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Business models and bank performance: A long-term perspective

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ABSTRACT

This paper examines the effects of bank business models on performance and risk for a sample of 505 banks from 30 European countries over the period from 1998 to 2013. We document that business models in the European banking sector are characterized by a continuum, rather than a discrete set, of possible strategies. Using factor analysis to identify business models, we can account for this continuity. To estimate the impact of business models on performance, we use a methodology that is able to separate short-run effects from the longer-term impact of business model choices. Our findings show that retail-oriented banks perform better in terms of both profitability and stability and that diversification is associated with higher profitability. We report substantial variation of business model effects over different bank types. Our results lend support to the new capital regulations proposed in the Basel III framework, but we also argue that business model considerations should be more fundamentally integrated in the post-crisis regulatory and supervisory practice.

1. Introduction

This paper examines the impact of bank business model choices on their profitability, net interest margin and default risk for a panel of 505 banks from *30* European countries over the period from 1998 to 2013. The motivation for this research originates in the financial crisis and the subsequent initiatives to strengthen the resilience of banks. Various studies (Altunbas et al., 2011; Beltratti and Stulz, 2012) show that some types of banks proved to be particularly vulnerable. Reforms in banking regulations, including Basel III as well as several initiatives to limit the scope of bank activities, will further induce banks to reconsider their business models. The assessment of these initiatives requires a deeper understanding of the performance outcomes associated with different bank business models.

Our investigation is related to a growing literature that focuses on the concept of bank business models to explain bank performance. Altunbas et al. (2011), who use a broad set of pre-crisis bank characteristics to capture business models, report that low capital, large balance sheets, reliance on short-term market funding and aggressive credit growth can cause distress while a strong deposit ratio and greater income diversification improve resilience. Ayadi et al. (2012) use cluster analysis to identify business models of which they then compare the performance during and after the banking crisis. They document that retail-oriented banks are less likely to default, but also that a diversified funding structure can support profitability during a downturn. Wholesale banks are shown to be more risky due to an apparent failure to build adequate liquidity buffers. Demirgüç-Kunt and Huizinga (2010) and Köhler (2015) examine the effect of income and funding diversification on bank profitability and stability. The former find that a more diverse activity mix and a larger share of wholesale funding materially increase bank risk, while diversification benefits are only observed at low levels. Köhler (2015), on the other hand, using a sample of listed and unlisted banks over a period that includes the crisis, provides evidence that income diversification improves performance for retail banks, but hurts the stability of investment banks. A larger share of wholesale funding improves the stability of investment banks, while the reverse is true for retail banks.

We attempt to contribute to this literature in several ways. First, we evaluate the accuracy of different classification techniques, i.e. the allocation of banks to specific business model groups, taking into account the very diverse landscape of business models in the European banking sector. We find that the European banking sector is characterized by a continuum of possible business models, rendering classification difficult. Second, as an alternative to classification we propose a new approach to identify banks' business models that is based on factor analysis. In line with cluster analysis it uses a combination of observed variables to identify business

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models, but since it produces continuous variables, rather than discrete groups, this procedure also accounts for the existence of mixed business models. Third, the econometric approach, based on Mundlak (1978), differentiates in a clear way the within and between dimension of the panel data. This is important for two reasons. Statistically, we find that the differences across banks, i.e. the between dimension, are quite large compared with the observed changes within individual banks over time. Economically, the estimation enables an interpretation that disentangles short- and long-term effects (Baltagi and Griffin, 1984). In previous studies long-term effects were left largely unexplored, whereas we deem them crucial to understand the impact of business models on bank performance. Fourth, we exclude domestic subsidiaries of banking groups from our dataset. This is important since the strategic choices and performance of these subsidiaries are not independent from their parent firms, so that their inclusion might bias the results. These considerations are to a lesser extent valid for foreign subsidiaries since these enjoy more autonomy and fall under the jurisdiction of different supervisory agencies.

The factor analysis suggests that there are two important business model strategies, which we label *RETAIL* and *DIVERSIFICATION* based on their relation with the individual business model variables. In the investigation of the impact of business models on bank performance, we use four indicators: return on equity (ROE), return on assets (ROA), the net interest margin (NIM) and stability as measured by the *Z*-score.[1] We perform two sets of regressions. The first set uses the individual business model variables as regressors, while the second examines the impact of the principal factors. Finally, we also examine the impact of the individual variables for different levels of the *RETAIL* factor to assess the heterogeneity of these effects.

