Thoroughly examining the influence of managerial accounting on organizational performance with Heckman two-step technique

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Abstract
The implementation of managerial accounting practices in business has been broadly recognized as a determinant of organizational performance. Earlier studies have not taken sample selection bias problem into consideration when examining this relationship. The current work scrutinizes the relation from managerial accounting adoption to organizational performance by employing Heckman two-step technique. The data was collected from 302 publicly listed enterprises in Vietnam’s main Stock Exchanges. The findings suggest there exists sample selection bias in the causal link from the implementation of managerial accounting practices to organizational performance. The current research is helpful to managerial accounting scholars as well as business executives, in shedding light on the association between managerial accounting practices and organizational performance. The findings could help directors in their business decisions on adopting managerial accounting practices which should correspond to their organizational characteristics and business environment, where they can obtain the best organizational performance.

Keywords
Heckman two-step technique, Organizational performance, Managerial accounting, Organizational characteristics, Business environment

Introduction
The achievement of enterprises is considerably conditional on managerial accounting. Managerial accounting is the implementation of suitable procedures in processing the business data of an enterprise to help directors establish a plan for sensible business goals (Adu-Gyamfi & Chipwere 2020). Managerial accounting practices are commonly referred to as a vital monitoring tool that provides directors with useful information to make
sound business decisions and sustain active managing mechanism over organizational resources. Enterprises need managerial accounting practices for appropriate and exact information to manage expenses, measurement and improvement of efficiency (Johnson & Kaplan 1987). Implementing managerial accounting practices allows directors to enjoy numerous competitive advantages for their business.

Prior research projects recommended the implementation of managerial accounting practices in business adds more value to organizational performance; therefore, it can leads to enhanced organizational performance (Saeidi et al. 2018; Phornlaphatrachakorn & Na-Kalasindhu 2020; Adu-Gyamfi & Chipwere 2020). They explored the impact of adopting managerial accounting practices on organizational performance using the whole research sample which comprises both the adopters and non-adopters of managerial accounting practices. The findings of the aforementioned studies could incorrectly reflect the causal association form the adoption of managerial accounting practices in business to organizational performance for enterprises adopting managerial accounting practices.

The current research tries to scrutinize the impact of adopting managerial accounting practices in business on organizational performance only for enterprises adopting managerial accounting tools; while it also takes into consideration the influences of environmental uncertainty and organizational characteristics on the probability of adopting managerial accounting practices within business. Additionally, organizational performance is estimated by comparing the efficiency the adopters or non-adopter of managerial accounting practices in business with the average effectiveness of industry during the last year. This study employs the Heckman two-step technique to discover the causal connection from the adoption of managerial accounting practices in business to organizational performance allowing for the influences of environmental uncertainty and organizational characteristics on the likelihood of adopting managerial accounting practices.

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

The results also offer executives with more deeply understanding the way where organizational performance is augmented by the acceptance of managerial accounting practices 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 methodology will explain how to collect and analyze the research data. A succeeding part will demonstrate the research results. Finally, some conclusions will be presented.
Hypothetical framework

Managerial accounting is a managerial technique which is aimed to provide essential business information to make sound decisions for an enterprise. Kaplan (1983) referred to managerial accounting as one of the managerial methods, the role of which is to deliver vital information for business to enhance organizational performance. In addition, Lucas (1997) suggested that traditional managerial accounting practices are no more deemed as a helpful tool for running business in the recent dynamic environment. Along with these traditional managerial 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 acceptance of managerial accounting practices in business as the extent to which an enterprise selects and adopts managerial accounting practices for their business, which are composed of both the aforementioned traditional and advanced methods to run business. Numerous studies have revealed the role of managerial accounting practices in improving organizational performance.


