

Performance Management Accounting and Profitability: Evidence from Small and Medium Enterprises

Asma Khatoon¹, Adeb Alhebr², Hina Khan³, Ebrahim Mohammed Al-Matari^{4*}, Asif Baig⁵ and Imran Ahmad Khan^{6*}

¹Department of Accounting, College of Business Administration, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia.

²Accounting Program, Applied College, King Khalid University, Kingdom of Saudi Arabia and Ibb University, Yemen.

³Assistant Professor, College of Business Administration, Imam Abdulrahman Bin Faisal University, Dammam, Saudi Arabia

⁴Department of Accounting, College of Business, Jouf University, Kingdom of Saudi Arabia and Faculty of Commerce and Economics, Amran University, Amran, Yemen.

⁵Assistant Professor, Jubail Industrial College, Jubail Industrial City, Jubail, Saudi Arabia.

⁶Consultant, Pacelile Corporate Consulting, India.

Abstract: This study analyzed the relationship between the level of profit margin and profit margin control with the level of performance management accounting practices in SMEs. We conducted a quasi-experiment using the propensity score of Rosenbaum and Rubin (1983). Then, ordinal logistic regression analysis was used to calculate the propensity score. We tested the hypothesis regarding the relative level of performance management accounting practices and the level of profitability of SMEs (the profit improvement effect hypothesis). We also tested whether the variance of profit margins is smaller in the group of SMEs with relatively high levels of performance management accounting practice compared to the group of SMEs with relatively low levels of practice (profit control effect hypothesis). The results of the analysis were not statistically significant, as there was no tendency to suggest that SMEs' implementation of performance management accounting is associated with the achievement of higher profit margins. We also could not confirm a statistically significant difference in the tendency of SMEs to control their profit margins by engaging in performance management accounting. The results of the additional stratified analysis suggest that the relationship between the degree of implementation of performance management accounting and profitability varies depending on the size of the organization.

Keywords: Management accounting practice, Profit margin control effects, Propensity score matching.

JEL Classification: M40, M41.

1. INTRODUCTION

India is the largest SME market in the world with a figure of 75 million SMEs and that is projected to grow to 95 million or more in the next few years. It already contributes more than a trillion dollars to the economy and has the potential to create 10s of millions of jobs in the next few years. Small and medium enterprises across India accounted for nearly 27 percent of India's GDP in the financial year 2022. Although it is needless to reiterate the importance of SMEs in the Indian economy, the role played by performance management accounting in SMEs has not yet been fully clarified, partly due to the small number of studies. In this study, among the roles played by performance management accounting in SMEs, we focus on its impact on profit margins.

The question of whether a business management system such as performance management accounting is useful for improving the company's business performance is a serious question for managers and accountants of small and medium-sized firms who are considering the introduction and use of performance management accounting. The previous studies on performance management accounting in SMEs do not necessarily provide a sufficient answer to this question. Some studies have found that the practice of performance management accounting is associated with higher performance of SMEs (López and Hiebl 2015), while others have shown that SMEs that have introduced performance management accounting are less profitable (Roper 1997), so no unified view has been obtained. In addition, there are studies that focus on the subjective performance of managers and executives as performance (King et al. 2010), and the number of studies on the relationship between performance management accounting and the objective level of profitability itself is currently small. There is room for further research on the relationship between performance management account-

*Address correspondence to the authors at the Department of Accounting, College of Business, Jouf University, Kingdom of Saudi Arabia and Faculty of Commerce and Economics, Amran University, Amran, Yemen, Consultant, Pacelile Corporate Consulting, India,
E-mail: Ibrahim_matri7@yahoo.com; imranalig77@gmail.com

ing and the level of profitability in small and medium-sized firms.

On the other hand, the relationship between performance management accounting and variation in profit margins in SMEs has rarely been examined in previous studies. Variation in profitability means the degree to which profitability fluctuates over multiple accounting periods. Variation in profit margins means that profit margins fluctuate significantly up and down and are not stable over multiple accounting periods. On the other hand, a small variation in profit margins means that SMEs have achieved a stable and constant level of profit margins over several accounting periods. If small fluctuations in profit margins can be regarded as the achievement of a constant level of profit margins, external fund providers will feel comfortable investing in (investing in or financing) SMEs that maintain stable profit margins. This will lead to a reduction in the financing cost of SMEs.

