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An Application of Heckman Two-step Procedure to Management Accounting and Firm Effectiveness: An Empirical Study from Vietnam

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Abstract

Using the Heckman two-step procedure, this study investigates the relationship between management accounting implementation and firm effectiveness. The research data for this study was acquired from 450 publicly traded companies in Vietnam; however, the final sample only includes 304 responses containing useful information. The reliability analysis was used to evaluate the acquired data to examine the qualities of constructs and the dimensions that make them up. Then, the Heckman two-step technique was performed to analyze the causal connection from the acceptance of management accounting to firm effectiveness allowing for the effect of environmental uncertainty and organizational characteristics on the likelihood of adopting management accounting. The empirical findings show that management accounting acceptance determines firm effectiveness; however, the research model on the relationship between management accounting adoption and firm effectiveness has a sample selection bias. The main conclusions of this study are that there is a difference in the effects of management accounting adoption on business effectiveness when sample selection bias is not taken into consideration. When potential sample selection bias is taken into account by integrating environmental uncertainty and organizational characteristics in the research model, the effect of adopting management accounting on company effectiveness becomes minor.

Keywords: Heckman Two-Step Technique, Firm Effectiveness, Management Accounting, Organizational Characteristics, Business Environment

JEL Classification Code: C51, G32, L25, M41

1. Introduction

The success of businesses is heavily dependent on management accounting. Management accounting is the application of appropriate procedures in the processing of an organization's business data to assist directors in developing a strategy for achieving reasonable corporate objectives (Adu-Gyamfi & Chipwere, 2020). Management accounting procedures are usually referred to as a critical monitoring tool that provides directors with relevant information that allows them to make great business decisions and maintain active management of organizational resources. Management accounting procedures are required by businesses to manage expenses, measure efficiency, and increase efficiency (Johnson & Kaplan 1987). Directors can get several competitive benefits for their company by implementing management accounting procedures.

Prior research projects recommended the implementation of management accounting practices in business adds more value to firm effectiveness; therefore, it can lead to enhanced firm effectiveness (Adu-Gyamfi & Chipwere 2020). They explored the influence of adopting management accounting tools on firm effectiveness using the whole research sample which comprises both the adopters and non-adopters of management accounting tools. The results of the aforementioned studies wrongly reflected the

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causal relationship between management accounting tool acceptance and firm effectiveness for businesses that use management accounting tools.

The current study examines the impact of management accounting practices in business on firm effectiveness only for businesses that use management accounting tools; however, it also considers the effects of environmental uncertainty and organizational characteristics on the likelihood of using management accounting tools in the business. Firm effectiveness is also calculated by comparing the efficiency of adopters and non-adopters of management accounting methods in business to the industry's average effectiveness over the previous year. The Heckman two-step technique is used in this study to determine the causal relationship between management accounting tool acceptance and firm effectiveness, taking into account the effects of environmental uncertainty and organizational characteristics on the likelihood of adopting management accounting practices.

To the best of my knowledge, the existing article is one of the first to apply the Heckman two-step technique to analyze the effect of accepting management accounting practices on firm effectiveness allowing for the influences of environmental uncertainty and organizational characteristics on the likelihood of adopting management accounting practices. To managerial academics, the current project offers an insight into the acceptance of management accounting practices and their connection with firm effectiveness by considering the interference of environmental uncertainty and organizational characteristics in the research model.

The results also offer executives a deeper understanding of the way where firm effectiveness is augmented by the acceptance of management accounting tools for business considering the intervention of environmental uncertainty and organizational characteristics. The current research is organized as follows. A hypothetical framework will recommend the research model in the following part. Next, the method will explain how to gather and evaluate the research data. A succeeding part will demonstrate the research results. Finally, some conclusions will be presented.