Our results provide evidence for the importance of business model characteristics as determinants of bank performance. We find that a strong reliance on retail activities is associated with higher profitability and stability. More diversified banks also perform better: they are more profitable, but not more susceptible to distress. The results for the individual business model variables reveal that the improved performance of retail banks can mainly be attributed to their reliance on customer deposits and larger capital ratio, while their typically low level of income diversification may undermine their profitability. The impact of the loan ratio appears to be negative, but the heterogeneity analysis demonstrates that this is not the case for more retail-oriented banks. These banks are also better able to convert additional credit risk into a higher NIM, suggesting that retail banks can more effectively screen and monitor loans. The results furthermore support the new capital regulations of the Basel III framework. Business models characterized by higher capital ratios are, ceteris paribus, associated with an improved trade-off between risk and profitability. Moreover, the impact on bank stability is found to be more positive for banks with a low degree of retail activities, which are typically larger and more highly leveraged. With respect to funding risk, we do not find evidence that a higher net stable funding ratio (NSFR) affects ROA or the *Z*-score, but there appears to be a positive effect on and stability for more retail-oriented banks. Finally, we also find that large banks are on average more stable. However, the increased stability of an individual bank due to its size is not necessarily consistent with the macroprudential aim of bank sector stability.

This paper is organized in the following way. In Section 2 we discuss the methodology to identify bank business models and how they can be related to bank performance. In Section 3 we discuss the data. Section 4 presents the results of our analysis. In Section 5 we explore the robustness of our findings. In the final section, we state our conclusions and consider some implications.

2. Methodology

2.1. Identification of bank business models

The concept of business models originates from the literature concerning strategic groups (Porter, 1979), i.e. sets of firms that are active in a single sector and use similar strategies. The space of possible strategies in banking, and therefore of possible business models, is spanned by a number of strategic variables that reflect the long-term choices of bank management with respect to assets, funding, capitalization and diversification. Given that a strategy is necessarily a long-term notion, we consider business models to be very stable, implying that the differences between banks are empirically more important than changes over time within banks to identify the performance impact of business model choices. The identification of bank business models requires a set of variables that determine the space of possible strategies. In this respect, the use of balance sheet and income statement data has a long history in the banking literature (Amel and Rhoades, 1988; Passmore, 1985). Although other non-financial variables, such as distribution channels and types of clients and products, may also provide information regarding a bank's strategy, we believe that this information should ultimately be reflected in the observed financial ratios. In order to be constitutive of a business model, these variables should not be independent from each other, i.e. some combinations of strategic variables should be more common than others. Concretely, we use a set of variables that capture a bank's strategic choices related to asset, liability, capital and income structure, including financial ratios linked to a bank's risk profile (see also, for instance, Altunbas et al., 2011). The specific variables are presented in Section 3.3. We now discuss several procedures to use the information contained in these variables to identify business models.

The first approach is based on the allocation of banks to specific groups through direct or indirect classification. Direct classification uses qualitative variables, e.g. the bank type according to Bankscope (Köhler, 2015), that are equated to the business model. Indirect classification, usually achieved through cluster analysis,[2] combines the information from a set of continuous variables to construct distinct groups of observations, that are as homogeneous as possible (Ayadi et al., 2011, 2012; Martín-Oliver et al., 2015; Roengpitya et al., 2014). An important drawback of classification that has remained underappreciated, however, is the validity of its assumption that there exist clearly separable business models, i.e. the unavailability of intermediate strategies. Compared to the US, the European banking sector is historically characterized by very limited regulations regarding the scope of bank activities. As a result, e.g. through mergers and acquisitions, a banking sector has developed that is characterized by a broad and continuous spectrum of available intermediate strategies, ranging from small savings and cooperative banks to big financial conglomerates in which non-retail activities dominate. We empirically document this issue in Section 4.1.

[1] The *Z*-score is most often used as a direct measure of bank risk. Delis et al. (2014), however, document the failure of the *Z*-score to measure the build-up of risk prior to the crisis in the US. For our purposes, however, the *Z*-score is still preferable as it measures the ex-post realization of default risk and, as such, the distress experienced by banks.

[2] Cluster analysis is a statistical technique to identify groups of observations in a dataset based on a dissimilarity measure of observations and a specific clustering method, e.g. hierarchical clustering (Everitt et al., 2011).