

Executive

# **Relative Efficiency of Malaysian Commercial Banks: A Non-Parametric Approach**

**Universiti Utara Malaysia**

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# **Relative Efficiency of Malaysian Commercial Banks: A Non-Parametric Approach**

**A thesis submitted to Othman Yeop Abdullah Graduate School of Business in  
partial fulfillment of the requirements for the Degree of  
Master of Science (Banking), College of Business  
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**By**

**Raheleh Jahd**

**803972**



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## **Abstract**

This paper investigates the relative efficiency of Malaysian commercial banks for the years of 2005 to 2009. Data Envelopment Analysis is the method used to evaluate efficiency of 20 commercial banks in Malaysia including 9 domestic banks and 11 foreign banks. Based on the definition of input-output, most of the studies related to bank efficiency adopt either production or intermediation approach. However, in this study both approaches have been employed to find how efficiency score change when inputs-outputs are changed. Findings of this paper suggest that in general commercial banks are more efficient via production approach than intermediation approach. This study also compares the efficiency scores between domestic and foreign banks to find differences or similarities of bank performance under different ownership. Evidence is not in favor of domestic banks via production method while it is in favor of domestic banks under intermediation approach. In other words, the empirical results imply that foreign banks in production approach and domestic banks in intermediation approach were more efficient than their counterparts. In the last section, this study examines the efficiency among large, medium and small banks which were categorized by total assets to find the influence of size in commercial banks' performance in Malaysia. Results suggest that size has no significant impact on banks' performance in Malaysia. Although the influence is not substantial, however, the empirical results show that small banks are somewhat more efficient under production method while they are least efficient banks under intermediation approach comparing with large and medium banks.

**Keywords:** Commercial Bank, Relative Efficiency, Malaysia, Non-Parametric Approach

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**Raheleh Jahd**

**College of Business**

**Universiti Utara Malaysia**

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## **List of Abbreviations**

<b>SFA</b>	<b>Stochastic Frontier Approach</b>
<b>DFA</b>	<b>Distribution-Free Approach</b>
<b>DEA</b>	<b>Data Envelopment Analysis</b>
<b>BFI</b> s	<b>Banking Financial Institutions</b>
<b>NBFI</b> s	<b>Non-Bank Financial Institutions</b>
<b>PA</b>	<b>Parametric Approach</b>
<b>NPA</b>	<b>Non-Parametric Approach</b>
<b>FDI</b>	<b>Foreign Direct Investments</b>
<b>DMU</b> s	<b>Decision-Making Units</b>
<b>CRS</b>	<b>Constant Return to Scale</b>
<b>VRS</b>	<b>Variable Return to Scale</b>
<b>OECD</b>	<b>Organizations for Economic Co-operation and Development</b>

# **Chapter 1**

## **Introduction**

## **1.1 Introduction**

The past two centuries have been fateful ones for Malaysia. After the United Kingdom established colonies and protectorates in what was modern Malaysia during the 18<sup>th</sup> and 19<sup>th</sup> centuries, the mid-20<sup>th</sup> century witnessed these regions being occupied by Japan during World War II, only to revert to British control after the war (Osborne, 2003, pp. 109-112). By 1948, other events swept across what is now modern Malaysia when the territories under British control, including Singapore, established the Federation of Malaya until 1957 when they achieved their independence. The modern country of Malaysia was created in 1963, but the country's early history was far from uneventful as well, with fundamental changes in organization taking place that culminated in Singapore's withdrawal from the confederation in 1965 (Osborne, 2003, pp. 30-33). More recently, a series of economic reforms and an emphasis on diversifying the nation's economic base have succeeded in providing a number of value-added industries for Malaysia that have included manufacturing and services industries, and increasingly, the travel and tourism trade (Osborne, 2003, pp. 208-210).

