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TO: Governor Partee

DATE: August 10, 1976

FROM: Division of Research and Statistics (David B. Humphrey)

SUBJECT: Studies Bearing on the Usefulness of Disclosing Bank "Nonperforming" Loan Data

SUMMARY

In arguing for the disclosure of amounts of nonperforming loans, the SEC contends that this information will improve the ability of investors to predict bank net loan losses, and hence the future level of bank earnings. With data on nonperforming loans, as defined by SEC, being unavailable, Federal Reserve staff have conducted studies using classified loans (as determined by bank examiners) as a proxy for nonperforming loans in a statistical model for predicting net loan losses. These studies show use of classified loans does not improve predictions over those obtained using available public information on past net loan losses. Since nonperforming loans, as defined by SEC, likely would reflect far wider errors in the measurement of the risk characteristics of a bank's loans portfolio than classified loans, because of both judgmental and conceptual differences governing the composition of those aggregates, we conclude that reporting each bank's total of nonperforming loans would not only fail to improve the ability of investors to predict future loan losses or bank earnings but could prove misleading for the purpose of making such estimates.

Introduction

The SEC has argued that disclosing the amounts of outstanding bank nonperforming loans will result in investors being able to make more accurate predictions of future net loan losses (and hence bank

profits). Existing evidence on the relationship between one year's level of classified loans (which is likely to provide a much more reliable indicator of loan risk than the SEC's proposed category of nonperforming loans) and the following year's level of net loan losses, gives no indication that improved forecasts are realized over and above those already possible with existing publicly available data on past net loan losses.

The volume of loan loss in one year is indeed significantly correlated with total classified loans of the preceding year, but an almost identical correlation also is found between the current volume of loan loss and losses for the previous year. And in a second study which directly tests the informational value of bank classified loans data for predicting future net loan losses, it was found that models including these confidential data do not predict loan losses any better than models using only the (publicly available) data on loan losses of the preceding year. In the nine cases tested (for three different asset size classes of banks), about half of the time the addition of classified loan data led to slightly more accurate net loan loss predictions, but in the other half

the predictions were slightly worse using the classified information. Overall, it was found that disclosure of classified loans data had a largely neutral effect in the model's ability to generate more accurate net loan loss predictions. The common sense reason behind this result is that the previous period's level of net loan losses (publicly available) is itself very highly correlated with the previous period's level of total classified loans. Statistically speaking, these two variables have almost the same information content.

The above results are based on two studies. One of the studies, undertaken for this memo, uses time-series data on nine large New York City (as a group) banks/observed over the period 1962-1974. The other is a cross-section analysis of 501 banks observed over 1972-1974. Still other studies, although not concerned with the accuracy of loan loss predictions using both publicly available and confidential bank data, indicate that loan losses as a percentage of total classified loans varies considerably over time for a single bank. As well, it is found that these charge-off ratios are quite different between banks even for the same time period. These additional results indicate that ratios of net loan losses to either total loans or all classified loans are probably not stable enough to yield very accurate predictions of future loan losses. Indeed, this presumption is borne out in the analysis undertaken for this memo and is presented below.[1/]

1/ All studies, except the one undertaken for this memo, are briefly summarized in the Appendix. Time constraints prevented us from performing statistical analysis on individual bank data. Aggregations of banks were used and so refer to the "average" relationship for the banks which comprise the total.

All studies cited in the text and the Appendix are concerned with the usefulness of classified loans as a predictor of net loan losses. Because of substantial conceptual and subjective differences between the determinants of classified loans and the SEC's proposed measure of nonperforming loans, nonperforming loans would not be expected to demonstrate anything approaching the predictive value of classified loans for estimating future loan losses and in fact they likely could prove misleading.

Classified loans focus exclusively on the risk attributes of the loans portfolio. They are compiled in accordance with general standards uniformly agreed to among the three Federal supervisory agencies by experienced examiners who have been specially trained for making these determinations. Nonperforming loans, on the other hand, are an aggregate of diverse components, which do not relate exclusively to the risk components of the portfolio (e.g., they include past due loans) and which in part are subject to the effects of wide differences in judgmental and policy influences on the amounts reported, from bank to bank and from reporting period to reporting period within a bank.

Two Specific Studies

A. Time-Series Study Using Data on Nine Large New York Banks, 1962-1974.

Using data on an aggregate of nine large New York City banks,[2] the correlation coefficient (R^2) between one year's level of net loan losses (gross loan losses minus recoveries) and the previous year's level of total classified loans was .64.[3] If no other information were available to investors, then indeed disclosure of bank levels of total classified loans would clearly be of some use in helping the public more accurately predict net loan losses, and hence lead to more accurate forecasts of bank after tax income and profits.