2. Research Framework

The impact of management accounting tools on firm effectiveness is influenced by a number of other factors, including environmental uncertainty and firm characteristics. Following that, a review of the research on the links between management accounting tool acceptability, firm effectiveness, environmental uncertainty, and firm characteristics is examined. Management accounting is a managerial strategy that aims to deliver crucial company information to make effective business decisions. Management accounting, according to Kaplan (1983), is one of the managerial strategies whose purpose is to offer crucial information to businesses to improve their effectiveness.

In addition, Lucas (1997) suggested that traditional management accounting practices are no more deemed as a helpful tool for running the business in the recent dynamic environment. Along with these traditional management accounting practices, organizations had better link their managerial technique with more advanced managerial tools so that they can satisfy the requirements of stakeholders.

Anchored in the abovementioned perceptions, it refers to the adoption of management accounting practices in business as the extent to which an enterprise selects and adopts management accounting practices for their business, which include both the aforesaid traditional and modern methods to run business. Numerous studies have revealed the role of management accounting practices in improving firm effectiveness.

Management accounting adoption, which refers to the degree to which firms identify the objectives, is a result of firm effectiveness. The real results of organizational financial and nonfinancial performances are referred to as firm effectiveness. Firm effectiveness contributes to the overall success, market share, profitability, growth rate, and innovativeness of the enterprises when compared to their competitors. Competitive advantage and firm performance are directly developed as a result of company effectiveness. Firm effectiveness, according to Ferreira and Proenca (2015), is defined as a company's capacity to meet the needs of its target customers. Firms may be considered operational if they are able to meet the needs of the target audience, if a network gives information about the actions undertaken, and if they achieve the goals set forth. The ability to resolve problems, adopt sound managerial tools, create new services or build new processes to investigate and satisfy customers that explicitly influence competitiveness, success, and effectiveness. Firm effectiveness is how a company runs its business effectively. It is the potential to accomplish customer needs and satisfy them through commitment, supplement and happiness. Firm effectiveness therefore make them continue internal efficiency, optimize the usage of business resources, enhance flexibility and capability to maintain themselves through the external inconsistencies, and reach their aims. Consequently, firm effectiveness can improve firm performance.

In addition, Cheng et al. (2020) suggested that enterprises should choose sound managerial tools and hire managers who are compatible with these tools to improve their firm's effectiveness. Ferreira and Proenca (2015) also investigated the use of strategic planning as well as its impact on company effectiveness. They classified companies into clusters based on the extent to which strategic planning had been implemented and how effective it was. Then they conducted analyses for various groups, with the results

indicating that formal managerial tools must be accepted by enterprises. Strategic planning is one of the most important strategic managerial techniques for increasing a company's effectiveness. The findings show that acceptance of strategic planning in business has a beneficial impact on firm effectiveness.

Likewise, Dwirandra and Astika (2020) implied that the acceptance of accounting information tools in business can increase employee performance; and so it can improve firm effectiveness. As a result, the aforesaid findings can arrive at the hypothesis for the management accounting context. The hypothesis H1: Firm effectiveness is likely determined by the adoption of management accounting practices.

Although the likelihood of businesses using management accounting tools to improve their effectiveness is determined by other business factors such as organizational characteristics and environmental uncertainty, it is determined by other business factors such as organizational characteristics and environmental uncertainty. The term "environmental uncertainty" refers to a situation in which the business environment's conditions are constantly changing. As a result, managers have minimal influence over external events that are beyond their company's control. Environmental uncertainty is a critical contingent variable in business operations.

Moreover, Wierenga and Ophuis (1997) suggested higher environmental uncertainty may result in a higher application of managerial information systems for business. In addition, Masrek (2009) confirmed a positive correlation from environmental uncertainty to the application of managerial information systems. Similarly, statistical evidence on a positive connection from environmental uncertainty to the design of management accounting practices in business was found out by Ibadin and Imoisili (2010).

Furthermore, Amara and Benelifa (2017) used contingency theory to determine external factors related to the use of management accounting technologies. The findings point to a relationship between the external company environment and managerial accounting tool acceptability. Dwirandra and Astika (2020) have attempted to investigate the causal link between environmental uncertainty and company accounting adoption. The empirical findings revealed a relationship between corporate adoption of accounting information tools and environmental uncertainty. The preceding discussions may lead to the fol-lowing hypothesis in the context of management accounting. The likelihood of businesses adopting management accoun-ting techniques is determined by environmental uncertainty.

