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Economic value, competition and financial distress in the European banking system

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ABSTRACT

In this paper we examine the impact of a large number of factors at the bank level (liquidity and credit risks, asset size, income diversification and market power), at the industry level (banking concentration) and macro-level (real GDP growth) on bank financial distress using an unbalanced panel of 308 European commercial banks between 1996 and 2009. The observations falling below a given threshold of the empirical distribution of the Shareholder Value Ratio proxy bank financial distress. We employ a panel probit regression and, given the presence of overlapping data giving rise to residual autocorrelation, we use the Bertschek and Lechner (1998) robust estimator of the covariance matrix of parameters. We show that credit risk, liquidity risk and bank market power are the most influential determinants of distressed Shareholder Value Ratio. Finally we evaluate the model out-sample forecasting performance over the 2008–2009 crisis period.

1. Introduction

Given the recent wave of consolidation in the European banking system (see DeYoung et al., 2009), there have been increasing concerns during the 2000s regarding the impact of bank competition on the stability of the overall banking system. Two views concerning the impact of higher competition on financial stability have been proposed in the literature. The 'competition-fragility' view (see Allen and Gale, 2004, among others) argues that bank competition incentivizes banks to finance risky projects to increase profit margins and this results in higher probability of financial distress. On the other hand, the 'competition-stability' view (Boyd and De Nicolò, 2005, among others) argues against bank concentration, claiming that the considerable market power of only few banks will cause them to raise the interest rate on loans, which will adversely select the firm with risky projects, with a negative impact on the stability of the banking system.

We aim to contribute to the aforementioned debate by providing new empirical evidence for the EU-25 banking system considering both quoted and unquoted banks. Specifically, we examine the impact of a number of factors (at the bank, industry and macroeconomic levels) on bank financial distress using an unbalanced panel of 308 European commercial banks over the period 1996–2009. The main contribution of our paper is that it is the first to measure financial distress using an economic value measure such as the Shareholder Value Ratio (SHVR), i.e. a very popular risk-adjusted indicator of bank performance among bank practitioners, academics and regulators (Fiordelisi and Molyneux, 2006), rather than the *z* score, which is an inverse proxy of firm's probability failure, uncommon among practitioners. Thereafter, we investigate the impact that a large number of factors at the bank level (liquidity and credit risks, asset size, income diversification and market power), at the industry level (banking concentration) and macro-level (GDP growth and interest rates) have on our financial distress variable. We use a large dataset composed of a balanced panel of 308 commercial banks over the period 1996–2009 (on annual frequency) and, consequently, include both the onset and further development of the sub-prime crisis. As such, our empirical analysis can focus on differences between the period prior to the crisis (i.e. up to 2006) and the years during the crisis (2007–2009).[1]

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[1] We wish to thank the referee for this valuable suggestion to extend our data set up to 2009 in order to distinguish between the pre- and post-crisis phases.

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Regarding the methodology, a straightforward approach to modeling the impact of a number of factors (at the bank, industry and macroeconomic levels) on bank financial distress would be to use ordinary least squares regressions. However, this technique may make our results merely be driven by small changes in the dependent variable (SHVR), while there is a need to differentiate among sizeable increases, sizeable decreases, and relatively constant levels of shareholder value to accurately measure the financial distress. As such, we build a binary variable having value equal to one when we observe values of the SHVR falling below either the 25th percentile or the 20th or the 15th percentile. Thereafter, our modeling framework is based on a panel probit regression model, and our contribution is also to make inferences in the context of such a modeling framework. In particular, we take into account the presence of overlapping data, due to a focus on a forecast horizon over the next 2 years and data observed annually. The choice of a 2 year horizon is along the lines of the Early Warnings Signal models put forward by Kaminsky et al. (1998) to predict the probability of currency (and also banking) crises (see also Berg et al., 2005, for a review of the prediction performance of EWS). The presence of overlapping data gives rise to residual autocorrelation in the forecast errors. We use the Bertschek and Lechner (1998) non-parametric type of correction to the standard errors of the parameters estimated, in a first stage, by Full Information Maximum Likelihood. We also assess the out-of-sample forecasting performance over the 2008–2009 forecast horizon of the panel probit relative to that obtained by a naïve predictor, based on the unconditional probability forecast.

Our empirical findings show that credit risk (measured by the ratio of loan loss provisions to total loans), liquidity risk (measured by the ratio of liquid assets to total assets) and bank market power (measured by the Lerner index) are the most influential determinants of distressed SHVR.

Overall, our finding supports the competition-fragility view put forward by Allen and Gale (2004). Moreover, we find that the pooled probit regression model is the one improving, in terms of out-of-sample prediction performance, upon a naïve predictor (based upon the unconditional probability forecast), especially for countries such as Portugal, Ireland, Greece, Italy and Spain, that is those EU countries, which manifest most the greatest financial strain during the most recent EMU sovereign debt turmoil period.