The use of performance management accounting in SMEs is thought to have an impact on the achievement of such stable profit margins. By utilizing performance management accounting, firms can mobilize their employees to achieve the target values set in advance in their plans, and corrective actions are taken when problems arise. In recent years, many firms have received loans with financial covenants, and firms will try to avoid losses by using performance management accounting to avoid violating financial covenants. On the other hand, they may also use information obtained from performance management accounting to adjust their profits to avoid excessive tax burdens (Gallemore and Labro, 2015). Through the mechanisms described above, SMEs are expected to use performance management accounting to control the variation in profit margins. However, to the best of our knowledge, there are no studies that examine the relationship between performance management accounting and profit margin dispersion in SMEs.

The purpose of this study is to clarify the relationship between performance management accounting and the level and variability of profit margins in SMEs. The reason why SMEs are the subject of this study is not only because SMEs are important as a research subject from an economic and academic point of view. There are two advantages of using SMEs as research subjects in testing our hypotheses. First, unlike large firms, where it is a matter, of course, that performance management accounting is established and operated, it is expected that the level of establishment and operation of performance management accounting differs among small and medium-sized firms, and thus data suitable for hypothesis testing can be obtained. Second, by obtaining the cooperation of clinicians who provide management support to SMEs, it is possible to evaluate the practice of performance management accounting in SMEs in line with actual conditions (Moyo & Mpofu, 2019). In this study, the clinical accounting data used by Oyewo & Ajibolade (2019) were used in the analysis.

The structure of this paper is as follows. Section two examines the impact of the level of practice of performance management accounting on the level and variability of profit margins and presents two hypotheses. Section three explains the research methodology, and section four presents and discusses the results of the analysis. Section five presents addi-

tional analyses, and section six concludes with conclusions and future issues.

2. ESTABLISHMENT OF HYPOTHESIS

In this study, we focus on financial performance and define performance management accounting as a short-term PDCA cycle (Albu & Albu, 2012; Nartey & van der Poll, 2021). The state of practicing performance management accounting means that the company organizes a plan for a single fiscal year (Plan), performs operations based on the plan (Do), compares and analyzes the plan with target values at performance reporting meetings (Check), and uses the plan for daily actions and modification of the plan for the next fiscal year (Action). To realize this, it is necessary to have a system in place to measure monthly profitability based on product and departmental axes within the company.

In companies where such performance management accounting is not practiced, various problems are expected to occur. For example, the allocation of resources such as people, goods, and money within a company does not go well because plans are not made, discussions on solving problems within a company do not progress because discussions at performance reporting meetings are not sufficient, and even if they are discussed, they are not used to revise actions and plans. On the contrary, in firms with relatively high levels of performance management accounting practices, the likelihood of the above problems occurring decreases. Rather, management accounting information will lead to appropriate resource allocation and modification of plans and actions.

In this regard, Oyewo and Ajibolade (2019) obtained data on the degree of performance management accounting practice and managerial aspiration in SMEs from management accounting experts and analyzed the relationship between the two. As a result, they demonstrated that, in SMEs, a lack of managerial aspiration (ambition and desire for financial performance) has a barrier effect that does not increase the degree of performance management accounting practice. However, Oyewo and Ajibolade (2019) did not clarify whether the practice of performance management accounting enhances the financial performance of SMEs.

Not only Oyewo and Ajibolade (2019) but there have not been many empirical studies on the level of practice of performance management accounting and the level of profitability in the past performance management accounting studies of SMEs. Furthermore, few results support a positive correlation between the two. Looking at previous studies, some authors have pointed out that a relatively high level of performance management accounting practice in SMEs tends to improve business performance, while a failure to properly utilize performance management accounting tends to lead to business failure (López and Hiebl, 2015; Pelz, 2019). However, a detailed examination of individual studies reveals that many of them are case studies and thus have not been quantitatively verified. Even quantitative studies focus only on a part of performance management accounting techniques or the dependent variable is subjective performance. Some studies have shown a negative relationship between performance management accounting and objective performance. For example, Roper (1997) found that when comparing firms that newly introduced a performance management account-

ing system with those that did not, the profitability of the firms that introduced the system was statistically significantly lower.

The correlation between performance management accounting and profitability has not been examined much in quantitative performance management accounting studies targeting small and medium-sized firms in India (Joshi, 2001; Kallapur & Krishnan, 2009; Mahesha & Sachindra, 2013; Bhattacharyya, 2015; Lawson, 2018; Bai, 2020). One of the few studies showing a positive correlation between the level of performance management accounting practice and objective profitability is Bhattacharyya (2015). According to their study, groups of firms with relatively higher levels of performance management accounting practices tend to have higher operating profit margins and ordinary profit margins on sales.

Therefore, in this study, we test the following hypothesis regarding the relationship between the degree of implementation of performance management accounting and profitability in small and medium-sized firms, which has not been adequately examined in the past. In this study, this hypothesis is called the profit improvement effect hypothesis.