The probability of adopting managerial accounting practices in business by enterprises is determined by organizational characteristics and environmental uncertainty. Environmental uncertainty is referred to as a vital contingent variable in running business (Duncan 1972). 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 managerial accounting practices in business was found out by Ibadin and Imoisili (2010) and Ajibolade et al. (2010). Moreover, Amara and Benelifa (2017) employed the contingency theory to decide external factors related to the implementation of managerial accounting practices. The findings suggest a link between external business environment and the acceptance of managerial accounting practices. Likewise, Shahzadi et al. (2018) also highlighted the influence of external environment on the application of managerial accounting practices. The aforementioned discussions can allow to arrive at the following supposition for the
managerial accounting context. Environmental uncertainty likely determines the probability of adopting managerial accounting practices in business.

Nimtrakoon and Tayles (2010) referred to organizational characteristics as organizational industry type and organizational size, which play an important role in organizational success. In this research, it uses organizational characteristics similar to the above definition, consisting of the two above mentioned dimensions, namely industry type to which the enterprise belongs, and organizational size. Besides, Wierenga and Ophuis (1997) asserted organizational characteristics could enable executives’ decisions to adopt managerial information practices. Grounded on Mellahi and Eyuboglu (2001), organizational characteristics can be critical to the acceptance of the quality management system for business. Whereas Warwood and Roberts (2004) emphasized the vital role of organizational characteristics in the acceptance of the quality management system for business; Al-Omiri and Drury (2007) determined the adoption of managerial accounting practices will differ significantly depending on organizational characteristics. Following them, Abdel-Kader and Luther (2008) confirmed the impact of organizational characteristics on the adoption of managerial tools in business; while Masrek (2009) indicated organizational characteristics decide the usage of management information systems in an enterprise. Moreover, a study by Erserim (2012) suggested a causal tie from organizational characteristics to the acceptance of managerial accounting practices in industrial enterprises. Furthermore, organizational characteristics significantly determines the implementation of managerial accounting practices in business that can lead to organizational sustainability (Oyewo 2020). Hence, the following proposition can be suggested for the managerial accounting context. Organizational characteristics can influence the probability of adopting managerial accounting practices in business. On the evidence of the managerial accounting literature, it can propose the probability of accepting managerial accounting practices is conditional on organizational characteristics and environmental uncertainty.

Methodology

Measurement of Variables

*Adoption of managerial accounting practices (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 and Drury 2007).* The probability of adopting managerial accounting practices in business (PRS) takes 1 (one), if satisfaction with the acceptance of managerial accounting practices in business is obvious within an enterprise, and 0 (zero), otherwise. If an enterprise is satisfied with the successes in the dimensions of managerial accounting practices, PRS takes 1 (one), otherwise 0 (zero).

*Organizational Performance (ORE) is computed with a five-point scale from 1 (one) to 5 (five). A comparison with the industry average during 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 (Hudson et al. 2001; 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) and Miller (1993). *Organizational Characteristics (ORS) is 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 Chenhall and Morris (1986) as well as Ibadin and Imoisiili (2010).

**Data collection and analyses**

The research population consisted of the publicly listed enterprises in Vietnam’s main Stock Exchanges. Besides available information from the business reports, the initial emails were sent to implore replies from key informers involved in managerial accounting. A related director for each targeted enterprise was included. After the responses had been gathered from 450 enterprises, those without essentially adequate information were removed. The final sample comprises the 302 replies with effective information.

After the research data had been collected, reliability analysis was undertaken to examine the properties of constructs and the dimensions which constitute the constructs. Subsequently, the Heckman two-step technique was performed to scrutinize the causal bond from the adoption of managerial accounting practices in business to organizational performance allowing for the influence of environmental uncertainty and organizational characteristics on the likelihood of adopting managerial accounting practices in business. Besides, the regression analysis was also undertaken to test the link between the adoption of managerial accounting practices in business and organizational performance, in comparison with the results from the Heckman two-step technique.

