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Evidence from Malaysia Banking Sector**

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1 January 2008

Online at <https://mpra.ub.uni-muenchen.de/61817/>

MPRA Paper No. 61817, posted 05 Feb 2015 20:41 UTC

The Relationship between Risk-Return Trade-Off and Productive Efficiency: Evidence from Malaysia Banking Sector

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Disclaimer: All findings, interpretations, and conclusions are solely of the authors' opinion and do not necessarily represent the views of the institutions. The authors also like to thank Razali Haron in providing constructive comments and feedbacks for the earlier draft.

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ABSTRACT

The non-parametric frontier approach, Data Envelopment Analysis (DEA) is employed to investigate the efficiency of banking stocks which are traded on the Kuala Lumpur Stock Exchange (KLSE). Unlike the earlier studies which use balance sheet and income statements data, the paper uses market data as the input and output variables. The results suggest that the most efficient bank is also highly ranked in terms of returns with relatively low standard deviation and beta. The results also suggest that all stocks which managed to appear on the efficiency frontier were mainly driven by the relatively higher mean returns rather than lower standard deviations and/or beta.

JEL Classification: G21; D24

Keywords: Bank Efficiency, Share Prices, Data Envelopment Analysis, Malaysia

1. INTRODUCTION

Over the last years, several papers have examined the efficiency of banks with parametric and/or non-parametric frontier techniques. While the majority of the early studies focus on the U.S. (see Berger and Humphrey, 1991; Berger, 1993; Miller and Noulas, 1996) more recent studies examine several other countries such as Australia (Sathye, 2001), India (Ataullah and Le, 2006), Hong Kong (Drake *et al.* 2006). Apart from focusing on various countries, these studies also examine several other issues of bank efficiency i.e. efficiency of foreign and domestic banks, impact of risk on bank efficiency, off-balance sheet activities on bank efficiency, etc.

However, only a few studies examine the relationship between share performance and bank efficiency (Beccalli *et al.* 2006). These include Adenso-Diaz and Gascon (1997) in Spain, Chu and Lim (1998) and Sufian and Majid (2006a) in Singapore, Eisenbeis *et al.* (1999) in the U.S., Beccalli *et al.* (2006) in the principal EU banking sectors (i.e. France, Germany, Italy, Spain, and U.K), Sufian and Majid (2006b) in Malaysia and Kirkwood and Nahm (2006) in Australia. This is surprising since several studies have examined the relationship between share price changes and traditional accounting performance measures that reflect earnings and cash flows and many of them tend to support that earnings reflect the information in share prices¹.

Nonetheless, as mentioned in Halkos and Salamouris (2004), the use of financial ratios to measure bank performance has recently been criticized. Berger and Humphrey (1997) and Bauer *et al.* (1998) mentioned that efficient frontier approaches seem to be superior compared to the use of traditional financial ratios from accounting statements – such as return on assets (ROA) or the cost/revenue ratio – in terms of measuring performance. Berger and Humphrey (1997) point out that the frontier approaches offer an overall objective numerical score and ranking and an efficiency proxy together with the economic optimization mechanism. Furthermore, in relation to share performance, the empirical findings by Beccalli *et al.* (2006) not only provide support to the argument that better operating efficiency is reflected in better stock performance, but they also find evidence that efficiency measures appear to have high explanatory power than traditional accounting ratios.

The purpose of the present study is to provide additional evidence from the Malaysian banking sector. Although a recent study by Sufian and Majid (2006b) investigate the efficiency of Malaysian banks and its share performance in the marketplace, in the present paper, we extend the technique used by

¹ See Kothari (2001) for a very comprehensive review of the literature.

Oliviera and Tabak (2005) by employing market data as input and output variables to individual banks stocks that are listed on the Kuala Lumpur Stock Exchange (KLSE). By doing this, we intend to broaden the scope of the existing studies, by employing individual bank market data to measure their efficiency levels.

