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Trademarking activities and total factor productivity: Some evidence for British commercial banks using a metafrontier approach

Meryem Duygun [c], Vania Sena [a,*], Mohamed Shaban [b]

[a] University of Essex, UK
[b] University of Sheffield, UK
[c] University of Nottingham, UK

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ABSTRACT

In this paper, we compute a non-parametric Metafrontier Malmquist index to evaluate the Total Factor Productivity (TFP) change among UK-based trademarking and non-trademarking commercial banks between 2005 and 2013. The use of the metafrontier approach allows us to: a) identify the drivers of TFP growth for each group of banks, b) compare the TFP growth of each group to the TFP growth experienced by the whole industry, and c) assess the extent to which the former catches up with the latter measured along the metafrontier. Our results suggest that TFP has been increasing among trademarking banks up to the onset of the financial crisis but this process has since reversed. The catch-up indexes suggest that both groups of banks were catching up with the metafrontier up to the financial crisis although the drivers of this process differed between the two groups. After the financial crisis, improvements in technology have been driven by a small number of commercial banks i.e. the non-trademarking banks. These results suggest that a large section of the commercial banking sector has not been able to overcome the effects of the financial crisis.

1. Introduction

A trademark is defined as any sign (a word, a logo, a phrase, etc.) which makes distinctive the goods or services offered by a firm. Trademarks belong to the portfolio of legal mechanisms which protect a firm's intellectual property and have been mostly studied as such in conjunction with patents, design rights and so on (Schmoch, 2003; Greenhalgh and Longland, 2005). However, economists have pointed out that they perform other roles: for instance, it has been suggested that firms use them to differentiate their products from those offered by their competitors (Landes and Posner, 1987; Elliott and Percy, 2006); also, they can signal consumers that the products on sale are of consistent quality contributing to solve the problem of asymmetric information between producers and consumers about the quality of the products.

Over the last fifteen years, British commercial banks have started to make extensive use of trademarks. Greenhalgh and Rogers (2006) reported a surge of the trademarking activity in the financial services sector around mid-Nineties and suggested it was the direct result of the increase in competition in the sector following a set of regulatory changes that allowed commercial banks to diversify their activities[1]. Nowadays, trademarking is quite common among commercial banks. Trademarks are associated to products and services for both consumers and companies. Trademarking banks include some of the largest British commercial banks (like Barclays, Lloyds Bank, Natwest and HSBC) although small banking groups (which serve regional markets) trademark as well (an example is Clydesdale Bank plc). The common feature of trademarking banks is that they do not operate in niche segments of the retail banking: on the contrary they offer generic retail banking services to consumers and since these are not necessarily tailored to the needs of specific customers, trademarking is quite important as it helps to attract more customers. Trademarking banks tend to be active in corporate banking and therefore they play a key role in helping both small and large firms to access credit.

Does trademarking matter to commercial banks? In other words, what are the economic benefits of trademarking to commercial banks? Despite the fact trademarks are widely used across the banking sector, these questions have been only partially explored by the banking literature. The existing research suggests

* Corresponding author at: Essex Business School, University of Essex, Gateway Building, Southend on Sea, UK. Tel.: +44 1702328423.
E-mail address: vsena@essex.ac.uk (V. Sena).

[1] The European banking sector was deregulated during the Nineties and this process led to: (a) the deregulation of interest rates, (b) the abolition of credit ceilings and c) the lifting of the restrictions on cross-border activities.

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trademarking may be beneficial to commercial banks in several ways. For instance, a couple of studies have found that there exists a positive association between the value of the Tobin's q among commercial banks and their trademarking activity (Gonzalez-Pedraz and Mayordomo, 2011; Greenhalgh and Rogers, 2006). In a similar vein, Duygun et al. (2014) have found that trademarking banks tend to be more profit-efficient than their non trademarking counterparts. However, we argue that trademarking may potentially affect other dimensions of a bank's performance like Total Factor Productivity growth (TFP growth, henceforth) and its components. Although no previous study has tested directly whether trademarking is associated to faster (or slower) TFP growth in the banking sector, evidence from the manufacturing sector suggests that trademarking firms tend to be more productive as well[2]. This positive association is usually explained by the fact that trademarking induces consumers to demand more of the products offered by trademarking firms with the result that these have to produce more output (for a given level of inputs). However, whether such an association exists among commercial banks as well is unknown.