Hypothesis 1: SMEs with a relatively high level of performance management accounting practice are more profitable than SMEs with a relatively low level of practice.

Thorough implementation of performance management accounting practices is expected to increase the level of profit margins and reduce the variability of profit margins for firms with higher levels of performance management accounting practices. As already mentioned, the practice of performance management accounting examined in this paper is a short-term PDCA cycle based on profitability calculations by product and department. The more thoroughly this is done, the more likely it is that large deviations from the plan and delays in problem-solving will be prevented, and the less likely it is that profit margins will fluctuate significantly. The effect of suppressing the variability of profit margins through the use of performance management accounting is referred to as the "control effect" of profit margins in this paper.

There are multiple possible paths through which SMEs can control their profit margins. The most likely route is to use performance management accounting to achieve the company's profit targets and thereby control profit margins. To achieve company-wide profit targets, each department in the company is assigned a target in terms of accounting figures, and the target and actual results are periodically compared, and feedback is provided if necessary (Anthony and Govindarajan 2007). When performance management accounting is utilized in this way, corrective actions are taken as necessary when targets and actual results diverge, and profit margins are considered to be controlled as a result. Without performance management accounting, actual results would not be properly controlled, and controlling profit margins would be relatively difficult.

In addition, SMEs may also receive loans with financial covenants. The financial covenants may include, for example, a condition that the company does not fall into an operating loss. In such cases, it can be expected that firms will try to avoid losses by using performance management accounting

to maintain or improve their performance to avoid violating this condition. In addition, SMEs will also try to avoid posting excessive profits, since excessive profits are associated with higher tax burdens. At this point, SMEs may utilize performance management accounting information to effectively avoid increasing their tax burden¹ (Gallemore and Labro 2015).

Few quantitative studies have been conducted on performance management accounting and profit margin controls. In Gallemore and Labro (2015), which studied U.S. listed firms, the results suggest that the quality of internal information is associated with the avoidance of an increased tax burden. However, this study was conducted for listed firms and does not address the degree of the practice of performance management accounting per se, nor does it directly examine profit margin controls. The study by Pavlatos and Kostakis (2015) directly examines the relationship between performance management accounting and control of profit margins. Their study suggests that profit margins are controlled more in firms with relatively high levels of performance management accounting practices. However, this study only compared the variation in profit margins by dividing firms into four groups based on the level of performance management accounting practice and did not fully control for the effects of other variables. This study also does not target small and medium-sized firms. Therefore, this paper tests the following hypothesis with the analysis of variation in profit margins across groups of firms presented in Pavlatos and Kostakis (2015) in mind. In this study, this hypothesis is called the profit control effect hypothesis.

Hypothesis 2: SMEs with a relatively high level of performance management accounting practice have a smaller variance in profit margin than SMEs with a relatively low level of practice.

3. RESEARCH METHODS

3.1 Data Collection

To test the above two hypotheses (profit improvement effect and profit control effect), this study used the clinical accounting data² used by Oyewo and Ajibolade (2019). This data on the degree of the practice of performance management accounting and profitability of small and medium-sized firms were obtained through accounting firms that provide management support to small and medium-sized firms. By obtaining the cooperation of accounting specialists belonging to accounting firms, we believe that we can obtain data more in line with the actual situation than by obtaining data on the degree of the practice of performance management accounting from managers and employees of SMEs who are not necessarily familiar with accounting (Oyewo & Ajibolade, 2019).

A questionnaire on the level of performance management accounting practices was sent to accounting firms via email on April 12, 2021, and response data were collected by May 5, 2021. A total of 43 accounting firms were asked to cooperate. We asked each firm to select about 50 to 60 firms by random sampling from among their client firms and obtained responses from these firms. For those accounting firms that had not responded by the data collection deadline, the ques-

Table 1. Level of Performance Management Accounting Practices.

Item Name						Factor Load
(1) Management accounting system is well developed						0.760
(2) Short-term planning ability is high						0.913
(3) The level of performance reporting meetings is high						0.848
(4) High level of analytical ability						0.928
(5) High ability to modify actions						0.910
(6) High ability to modify plans						0.925
Reliability coefficient (Cronbach's alpha)						0.954
Correlation coefficient with criterion-related validity ("⑦High overall level of management accounting")						0.926
Item No.	Mean	Median	Standard deviation	Mode	Minimum value	Maximum value
1	3.00	3	1.307	3	1	5
2	2.87	3	1.352	3	1	5
3	2.75	3	1.432	1	1	5
4	2.85	3	1.325	3	1	5
5	2.88	3	1.305	3	1	5
6	2.82	3	1.314	3	1	5
7	2.71	3	1.288	3	1	5

tionnaire was resent. Finally, data were collected from 17 accounting firms, for a total of 652 firms. Of these, data from 496 firms were available for analysis in this study.