The rest of the paper is structured as follows: Section 2 presents the review of the related studies. Section 3 discusses the data and methodology. Section 4 discusses the empirical results and Section 5 concludes the study.

2.0 REVIEW OF THE LITERATURE

Efficiency studies applied to banking sectors abound in the literature. However, only a few studies examine the relationship between share performance and bank efficiency (Beccalli *et al.* 2006). Using DEA with three inputs and two outputs, Chu and Lim (1998) have evaluated the relative cost and profit efficiency of a panel of six Singapore listed banks during the period 1992-1996. They found that during the period the six Singapore listed banks have exhibited higher overall efficiency of 95.3% compared to profit efficiency of 82.6%. They also found that large Singapore banks have reported higher efficiency of 99.0% compared to 92.0% for the small banks. They also suggested that scale inefficiency dominates pure technical inefficiency during the period of study. They found that percentage change in the price of bank shares reflect percentage change in profit rather than cost efficiency.

By using the DEA besides the parametric model Stochastic Frontier Approach (SFA), Beccalli *et al.* (2006) estimated efficiency measures of the banking cost to a sample of European banks (France, Germany, Italy, Spain and the UK) in 1999 and 2000. When they defined the parameters to be used in the model, the authors chose the focus of intermediation using deposits, loans, and securities as outputs, and labor and capital as inputs. The authors made the regression of the annual scores of efficiency in relation to the respective performances in the stock market. The results suggest that changes in the prices of banks' stocks mirror changes in the cost of efficiency, especially the ones derived from the DEA. This trend is not that clear when using the SFA model.

Kirkwood and Nahm (2006) used Data Envelopment Analysis (DEA) to evaluate cost efficiency of Australian banks in producing banking services and profit between 1995 and 2002. Empirical findings indicate that major banks have improved their efficiency in producing banking services and profit, while the regional banks have experienced little change in the efficiency of producing banking services, and a

decline in the efficiency of producing profit. They further relate the changes in efficiency to stock returns and found that changes in bank efficiency are reflected in stock returns.

Sufian and Majid (2006a) employed the non-parametric frontier approach, Data Envelopment Analysis (DEA) to three-year event window to detect for any efficiency gains (loss) resulting from the mergers and acquisitions among the domestic incorporated Singapore banking groups. Their results suggest that the merger has resulted in higher mean overall efficiency of Singapore banks post-merger relative to pre-merger. The results also support the hypothesis that the acquiring banks' efficiency improved (deteriorates) post-merger resulting from the merger with a more (less) efficient bank. They have further established the relationship between cost efficiency and share price performance by employing panel regression analysis. The evidence seems to indicate that the excess market returns tend to reflect the stock performance rather than changes in cost efficiency.

Sufian and Majid (2006b) empirically investigates the X-and P-efficiencies of Malaysian banks that are listed on the Kuala Lumpur Stock Exchange (KLSE) during 2002-2003 by applying the non-parametric DEA model. They found that the X-efficiency of Malaysian banks was on average significantly higher compared to the P-efficiency. They also suggest that the large banking groups on average were more X-efficient whereas the smaller banking groups were found to be more P-efficient. They suggest that the stock prices of Malaysian banks react more towards the improvements in P-efficiency rather than the improvements in X-efficiency.

Oliveira and Tabak (2005) presents a novel approach to measure and compare the efficiency of the banking system in 41 developed and developing countries by using the non-parametric Data Envelopment Analysis (DEA) methodology. Differently from most studies that use accounting data for measuring efficiency, in order to build a new measure of efficiency, they employed market data for measuring returns and risk (calculated in different ways). This approach allows the comparison of different countries, which have different accounting rules and are not comparable by using standard models. The main results suggest a downward trend in the average efficiency levels of developed countries and a slight upward trend in the efficiency levels of emerging market countries during the period. According to the study, efficiency tends to level off emerging and developed countries. It may be partially explained by the increasing globalization and integration processes that markets have been going through in the last years.