Inequalities in the efficiency of the banking sectors of the European Union

Juan Fernández de Guevara (IVIE)

Joaquín Maudos (University of Valencia and IVIE)

Abstract

The aim of this study is to analyse the inequalities of cost and profit efficiency existing in the banking sectors of the European Union, and the origins of the inequalities observed. The decomposition of the Theil index shows that on the cost side the greatest differences within groups occur when we divide the total sample into institutional groups (commercial banks, saving banks, co-operative banks and other banks), being the country effect and the type of productive specialisation more important in explaining the differences between groups. In profit efficiency, there are much greater differences between countries, but none between specialisation clusters.

Universitat de Valencia; Departamento de Análisis Económico; Edificio departamental oriental; Avda. de los Naranjos, s/n; Valencia -46022- (SPAIN). E-mail: joaquin.maudos@uv.es

Instituto Valenciano de Investigaciones Económicas (IVIE); c/ Guardia civil 22, Esc 2, 1º; Valencia -46020- (SPAIN). Tel: 34-96-393.08.16; Fax: 34-96-393.08.56. E-mail: juan.fernandez@ivie.es [corresponding author]

1. Introduction

The creation of the European Union has led to an increase in the degree of competition among banking firms. This greater competition compels firms to improve their efficiency levels in a banking market in which there are no barriers to the movement of capital. Thus, the achievement of a high degree of efficiency in the management of resources becomes a necessity.

A recent study by Altunbas and Chakravarty (Economics Letters, 1998) reveals substantial differences of efficiency in the banking sectors of the European Union. Using the Theil index, they decompose inequalities of technical efficiency into a inter group-component and a intra-group group component, classifying European banks into groups according to their institutional nature (commercial banks, savings banks, co-operative banks and others[1]). The main result they obtain is that, although the variation in efficiency is explained mainly by the differences within each institutional group, the differences between groups are not negligible.

However, there are other aspects that may be of equal or greater importance than institutional character in explaining the inequalities of efficiency among European banks. This study analyses two in particular: productive specialisation and the characteristics of each country.

Furthermore, recently published studies (Berger and Humphrey, 1997; Berger and Mester, 1997) show the importance of analysing efficiency not only in costs but also in profits. Consequently, in this study we will analyse the inequalities in both types of efficiency.

To sum up, the study extends the results of Altunbas and Chakravarty (1998) in two directions: analysing the importance of productive specialisation and the country effect in the explanation of the differences in efficiency of the banking sectors of the European Union; and estimating both cost efficiency and profit efficiency.

2. Origins of inequality: type of institution, type of specialisation and country effect

As shown by Altunbas and Chakravarty (1998), banks of different institutional type carry out different types of banking business, so the differences in efficiency among countries may reflect the differences in the banking structure of the different countries.

On this basis, the different types of banks (commercial banks, savings banks, co-operative banks and others) offer different banking services and products, therefore there also exist differences of productive specialisation. However, although the institutional differences can imply differences of specialisation, in many countries firms with different institutional classification specialise in the same type of banking business. Consequently, productive specialisation is more suitable than the institutional characteristic for a proper comparison of measurements of efficiency.

Direct comparisons are often made between the levels of average costs, efficiency, etc., of different banking sectors or firms. These comparisons can be deceptive if they do not take into

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[1] This group is composed of small specialised banks such as investment banks, medium and long term credit banks, non banking credit institutions, real estate banks, mortgage banks and special government banks.

account the differences of specialisation of the banking systems or firms being compared. This is because the composition of banking output (productive specialisation) influences the levels of average costs and revenue - and therefore profitability - so that a higher or lower level should not necessarily be interpreted as greater or lesser relative efficiency.

For all these reasons, in this study we identify banking groups of similar specialisation using cluster techniques[2]. The criterion used to determine the clusters is to group firms in accordance with some measurement of their distance from certain individual characteristics, each group being as different as possible from the others. The variables chosen for grouping banking firms were: loans, other earning assets, fixed assets, deposits, other sources of funding and equity, all of them expressed as ratios of total assets.