Today, Malaysia is characterized by the World Bank as being a middle-income country that has transformed itself from a producer of raw materials into an emerging multi-sector economy with much of the credit for the progress to date being attributed to the country's political leadership. For example, following his accession to office in 2003, former Prime Minister Abdullah attempted to transform the Malaysian economy by introducing initiatives designed to improve the value-added production chain through increased investments in high technology industries, medical technology, and pharmaceuticals; these initiatives have been continued under the nation's current Prime Minister Najib, as well (Razak, 2010). The Najib administration has continued to implement initiatives that are intended to increase foreign

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## References

- Akhigbe, A. & McNulty, J. (2005). Profit efficiency sources and differences among small and large U.S. commercial banks. *Journal of Economics and Finance*, 29(3), 289-290.
- Aigner, D., Lovell, C. & Schmidt, P. (1977). Formulation and estimation of stochastic frontier production models. *Journal of Econometrics*, 6, 21–37.
- Alam, I. M. (2001). Nonparametric approach for assessing productivity dynamics of large U.S. banks. *Journal of Money, Credit & Banking*, 33(1), 121.
- Allen, F. & Gale, D. (2004). Competition and financial stability. *Journal of Money, Credit & Banking*, 36(3), 453-455.
- Allen, L. & Rai, A. (1996). Operational efficiency in banking: An international comparison. *Journal of Banking and Finance* 20, 655-672.
- Altunbas, Y., Evans, L. & Molyneux, P. (2001). Bank ownership and efficiency. *Journal of Money, Credit & Banking*, 33(4), 926.
- Artis, M., Weber, A. & Hennessy, E. (2000). *The Euro: A challenge and opportunity for financial markets*. London: Routledge.
- Balling, M., Lierman, F. & Mullineux, A. (2004). *Financial markets in Central and Eastern Europe: Stability and efficiency*. New York: Routledge.
- Banker, R. D., Charnes, and W.W. Cooper (1984). Some models for estimating technical efficiencies in data envelopment analysis. *Management Science*, 30, 1078-92.
- Banker, R. D. & Morey, R. C. (1986). The use of categorical variables in Data Envelopment Analysis. *Management Science* ,32(12), 1613-1627.
- Berg, S. A., Førsund, F. R., Hjalmarsson, L. & Suominen, M. (1993). Banking efficiency in the Nordic countries. *Journal of Banking & Finance*, 17(2-3), 371-388.



- Berger A., Hancock D. and Humphrey D., (1993). Bank efficiency derived from the profit function. *Journal of Banking and Finance*, 17, 317-347.
- Berger A., Humphrey D. (1997). Efficiency of financial institutions: International survey and directions for future research. *European Journal of Operational Research*, 98, 175– 212.
- Berger, A. N. (1993). “Distribution-Free” estimates of efficiency in the US banking industry and tests of the Standard Distributional Assumptions. *The Journal of Productivity Analysis*, 4:261-92.
- Berger, A. N. & Mester, L. J. (1997). Inside the black box: What explains differences in the efficiencies of financial institutions. *Journal of Banking and Finance*, 21, 895-947.
- Berger, A.N. and Mester, L.J. (2003), “Explaining the Dramatic Changes in Performance of U.S. Banks: Technological Change, Deregulation and Dynamic Changes in Competition,” *Journal of Financial Intermediation* 12 (1), 57-95.
- Brown, M. & Skully, K. (2003). A cross-country analysis of Islamic bank performance. Paper presented at the International Banking Conference, September 2003.
- Casu, B. & Molyneux, P. (2003). A comparative study of efficiency in European banking. *Applied Economics* ,35, 1865-1876.
- Charnes, A., W. W. Cooper, and E, Rhodes (1978). Measuring the efficiency of decision making units. *European Journal of Operational Research*, 2, 429-44.
- Desa, K. A. (2003). An analysis of the determinants of commercial banks profitability in Malaysia. Unpublished dissertation. Universiti Utara Malaysia.
- Dietsch, M. & Vivas, A. L. (1996). How the environment determines the efficiency of banks: A comparison between French and Spanish banking industry. CNRS and DGICYT PFECS95-0005.
- Elyor, S. I. (2009). Factors affecting the performance of foreign banks in Malaysia. Unpublished dissertation. Universiti Utara Malaysia.