3.2. Variable Measurement

In this study, the degree of performance management accounting practice, operating profit margin, and standard deviation of operating profit margin on sales are used for hypothesis testing. The level of performance management accounting practice uses the same scale used by Moyo and Mporu (2019), who reported the correlation between the level of performance management accounting practice and profitability in SMEs, and Oyewo and Ajibolade (2019), who demonstrated that the lack of aspiration of managers is a barrier to performance management accounting practice.³ This scale consists of six items, each of which is a five-point Likert scale, where one item is scored 5 if the level of performance management accounting is very high and one is scored 1 if performance management accounting is not practiced substantially. Each of the six items consisted of (1) a well-developed management accounting system, (2) a high level of short-term planning ability, (3) a high level of performance reporting meetings, (4) a high level of analytical ability, (5) a high ability to modify actions, and (6) a high ability to modify plans (n=496, Table 1).

Based on the scree plot, we determined that it was one factor, and the factor analysis was estimated using the main factor method.⁴ As shown in Table 1, the factor loadings all exceeded 0.7. Cronbach's alpha coefficient was calculated to evaluate the reliability of the scale, and it was 0.954. To evaluate the criterion-related validity (concurrent validity) of the scale, the correlation coefficient between the five-point

Likert scale (7), which measures the overall level of performance management accounting, and the total score of the six items was calculated to be 0.926. Therefore, it can be said that there are no major problems with the reliability and validity of the scale.

In this study, the ratio of operating income to sales was used as the profit margin. The ratio of operating income to sales was calculated based on the latest financial data available at the time of the study from accounting firms. The reason for using the ratio of operating income to sales is that a short-term PDCA cycle is considered to lead to an improvement in operating income. Other profit figures, such as gross profit, do not reflect the management of SG&A expenses. Ordinary income reflects the impact of non-operating income and expenses, which are not subject to performance management accounting. Net income reflects the effect of extraordinary profit and loss. Therefore, we considered operating income to be the appropriate type of profit. The ratio of operating income to sales is used to verify the hypothesis of the effect of profit improvement.

The standard deviation of the ratio of operating profit to sales was calculated for each firm based on the most recent three years of data available from the accounting firm at the time of the survey. The standard deviation of the ratio of operating income to sales is used to test the hypothesis of the profit control effect.

3.3. Method of Analysis

In this study, we conducted a quasi-experiment using the propensity score of Rosenbaum and Rubin (1983). First, as in Oyewo and Ajibolade (2019), a factor analysis (main fac-

tor method) was conducted using the six items measuring the degree of performance management accounting practice, and the score of one factor representing management accounting ability was calculated. Basically, the higher the rating of the six items measuring the degree of management accounting practice, the higher the score, and the lower the rating, the lower the score. Based on these scores, the corporate data were divided into three groups (lower, middle, and upper).⁵ In this case, the number of tertiles of performance management accounting practice was used so that the number of corporate data belonging to each group would be about the same. Then, ordinal logistic regression analysis ($n=496$) was used to calculate the propensity score.⁶ For the covariates, the variables used by Oyewo and Ajibolade (2019) were referenced to calculate the propensity score. The ordinal logistic regression equation is as follows:

$$\log\left(\frac{\pi_k}{1-\pi_k}\right) = b_0 + b_1 Asp + b_2 Taxa + b_3 \ln Emp + b_4 Bnis + b_5 \Delta Sales + b_6 Lev + b_7 Namd + Ind + Accountant + \varepsilon$$

For the variables appearing in the above equation, *Asp* is a variable indicating the lack of aspiration of management. The factor score calculated based on a dummy variable that asks about increasing sales, reducing expenses, and increasing profit margins and takes 1 if management does not have these goals and 0 otherwise was used in the analysis. *Taxa* is a dummy variable that takes 1 if the manager has this goal and 0 otherwise. *lnEmp* is the natural logarithm of the number of employees, *Bnis* is the ratio of operating income to sales for the previous year, $\Delta Sales$ is the sales growth rate, and *Lev* is leverage, which is interest-bearing debt divided by net assets. In addition, *Namd* is a dummy variable⁷ identifying firms with net assets less than 0, *Ind* is an industry dummy⁸, and *Accountant* is a dummy variable⁹ identifying the accounting firm that responded. Note that b_{0k} is the intercept calculated when the analysis is performed for the k th category. By conducting this ordinal logistic regression analysis, a propensity score is calculated. The propensity score calculated here indicates the probability that a given sample belongs to each of the three groups of management accounting practices: the lower, middle, and upper groups.