Other information, however, does exist and, since 1972, has been available to investors and the general public. This information concerns data on past net loan losses. The R^2 between one year's level of net loan losses (publicly available) and net loan losses for the following year was .65 for the same set of nine New York banks. Scatter diagrams of these two regressions are displayed below in Graph A.[4]

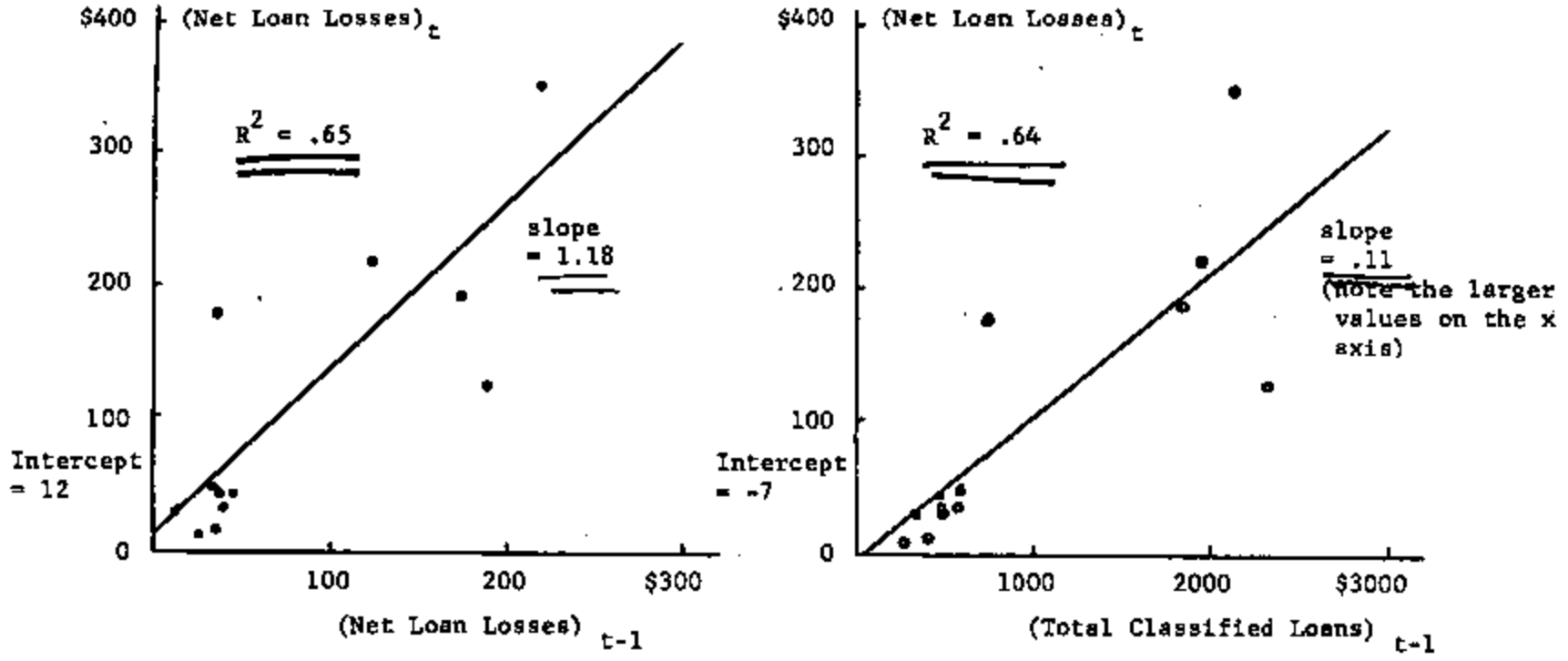
2/ Bank of New York, Bankers Trust, Chase Manhattan, Chemical Bank, Citibank, Irving Trust, Manufacturers Hanover, Marine Midland-N.Y., Morgan Guaranty.

3/ Total classified loans are here composed of those loans classified as being loss, doubtful, and substandard.

4/ As indicated in the scatter diagrams, there is much less than a perfect fit between the variables specified, particularly in the 1970's when net loan losses were highest. Since the R^2's are around .65, there is still 35 per cent of the variation in (future) net loan losses which is left unexplained in either of the cases shown.

GRAPH A

Display of Regressions Using Past Loan Losses and Total Classified Loans as "Predictors" of Future Net Loan Losses (in millions of dollars)



Each point above refers to a different year. Figures for the 1970's, being larger, are to the right. The reason why past public data on net loan losses gives the same results as using past data on total classified loans is that these two variables contain (statistically speaking) much the same information. The R^2 between $(\text{Net Loan Losses})_{t-1}$ and $(\text{Total Classified Loans})_{t-1}$ was .92 .