Against this background, the purpose of this paper is threefold. First, we want to measure the TFP growth of trademarking and non-trademarking banks so to quantify the gains in productivity the two groups of banks have experienced; second, it will fill a gap in the academic literature by investigating the mechanisms that drive TFP growth among the two groups of banks by decomposing the TFP growth index into its main components (Ray and Desli, 1997). Third, we use a metafrontier approach to construct a catch-up index that allows to measure the speed at which each group is catching up with the TFP growth measured along the metafrontier. Our analysis is conducted on a panel of UK commercial banks, observed over the period 2005–2013 offering this way an opportunity to study the evolution of productivity among these two groups of banks during the most acute phase of the financial crisis as well as the start of the economic recovery. Data Envelopment Analysis (DEA) will be used to compute the TFP growth (and its components) of both trademarking and non- trademarking banks and will identify the sources of catch-up towards the industry best practice among commercial banks before and after the financial crisis[3] and explore whether there are differences between the two groups that prevent them from catching up with the metafrontier[4].

The structure of the paper is as follows. Section 2 discusses the channels through which trademarking can influence TFP growth. Section 3 focuses on the empirical methodology we employ in the paper as well as the data-sets and the measurement of the variables. The empirical results are presented in Section 4. Finally, Section 5 offers some conclusions.

2. Can trademarking influence total factor productivity?

As mentioned in the Introduction, trademarks stimulate the demand for a company's products and it is through this main channel that trademarking can have a positive influence on TFP growth (Schautschick and Greenhalgh, 2013). To understand why this is the case, it is useful to recall the definition of TFP. This is usually defined as the ratio between an index of output and an index of total input usage (Grosskopf, 1993). Changes of TFP over time can be driven either by changes in the technology firms have access to with the result that they can produce more output (for a given level of inputs) or reduce the existing inputs' usage (for a given level of output). Equally, changes in technical efficiency (or the efficiency by which firms use their inputs) can contribute to TFP growth as again firms can produce more output with the same amount of inputs (or viceversa). If we allow variable returns to scale, then adjustments of the scale of operations of a firm may also create the conditions for an increase in output or a reduction in the amount of employed input (Ray and Desli, 1997). The frontier approach to the measurement of TFP defines a firm's TFP growth as the net change in output due to change in efficiency and technical change where the former is ascribed to movements towards the frontier while the latter is due to movements of the frontier (Caves et al., 1982).

Potentially, trademarking can influence TFP growth through each of its components. As mentioned above, the main channel through which trademarking can influence a firm's TFP is by stimulating the demand for its services and products. How a firm responds to such an increase in demand may vary. It can be met by firms either by changing the level of usage of the existing inputs (i.e. by using some of the excess capacity) or by expanding the inputs (for instance, by hiring more workers) if there is no excess capacity left. In the former case, we should observe an improvement of the operational efficiency as more output can be produced for the same amount of inputs. In the latter case, the expansion of inputs can be followed by a change of the firm's scale as well as a change of the returns to scale (if the firm's technology is characterised by variable returns of scale).

In both cases, changes in the demand can be accommodated by a firm mostly by changing the existing inputs usage but without changing the existing production techniques. This is possible as long as there is some pre-existing unused capacity in the firm or some technical inefficiency in the firm (due to size or any other reason) which can be used to meet the surge in demand. However, if this is not possible, firms may decide to adopt different production techniques which would allow them to produce more output with the same (or less) levels of inputs and this way accommodate the increase in demand following the trademarking activities. This way, firms would experience technical change followed by increases in TFP. This relationship between trademarking activity, technical change and eventually TFP growth can be particularly relevant to firms which tend to invest more in the development of innovative production technologies and therefore tend to be the technological leaders in their industry. Interestingly, there is some evidence suggesting that trademarking is associated to innovation, in particular in the service industry. A few examples include Schmoch (2003) who has found that trademarks and product innovation are positively correlated in the service industry and Malmberg (2005) who compared the new trademark applications with the launch of new product innovations and found that there is a positive correlation between the two in particular among companies targeting consumers.

Although theoretically trademarking can be positively associated to each component of a firm's TFP growth, in practice the extent to which trademarking can drive efficiency change, technical change and scale efficiency change will vary according to the characteristics of the industry with the result that it is up to empirical analysis to quantify the contribution of trademarking to each source of TFP growth.

3. The empirical strategy: data and methodology

3.1. Data

Our empirical analysis has been conducted on a sample of commercial banks drawn from Bankscope. We first selected all the

[2] Greenhalgh and Longland (2005) find that increasing trademarking intensity had a significant positive impact on the subsequent levels of output in the UK manufacturing. Also, Greenhalgh and Rogers (2012) show that trademarking is associated to a value-added premium ranging between 10% and 30%.

[3] See for instance Matousek et al. (2014) on this point.

[4] These may be due to imperfections in the market for new technology or to the incapability of some banks to benefit from the technology spillovers that are produced in the industry.