Finally, matching is performed based on the calculated propensity score. As a matching method based on propensity scores, this study employed nearest neighbor matching with calipers. Nearest neighbor matching is a method that simply matches the treatment group with the control group whose propensity scores are close. The caliper here refers to an acceptable range of error in propensity scores when matching. If the difference between the propensity scores of the treatment and control groups is greater than the set caliper, matching is not performed to obtain more accurate analysis results. In this case, the caliper was set at 0.05. In other words, matching was performed only when the ratio of propensity scores matched almost perfectly to two decimal places. Since there are three groups of performance management accounting practices (lower, middle, and upper), we matched firms with similar propensity scores in these three groups. As a result, the number of firms used in the final analysis was 150 in total, 50 in each group, out of the 496 firms for which data were initially collected.

In this paper, we use propensity score matching to estimate the causal effects of differences in performance management accounting practices on the level and variability of profit margins. For hypothesis 1, we use the Kruskal-Wallis test to test whether there is a difference in the median operating profit margin on sales for each group of firms. The Kruskal-Wallis test is used to test whether there is a difference in the medians of the operating margin on sales of the two explained variables and whether the null hypothesis is rejected at the 5 % level. The Kruskal-Wallis test was used because the null hypothesis was rejected at the 5 % level when the two explained variables were tested for normality, and the null hypothesis could not be said to follow a normal distribution. If the Kruskal-Wallis test yielded statistically significant results, pairwise comparisons were made using Dunn-Bonferroni's method. Note that SPSS Statistics version 26.0.0.1 64-bit version was used in the analysis.

4. ANALYSIS RESULTS AND DISCUSSION

Table 2 shows the level of performance management accounting practice for each group and the means and standard deviations of the covariates used in the ordinal logistic regression. There is a difference of about 1 in the mean values between the lower and middle and between the middle and upper groups in the level of performance management accounting practice, and this difference is statistically significant. On the other hand, the propensity score matching results showed no statistically significant differences among the three groups in the means of all covariates in Table 2 of the ordinal logistic regression. In other words, there were no important differences in the distribution of attributes among the three groups, which is an appropriate condition for a quasi-experiment.

When the median and mean of the profit margin for each group were calculated, it was confirmed that the profit margin level also tended to differ with different levels of performance management accounting practice (Table 3). Specifically, the median (mean) profit margin for the lower level of performance management accounting practice was 1.7% (1.6%), the median (mean) profit margin for the middle level was 0.8% (2.1%), and the median (mean) profit margin for the higher level was 2.4% (2.5%). In other words, the median profit margin level of the upper group was the highest, the next highest was the lower group, and the lowest profit margin level was the middle group. To verify the hypothesis of the effect of profit improvement, a Kruskal-Wallis test was conducted with the median profit margin as the dependent variable and the classification by the level of performance management accounting practice as the independent variable (Table 3). The results of the analysis showed that there was no statistically significant difference in the median profit margin among the three groups with different levels of performance management accounting practices.¹⁰ Therefore, hypothesis 1 was rejected.¹¹

Table 3 also shows the standard deviation of profit margins for each group. The largest standard deviations are found in the lower groups, suggesting a large variation in performance within groups.

Table 2. Means and Standard Deviations of Covariates for Performance Management Accounting Practices and Ordinal Logistic Regression.

		Map	Asp	Taxa	InEmp	Bnis	ΔSales	Lev	Namd
Lower level	Mean	-0.913	-0.034	0.600	2.511	0.025	0.065	0.575	0.340
N=50	S.D.	0.365	0.826	0.495	1.069	0.114	0.286	0.625	0.479
Middle level	Mean	-0.073	-0.048	0.440	2.872	0.017	0.083	0.554	0.240
N=50	S.D.	0.264	0.731	0.501	1.099	0.100	0.194	0.606	0.431
Higher level	Mean	1.011	-0.014	0.600	2.669	0.029	0.030	0.537	0.240
N=50	S.D.	0.402	0.790	0.495	1.124	0.084	0.139	0.478	0.431
Analysis of variance	F value	382.701	0.024	1.727	1.361	0.180	0.808	0.054	0.832
	p-value	0.000	0.977	0.181	0.260	0.835	0.448	0.948	0.437

Table 3. Testing the Profit-Enhancing Effect Hypothesis: Results of Descriptive Statistics and Hypothesis Testing of Profit Margins by Group.

Group	n	Mean	S.D.	Profit Ratio			Kruskal-Wallis Test	
				Median	Minimum Value	Maximum Value	Test Statistic	p-value
Lower level	50	0.016	0.116	0.017	-0.247	0.392		
Middle level	50	0.021	0.082	0.008	-0.169	0.263	1.581	0.454
Higher level	50	0.025	0.087	0.024	-0.247	0.268		

Table 4. Testing the Profit Control Hypothesis: Descriptive Statistics and Hypothesis Testing Results for the Standard Deviation of Profit Margins by Group.