**Research results**

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

**Table 1: Reliability analyses**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Smallest item total correlation</th>
<th>Highest Cronbach’s $\alpha$ if item is deleted</th>
<th>Cronbach’s $\alpha$</th>
<th>N of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADS</td>
<td>0.705</td>
<td>0.875</td>
<td>0.882</td>
<td>6</td>
</tr>
<tr>
<td>ORE</td>
<td>0.694</td>
<td>0.812</td>
<td>0.835</td>
<td>5</td>
</tr>
<tr>
<td>ENY</td>
<td>0.673</td>
<td>0.789</td>
<td>0.792</td>
<td>6</td>
</tr>
<tr>
<td>ORS</td>
<td>0.681</td>
<td>0.823</td>
<td>0.876</td>
<td>3</td>
</tr>
</tbody>
</table>
Four of the five constructs need reliability analyses. The results are displayed in Table 1. All of the Cronbach’s $\alpha$s all exceed the 0.7 value (the lowest value is 0.792). All of the item total correlations surpass the 0.5 value (the lowest value is 0.673). In addition, all of the highest Cronbach’s $\alpha$s if if item is deleted’ are smaller than their own Cronbach’s $\alpha$s (0.875 vs 0.882; 0.812 vs 0.835; 0.789 vs 0.792; 0.823 vs 0.876). These findings show all of the constructs are internally reliable. As a result, they should be retained in subsequent analyses.

Next, the composite scores of the factors for the Heckman two-step technique and regression analysis were calculated. Subsequently, the Heckman two-step technique was used to scrutinize the causal correlation from the acceptance of managerial accounting practices in business to organizational performance allowing for the influences of environmental uncertainty and organizational characteristics on the likelihood of accepting managerial accounting practices in business.

**Table 2:** The first step of Heckman technique

<table>
<thead>
<tr>
<th>PRS</th>
<th>$\beta$</th>
<th>Std. Err.</th>
<th>z</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENY</td>
<td>0.281</td>
<td>0.051</td>
<td>4.70</td>
<td>0.000</td>
</tr>
<tr>
<td>ORS</td>
<td>0.427</td>
<td>0.050</td>
<td>3.88</td>
<td>0.000</td>
</tr>
<tr>
<td>$C_0$</td>
<td>-0.002</td>
<td>0.049</td>
<td>-0.042</td>
<td>0.96</td>
</tr>
</tbody>
</table>

Prob > chi$^2 = 0.000$, Pseudo $R^2 = 0.313$

The Heckman technique of two steps is applied to take potential sample selection bias into consideration, consisting of two stages. The first stage is to develop a selection equation. A probit model for all the observations (adopters and non-adopters of managerial accounting practices in business) is applied to assess the influences of environmental uncertainty and organizational characteristics on the likelihood of adopting managerial accounting practices in business. The estimations of $\gamma$ in the probit model are employed to generate the consistent coefficients of the inverse Mills ratio. The second stage, where the consistent coefficients of the inverse Mills ratio has been included into the research model, is to estimate the outcome equation with OLS, which only utilizes uncensored observations for analyses.

The outcomes obtained from the Heckman two-step technique are exhibited in Tables 2 and 3. The outcomes in Table 2 were gained from the selection equation (the first stage). The probability of accepting managerial accounting practices in business is determined by environmental uncertainty and organizational characteristics at the 1% significance level (Pvalue = 0.000) with the estimates of 0.281 and 0.427 respectively. Furthermore, the fit of model is statistically significant at the 1% level (Prob > chi$^2 = 0.000$). Pseudo $R^2$ is 0.313, implying that the likelihood of accepting managerial accounting practices in business is explained by environmental uncertainty and organizational characteristics in 31.3%. The abovementioned findings reveal that organizational characteristics are stronger in affecting the probability of adopting managerial accounting practices than environmental uncertainty is. This stage allowed to compute the consistent coefficients of the inverse Mills ratio (INMILRA). After INMILRA had been included into the outcome equation, the second stage was carried out. The outcomes from the second step are presented in Table 3.
Table 3: The second step of Heckman technique with INMILRA

