



Why do banks choose to finance with equity?☆



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ABSTRACT

A majority of U.S. banks between 1973 and 2012 held equity capital significantly beyond the required minimum. We study the risk–return tradeoff in connection with a bank's capital structure, and identify several new significant market factors that drive the level of equity capital in banks. During normal growth periods, bank leverage is negatively related to a level of competition and loan portfolio diversification, while high bank leverage is associated with low past liquidity. During recessions and expansions, the roles of those factors change following distortions in risk–return tradeoff. In distress, when banks approach regulatory capital requirements, market determinants of book leverage lose their significance; however, leverage does not decrease until a bank is within 1% of the minimal capital threshold.

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1. Introduction

Even a cursory review of the capital structure literature shows that banks are routinely excluded from empirical studies. This may be due to a belief that bank capital structure is largely dictated by regulatory capital standards. Indeed, banks are heavily regulated, have very high leverage, and a substantial portion of their liabilities are guaranteed by the government. However, recent evidence shows that banks typically maintain discretionary capital that is significantly greater than that required by regulatory authorities (Flannery and Rangan, 2008; Berger et al., 2008).

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Gropp and Heider (2010) make an initial attempt to address this issue and find that variables drawn from the capital structure literature for non-financial firms are significant determinants of the capital structure for a sample of very large banks in the United States and Europe during the period 1991–2004. They show that capital structure determinants for the banks in their sample are similar to the determinants of capital structure for non-financial firms, as identified by Frank and Goyal (2009). At the same time, Gropp and Heider find significant bank and time fixed effects, perhaps determined by factors omitted from their study. When Gropp and Heider build their model based on Frank and Goyal's work, they only use the most reliable determinants of leverage, identified in the original sample of non-financial firms, with the exception of inflation. They do, however, add risk to their model. These findings raise the question of whether additional factors, found to be important determinants of capital structure for non-financial firms, are also important in determining bank capital structure.

In search for additional bank leverage factors, we re-introduce variables from Frank and Goyal's study, and augment the model with bank-specific variables suggested by recent theoretical work on bank capital by Allen et al. (2009), Allen et al. (2015) and

DeAngelo and Stulz (2015). Moreover, according to Shleifer and Vishny (1992) and Korajczyk and Levy (2003), capital structure choice should depend on the macroeconomic cycle; therefore, we study the behavior of our models during different stages of the economic cycle.

The dependent variables in our models are book and market leverage. We use two specifications for each dependent variable, carefully selecting the relevant determinants with the lasso regression method that is robust to multicollinearity, proper outlier treatment, and fixed effects that are robust to endogeneity. The complete model description is provided in the “Methodology” subsection and details for the construction of the variables are found in Table 1 of this paper. Our study substantially extends the empirical research on the determinants of bank capital structure and contributes to the existing literature in two important ways. First, it demonstrates that capital structure studies of banks should be an integral part of the general capital structure literature. A number of leverage factors that are tied to existing capital structure theories (pecking order, trade-off, managerial timing, and agency free cash flows) are also significant determinants of the leverage of banks. Our results support the trade-off theory in application to the banks’ capital. Second, we test empirically bank-specific theories and find that competition and diversification in lending are negatively correlated with bank leverage, while greater leverage is associated with lower past liquidity of banks. Finally, we demonstrate that the significance and role of the factors that explain bank capital structure change with the economic cycle. Specifically, during recessions, many factors become statistically insignificant and/or change the sign of the correlation. Although we find that capital structure decision factors change when a bank approaches minimum capital requirements, even then, the discretionary capital decision process is not entirely eliminated. The majority of banks are far from the minimum requirements most of the time, and market factors drive their capital structure decisions.

The existing literature on bank capital focuses on the safety of the banking system – i.e., the focus is on regulatory concerns (Shrieves and Dahl, 1992). Consequently, the determinants of bank capital structure are for the most part selected with risk management in mind (Berger et al., 2008). At the same time, banks are for-profit entities, which means that they are also focused on maximizing shareholder value through comprehensive risk-return management, while simultaneously satisfying stringent safety and soundness constraints imposed by regulators, deposit holders, shareholders, borrowers, and other stakeholders. However, there are two shortcomings in the current literature. First, there is very little attention paid to the return-generating activities of banks in the capital structure literature. Second, the risk-return trade-off, as it applies to wealth creation for shareholders of banks, is not concisely connected to studies of capital structure for financial institutions.