Group	n	Mean	S.D.	Profit Ratio			Kruskal-Wallis Test	
				Median	Minimum Value	Maximum Value	Test Statistic	p-value
Lower level	50	0.039	0.046	0.024	0.001	0.222		
Middle level	50	0.034	0.072	0.017	0.001	0.502	3.23	0.199
Higher level	50	0.042	0.074	0.021	0.001	0.495		

Table 4 shows the results of testing the profit control effect hypothesis. The standard deviation of the ratio of operating profit to sales was calculated for each firm based on the most recent three years of data available from the accounting firm at the time of the survey. No clear trend was observed between the level of performance management accounting practice and the standard deviation of the profit margin (Table 4). Specifically, the median (mean) standard deviation of the profit margin for the lower level of performance management accounting practice was 2.4% (3.9%), the median (mean) standard deviation of the profit margin for the middle level was 1.7% (3.4%), and the median (mean) standard deviation of the profit margin for the higher level was 2.1% (4.2%). To test the hypothesis of a profit control effect, a Kruskal-Wallis test was conducted using the median standard deviation of the profit margin as the dependent variable and the classification by the level of performance management accounting practice as the independent variable (Table 4). The results of the analysis showed that there was no statistically significant difference in the median standard deviation of the profit margin among the three groups with differ-

ent levels of performance management accounting practices.¹² Therefore, hypothesis 2 was also rejected.¹³

The quasi-experiments in this study did not provide evidence of the existence of a profit-enhancing effect, in which higher profit rates are brought about by higher levels of performance management accounting practice by SMEs, or a profit-control effect, in which the scattering of profit rates can be suppressed. (1) The same variables and data were used as in Oyewo and Ajibolade (2019), who demonstrated that the lack of aspiration among SME managers is a barrier effect on the degree of management accounting practice, and (2) the differences in the distribution of covariates among groups based on propensity scores in this quasi-experiment can be statistically ignored (fair matching was achieved). In the same way that the above-mentioned series of previous studies did not obtain consistent results on the effects of management accounting practices on financial performance in small and medium-sized firms, the results of this quasi-experiment also showed that the practice of performance management accounting cannot be said to have the effect of improving profits or controlling profits.

Map represents the degree of management accounting practice. For other variables, see Section 3. Industry dummies (Ind 1 to 20, but Ind 2 and Ind 10 are not applicable after matching) and accounting firm dummies (Accountant 1 to 17, but Accountant 15 is not applicable after matching) are omitted.

5. ADDITIONAL ANALYSIS

Although the results did not support the hypothesis, each group included firms of different sizes. Therefore, we stratified the sample with respect to size and conducted an additional exploratory analysis of the relationship between the level and variance of profit margins and the degree of performance management accounting practice.

As a result, in the sample with the highest sales scale¹⁴ (caliper 0.05), a difference in profitability was found between the groups with the highest and middle levels of performance management accounting practice (mean: high (n=16) = 0.065, middle (n=16) = -0.004, p-value by Bonferroni's method = 0.048). Prior research has indicated that small and medium-sized firms with small size have little need to introduce performance management accounting for control, but as firm size increases, managers become unable to manage the organization alone and thus begin to introduce performance management accounting. Pavlatos and Kostakis (2015) analyzed firms with revenues of 1 billion euros or more, which are relatively large in size. Even for firms of this size, the results indicated that the practice of performance management accounting leads to improved profitability. Based on the results of the previous study and the additional analysis, it can be said that small and medium-sized companies, which are relatively larger in size, have greater advantages in introducing and utilizing performance management accounting.

It should be noted, however, that the results of this additional analysis showed no difference in profit margins between the groups with the highest and lowest levels of management accounting practices, but only between the groups with the highest and middle levels of management accounting practices. The results of this analysis may suggest that at relatively moderate levels of performance management accounting implementation, the costs may be greater than the benefits gained from the practice of performance management accounting. In other words, the implementation of performance management accounting at a moderate level in the sample may result in lower profit margins because firms are unable to obtain and use the information necessary to improve their performance despite the costs associated with the maintenance and operation of management accounting.

6. CONCLUSIONS AND FUTURE ISSUES

In this study, we tested the hypothesis regarding the relative level of performance management accounting practices and the level of profitability of SMEs (the profit improvement effect hypothesis). In addition to that, we tested whether the variance of profit margins is smaller in the group of SMEs with relatively high levels of performance management accounting practice compared to the group of SMEs with relatively low levels of practice (profit control effect hypothesis). With the cooperation of an accounting firm, we asked

accounting experts to evaluate the degree of performance management accounting practice in SMEs and obtained data on operating profit margin. Analysis of this data revealed no statistically significant differences in the level and standard deviation of profit margins among the groups with different levels of performance management accounting practices.