<table>
<thead>
<tr>
<th>ORE</th>
<th>β</th>
<th>Std. Err.</th>
<th>t</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADS</td>
<td>0.030</td>
<td>0.073</td>
<td>0.408</td>
<td>0.684</td>
</tr>
<tr>
<td>INMILRA</td>
<td>0.148</td>
<td>0.072</td>
<td>2.057</td>
<td>0.041</td>
</tr>
<tr>
<td>C₀</td>
<td>4.009</td>
<td>0.058</td>
<td>69.069</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Prob > F = 0.013, R² = 0.714

The findings indicate the outcome equation obtains the model fit at the 5% significance value. The estimation of INMILRA (0.148) is different from 0 at the 5% significance level, indicating there exists sample selection bias in the research data. It can suggest environmental uncertainty and organizational characteristics likely interferes in the effect of adopting managerial accounting practices in business on organizational performance. The intervention of environmental uncertainty and organizational characteristics leads to the statistical insignificance of the link between the adoption of managerial accounting practices in business and organizational performance.

To make an additional comparison, the outcome equation was run using the OLS regression without INMILRA. The outcomes are exhibited in Table 4. There is difference between influential coefficients of accepting managerial accounting practices on organizational performance in Table 3, compared with Table 4, wherein the influential coefficient of adopting managerial accounting practices in business on organizational performance is bigger for the regression without INMILRA (0.122) than that with INMILRA (0.030). The evidence implies the effect of accepting managerial accounting practices on organizational performance, if potential sample selection bias is not considered (Table 4), is larger than if potential sample selection bias is included into the model (Table 3). In addition, the impact of accepting managerial accounting practices on organizational performance becomes insignificant when INMILRA is taken into account. Accordingly, sample selection bias could make the outcomes from the OLS regression become distorted. If potential sample selection bias is not considered, the hypothesis H1 is statistically supported. However, when potential sample selection bias is taken into consideration, the hypothesis H1 becomes statistically unsupported. Therefore, scholars sought to consider sample selection bias, when facing sample selection problem, so that the research results are more truly generated.

Table 4: OLS regression without INMILRA

<table>
<thead>
<tr>
<th>ORE</th>
<th>β</th>
<th>Std. Err.</th>
<th>t</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADS</td>
<td>0.122</td>
<td>0.058</td>
<td>2.111</td>
<td>0.036</td>
</tr>
<tr>
<td>C₀</td>
<td>4.009</td>
<td>0.058</td>
<td>68.692</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Prob > F = 0.036, R² = 0.502

Conclusions

The casual association from the adoption of managerial accounting practices to organizational performance has been considered by earlier research. Nevertheless, to the best of my knowledge, no research had discovered the casual relation allowing for sample selection bias. The current project utilizes the Heckman two-step technique to scrutinize the impact of...
accepting managerial accounting practices on organizational performance, where it considers the effects of environmental uncertainty and organizational characteristics on the likelihood of adopting managerial accounting practices in business.

The current study makes some contributions to the managerial accounting literature. The evidence reveals there exists sample selection bias in the data. And also there is difference between the effects of adopting managerial accounting practices in business on organizational performance if potential sample selection bias is not considered in comparison with if potential sample selection bias is considered. The impact of adopting managerial accounting practices on organizational performance becomes insignificant if potential sample selection bias is considered by including environmental uncertainty and organizational characteristics into the research model of managerial accounting practices and organizational performance.

The findings offer managerial accountingscholars with an insight into the significance of sample selection bias problem if they scrutinize the effect of adopting managerial accounting practices in business on organizational performance. The problem of sample selection bias can distort the research findingstobe inaccurate. In other words, when entered in the research model, environmental uncertainty and organizational characteristics make the link between the adoption of managerial accounting practices and organizational performance become insignificant.

The findings are also valuable toexecutives by leading them to well understand the casual connection from the acceptance of managerial accounting practices to organizational performance with the existence of sample selection bias in the research model when considering the intervention of environmental uncertainty and organizational characteristics into managerial accounting practices. Consequently, they could deliver better decisions on adopting managerial accounting practices which can lead to the best organizational performance.

References