Our study aims to close these gaps by bringing together the risk and return-related concerns under the umbrella of bank capital structure management. We achieve these goals by introducing new variables, which affect both risk and return in more than one way, into the existing empirical framework of capital structure determinants: competition in banking, diversification of the bank loan portfolio, and liquidity. The variables are tied to the economic cycle through their relationship with risk and return, thus explaining bank leverage cyclicality.

The rest of the paper is organized as follows: we present a review of the existing capital structure literature and the development of hypotheses in section 2. In Section 3, we introduce the sources of the data used in this study, provide descriptive statistics of the variables, and explain the models and statistical methods implemented for the analysis. The results of the empirical tests are provided in Section 4 of the paper. We give a preview of the extensions to

this study in Section 5. The last section provides a summary of the findings, our conclusions, and the implications of our findings.

2. Literature review and hypotheses development

This research is largely inspired by the work of Frank and Goyal (2009) and, subsequently, Gropp and Heider (2010), who first applied the general framework of capital structure determinants to banks. According to Gropp and Heider, traditionally, financial firms were excluded from the empirical capital structure literature. Empirical studies of bank’s capital structure were considered unnecessary, since leverage of all banks was, supposedly, determined by regulatory capital requirements. Gropp and Heider study the 100 largest U.S. and the 100 largest E.U. banks empirically and find, in contrast to common belief, substantial variation in equity capital ratios of the banks in their sample. Further, they demonstrate that some of the leverage determinants borrowed from the general capital structure literature help explain variation in bank leverage. Gropp and Heider find that the most reliable factors explaining leverage for non-financial firms, determined by Frank and Goyal (2009), are similarly significant when explaining leverage for the banks in their sample.

While financial firms usually have been ignored in the empirical capital structure literature, a significant body of theoretical literature on bank capital structure has developed since the beginning of the new millennium. Diamond and Rajan (2000), Allen et al. (2009), and DeAngelo and Stulz (2015), among many others, build an elaborate picture of discretionary bank capital determinants.

We extend Gropp and Heider’s tests to a broader sample of U.S. banks, as described in the next section. We also extend the period of study back to 1973. The leverage ratios of banks in our sample vary significantly, as in Gropp and Heider’s, supporting the potential presence of discretionary capital, which is determined independently from capital requirements. In 99% of the observations in our sample, the Tier 1 capital ratio is above 5% (while 4% is required). At the same time, as we can see in Fig. 1, in 99% of the observations, banks hold equity capital above 5%. In about 50% of the observations, banks hold 10% or more of equity capital. However, only 9% of the observations are above 15%. Therefore, in 90% of the observations, equity capital holdings vary between 5% and 15%. Their Tier 1 Capital Ratio is also in the 5% – 15% range, 10.83% on average. Thus, the majority of the banks hold equity capital for reasons other than regulatory requirements.

Gropp and Heider (2010) begin their analysis with the core variables identified in the Frank and Goyal (2009) model and then introduce a risk variable. Gropp and Heider still find significant bank-specific and time-specific fixed effects. They discuss a few potential sources of differences in leverage between banks and non-financial firms, related to the general theories of capital structure, and lay a foundation for the study of bank leverage within a general capital structure framework. However, Gropp and Heider do not test the explanatory power of the leverage variables beyond Frank and Goyal’s five most reliable factors (except by adding risk). At the same time, the core model of Frank and Goyal was selected through tests based on a sample of non-financial firms. Potentially, some variables, particularly important for banks, but not for non-financial firms, are not included in Gropp and Heider’s experimental design.

While Frank and Goyal find variables in the core model to be most reliable in explaining market leverage for the non-financial firms in their sample, they suggest re-introduction of the variables of minor importance for a detailed analysis of leverage. The full list of Frank and Goyal’s variables was developed as a result of a comprehensive survey of the current literature on capital structure.

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