- Evanoff, D. D. & Ors, E. (2008). The competitive dynamics of geographic deregulation in banking: Implications for [productive efficiency. *Journal of Money, Credit & Banking* 40(5): 897-898.
- Farrel, M.J (1957). The measurement of productive Efficiency. *Journal of the Royal Statistical Society, Series A (general)*, 120, 253.
- Fecher, F. & Pestieu, P. (1993). Efficiency and competition in O.E.C.D. financial services. In: Fried, H.O., Lovell, C.A.K., Schmidt, S.S. (Eds.), "*The measurement of productive efficiency techniques and applications.*" Oxford, 374-385.
- Fernandez, A. I., Gascon F. & Gonzalez, E. (2002). Economic efficiency and value maximization in banking firms. Paper presented to the 7th European workshop on efficiency and productivity analysis, Oviedo, Spain.
- Finneran, J. (2006). Bank Efficiency: Measure with care. *The Motley Fool*. Retrieved august 2010, from <http://www.fool.com/investing/dividends-income/2006/12/14/bank-efficiency-measure-with-care.aspx>.
- Fraenkel, J. R. & Wallen, N. E. (2001). *Educational Research: A Guide to the Process*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Fried, H. O., Lovell, C. A. K. & Schmidt, S. S. (1993). *The measurement of productive efficiency: Techniques and Applications*. New York: Oxford University Press.
- Garcia-Cestona, M., Surroca, J., (2008). Multiple goals and ownership structure: effect on the performance of Spanish saving banks. *European Journal of Operational Research* 187, 582-599.
- Gardener, E. P. & Versluijs, P. C. (2001). *Bank strategies and challenges in the New Europe*. New York: Palgrave.
- Gratton, C. & Jones, I. (2003). *Research Methods for Sport Studies*. New York: Routledge.
- Griffith-Jones, S., Gottschalk, R. & Cailloux, J. (2003). *International capital flows in calm and turbulent times*. University of Michigan Press.

- Gupta, K. L. & Lensink, R. (1996). Financial liberalization and investment. New York: Routledge.
- Hasan, I. & Marton, K. (2003). Development and efficiency of the banking sector in a transitional economy: Hungarian experience. *Journal of Banking and Finance*, 27(12),
- Ikhide S. (2000). Efficiency of commercial banks in Namibia. Bank of Nigeria Occasional Paper, No. 4.
- Jayadev, M. & Sensarma, R. (2007). Mergers in Indian banking: an analysis. *South Asian Journal of Management*, 14(4), 20-22.
- Kaparakis, E. I., Miller, S. M. & Noulas, A. G. (1994). Short-run cost inefficiency of commercial banks: A flexible stochastic frontier approach. *Journal of Money, Credit & Banking*, 26(4), 875-877.
- Karim, M. Z. (2001). Comparative bank efficiency across select ASEAN countries. *ASEAN Economic Bulletin*, 18(3), 289-290.
- Katib, M. N. (1999). Technical efficiency of commercial banks in Malaysia. *Banker's Journal Malaysia*, 40-53.
- Katib, M. N. & Matthews, K. 2000. A non-parametric approach to efficiency measurement in the Malaysian banking sector. *The Singapore Economic Review*, 44(2), 89-114.
- Lee, C. H. (2003). *Financial liberalization and the economic crisis in Asia*. New York: Routledge.
- Leong, W. H., Dollery, B. & Coelli, T. (2003). Measuring the technical efficiency of banks in Singapore for the Period 1993-99: An application and extension of the Bauer et al. (1997) technique. *ASEAN Economic Bulletin*, 20(3), 195-196.
- Lin, P. W. (2002). The Efficiency of Commercial Bank Mergers in Taiwan: an Envelopment Analysis. *International Journal of Management* 19(2): 334.