This study did not find statistically significant results to support the hypothesis regarding the effects of performance management accounting practices in SMEs. Further theoretical and empirical research, including the possibility that the hypothesis is incorrect, is warranted. In this study, the profit margin was used as the explained variable, but it may contain noise such as differences in the month of the fiscal year end and fluctuations due to economic trends. Since these noises could not be eliminated due to data limitations, future studies will need to address this point. In addition, although we controlled for as many factors as possible in this study, there may be factors that weakened the benefit-enhancing and control effects that we did not identify. Therefore, it is possible that the results do not support our hypothesis. In the future, it will be necessary to identify other factors that weaken the effects of profit improvement and control and to control them in a quasi-experiment to verify the effects of performance management accounting practices with higher precision. In addition, in propensity score matching, the balance of covariates is important when seeking more accurate analysis results (Zhang et al. 2019). When performing propensity score matching, if the values of the covariates in the treatment and control groups are too far apart, it may not be possible to obtain accurate analytical results. It is important to set calipers of appropriate width to obtain accurate analysis results. On the other hand, setting the caliper width too strictly will reduce the number of samples matched among different groups. To solve this dilemma, increasing the sample size may be important.

The additional analysis suggests that the profit margin level tends to be higher in the group of firms with a high level of performance management accounting practice than in the group of firms with a medium level of practice if the analysis is limited to larger firms. This suggests that there may be a situation in which the information obtained through the practice of performance management accounting is beneficial to small and medium-sized firms and that when the degree of management accounting practice is relatively low compared to the top group (but not as low as in the bottom group), the cost of management accounting practice may have a large negative impact on profit margins. The results suggest that the cost of management accounting practices may have a significant negative impact on profit margins. In the future, it is necessary to examine more precisely under what circumstances the practice of performance management accounting is effective in improving the performance and controlling profits of small and medium-sized firms.

In this study, we focused on management accounting for short-term PDCA cycles. However, industries exposed to dramatic environmental changes, such as the food and beverage and tourism industries, may need to change their medium- to long-term business plans by implementing long-term PDCA cycles. The impact of management accounting subject to a long-term PDCA cycle on the level and variability

of profit margins of small and medium-sized enterprises should also be examined in the future.

In terms of the long-term span, the data used in this study has another limitation. The data used in this study to examine the variation in profit margins was for a three-year period, which is the same period covered by a typical medium-term business plan, and therefore, we were not able to analyze the long-term variation in profit margins. Although it is difficult to obtain long-term data on profit margins for small and medium-sized firms, it would be worthwhile to analyze data for more than five years, for example, if studying the variability of profit margins. This point remains an issue for the future.

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NOTES

1 From this perspective, it can be taken that SME managers are motivated to perform profit leveling and are doing so by utilizing performance management accounting.

2 Clinical knowledge in (management) accounting, which is the basis of clinical accounting, refers to knowledge and abilities used by entities that judge the situation of managers and organizational operators and provide appropriate advice. A concrete example is the knowledge and abilities of accounting specialists such as certified public accountants and certified tax accountants who provide support to managers in introducing management accounting. Clinical accounting studies provide a place to accumulate and systematize the clinical knowledge of management accounting as knowledge and abilities that professionals should possess. And clinical accounting data in this paper are data obtained by utilizing the clinical knowledge of accounting professionals and observing management accounting practices in companies, meaning data that utilize an organized professional observation device.

3 However, Moyo and Mpofo (2019) included the item "(7) Overall level of management accounting is high" as described below in the items comprising the scale. In this paper, since this item was utilized to evaluate the criterion-related validity, it was not included in the items comprising the scale, and a scale consisting of six items was used to measure the level of management accounting practice. Oyewo and Ajibolade (2019) also used six items to measure the level of management accounting practice.

4 As an additional analysis, principal component analysis was conducted instead of factor analysis, and the first principal component score was used as the level of performance management accounting practice to test the hypotheses. This analysis did not support either hypothesis 1 or 2. The mean values of the six items were calculated, and the mean value of 2 or less was classified as the lower level of practice, the mean value of greater than 2 and less than 4 as the middle level of practice, and the mean value of 4 or more as the

higher level of practice, and the hypotheses were tested. In this analysis, neither hypothesis 1 nor 2 was supported.