Organizational features, according to Ko et al. (2008), can be divided into numerous categories. Organizational variables such as organizational industry type and organizational size, according to Nimtrakoon and Tayles (2010), play a crucial effect in organizational success. In this study, organizational characteristics comparable to the preceding description are used, consisting of the two dimensions indicated above, namely the industry type to which the company belongs and the size of the company.

Wierenga and Ophuis (1997) also claimed that organizational variables could influence CEOs' decisions to use management information methods. According to Mellahi and Eyuboglu (2001), organizational features might be particularly significant to the acceptance of quality management for business. Unlike Warwood and Roberts (2004), who stressed the importance of organizational characteristics in the acceptance of quality management for business, Al-Omiri and Drury (2007) found that the adoption of management accounting practices varies significantly depending on organizational characteristics.

Following that, Abdel-Kader and Luther (2008) attempted to research the impact of organizational factors on managerial tool adoption by employing a multiple contingencies approach to investigate the impact of company characteristics on the adoption of management accounting tools in business. They examined the impact of potentially confounding factors on the acceptability of management accounting tools in the workplace in a sample of enterprises from the UK's largest industry sector. The findings of the study contribute to a better understanding of the causal relationships between contingent variables such as company characteristics and the use of management accounting tools in business, advancing the development of an integrated contingent framework.

Organizational features, according to Masrek (2009), determine how management information is used. Furthermore, Erserim (2012) found a link between organizational features and the acceptability of management accounting procedures in industrial businesses in a study. Furthermore, the implementation of management accounting methods in the company, which can lead to organizational sustainability, is heavily influenced by organizational features.

Furthermore, Fuadah et al. (2020) attempted to investigate the factors that influence management accounting tools. Some variables of firm characteristics, according to the research findings, influence the use of management accounting techniques in the business. As a result, in the framework of management accounting, the following thesis can be proposed. The likelihood of a company adopting management accounting procedures is influenced by organizational features. The chance of accepting management accounting procedures in the company is conditional on organizational traits and environmental uncertainty, according to research from the management accounting literature.

3. Research Methodology

3.1. Measurement of Variables

Adoption of Management Accounting Tools (ADS) is calculated using a five-point scale, which ranges from 1 (one) to 5 (five), modified from Cinquini et al. (2008). The measured items are traditional budgeting (ADS1), cost volume profit analysis (ADS2), variance analysis (ADS3), activity-based costing (ADS4), total quality management (ADS5), and balanced scorecard (ADS6), employed for ADS, modified from earlier research (Lucas 1997; Al-Omiri & Drury 2007).

The probability of Adopting Management Accounting Tools (PRS) takes 1 (one) if satisfied with the adoption of management accounting tools in business is obvious within an enterprise, and 0 (zero), otherwise. If an enterprise is satisfied with the successes in the dimensions of management accounting tools, PRS takes 1 (one), otherwise 0 (zero).

Firm Effectiveness (ORE) is computed with a five-point scale from 1 (one) to 5 (five). A comparison with the industry average for the last year was made. Drawing on Huynh (2015), this research measures ORE with five items: 1. returns on asset (ORE1), 2. returns on equity (ORE2), (modified from Droge et al., 2003), 3. innovativeness (ORE3), 4. quality in products or services (ORE4) and 5. customer satisfaction (ORE5), adjusted from previous research (Kaplan & Norton 2007).

Environmental Uncertainty (ENY) is evaluated on six items: (1) technology- ENY1, (2) economy- ENY2, (3) resources and services used by the company- ENY3, (4) product market and demand- ENY4, (5) competition- ENY5 and (6) government policies- ENY6, using a five-point scale ranging from 1 (one) to 5 (five), modified from Miles et al. (1978).

