Schumpeterian competition and efficiency among commercial banks

Meryem Duygun, Vania Sena, Mohamed Shaban

Abstract
In this paper, we aim to fill the gap in the banking literature by quantifying the impact that the Schumpeterian competition mode—i.e. competition through the launch of new products (or new varieties of products)—has on the cost and profit efficiency of a sample of commercial banks based in the United Kingdom. We estimate both a cost and an alternative profit frontier on an unbalanced panel of UK commercial banks over the period 2001–2012. The intensity of competition through product innovation is proxied by the trademark intensity (i.e. the ratio between the number of trademarks registered in a given year by all the commercial banks – net of the trademarks registered by the bank under observation—and the employment in the sector) in the commercial banking sector. Our results show that the (lagged) trademark intensity in the commercial banking sector does affect negatively the mean cost and profit efficiency in the sector but there is evidence that as trademark intensity increases in the sector, commercial banks react by improving their cost and profit efficiency.

1. Introduction
The last two decades have witnessed an unprecedented process of liberalisation and deregulation in the banking sector. For instance, in the European Union, the purpose of the deregulation process was to favour competition among banks and create the conditions for a pan-European banking market (Casu and Girardone, 2009). The expectation was that a more competitive environment could provide banks with incentives to cut their costs to remain profitable (Casu and Girardone, 2006).

The deregulation process has indeed increased the level of competition in the European banking sector (Cetorelli, 2004), particularly in non-traditional and non-interest bearing areas of banking activity (Goddard et al., 2001). Less clear though is the impact of these changes on the efficiency of the banking sector. A large empirical literature has tried to quantify the impact of increasing competition on the cost efficiency of European banks but the results have shown that the view that competition is unambiguously good is more naïve in banking than in other industries ( Claessens and Laeven, 2004).

One problem with this literature is that it assumes that banks mostly engage in price competition (Degryse and Ongena, 2008). In other words, they assume that the increasing competition in the sector would push banks with market power to lower their loan rates (to enable them to keep their market share) while at the same time they would try to reduce their inefficiencies to keep their profitability. In practice, as competition in the banking sector intensified, it became clear that banks had started to compete not only by altering the price of their products but also by offering a wider range of products and services, so effectively engaging in a different type of competition mode (resembling the competitive process described by Schumpeter (1942) in his groundbreaking work on capitalist economies1) where firms compete by continuously introducing new products (or new varieties of existing products) so to be able to attract new customers and/or keep their customer base.

The impact of this type of competition on the productive efficiency in the banking sector is totally unknown as no empirical study has been conducted in this area. However, some authors have studied the impact of this type of competitive process on the performance and the market value of manufacturing and service firms (see for instance Greenhalgh and Rogers, 2007). Their results suggest that competition through product innovation may have two opposite effects on firms' performance. On the one hand, if a firm's competitors commercialise new products and manage to attract some of the customers, then the launch of new products will effectively put pressure on its market share and performance; on the other hand, if the competition intensity is above a certain threshold, it may exert pressure on firms to cut their cost and/or to introduce new products so to improve their performance.

1 According to Schumpeter, in capitalist economies, firms introduce new products in the market which can give the innovating firm a temporary monopoly position as it manages to attract customers from other firms and so to increase its profits; at the same time, the launch of any successful product signals to the competitors in the industry what is valued by customers and therefore will be followed by a spate of similar products which will eventually erode the profits of the first innovator.
Against this background, the purpose of this paper is to fill this gap in the banking literature and therefore we want to quantify the impact that the Schumpeterian competition mode – i.e. competition through the launch of new products (or new varieties of products) – has on the economic efficiency of the UK commercial banks. However, economic efficiency is a multifaceted concept and therefore it is important to decide beforehand the type of efficiency to focus on when measuring it (Berger and Mester, 1997). Traditionally, the banking literature has focused on the concept of cost efficiency (Berger and Mester, 1997); however, the ultimate objective of a bank is to maximise profits and fulfilling this goal does not only require that goods and services are produced at a minimum cost but that revenues are maximised as well. As pointed out by Maudos et al. (2002), computing profit efficiency, therefore, may provide the bank management with more information than just cost efficiency. The estimation of a profit frontier instead can capture the fact that there may be banks which produce high quality outputs: for instance higher levels of profit inefficiency than of cost inefficiency may suggest some inefficiency on the revenue side either due to the wrong choice of output or to the mispricing of output (Berger and Mester, 1997; Lozano, 1997; Rogers, 1998; Maudos et al., 2002).

