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Intellectual capital and productivity of Malaysian general insurers

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ABSTRACT

This study investigates changes in productivity of general insurance firms in Malaysia for the period from 2008 to 2011. Moreover, this study examines the impact of intellectual capital on changes in productivity. In the first stage, this study applies the Malmquist productivity index (MPI) of data envelopment analysis (DEA) and the MPI with bootstrapping approach to evaluate changes in productivity. In the second stage, this study examines the impact of intellectual capital on changes in productivity through OLS and Tobit regressions. Our MPI findings indicate that all but one sample firms experienced growth in productivity over the sample period. Moreover, the use of the MPI with bootstrapping approach provides an effective analysis of MPI estimates. Our regression analysis reveals that VAIC™ and its individual components have significantly positive impacts on changes in productivity. We suggest that general insurers in Malaysia should invest in intellectual capital, including to improve their managerial skills, to gain sustainable growth in productivity. Our findings corroborate the initiative carried out by the Malaysian government, which continuously emphasize the importance of IC. The findings of this study may lead to a better understanding of the relative changes in total productivity of general insurance firms. By identifying changes in efficiency and changes in technology, better management decisions can be made to achieve greater productivity. Moreover, through the bootstrap estimation, we are able to determine whether estimated increases or decreases are statistically significant.

1. Introduction

Based on the resource-based and knowledge-based theories, which state that superior performance is linked to the tangible and intangible resources owned by firms, this study aims: (i) to investigate productivity changes of general insurance firms in Malaysia, and (ii) to evaluate the impact of IC (VAIC™, human capital, structural capital, and financial capital) on changes in productivity over a time period. While there is ample empirical evidence to support the relationship between IC and firm performance, to the best of our knowledge, there has been little attempt to examine whether IC is related to changes in total productivity over a time period. On the merits of VAIC™ as a measurement tool, this paper argues that regressing IC (explanatory variable) on MPI scores (dependent variable) would provide some understanding of the importance of IC in creating values.

In the new global economy, intellectual capital (IC) has become a central issue for academicians and practitioners. The impetus for this interest is a series of challenges in this knowledge-based business environment that motivate firms to invest in IC, given that IC has become a major driver for a firm to be more productive (Goh and Lim, 2004). Since the early 2000s, Malaysian government has emphasized the need to transform from a production-based economy to a knowledge-based economy. In the 10th Malaysia Plan (2011–2015) and its New Economic Model, Malaysia continues to promote knowledge economy by emphasizing human capital development and improvements in innovation capacity. Specifically, Malaysian government has been promoting sustainable long-term growth since the last decade.

The notion by Wang (2012) that firms facing challenges implication must invest heavily in IC to maintain or improve competitive advantage is likely to be more important in knowledge-intensive industries, such as the insurance industry. Wu and Strange (2000) indicate that insurance firms rely on IC, that is the "soft" infrastructure to excel in performance, given its knowledge-intensive nature. To provide some perspective, we examine the general insurance industry in Malaysia because it provides us with an ideal setting to assess the extent to which IC is associated with changes in total productivity. According to Mansor and Radam (2000), the insurance industry has contributed towards the economic growth of Malaysia and increased employment opportunities in Malaysia. Moreover, note that the amount of premium received in the general insurance industry in Malaysia increased from RM1979 million in 1990 to RM13,596 million in 2011.

To address our research objectives, we apply a two-stage approach, in line with many DEA studies that evaluate the effect of contextual variables on production efficiency through a two-stage procedure (Liu et al., 2013a). In the first stage, we estimate changes in productivity of

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Malaysian general insurers using the Malmquist productivity index (MPI) of data envelopment analysis (DEA). Note that DEA has been widely applied to real world applications including the insurance industry, in which there are 44 papers available from the ISI We of Science database (Liu et al., 2013b). Following Wang et al. (2012), we also integrate the MPI with bootstrapping approach to establish effective statistical inferences. In the second stage, we use ordinary least square (OLS) and Tobit regressions to test the impact of IC on changes in productivity. Our findings show that most of our sample firms experience productivity growth during the sample period. From our regression results, we show that IC has a significantly positive impact on changes in productivity.

This study contributes not only to the existing DEA and IC literature in the spotlight of VAIC™, but also to the practical front. First, the findings of this study may lead to a better understanding of the relative changes in total productivity of general insurance firms, which allows managers to identify and improve on any inefficient areas. MPI can be decomposed into changes in efficiency and changes in technology. As such, better management decisions can be made to achieve greater productivity. Moreover, the use of the bootstrap estimation allows us to determine whether estimated increases or decreases are statistically significant, through the construction of confidence intervals.