Organizational Characteristics (ORS) are computed on three items. Organizational industry (ORS1) is computed with a three-point scale from 1 (one) to 3 (three), modified from Taha et al. (2011) as well as Brouthers et al. (2002). Organizational size (ORZ1) is calculated with three levels, based on Nguyen (2009). Organizational interdependence (ORC3) is assessed with a three-point scale from 1 (one) to 3 (three), grounded on Ibadin and Imoisili (2010).

3.2. Data Collection and Analyses

The participants in the study were Vietnam's publicly traded companies. The initial emails were sent to implore responses from key informants involved in management accounting, in addition to the information available from the business reports. For each target entered, an associated director was supplied. Those with fundamentally insufficient information were deleted after the replies from 450 businesses were gathered. The 304 responses with useful information make up the final sample.

Following the collection of research data, reliability analysis was used to investigate the qualities of constructs and the dimensions that make up the constructs. Following that, the Heckman tow-step technique was used to examine the causal link between management accounting practices acceptance and firm effectiveness, taking into account the impact of environmental uncertainty and organizational characteristics on the likelihood of management accounting practices adoption in business. In addition, regression analysis was used to compare the outcomes of the Heckman two-step technique with the results of the acceptability of management accounting procedures and business effectiveness.

4. Research Results

To investigate the internal constancy of the scales, reliability analyses were applied. The lowest satisfactory thresholds of the Cronbach's αs and the item-total correlations are 0.7 and 0.5 respectively; and the smallest α, if the item is deleted, should be less than their own Cronbach's αs (Hair et al., 2012).

Reliability analyses are required for four of the five constructs. Table 1 summarizes the findings. All the Cronbach's coefficients are greater than 0.7. (the lowest value is 0.792). All the item-total correlations are more than 0.5. (the lowest value is 0.673). Furthermore, if an item is eliminated, all of the highest Cronbach's s are smaller than their own Cronbach's s. (0.875 vs. 0.882; 0.812 vs. 0.835; 0.789 vs. 0.792; 0.823 vs. 0.876). The results show that all of the constructs are internally consistent. As a result, they need to be kept in future analysis. The composite scores of the components were then generated for the Heckman two-step approach and regression analysis. The Heckman two-step technique was then used to examine the causal relationship between the acceptability of management accounting procedures in business and company effectiveness, taking into consideration the effects of environmental uncertainty and organizational features.

The Heckman approach, which is divided into two stages, is used to account for potential sample selection bias. The first step is to create a selection formula. To analyze the influences of environmental uncertainty and organizational features on the likelihood of adopting management accounting techniques in business, a probit model for all observations (adopters and non-adopters of management accounting practices in business) is used. The consistent coefficients of the inverse Mills ratio are generated using the estimations in the probit model. The result equation is estimated by OLS, which only uses uncensored observations for analyses, once the consistent coefficients of the inverse Mills ratio have been included in the research model.

Table 1: Reliability Analyses

Scale	Smallest Item-Total Correlation	Highest Cronbach's *α* if the Item is Deleted	Cronbach's *α*	*N* of Items
ADS	0.705	0.875	0.882	6
ORE	0.694	0.812	0.835	5
ENY	0.673	0.789	0.792	6
ORS	0.681	0.823	0.876	3

Tables 2 and 3 show the findings achieved using the Heckman two-step technique. The selection equation yielded the results in Table 2. (the first stage). At the 1% significance level (P-value = 0.000), environmental uncertainty and organizational features impact the chance of accepting management accounting procedures in business with estimates of 0.281 and 0.427, respectively. Furthermore, at the 1% level, the model fit is statistically significant (Prob > χ^2 = 0.000). Pseudo R^2 is 0.313, meaning that environmental uncertainty and organizational variables account for 31.3 percent of the variance in accepting management accounting procedures in the business.

According to the findings, organizational factors have a greater impact on the likelihood of adopting management accounting approaches than environmental uncertainty. The consistent coefficients of the inverse Mills ratio are computed in this step (INMILRA). The second stage began once INMILRA was incorporated into the outcome equation. The results of the second step are shown in Table 3.

