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The prediction of bank acquisition targets with discriminant and logit analyses: Methodological issues and empirical evidence

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ABSTRACT

This paper uses discriminant and logit analyses to develop prediction models to identify bank acquisition targets. We consider several methodological issues, such as whether the choice of the estimation technique, the selection of variables, the use of raw versus industry relative data, the train-and-test sampling scheme, and the criteria for model evaluation affect the predictive accuracy of the developed models. Both estimation methods generate remarkably similar model performance rankings, while differences are revealed in the relative importance of variables when using raw versus industry relative data. We find that in most cases there is a fair amount of misclassification, consistent with previous studies in non-financial sectors, which is hard to avoid given the nature of the problem.

1. Introduction

Over the last 35 years or so there has been significant research undertaken to develop classification models for predicting takeover targets, in various countries such as the US (e.g. Espahbodi and Espahbodi, 2003), the UK (e.g. Powell, 2001), Canada (e.g. Belkaoui, 1978), and Greece (e.g. Slowinski et al., 1997). This is not surprising, since the prediction of acquisitions is of major interest to stakeholders, such as investors, creditors, and others in the supply chain that have established relationships

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with the target firms (Tartari et al., 2003). These studies, however, have traditionally focused on the development of prediction models for non-financial sectors (e.g. manufacturing) and excluded financial institutions such as banks from their analysis, owing to differences in the environment in which they operate and their unique characteristics.[1]

The banking industry has experienced significant consolidation through merger and acquisition (M&A) activity over the past two decades. Yet, in relation to studies that can be found for non-financial sectors, there has been very limited research on developing prediction models to identify potential acquisition targets in the banking industry.[2] Apart from their bank-specific characteristics, it may be argued that the regulatory environment in which banks operate might be an important factor for the dearth of research in this area. In the US, for example, bank M&As were tightly regulated until the Gramm–Leach–Bliley Financial Services Modernization Act of 1999 and so the need for building a prediction model to identify potential bank targets would diminish if regulators were to approve only certain types of mergers.[3] In the European Union banking industry, despite the influence of regulatory control from both the European Commission and national authorities, there was a 23% reduction in the number of banks over the period 1997–2003, and this decrease was to a large extent due to M&As within national boundaries (Campa and Hernando, 2006). Hence, the evidence seems to suggest that it is competitive environment created by the single financial market rather than the underlying regulatory regime that has driven merger activity in the European banking industry.[4] Nevertheless, it is surprising that research on identifying potential targets in the banking industry has not attracted as much interest as research on other aspects of bank M&As, such as studying the underlying characteristics of bank acquisition likelihood, the assessment of performance gains from mergers, and the importance the environment (including the regulatory framework) in affecting the incentive to merge (see, e.g. Campa and Hernando, 2006).

The goal of this paper is to highlight the methodological issues involved in developing prediction models to identify acquisition targets in the EU banking industry, in the hope of encouraging research interest and activity in this relatively under-researched area. Although Pasiouras et al. (2007, 2008a,b) have recently examined the development of such models, they focus on the comparison of non-parametric techniques (e.g. multicriteria decision aid and support vector machines) rather than on traditional, parametric methods like discriminant and logit, which dominated research activity in the business of predicting non-financial targets for well over 30 years. Our study complements the aforementioned studies by developing discriminant and logit models of prediction, while undertaking a systematic comparison of the two sets of models by addressing several methodological issues, such as the approach to select variables, the use of raw versus industry relative data, and other issues involved in the evaluation process for predicting bank acquisition targets. The banking sector offers a fertile ground for developing prediction models to help identify potential takeover targets, in response

[1] Among the unique features of banks in particular, apart from their role in financial intermediation and the provision of financial services, is their unusual structure of financial statements suggesting that certain bank-specific characteristics distinguish them from other corporations (Bauer and Ryser, 2004). Thus many of the empirical proxies typically included in prediction models for non-financial firms, such as current and quick ratio, are not meaningful for banks, which are therefore excluded from the analysis.

[2] With the exception of Pasiouras et al. (2007, 2008a,b), none of studies in the literature on developing prediction models for takeover targets have focussed on financial firms for reasons explained above.

[3] We are thankful to an anonymous reviewer for this interesting and relevant comment that motivated us to include this paragraph in the revised version.

[4] Regulatory barriers, among other factors, appear to have hindered cross-border mergers according to the European Commission (2005), as they are subject to investigation by the EC Merger Regulation No. 4064/89 (Council of the European Union, 1989, 2004) if the transaction exceeds the turnover thresholds. Nevertheless, deals which do not raise serious doubts about competition in the single market often get approval. In the case of banks, nation states also have the right to block cross-border deals if they are not satisfied with the soundness and prudence of the acquirer. However, according to Koehler (2007), there have been only three cases so far where regulators have intervened and delayed the merger of banks in the EU. On the other hand, domestic M&As are typically governed by national laws, and these are rarely blocked except in cases where there is serious opposition from anti-trust authorities. Hence, the role of regulatory environment in affecting bank M&As is not clear-cut, and the empirical evidence seems to suggest that the underlying economic environment and the specific characteristics of banks play a more significant role in driving M&As in the European banking industry (see, e.g. Lanine and Vander Vennet, 2007; Hernando et al., 2008).