Because of the additional information that profit efficiency can give compared to cost efficiency, we will focus on both cost and profit efficiency and therefore we estimate both a cost and an alternative profit frontier on an unbalanced panel of UK commercial banks (drawn from the global database Bankscope), observed over the period 2001–2012. To estimate cost (profit) efficiency in our panel, we adopt the so-called “frontier” approach to the measurement of cost (profit) efficiency where (in) efficiency is computed as the distance from an estimated cost (alternative profit) frontier for the sector. To estimate the impact that the competitors’ launch of new products has on the cost (profit) efficiency of commercial banks, we use the one-stage approach to the estimation of the cost (alternative profit) frontier proposed by Battese and Coelli (1995) that allows to estimate simultaneously the parameters of the frontier and the size of the impact of a set of observable variables on the efficiency scores’ mean.

The key issue for our analysis is, of course, the choice of the variable which proxies for the launch of new products by commercial banks. In this paper, we use trademarks as our proxy. A trademark is any sign (a word, a logo, a phrase, etc.) which makes distinctive the goods or the services offered by a firm or a commercial bank in our case. There are many advantages associated to the use of trademarks as a proxy for product innovation. First, the commercialisation of new products is sometimes associated to the creation of a new trademark and therefore trademarks could possibly mitigate the lack of information on innovation in the service sector. Second, trademarks do not have the drawbacks generally associated with the traditional innovation indicators, namely patents and R&D data. One particular drawback of patents and R&D is that they do not reflect the commercial aspect of innovations. R&D is indeed an input in the innovation production process while patents tend to be used mostly for technological innovations which are not particularly relevant to the banking sector.

In our empirical analysis, the intensity of competition through product innovation in the commercial banking sector is proxied by the trademark intensity (i.e. the ratio between the number of trademarks registered in a given year by all the commercial banks – net of the trademarks registered by the bank under observation – and the employment in the sector) in the commercial banking sector. This variable is, therefore, introduced among the determinants of cost and profit efficiency (as well as the standard set of variables used as controls in this literature) to gauge the extent to which the launch of new products from competitors affects the mean cost and profit efficiency among commercial banks. To capture the possibility that the competition measure has a non-linear impact on the average cost (profit) efficiency among commercial banks, we introduce the square of this variable among the determinants of the mean efficiency. Finally, the trademark intensity at sectoral level (both in level and squared) is lagged to allow for the fact that it may take some time before the intensity of competition may have an impact on cost (profit) efficiency.

Our results show that the (lagged) trademark intensity in the commercial banking sector does affect the mean cost and profit efficiency among commercial banks. In the case of cost efficiency, it appears that the launch of new products in the sector makes them more cost inefficient, presumably because the increasing trademark intensity in the sector puts pressure on the market share of the remaining banks. Unsurprisingly, falls in cost efficiency are followed by decreases in profit efficiency. However, as the competition through innovation intensifies, its impact on the sector’s mean cost efficiency becomes positive as now banks start to react to the competitive pressure and begin to contain costs with the result that cost efficiency improves. As for profit efficiency, we find evidence that profit efficiency improves as well as competition intensifies although the estimates suggest that for some value of competition intensity, profit efficiency does not improve even if cost efficiency does. The net impact of this competition mode on cost and profit efficiency in the sector is though negative in the sense that overall both cost and profit inefficiency in the banking sector increases following an increase in the intensity of competition.

We have also performed some additional tests to gauge the robustness of our results. First, we have tested whether our results still hold when only non-trademarking banks are included in the sample. Second, we have tested their robustness to the introduction of the (lagged) stock of trademarks in the industry in case the impact of trademarks on cost efficiency is really through the stock of trademarks in the sector rather than the flows. Finally, we have re-estimated our two frontier models on a sub-sample of commercial banks which excludes very large banks (with total assets above one hundred million thousands) to rule out the possibility that the main results are driven by the presence of this segment of banks which may find difficult to adjust their cost and profit efficiency to changes of the competitive environment because of their size. In all cases, the main results hold; in particular in the second case, the sectoral stock of trademarks is not significant so suggesting that it is the introduction of new products which has an impact on the movements of cost and profit efficiency rather than the existing stock of products.

The structure of the paper is the following. Section 2 summarises the main literature in two distinct areas. First, we review the empirical literature on the impact of competition on the cost efficiency in the banking sector. Afterwards, we present the literature discussing the relationship between trademarks and product innovation. Section 3 focuses on the empirical methodology and therefore it give details on our empirical specification as well as the data-sets.
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