5 In this study, we typified and organized the firms into groups with lower, medium, and higher degrees of management accounting practice, corresponding to the classification in the larger project in which this study was included. Thus, the three-group classification was used in this study to test the hypotheses. On the other hand, prior studies have also conducted analyses based on the four-group classification (e.g., Pavlatos & Kostakis, 2015). Although a follow-up study using the same classification is not possible because the scale of management accounting information is different from that of Pavlatos and Kostakis (2015), we tested hypotheses 1 and 2 by classifying the respondents into four groups based on the degree of management accounting practice in this study. The results of the analysis did not support either hypothesis.

6 The following regression coefficients were statistically significant at the 5 % level in the ordinal logistic regression analysis. The values shown below are the regression coefficients (p-values): Asp = 0.328 (0.013), Taxa = 0.485 (0.024), Namd = -0.845 (0.004), Ind17 (Other Medical, Dental and Welfare Related Industry dummy variable) = -1.05 (0.026), Acc 1 (1st accounting Firm. Same hereafter) = 2.258 (0.001), Acc 2 = -2.332 (<0.001), Acc 3 = 1.526 (<0.001), Acc 13 = 1.34 (<0.001).

7 Management accounting is not excluded from the analysis in this study because there are cases in which management accounting is introduced as part of corporate revitalization even for firms with negative net assets. When firms with negative net assets were excluded from the analysis, both hypotheses 1 and 2 were not supported.

8 Industry dummy variables were originally created with reference to the Indian Standard Industrial Classification, and were set to distinguish 20 industries. However, in the process of limiting the sample to those with all the necessary variables for the analysis ($n=652 \rightarrow n=496$), firms that answered 2 (mining industry) were excluded. When conducting the logistic regression, the dummy variable for the 20th industry (other industries) was removed. In the matching process after the logistic regression analysis, the data for the 10th industry (finance and insurance) was excluded from the analysis.

9 The accounting firm dummy variable was set up so that 17 firms could be distinguished, but data from the 15th accounting firm was excluded from the analysis during the matching process after the logistic regression analysis. The 17th accounting firm dummy variable was removed when conducting the logistic regression. The accounting firm dummy variable controls for the average impact of a single accounting firm on the management accounting practices of its clients. However, in reality, some firms receive management accounting implementation support from accounting firms while others do not. Therefore, it is possible that the impact on the degree of management accounting practice differs

depending on the relationship between the accounting firm and the firm. The limitation of this study is that we were not able to control for this difference in impact.

10 The median (mean) profit margin for the lower group of firms with a caliper of 0.01 (39 firms in each group, 117 firms in total) was 1.6% (0.6%), the median (mean) profit margin for the middle group was 0.3% (2.3%), and the median (mean) profit margin for the upper group was 2.6% (2.6%). The Kruskal-Wallis test showed no significant difference with a probability of significance (test statistic) of 0.333 (2.201).

11 In addition, t-tests, and Mann-Whitney U-tests were also conducted for lower vs. medium, medium vs. higher, and lower vs. higher, but none of these tests yielded significant results. In order to take into account differences in profit margin levels by industry, a Kruskal-Wallis test was conducted with the explained variable as the deviation from the average profit margin of the industry in the sample, but no significant results were obtained.

12 The median (mean) standard deviation of the profit margin for the lower performance management accounting practice group was 2.5% (4.0%), the median (mean) standard deviation of the profit margin for the middle group was 1.9% (3.9%), and the median (mean) standard deviation of the profit margin for the upper group was 2.1% (4.4%), which were not significantly different from those for the caliper 0.01 (39 companies in each group, 117 companies in total). The Kruskal-Wallis test showed that the probability of significance (test statistic) was 0.288 (2.490), which was not significantly different.

13 The results of the F-test of analysis of variance for the profit margins in Table 3 showed no significant difference with a probability of significance (F value) of 0.893 (0.113). In addition, to take into account the difference in profit margin standard deviation by industry, a Kruskal-Wallis test was conducted with the explained variable as the deviation from the industry profit margin standard deviation within the sample, but no significant results were obtained. We also conducted an additional analysis focusing on the variation in the amount of profit. Specifically, the Kruskal-Wallis test was conducted by calculating the ratio of the amount of profit in the second and third years when the amount of profit in the first year was set as 1, and the standard deviation of this ratio (standard deviation of the profit ratio) was used as the explained variable. This analysis did not yield statistically significant results.

14 The top 50% of the 150 small and medium-sized enterprises in terms of sales size were selected, and then the analysis was limited to enterprises that would be in the top 50% in any of the three groups (with sales of 375,315,000 rupees or more). In addition, to ensure that the number of firms in each group was the same, we excluded firms with small sales in accordance with the smallest group from the analysis. As a result, $n=16$ for the top, middle, and bottom groups.