Second, such an analysis leads to a better understanding on the effect of IC on changes in total productivity of general insurers in Malaysia over a time period. This study provides an insight into the importance of IC in the general insurance industry. Our results may give managers an insight to better utilize IC resource available in their firms in order to improve competitive advantage and ultimately firm performance. Overall, our results corroborate the initiatives of Malaysian government in promoting knowledge-based economy. Putting continuous emphasis on IC investment is necessary for sustainable productivity growth.

The remainder of this study is organized as follows. Section 2 describes the prior literature, including an overview of the Malaysian general insurance industry and hypotheses development. Section 3 introduces the sample collection criteria and the MPI of DEA methodology. Section 4 presents the MPI and regression results. A final section concludes our paper.

2. Literature review

2.1. An overview of the Malaysian general insurance industry

In 1988, the insurance industry in Malaysia, an emerging economy, was brought under the supervision of the Central Bank of Malaysia. The industry, including the life and general insurance sectors, is governed by the Insurance Act 1996. In 2009, the Central Bank of Malaysia established a risk-based capital framework, which requires all insurance firms in Malaysia to maintain minimum capital adequacy ratios. With that prudential implementation, Malaysian insurance companies are very adequately capitalized based on their individual risk profiles. The capital base of the general insurance industry in Malaysia has strengthened and their performance has improved markedly throughout the years. However, the Central Bank of Malaysia states that the insurance industry in Malaysia is relatively small by international standards. Particularly, Table 1 displays the performance of the general insurance industry in Malaysia for the period from 2008 to 2011.

Table 1
Key performance indicators.

	2008	2009	2010	2011
Net premiums	8983.30	9376.90	10,127.90	10,858.90
Net retention ratio	92.6%	92.1%	92.2%	92.6%
Technical reserves	13,200.60	12,965.40	13,580.80	14,322.40
Underwriting margin	101.40	791.50	767.10	1074.90

[a]All variables are measured in Malaysian Ringgit (MYR) millions except net retention ratio.

2.2. Intellectual capital

In 1994, the first IC report to quantify and report IC was issued by Sweden's Skandia Insurance Company, Ltd. Since then, a growing number of research studies are available to shed some light on the definition and classification of IC. Summarizing prior literature (for example, Bose and Thomas, 2007; Edvinsson and Malone, 1997; Hsu and Fang, 2009; Lynn, 1998; Stewart, 1997; Wang et al., 2013), we conclude that IC may be defined as knowledge-related intangible assets embedded in an organization that include intellectual competences, intellectual property, and intellectual resources. Correspondingly, Pulic (2000) argues that there are three broad categories of IC: human capital, structural capital, and financial capital.

Among the 42 methods summarized by Sveiby (2010), VAIC™ is a practical method that applies financial data (Zéghal and Maaloul, 2010) that are quantitative and audited (Clarke et al., 2011). As such, VAIC™ has been widely used to examine the impact of IC on firm performance (for example, Wang, 2012; Young et al., 2009). It is important to stress that IC measurement per se is not the concern here. However, the research to date that examines the relationship between IC and firm performance provides mixed evidence. On the one hand, Wang (2012) examines the value relevance of VAIC™. Their findings show that VAIC™ is positively related to firm value. Zéghal and Maaloul (2010) also show that firms' IC has a positive impact on economic and financial performance, in which the association is only significant for high-tech industries. On the other hand, Zou and Huan (2011) find that structural capital has a negative impact on efficiency. Elsewhere, Maditinos et al. (2011) and Rehman et al. (2011) document that only human capital has a significantly positive impact on firm performance. Acknowledging the vast literature on the application of VAIC™ as an IC indicator, we also employ VAIC™ to estimate the value of IC. We differ from prior studies in that we examine changes in productivity over a time period instead of unidimensional financial ratios.

3. Data and methodology

3.1. Data selection

In this study, sample firms are licensed general insurance firms identified on the website of the Central Bank of Malaysia. We collect financial data from Datastream, additional information from annual reports of the sample firms, and supplemental statistics from the central bank website. There are 20 general insurance firms as listed on the central bank website. However, we only study 16 of them for the period from 2008 to 2011 due to data availability. If we were to increase the sample period, the number of sample firms would be further reduced. The total net premiums of these sample firms account for approximately 80% of that of the 20 firms. This suggests that our sample is representative of the Malaysian general insurance industry.

3.2. Methodology

This study employs a two-stage approach. In the first stage, we estimate changes in productivity of Malaysia general insurers. The second stage involves employing OLS and Tobit regressions to examine the relationship between IC and changes in productivity. They are explained in the following paragraphs.

3.2.1. Dependent variables: The Malmquist productivity index (MPI)

This study employs the MPI of DEA to measure changes in productivity of Malaysian general insurers across several periods. By measuring changes in productivity, we can examine whether a change in efficiency has occurred. The MPI measure helps us understand how benchmarking results change over time. MPI, initially a quantity index proposed by Malmquist (1953) and further developed by other authors such as Caves et al. (1982) and Färe et al. (1994), measures changes in