All the information necessary for estimating cost and profit efficiency and for forming clusters is contained in the balance sheets and profit and loss accounts in the IBCA database. The sample used covers the period from 1993 to 1997 and is formed of all those banking firms with a size greater than 100 million dollars, hence excluding the banks of very small size. Since the technique used to estimate efficiency (distribution - free approach, Berger, 1993) requires the availability of a complete panel data, the firms that did not have information for all these years were eliminated. With these restrictions, the sample finally used consists of 9,260 observations corresponding to 1,852 firms of all countries of the EU except Holland.

The application of the program for grouping banking firms into clusters by specialisation enables us to detect four productive specialisation groups[3]:

* Cluster 1 (CL1): Traditional intermediary banks. This group is characterised by financing itself mainly by the capturing of deposits (84.3% of total assets), placing its resources mainly in the form of loans (66.6%). The total number of banks contained in CL1 is the largest of the sample (933).

* Cluster 2 (CL2): Mortgage banks. This cluster contains only 73 banks of the sample. It is financed by means of instruments other than deposits and devotes its resources to granting mortgage loans.

* Cluster 3 (CL3): Retail banks. This cluster groups 600 firms. This group, formed mainly by savings banks and commercial banks, is financed mainly through deposits (80%), distributing its resources fairly evenly between loans (44.6%) and other earning assets (49.2%).

* Cluster 4 (CL4): Market investment deposit banks. This group captures the major part (80%) of its resources in the deposit market, but devotes most of them (76%) to earning assets other than loans. 245 banks are included here.

Finally, as the characteristics of each country (degree of concentration, level of competition, density of the branch network, existence of barriers to entry, etc.) may also be important in explaining the differences observed in the levels of efficiency of the different banking sectors of the European Union, we will also analyse the importance of the country effect

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[2] See more details in Maudos et al. (2001).
[3] For this purpose we used a non-hierarchical method (k-means) though first a hierarchical one (Ward) was used to determine the number of clusters.

on inequalities of efficiency.

3. Inequalities of efficiency: empirical results

Cost and profit efficiency were estimated using the distribution – free approach (Berger, 1993). The efficiency of each firm was obtained by estimating cost and profit functions[4] that take the Fourier Flexible functional form, which nests the translog specification. In the case of the profit function, we estimate alternative profit efficiency (see Berger and Mester, 1997), as it permits the existence of market power in the setting of prices. The intermediation approach is used, specifying 3 outputs (loans, other earning assets and deposits) and 3 inputs (labour, loanable funds and physical capital). The dependent variable in the cost function is total costs (operating and financial) and in the profit function it is operating profit. The estimation includes financial capital as netput in order to capture the differences in risk between firms[5].

Table 1 contains the average values of cost and profit efficiency[6] both for the total sample and for the institutional groups and specialisation clusters. As is usual in other studies, profit efficiency (0.64) is lower than cost efficiency (0.93), showing the added importance of inefficiency on the revenue side. By countries, the differences are more pronounced in profit efficiency, highlighting the high efficiency of Sweden and the low value for Finland.

The information by institutional groups offers a different view in both types of efficiency. Thus, although the "other bank institutions" group is the most efficient in costs, it is the most inefficient in profits. This shows that the analysis of cost efficiency offers only a partial view of the efficiency of a banking firm and consequently the need to analyse also inefficiencies in profits.

By specialisation clusters, the "retail banks" are the most cost efficient, the "market investment deposit banks" the most inefficient. In profit efficiency also it is the cluster of "market investment deposit banks" that shows the highest levels of inefficiency, while the "mortgage banks" are the specialisation group with the highest levels of efficiency in profits.

Table 2 contains the decomposition of the inequalities of efficiency within (intra-group component) and between (inter-group component) groups, using the Theil index (Shorrocks, 1980; Shorrocks, 1984). Comparison of the decomposition of the Theil index on the cost side shows that the greatest differences within groups occur when we divide the total sample into institutional groups; in this case the inequalities between groups represent 3.89% of the total. This percentage is slightly lower than that obtained when we divide the total sample by countries (6.10%) and by productive specialisation groups or clusters (5.63%).