The results show that the outcome equation obtains a model fit at a 5% significance level. At the 5% significance level, the estimation of INMILRA (0.148) differs from 0, indicating that the research data contains sample selection bias. It could imply that environmental uncertainty and organizational features are likely interfering with the impact of management accounting methods on firm effectiveness. The statistical insignificance of the link between the adoption of management accounting procedures nonbusiness and firm effectiveness is due to the intervention of environmental uncertainty and organizational features. The outcome equation was conducted using the OLS regression sans INMILRA to offer an additional comparison.

The results are shown in Table 4. Table 3 compares the impact of coefficients of accepting management accounting practices on firm effectiveness to Table 4, where the impact of coefficients of adopting management accounting practices in business on firm effectiveness is higher for the regression without INMILRA (0.122) than for the regression with INMILRA (0.122). (0.030). The evidence suggests that if potential sample selection bias is not taken into account (Table 4), the impact of accepting management accounting tools on company effectiveness is greater if potential sample selection bias is taken into account (Table 3).

Table 2: The First Step of Heckman Technique

PRS	*B*	Std. Err.	*z*	P_{value}
ENY	0.281	0.051	4.70	0.000
ORS	0.427	0.050	3.88	0.000
C_0	–0.002	0.049	–0.042	0.96

Prob > chi² = 0.000, Pseudo R^2 = 0.313.

Table 3: The Second Step of Heckman Technique with INMILRA

ORE	*β*	Std. Err.	*t*	P_{value}
ADS	0.030	0.073	0.408	0.684
INMILRA	0.148	0.072	2.057	0.041
C_0	4.009	0.058	69.069	0.000

Prob > F = 0.013, R^2 = 0.714.

Table 4: OLS Regression Without INMILRA

ORE	*β*	Std. Err.	*t*	P_{value}
ADS	0.122	0.058	2.111	0.036
C_0	4.009	0.058	68.692	0.000

Prob > F = 0.036, R^2 = 0.502.

Furthermore, when INMILRA is taken into account, the impact of embracing management accounting techniques on company effectiveness is negligible. As a result, sample selection bias could cause the OLS regression results to be skewed. Hypothesis H1 is statistically supported if sample selection bias is not taken into account. When sample selection bias is taken into account, however, hypothesis H1 becomes statistically unsupported. As a result, when faced with a sample selection dilemma, academics should consider sample selection bias so that the study results are more accurately generated.

5. Conclusion

An earlier study has examined the correlation between the adoption of management accounting methods and corporate effectiveness. To my knowledge, no study has uncovered the casual relationship that allows for sample selection bias. The current project examines the impact of accepting management accounting practices on firm effectiveness using the Heckman two-step technique, which takes into account the effects of environmental uncertainty and organizational characteristics on the likelihood of adopting management accounting practices in business. The present research contributes to the management accounting literature in some ways. The evidence shows that the data contains sample selection bias.

Also, there is a difference in the benefits of adopting management accounting methods in business on company effectiveness when potential sample selection bias is not taken into account versus when it is taken into consideration. When environmental uncertainty and organizational factors are factored into the study model of management accounting practices and firm effectiveness, the effect of accepting management accounting methods on company effectiveness becomes minimal.

If management accounting scholars examine the effect of adopting management accounting practices in business on firm effectiveness, the findings provide insight into the significance of sample selection bias. The issue of sample selection bias can cause study conclusions to be distorted and erroneous. In other words, when environmental unpredictability and organizational characteristics are factored into the research model, the link between management accounting techniques adoption and company effectiveness becomes insignificant. The findings are also useful to executives because they help them understand the unintended relationship between management accounting practices acceptance and firm effectiveness, as well as the presence of sample selection bias in the research model when considering the impact of environmental uncertainty and organizational characteristics on management accounting practices. As a result, they may be able to make better decisions about management accounting processes, resulting in increased firm effectiveness.

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