- Mahesh, R. & Rajeev, M. (2008). Producing financial services: An efficiency analysis of Indian commercial banks. *Journal of Services Research* ,8(2), 7-8.
- Majid, A. M., Nor, N. G. & Said, F. F. (2003). Efficiency of Malaysian banks: What happened after the financial crisis. Paper presented at the National Seminar on Managing Malaysia in the Millennium.
- Marcoulides, G. A. (1998). *Modern methods for business research*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Mikdashi, Z. (2001). *Financial intermediation in the 21st Century*. New York: Palgrave.
- Mohamad, S., Hassan, T. & Bader, M. K. (2006). Efficiency of Conventional versus Islamic Banks: International Evidence using the Stochastic frontier approach (SFA). *Journal of Islamic Economics, Banking and Finance*, 108-135.
- Mohktar, H. S., Abduhallah, N. & Al-Habshi, S. M. (2006). Efficiency of Islamic banking in Malaysia: A stochastic frontier approach. *Journal of Economic Cooperation* 27(2): 37-70.
- Okuda, H., Hashimoto, H. & Murakami, M. (2003). The estimation of stochastic cost functions of Malaysian commercial banks and its policy implications to bank restructuring. *Centre for Economic Institutions Working Paper Series, No. 2003-2*.
- Osborne, M. (2003). *A short history of Malaysia*. Australia: Allen & Unwin.
- Pastor, J. M., Perez, F. & Quesada, J. (2002). Cost and profit efficiency in European banks. *Journal of International Financial Markets, Institutions and Money*, 12(1), 33-58.
- Rao, N. & Tiwari, S. (2008), October-March. A Study of Factors Affecting Efficiency of Public Sector Banks. *Journal of Services Research* 8(2): 73-74.
- Razak, N. (2009). The 2010 budget speech. Retrieved august 10, 2010, from [www.lawnet.com.my/lawnetpublic/2010budget speech.pdf](http://www.lawnet.com.my/lawnetpublic/2010budget%20speech.pdf)

- Rutherford, D. (1995). *Routledge Dictionary of Economics*. London: Routledge.
- Schellekens, P. (2010). *Malaysia economic monitor: Growth through Innovation*. Bangkok, Thailand: The World Bank.
- Silverman, D. (2005). *Doing Qualitative Research: A Practical Handbook (2<sup>nd</sup> ed.)*. London: Sage.
- Stavarek, D. & Šulganová, J. (2009). Analysis of efficiency of Slovak banks using stochastic frontier approach. University Library of Munich, Germany: MPRA Paper 16020.
- Sufian, F. (2004). The efficiency effects of bank mergers and acquisitions in a developing economy: Evidence from Malaysia. *International Journal of Applied Econometrics and Quantitative Studies*, 1(4), 53:57.
- . 2006a. Size and total factor productivity growth of non-bank financial institutions: Evidence from Malaysia. *South Asian Journal of Management*, 13(4), 7-8.
- . 2006b. The efficiency of non-bank financial institutions: Empirical evidence from Malaysia. *International Research Journal of Finance and Economics* 6: 37-38.
- Stewart, I. (2003). *The Mahathir legacy: A nation divided a region at risk*. St. Leonards, NSW: Allen & Unwin.
- Taci, A. (2000). Efficiency in the Czech banking sector. CERGE-EI, Doctoral dissertation.
- Tahir, I. M., Bakar, N. M. A. & Haron, S. (2009). Evaluating efficiency of Malaysian banks using data envelopment analysis. *International Journal of Business and Management*, 4(8), 1-11.
- Vennet, R. V. (2002). Cost and profit efficiency of financial conglomerates and Universal banks in Europe. *Journal of Money, Credit & Banking*, 34(1), 254-255.
- Weill, L. (2002). Measuring cost efficiency in European banking: A comparison of frontier techniques. Unpublished dissertation. Université Robert Schuman