Efficiency measurement of the Greek commercial banks with the
use of financial ratios: a data envelopment analysis approach

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Received 6 October 2001; accepted 1 February 2004

Abstract

This study offers an application of a non-parametric analytic technique (data envelopment analysis, DEA) in
measuring the performance of the Greek banking sector. It explores the efficiency of Greek banks with the use of
a number of suggested financial efficiency ratios for the time period 1997–1999. In this way the proposed model
offers an empirical reference set for comparing the inefficient banks with the efficient ones. It departs from most
frontier studies of bank performance, by using these suggested ratios as output measures and with no use of input
measures. The proposed model is compared to the conventionally used input–output analysis as well as to the simple
ratio analysis. It is shown that data envelopment analysis can be used as either an alternative or complement to ratio
analysis for the evaluation of an organization’s performance. We find that the higher the size of total assets the
higher the efficiency. We also find a wide variation in performance and we show that the increase in efficiency
is accompanied with a reduction in the number of small banks due to mergers and acquisitions. Finally, from the
efficiency results it seems that there is a non-systematic relationship between transfer of ownership and last period’s
performance.

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Keywords: Banking; Financial ratios; Data envelopment analysis

1. Introduction

In the Greek financial system, the commercial banks play an important role and contribute substan-
tially to the finance of the national economy. The Greek banking industry has undergone a substantial
development over the last years. Since the end of 1980s it has entered a new stage with several changes,
which started with the Report of the Karatza’s Committee in 1987. These changes are on going and are
expected to continue into the future as well.

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1044-5005/$ – see front matter © 2004 Elsevier Ltd. All rights reserved.
doi:10.1016/j.mar.2004.02.001
The main changes in the banking system after 1992 include among others the liberalization of interest rate determination,\(^1\) the abolition of various credit rules, the free movement of capital and the increased competition from banks of the European Union (Noulas, 1999). As a result, banks have been free to determine their interest policy for deposits and loans since 1993. In the same year, banks were allowed to follow their own investment policy without the restriction of investing a certain percentage in government bonds. These two measures towards further liberalization have driven increased competition in both price and quality levels of the offered services by the banking sector. The competition among banks has increased mainly due to this market liberalization, technological improvements and the entrance of non-banking institutions for the provision of banking services in the form of non-intermediation (Staikouras and Steliarou, 1999). The competition has strengthened with the emergence of banking institutes from the EU but also from the competition from other credit institutes such as insurance companies and cooperative banks.

Although till recently the main choice of banks to achieve their targets for development was by growing the components of their assets, today this choice has moved to increasing profitability. All of the above require the determination and management of several factors, which play an important role in the profitability of banks in the new environment.

The task of this study is to examine the efficiency of the commercial banking system during the period 1997–1999 and the relative efficiency of each bank. We intend to show that financial accounting ratios and non-parametric techniques can be used as a complement to each other for the evaluation of bank performance (Rouse et al., 2002). For this reason we employ both ratio analysis and data envelopment analysis techniques (hereafter DEA) for the measurement of efficiency with the use of financial ratios which are frequently applied in the banking sector.\(^2\) It is also generally accepted among analysts of the banking sector, that the efficiency of a bank is multidimensional from its nature. Specifically the efficiency of a bank is measured by using ratios such as return on equity (ROE), return on total assets, the difference of interest bearing elements of assets and liabilities, profit/loss per employee, the efficiency ratio and the net interest margin ratio.

Before we proceed with the presentation of the method used, we have to emphasize that the derivation of reasonable conclusions related to the comparative performance of a subset of banks pre-supposes that this comparison is carried out among banks operating in homogeneous markets. That is, we should compare banks with the maximum feasible homogeneity in their offered services.

This study offers an application of DEA to the Greek banking system. In contrast to most frontier studies of bank performance, which use bank inputs and outputs, we rely on standard ratio measures of bank financial performance as output measures in the DEA model. In this way we evaluate the performance of the Greek banks over the period of 1997–1999. This modeling follows that of Lovell (1995), who took standard measures of macroeconomic performance and used a modified DEA model to derive a composite index of performance.

There are some innovative features in this study. It is the first time that financial-banking efficiency ratios are used as variables to evaluate efficiency, instead of the typically used input–output variables in almost all banking applications based on input quantity, output quantity and prices.

Another interesting feature is the absence of inputs in the model which while not innovative is relatively underutilized. In this study performance is measured with an output vector consisting of five

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\(^1\) For the consequences in banks’ efficiency from the reduction in interest rates in the zone of EU/RO see Thanos (2000).

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