for further research.

An important caveat when working with entity ratings over time was provided by Blume, Lim, and Mackinlay (1998), who show that U.S. agency ratings for nonfinancial firms appear to become more stringent from 1978 to 1995. A related theme of potential time variations in ratings was noted by Berger, Kyle, and Scalise (2001), who find that supervisory ratings of banks, known as CAMEL ratings, fluctuated in their degree of "toughness" from 1989 to 1998.[3]

The second contribution of Gropp, Vesala, and Vulpes is the inclusion of both equity and debt market variables within a single model specification. Many studies have examined separately the potential usefulness to supervisors of the information in BHC stock returns or subordinated debt yields (see the literature review in Krainer and Lopez [2004]). However, a few studies, such as Berger, Davies, and Flannery (2000) and Krainer and Lopez (2004), have recently examined both sets of securities market information together. Specifically, the equity market distance to default (DTD) measure in this study anticipates rating downgrades six to eighteen months before their occurrence, while subordinated debt spreads do so only three to twelve months prior. These results are consistent with those of Krainer and Lopez for the United States; that is, both equity and debt market variables anticipate supervisory BOPEC rating changes by up to twelve months.

The third contribution is the introduction of new techniques to the literature, particularly the proportional hazard model. This model permits an in-sample analysis of downgrade probabilities in the coming months, contingent upon bank conditions today. Using this analysis, the authors find that the model's downgrade probabilities are more accurate for banks with "high" debt spreads than for banks with "low" spreads, but this difference dissipates by thirty-six months out. Hence, the spread data add the most value to this off-site monitoring model in the relatively near future. In contrast, for their equity market DTD measure, the authors find little difference in the accuracy of downgrade probabilities associated with banks with high and low DTDs in the near term. However, after twenty-four months, the probabilities for banks with high DTD values become more accurate. These results offer evidence that the two securities markets provide different information on bank conditions.

These findings are basically consistent with the Krainer and Lopez (2004) results. For BHCs close to default where DTD is low and debt spreads are typically high, Krainer and Lopez suggest that spreads are more informative with respect to supervisory downgrades. In contrast, for BHCs further away from default where DTD is higher and spreads are lower, equity market variables are more informative. Although the Krainer and Lopez results lack the time dimension that the Gropp, Vesala, and Vulpes proportional hazard model permits, both sets of results suggest asymmetric contributions of information from the two markets, with debt spreads being more informative closer to default and equity market measures more so further from default.

The authors' fourth contribution is their analysis of results with respect to the types of classification errors. Other studies, such as Cole, Cornyn, and Gunther (1995) and Gilbert, Meyer, and Vaughan (2002), use this analytical approach as well because it provides additional insight into model performance in a way that appeals more directly to supervisors. Specifically, Gropp, Vesala, and Vulpes find that their model's accuracy for rating downgrades is 78 percent when using just accounting variables and that it improves to 84 percent when both sets of securities market variables are added. This improvement is found to be due mainly to a reduction in the number of false positives. The authors conclude that while the improvement in accuracy seems small, its value to supervisors (for example, through the avoidance of false downgrade signals) could potentially be large enough to pursue.

Once again, the Krainer and Lopez (2004) results complement the authors' work. In an out-of-sample forecasting exercise, the authors find that BOPEC rating forecasts incorporating securities market information are not statistically more accurate than forecasts generated using just

supervisory variables. However, when the two sets of forecasts are combined, additional correct signals are generated. The model with securities market variables contributes 9 percent more correct signals four quarters prior to BOPEC assignment than just the correct signals produced by the model without these variables. At one quarter prior, the improvement is 37 percent more correct signals. Of course, additional incorrect signals are produced as well, and to gauge the overall benefit of securities market information, Krainer and Lopez report an analysis of the ratio of correct downgrade signals to incorrect signals. At four quarters prior, the model with market information produces one additional correct signal at the cost of four incorrect signals. At one quarter prior, the accuracy improves dramatically to four additional correct signals at the cost of only one additional incorrect signal. As in the authors' work, the value of such improvements could be sufficient to warrant incorporating securities market information more directly into the off-site monitoring process.

## 3. Current Supervisory Issues

Gropp, Vesala, and Vulpes contribute significantly to an already strong body of evidence that indirect market discipline of commercial banks, as reflected by changes in the banks' securities prices, is present and could be useful for supervisory monitoring. Hence, the interesting public policy questions in this field are how much additional benefit is afforded by securities market information relative to the various forms of supervisory data, and how best to incorporate that information into supervisory monitoring.

The question of how much benefit is afforded by securities market information moves us beyond purely statistical measures and into the realm of supervisory loss functions. That is, in order to understand whether the seemingly small improvements in model accuracy, both in-sample and out-of-sample, afforded by securities market data are worthwhile, we need to understand what concerns supervisors most. A specific example is how supervisors value receiving a correct downgrade signal relative to the cost of an incorrect signal. If the relative benefit is large, the additional monitoring effort might be extremely worthwhile, but if it is small, the effort could be reduced or abandoned entirely.

Further aspects of the supervisory loss function require more research and analysis. For example, what is the value trade-off between missed signal and false positive errors for supervisors? Does this trade-off differ based on bank size or current supervisory rating? Another interesting question is whether supervisors are interested in downgrade forecasts (or downgrades below certain thresholds) exclusively.

Assuming that supervisors will monitor securities market information, the question of interest then is how best to incorporate that information into the supervisory process. Clearly, the authors as well as other researchers would advocate the use of an off-site monitoring model of some sort. For this type of analysis, the choice of explanatory variables represents an important question: Are supervisors concerned most about supervisory ratings or actual performance variables, as in the Berger, Davies, and Flannery (2000) study?

Short of the relatively simple solution of using an off-site monitoring model, a key question is the degree to which the securities market data are transformed for supervisory purposes. For example, academic studies do not use raw stock returns, but instead typically filter them through a capital asset-pricing style of model or the Merton model of the firm, as the authors do to generate their DTD measure. This transformation removes systemic factors in the returns and allows a focus on firm-specific factors. However, are supervisors willing to work with these transformed, theoretical constructs? Or are more standard measures of market information better suited for supervisory purposes? If the latter is the case, what are the accuracy properties of such measures, using methods similar to those employed by the authors?

## 4. Conclusion

The study by Gropp, Vesala, and Vulpes offers a solid contribution to the growing literature on market discipline for financial institutions and the potential use of securities market information in supervisory monitoring. This work and other related research have shifted the supervisory debate to how much benefit supervisors could derive from using these data and how best to incorporate them into the supervisory process. Much more work remains to be done in this area, but at first glance, the potential benefits seem to outweigh the costs.

1. Note that the authors' use of terms such as "predictive ability" refers to the fact that the securities market variables in their models are lagged with respect to the time agency ratings were assigned. The authors do not predict rating outcomes in an out-of-sample forecasting exercise.

2. BOPEC refers to the five key areas of supervisory concern: the condition of the BHC's Bank subsidiaries, Other nonbank subsidiaries, Parent company, Earnings, and Capital adequacy.

Note that BOPEC ratings, as well as all other supervisory examination materials, are confidential and are not made publicly available.

3. CAMEL refers to a bank's Capital adequacy, Asset quality, Management, Earnings, and Liquidity.

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