The remainder of the paper is organized as follows. Section 2 presents data and variables, Section 3 provides a description of the econometric methodology and Section 4 discusses our empirical findings. Conclusions are drawn in Section 5.

2. Data description

2.1. Definition of distress

In order to define "financial distress", we focus on the Shareholder Value Ratio (SHVR), i.e. the ratio between Economic Value Added (EVA) and the shareholder capital invested at time $t-1$. Various empirical studies (e.g. Ferguson and Leistikow, 1998; Machuga et al., 2002; Adsera and Vinolas, 2003; Abate et al., 2004; Ferguson et al., 2005, 2006) provide evidence that EVA is particularly useful in assessing shareholder value, considering the opportunity cost of capital as well as bank economic performance. Given our interest in financial distress, we consider the observations falling below a given threshold of the SHVR. For robustness, the threshold values used are either the 25th percentile, or the 20th percentile or the 15th percentile of the empirical probability distribution of the SHVR.

EVA is calculated following the procedure adopted by previous studies (e.g. Uyemura et al., 1996; Fiordelisi, 2007; Fiordelisi and Molyneux, 2010a, 2010b), by computing the difference $\psi_{t-1,t} = \pi_{t-1,t} - k \cdot K_{t-1}$, where $\pi_{t-1,t}$ is the 'economic measure' of the bank net operating profits, K is capital invested, k is the estimated cost of capital invested. In order to minimize heteroscedasticity and scale effects in our model, we focus on the SHVR that is obtained by standardizing EVA by shareholder capital invested at time $t-1$ so that this ratio expresses the shareholder value created for any euro of capital invested by shareholders in the bank. Regarding capital invested and its cost, various studies (Uyemura et al., 1996; Fiordelisi and Molyneux, 2010b, among others) suggest measuring the bank's capital invested (and, consequently, the capital charge), focusing on equity capital. The estimation of the cost of equity capital is challenging in banking since most of the banks are not quoted on any stock exchange market. Following Fiordelisi (2007) and Fiordelisi and Molyneux (2010a, 2010b), we estimate the shareholders' expected rate of return using the following procedure: (1) for quoted banks, we follow a standard procedure applying a two-factor model using both market and interest rate risk factors (following Unal and Kane, 1988); (2) for unquoted banks, we use the mean of the cost of equity capital for comparable domestic quoted banks (in terms of total assets). Our estimation procedure is consistent with some recent papers (e.g. Stoughton and Zechner, 2007) in which it is assumed that the cost of equity in banking is constant, since banking regulation constrains the leverage of banks in the same way. Finally, net operating profits and capital invested are calculated by undertaking various adjustments specific for banks, to move the book values closer to their economic values. These adjustments concern: (1) loan loss provisions and loan loss reserves; (2) restructuring charges; (3) security accounting; (4) general risk reserves; (5) R&D expenses and (6) operating lease expenses.[2]

2.2. Description of explanatory variables

As proposed in various studies (e.g. Athanasoglou et al., 2008; Yildirim and Philippatos, 2007; Brissimis et al., 2008; Delis and Tsionas, 2009; Fiordelisi et al., 2011) we consider various different bank-specific control variables. First, we account for income diversification (in line with Lepetit et al., 2008), as a potential driver of bank performance and risk in European banking, and, consequently, as a driver of banks' distress. More specifically, we consider the income diversification ratio, measured by the net non-interest income to net operating income ratio, (ID). Another bank specific control variable, typically employed in the literature, is bank size (BAS), i.e. measured by the log of bank total assets.

We recognize that efficiency is likely to have an impact on bank performance (see Fiordelisi and Molyneux, 2010a, among the others), and we include profit efficiency (EFF) in regression analysis. Profit efficiency is estimated using the stochastic frontier approach (see Fiordelisi and Molyneux, 2010b) outlined in the Appendix A.

The credit crunch of 2007 revived the importance of bank risk-taking among potential drivers of financial distress. We consider both liquidity and credit risks. Liquidity risk arises from the inability of a bank to accommodate decreases in liabilities or to fund increases in assets. In line with Delis and Tsionas (2009), we use the liquid assets to total assets ratio (LIQ), as a proxy of liquidity risk.[3] Consequently, an LIQ increase would suggest a lower exposure of a bank to liquidity risk, given that it means a greater liquid assets availability to face bank's cash outflows. Regarding credit risk, we focus on the ratio of loan-loss provisions to total loans (CRL), as in Fiordelisi et al., 2011.

[2] Various adjustments have been made to deal with accounting distortions concerning loan loss provisions and loan loss reserves, general risk reserves, R&D expenses and operating lease expenses. For further details, see Uyemura et al. (1996), and Fiordelisi and Molyneux (2006).

[3] We wish to thank the referee for this helpful suggestion.