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In terms of correlation values (R^2), publicly available data does just as well as a "predictor" of future net loan losses as does presently undisclosed data on classified loans. This conclusion also holds for all Federal Reserve member banks. Using data on all member banks over 1965-1972, public information on past levels of net loan losses gave an R^2 of .54 while a regression using data on total classified loans resulted in a slightly lower R^2 of .46 when net loan losses of the following year are being "predicted." If disclosure of classified loan information does not appear to improve an investor's ability to predict loan losses and can (as suggested in the Board's comments to the SEC) possibly mislead depositors or large CD holders as to the viability of a bank, leading to a depositor run or a penalty tiering of CD rates against the bank, there would seem to be little net benefit to the disclosure of this information.

Table A (below) presents the R^2s obtained for nine large New York banks (as a total) when different regressions of loan losses to past classified loans and loan losses to past losses are specified. The data are yearly observations over 1962-1974. Using publicly available data on loan losses alone, regressions (1) and (2) yield R^2s between .65 and .16, depending upon whether one uses one year's data on net loan loss levels or ratios to "predict" this level or ratio in the following year. The low R^2 for the ratio results indicate that there is substantial fluctuation in net loan loss ratios from year to year; otherwise one year's ratio would be highly correlated with the ratio value of the previous year.

Using one year's classified loan data in ratio form to explain the next year's loan loss ratio yield results which are either: just as bad (using total classified loans in regression (6) $R^2 = .18$); somewhat better (using doubtful classified loans in (7) $R^2 = .33$); or markedly worse (using substandard loans (8) giving an $R^2 = .07$). It is clear that either publicly available or classified loan data in one year is weakly

related to the following year's data when ratios are used. Only in one regression (out of four) is the unexplained variation less than 80 per cent.

More favorable results are obtained when one year's total classified loan level is related to the net loan loss level in the following year. As was reported above, the R^2 here was .64 (regression (3)). The R^2 using doubtful classified loans is somewhat better at .72 but using the substandard category reduces the R^2 to .57 (regressions (4) and (5)). However, as seen in regression (1), use of publicly available data alone yields almost identical correlation results.

B. Cross-Section Study on 501 Banks, 1972-1974.

In this Board study, two types of loan loss prediction models were developed. One used only publicly available information on past net loan losses, the other used this information and augmented it with data on bank classified loans. In about one-half of the nine cases tested over 1972-74, the addition of classified loan information led to slightly worse predictions of future net loan losses. The other half of the cases yielded slightly more accurate loan loss predictions.[5/]

This result, obtained from large cross-sections of banks divided into three asset size classes (501 banks total), is in accord with the time-series correlation results for the group of nine large New York banks presented above. Disclosure of classified loans to

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5/ When loan loss levels were being predicted, five cases were marginally worse. When the ratio of net loan losses to total loans was being predicted, four cases were marginally poorer.

END READING.

shareholders, overall, is seen to have a largely neutral effect on the accuracy of predictions of future net loan losses even when large numbers of banks are used in the analysis. As such, the above conclusions are apparently not limited to just nine large New York banks but appear to have general validity. The three asset size classes distinguished in the large study were: assets $1 billion or larger (65 banks); banks with asset sizes between $500 million and $1 billion (63 banks); and banks with assets values between $100 and $500 million (373 banks). This study is summarized in the Appendix (#3).

Qualification

The conclusions expressed above represent the best judgments possible from the evidence. Nevertheless, some qualifications are in order. For example, exact data on nonperforming loans as defined by the SEC are not available and hence it is not possible to fully confirm the judgment that this data would be less satisfactory than classified loan data for predicting loan losses. Furthermore, no tests were performed on time series data for individual banks and it is not possible to completely rule out the possibility that classified loan

data or nonperforming loan data could have, in some cases, predictive value for certain individual banks. Finally, the tests performed did not encompass all possible statistical relationships and, as such, it is at least possible that some other model (for example, a model involving nonlinear equation forms or other explanatory variables) could give different results.

The Appendix

Three studies are summarized in the Appendix. Only the third study was discussed in any detail in the text since this was the only previously existing paper which contrasted the predictive accuracy of publicly available and confidential data. The other studies only relate net loan losses to classified loan data alone.

The Appendix also presents three ratios for nine large New York banks (as a total) over 1961-1974. The ratios themselves are shown in Table B and are graphically displayed as index numbers in Graph B (showing percentage changes year to year). The ratios are:

1. Loans classified doubtful/total classified loans
2. Gross loan losses/total classified loans
3. Net loan losses/total classified loans

(The SEC was given information on the last two ratios in index number form for their internal use.) The ratios show considerable percentage variation from year to year. Ratios for four individual banks (three from New York, one from California) are shown in Table C. They also show wide variation over time.