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Modelling the causes and manifestation of bank stress: an example from the financial crisis

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Abstract

In this study, I model the predictors and manifestation of bank stress during the financial crisis using a Multiple Indicator Multiple Cause model. Unlike most early warning models that predict failure probabilities, this article describes a framework for predicting a broader notion of bank stress that need not rely on regulatory decisions. As such, this method can be easily applied to large institutions, and avoids the complications associated with modelling a regulatory decision such as failure or a CAMELS downgrade. Using bank reliance on Term Auction Facility funds and the out-of-sample incidence of failures and acquisitions, I demonstrate that the measure of bank stress generated here accords with other notions of bank-level distress. Finally, this method catalogues predictors of distress during the financial crisis. Thus, this article can help assess the validity of several recent regulatory proposals. I find that those

banks entering the crisis with more Tier 1 capital, more liquid balance sheets, and relatively stable liabilities subsequently came under less stress. These findings support the Basel III recommended increases in banks' capital adequacy, liquidity and stable funding.

Acknowledgements

Notes

[1] I should note that although regulatory forbearance during the early and middle stages of the S&L crisis presents an issue, the regulatory reform during the S&L crisis may mean that the bank failures during 2007–2011 can be used to form a more reasonable baseline for comparison with expected future regulatory procedures and attitudes.

[2] Although I apply the method described in this section to larger financial institutions, the method is very flexible and can easily be applied to small banks as well.

[3] All of the analysis presented in this article is done on a 'highest holder' basis. Specifically, I aggregate to bank holding company level using Call Report information on equity stakes in each bank.

[4] Out-of-sample performance of these institutions is also evaluated below.

[5] Bank mergers that occurred during this time period are handled by aggregating the balance sheet and income statements of the merged banks.

[6] Alternate definitions of the capital ratio were used with little changes to the results reported in the next section. For example, percentage-point changes and percentage changes in the Tier 1 plus Tier 2 capital ratio were used as well as a measure that normalizes by the bank-level excess capital above the regulatory minimum. The main results hold.

[7] Using loan charge-offs in place of securities losses produces very similar results. As mentioned previously, many different indicators of bank stress can be used, but I limit the number presented here for parsimony. Furthermore, loan charge-offs can be subject to evergreening practices and may not be fully realized during a high-stress period.

[8] As will be demonstrated, the conclusions are not sensitive to excluding TARP injections from the measures of bank stress indicators.

[9] Indeed, the stigma associated with accessing the discount window was a motivating factor behind the creation of the Term Auction Facility, which allowed banks to borrow term funds anonymously from the Federal Reserve.

[10] In the accompanying Appendix, I produce a time series of system-wide bank holding company stress by plotting an aggregated version of the latent stress factors over time.

[11] However, in Section V, I present evidence that the latent stress factor derived in the MIMIC model is consistent with other notions of bank stress.

[12] I direct readers to the literature described in Section II and, in particular, the following studies, which have used most of the variables that appear in Table 4: Cole et al. (1995), Cole and Gunther (1995) and Kolari et al. (2002). The data set used for this study may be accessed at http://dx.doi.org/10.1080/00036846.2014.955257

[13] This result extends to alternate definitions of capital adequacy, such as Tier 1 plus Tier 2 capital.

[14] These results are robust to using either savings or demand deposits separately. Additionally, replacing core deposits with nondeposit liabilities shows a significant positive relationship with levels of financial distress.

[15] Interestingly, however, replacing overhead costs with a normalized measure of salaries exhibits an insignificant relationship.

[16] Although left undiscussed due to the lack of statistical significance conditional on other controls, the effect of banks' off-balance sheet activity could represent an area for future study. One might have expected off-balance sheet activity to be correlated with higher levels financial distress during the crisis, but the differential composition of the off-balance sheet activity could be driving the results. For example, some off-balance sheet items could represent beneficial derivative-based hedging activity, while others could be concentrated in toxic collateralized debt obligations and subprime MBSs.

[17] Three of the acquirers in the high stress quintile were among the nine healthiest banks of the quintile.

[18] Because of the unavailability of certain regulatory capital data and definition changes, the stress factor 1 construct here – plotted in Fig. A1 – is generated using the Call Report series RCFD3210 to measure bank capital.

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