In profit efficiency, the results are more variable according to the indicator used for forming the groups. Thus, if we divide the sample of European banks by specialisation clusters, practically all the inequalities are within groups, the differences between clusters being

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[4] Altunbaş and Chakravarty (1998) estimate a production function and therefore only analyse technical efficiency. The advantage of estimating a cost function is that it enables economic efficiency, including both technical and allocative efficiency, to be measured.
[5] See Berger and Mester (1997).
[6] The values correspond to the usual truncation level of 5%.

practically negligible. In the case of institutional groups, the differences between groups (3.097%) are very similar to those obtained in cost efficiency. However, when we divide the total sample by countries, the differences between countries are substantial, the inter-group component accounting for 18.22% of the total.

Thus, the results obtained show that the inequalities of efficiency are explained mainly by the differences within groups, the differences between groups being smaller. It is in profit efficiency that the country effect is most important in explaining the inequalities observed in the banking sectors of the European Union, the specialisation effect being practically negligible. On the cost side, the country effect it is also more important than the type of institution and specialisation in explaining the inequalities of efficiency between groups. It is also important to note that the type of productive specialisation is more important than the type of institution in explaining the differences between groups.

4. Conclusions

The aim of this study has been to analyse the inequalities of efficiency in the banking sectors of the European Union, as well as the sources of the inequalities observed. The estimation of profit and cost efficiency by means of frontier techniques reveals the existence of greater inequalities of efficiency in profits than in costs. The use of the Theil index shows that on the cost side the greatest differences within groups occur when we divide the total sample into institutional groups (commercial banks, savings banks, co-operative banks and other banks), although the country effect and the type of productive specialisation also help to explain the differences between groups. Consequently, the type of productive specialisation is more important than the type of institution in explaining the decomposition of the Theil index between groups. In profit efficiency, the differences between countries are much greater, there being no differences between specialisation clusters.

The implication of the results obtained is that the specific factors of each country (degree of competition, barriers to entry, etc.) explain some of the inequalities of profit efficiency, while on the cost side the differences between the groups formed (institutional, specialisation, or country) are smaller than those found on the profit side.

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Table 1. Average efficiency by country, cluster and type of institution

	Cost efficiency	Profit efficiency
Means by country		
Austria	0,9250	0,5809
Belguim	0,9366	0,4439
Germany	0,9291	0,6686
Denmark	0,9366	0,7427
Spain	0,9404	0,6890
Finland	0,7982	0,3029
France	0,9002	0,5405
United Kingdom	0,8417	0,4472
Greece	0,9068	0,6683
Ireland	0,9643	0,4564
Italy	0,9089	0,6052
Luxembourg	0,9400	0,7524
Portugal	0,9199	0,7185
Sweden	0,8611	0,9710
Means by cluster		
Cluster 1: Traditional intermediary banks	0,9203	0,6373
Cluster 2: Mortgage banks	0,9189	0,6664
Cluster 3: Retail banks	0,9378	0,6393
Cluster 4: Market investment deposit banks	0,8999	0,5977
Means by type of institution		
Commercial Banks	0,9187	0,6595
Saving banks	0,9324	0,6611
Co-operative banks	0,9142	0,6040
Other bank institutions	0,9465	0,5759
Total sample	0,9252	0,6367

Table 2. Decomposition of the Theil index by country, cluster and type of institution

	Country		Cluster		Type of institution		Theil
	Within	**Between**	**Within**	**Between**	**Within**	**Between**	**Index**
Cost efficiency	0,0015	0,0001	0,0015	0,0001	0,0016	0,0001	0,0016
	93,8957	6,1054	94,3719	5,6310	96,1098	3,8909	100,0000
Profit efficiency	0,0416	0,0093	0,0505	0,0004	0,0493	0,0016	0,0509
	81,7766	18,2246	99,2694	0,7304	96,9029	3,0975	100,0000

Note: In each cell it is shown the decomposition of the Theil index and the percentage over the total index